STORMWATER REPORT

BATTERSON PARK IMPROVEMENTS
76 BATTERSON PARK ROAD
FARMINGTON, CONNECTICUT

SEPTEMBER 2024

Owner/Applicant:

CITY OF HARTFORD
550 Main Street
Hartford, CT 06103

BSC Job Number: 83885.01

Prepared by:

BSC GROUP
BUILD | SUPPORT | CONNECT

655 Winding Brook Drive
Glastonbury, CT 06033

TABLE OF CONTENTS

SECTION 1.0

PROJECT INFORMATION

1.01 PROJECT DESCRIPTION

The City of Hartford, the "Applicant", is proposing to redevelop the existing Batterson Park located at 95 Batterson Park Road in Farmington, Connecticut. The approximately 171.65-acre property is bounded by Batterson Park Road to the north, Two Mile Road to the east, Batterson Park Pond to the south, and Fienemann Road to the west. The site is currently a former park facility with associated buildings and paved walkways and parking areas. The majority of the property is comprised of Batterson Park Pond and the undeveloped wooded area to the west.

The project is proposing to completely renovate the existing park to construct a new public park complex, which will generally include public restrooms, storage and maintenance building, pavilions, paved parking for 100 vehicles, paved multi-use trails, playground, stormwater management systems, and utilities.

There are numerous wetlands located on the property, as well as Batterson Park Pond. The wetlands and banks were delineated by BSC Group ecologists. Additional information is provided in the Wetland Report. A small portion of the site is located within FEMA Zone A. The majority of the proposed improvements will take place within the local 150-foot regulatory upland review area.

The proposed project has been designed to comply with the 2024 Connecticut Stormwater Quality Manual (WQM), 2024 Connecticut Guidelines for Soil Erosion & Sediment Control (E&S Manual), 2000 Connecticut Department of Transportation Drainage Manual (CTDOT Drainage Manual), and local municipal standards.

1.02 PRE-DEVELOPMENT CONDITIONS

The existing site is previously developed, consisting of mostly impervious pavement, buildings, and filled grass/lawn areas. Site topography generally slopes towards Batterson Park Pond from the north and west perimeter of the property. There is no known stormwater management system on the site. The majority of surface runoff appears to flow overland into the nearest wetland, which ultimately discharges to Batterson Park Pond. It should be noted that Batterson Park Pond is controlled via a spillway that regulates both elevation and discharge.

Review of the USDA NRCS Web Soil Survey indicates that the onsite soils are generally poorly drained loams and silt loams with high groundwater. The hydrologic soil groups are classified as either "C" or "D". The Web Soil Survey is included in Appendix C.

1.03 POST-DEVELOPMENT CONDITIONS

As a redevelopment project located in soils poorly suited for stormwater infiltration, the intent of the proposed stormwater management system is to meet the requirements of the WQM to the maximum extent practicable.

The proposed stormwater management for the project will primarily focus on overland flow and water quality. The site has been graded to direct surface runoff to one of five separate above-ground bio-retention basins. Bio-retention basins provide primary water quality treatment by allowing total suspended solids (TSS) to settle out prior to discharge, as well as providing pollutant and bacteria removal through the underlying soil media. The basins have all been designed with overflow systems to safely pass larger storm events. In accordance with the WQM, surface runoff from impervious surfaces subject to potential pollutant loads will be directed to a forebay for pre-treatment prior to entering the bio-retention basin.

Stormwater runoff from building roofs will be piped directly into the nearest bio-retention basin.

The proposed stormwater management systems are focused on the central park complex area, which is where the majority of new impervious area and ground disturbance will take place. Along the proposed multi-use trail that connects the park to the CT DEEP boat launch to the southwest, there are no stormwater management systems proposed in order to minimize tree removals, grading, and ground disturbance.

SECTION 2.0

DRAINAGE SUMMARY

2.01 Stormwater Standard 1 – Runoff Volume and Pollutant Reduction

Per the WQM Stormwater Management Standard #1, the project should *preserve pre-development hydrology and pollutant loads to protect water quality and maintain groundwater recharge.*

Water Quality Volume

The goal of this section of Stormwater Standard #1 is to for new developments to retain 100% of the water quality volume (WQV) onsite and redevelopments to retain 50% of the WQV onsite. The volume of runoff required to be retained onsite is the required retention volume (RRV).

The "redevelopment" project proposes to meet this requirement through the implementation of the following measures:

1. Five above-ground bioretention basins are proposed to provide RRV for each associated catchment area. The systems have been designed to be as shallow as possible while providing storage below the lowest outlet greater than or equal to 50% of the WQV. The receiving soils are classified as Hydrologic Soil Group "C" and "D". Therefore, significant infiltration of stormwater is not feasible for this site. RRV will be met by providing shallow retention areas for surface runoff that allow larger events to safely bypass offsite via pipe or armored spillway.
2. The remainder of the site, most of which is pervious, will sheet flow overland offsite towards Batterson Pond.

Table 2-1

BMP Catchment	Imp. Area (ac)	WQV Required (cf)	WQV Treated (cf)
Pond 1	1.39	3,206	4,403
Pond 1A	Same as above	Same as above	639
Pond 2	0.22	626	378
Pond 2A	Same as above	Same as above	433
Pond 3	0.04	161	199
Pond 4	0.06	154	383
Pond 5	0.46	1,432	2,379
Uncontrolled	0.45	2,026	0
Total Site	2.62	7,605	8,814

Table 2-1 above indicates that the total treated and retained WQV for the site will exceed the required WQV. Computations for WQV are included in Section 6.01.

TSS, Pollutant, and Nutrient Removal

The goal of this section of Stormwater Standard #1 is for projects to meet the minimum average annual pollutant load reductions of stormwater runoff in accordance with Table 4-3. Projects that meet the RRV are assumed to meet the pollutant reduction standards.

2.02 Stormwater Standard 2 – Stormwater Runoff Quantity Control

Per the WQM Stormwater Management Standard #2, the project should *not exceed pre-development peak flow rates and manage the volume and timing of runoff to prevent downstream flooding, channel erosion, and other adverse impacts, and safely convey flows into, through, and from structural stormwater BMPs.*

Watershed modeling was performed using HydroCAD Stormwater Modeling Software version 10.20, a computer aided design program that combines SCS runoff methodology with standard hydraulic calculations. A model of the site's hydrology was developed for both pre- and post-development conditions to assess the effects of the proposed development on the project site and surrounding areas.

Stormwater runoff was modeled using rainfall data from the NOAA Atlas 14 Point Precipitation Frequency Database. A Storm Type of NOAA10, Storm Curve D, 24-hour duration was used for each rainfall event.

Table 2-2

Storm Frequency	**NOAA 14++ Rainfall (Inches)**
2-year	3.32
10-year	5.32
25-year	6.56
100-year	8.48

The peak rates of runoff for pre- and post-development conditions are provided in the following table:

Table 2-3

Storm Discharge Comparison				
Watershed	Storm Event	Existing (cfs)	Proposed (cfs)	Difference (cfs)
1	2-year	29.71	31.90	+2.19
	10-year	66.02	70.52	+4.50
	25-year	89.75	95.02	+5.27
	100-year	127.06	133.36	+6.30

The above table demonstrates that the peak runoff rate for each design storm will marginally increase from pre- to post-development by approximately 5 to 8 percent. As a redevelopment project, the project is proposing to address peak runoff mitigation to the maximum extent practicable. Considering that the site is located at the bottom of the Batterson Park Pond watershed, and that the pond is dam-controlled, no detrimental downstream impacts are anticipated as a result of these marginal increases in peak runoff rate.

2.03 Stormwater Standard 3 – Construction Soil Erosion and Sediment Control

Per the WQM Stormwater Management Standard #3, the project should *design, install, and maintain effective soil erosion and sedimentation control measures during construction and land disturbance activities. Consideration for final site stabilization should also be included during the development of a SESC Plan.*

An Erosion & Sedimentation Control Plan, construction drawings, and construction details have been developed for the proposed project to demonstrate compliance with this Standard and the CT E&S Manual. Provisions for operations and maintenance during construction are included in Section 3 of this report.

2.04 Stormwater Standard 4 – Post-Construction Operation and Maintenance

Per the WQM Stormwater Management Standard #4, the project should *perform long-term maintenance of structural stormwater management systems to ensure that they continue to function as designed and implement operational source control and pollution prevention measures.*

Provisions for post-construction operations and maintenance are included in Section 4 of this report.

2.05 Stormwater Standard 5 – Stormwater Management Plan

Per the WQM Stormwater Management Standard #5, the project should *document how the proposed stormwater management measures meet the stormwater management standards, performance criteria, and design guidelines.*

The intent of this Stormwater Management Report is to meet Stormwater Standard #5 and demonstrate compliance with the WQM for the proposed project.

2.06 Conclusion

The project has been designed in accordance with local standards, the CT DEEP WQM, CT DEEP E&S Manual, and CTDOT Drainage Manual. The Stormwater Standards have been met to the maximum extent practicable for the proposed redevelopment project.

SECTION 3.0

CONSTRUCTION PERIOD EROSION AND SEDIMENTATION CONTROL PLAN

3.0 CONSTRUCTION PERIOD EROSION AND SEDIMENTATION CONTROL PLAN

The objective of temporary erosion control during construction is to minimize the area of exposed soil, control runoff rate and direction, and provide for rapid stabilization of exposed areas. Prior to any construction activity, trenched silt fence and/or staked hay bales will be placed down gradient of the proposed work areas. The fence/barrier will provide some sediment control, as well as provide a limit of construction activity.

Construction entrances will be utilized to remove sediment from construction vehicle tires and prevent it from being tracked onto adjoining paved roadway areas.

Any excavated and stockpiled topsoil will be contained within staked hay bales and silt fence. Topsoil locations have been shown on the Erosion and Sediment Control (E&S) Plan. Erosion-prone areas to be left exposed for extended periods (>30 days) will be mulched and seeded for temporary vegetative cover. After construction, all exposed areas will be graded, mulched and re-vegetated with appropriate ground cover. The silt fence and/or hay bales will remain in place until groundcover is established.

Filter inserts will be used to collect sediment that may be carried in the storm runoff during construction. Filter inserts will be placed in each existing catch basin, yard drain, dry well, and in each new catch basin during construction and until all disturbed areas of the site have been stabilized. Replacement of the insert shall be as often as necessary to prevent excessive ponding due to clogged fabric.

Temporary diversion swales may be constructed to direct storm runoff away from disturbed areas. Stone or hay bale check dams will be installed at intervals along the swales to reduce the runoff velocity. In areas of excessive grade changes, temporary pipe slope drains will be constructed to convey runoff flows down the face of slopes without causing erosion problems. The diversion swales will outlet into temporary sediment traps.

Dewatering settling basins will be utilized where groundwater is encountered in trenching, foundation excavation, or any other excavation. The dewatering wastewaters will be infiltrated into the ground or discharged, after filtration into the nearest catch basin.

Throughout all phases of construction, the erosion control measures will be routinely inspected and cleaned, repaired, and replaced as necessary. See Section 4.0 entitled “Operation and Maintenance Plan” for more details.

Throughout the construction process, extra stocks of hay bales and silt fence will be kept on-site to replace those that become damaged and/or deteriorated.

Any erosion and sediment control measures, which, upon inspection, are found to be damaged, deteriorated or not functioning properly, will be repaired, replaced, and corrected immediately after inspection.

Areas which are mulched or seeded for temporary vegetative cover will be inspected for proper cover at the end of each workday if precipitation is forecast and prior to weekends. Additional seeding or mulch will be placed as necessary.

The temporary erosion and sediment control systems will not be removed until all stormwater drainage system components are in place, cleaned and working properly and until permanent vegetative cover and other stabilization measures are established.

The following maintenance procedures shall be followed by the Contractor for temporary and permanent erosion and sedimentation measures and stormwater treatment systems installed during the construction period:

a. Dust Control: Moisten disturbed soil areas with water periodically or use a non-asphaltic soil tackifier to minimize dust.

b. Temporary Seeding: Inspect weekly and within 24 hours of a storm with a rainfall generating a discharge. Continue inspection until vegetation is firmly established.

c. Permanent Seeding: Inspect seeded areas weekly and within 24 hours after a storm with a rainfall generating a discharge. Continue inspection until vegetation is firmly established.

d. Temporary Soil Protection: Inspect seeded areas weekly and within 24 hours after a storm with a rainfall generating a discharge.

e. Temporary Erosion Control Mat: Inspect mats weekly and within 24 hours after a storm with a rainfall generating a discharge.

f. Temporary Filter Inserts: Inspect the fabric at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. Check the fabric for structural soundness (i.e. tears), proper anchoring/alignment within the grate and ability to drain runoff (i.e. percent of clogging by sediment). Remove the sediment every week, or sooner if ponding is excessive. Each time the sediment is removed, replace the section of fabric removed with a new section. Do not remove the sediment and reuse the same section of fabric.

g. Hay Bale/ Silt Fence Barrier: Inspect the barrier at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. For dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits when the depth reaches one half the barrier heights. Repair or replace a barrier within 24 hours of observed failure. Maintain the barrier until the contributing disturbed area is stabilized.

h. Construction Entrance/Exit Pad: Maintain the pad in a condition that will prevent tracking and washing of sediment onto paved surfaces. Place additional clean gravel on top of gravel that has become silted or remove the silted gravel and replace the gravel to the depth removed with clean gravel, as conditions warrant. Remove immediately all sediment spilled, dropped, washed, or tracked onto paved surfaces. Roads adjacent to the construction site shall be cleaned at the end of each day by hand sweeping or sweeper truck.

i. Dewatering Settling Basin (if used): Inspect the basin at least every two hours during periods of use. Remove accumulated sediments when the volume equals one half the provided storage volume.

j. Existing Catch Basins and Sumps: Inspect the sediment traps as specified in f. above. After final removal of the sediment traps at the end of construction, clean the sump of all silt and debris.

k. New Catch Basins and Sumps: As new catch basins are constructed; a sediment filter basket shall be installed in the unit and a sediment barrier installed around the grate. Inspect the basket and barrier weekly and within 24 hours after a storm with a rainfall generating a discharge. After stabilization of the drainage area entering the catch basin, remove the trap and barrier and clean the basin sump of all silt and debris.

l. Stone or Hay Bale Check Dams: Inspect the check dam at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. Remove the sediment deposits when the depth reaches one half the check dam heights. Repair or replace a check dam within 24 hours of observed failure. Maintain the check dam until the contributing disturbed area is stabilized.

m. Waterbars: Inspect the waterbars daily when exposed to vehicle traffic and within 24 hours after the end of a storm with a rainfall generating a discharge. Repair and reshape the waterbar immediately after observing any damages. Remove the sediment deposits when the depth reaches one half the waterbar heights. Maintain the waterbar until the contributing disturbed area is stabilized.

n. Temporary Diversion Swales & Pipe Slope Drains: Inspect at least once a week and within 24 hours after the end of a storm with a rainfall generating a discharge. Inspect daily when construction activities are in close proximity to the swales or slope drains. Repair damaged areas within 24 hours of observed failure. Maintain the swales and slope drains until the contributing disturbed area is stabilized.

o. Temporary Stockpiles: Inspect temporary stockpiles at the end of each workday to ensure that tarps are in place and secured. Temporary stockpiles that are expected to be inactive for more than 30 days should be temporarily seeded (see above).

p. Temporary Sediment Traps: Inspect monthly and within 24 hours after a storm with a rainfall generating a discharge. Sediment and oil shall be removed when the storage volume is reduced by one half, or at least every 6 months during construction.

During construction, the Contractor shall be required to remove accumulated sediment from sediment control measures and water quality measures. Sediment shall be disposed of off-site in a manner and location approved by local and state agencies. Temporary storage of sediment on-site is permissible if it is protected from erosion and stockpiled in a manner that will prevent it from being carried by erosion into adjacent properties or resource areas.

Temporary sediment traps may be removed if the contributing drainage area is stabilized. The area shall be re-graded to match original grades or proposed grades as shown on the plans. The disturbed area shall be temporarily, or permanently seeded and mulched if the area is not to be paved.

For hay bale barriers, the stakes may be removed as soon as the upslope areas have been permanently stabilized. Unless proposed construction requires otherwise, any accumulated sediment shall be left in place and the hay bales left in place or broken up for ground cover.

Upon the stabilization of the contributing drainage area, silt fence shall be inspected for sediment accumulation prior to removal. For sediment depths greater than 6", the sediment shall be re-graded or removed. The silt fence shall be removed by pulling the support posts and cutting the geotextile at the ground level. Re-grade or remove the sediment as necessary and stabilize the disturbed soils by placing temporary or permanent seeding and mulch.

When dewatering has been completed, remove the hay bale barrier, sediment and stone, as appropriate, and re-grade the area to original or proposed grade. Stabilize the disturbed area with temporary or permanent seed and mulch.

After the drainage areas to the new and existing catch basins have been stabilized, the Contractor shall be required to clean all sumps and hoods of debris and silt. In addition, within the limits of work, the Contractor shall clean all storm drain piping of collected silt and debris by flushing with water. If the storm system discharges to ground, a hay bale and silt fence barrier must remain in place at each outfall to capture any sediment or debris carried down by the flushing. If the storm drainage system discharges into a public or private drainage collection system, the Contractor must install a means of collecting debris and filtering the sediment from the flushing water in the on-site storm system before discharge to the existing storm system.

SECTION 4.0

OPERATION AND MAINTENANCE PLAN

4.0 OPERATION AND MAINTENANCE PLAN

As required by Stormwater Standard #4, this Operation and Maintenance Plan has been developed for source control and pollution prevention at the site after construction.

MAINTENANCE RESPONSIBILITY

After construction is completed and accepted by the Owner, it shall be the responsibility of the Owner to maintain all drainage and water quality structures. In addition, the following inspection and maintenance guidelines shall be the responsibility of the Owner, or the Owner's representative, beginning the first year period following construction completion and acceptance, and shall be followed each year thereafter.

GOOD HOUSEKEEPING PRACTICES

The site to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside. Inspect on a regular basis not to exceed weekly for litter and debris.

REQUIREMENTS FOR ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BMPS

All stormwater BMPs are to be inspected and maintained as follows;

Parking Lot and Driveway Sweeping

At least twice per year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.

Landscaped Areas

Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.

Deep Sump Catch Basins

Shall be inspected semi-annually and cleaned when the sump is one-half full of silt and/or debris.

Bio-Retention Basins

At a minimum, inspect after major storms (1 inch or more of precipitation) during the first six months following construction, then inspect annually. Remove trash and organic debris (leaves) in the Spring and Fall. Maintain vegetated filter strip and/or grassed side slopes. Remove accumulated sediment from the system when accumulation exceeds 1 inch or when drawdown time exceeds 48 hours after the end of a storm event, in which case the soil media shall be replaced in accordance with the CT Stormwater Quality Manual.

Dry Water Quality Swale

At a minimum, inspect after major storms (1 inch or more of precipitation) during the first six months following construction, then inspect annually. Remove trash and organic debris (leaves) in the Spring and Fall. Maintain vegetated filter strip and/or grassed side slopes. Remove accumulated sediment from the system, including at each check dam, when accumulation exceeds 1 inch or when drawdown time exceeds 48 hours after the end of a storm event, in which case the soil media shall be replaced in accordance with the CT Stormwater Quality Manual.

PROVISIONS FOR SOLID WASTE MANAGEMENT (SITE TRASH)

Trash will be placed in on-site dumpsters and the Owner will make provisions for its regular and timely removal.

SNOW DISPOSAL AND PLOWING PLANS

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance. For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious areas along the shoulder of the roadway and development as windrowed by plows.

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater basins. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.
- In significant storm events, the melting or off-site trucking of snow may be implemented. These activities shall be conducted in accordance with all local, state and federal regulations.
- Snow shall be removed from the areas around on-site fire-hydrants to maintain emergency access to hydrants at all times. Removable flags or markers should be placed on hydrants to allow snow removal crews to more easily locate hydrants and not damage them with plows or other snow removal equipment.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

The Owner will be responsible for sanding and salting the site. No storage on site.

STREET SWEEPING SCHEDULES

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter.

1) Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement.
2) Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed.
3) Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression.

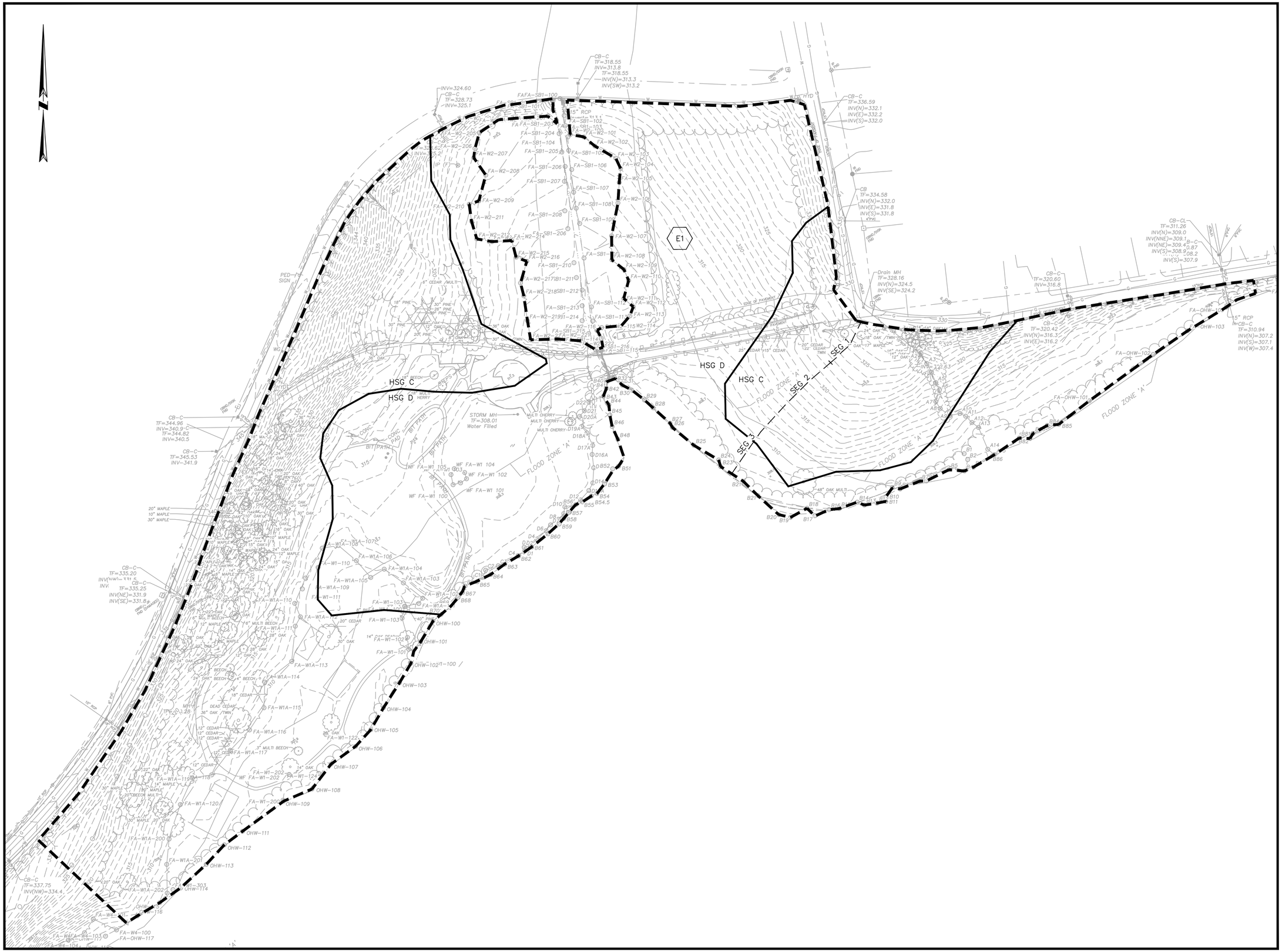
Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

It is recommended that street sweeping of the parking areas occur four times a year, including once after the spring snow melt.

SECTION 5.0

HYDROLOGY CALCULATIONS

5.01 EXISTING WATERSHED PLAN



IMPROVEMENTS TO BATTERSON PARK

BATTERSON PARK ROAD

IN

FARMINGTON
CONNECTICUT

EXISTING WATERSHED AREA MAP

SEPTEMBER 19, 2024

REVISIONS:

NO.	DATE	DESC.

PREPARED FOR:

CITY OF HARTFORD
550 MAIN STREET
HARTFORD, CT 06103

BSC GROUP
BUILD | SUPPORT | CONNECT
665 Winding Brook Drive
Glastonbury,
Connecticut 06033
860 652 8227

SCALE: 1" = 80'

40 80 160 FEET

FILE:

DWG.:

JOB. NO: 83885.01

FIG. 501

5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)

Flow to Batterson Park Pond

Batterson Park Pond

Subcat Reach Pond Link

Routing Diagram for 008388501-EWAM
Prepared by BSC Group, Printed 9/25/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NOAA10 24-hr	D	Default	24.00	1	3.32	2
2	10-Year	NOAA10 24-hr	D	Default	24.00	1	5.32	2
3	25-Year	NOAA10 24-hr	D	Default	24.00	1	6.56	2
4	100-Year	NOAA10 24-hr	D	Default	24.00	1	8.48	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.850	74	>75% Grass cover, Good, HSG C (E1)
7.650	80	>75% Grass cover, Good, HSG D (E1)
2.960	73	Brush, Good, HSG D (E1)
2.400	98	Paved parking, HSG D (E1)
2.830	70	Woods, Good, HSG C (E1)
3.140	77	Woods, Good, HSG D (E1)
25.830	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
9.680	HSG C	E1
16.150	HSG D	E1
0.000	Other	
25.830		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	6.850	7.650	0.000	14.500	>75% Grass cover, Good	E1
0.000	0.000	0.000	2.960	0.000	2.960	Brush, Good	E1
0.000	0.000	0.000	2.400	0.000	2.400	Paved parking	E1
0.000	0.000	2.830	3.140	0.000	5.970	Woods, Good	E1
0.000	**0.000**	**9.680**	**16.150**	**0.000**	**25.830**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 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 E1: Flow to Batterson Park Runoff Area=25.830 ac 9.29% Impervious Runoff Depth>1.36"
Flow Length=385' Tc=15.4 min CN=78 Runoff=29.71 cfs 2.917 af

Reach 2R: Batterson Park Pond Inflow=29.71 cfs 2.917 af
Outflow=29.71 cfs 2.917 af

Total Runoff Area = 25.830 ac Runoff Volume = 2.917 af Average Runoff Depth = 1.36"
90.71% Pervious = 23.430 ac 9.29% Impervious = 2.400 ac

Summary for Subcatchment E1: Flow to Batterson Park Pond

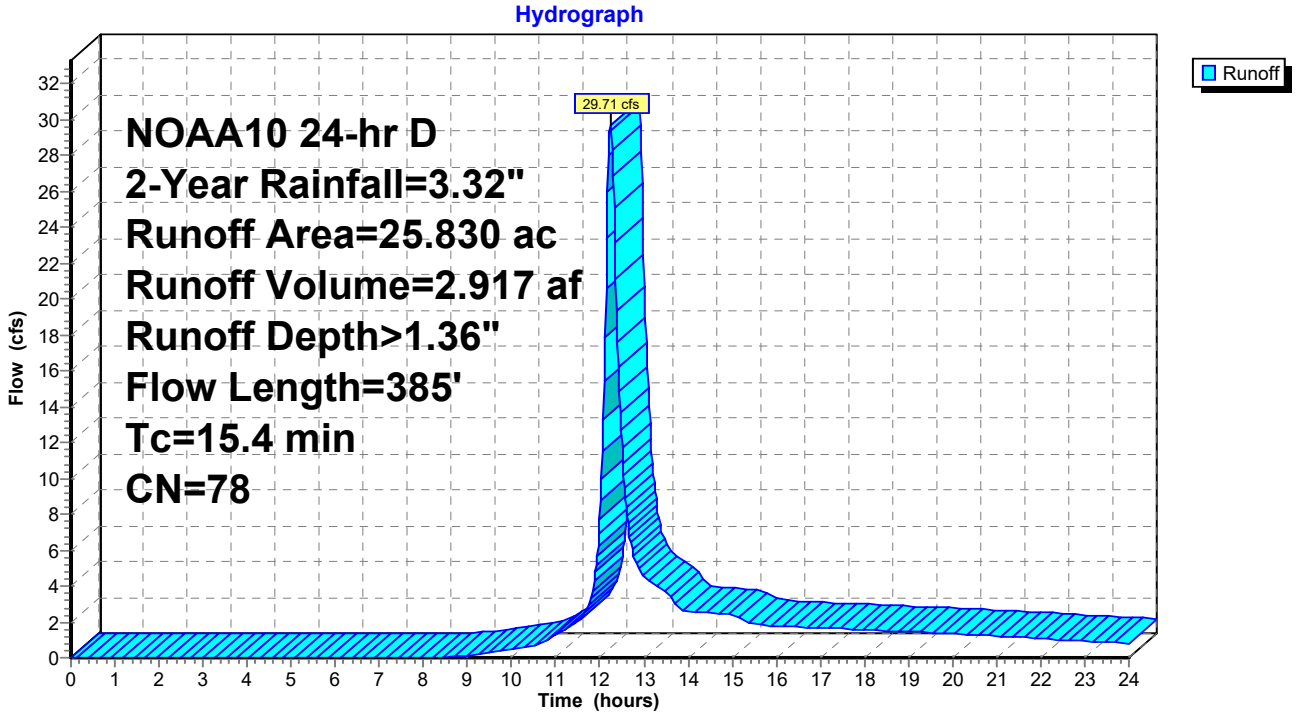
Runoff = 29.71 cfs @ 12.24 hrs, Volume= 2.917 af, Depth> 1.36"
Routed to Reach 2R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
6.850	74	>75% Grass cover, Good, HSG C
7.650	80	>75% Grass cover, Good, HSG D
2.830	70	Woods, Good, HSG C
3.140	77	Woods, Good, HSG D
2.960	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
2.400	98	Paved parking, HSG D
25.830	78	Weighted Average
23.430		90.71% Pervious Area
2.400		9.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
1.3	285	0.0540	3.74		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment E1: Flow to Batterson Park Pond



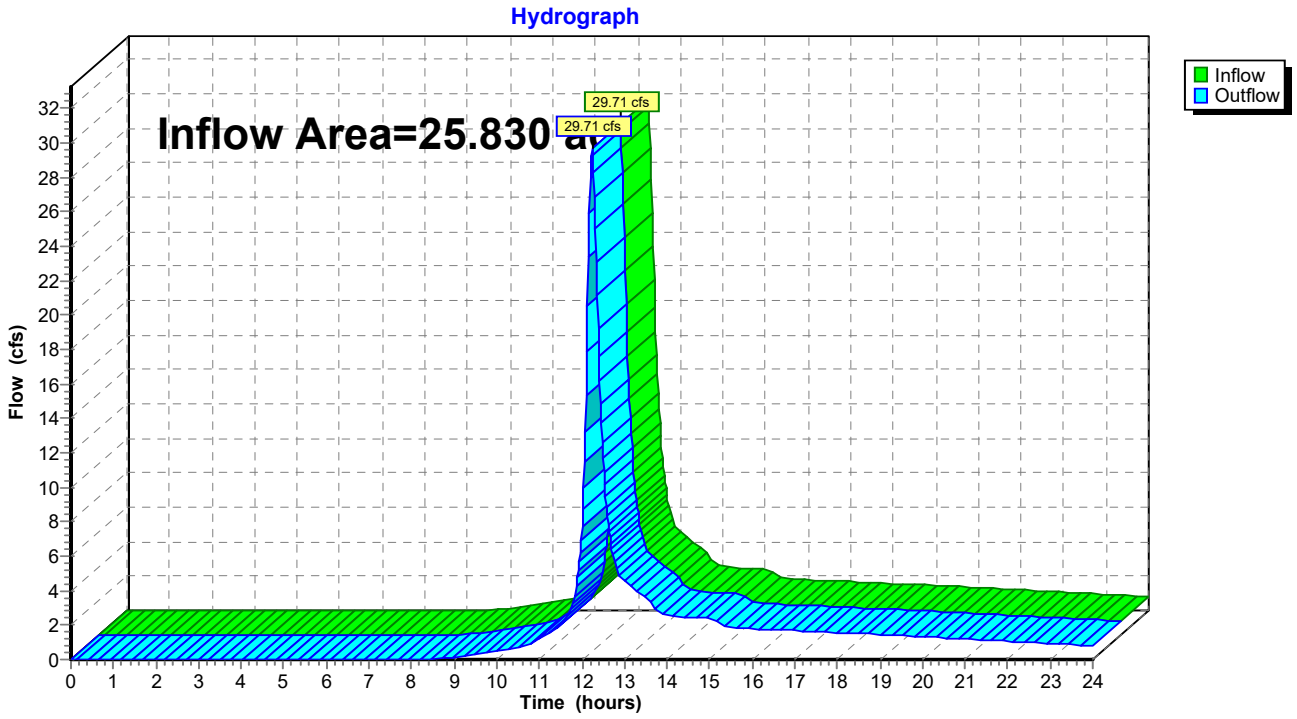
Summary for Reach 2R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 9.29% Impervious, Inflow Depth > 1.36" for 2-Year event
Inflow = 29.71 cfs @ 12.24 hrs, Volume= 2.917 af
Outflow = 29.71 cfs @ 12.24 hrs, Volume= 2.917 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Batterson Park Pond



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 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 E1: Flow to Batterson Park Runoff Area=25.830 ac 9.29% Impervious Runoff Depth>2.97"
Flow Length=385' Tc=15.4 min CN=78 Runoff=66.02 cfs 6.398 af

Reach 2R: Batterson Park Pond Inflow=66.02 cfs 6.398 af
Outflow=66.02 cfs 6.398 af

Total Runoff Area = 25.830 ac Runoff Volume = 6.398 af Average Runoff Depth = 2.97"
90.71% Pervious = 23.430 ac 9.29% Impervious = 2.400 ac

Summary for Subcatchment E1: Flow to Batterson Park Pond

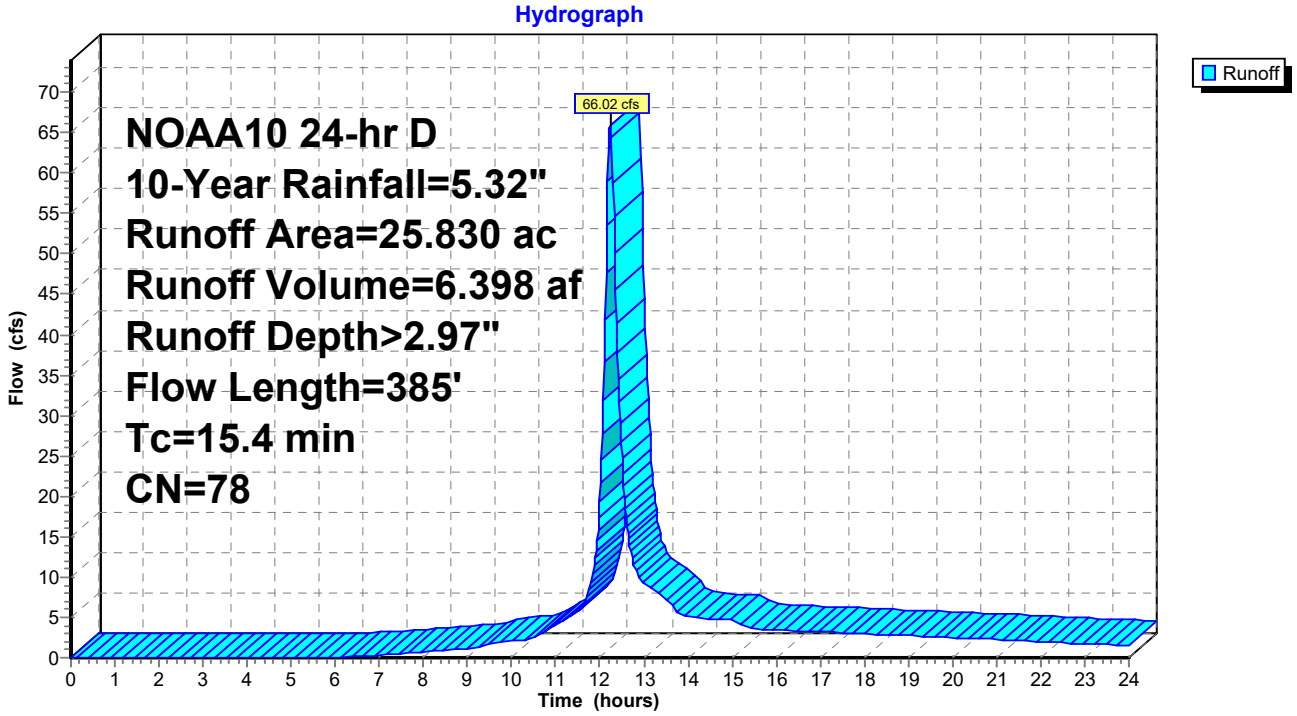
Runoff = 66.02 cfs @ 12.24 hrs, Volume= 6.398 af, Depth> 2.97"
Routed to Reach 2R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
6.850	74	>75% Grass cover, Good, HSG C
7.650	80	>75% Grass cover, Good, HSG D
2.830	70	Woods, Good, HSG C
3.140	77	Woods, Good, HSG D
2.960	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
2.400	98	Paved parking, HSG D
25.830	78	Weighted Average
23.430		90.71% Pervious Area
2.400		9.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
1.3	285	0.0540	3.74		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment E1: Flow to Batterson Park Pond



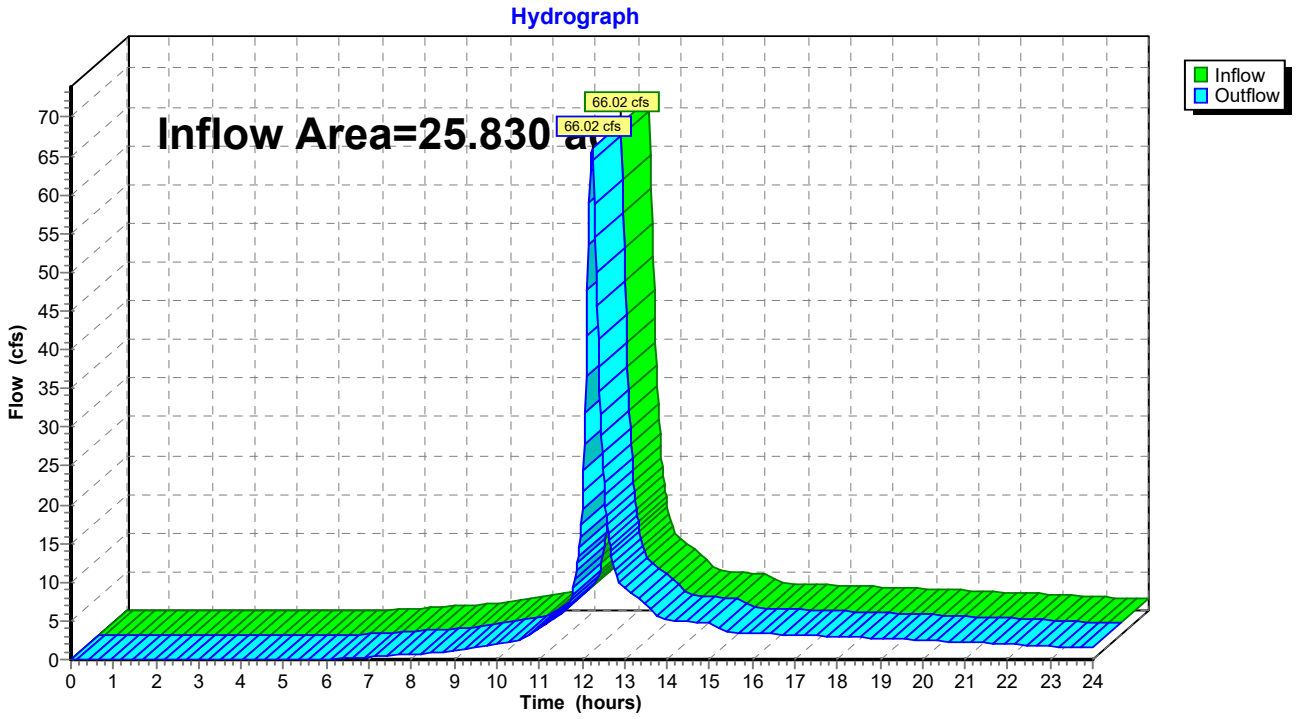
Summary for Reach 2R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 9.29% Impervious, Inflow Depth > 2.97" for 10-Year event
Inflow = 66.02 cfs @ 12.24 hrs, Volume= 6.398 af
Outflow = 66.02 cfs @ 12.24 hrs, Volume= 6.398 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Batterson Park Pond



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 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 E1: Flow to Batterson Park Runoff Area=25.830 ac 9.29% Impervious Runoff Depth>4.06"
Flow Length=385' Tc=15.4 min CN=78 Runoff=89.75 cfs 8.742 af

Reach 2R: Batterson Park Pond Inflow=89.75 cfs 8.742 af
Outflow=89.75 cfs 8.742 af

Total Runoff Area = 25.830 ac Runoff Volume = 8.742 af Average Runoff Depth = 4.06"
90.71% Pervious = 23.430 ac 9.29% Impervious = 2.400 ac

Summary for Subcatchment E1: Flow to Batterson Park Pond

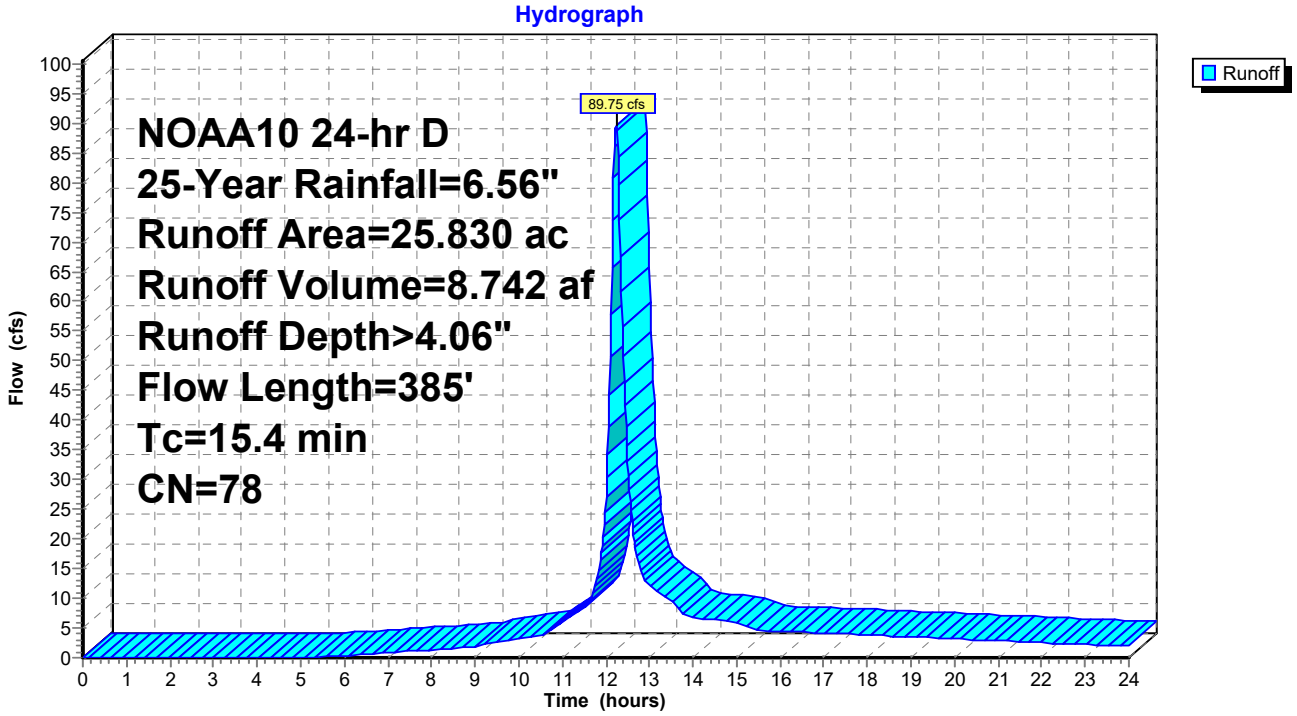
Runoff = 89.75 cfs @ 12.24 hrs, Volume= 8.742 af, Depth> 4.06"
Routed to Reach 2R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
6.850	74	>75% Grass cover, Good, HSG C
7.650	80	>75% Grass cover, Good, HSG D
2.830	70	Woods, Good, HSG C
3.140	77	Woods, Good, HSG D
2.960	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
2.400	98	Paved parking, HSG D
25.830	78	Weighted Average
23.430		90.71% Pervious Area
2.400		9.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
1.3	285	0.0540	3.74		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment E1: Flow to Batterson Park Pond



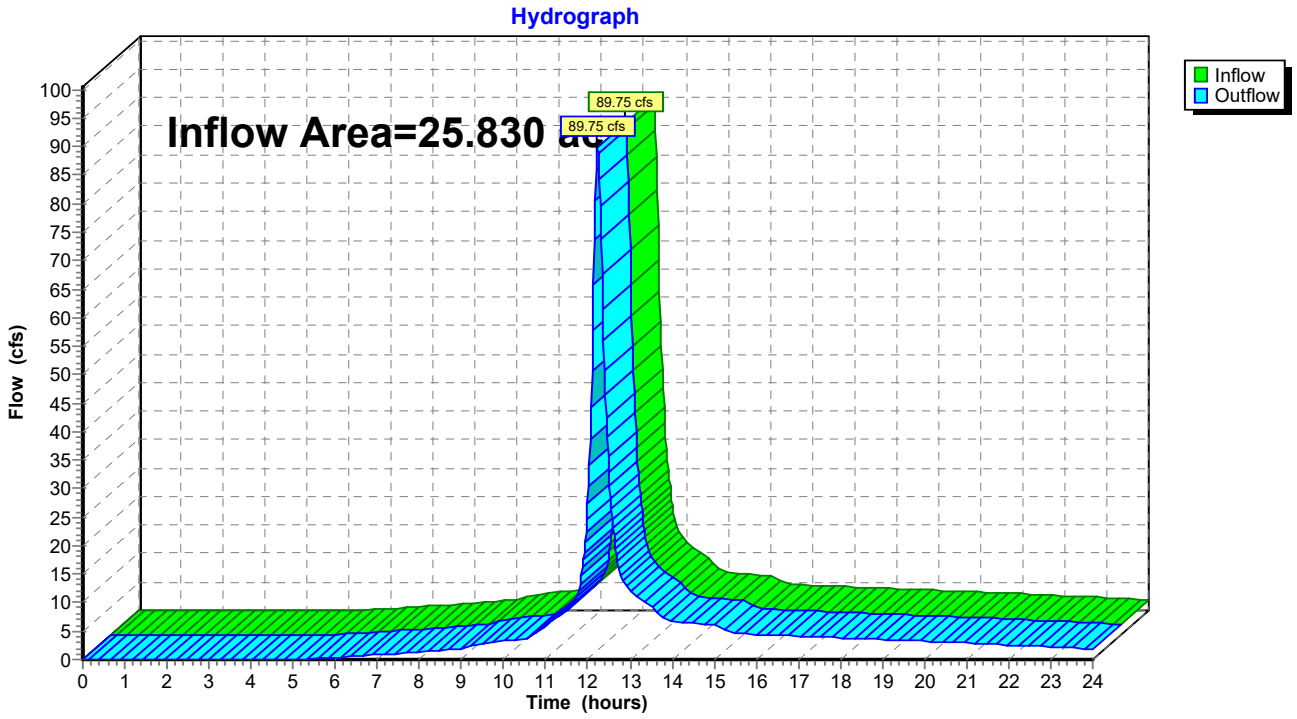
Summary for Reach 2R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 9.29% Impervious, Inflow Depth > 4.06" for 25-Year event
Inflow = 89.75 cfs @ 12.24 hrs, Volume= 8.742 af
Outflow = 89.75 cfs @ 12.24 hrs, Volume= 8.742 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Batterson Park Pond



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 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 E1: Flow to Batterson Park Runoff Area=25.830 ac 9.29% Impervious Runoff Depth>5.81"
Flow Length=385' Tc=15.4 min CN=78 Runoff=127.06 cfs 12.515 af

Reach 2R: Batterson Park Pond Inflow=127.06 cfs 12.515 af
Outflow=127.06 cfs 12.515 af

Total Runoff Area = 25.830 ac Runoff Volume = 12.515 af Average Runoff Depth = 5.81"
90.71% Pervious = 23.430 ac 9.29% Impervious = 2.400 ac

Summary for Subcatchment E1: Flow to Batterson Park Pond

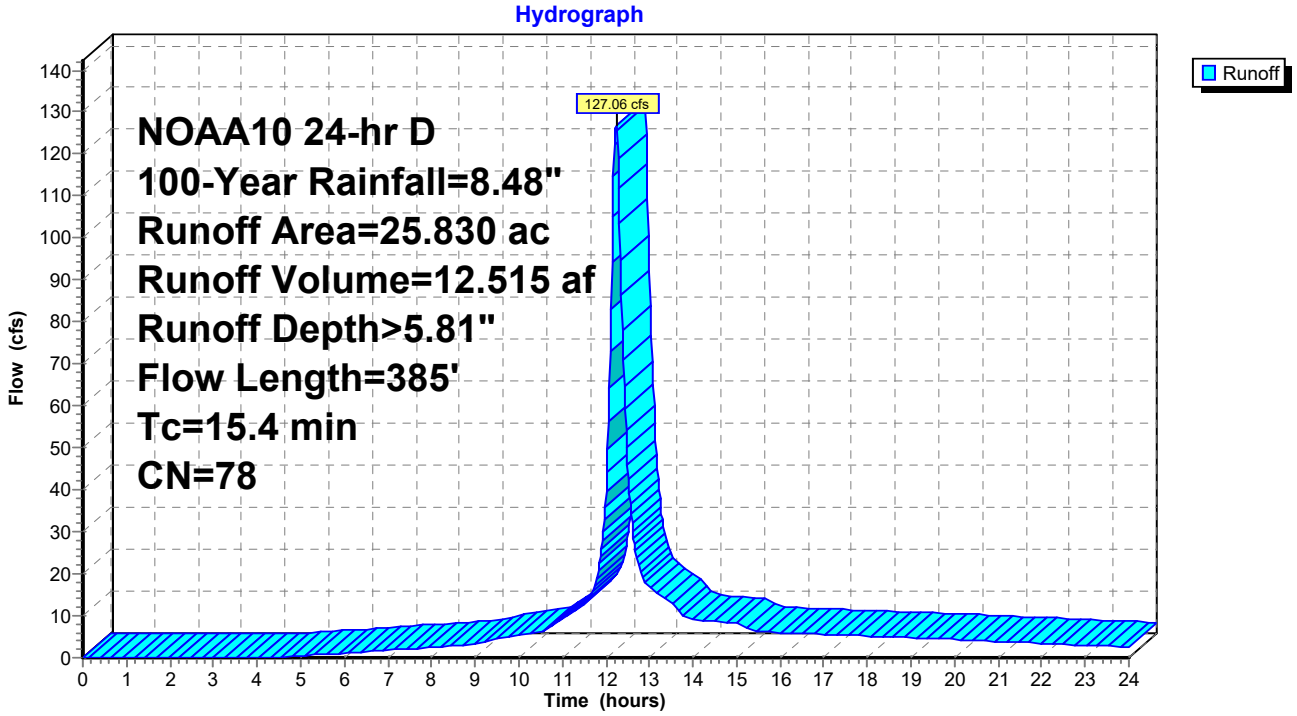
Runoff = 127.06 cfs @ 12.23 hrs, Volume= 12.515 af, Depth> 5.81"
Routed to Reach 2R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
6.850	74	>75% Grass cover, Good, HSG C
7.650	80	>75% Grass cover, Good, HSG D
2.830	70	Woods, Good, HSG C
3.140	77	Woods, Good, HSG D
2.960	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
2.400	98	Paved parking, HSG D
25.830	78	Weighted Average
23.430		90.71% Pervious Area
2.400		9.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
1.3	285	0.0540	3.74		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment E1: Flow to Batterson Park Pond



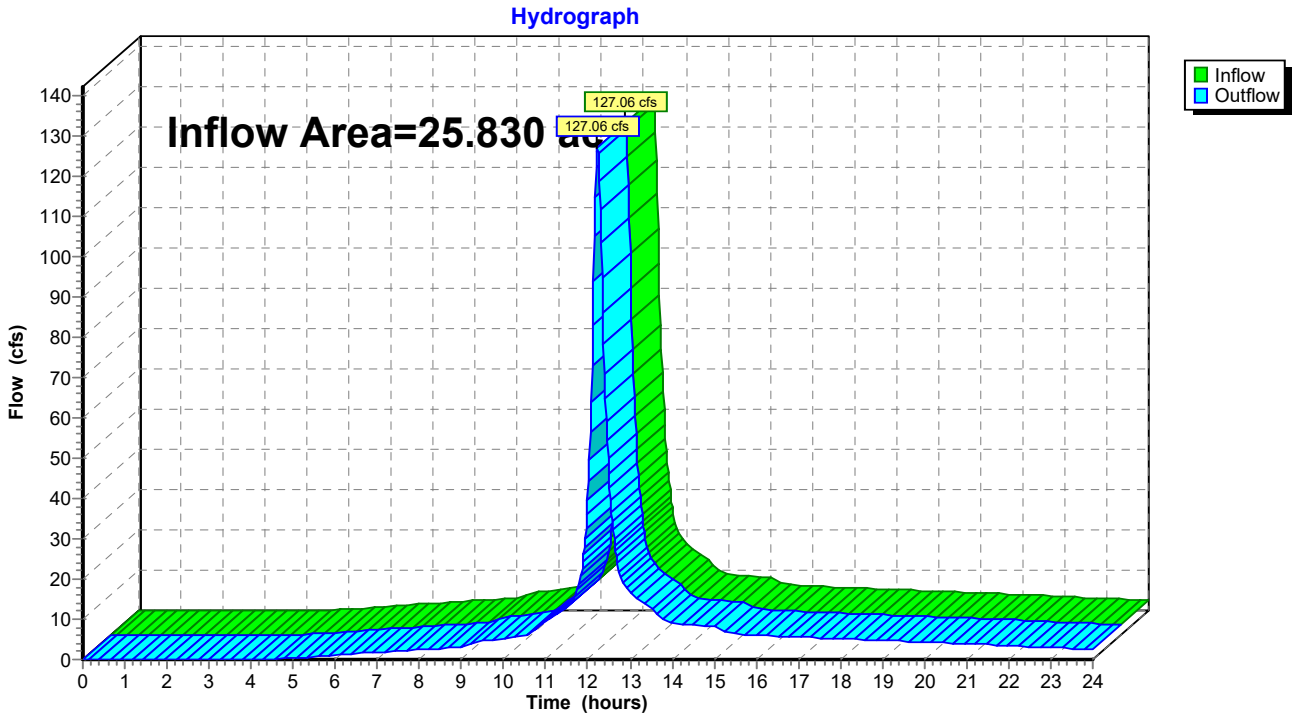
Summary for Reach 2R: Batterson Park Pond

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

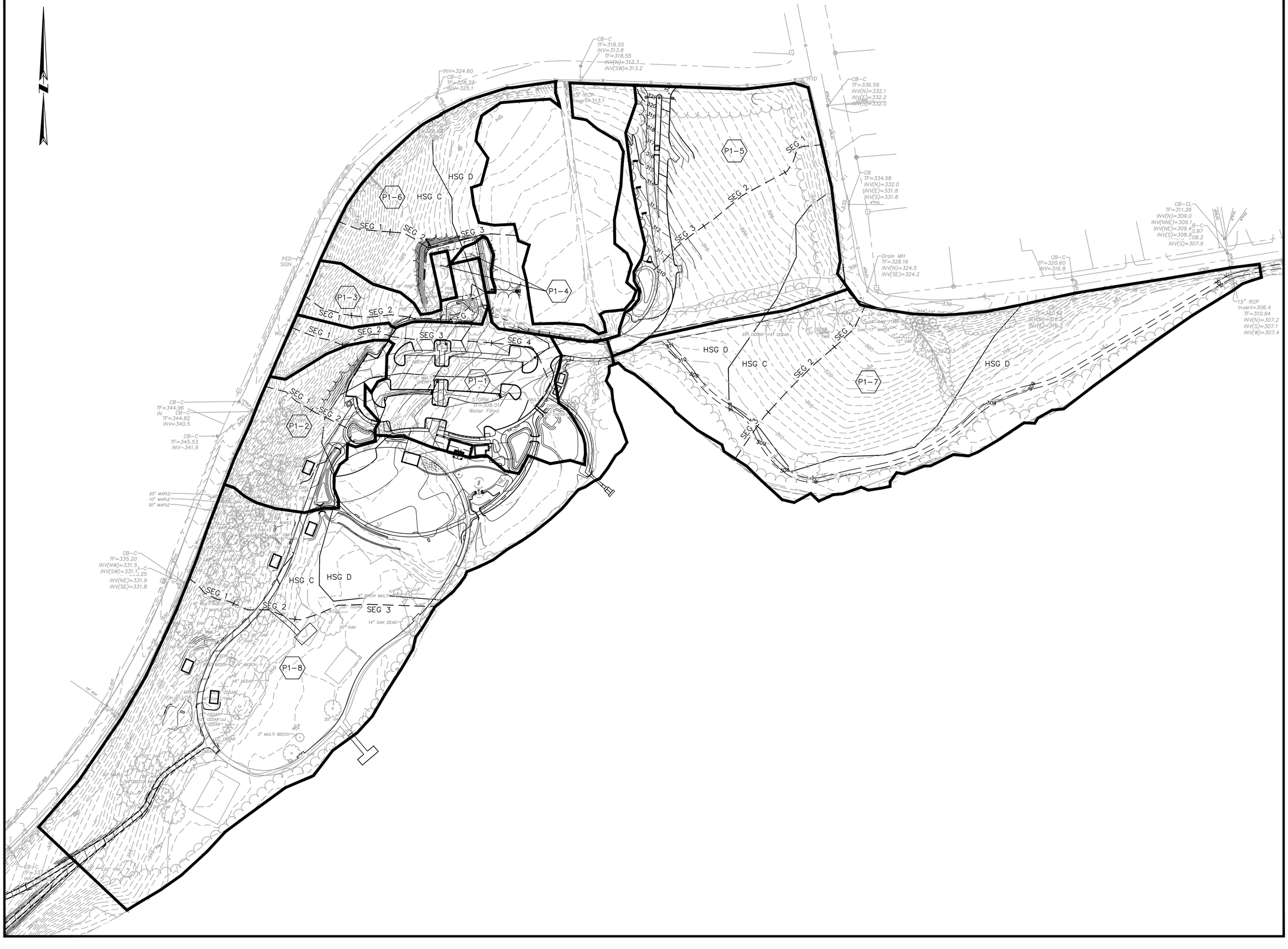
Inflow Area = 25.830 ac, 9.29% Impervious, Inflow Depth > 5.81" for 100-Year event
Inflow = 127.06 cfs @ 12.23 hrs, Volume= 12.515 af
Outflow = 127.06 cfs @ 12.23 hrs, Volume= 12.515 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Batterson Park Pond



5.03 PROPOSED WATERSHED PLAN



IMPROVEMENTS TO BATTERSON PARK

BATTERSON PARK ROAD

IN

FARMINGTON
CONNECTICUT

PROPOSED WATERSHED AREA MAP

SEPTEMBER 19, 2024

REVISIONS:

NO.	DATE	DESC.

PREPARED FOR:

CITY OF HARTFORD
550 MAIN STREET
HARTFORD, CT 06103

BSC GROUP
BUILD | SUPPORT | CONNECT
665 Winding Brook Drive
Glastonbury,
Connecticut 06033
860 652 8227

SCALE: 1" = 80'

40 80 160 FEET

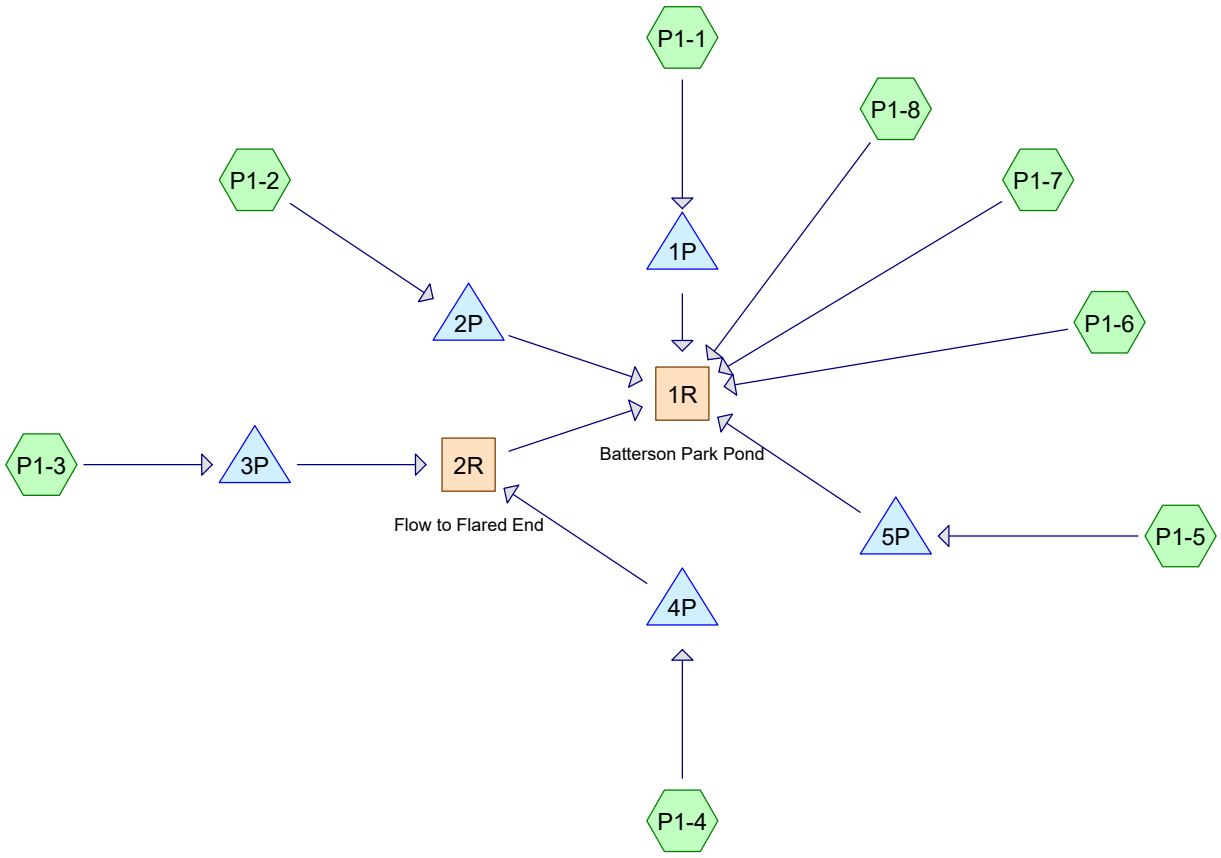
FILE:

DWG.:

JOB. NO: 83885.01

FIG. 503

5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



Subcat Reach Pond Link

Routing Diagram for 008388501-PWAM
Prepared by BSC Group, Printed 9/25/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NOAA10 24-hr	D	Default	24.00	1	3.32	2
2	10-Year	NOAA10 24-hr	D	Default	24.00	1	5.32	2
3	25-Year	NOAA10 24-hr	D	Default	24.00	1	6.56	2
4	100-Year	NOAA10 24-hr	D	Default	24.00	1	8.48	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.750	74	>75% Grass cover, Good, HSG C (P1-1, P1-2, P1-3, P1-5, P1-6, P1-7, P1-8)
7.450	80	>75% Grass cover, Good, HSG D (P1-1, P1-2, P1-4, P1-5, P1-6, P1-7, P1-8)
2.950	73	Brush, Good, HSG D (P1-8)
0.610	96	Gravel surface, HSG D (P1-3, P1-4, P1-5, P1-7, P1-8)
2.650	98	Paved parking, HSG D (P1-1, P1-2, P1-3, P1-4, P1-5, P1-8)
2.780	70	Woods, Good, HSG C (P1-1, P1-3, P1-5, P1-6, P1-8)
2.640	77	Woods, Good, HSG D (P1-5, P1-6, P1-7)
25.830	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
9.530	HSG C	P1-1, P1-2, P1-3, P1-5, P1-6, P1-7, P1-8
16.300	HSG D	P1-1, P1-2, P1-3, P1-4, P1-5, P1-6, P1-7, P1-8
0.000	Other	
25.830		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	6.750	7.450	0.000	14.200	>75% Grass cover, Good	P1-1, P1-2, P1-3, P1-4, P1-5, P1-6, P1-7, P1-8
0.000	0.000	0.000	2.950	0.000	2.950	Brush, Good	P1-8
0.000	0.000	0.000	0.610	0.000	0.610	Gravel surface	P1-3, P1-4, P1-5, P1-7, P1-8
0.000	0.000	0.000	2.650	0.000	2.650	Paved parking	P1-1, P1-2, P1-3, P1-4, P1-5, P1-8
0.000	0.000	2.780	2.640	0.000	5.420	Woods, Good	P1-1, P1-3, P1-5, P1-6, P1-7, P1-8
0.000	**0.000**	**9.530**	**16.300**	**0.000**	**25.830**	**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)	Node Name
1	2P	311.63	311.20	11.0	0.0391	0.011	0.0	8.0	0.0	
2	3P	311.50	311.00	50.0	0.0100	0.011	0.0	12.0	0.0	
3	4P	310.50	310.00	25.0	0.0200	0.013	0.0	12.0	0.0	

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1: Runoff Area=2.240 ac 62.05% Impervious Runoff Depth>2.27"
Flow Length=593' Tc=11.5 min CN=90 Runoff=4.93 cfs 0.424 af

SubcatchmentP1-2: Runoff Area=1.390 ac 15.83% Impervious Runoff Depth>1.36"
Flow Length=175' Tc=9.0 min CN=78 Runoff=2.06 cfs 0.157 af

SubcatchmentP1-3: Runoff Area=0.620 ac 8.06% Impervious Runoff Depth>1.29"
Flow Length=334' Tc=10.0 min CN=77 Runoff=0.83 cfs 0.067 af

SubcatchmentP1-4: Runoff Area=0.140 ac 50.00% Impervious Runoff Depth>2.37"
Tc=6.0 min CN=91 Runoff=0.40 cfs 0.028 af

SubcatchmentP1-5: Runoff Area=3.790 ac 12.40% Impervious Runoff Depth>1.56"
Flow Length=412' Tc=13.6 min CN=81 Runoff=5.38 cfs 0.492 af

SubcatchmentP1-6: Runoff Area=2.540 ac 0.00% Impervious Runoff Depth>1.11"
Flow Length=351' Tc=10.7 min CN=74 Runoff=2.79 cfs 0.236 af

SubcatchmentP1-7: Runoff Area=6.000 ac 0.00% Impervious Runoff Depth>1.36"
Flow Length=385' Tc=15.4 min CN=78 Runoff=6.90 cfs 0.678 af

SubcatchmentP1-8: Runoff Area=9.110 ac 4.94% Impervious Runoff Depth>1.23"
Flow Length=496' Tc=12.5 min CN=76 Runoff=10.44 cfs 0.935 af

Reach 1R: Batterson Park Pond Inflow=31.90 cfs 2.829 af
Outflow=31.90 cfs 2.829 af

Reach 2R: Flow to Flared End Inflow=0.82 cfs 0.074 af
Outflow=0.82 cfs 0.074 af

Pond 1P: Peak Elev=307.52' Storage=5,788 cf Inflow=4.93 cfs 0.424 af
Outflow=4.47 cfs 0.323 af

Pond 2P: Peak Elev=312.22' Storage=880 cf Inflow=2.06 cfs 0.157 af
8.0" Round Culvert x 2.00 n=0.011 L=11.0' S=0.0391 '/' Outflow=1.72 cfs 0.148 af

Pond 3P: Peak Elev=314.16' Storage=289 cf Inflow=0.83 cfs 0.067 af
Outflow=0.82 cfs 0.061 af

Pond 4P: Peak Elev=312.93' Storage=687 cf Inflow=0.40 cfs 0.028 af
Outflow=0.03 cfs 0.012 af

Pond 5P: Peak Elev=309.45' Storage=2,870 cf Inflow=5.38 cfs 0.492 af
Outflow=5.29 cfs 0.437 af

Total Runoff Area = 25.830 ac Runoff Volume = 3.016 af Average Runoff Depth = 1.40"
89.74% Pervious = 23.180 ac 10.26% Impervious = 2.650 ac

Summary for Subcatchment P1-1:

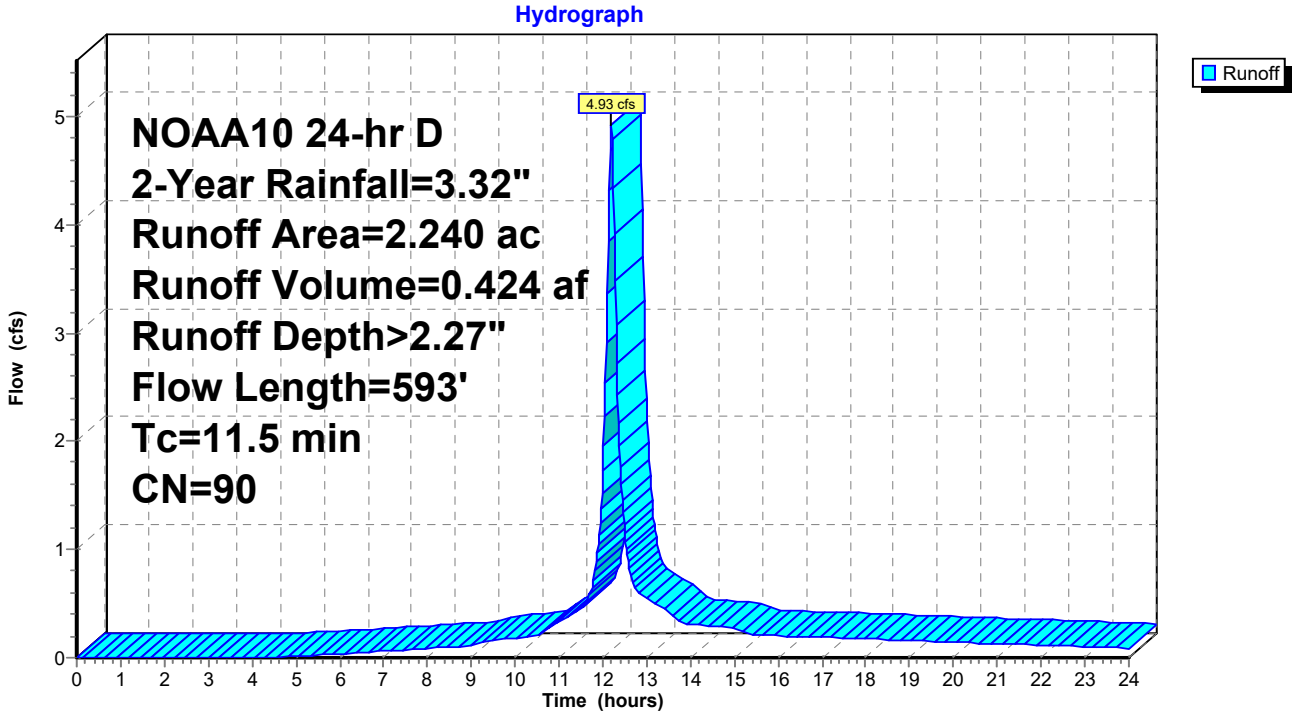
Runoff = 4.93 cfs @ 12.19 hrs, Volume= 0.424 af, Depth> 2.27"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

	Area (ac)	CN	Description
	0.170	74	>75% Grass cover, Good, HSG C
	0.460	80	>75% Grass cover, Good, HSG D
	0.220	70	Woods, Good, HSG C
	0.000	77	Woods, Good, HSG D
*	0.000	73	Brush, Good, HSG D
	0.000	96	Gravel surface, HSG D
	1.390	98	Paved parking, HSG D
	2.240	90	Weighted Average
	0.850		37.95% Pervious Area
	1.390		62.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.1700	0.19		**Sheet Flow, Seg 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	96	0.1000	5.09		**Shallow Concentrated Flow, Seg 2** Unpaved Kv= 16.1 fps
0.9	191	0.0340	3.74		**Shallow Concentrated Flow, Seg 3** Paved Kv= 20.3 fps
1.3	206	0.0170	2.65		**Shallow Concentrated Flow, Seg 4** Paved Kv= 20.3 fps
11.5	593	Total			

Subcatchment P1-1:



Summary for Subcatchment P1-2:

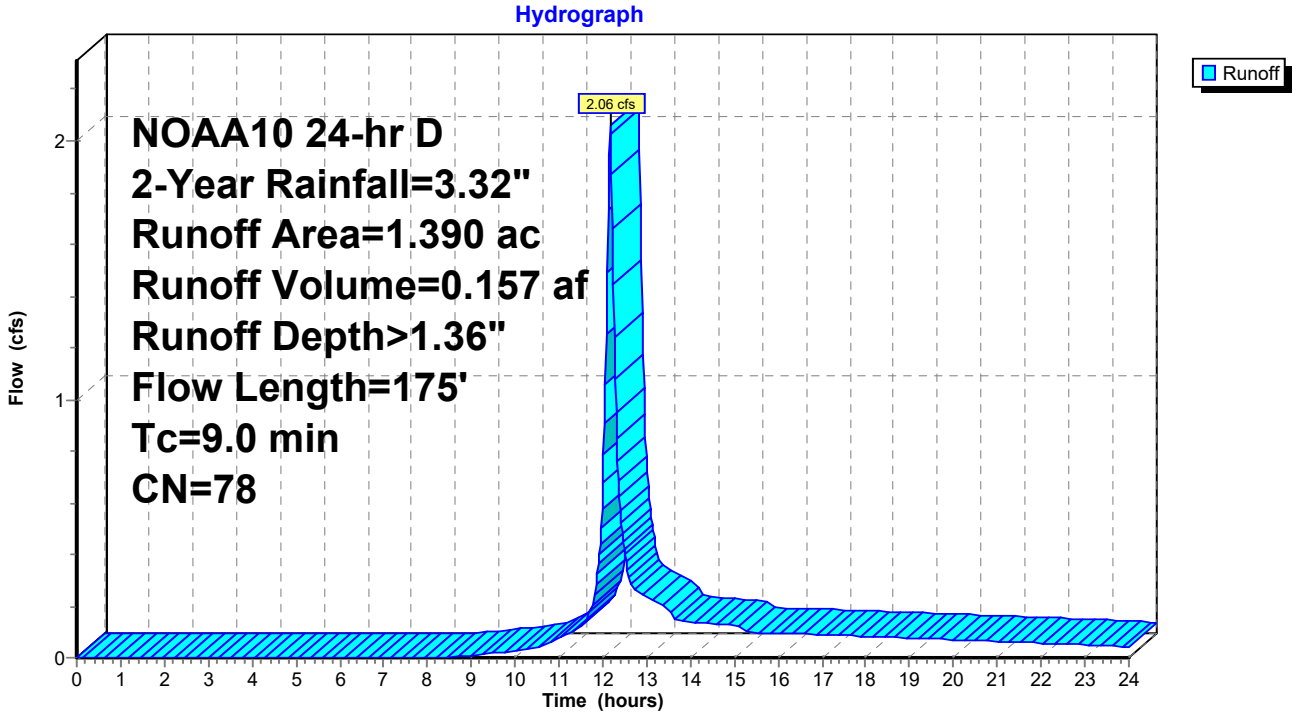
Runoff = 2.06 cfs @ 12.17 hrs, Volume= 0.157 af, Depth> 1.36"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
1.010	74	>75% Grass cover, Good, HSG C
0.160	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.220	98	Paved parking, HSG D
1.390	78	Weighted Average
1.170		84.17% Pervious Area
0.220		15.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.1800	0.19		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	75	0.1500	6.24		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
9.0	175	Total			

Subcatchment P1-2:



Summary for Subcatchment P1-3:

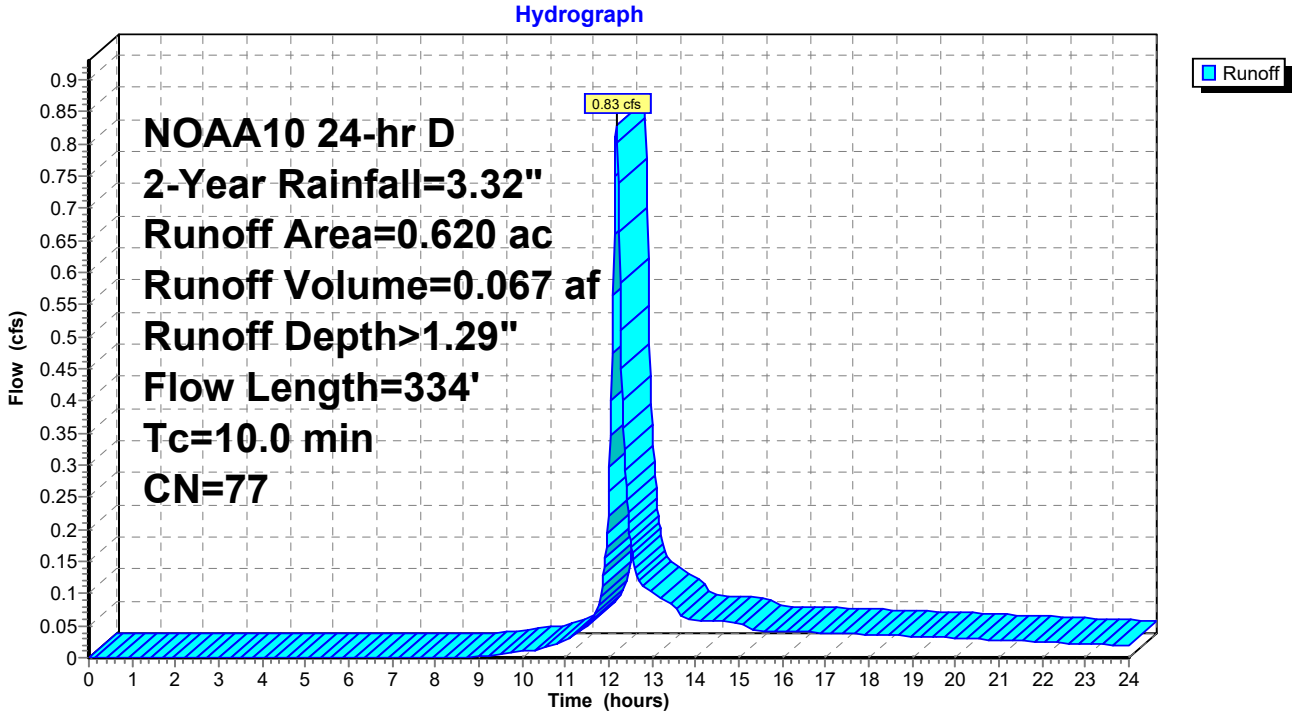
Runoff = 0.83 cfs @ 12.18 hrs, Volume= 0.067 af, Depth> 1.29"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
0.080	74	>75% Grass cover, Good, HSG C
0.000	80	>75% Grass cover, Good, HSG D
0.400	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.050	98	Paved parking, HSG D
0.620	77	Weighted Average
0.570		91.94% Pervious Area
0.050		8.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1650	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	111	0.1100	5.34		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	123	0.0500	3.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.0	334	Total			

Subcatchment P1-3:



Summary for Subcatchment P1-4:

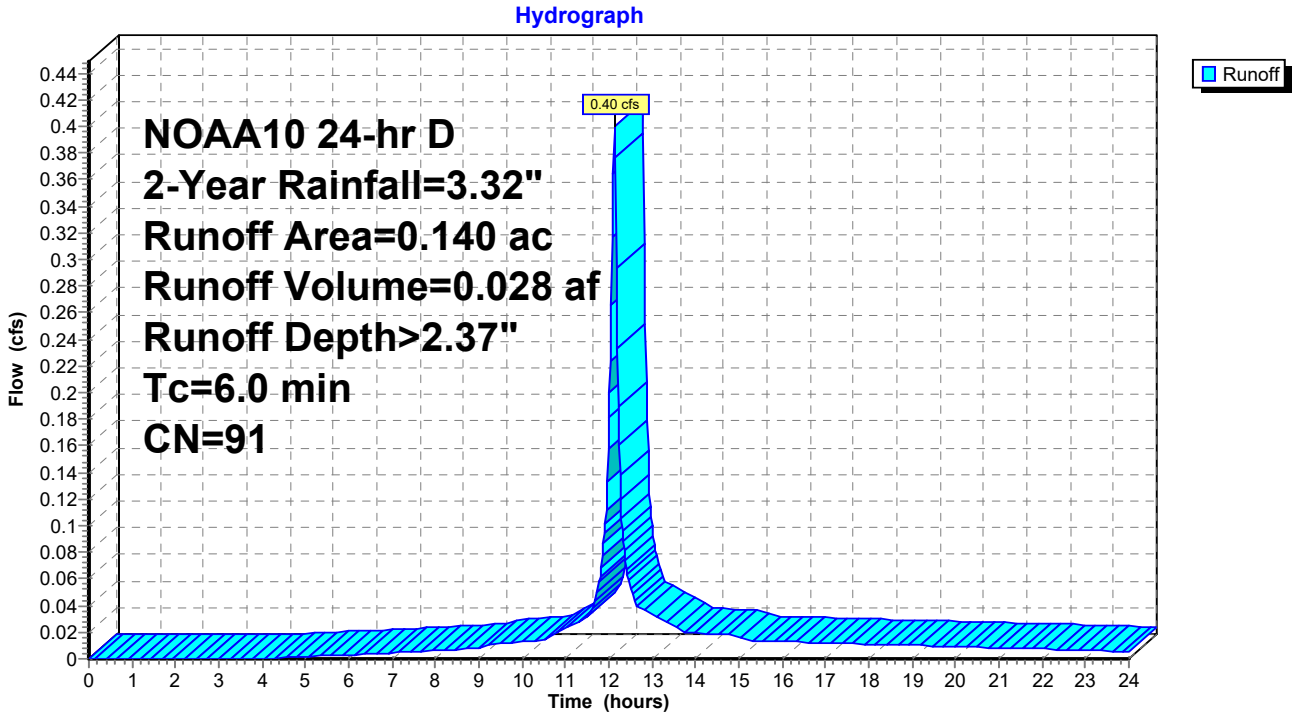
Runoff = 0.40 cfs @ 12.13 hrs, Volume= 0.028 af, Depth> 2.37"
Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.050	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.020	96	Gravel surface, HSG D
0.070	98	Paved parking, HSG D
0.140	91	Weighted Average
0.070		50.00% Pervious Area
0.070		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. time to pond**

Subcatchment P1-4:



Summary for Subcatchment P1-5:

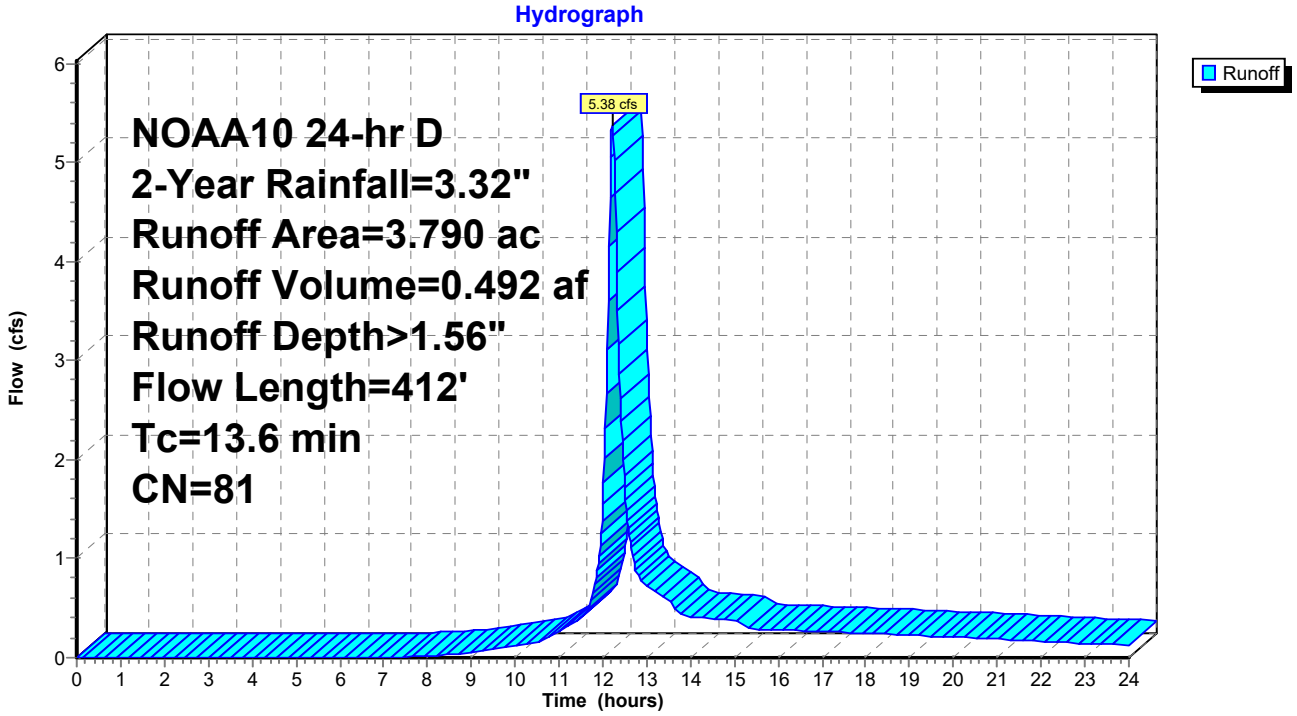
Runoff = 5.38 cfs @ 12.22 hrs, Volume= 0.492 af, Depth> 1.56"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
0.210	74	>75% Grass cover, Good, HSG C
2.470	80	>75% Grass cover, Good, HSG D
0.150	70	Woods, Good, HSG C
0.440	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.050	96	Gravel surface, HSG D
0.470	98	Paved parking, HSG D
3.790	81	Weighted Average
3.320		87.60% Pervious Area
0.470		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0750	0.13		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	185	0.0680	4.20		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.5	127	0.0600	3.94		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
13.6	412	Total			

Subcatchment P1-5:



Summary for Subcatchment P1-6:

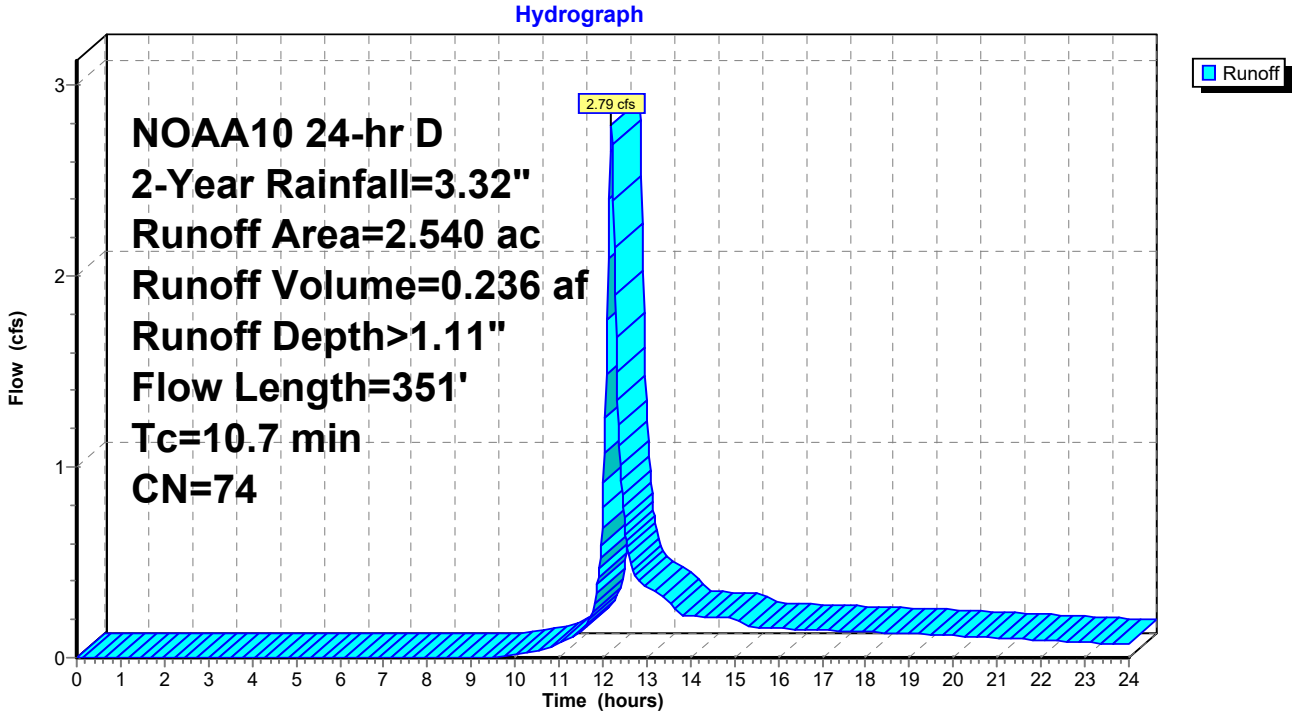
Runoff = 2.79 cfs @ 12.19 hrs, Volume= 0.236 af, Depth> 1.11"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
0.190	74	>75% Grass cover, Good, HSG C
0.190	80	>75% Grass cover, Good, HSG D
0.990	70	Woods, Good, HSG C
1.170	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
2.540	74	Weighted Average
2.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1500	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	81	0.2040	7.27		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
1.1	170	0.0260	2.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.7	351	Total			

Subcatchment P1-6:



Summary for Subcatchment P1-7:

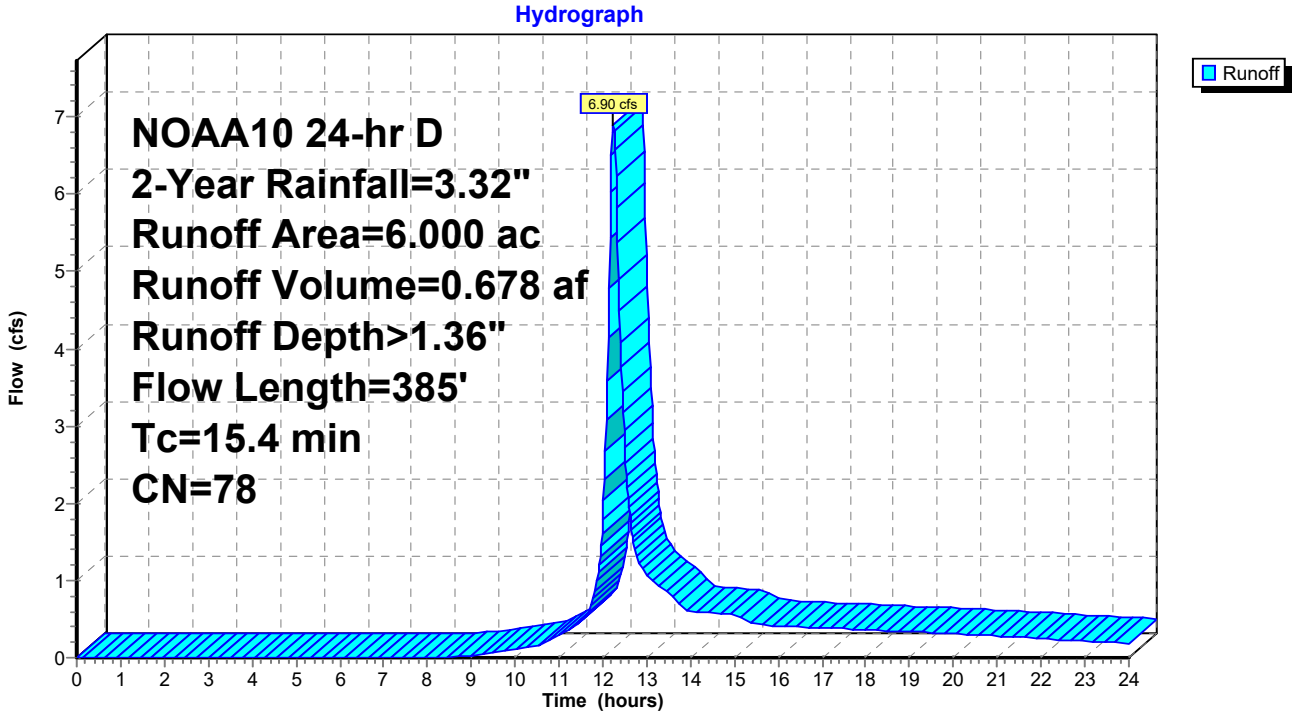
Runoff = 6.90 cfs @ 12.24 hrs, Volume= 0.678 af, Depth> 1.36"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
2.620	74	>75% Grass cover, Good, HSG C
1.990	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.360	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
6.000	78	Weighted Average
6.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	176	0.0650	4.10		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	109	0.0400	3.22		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment P1-7:



Summary for Subcatchment P1-8:

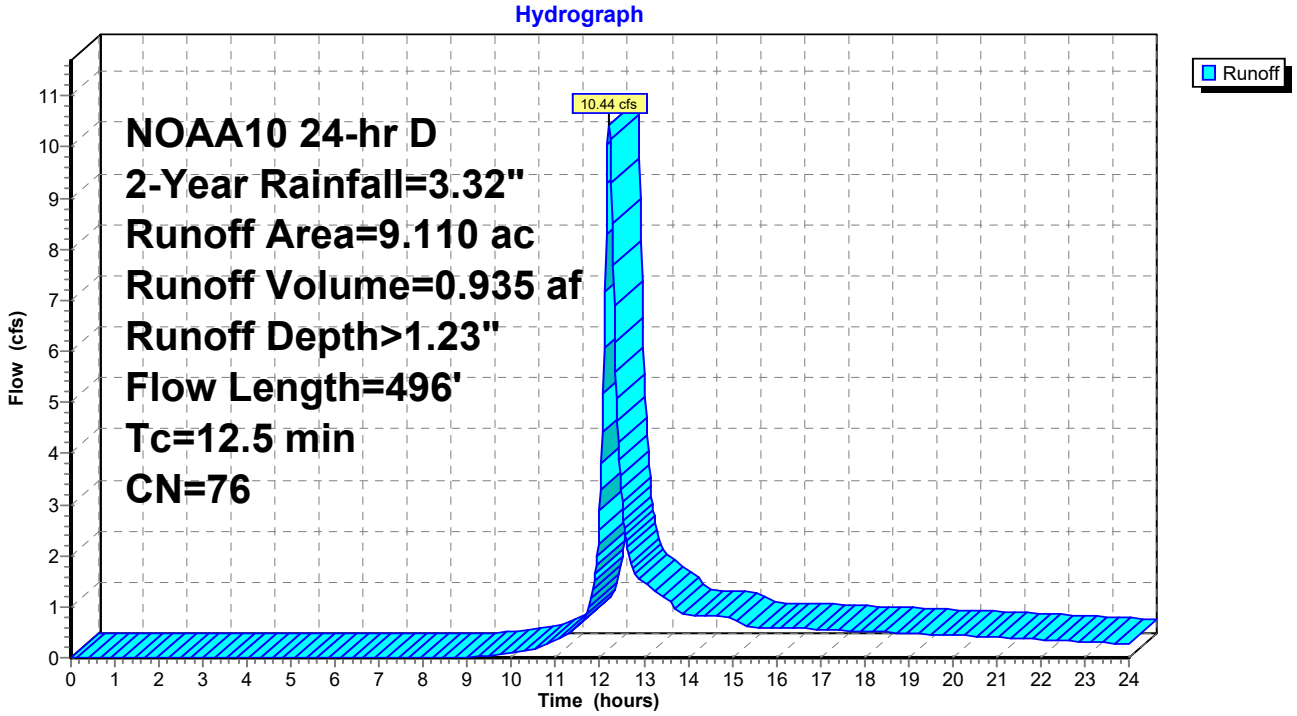
Runoff = 10.44 cfs @ 12.21 hrs, Volume= 0.935 af, Depth> 1.23"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 2-Year Rainfall=3.32"

Area (ac)	CN	Description
2.470	74	>75% Grass cover, Good, HSG C
2.130	80	>75% Grass cover, Good, HSG D
1.020	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
2.950	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.450	98	Paved parking, HSG D
9.110	76	Weighted Average
8.660		95.06% Pervious Area
0.450		4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1320	0.17		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.4	122	0.0890	4.80		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
2.2	274	0.0160	2.04		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
12.5	496	Total			

Subcatchment P1-8:



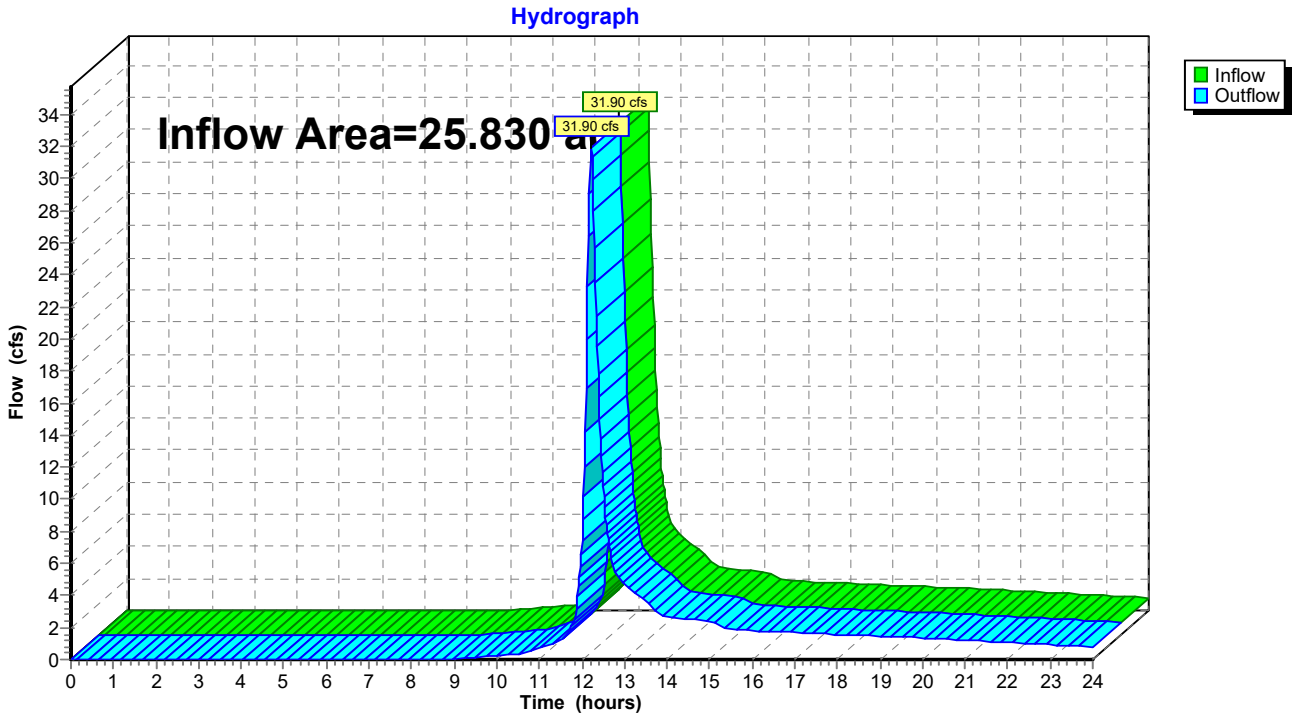
Summary for Reach 1R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 10.26% Impervious, Inflow Depth > 1.31" for 2-Year event
Inflow = 31.90 cfs @ 12.22 hrs, Volume= 2.829 af
Outflow = 31.90 cfs @ 12.22 hrs, Volume= 2.829 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: Batterson Park Pond



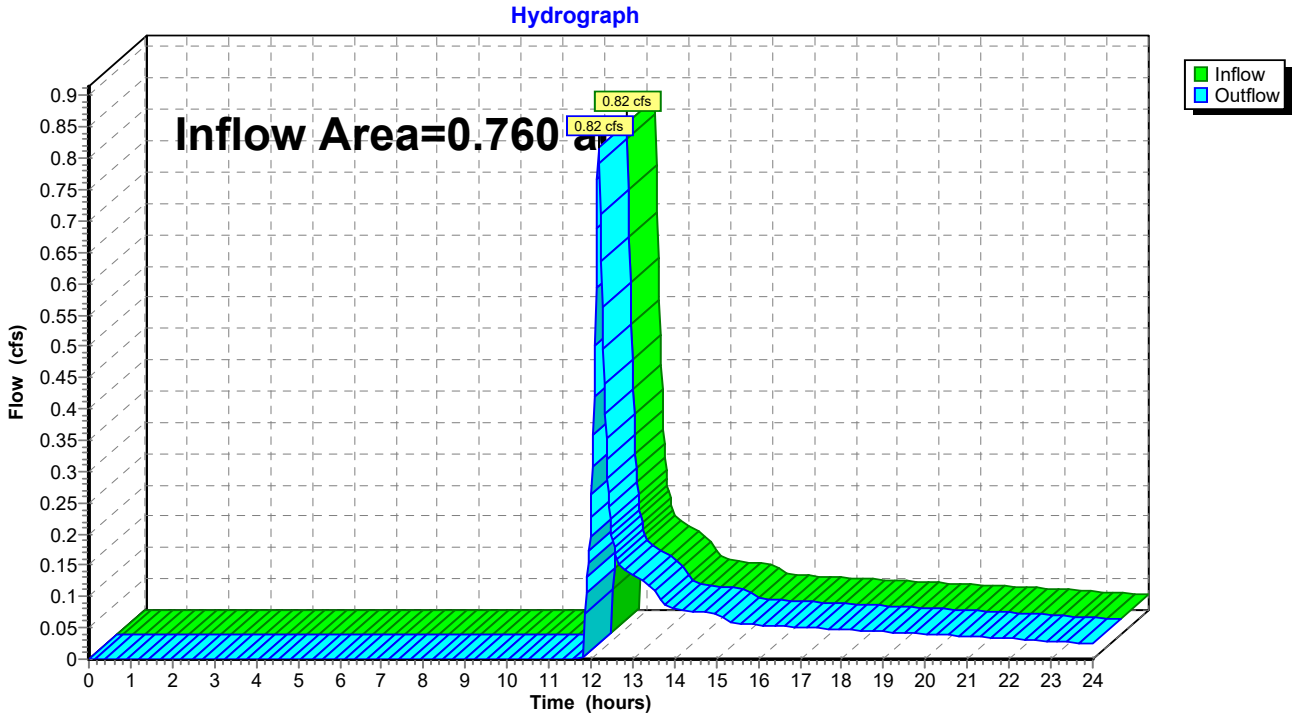
Summary for Reach 2R: Flow to Flared End

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

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 1.16" for 2-Year event
Inflow = 0.82 cfs @ 12.19 hrs, Volume= 0.074 af
Outflow = 0.82 cfs @ 12.19 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Flow to Flared End



Summary for Pond 1P:

Inflow Area = 2.240 ac, 62.05% Impervious, Inflow Depth > 2.27" for 2-Year event
Inflow = 4.93 cfs @ 12.19 hrs, Volume= 0.424 af
Outflow = 4.47 cfs @ 12.23 hrs, Volume= 0.323 af, Atten= 9%, Lag= 2.7 min
Primary = 4.47 cfs @ 12.23 hrs, Volume= 0.323 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 307.52' @ 12.23 hrs Surf.Area= 5,451 sf Storage= 5,788 cf

Plug-Flow detention time= 176.3 min calculated for 0.322 af (76% of inflow)
Center-of-Mass det. time= 73.2 min (902.1 - 828.9)

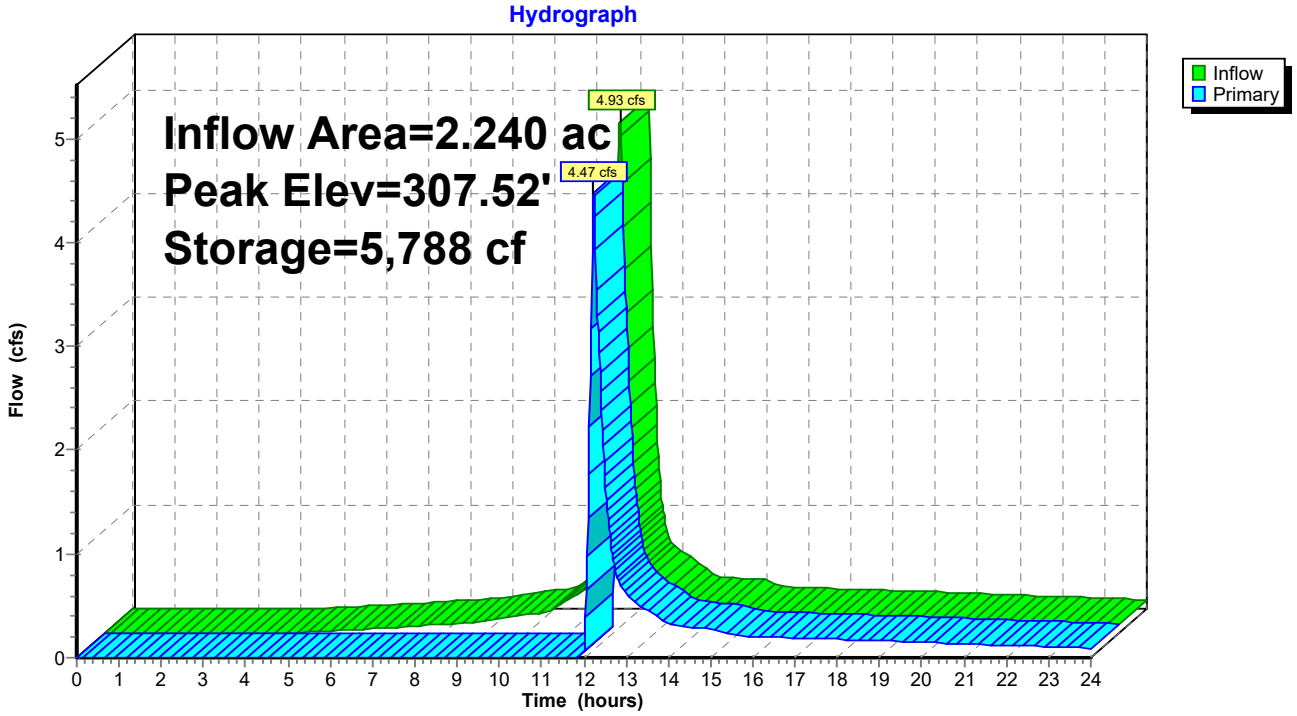
Volume	Invert	Avail.Storage	Storage Description
#1	306.00'	8,662 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.00	353	70.9	0	0	353
306.50	4,079	368.1	939	939	10,736
307.00	4,639	377.5	2,178	3,117	11,324
307.50	5,669	288.9	2,573	5,689	16,026
308.00	1,153	143.1	1,563	7,252	21,039
309.00	1,682	177.1	1,409	8,662	21,920

Device	Routing	Invert	Outlet Devices
#1	Primary	307.25'	**10.0' long x 25.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	307.50'	**90.0' long x 25.0' breadth Top of pond overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.26 cfs @ 12.23 hrs HW=307.52' (Free Discharge)
1=Primary Spillway (Weir Controls 3.71 cfs @ 1.39 fps)
2=Top of pond overflow (Weir Controls 0.55 cfs @ 0.35 fps)

Pond 1P:


Hydrograph
Inflow Area=2.240 ac
Peak Elev=307.52'
Storage=5,788 cf
4.93 cfs
4.47 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 1P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
306.00	0.00	307.02	0.00	308.04	114.98
306.02	0.00	307.04	0.00	308.06	121.07
306.04	0.00	307.06	0.00	308.08	127.29
306.06	0.00	307.08	0.00	308.10	133.61
306.08	0.00	307.10	0.00	308.12	139.76
306.10	0.00	307.12	0.00	308.14	145.99
306.12	0.00	307.14	0.00	308.16	152.29
306.14	0.00	307.16	0.00	308.18	158.67
306.16	0.00	307.18	0.00	308.20	165.11
306.18	0.00	307.20	0.00	308.22	171.62
306.20	0.00	307.22	0.00	308.24	178.19
306.22	0.00	307.24	0.00	308.26	184.84
306.24	0.00	307.26	0.03	308.28	191.56
306.26	0.00	307.28	0.14	308.30	198.34
306.28	0.00	307.30	0.30	308.32	205.51
306.30	0.00	307.32	0.50	308.34	212.76
306.32	0.00	307.34	0.72	308.36	220.10
306.34	0.00	307.36	0.98	308.38	227.51
306.36	0.00	307.38	1.26	308.40	235.01
306.38	0.00	307.40	1.56	308.42	242.58
306.40	0.00	307.42	1.88	308.44	250.23
306.42	0.00	307.44	2.22	308.46	257.95
306.44	0.00	307.46	2.58	308.48	265.74
306.46	0.00	307.48	2.96	308.50	273.60
306.48	0.00	307.50	3.36	308.52	281.71
306.50	0.00	307.52	4.45	308.54	289.91
306.52	0.00	307.54	6.13	308.56	298.20
306.54	0.00	307.56	8.19	308.58	306.56
306.56	0.00	307.58	10.56	308.60	315.01
306.58	0.00	307.60	13.21	308.62	323.53
306.60	0.00	307.62	16.10	308.64	332.14
306.62	0.00	307.64	19.21	308.66	340.82
306.64	0.00	307.66	22.53	308.68	349.56
306.66	0.00	307.68	26.03	308.70	358.38
306.68	0.00	307.70	29.72	308.72	367.16
306.70	0.00	307.72	33.61	308.74	376.01
306.72	0.00	307.74	37.66	308.76	384.93
306.74	0.00	307.76	41.88	308.78	393.92
306.76	0.00	307.78	46.26	308.80	402.98
306.78	0.00	307.80	50.79	308.82	412.10
306.80	0.00	307.82	55.48	308.84	421.30
306.82	0.00	307.84	60.30	308.86	430.57
306.84	0.00	307.86	65.26	308.88	439.91
306.86	0.00	307.88	70.34	308.90	449.33
306.88	0.00	307.90	75.55	308.92	458.66
306.90	0.00	307.92	80.83	308.94	468.04
306.92	0.00	307.94	86.24	308.96	477.49
306.94	0.00	307.96	91.77	308.98	486.99
306.96	0.00	307.98	97.41	309.00	**496.56**
306.98	0.00	308.00	103.16		
307.00	0.00	308.02	109.02		

Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
306.00	353	0
306.05	543	22
306.10	773	55
306.15	1,044	100
306.20	1,356	160
306.25	1,708	236
306.30	2,101	332
306.35	2,534	447
306.40	3,009	586
306.45	3,524	749
306.50	4,079	939
306.55	4,133	1,144
306.60	4,188	1,352
306.65	4,243	1,563
306.70	4,299	1,776
306.75	4,354	1,993
306.80	4,411	2,212
306.85	4,467	2,434
306.90	4,524	2,659
306.95	4,581	2,886
307.00	4,639	3,117
307.05	4,737	3,351
307.10	4,837	3,590
307.15	4,937	3,835
307.20	5,039	4,084
307.25	5,141	4,339
307.30	5,245	4,598
307.35	5,349	4,863
307.40	5,455	5,133
307.45	5,561	5,409
307.50	**5,669**	5,689
307.55	5,064	5,958
307.60	4,492	6,196
307.65	3,955	6,407
307.70	3,453	6,592
307.75	2,984	6,753
307.80	2,549	6,891
307.85	2,149	7,009
307.90	1,783	7,107
307.95	1,451	7,188
308.00	1,153	7,252
308.05	1,177	7,311
308.10	1,201	7,370
308.15	1,226	7,431
308.20	1,251	7,493
308.25	1,276	7,556
308.30	1,301	7,620
308.35	1,327	7,686
308.40	1,353	7,753
308.45	1,379	7,821
308.50	1,405	7,891
308.55	1,432	7,962
308.60	1,458	8,034
308.65	1,486	8,108
308.70	1,513	8,183
308.75	1,540	8,259
308.80	1,568	8,337
308.85	1,596	8,416
308.90	1,625	8,496
308.95	1,653	8,578
309.00	1,682	**8,662**

Summary for Pond 2P:

Inflow Area = 1.390 ac, 15.83% Impervious, Inflow Depth > 1.36" for 2-Year event
Inflow = 2.06 cfs @ 12.17 hrs, Volume= 0.157 af
Outflow = 1.72 cfs @ 12.22 hrs, Volume= 0.148 af, Atten= 17%, Lag= 3.0 min
Primary = 1.72 cfs @ 12.22 hrs, Volume= 0.148 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 312.22' @ 12.22 hrs Surf.Area= 1,088 sf Storage= 880 cf

Plug-Flow detention time= 52.8 min calculated for 0.148 af (94% of inflow)
Center-of-Mass det. time= 20.8 min (904.8 - 884.0)

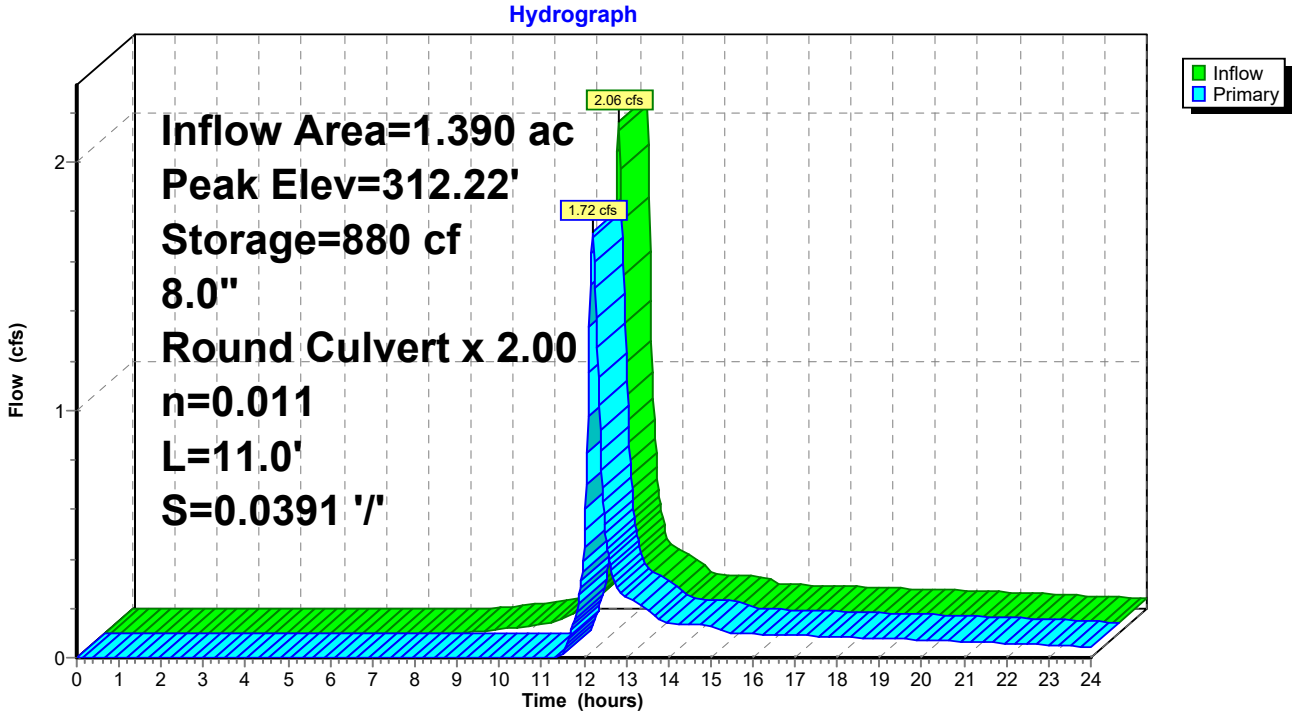
Volume	Invert	Avail.Storage	Storage Description
#1	311.00'	4,013 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
311.00	474	88.9	0	0	474
312.00	872	164.1	663	663	1,993
313.00	2,035	374.0	1,413	2,076	10,985
313.50	2,457	386.0	1,121	3,197	11,736
314.00	928	131.1	816	4,013	22,225

Device	Routing	Invert	Outlet Devices
#1	Primary	311.63'	**8.0" Round Culvert X 2.00** L= 11.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.63' / 311.20' S= 0.0391 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=1.71 cfs @ 12.22 hrs HW=312.22' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.71 cfs @ 2.62 fps)

Pond 2P:


Hydrograph
Inflow
Primary
2.06 cfs
1.72 cfs
Inflow Area=1.390 ac
Peak Elev=312.22'
Storage=880 cf
8.0"
Round Culvert x 2.00
n=0.011
L=11.0'
S=0.0391 '/'
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 2P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
311.00	0.00	312.02	0.90	313.04	3.49
311.02	0.00	312.04	0.98	313.06	3.52
311.04	0.00	312.06	1.06	313.08	3.55
311.06	0.00	312.08	1.15	313.10	3.58
311.08	0.00	312.10	1.23	313.12	3.62
311.10	0.00	312.12	1.31	313.14	3.65
311.12	0.00	312.14	1.39	313.16	3.68
311.14	0.00	312.16	1.48	313.18	3.71
311.16	0.00	312.18	1.56	313.20	3.74
311.18	0.00	312.20	1.63	313.22	3.77
311.20	0.00	312.22	1.71	313.24	3.80
311.22	0.00	312.24	1.78	313.26	3.83
311.24	0.00	312.26	1.85	313.28	3.86
311.26	0.00	312.28	1.90	313.30	3.89
311.28	0.00	312.30	1.95	313.32	3.92
311.30	0.00	312.32	2.01	313.34	3.94
311.32	0.00	312.34	2.06	313.36	3.97
311.34	0.00	312.36	2.12	313.38	4.00
311.36	0.00	312.38	2.17	313.40	4.03
311.38	0.00	312.40	2.22	313.42	4.06
311.40	0.00	312.42	2.27	313.44	4.08
311.42	0.00	312.44	2.32	313.46	4.11
311.44	0.00	312.46	2.37	313.48	4.14
311.46	0.00	312.48	2.42	313.50	4.17
311.48	0.00	312.50	2.46	313.52	4.19
311.50	0.00	312.52	2.51	313.54	4.22
311.52	0.00	312.54	2.55	313.56	4.25
311.54	0.00	312.56	2.60	313.58	4.27
311.56	0.00	312.58	2.64	313.60	4.30
311.58	0.00	312.60	2.68	313.62	4.33
311.60	0.00	312.62	2.72	313.64	4.35
311.62	0.00	312.64	2.77	313.66	4.38
311.64	0.00	312.66	2.81	313.68	4.40
311.66	0.01	312.68	2.85	313.70	4.43
311.68	0.02	312.70	2.89	313.72	4.46
311.70	0.04	312.72	2.92	313.74	4.48
311.72	0.06	312.74	2.96	313.76	4.51
311.74	0.09	312.76	3.00	313.78	4.53
311.76	0.12	312.78	3.04	313.80	4.56
311.78	0.16	312.80	3.07	313.82	4.58
311.80	0.20	312.82	3.11	313.84	4.60
311.82	0.24	312.84	3.15	313.86	4.63
311.84	0.29	312.86	3.18	313.88	4.65
311.86	0.35	312.88	3.22	313.90	4.68
311.88	0.41	312.90	3.25	313.92	4.70
311.90	0.47	312.92	3.29	313.94	4.73
311.92	0.53	312.94	3.32	313.96	4.75
311.94	0.60	312.96	3.36	313.98	4.77
311.96	0.67	312.98	3.39	314.00	**4.80**
311.98	0.75	313.00	3.42		
312.00	0.82	313.02	3.46		

Stage-Area-Storage for Pond 2P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
311.00	474	0
311.05	491	24
311.10	508	49
311.15	526	75
311.20	544	102
311.25	562	129
311.30	581	158
311.35	600	187
311.40	619	218
311.45	638	249
311.50	658	282
311.55	678	315
311.60	698	350
311.65	719	385
311.70	740	421
311.75	761	459
311.80	783	498
311.85	805	537
311.90	827	578
311.95	849	620
312.00	872	663
312.05	919	708
312.10	966	755
312.15	1,015	804
312.20	1,066	856
312.25	1,117	911
312.30	1,170	968
312.35	1,224	1,028
312.40	1,279	1,091
312.45	1,335	1,156
312.50	1,393	1,224
312.55	1,452	1,295
312.60	1,512	1,369
312.65	1,573	1,446
312.70	1,635	1,527
312.75	1,699	1,610
312.80	1,764	1,696
312.85	1,830	1,786
312.90	1,897	1,879
312.95	1,965	1,976
313.00	2,035	2,076
313.05	2,075	2,179
313.10	2,116	2,284
313.15	2,157	2,390
313.20	2,199	2,499
313.25	2,241	2,610
313.30	2,283	2,723
313.35	2,326	2,839
313.40	2,369	2,956
313.45	2,413	3,076
313.50	**2,457**	3,197
313.55	2,271	3,316
313.60	2,093	3,425
313.65	1,922	3,525
313.70	1,758	3,617
313.75	1,601	3,701
313.80	1,452	3,777
313.85	1,310	3,846
313.90	1,175	3,908
313.95	1,048	3,964
314.00	928	**4,013**

Summary for Pond 3P:

Inflow Area = 0.620 ac, 8.06% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 0.83 cfs @ 12.18 hrs, Volume= 0.067 af
Outflow = 0.82 cfs @ 12.19 hrs, Volume= 0.061 af, Atten= 2%, Lag= 0.8 min
Primary = 0.82 cfs @ 12.19 hrs, Volume= 0.061 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 314.16' @ 12.19 hrs Surf.Area= 352 sf Storage= 289 cf

Plug-Flow detention time= 62.2 min calculated for 0.061 af (92% of inflow)
Center-of-Mass det. time= 21.2 min (910.1 - 888.9)

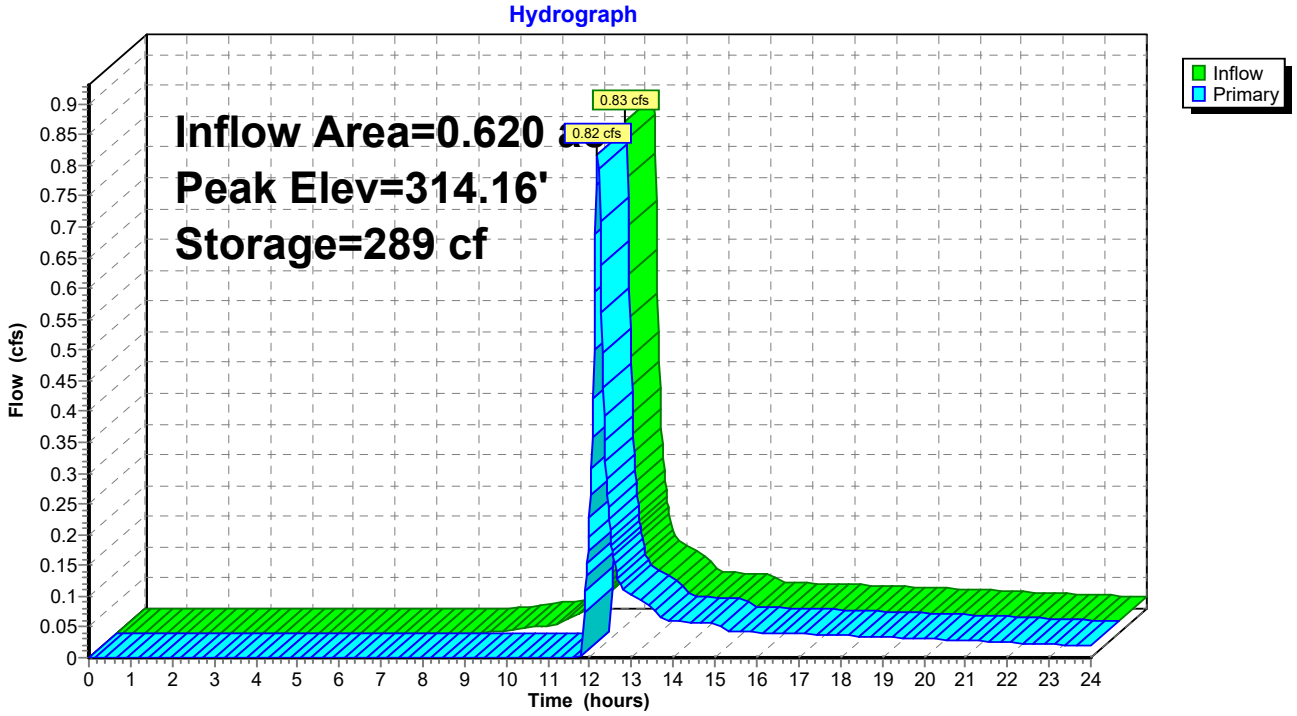
Volume	Invert	Avail.Storage	Storage Description
#1	312.50'	423 cf	**Above-ground bio-retention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.50	47	33.1	0	0	47
313.00	103	42.5	37	37	107
314.00	315	76.7	199	236	436
314.50	437	86.1	187	423	565

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 311.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	314.00'	**15.0" Horiz. Overflow Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.81 cfs @ 12.19 hrs HW=314.16' (Free Discharge)
↑**1=Culvert** (Passes 0.81 cfs of 5.56 cfs potential flow)
↑**2=Overflow Grate** (Weir Controls 0.81 cfs @ 1.30 fps)

Pond 3P:


Hydrograph
Inflow Area=0.620
Peak Elev=314.16'
Storage=289 cf
0.83 cfs
0.82 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 3P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.50	0.00	313.01	0.00	313.52	0.00	314.03	0.07
312.51	0.00	313.02	0.00	313.53	0.00	314.04	0.10
312.52	0.00	313.03	0.00	313.54	0.00	314.05	0.14
312.53	0.00	313.04	0.00	313.55	0.00	314.06	0.19
312.54	0.00	313.05	0.00	313.56	0.00	314.07	0.24
312.55	0.00	313.06	0.00	313.57	0.00	314.08	0.29
312.56	0.00	313.07	0.00	313.58	0.00	314.09	0.35
312.57	0.00	313.08	0.00	313.59	0.00	314.10	0.41
312.58	0.00	313.09	0.00	313.60	0.00	314.11	0.47
312.59	0.00	313.10	0.00	313.61	0.00	314.12	0.53
312.60	0.00	313.11	0.00	313.62	0.00	314.13	0.60
312.61	0.00	313.12	0.00	313.63	0.00	314.14	0.67
312.62	0.00	313.13	0.00	313.64	0.00	314.15	0.75
312.63	0.00	313.14	0.00	313.65	0.00	314.16	0.82
312.64	0.00	313.15	0.00	313.66	0.00	314.17	0.90
312.65	0.00	313.16	0.00	313.67	0.00	314.18	0.98
312.66	0.00	313.17	0.00	313.68	0.00	314.19	1.06
312.67	0.00	313.18	0.00	313.69	0.00	314.20	1.15
312.68	0.00	313.19	0.00	313.70	0.00	314.21	1.24
312.69	0.00	313.20	0.00	313.71	0.00	314.22	1.33
312.70	0.00	313.21	0.00	313.72	0.00	314.23	1.42
312.71	0.00	313.22	0.00	313.73	0.00	314.24	1.51
312.72	0.00	313.23	0.00	313.74	0.00	314.25	1.61
312.73	0.00	313.24	0.00	313.75	0.00	314.26	1.70
312.74	0.00	313.25	0.00	313.76	0.00	314.27	1.80
312.75	0.00	313.26	0.00	313.77	0.00	314.28	1.90
312.76	0.00	313.27	0.00	313.78	0.00	314.29	2.01
312.77	0.00	313.28	0.00	313.79	0.00	314.30	2.11
312.78	0.00	313.29	0.00	313.80	0.00	314.31	2.22
312.79	0.00	313.30	0.00	313.81	0.00	314.32	2.32
312.80	0.00	313.31	0.00	313.82	0.00	314.33	2.43
312.81	0.00	313.32	0.00	313.83	0.00	314.34	2.55
312.82	0.00	313.33	0.00	313.84	0.00	314.35	2.66
312.83	0.00	313.34	0.00	313.85	0.00	314.36	2.77
312.84	0.00	313.35	0.00	313.86	0.00	314.37	2.89
312.85	0.00	313.36	0.00	313.87	0.00	314.38	3.01
312.86	0.00	313.37	0.00	313.88	0.00	314.39	3.13
312.87	0.00	313.38	0.00	313.89	0.00	314.40	3.25
312.88	0.00	313.39	0.00	313.90	0.00	314.41	3.37
312.89	0.00	313.40	0.00	313.91	0.00	314.42	3.50
312.90	0.00	313.41	0.00	313.92	0.00	314.43	3.62
312.91	0.00	313.42	0.00	313.93	0.00	314.44	3.75
312.92	0.00	313.43	0.00	313.94	0.00	314.45	3.88
312.93	0.00	313.44	0.00	313.95	0.00	314.46	4.01
312.94	0.00	313.45	0.00	313.96	0.00	314.47	4.05
312.95	0.00	313.46	0.00	313.97	0.00	314.48	4.09
312.96	0.00	313.47	0.00	313.98	0.00	314.49	4.14
312.97	0.00	313.48	0.00	313.99	0.00	314.50	**4.18**
312.98	0.00	313.49	0.00	314.00	0.00		
312.99	0.00	313.50	0.00	314.01	0.01		
313.00	0.00	313.51	0.00	314.02	0.04		

Stage-Area-Storage for Pond 3P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.50	47	0
312.52	49	1
312.54	51	2
312.56	53	3
312.58	55	4
312.60	56	5
312.62	58	6
312.64	60	8
312.66	63	9
312.68	65	10
312.70	67	11
312.72	69	13
312.74	71	14
312.76	73	16
312.78	76	17
312.80	78	19
312.82	80	20
312.84	83	22
312.86	85	23
312.88	88	25
312.90	90	27
312.92	93	29
312.94	95	31
312.96	98	33
312.98	100	35
313.00	103	37
313.02	106	39
313.04	109	41
313.06	112	43
313.08	116	45
313.10	119	48
313.12	122	50
313.14	126	53
313.16	129	55
313.18	133	58
313.20	136	60
313.22	140	63
313.24	143	66
313.26	147	69
313.28	151	72
313.30	154	75
313.32	158	78
313.34	162	81
313.36	166	85
313.38	170	88
313.40	174	91
313.42	178	95
313.44	182	98
313.46	186	102
313.48	190	106
313.50	195	110
313.52	199	114
313.54	203	118
313.56	207	122
313.58	212	126
313.60	216	130
313.62	221	135
313.64	225	139
313.66	230	144
313.68	235	148
313.70	239	153
313.72	244	158
313.74	249	163
313.76	254	168
313.78	258	173
313.80	263	178
313.82	268	184
313.84	273	189
313.86	278	194
313.88	283	200
313.90	289	206
313.92	294	212
313.94	299	218
313.96	304	224
313.98	310	230
314.00	315	236
314.02	319	242
314.04	324	249
314.06	329	255
314.08	333	262
314.10	338	269
314.12	342	275
314.14	347	282
314.16	352	289
314.18	357	296
314.20	361	304
314.22	366	311
314.24	371	318
314.26	376	326
314.28	381	333
314.30	386	341
314.32	391	349
314.34	396	357
314.36	401	365
314.38	406	373
314.40	411	381
314.42	416	389
314.44	421	397
314.46	427	406
314.48	432	414
314.50	**437**	**423**

Summary for Pond 4P:

Inflow Area = 0.140 ac, 50.00% Impervious, Inflow Depth > 2.37" for 2-Year event
Inflow = 0.40 cfs @ 12.13 hrs, Volume= 0.028 af
Outflow = 0.03 cfs @ 13.02 hrs, Volume= 0.012 af, Atten= 92%, Lag= 53.2 min
Primary = 0.03 cfs @ 13.02 hrs, Volume= 0.012 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 312.93' @ 13.02 hrs Surf.Area= 1,062 sf Storage= 687 cf

Plug-Flow detention time= 347.7 min calculated for 0.012 af (45% of inflow)
Center-of-Mass det. time= 188.4 min (1,007.0 - 818.7)

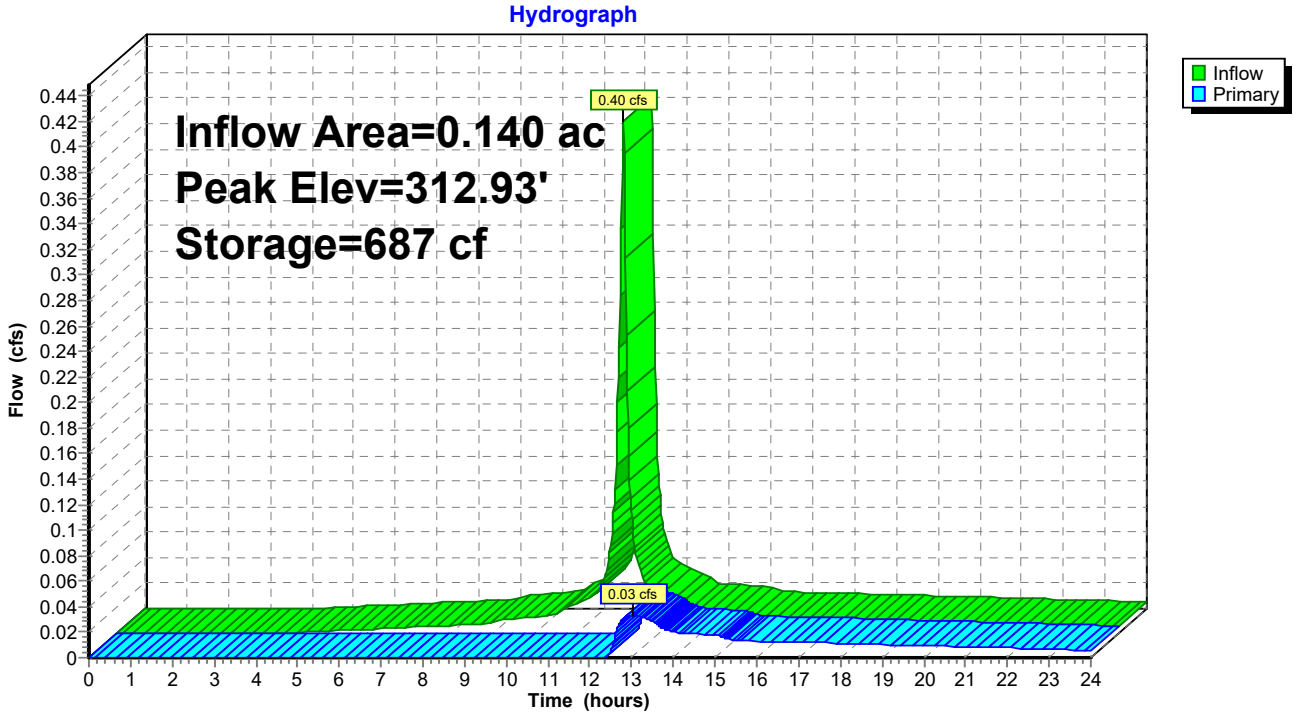
Volume	Invert	Avail.Storage	Storage Description
#1	312.00'	1,405 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.00	460	123.2	0	0	460
313.00	1,118	215.0	765	765	2,936
313.50	1,447	224.4	639	1,405	3,283

Device	Routing	Invert	Outlet Devices
#1	Primary	310.50'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 310.50' / 310.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	312.90'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	313.25'	**10.0' long x 10.0' breadth Overflow Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.03 cfs @ 13.02 hrs HW=312.93' (Free Discharge)
- **1=Culvert** (Passes 0.03 cfs of 5.25 cfs potential flow)
  - **2=Orifice/Grate** (Weir Controls 0.03 cfs @ 0.55 fps)
- **3=Overflow Spillway** (Controls 0.00 cfs)

Pond 4P:


Hydrograph
Inflow Area=0.140 ac
Peak Elev=312.93'
Storage=687 cf
0.40 cfs
0.03 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 0.02 0.04 0.06 0.08 0.1 0.12 0.14 0.16 0.18 0.2 0.22 0.24 0.26 0.28 0.3 0.32 0.34 0.36 0.38 0.4 0.42 0.44
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 4P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.00	0.00	312.51	0.00	313.02	0.28
312.01	0.00	312.52	0.00	313.03	0.32
312.02	0.00	312.53	0.00	313.04	0.36
312.03	0.00	312.54	0.00	313.05	0.40
312.04	0.00	312.55	0.00	313.06	0.44
312.05	0.00	312.56	0.00	313.07	0.48
312.06	0.00	312.57	0.00	313.08	0.52
312.07	0.00	312.58	0.00	313.09	0.57
312.08	0.00	312.59	0.00	313.10	0.61
312.09	0.00	312.60	0.00	313.11	0.66
312.10	0.00	312.61	0.00	313.12	0.71
312.11	0.00	312.62	0.00	313.13	0.76
312.12	0.00	312.63	0.00	313.14	0.81
312.13	0.00	312.64	0.00	313.15	0.84
312.14	0.00	312.65	0.00	313.16	0.86
312.15	0.00	312.66	0.00	313.17	0.87
312.16	0.00	312.67	0.00	313.18	0.89
312.17	0.00	312.68	0.00	313.19	0.91
312.18	0.00	312.69	0.00	313.20	0.92
312.19	0.00	312.70	0.00	313.21	0.94
312.20	0.00	312.71	0.00	313.22	0.95
312.21	0.00	312.72	0.00	313.23	0.97
312.22	0.00	312.73	0.00	313.24	0.98
312.23	0.00	312.74	0.00	313.25	0.99
312.24	0.00	312.75	0.00	313.26	1.03
312.25	0.00	312.76	0.00	313.27	1.09
312.26	0.00	312.77	0.00	313.28	1.17
312.27	0.00	312.78	0.00	313.29	1.25
312.28	0.00	312.79	0.00	313.30	1.34
312.29	0.00	312.80	0.00	313.31	1.44
312.30	0.00	312.81	0.00	313.32	1.55
312.31	0.00	312.82	0.00	313.33	1.67
312.32	0.00	312.83	0.00	313.34	1.79
312.33	0.00	312.84	0.00	313.35	1.91
312.34	0.00	312.85	0.00	313.36	2.05
312.35	0.00	312.86	0.00	313.37	2.19
312.36	0.00	312.87	0.00	313.38	2.33
312.37	0.00	312.88	0.00	313.39	2.48
312.38	0.00	312.89	0.00	313.40	2.64
312.39	0.00	312.90	0.00	313.41	2.79
312.40	0.00	312.91	0.01	313.42	2.96
312.41	0.00	312.92	0.02	313.43	3.13
312.42	0.00	312.93	0.04	313.44	3.30
312.43	0.00	312.94	0.05	313.45	3.47
312.44	0.00	312.95	0.08	313.46	3.66
312.45	0.00	312.96	0.10	313.47	3.85
312.46	0.00	312.97	0.13	313.48	4.04
312.47	0.00	312.98	0.15	313.49	4.24
312.48	0.00	312.99	0.18	313.50	**4.44**
312.49	0.00	313.00	0.22		
312.50	0.00	313.01	0.25		

Stage-Area-Storage for Pond 4P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.00	460	0
312.02	470	9
312.04	481	19
312.06	491	29
312.08	502	38
312.10	513	49
312.12	524	59
312.14	535	70
312.16	546	80
312.18	557	91
312.20	569	103
312.22	580	114
312.24	592	126
312.26	603	138
312.28	615	150
312.30	627	162
312.32	639	175
312.34	651	188
312.36	664	201
312.38	676	215
312.40	689	228
312.42	701	242
312.44	714	256
312.46	727	271
312.48	740	285
312.50	753	300
312.52	766	315
312.54	780	331
312.56	793	347
312.58	807	363
312.60	820	379
312.62	834	395
312.64	848	412
312.66	862	429
312.68	876	447
312.70	890	464
312.72	905	482
312.74	919	501
312.76	934	519
312.78	949	538
312.80	963	557
312.82	978	577
312.84	993	596
312.86	1,009	616
312.88	1,024	637
312.90	1,039	657
312.92	1,055	678
312.94	1,070	699
312.96	1,086	721
312.98	1,102	743
313.00	1,118	765
313.02	1,130	788
313.04	1,143	810
313.06	1,155	833
313.08	1,168	856
313.10	1,180	880
313.12	1,193	904
313.14	1,206	928
313.16	1,219	952
313.18	1,232	976
313.20	1,245	1,001
313.22	1,258	1,026
313.24	1,271	1,051
313.26	1,284	1,077
313.28	1,297	1,103
313.30	1,310	1,129
313.32	1,324	1,155
313.34	1,337	1,182
313.36	1,351	1,209
313.38	1,364	1,236
313.40	1,378	1,263
313.42	1,392	1,291
313.44	1,405	1,319
313.46	1,419	1,347
313.48	1,433	1,376
313.50	**1,447**	**1,405**

Summary for Pond 5P:

Inflow Area = 3.790 ac, 12.40% Impervious, Inflow Depth > 1.56" for 2-Year event
Inflow = 5.38 cfs @ 12.22 hrs, Volume= 0.492 af
Outflow = 5.29 cfs @ 12.24 hrs, Volume= 0.437 af, Atten= 2%, Lag= 1.2 min
Primary = 5.29 cfs @ 12.24 hrs, Volume= 0.437 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 309.45' @ 12.24 hrs Surf.Area= 2,659 sf Storage= 2,870 cf

Plug-Flow detention time= 84.6 min calculated for 0.437 af (89% of inflow)
Center-of-Mass det. time= 29.9 min (904.6 - 874.7)

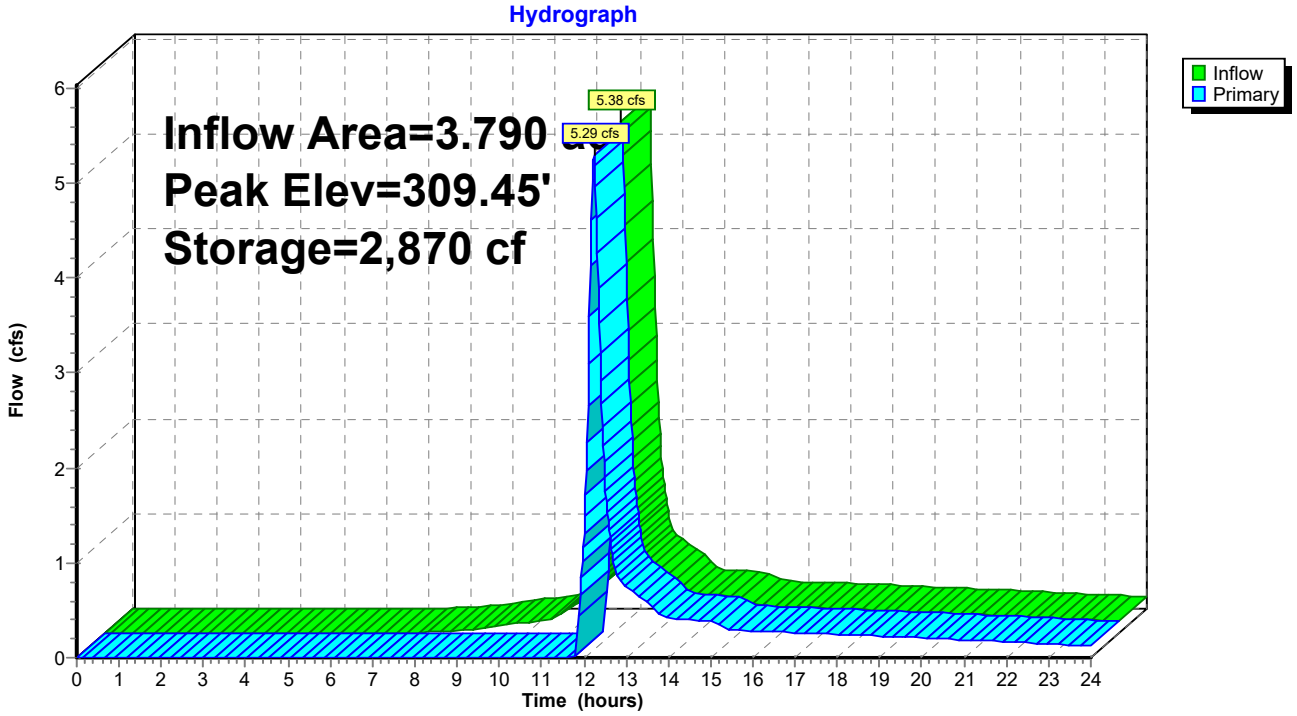
Volume	Invert	Avail.Storage	Storage Description
#1	308.00'	3,691 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.00	1,092	152.1	0	0	1,092
309.00	2,443	239.0	1,723	1,723	3,804
309.75	2,809	248.3	1,968	3,691	4,208

Device	Routing	Invert	Outlet Devices
#1	Primary	309.25'	**25.0' long x 6.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=5.28 cfs @ 12.24 hrs HW=309.45' (Free Discharge)
↑—**1=Primary Spillway** (Weir Controls 5.28 cfs @ 1.06 fps)

Pond 5P:


Hydrograph
Inflow Area=3.790
Peak Elev=309.45'
Storage=2,870 cf
5.38 cfs
5.29 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 5P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
308.00	0.00	308.51	0.00	309.02	0.00	309.53	8.99
308.01	0.00	308.52	0.00	309.03	0.00	309.54	9.50
308.02	0.00	308.53	0.00	309.04	0.00	309.55	10.02
308.03	0.00	308.54	0.00	309.05	0.00	309.56	10.56
308.04	0.00	308.55	0.00	309.06	0.00	309.57	11.11
308.05	0.00	308.56	0.00	309.07	0.00	309.58	11.66
308.06	0.00	308.57	0.00	309.08	0.00	309.59	12.23
308.07	0.00	308.58	0.00	309.09	0.00	309.60	12.81
308.08	0.00	308.59	0.00	309.10	0.00	309.61	13.40
308.09	0.00	308.60	0.00	309.11	0.00	309.62	14.00
308.10	0.00	308.61	0.00	309.12	0.00	309.63	14.62
308.11	0.00	308.62	0.00	309.13	0.00	309.64	15.24
308.12	0.00	308.63	0.00	309.14	0.00	309.65	15.87
308.13	0.00	308.64	0.00	309.15	0.00	309.66	16.54
308.14	0.00	308.65	0.00	309.16	0.00	309.67	17.21
308.15	0.00	308.66	0.00	309.17	0.00	309.68	17.89
308.16	0.00	308.67	0.00	309.18	0.00	309.69	18.59
308.17	0.00	308.68	0.00	309.19	0.00	309.70	19.30
308.18	0.00	308.69	0.00	309.20	0.00	309.71	20.02
308.19	0.00	308.70	0.00	309.21	0.00	309.72	20.75
308.20	0.00	308.71	0.00	309.22	0.00	309.73	21.50
308.21	0.00	308.72	0.00	309.23	0.00	309.74	22.26
308.22	0.00	308.73	0.00	309.24	0.00	309.75	**23.03**
308.23	0.00	308.74	0.00	309.25	0.00		
308.24	0.00	308.75	0.00	309.26	0.06		
308.25	0.00	308.76	0.00	309.27	0.17		
308.26	0.00	308.77	0.00	309.28	0.31		
308.27	0.00	308.78	0.00	309.29	0.47		
308.28	0.00	308.79	0.00	309.30	0.66		
308.29	0.00	308.80	0.00	309.31	0.87		
308.30	0.00	308.81	0.00	309.32	1.10		
308.31	0.00	308.82	0.00	309.33	1.34		
308.32	0.00	308.83	0.00	309.34	1.60		
308.33	0.00	308.84	0.00	309.35	1.87		
308.34	0.00	308.85	0.00	309.36	2.16		
308.35	0.00	308.86	0.00	309.37	2.46		
308.36	0.00	308.87	0.00	309.38	2.78		
308.37	0.00	308.88	0.00	309.39	3.10		
308.38	0.00	308.89	0.00	309.40	3.44		
308.39	0.00	308.90	0.00	309.41	3.79		
308.40	0.00	308.91	0.00	309.42	4.15		
308.41	0.00	308.92	0.00	309.43	4.52		
308.42	0.00	308.93	0.00	309.44	4.91		
308.43	0.00	308.94	0.00	309.45	5.30		
308.44	0.00	308.95	0.00	309.46	5.72		
308.45	0.00	308.96	0.00	309.47	6.15		
308.46	0.00	308.97	0.00	309.48	6.59		
308.47	0.00	308.98	0.00	309.49	7.05		
308.48	0.00	308.99	0.00	309.50	7.52		
308.49	0.00	309.00	0.00	309.51	7.99		
308.50	0.00	309.01	0.00	309.52	8.48		

Stage-Area-Storage for Pond 5P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
308.00	1,092	0
308.02	1,114	22
308.04	1,136	45
308.06	1,158	67
308.08	1,180	91
308.10	1,203	115
308.12	1,226	139
308.14	1,249	164
308.16	1,272	189
308.18	1,296	215
308.20	1,319	241
308.22	1,343	267
308.24	1,367	294
308.26	1,392	322
308.28	1,416	350
308.30	1,441	379
308.32	1,466	408
308.34	1,491	437
308.36	1,517	467
308.38	1,542	498
308.40	1,568	529
308.42	1,594	561
308.44	1,620	593
308.46	1,647	626
308.48	1,674	659
308.50	1,700	693
308.52	1,728	727
308.54	1,755	762
308.56	1,782	797
308.58	1,810	833
308.60	1,838	869
308.62	1,866	906
308.64	1,895	944
308.66	1,923	982
308.68	1,952	1,021
308.70	1,981	1,060
308.72	2,011	1,100
308.74	2,040	1,141
308.76	2,070	1,182
308.78	2,100	1,224
308.80	2,130	1,266
308.82	2,160	1,309
308.84	2,191	1,352
308.86	2,222	1,396
308.88	2,253	1,441
308.90	2,284	1,486
308.92	2,315	1,532
308.94	2,347	1,579
308.96	2,379	1,626
308.98	2,411	1,674
309.00	2,443	1,723
309.02	2,452	1,772
309.04	2,462	1,821
309.06	2,471	1,870
309.08	2,481	1,920
309.10	2,490	1,969
309.12	2,500	2,019
309.14	2,509	2,069
309.16	2,519	2,120
309.18	2,529	2,170
309.20	2,538	2,221
309.22	2,548	2,272
309.24	2,557	2,323
309.26	2,567	2,374
309.28	2,577	2,425
309.30	2,586	2,477
309.32	2,596	2,529
309.34	2,606	2,581
309.36	2,615	2,633
309.38	2,625	2,686
309.40	2,635	2,738
309.42	2,645	2,791
309.44	2,655	2,844
309.46	2,664	2,897
309.48	2,674	2,951
309.50	2,684	3,004
309.52	2,694	3,058
309.54	2,704	3,112
309.56	2,714	3,166
309.58	2,724	3,220
309.60	2,734	3,275
309.62	2,744	3,330
309.64	2,754	3,385
309.66	2,764	3,440
309.68	2,774	3,495
309.70	2,784	3,551
309.72	2,794	3,607
309.74	**2,804**	**3,663**

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1: Runoff Area=2.240 ac 62.05% Impervious Runoff Depth>4.17"
Flow Length=593' Tc=11.5 min CN=90 Runoff=8.77 cfs 0.779 af

SubcatchmentP1-2: Runoff Area=1.390 ac 15.83% Impervious Runoff Depth>2.98"
Flow Length=175' Tc=9.0 min CN=78 Runoff=4.56 cfs 0.345 af

SubcatchmentP1-3: Runoff Area=0.620 ac 8.06% Impervious Runoff Depth>2.88"
Flow Length=334' Tc=10.0 min CN=77 Runoff=1.88 cfs 0.149 af

SubcatchmentP1-4: Runoff Area=0.140 ac 50.00% Impervious Runoff Depth>4.29"
Tc=6.0 min CN=91 Runoff=0.70 cfs 0.050 af

SubcatchmentP1-5: Runoff Area=3.790 ac 12.40% Impervious Runoff Depth>3.26"
Flow Length=412' Tc=13.6 min CN=81 Runoff=11.23 cfs 1.029 af

SubcatchmentP1-6: Runoff Area=2.540 ac 0.00% Impervious Runoff Depth>2.61"
Flow Length=351' Tc=10.7 min CN=74 Runoff=6.79 cfs 0.553 af

SubcatchmentP1-7: Runoff Area=6.000 ac 0.00% Impervious Runoff Depth>2.97"
Flow Length=385' Tc=15.4 min CN=78 Runoff=15.33 cfs 1.486 af

SubcatchmentP1-8: Runoff Area=9.110 ac 4.94% Impervious Runoff Depth>2.79"
Flow Length=496' Tc=12.5 min CN=76 Runoff=24.21 cfs 2.119 af

Reach 1R: Batterson Park Pond Inflow=70.52 cfs 6.322 af
Outflow=70.52 cfs 6.322 af

Reach 2R: Flow to Flared End Inflow=2.38 cfs 0.178 af
Outflow=2.38 cfs 0.178 af

Pond 1P: Peak Elev=307.56' Storage=6,028 cf Inflow=8.77 cfs 0.779 af
Outflow=8.69 cfs 0.676 af

Pond 2P: Peak Elev=312.79' Storage=1,688 cf Inflow=4.56 cfs 0.345 af
8.0" Round Culvert x 2.00 n=0.011 L=11.0' S=0.0391 '/' Outflow=3.07 cfs 0.335 af

Pond 3P: Peak Elev=314.28' Storage=331 cf Inflow=1.88 cfs 0.149 af
Outflow=1.86 cfs 0.143 af

Pond 4P: Peak Elev=313.08' Storage=856 cf Inflow=0.70 cfs 0.050 af
Outflow=0.52 cfs 0.035 af

Pond 5P: Peak Elev=309.57' Storage=3,194 cf Inflow=11.23 cfs 1.029 af
Outflow=11.13 cfs 0.974 af

Total Runoff Area = 25.830 ac Runoff Volume = 6.511 af Average Runoff Depth = 3.02"
89.74% Pervious = 23.180 ac 10.26% Impervious = 2.650 ac

Summary for Subcatchment P1-1:

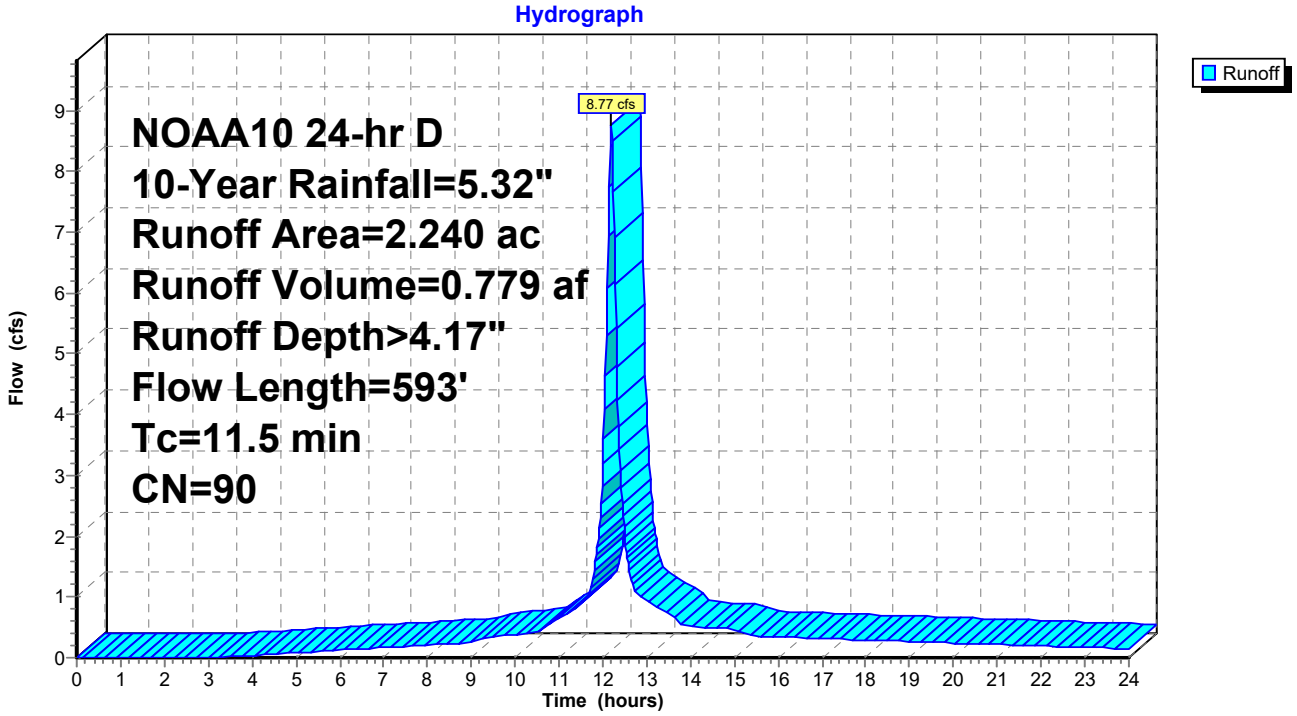
Runoff = 8.77 cfs @ 12.19 hrs, Volume= 0.779 af, Depth> 4.17"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

	Area (ac)	CN	Description
	0.170	74	>75% Grass cover, Good, HSG C
	0.460	80	>75% Grass cover, Good, HSG D
	0.220	70	Woods, Good, HSG C
	0.000	77	Woods, Good, HSG D
*	0.000	73	Brush, Good, HSG D
	0.000	96	Gravel surface, HSG D
	1.390	98	Paved parking, HSG D
	2.240	90	Weighted Average
	0.850		37.95% Pervious Area
	1.390		62.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.1700	0.19		**Sheet Flow, Seg 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	96	0.1000	5.09		**Shallow Concentrated Flow, Seg 2** Unpaved Kv= 16.1 fps
0.9	191	0.0340	3.74		**Shallow Concentrated Flow, Seg 3** Paved Kv= 20.3 fps
1.3	206	0.0170	2.65		**Shallow Concentrated Flow, Seg 4** Paved Kv= 20.3 fps
11.5	593	Total			

Subcatchment P1-1:



Summary for Subcatchment P1-2:

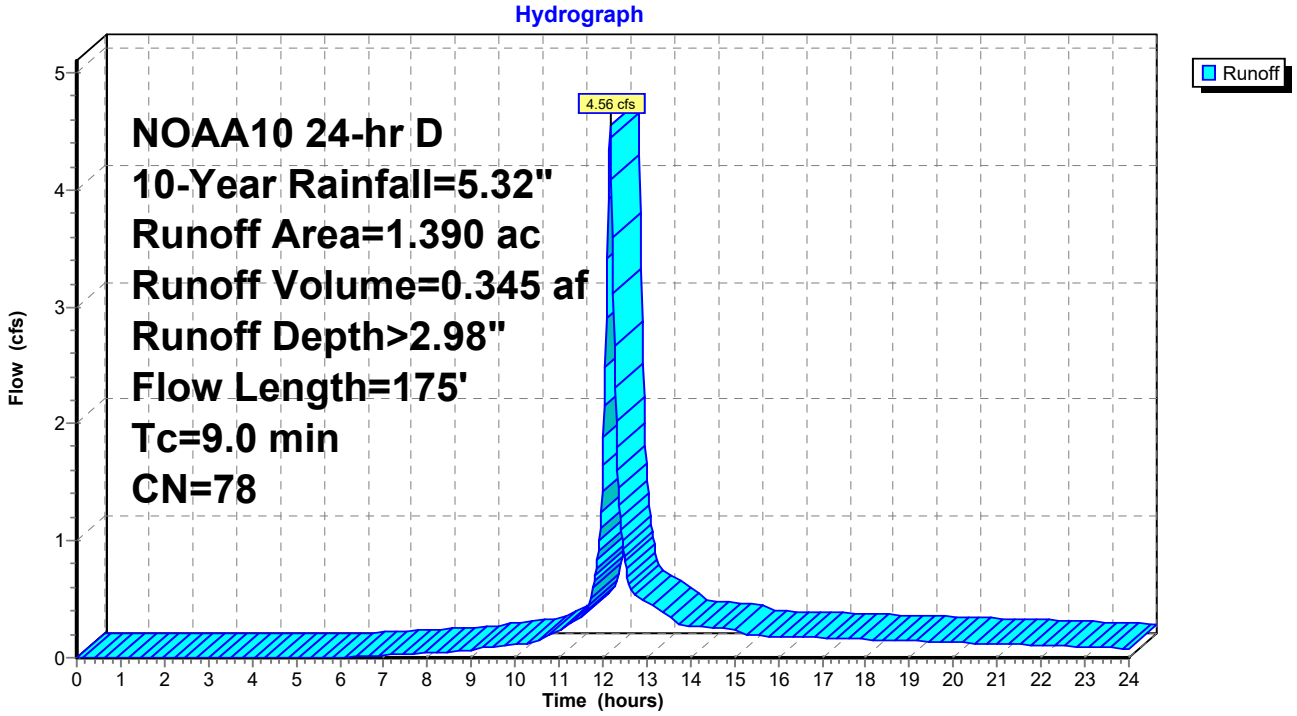
Runoff = 4.56 cfs @ 12.16 hrs, Volume= 0.345 af, Depth> 2.98"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
1.010	74	>75% Grass cover, Good, HSG C
0.160	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.220	98	Paved parking, HSG D
1.390	78	Weighted Average
1.170		84.17% Pervious Area
0.220		15.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.1800	0.19		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	75	0.1500	6.24		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
9.0	175	Total			

Subcatchment P1-2:



Summary for Subcatchment P1-3:

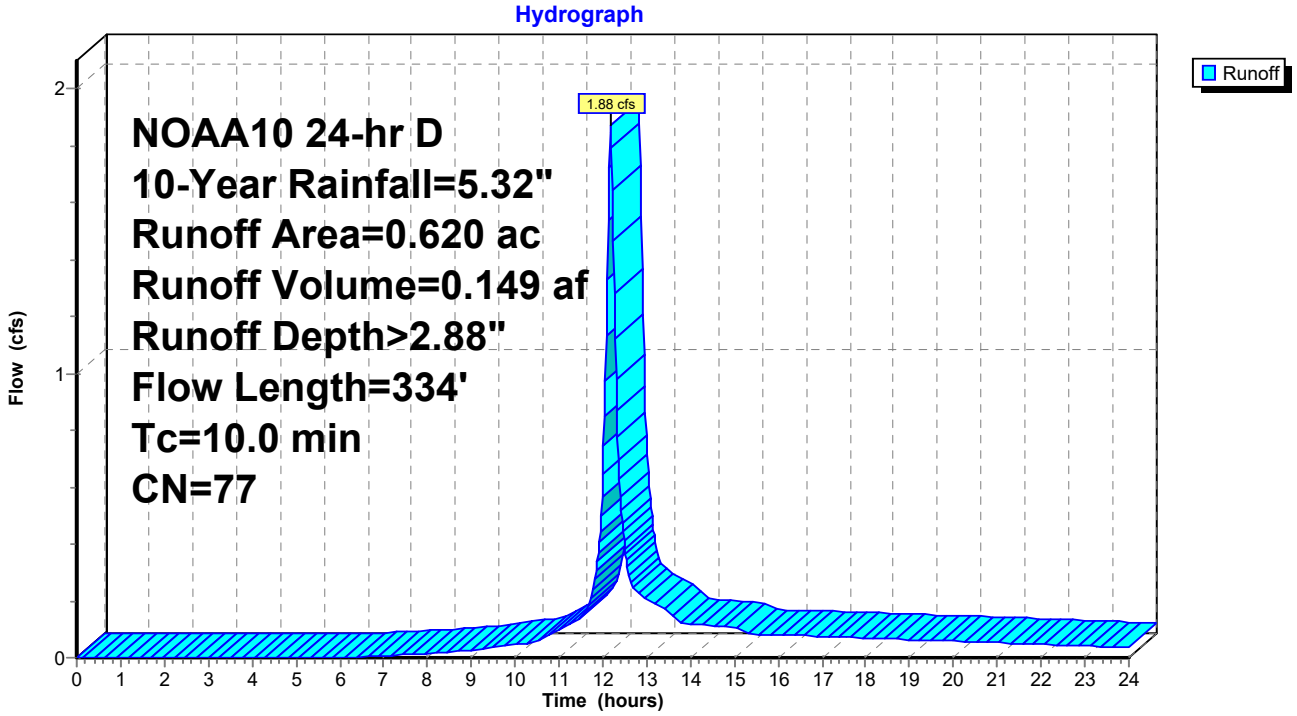
Runoff = 1.88 cfs @ 12.18 hrs, Volume= 0.149 af, Depth> 2.88"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
0.080	74	>75% Grass cover, Good, HSG C
0.000	80	>75% Grass cover, Good, HSG D
0.400	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.050	98	Paved parking, HSG D
0.620	77	Weighted Average
0.570		91.94% Pervious Area
0.050		8.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1650	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	111	0.1100	5.34		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	123	0.0500	3.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.0	334	Total			

Subcatchment P1-3:



Summary for Subcatchment P1-4:

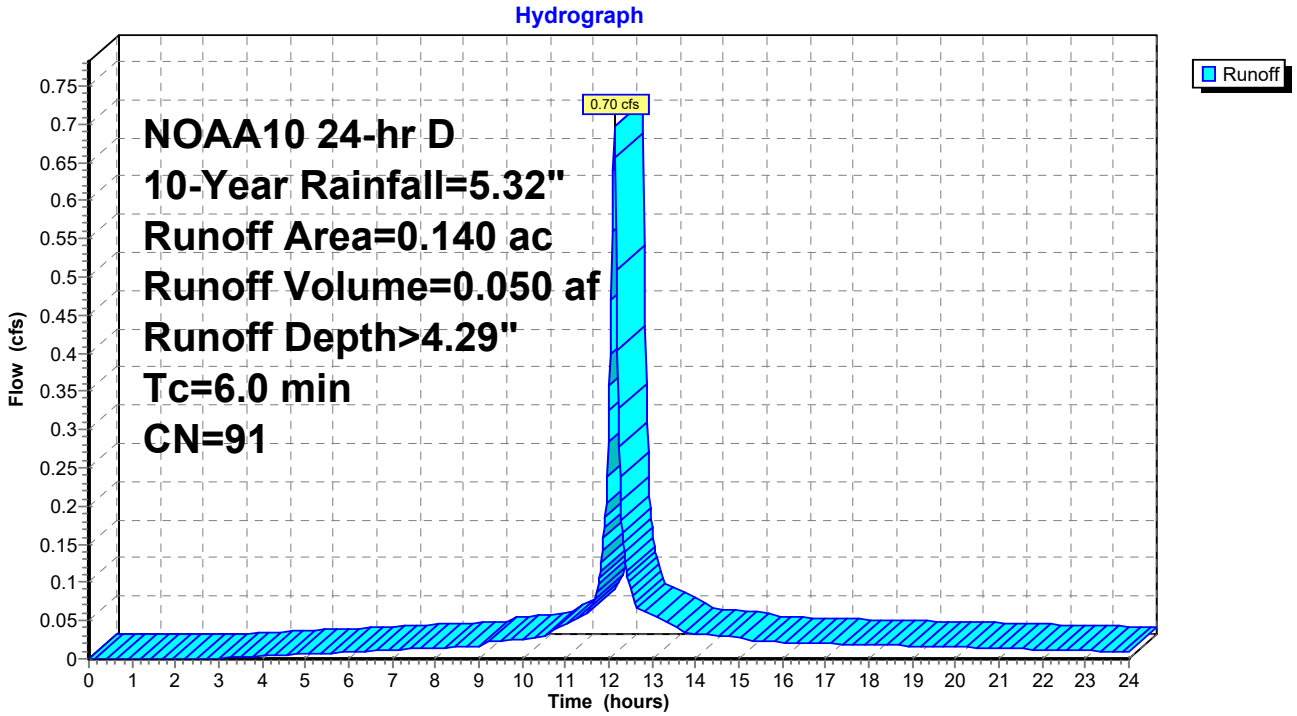
Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.050 af, Depth> 4.29"
Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.050	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.020	96	Gravel surface, HSG D
0.070	98	Paved parking, HSG D
0.140	91	Weighted Average
0.070		50.00% Pervious Area
0.070		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. time to pond**

Subcatchment P1-4:



Summary for Subcatchment P1-5:

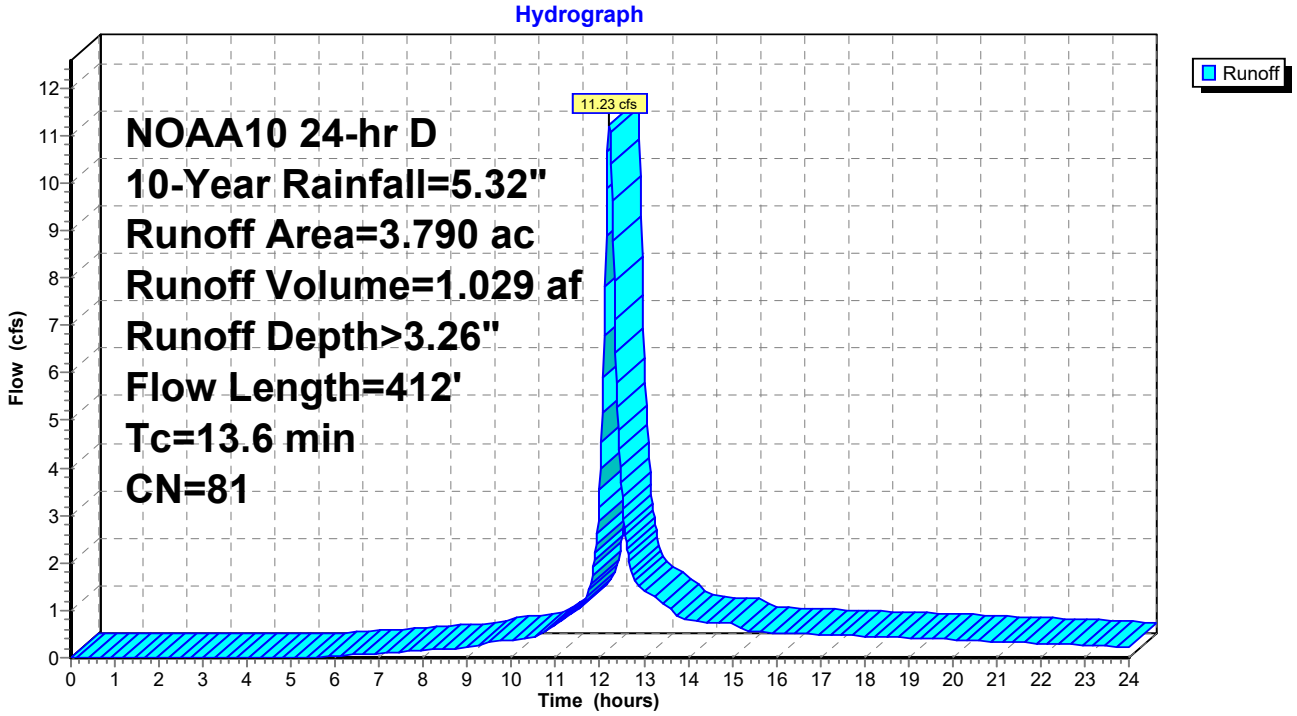
Runoff = 11.23 cfs @ 12.21 hrs, Volume= 1.029 af, Depth> 3.26"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
0.210	74	>75% Grass cover, Good, HSG C
2.470	80	>75% Grass cover, Good, HSG D
0.150	70	Woods, Good, HSG C
0.440	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.050	96	Gravel surface, HSG D
0.470	98	Paved parking, HSG D
3.790	81	Weighted Average
3.320		87.60% Pervious Area
0.470		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0750	0.13		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	185	0.0680	4.20		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.5	127	0.0600	3.94		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
13.6	412	Total			

Subcatchment P1-5:



Summary for Subcatchment P1-6:

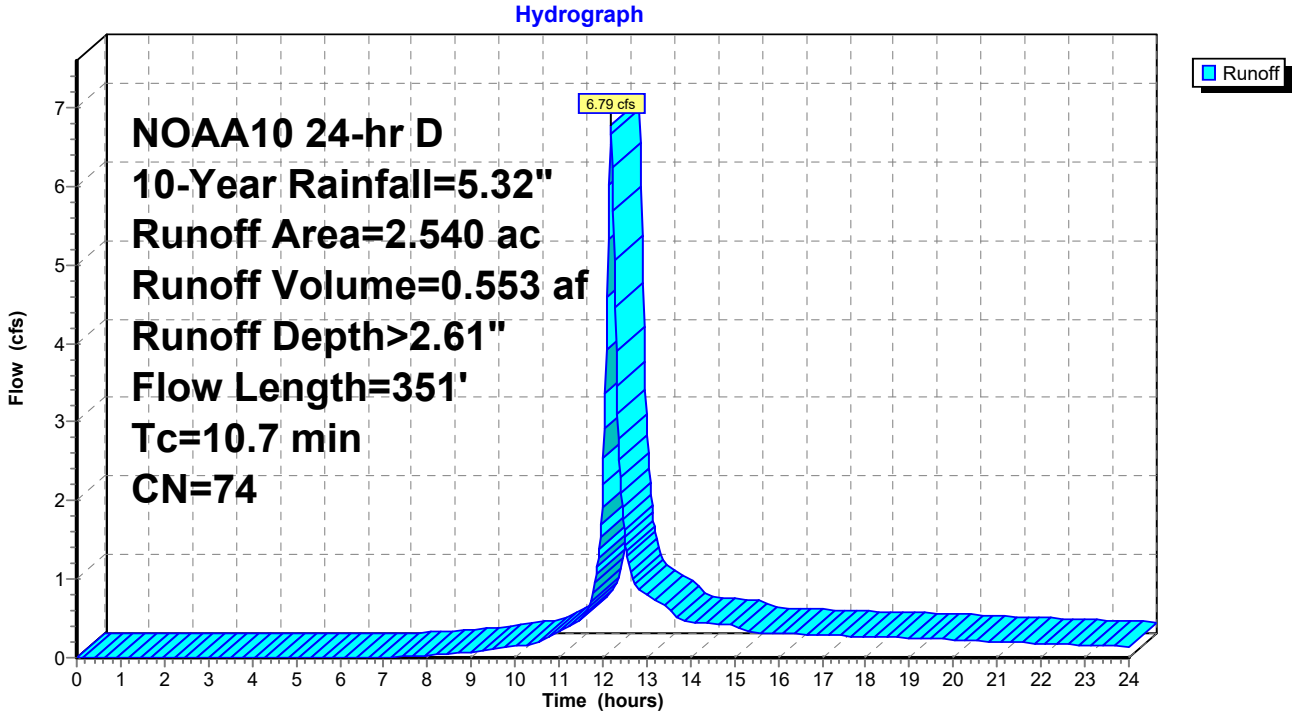
Runoff = 6.79 cfs @ 12.18 hrs, Volume= 0.553 af, Depth> 2.61"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
0.190	74	>75% Grass cover, Good, HSG C
0.190	80	>75% Grass cover, Good, HSG D
0.990	70	Woods, Good, HSG C
1.170	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
2.540	74	Weighted Average
2.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1500	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	81	0.2040	7.27		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
1.1	170	0.0260	2.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.7	351	Total			

Subcatchment P1-6:



Summary for Subcatchment P1-7:

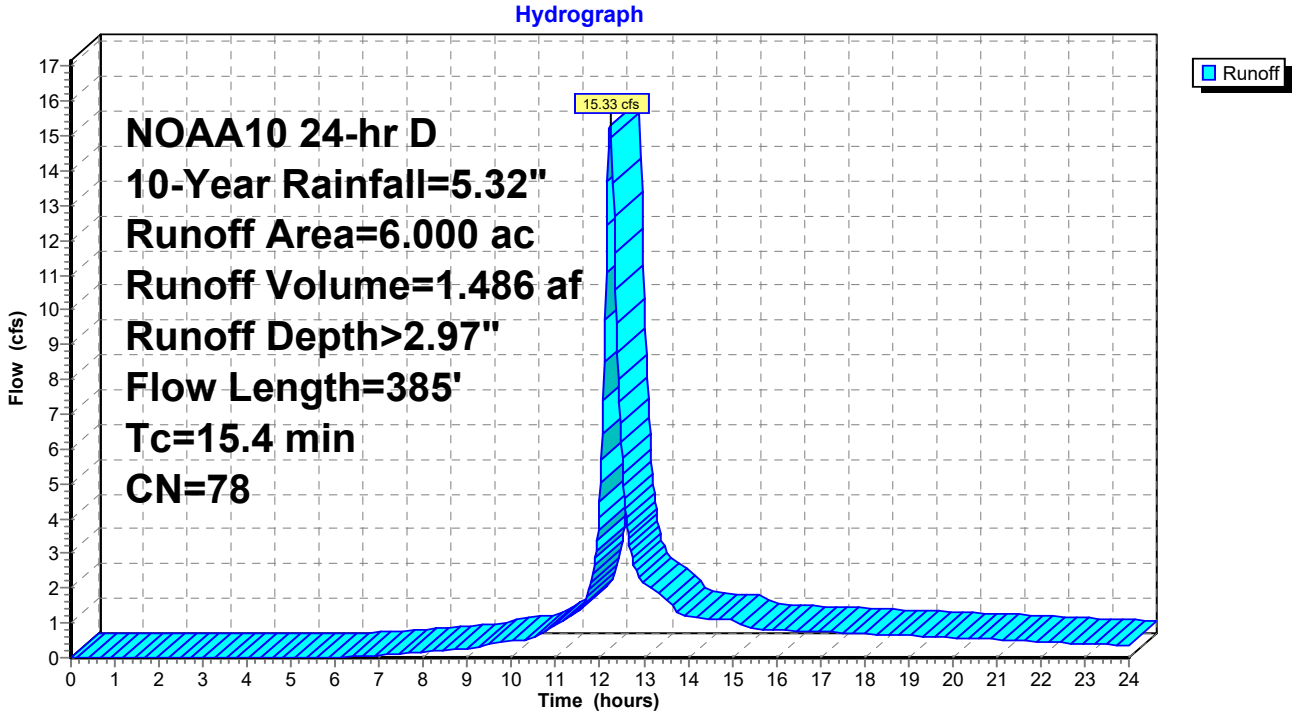
Runoff = 15.33 cfs @ 12.24 hrs, Volume= 1.486 af, Depth> 2.97"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
2.620	74	>75% Grass cover, Good, HSG C
1.990	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.360	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
6.000	78	Weighted Average
6.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	176	0.0650	4.10		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	109	0.0400	3.22		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment P1-7:



Summary for Subcatchment P1-8:

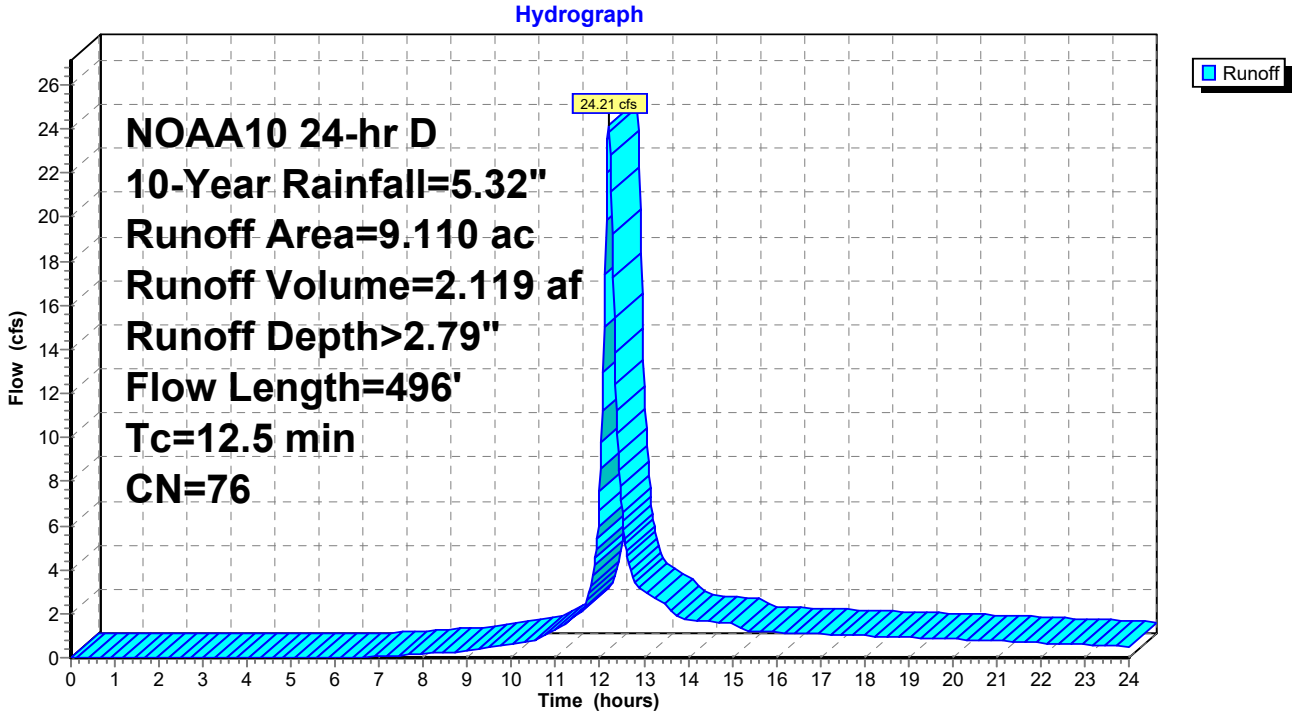
Runoff = 24.21 cfs @ 12.20 hrs, Volume= 2.119 af, Depth> 2.79"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 10-Year Rainfall=5.32"

Area (ac)	CN	Description
2.470	74	>75% Grass cover, Good, HSG C
2.130	80	>75% Grass cover, Good, HSG D
1.020	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
2.950	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.450	98	Paved parking, HSG D
9.110	76	Weighted Average
8.660		95.06% Pervious Area
0.450		4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1320	0.17		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.4	122	0.0890	4.80		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
2.2	274	0.0160	2.04		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
12.5	496	Total			

Subcatchment P1-8:



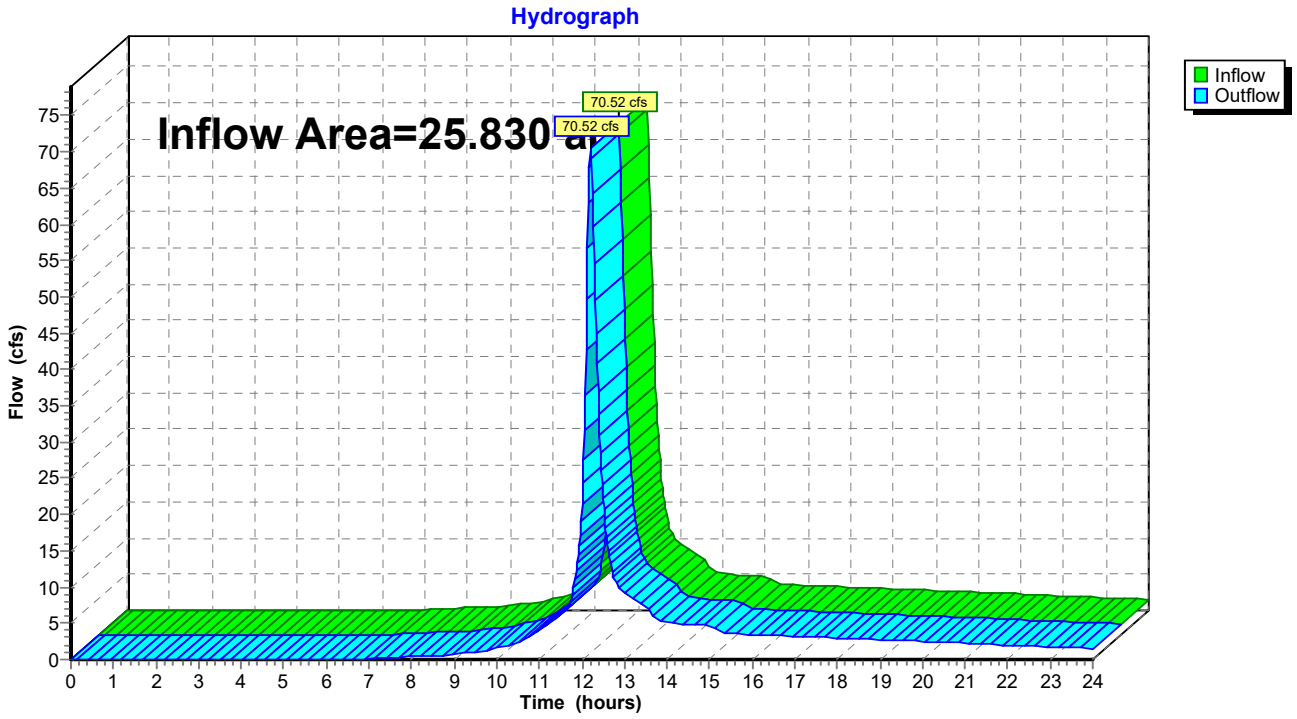
Summary for Reach 1R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 10.26% Impervious, Inflow Depth > 2.94" for 10-Year event
Inflow = 70.52 cfs @ 12.21 hrs, Volume= 6.322 af
Outflow = 70.52 cfs @ 12.21 hrs, Volume= 6.322 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: Batterson Park Pond



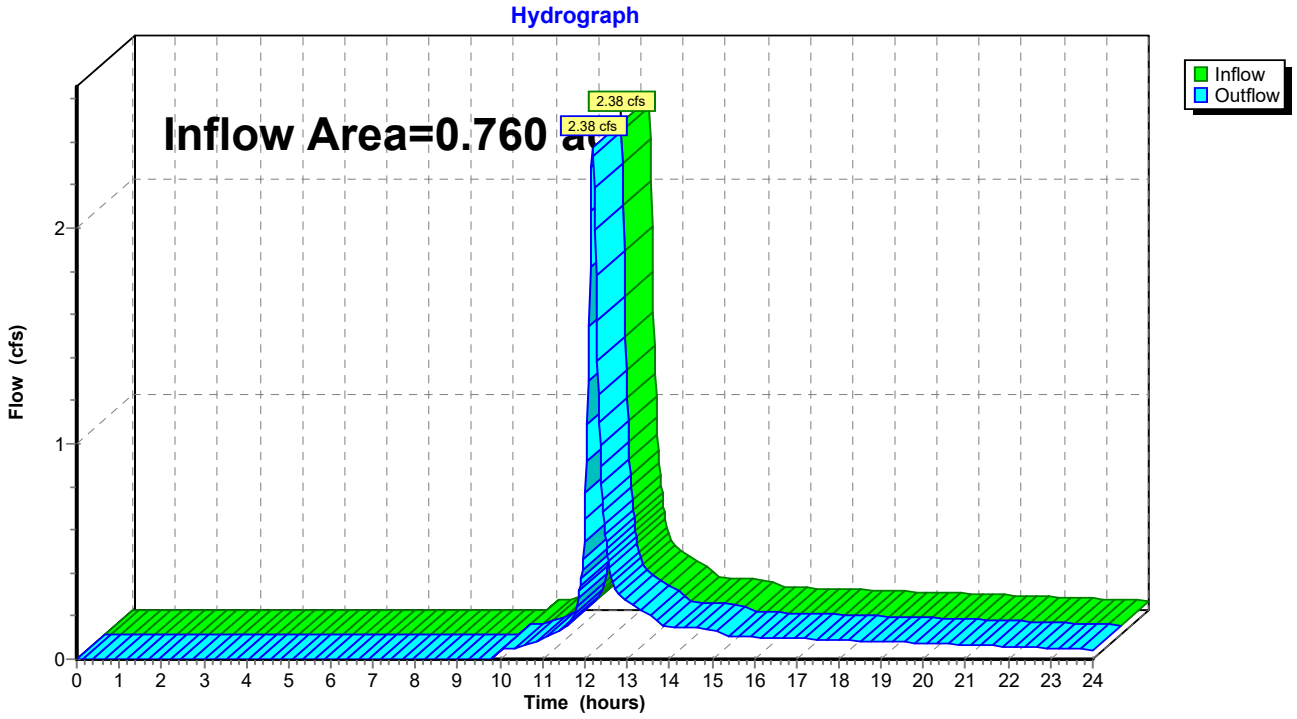
Summary for Reach 2R: Flow to Flared End

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

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 2.81" for 10-Year event
Inflow = 2.38 cfs @ 12.18 hrs, Volume= 0.178 af
Outflow = 2.38 cfs @ 12.18 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Flow to Flared End



Summary for Pond 1P:

Inflow Area = 2.240 ac, 62.05% Impervious, Inflow Depth > 4.17" for 10-Year event
Inflow = 8.77 cfs @ 12.19 hrs, Volume= 0.779 af
Outflow = 8.69 cfs @ 12.20 hrs, Volume= 0.676 af, Atten= 1%, Lag= 0.7 min
Primary = 8.69 cfs @ 12.20 hrs, Volume= 0.676 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 307.56' @ 12.20 hrs Surf.Area= 4,899 sf Storage= 6,028 cf

Plug-Flow detention time= 121.6 min calculated for 0.676 af (87% of inflow)
Center-of-Mass det. time= 54.3 min (860.3 - 806.0)

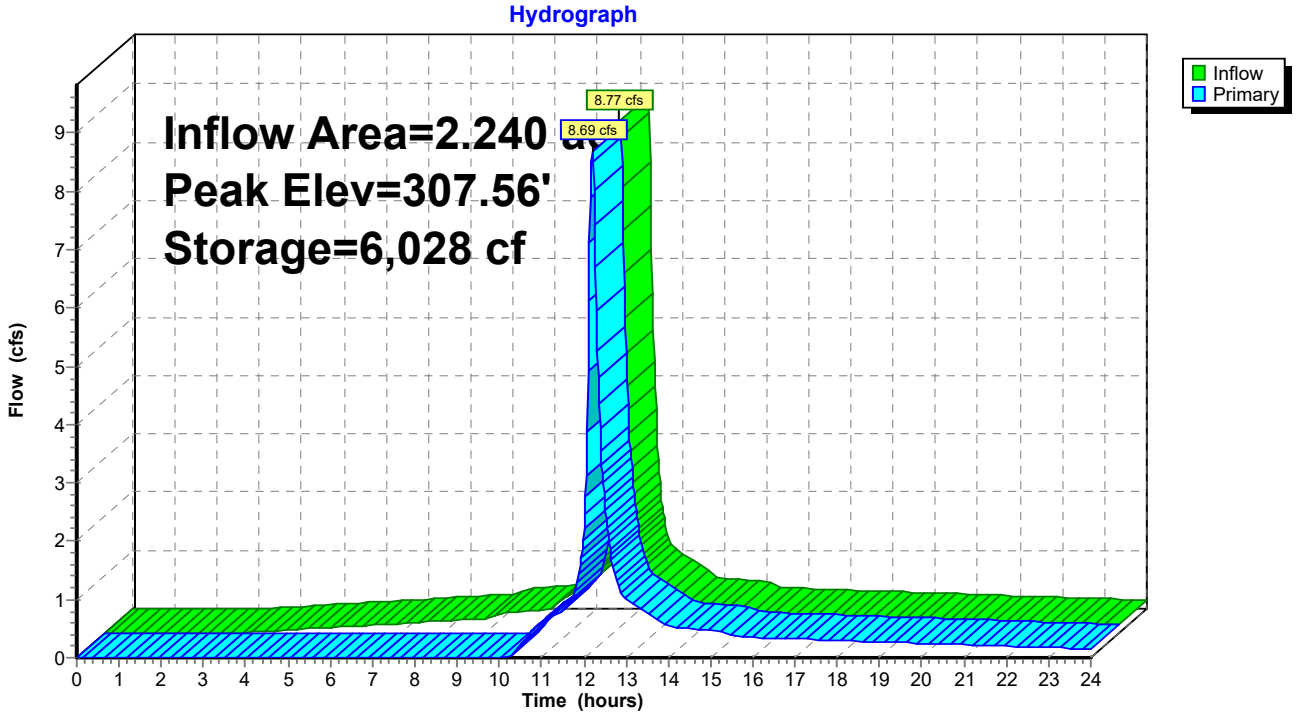
Volume	Invert	Avail.Storage	Storage Description
#1	306.00'	8,662 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.00	353	70.9	0	0	353
306.50	4,079	368.1	939	939	10,736
307.00	4,639	377.5	2,178	3,117	11,324
307.50	5,669	288.9	2,573	5,689	16,026
308.00	1,153	143.1	1,563	7,252	21,039
309.00	1,682	177.1	1,409	8,662	21,920

Device	Routing	Invert	Outlet Devices
#1	Primary	307.25'	**10.0' long x 25.0' breadth Primary Spillway**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	307.50'	**90.0' long x 25.0' breadth Top of pond overflow**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=8.65 cfs @ 12.20 hrs HW=307.56' (Free Discharge)
1=Primary Spillway (Weir Controls 4.74 cfs @ 1.51 fps)
2=Top of pond overflow (Weir Controls 3.91 cfs @ 0.68 fps)

Pond 1P:


Hydrograph
Inflow Area=2.240 a
Peak Elev=307.56'
Storage=6,028 cf
8.77 cfs
8.69 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 1P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
306.00	0.00	307.02	0.00	308.04	114.98
306.02	0.00	307.04	0.00	308.06	121.07
306.04	0.00	307.06	0.00	308.08	127.29
306.06	0.00	307.08	0.00	308.10	133.61
306.08	0.00	307.10	0.00	308.12	139.76
306.10	0.00	307.12	0.00	308.14	145.99
306.12	0.00	307.14	0.00	308.16	152.29
306.14	0.00	307.16	0.00	308.18	158.67
306.16	0.00	307.18	0.00	308.20	165.11
306.18	0.00	307.20	0.00	308.22	171.62
306.20	0.00	307.22	0.00	308.24	178.19
306.22	0.00	307.24	0.00	308.26	184.84
306.24	0.00	307.26	0.03	308.28	191.56
306.26	0.00	307.28	0.14	308.30	198.34
306.28	0.00	307.30	0.30	308.32	205.51
306.30	0.00	307.32	0.50	308.34	212.76
306.32	0.00	307.34	0.72	308.36	220.10
306.34	0.00	307.36	0.98	308.38	227.51
306.36	0.00	307.38	1.26	308.40	235.01
306.38	0.00	307.40	1.56	308.42	242.58
306.40	0.00	307.42	1.88	308.44	250.23
306.42	0.00	307.44	2.22	308.46	257.95
306.44	0.00	307.46	2.58	308.48	265.74
306.46	0.00	307.48	2.96	308.50	273.60
306.48	0.00	307.50	3.36	308.52	281.71
306.50	0.00	307.52	4.45	308.54	289.91
306.52	0.00	307.54	6.13	308.56	298.20
306.54	0.00	307.56	8.19	308.58	306.56
306.56	0.00	307.58	10.56	308.60	315.01
306.58	0.00	307.60	13.21	308.62	323.53
306.60	0.00	307.62	16.10	308.64	332.14
306.62	0.00	307.64	19.21	308.66	340.82
306.64	0.00	307.66	22.53	308.68	349.56
306.66	0.00	307.68	26.03	308.70	358.38
306.68	0.00	307.70	29.72	308.72	367.16
306.70	0.00	307.72	33.61	308.74	376.01
306.72	0.00	307.74	37.66	308.76	384.93
306.74	0.00	307.76	41.88	308.78	393.92
306.76	0.00	307.78	46.26	308.80	402.98
306.78	0.00	307.80	50.79	308.82	412.10
306.80	0.00	307.82	55.48	308.84	421.30
306.82	0.00	307.84	60.30	308.86	430.57
306.84	0.00	307.86	65.26	308.88	439.91
306.86	0.00	307.88	70.34	308.90	449.33
306.88	0.00	307.90	75.55	308.92	458.66
306.90	0.00	307.92	80.83	308.94	468.04
306.92	0.00	307.94	86.24	308.96	477.49
306.94	0.00	307.96	91.77	308.98	486.99
306.96	0.00	307.98	97.41	309.00	**496.56**
306.98	0.00	308.00	103.16		
307.00	0.00	308.02	109.02		

Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
306.00	353	0
306.05	543	22
306.10	773	55
306.15	1,044	100
306.20	1,356	160
306.25	1,708	236
306.30	2,101	332
306.35	2,534	447
306.40	3,009	586
306.45	3,524	749
306.50	4,079	939
306.55	4,133	1,144
306.60	4,188	1,352
306.65	4,243	1,563
306.70	4,299	1,776
306.75	4,354	1,993
306.80	4,411	2,212
306.85	4,467	2,434
306.90	4,524	2,659
306.95	4,581	2,886
307.00	4,639	3,117
307.05	4,737	3,351
307.10	4,837	3,590
307.15	4,937	3,835
307.20	5,039	4,084
307.25	5,141	4,339
307.30	5,245	4,598
307.35	5,349	4,863
307.40	5,455	5,133
307.45	5,561	5,409
307.50	**5,669**	5,689
307.55	5,064	5,958
307.60	4,492	6,196
307.65	3,955	6,407
307.70	3,453	6,592
307.75	2,984	6,753
307.80	2,549	6,891
307.85	2,149	7,009
307.90	1,783	7,107
307.95	1,451	7,188
308.00	1,153	7,252
308.05	1,177	7,311
308.10	1,201	7,370
308.15	1,226	7,431
308.20	1,251	7,493
308.25	1,276	7,556
308.30	1,301	7,620
308.35	1,327	7,686
308.40	1,353	7,753
308.45	1,379	7,821
308.50	1,405	7,891
308.55	1,432	7,962
308.60	1,458	8,034
308.65	1,486	8,108
308.70	1,513	8,183
308.75	1,540	8,259
308.80	1,568	8,337
308.85	1,596	8,416
308.90	1,625	8,496
308.95	1,653	8,578
309.00	1,682	**8,662**

Summary for Pond 2P:

Inflow Area = 1.390 ac, 15.83% Impervious, Inflow Depth > 2.98" for 10-Year event
Inflow = 4.56 cfs @ 12.16 hrs, Volume= 0.345 af
Outflow = 3.07 cfs @ 12.24 hrs, Volume= 0.335 af, Atten= 33%, Lag= 4.8 min
Primary = 3.07 cfs @ 12.24 hrs, Volume= 0.335 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 312.79' @ 12.24 hrs Surf.Area= 1,757 sf Storage= 1,688 cf

Plug-Flow detention time= 31.8 min calculated for 0.335 af (97% of inflow)
Center-of-Mass det. time= 15.1 min (868.1 - 853.0)

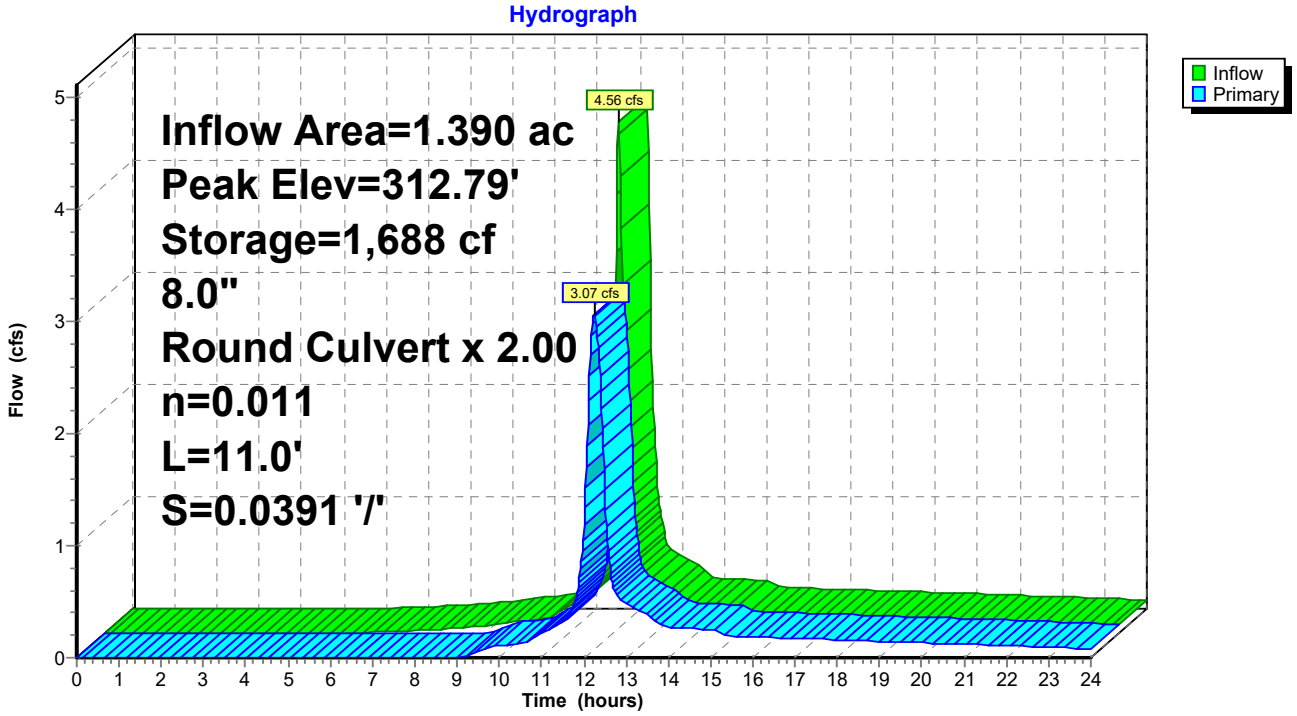
Volume	Invert	Avail.Storage	Storage Description
#1	311.00'	4,013 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
311.00	474	88.9	0	0	474
312.00	872	164.1	663	663	1,993
313.00	2,035	374.0	1,413	2,076	10,985
313.50	2,457	386.0	1,121	3,197	11,736
314.00	928	131.1	816	4,013	22,225

Device	Routing	Invert	Outlet Devices
#1	Primary	311.63'	**8.0" Round Culvert X 2.00** L= 11.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.63' / 311.20' S= 0.0391 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=3.06 cfs @ 12.24 hrs HW=312.79' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.06 cfs @ 4.39 fps)

Pond 2P:


Hydrograph
Inflow Area=1.390 ac
Peak Elev=312.79'
Storage=1,688 cf
8.0"
Round Culvert x 2.00
n=0.011
L=11.0'
S=0.0391 '/'
4.56 cfs
3.07 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 2P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
311.00	0.00	312.02	0.90	313.04	3.49
311.02	0.00	312.04	0.98	313.06	3.52
311.04	0.00	312.06	1.06	313.08	3.55
311.06	0.00	312.08	1.15	313.10	3.58
311.08	0.00	312.10	1.23	313.12	3.62
311.10	0.00	312.12	1.31	313.14	3.65
311.12	0.00	312.14	1.39	313.16	3.68
311.14	0.00	312.16	1.48	313.18	3.71
311.16	0.00	312.18	1.56	313.20	3.74
311.18	0.00	312.20	1.63	313.22	3.77
311.20	0.00	312.22	1.71	313.24	3.80
311.22	0.00	312.24	1.78	313.26	3.83
311.24	0.00	312.26	1.85	313.28	3.86
311.26	0.00	312.28	1.90	313.30	3.89
311.28	0.00	312.30	1.95	313.32	3.92
311.30	0.00	312.32	2.01	313.34	3.94
311.32	0.00	312.34	2.06	313.36	3.97
311.34	0.00	312.36	2.12	313.38	4.00
311.36	0.00	312.38	2.17	313.40	4.03
311.38	0.00	312.40	2.22	313.42	4.06
311.40	0.00	312.42	2.27	313.44	4.08
311.42	0.00	312.44	2.32	313.46	4.11
311.44	0.00	312.46	2.37	313.48	4.14
311.46	0.00	312.48	2.42	313.50	4.17
311.48	0.00	312.50	2.46	313.52	4.19
311.50	0.00	312.52	2.51	313.54	4.22
311.52	0.00	312.54	2.55	313.56	4.25
311.54	0.00	312.56	2.60	313.58	4.27
311.56	0.00	312.58	2.64	313.60	4.30
311.58	0.00	312.60	2.68	313.62	4.33
311.60	0.00	312.62	2.72	313.64	4.35
311.62	0.00	312.64	2.77	313.66	4.38
311.64	0.00	312.66	2.81	313.68	4.40
311.66	0.01	312.68	2.85	313.70	4.43
311.68	0.02	312.70	2.89	313.72	4.46
311.70	0.04	312.72	2.92	313.74	4.48
311.72	0.06	312.74	2.96	313.76	4.51
311.74	0.09	312.76	3.00	313.78	4.53
311.76	0.12	312.78	3.04	313.80	4.56
311.78	0.16	312.80	3.07	313.82	4.58
311.80	0.20	312.82	3.11	313.84	4.60
311.82	0.24	312.84	3.15	313.86	4.63
311.84	0.29	312.86	3.18	313.88	4.65
311.86	0.35	312.88	3.22	313.90	4.68
311.88	0.41	312.90	3.25	313.92	4.70
311.90	0.47	312.92	3.29	313.94	4.73
311.92	0.53	312.94	3.32	313.96	4.75
311.94	0.60	312.96	3.36	313.98	4.77
311.96	0.67	312.98	3.39	314.00	**4.80**
311.98	0.75	313.00	3.42		
312.00	0.82	313.02	3.46		

Stage-Area-Storage for Pond 2P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
311.00	474	0
311.05	491	24
311.10	508	49
311.15	526	75
311.20	544	102
311.25	562	129
311.30	581	158
311.35	600	187
311.40	619	218
311.45	638	249
311.50	658	282
311.55	678	315
311.60	698	350
311.65	719	385
311.70	740	421
311.75	761	459
311.80	783	498
311.85	805	537
311.90	827	578
311.95	849	620
312.00	872	663
312.05	919	708
312.10	966	755
312.15	1,015	804
312.20	1,066	856
312.25	1,117	911
312.30	1,170	968
312.35	1,224	1,028
312.40	1,279	1,091
312.45	1,335	1,156
312.50	1,393	1,224
312.55	1,452	1,295
312.60	1,512	1,369
312.65	1,573	1,446
312.70	1,635	1,527
312.75	1,699	1,610
312.80	1,764	1,696
312.85	1,830	1,786
312.90	1,897	1,879
312.95	1,965	1,976
313.00	2,035	2,076
313.05	2,075	2,179
313.10	2,116	2,284
313.15	2,157	2,390
313.20	2,199	2,499
313.25	2,241	2,610
313.30	2,283	2,723
313.35	2,326	2,839
313.40	2,369	2,956
313.45	2,413	3,076
313.50	**2,457**	3,197
313.55	2,271	3,316
313.60	2,093	3,425
313.65	1,922	3,525
313.70	1,758	3,617
313.75	1,601	3,701
313.80	1,452	3,777
313.85	1,310	3,846
313.90	1,175	3,908
313.95	1,048	3,964
314.00	928	**4,013**

Summary for Pond 3P:

Inflow Area = 0.620 ac, 8.06% Impervious, Inflow Depth > 2.88" for 10-Year event
Inflow = 1.88 cfs @ 12.18 hrs, Volume= 0.149 af
Outflow = 1.86 cfs @ 12.19 hrs, Volume= 0.143 af, Atten= 1%, Lag= 0.6 min
Primary = 1.86 cfs @ 12.19 hrs, Volume= 0.143 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 314.28' @ 12.19 hrs Surf.Area= 380 sf Storage= 331 cf

Plug-Flow detention time= 34.1 min calculated for 0.143 af (96% of inflow)
Center-of-Mass det. time= 13.6 min (870.9 - 857.3)

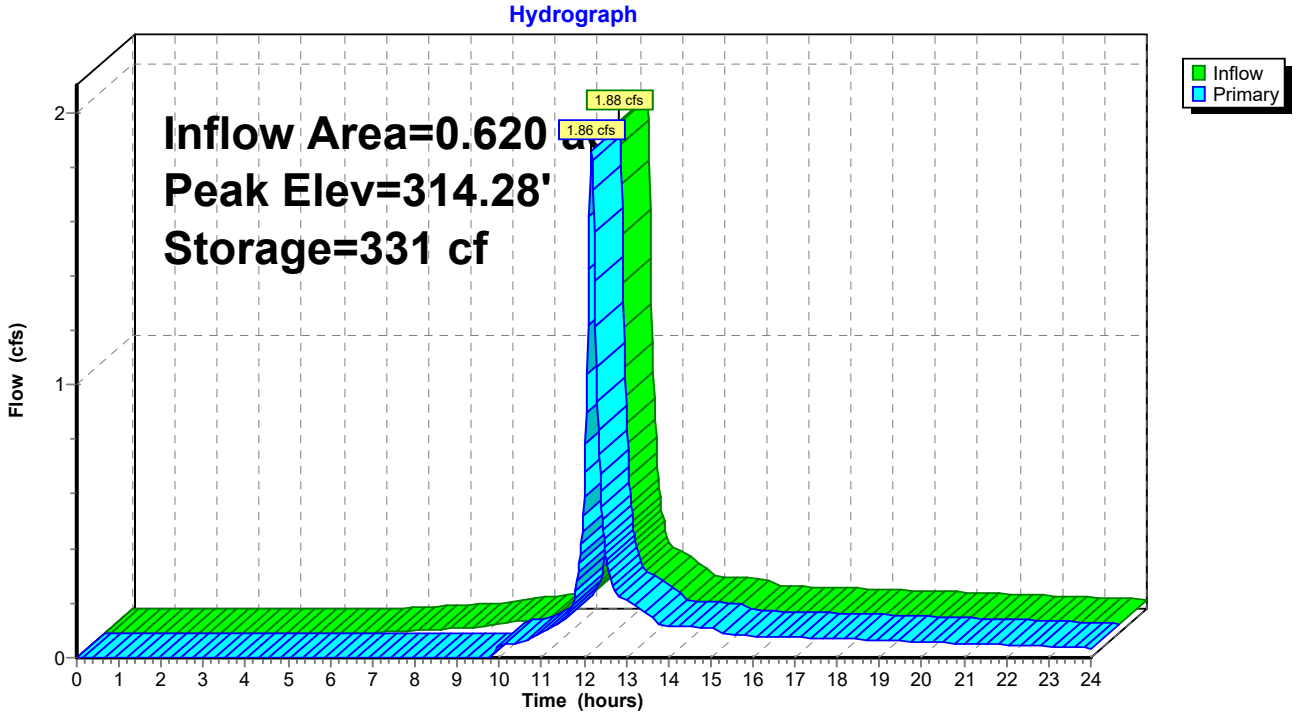
Volume	Invert	Avail.Storage	Storage Description
#1	312.50'	423 cf	**Above-ground bio-retention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.50	47	33.1	0	0	47
313.00	103	42.5	37	37	107
314.00	315	76.7	199	236	436
314.50	437	86.1	187	423	565

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 311.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	314.00'	**15.0" Horiz. Overflow Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.85 cfs @ 12.19 hrs HW=314.27' (Free Discharge)
↑**1=Culvert** (Passes 1.85 cfs of 5.70 cfs potential flow)
↑**2=Overflow Grate** (Weir Controls 1.85 cfs @ 1.71 fps)

Pond 3P:


Hydrograph
Inflow Area=0.620 a
Peak Elev=314.28'
Storage=331 cf
1.88 cfs
1.86 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 3P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.50	0.00	313.01	0.00	313.52	0.00	314.03	0.07
312.51	0.00	313.02	0.00	313.53	0.00	314.04	0.10
312.52	0.00	313.03	0.00	313.54	0.00	314.05	0.14
312.53	0.00	313.04	0.00	313.55	0.00	314.06	0.19
312.54	0.00	313.05	0.00	313.56	0.00	314.07	0.24
312.55	0.00	313.06	0.00	313.57	0.00	314.08	0.29
312.56	0.00	313.07	0.00	313.58	0.00	314.09	0.35
312.57	0.00	313.08	0.00	313.59	0.00	314.10	0.41
312.58	0.00	313.09	0.00	313.60	0.00	314.11	0.47
312.59	0.00	313.10	0.00	313.61	0.00	314.12	0.53
312.60	0.00	313.11	0.00	313.62	0.00	314.13	0.60
312.61	0.00	313.12	0.00	313.63	0.00	314.14	0.67
312.62	0.00	313.13	0.00	313.64	0.00	314.15	0.75
312.63	0.00	313.14	0.00	313.65	0.00	314.16	0.82
312.64	0.00	313.15	0.00	313.66	0.00	314.17	0.90
312.65	0.00	313.16	0.00	313.67	0.00	314.18	0.98
312.66	0.00	313.17	0.00	313.68	0.00	314.19	1.06
312.67	0.00	313.18	0.00	313.69	0.00	314.20	1.15
312.68	0.00	313.19	0.00	313.70	0.00	314.21	1.24
312.69	0.00	313.20	0.00	313.71	0.00	314.22	1.33
312.70	0.00	313.21	0.00	313.72	0.00	314.23	1.42
312.71	0.00	313.22	0.00	313.73	0.00	314.24	1.51
312.72	0.00	313.23	0.00	313.74	0.00	314.25	1.61
312.73	0.00	313.24	0.00	313.75	0.00	314.26	1.70
312.74	0.00	313.25	0.00	313.76	0.00	314.27	1.80
312.75	0.00	313.26	0.00	313.77	0.00	314.28	1.90
312.76	0.00	313.27	0.00	313.78	0.00	314.29	2.01
312.77	0.00	313.28	0.00	313.79	0.00	314.30	2.11
312.78	0.00	313.29	0.00	313.80	0.00	314.31	2.22
312.79	0.00	313.30	0.00	313.81	0.00	314.32	2.32
312.80	0.00	313.31	0.00	313.82	0.00	314.33	2.43
312.81	0.00	313.32	0.00	313.83	0.00	314.34	2.55
312.82	0.00	313.33	0.00	313.84	0.00	314.35	2.66
312.83	0.00	313.34	0.00	313.85	0.00	314.36	2.77
312.84	0.00	313.35	0.00	313.86	0.00	314.37	2.89
312.85	0.00	313.36	0.00	313.87	0.00	314.38	3.01
312.86	0.00	313.37	0.00	313.88	0.00	314.39	3.13
312.87	0.00	313.38	0.00	313.89	0.00	314.40	3.25
312.88	0.00	313.39	0.00	313.90	0.00	314.41	3.37
312.89	0.00	313.40	0.00	313.91	0.00	314.42	3.50
312.90	0.00	313.41	0.00	313.92	0.00	314.43	3.62
312.91	0.00	313.42	0.00	313.93	0.00	314.44	3.75
312.92	0.00	313.43	0.00	313.94	0.00	314.45	3.88
312.93	0.00	313.44	0.00	313.95	0.00	314.46	4.01
312.94	0.00	313.45	0.00	313.96	0.00	314.47	4.05
312.95	0.00	313.46	0.00	313.97	0.00	314.48	4.09
312.96	0.00	313.47	0.00	313.98	0.00	314.49	4.14
312.97	0.00	313.48	0.00	313.99	0.00	314.50	**4.18**
312.98	0.00	313.49	0.00	314.00	0.00		
312.99	0.00	313.50	0.00	314.01	0.01		
313.00	0.00	313.51	0.00	314.02	0.04		

Stage-Area-Storage for Pond 3P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.50	47	0
312.52	49	1
312.54	51	2
312.56	53	3
312.58	55	4
312.60	56	5
312.62	58	6
312.64	60	8
312.66	63	9
312.68	65	10
312.70	67	11
312.72	69	13
312.74	71	14
312.76	73	16
312.78	76	17
312.80	78	19
312.82	80	20
312.84	83	22
312.86	85	23
312.88	88	25
312.90	90	27
312.92	93	29
312.94	95	31
312.96	98	33
312.98	100	35
313.00	103	37
313.02	106	39
313.04	109	41
313.06	112	43
313.08	116	45
313.10	119	48
313.12	122	50
313.14	126	53
313.16	129	55
313.18	133	58
313.20	136	60
313.22	140	63
313.24	143	66
313.26	147	69
313.28	151	72
313.30	154	75
313.32	158	78
313.34	162	81
313.36	166	85
313.38	170	88
313.40	174	91
313.42	178	95
313.44	182	98
313.46	186	102
313.48	190	106
313.50	195	110
313.52	199	114
313.54	203	118
313.56	207	122
313.58	212	126
313.60	216	130
313.62	221	135
313.64	225	139
313.66	230	144
313.68	235	148
313.70	239	153
313.72	244	158
313.74	249	163
313.76	254	168
313.78	258	173
313.80	263	178
313.82	268	184
313.84	273	189
313.86	278	194
313.88	283	200
313.90	289	206
313.92	294	212
313.94	299	218
313.96	304	224
313.98	310	230
314.00	315	236
314.02	319	242
314.04	324	249
314.06	329	255
314.08	333	262
314.10	338	269
314.12	342	275
314.14	347	282
314.16	352	289
314.18	357	296
314.20	361	304
314.22	366	311
314.24	371	318
314.26	376	326
314.28	381	333
314.30	386	341
314.32	391	349
314.34	396	357
314.36	401	365
314.38	406	373
314.40	411	381
314.42	416	389
314.44	421	397
314.46	427	406
314.48	432	414
314.50	**437**	**423**

Summary for Pond 4P:

Inflow Area = 0.140 ac, 50.00% Impervious, Inflow Depth > 4.29" for 10-Year event
Inflow = 0.70 cfs @ 12.13 hrs, Volume= 0.050 af
Outflow = 0.52 cfs @ 12.18 hrs, Volume= 0.035 af, Atten= 25%, Lag= 3.0 min
Primary = 0.52 cfs @ 12.18 hrs, Volume= 0.035 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 313.08' @ 12.18 hrs Surf.Area= 1,168 sf Storage= 856 cf

Plug-Flow detention time= 220.6 min calculated for 0.035 af (69% of inflow)
Center-of-Mass det. time= 99.7 min (896.3 - 796.6)

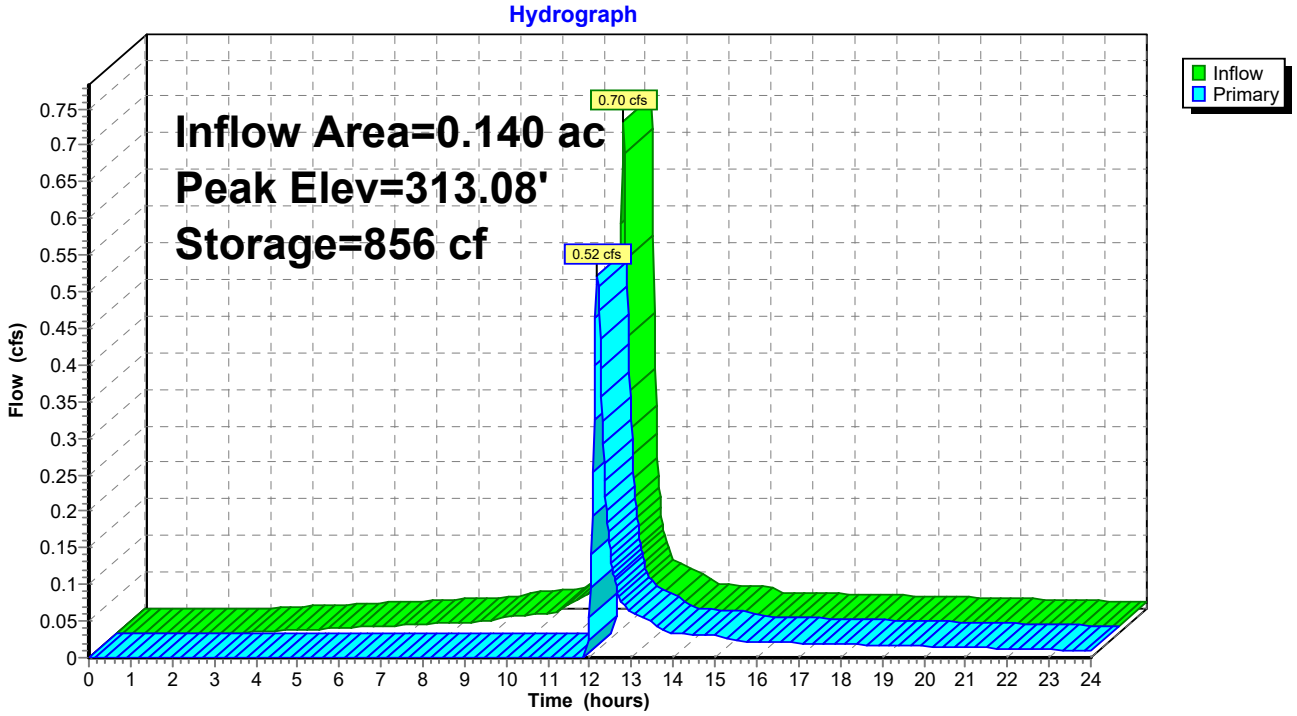
Volume	Invert	Avail.Storage	Storage Description
#1	312.00'	1,405 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.00	460	123.2	0	0	460
313.00	1,118	215.0	765	765	2,936
313.50	1,447	224.4	639	1,405	3,283

Device	Routing	Invert	Outlet Devices
#1	Primary	310.50'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 310.50' / 310.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	312.90'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	313.25'	**10.0' long x 10.0' breadth Overflow Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.52 cfs @ 12.18 hrs HW=313.08' (Free Discharge)
- **1=Culvert** (Passes 0.52 cfs of 5.45 cfs potential flow)
  - **2=Orifice/Grate** (Weir Controls 0.52 cfs @ 1.39 fps)
- **3=Overflow Spillway** (Controls 0.00 cfs)

Pond 4P:


Hydrograph
Inflow Area=0.140 ac
Peak Elev=313.08'
Storage=856 cf
0.70 cfs
0.52 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 4P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.00	0.00	312.51	0.00	313.02	0.28
312.01	0.00	312.52	0.00	313.03	0.32
312.02	0.00	312.53	0.00	313.04	0.36
312.03	0.00	312.54	0.00	313.05	0.40
312.04	0.00	312.55	0.00	313.06	0.44
312.05	0.00	312.56	0.00	313.07	0.48
312.06	0.00	312.57	0.00	313.08	0.52
312.07	0.00	312.58	0.00	313.09	0.57
312.08	0.00	312.59	0.00	313.10	0.61
312.09	0.00	312.60	0.00	313.11	0.66
312.10	0.00	312.61	0.00	313.12	0.71
312.11	0.00	312.62	0.00	313.13	0.76
312.12	0.00	312.63	0.00	313.14	0.81
312.13	0.00	312.64	0.00	313.15	0.84
312.14	0.00	312.65	0.00	313.16	0.86
312.15	0.00	312.66	0.00	313.17	0.87
312.16	0.00	312.67	0.00	313.18	0.89
312.17	0.00	312.68	0.00	313.19	0.91
312.18	0.00	312.69	0.00	313.20	0.92
312.19	0.00	312.70	0.00	313.21	0.94
312.20	0.00	312.71	0.00	313.22	0.95
312.21	0.00	312.72	0.00	313.23	0.97
312.22	0.00	312.73	0.00	313.24	0.98
312.23	0.00	312.74	0.00	313.25	0.99
312.24	0.00	312.75	0.00	313.26	1.03
312.25	0.00	312.76	0.00	313.27	1.09
312.26	0.00	312.77	0.00	313.28	1.17
312.27	0.00	312.78	0.00	313.29	1.25
312.28	0.00	312.79	0.00	313.30	1.34
312.29	0.00	312.80	0.00	313.31	1.44
312.30	0.00	312.81	0.00	313.32	1.55
312.31	0.00	312.82	0.00	313.33	1.67
312.32	0.00	312.83	0.00	313.34	1.79
312.33	0.00	312.84	0.00	313.35	1.91
312.34	0.00	312.85	0.00	313.36	2.05
312.35	0.00	312.86	0.00	313.37	2.19
312.36	0.00	312.87	0.00	313.38	2.33
312.37	0.00	312.88	0.00	313.39	2.48
312.38	0.00	312.89	0.00	313.40	2.64
312.39	0.00	312.90	0.00	313.41	2.79
312.40	0.00	312.91	0.01	313.42	2.96
312.41	0.00	312.92	0.02	313.43	3.13
312.42	0.00	312.93	0.04	313.44	3.30
312.43	0.00	312.94	0.05	313.45	3.47
312.44	0.00	312.95	0.08	313.46	3.66
312.45	0.00	312.96	0.10	313.47	3.85
312.46	0.00	312.97	0.13	313.48	4.04
312.47	0.00	312.98	0.15	313.49	4.24
312.48	0.00	312.99	0.18	313.50	**4.44**
312.49	0.00	313.00	0.22		
312.50	0.00	313.01	0.25		

Stage-Area-Storage for Pond 4P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.00	460	0
312.02	470	9
312.04	481	19
312.06	491	29
312.08	502	38
312.10	513	49
312.12	524	59
312.14	535	70
312.16	546	80
312.18	557	91
312.20	569	103
312.22	580	114
312.24	592	126
312.26	603	138
312.28	615	150
312.30	627	162
312.32	639	175
312.34	651	188
312.36	664	201
312.38	676	215
312.40	689	228
312.42	701	242
312.44	714	256
312.46	727	271
312.48	740	285
312.50	753	300
312.52	766	315
312.54	780	331
312.56	793	347
312.58	807	363
312.60	820	379
312.62	834	395
312.64	848	412
312.66	862	429
312.68	876	447
312.70	890	464
312.72	905	482
312.74	919	501
312.76	934	519
312.78	949	538
312.80	963	557
312.82	978	577
312.84	993	596
312.86	1,009	616
312.88	1,024	637
312.90	1,039	657
312.92	1,055	678
312.94	1,070	699
312.96	1,086	721
312.98	1,102	743
313.00	1,118	765
313.02	1,130	788
313.04	1,143	810
313.06	1,155	833
313.08	1,168	856
313.10	1,180	880
313.12	1,193	904
313.14	1,206	928
313.16	1,219	952
313.18	1,232	976
313.20	1,245	1,001
313.22	1,258	1,026
313.24	1,271	1,051
313.26	1,284	1,077
313.28	1,297	1,103
313.30	1,310	1,129
313.32	1,324	1,155
313.34	1,337	1,182
313.36	1,351	1,209
313.38	1,364	1,236
313.40	1,378	1,263
313.42	1,392	1,291
313.44	1,405	1,319
313.46	1,419	1,347
313.48	1,433	1,376
313.50	**1,447**	**1,405**

Summary for Pond 5P:

Inflow Area = 3.790 ac, 12.40% Impervious, Inflow Depth > 3.26" for 10-Year event
Inflow = 11.23 cfs @ 12.21 hrs, Volume= 1.029 af
Outflow = 11.13 cfs @ 12.23 hrs, Volume= 0.974 af, Atten= 1%, Lag= 0.8 min
Primary = 11.13 cfs @ 12.23 hrs, Volume= 0.974 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 309.57' @ 12.23 hrs Surf.Area= 2,719 sf Storage= 3,194 cf

Plug-Flow detention time= 49.8 min calculated for 0.973 af (95% of inflow)
Center-of-Mass det. time= 20.5 min (866.2 - 845.6)

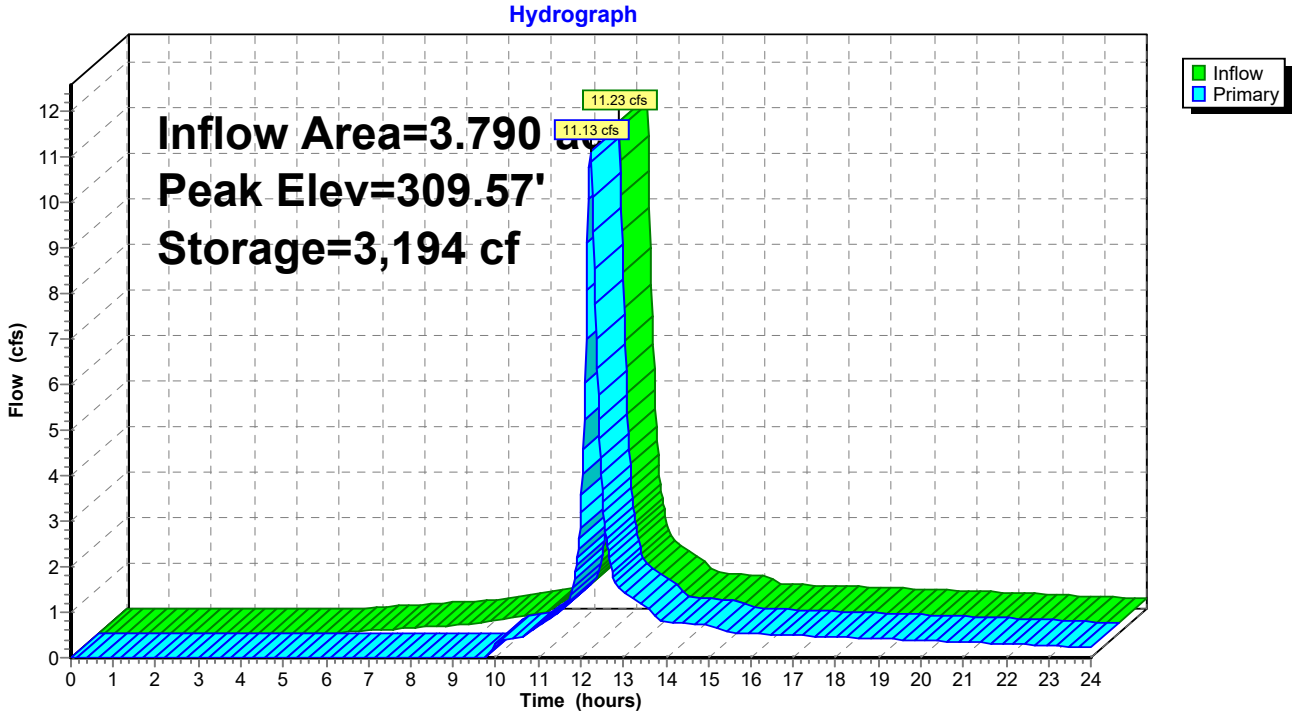
Volume	Invert	Avail.Storage	Storage Description
#1	308.00'	3,691 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.00	1,092	152.1	0	0	1,092
309.00	2,443	239.0	1,723	1,723	3,804
309.75	2,809	248.3	1,968	3,691	4,208

Device	Routing	Invert	Outlet Devices
#1	Primary	309.25'	**25.0' long x 6.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=11.08 cfs @ 12.23 hrs HW=309.57' (Free Discharge)
↑—**1=Primary Spillway** (Weir Controls 11.08 cfs @ 1.39 fps)

Pond 5P:


Hydrograph
Inflow Area=3.790 ac
Peak Elev=309.57'
Storage=3,194 cf
11.23 cfs
11.13 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 5P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
308.00	0.00	308.51	0.00	309.02	0.00	309.53	8.99
308.01	0.00	308.52	0.00	309.03	0.00	309.54	9.50
308.02	0.00	308.53	0.00	309.04	0.00	309.55	10.02
308.03	0.00	308.54	0.00	309.05	0.00	309.56	10.56
308.04	0.00	308.55	0.00	309.06	0.00	309.57	11.11
308.05	0.00	308.56	0.00	309.07	0.00	309.58	11.66
308.06	0.00	308.57	0.00	309.08	0.00	309.59	12.23
308.07	0.00	308.58	0.00	309.09	0.00	309.60	12.81
308.08	0.00	308.59	0.00	309.10	0.00	309.61	13.40
308.09	0.00	308.60	0.00	309.11	0.00	309.62	14.00
308.10	0.00	308.61	0.00	309.12	0.00	309.63	14.62
308.11	0.00	308.62	0.00	309.13	0.00	309.64	15.24
308.12	0.00	308.63	0.00	309.14	0.00	309.65	15.87
308.13	0.00	308.64	0.00	309.15	0.00	309.66	16.54
308.14	0.00	308.65	0.00	309.16	0.00	309.67	17.21
308.15	0.00	308.66	0.00	309.17	0.00	309.68	17.89
308.16	0.00	308.67	0.00	309.18	0.00	309.69	18.59
308.17	0.00	308.68	0.00	309.19	0.00	309.70	19.30
308.18	0.00	308.69	0.00	309.20	0.00	309.71	20.02
308.19	0.00	308.70	0.00	309.21	0.00	309.72	20.75
308.20	0.00	308.71	0.00	309.22	0.00	309.73	21.50
308.21	0.00	308.72	0.00	309.23	0.00	309.74	22.26
308.22	0.00	308.73	0.00	309.24	0.00	309.75	**23.03**
308.23	0.00	308.74	0.00	309.25	0.00		
308.24	0.00	308.75	0.00	309.26	0.06		
308.25	0.00	308.76	0.00	309.27	0.17		
308.26	0.00	308.77	0.00	309.28	0.31		
308.27	0.00	308.78	0.00	309.29	0.47		
308.28	0.00	308.79	0.00	309.30	0.66		
308.29	0.00	308.80	0.00	309.31	0.87		
308.30	0.00	308.81	0.00	309.32	1.10		
308.31	0.00	308.82	0.00	309.33	1.34		
308.32	0.00	308.83	0.00	309.34	1.60		
308.33	0.00	308.84	0.00	309.35	1.87		
308.34	0.00	308.85	0.00	309.36	2.16		
308.35	0.00	308.86	0.00	309.37	2.46		
308.36	0.00	308.87	0.00	309.38	2.78		
308.37	0.00	308.88	0.00	309.39	3.10		
308.38	0.00	308.89	0.00	309.40	3.44		
308.39	0.00	308.90	0.00	309.41	3.79		
308.40	0.00	308.91	0.00	309.42	4.15		
308.41	0.00	308.92	0.00	309.43	4.52		
308.42	0.00	308.93	0.00	309.44	4.91		
308.43	0.00	308.94	0.00	309.45	5.30		
308.44	0.00	308.95	0.00	309.46	5.72		
308.45	0.00	308.96	0.00	309.47	6.15		
308.46	0.00	308.97	0.00	309.48	6.59		
308.47	0.00	308.98	0.00	309.49	7.05		
308.48	0.00	308.99	0.00	309.50	7.52		
308.49	0.00	309.00	0.00	309.51	7.99		
308.50	0.00	309.01	0.00	309.52	8.48		

Stage-Area-Storage for Pond 5P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
308.00	1,092	0
308.02	1,114	22
308.04	1,136	45
308.06	1,158	67
308.08	1,180	91
308.10	1,203	115
308.12	1,226	139
308.14	1,249	164
308.16	1,272	189
308.18	1,296	215
308.20	1,319	241
308.22	1,343	267
308.24	1,367	294
308.26	1,392	322
308.28	1,416	350
308.30	1,441	379
308.32	1,466	408
308.34	1,491	437
308.36	1,517	467
308.38	1,542	498
308.40	1,568	529
308.42	1,594	561
308.44	1,620	593
308.46	1,647	626
308.48	1,674	659
308.50	1,700	693
308.52	1,728	727
308.54	1,755	762
308.56	1,782	797
308.58	1,810	833
308.60	1,838	869
308.62	1,866	906
308.64	1,895	944
308.66	1,923	982
308.68	1,952	1,021
308.70	1,981	1,060
308.72	2,011	1,100
308.74	2,040	1,141
308.76	2,070	1,182
308.78	2,100	1,224
308.80	2,130	1,266
308.82	2,160	1,309
308.84	2,191	1,352
308.86	2,222	1,396
308.88	2,253	1,441
308.90	2,284	1,486
308.92	2,315	1,532
308.94	2,347	1,579
308.96	2,379	1,626
308.98	2,411	1,674
309.00	2,443	1,723
309.02	2,452	1,772
309.04	2,462	1,821
309.06	2,471	1,870
309.08	2,481	1,920
309.10	2,490	1,969
309.12	2,500	2,019
309.14	2,509	2,069
309.16	2,519	2,120
309.18	2,529	2,170
309.20	2,538	2,221
309.22	2,548	2,272
309.24	2,557	2,323
309.26	2,567	2,374
309.28	2,577	2,425
309.30	2,586	2,477
309.32	2,596	2,529
309.34	2,606	2,581
309.36	2,615	2,633
309.38	2,625	2,686
309.40	2,635	2,738
309.42	2,645	2,791
309.44	2,655	2,844
309.46	2,664	2,897
309.48	2,674	2,951
309.50	2,684	3,004
309.52	2,694	3,058
309.54	2,704	3,112
309.56	2,714	3,166
309.58	2,724	3,220
309.60	2,734	3,275
309.62	2,744	3,330
309.64	2,754	3,385
309.66	2,764	3,440
309.68	2,774	3,495
309.70	2,784	3,551
309.72	2,794	3,607
309.74	**2,804**	**3,663**

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1: Runoff Area=2.240 ac 62.05% Impervious Runoff Depth>5.38"
Flow Length=593' Tc=11.5 min CN=90 Runoff=11.13 cfs 1.004 af

SubcatchmentP1-2: Runoff Area=1.390 ac 15.83% Impervious Runoff Depth>4.07"
Flow Length=175' Tc=9.0 min CN=78 Runoff=6.18 cfs 0.471 af

SubcatchmentP1-3: Runoff Area=0.620 ac 8.06% Impervious Runoff Depth>3.96"
Flow Length=334' Tc=10.0 min CN=77 Runoff=2.56 cfs 0.205 af

SubcatchmentP1-4: Runoff Area=0.140 ac 50.00% Impervious Runoff Depth>5.50"
Tc=6.0 min CN=91 Runoff=0.88 cfs 0.064 af

SubcatchmentP1-5: Runoff Area=3.790 ac 12.40% Impervious Runoff Depth>4.38"
Flow Length=412' Tc=13.6 min CN=81 Runoff=14.98 cfs 1.384 af

SubcatchmentP1-6: Runoff Area=2.540 ac 0.00% Impervious Runoff Depth>3.65"
Flow Length=351' Tc=10.7 min CN=74 Runoff=9.47 cfs 0.773 af

SubcatchmentP1-7: Runoff Area=6.000 ac 0.00% Impervious Runoff Depth>4.06"
Flow Length=385' Tc=15.4 min CN=78 Runoff=20.85 cfs 2.031 af

SubcatchmentP1-8: Runoff Area=9.110 ac 4.94% Impervious Runoff Depth>3.86"
Flow Length=496' Tc=12.5 min CN=76 Runoff=33.33 cfs 2.927 af

Reach 1R: Batterson Park Pond Inflow=95.02 cfs 8.667 af
Outflow=95.02 cfs 8.667 af

Reach 2R: Flow to Flared End Inflow=3.24 cfs 0.248 af
Outflow=3.24 cfs 0.248 af

Pond 1P: Peak Elev=307.58' Storage=6,120 cf Inflow=11.13 cfs 1.004 af
Outflow=11.04 cfs 0.900 af

Pond 2P: Peak Elev=313.17' Storage=2,424 cf Inflow=6.18 cfs 0.471 af
8.0" Round Culvert x 2.00 n=0.011 L=11.0' S=0.0391 '/' Outflow=3.69 cfs 0.461 af

Pond 3P: Peak Elev=314.34' Storage=356 cf Inflow=2.56 cfs 0.205 af
Outflow=2.54 cfs 0.199 af

Pond 4P: Peak Elev=313.12' Storage=904 cf Inflow=0.88 cfs 0.064 af
Outflow=0.71 cfs 0.049 af

Pond 5P: Peak Elev=309.63' Storage=3,368 cf Inflow=14.98 cfs 1.384 af
Outflow=14.86 cfs 1.329 af

Total Runoff Area = 25.830 ac Runoff Volume = 8.858 af Average Runoff Depth = 4.12"
89.74% Pervious = 23.180 ac 10.26% Impervious = 2.650 ac

Summary for Subcatchment P1-1:

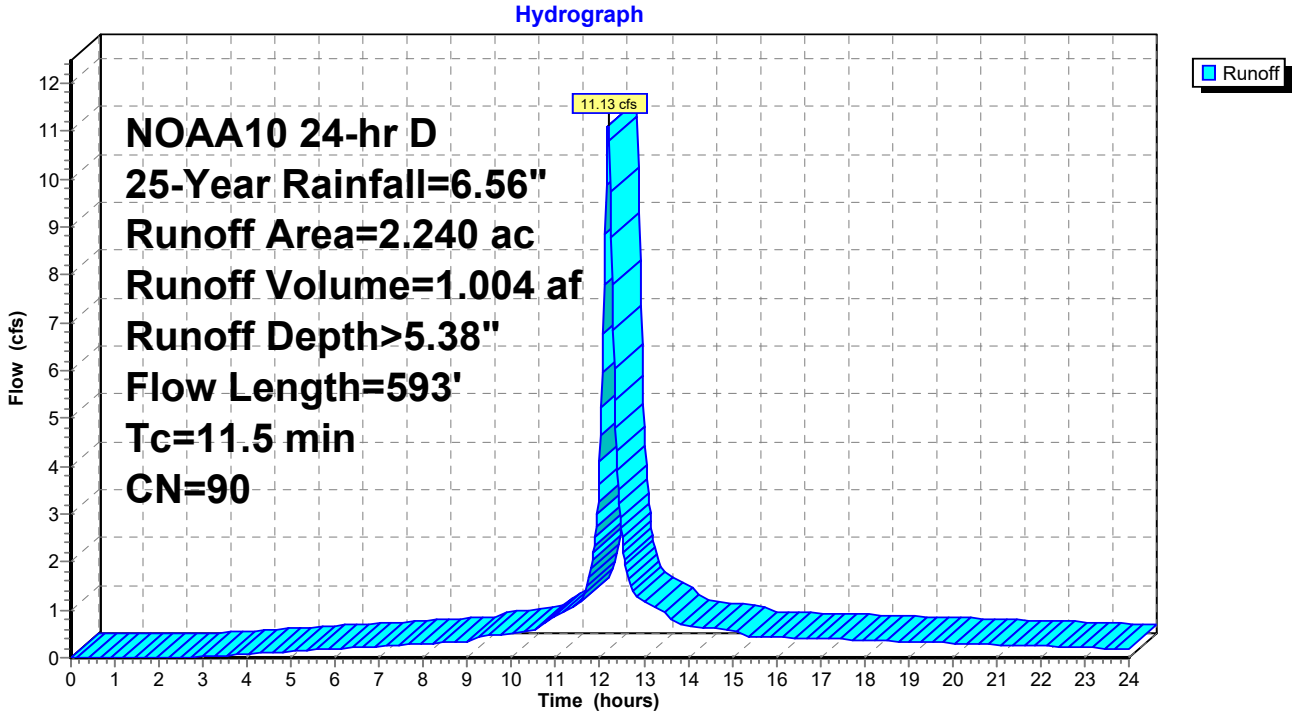
Runoff = 11.13 cfs @ 12.19 hrs, Volume= 1.004 af, Depth> 5.38"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

	Area (ac)	CN	Description
	0.170	74	>75% Grass cover, Good, HSG C
	0.460	80	>75% Grass cover, Good, HSG D
	0.220	70	Woods, Good, HSG C
	0.000	77	Woods, Good, HSG D
*	0.000	73	Brush, Good, HSG D
	0.000	96	Gravel surface, HSG D
	1.390	98	Paved parking, HSG D
	2.240	90	Weighted Average
	0.850		37.95% Pervious Area
	1.390		62.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.1700	0.19		**Sheet Flow, Seg 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	96	0.1000	5.09		**Shallow Concentrated Flow, Seg 2** Unpaved Kv= 16.1 fps
0.9	191	0.0340	3.74		**Shallow Concentrated Flow, Seg 3** Paved Kv= 20.3 fps
1.3	206	0.0170	2.65		**Shallow Concentrated Flow, Seg 4** Paved Kv= 20.3 fps
11.5	593	Total			

Subcatchment P1-1:



Summary for Subcatchment P1-2:

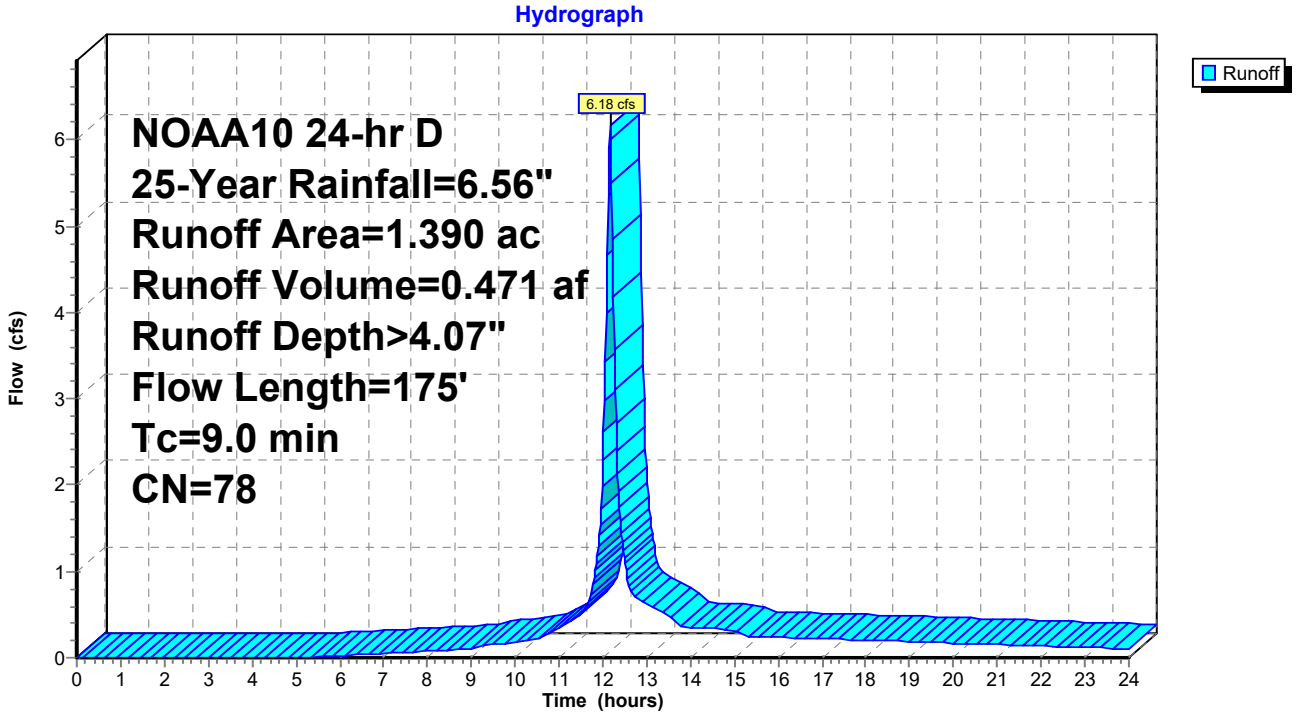
Runoff = 6.18 cfs @ 12.16 hrs, Volume= 0.471 af, Depth> 4.07"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
1.010	74	>75% Grass cover, Good, HSG C
0.160	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.220	98	Paved parking, HSG D
1.390	78	Weighted Average
1.170		84.17% Pervious Area
0.220		15.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.1800	0.19		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	75	0.1500	6.24		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
9.0	175	Total			

Subcatchment P1-2:



Summary for Subcatchment P1-3:

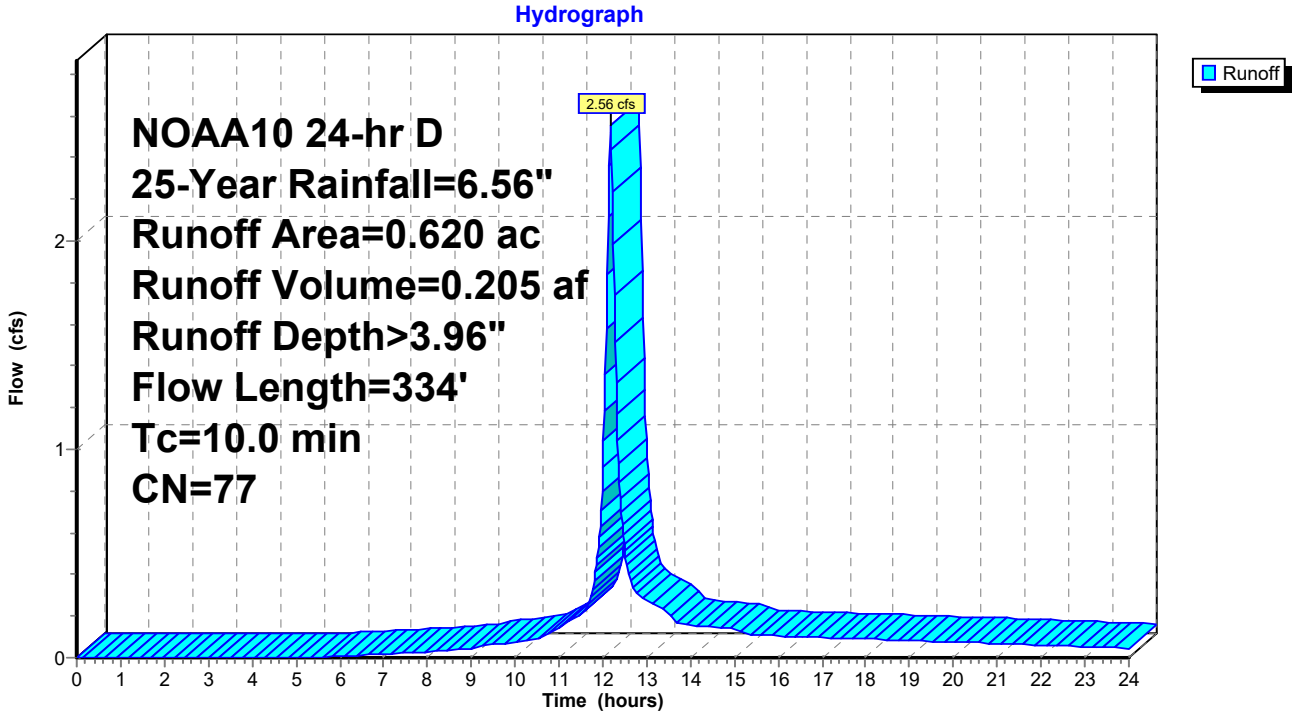
Runoff = 2.56 cfs @ 12.17 hrs, Volume= 0.205 af, Depth> 3.96"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
0.080	74	>75% Grass cover, Good, HSG C
0.000	80	>75% Grass cover, Good, HSG D
0.400	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.050	98	Paved parking, HSG D
0.620	77	Weighted Average
0.570		91.94% Pervious Area
0.050		8.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1650	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	111	0.1100	5.34		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	123	0.0500	3.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.0	334	Total			

Subcatchment P1-3:



Summary for Subcatchment P1-4:

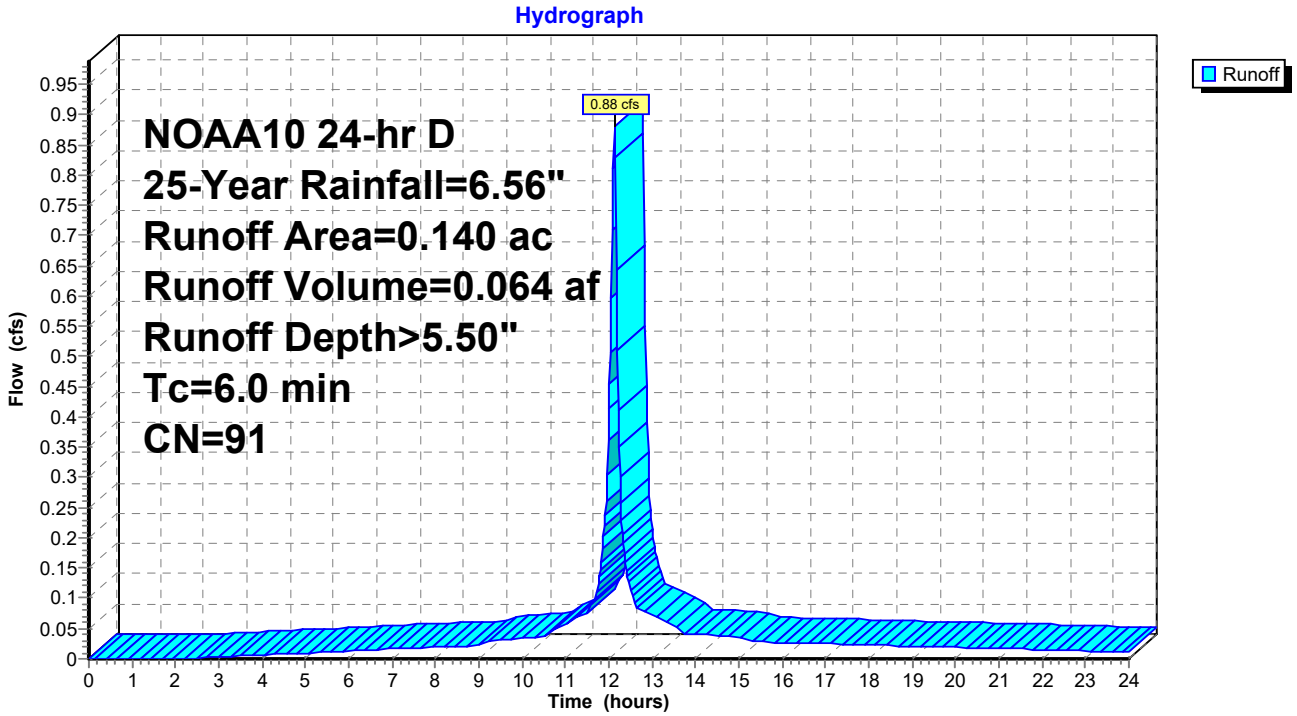
Runoff = 0.88 cfs @ 12.13 hrs, Volume= 0.064 af, Depth> 5.50"
Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.050	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.020	96	Gravel surface, HSG D
0.070	98	Paved parking, HSG D
0.140	91	Weighted Average
0.070		50.00% Pervious Area
0.070		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. time to pond**

Subcatchment P1-4:



Summary for Subcatchment P1-5:

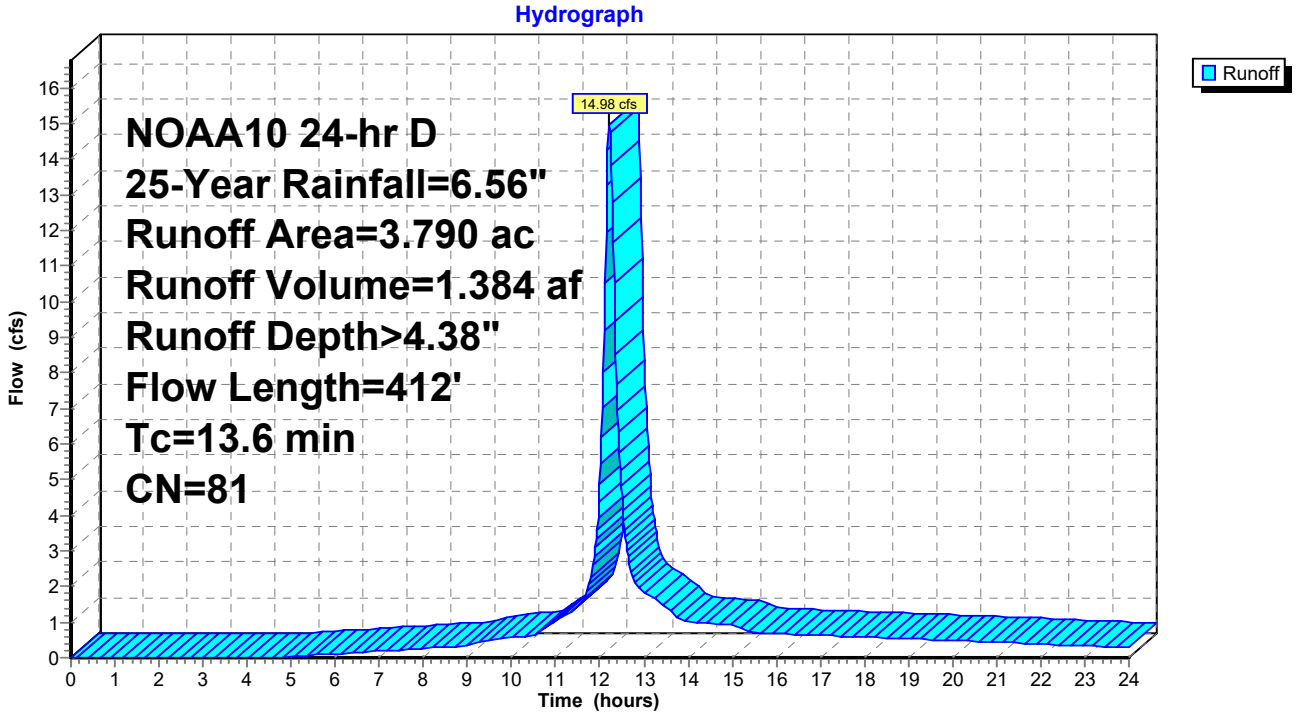
Runoff = 14.98 cfs @ 12.21 hrs, Volume= 1.384 af, Depth> 4.38"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
0.210	74	>75% Grass cover, Good, HSG C
2.470	80	>75% Grass cover, Good, HSG D
0.150	70	Woods, Good, HSG C
0.440	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.050	96	Gravel surface, HSG D
0.470	98	Paved parking, HSG D
3.790	81	Weighted Average
3.320		87.60% Pervious Area
0.470		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0750	0.13		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	185	0.0680	4.20		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.5	127	0.0600	3.94		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
13.6	412	Total			

Subcatchment P1-5:



Summary for Subcatchment P1-6:

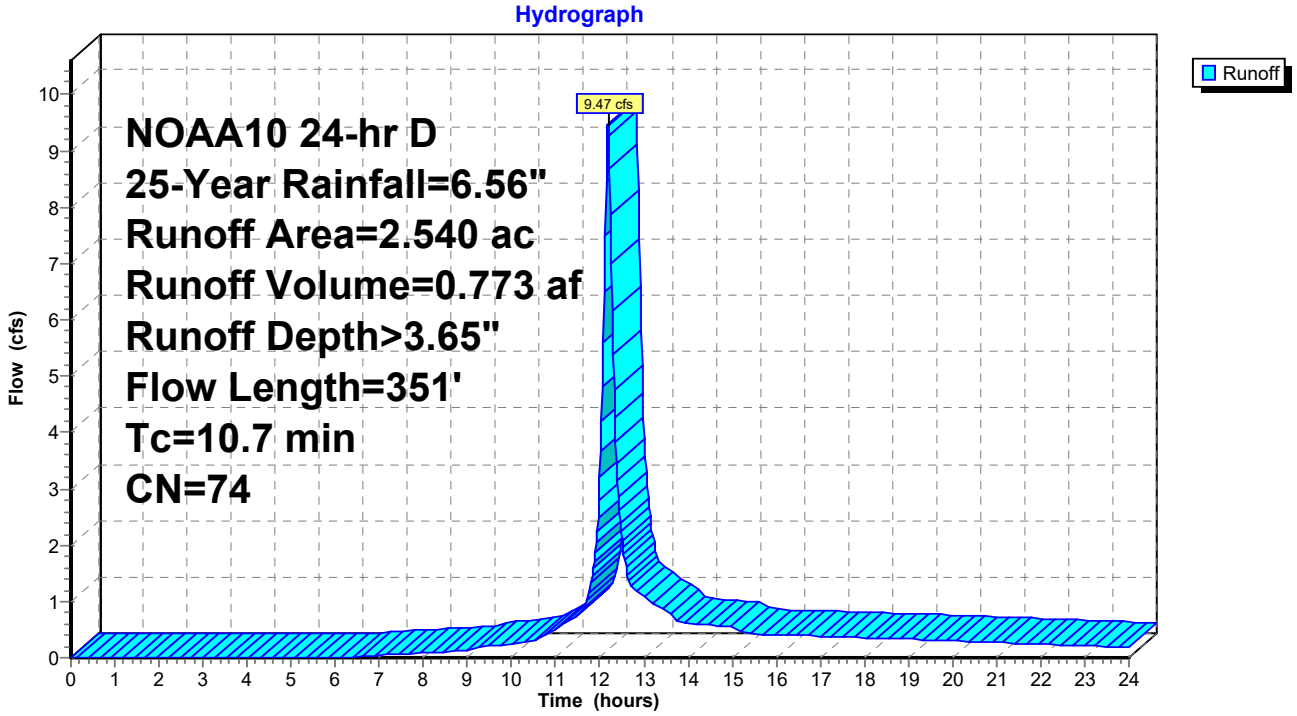
Runoff = 9.47 cfs @ 12.18 hrs, Volume= 0.773 af, Depth> 3.65"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
0.190	74	>75% Grass cover, Good, HSG C
0.190	80	>75% Grass cover, Good, HSG D
0.990	70	Woods, Good, HSG C
1.170	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
2.540	74	Weighted Average
2.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1500	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	81	0.2040	7.27		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
1.1	170	0.0260	2.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.7	351	Total			

Subcatchment P1-6:



Summary for Subcatchment P1-7:

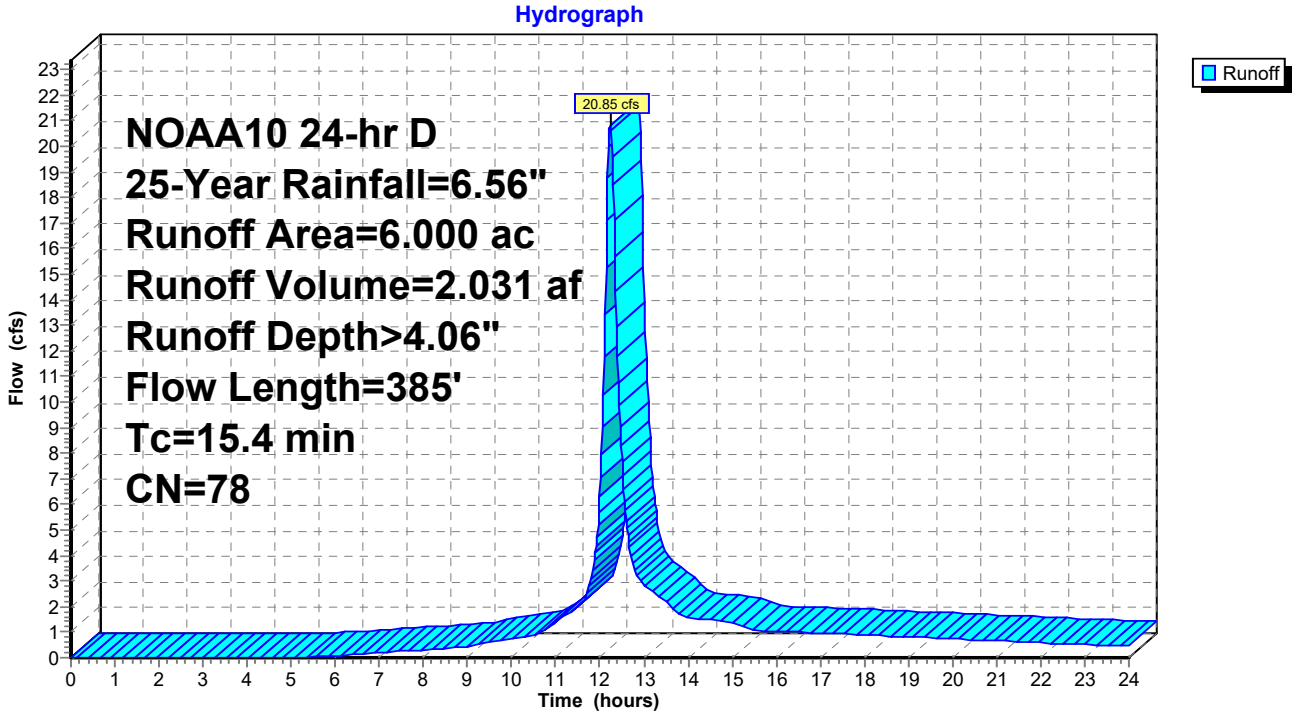
Runoff = 20.85 cfs @ 12.24 hrs, Volume= 2.031 af, Depth> 4.06"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
2.620	74	>75% Grass cover, Good, HSG C
1.990	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.360	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
6.000	78	Weighted Average
6.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	176	0.0650	4.10		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	109	0.0400	3.22		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment P1-7:



Summary for Subcatchment P1-8:

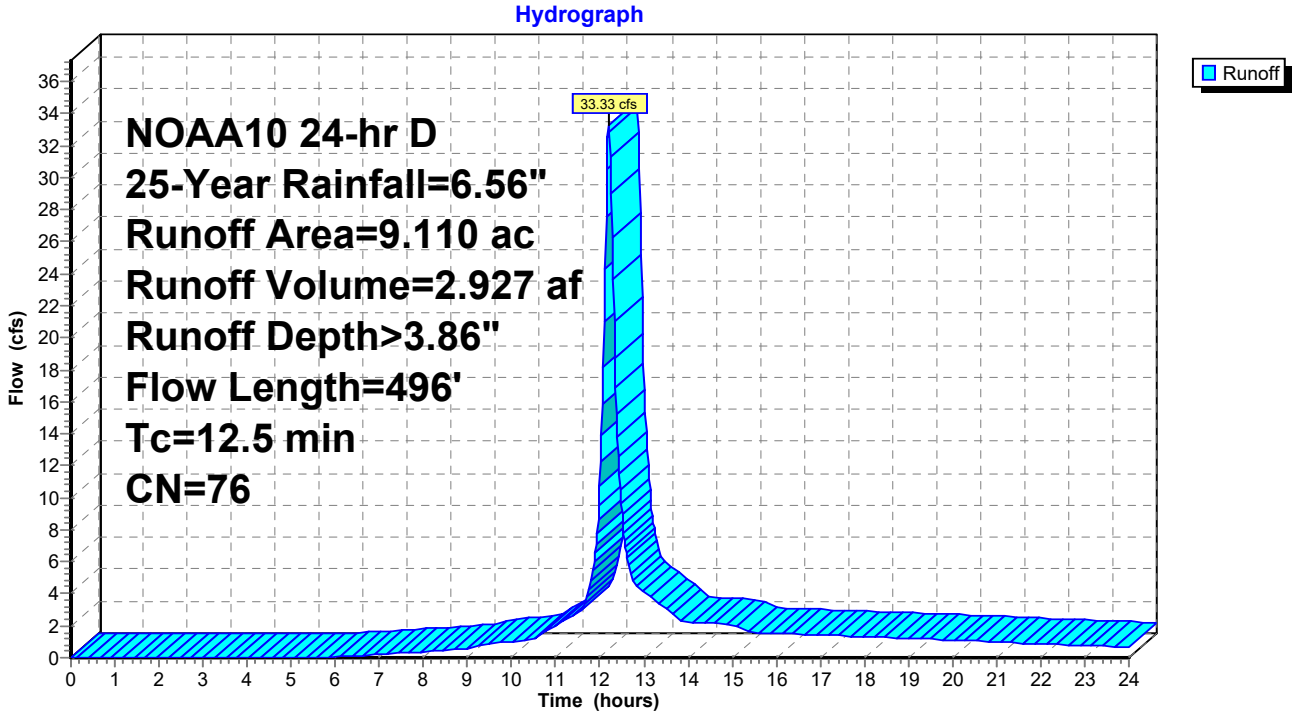
Runoff = 33.33 cfs @ 12.20 hrs, Volume= 2.927 af, Depth> 3.86"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 25-Year Rainfall=6.56"

Area (ac)	CN	Description
2.470	74	>75% Grass cover, Good, HSG C
2.130	80	>75% Grass cover, Good, HSG D
1.020	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
2.950	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.450	98	Paved parking, HSG D
9.110	76	Weighted Average
8.660		95.06% Pervious Area
0.450		4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1320	0.17		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.4	122	0.0890	4.80		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
2.2	274	0.0160	2.04		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
12.5	496	Total			

Subcatchment P1-8:



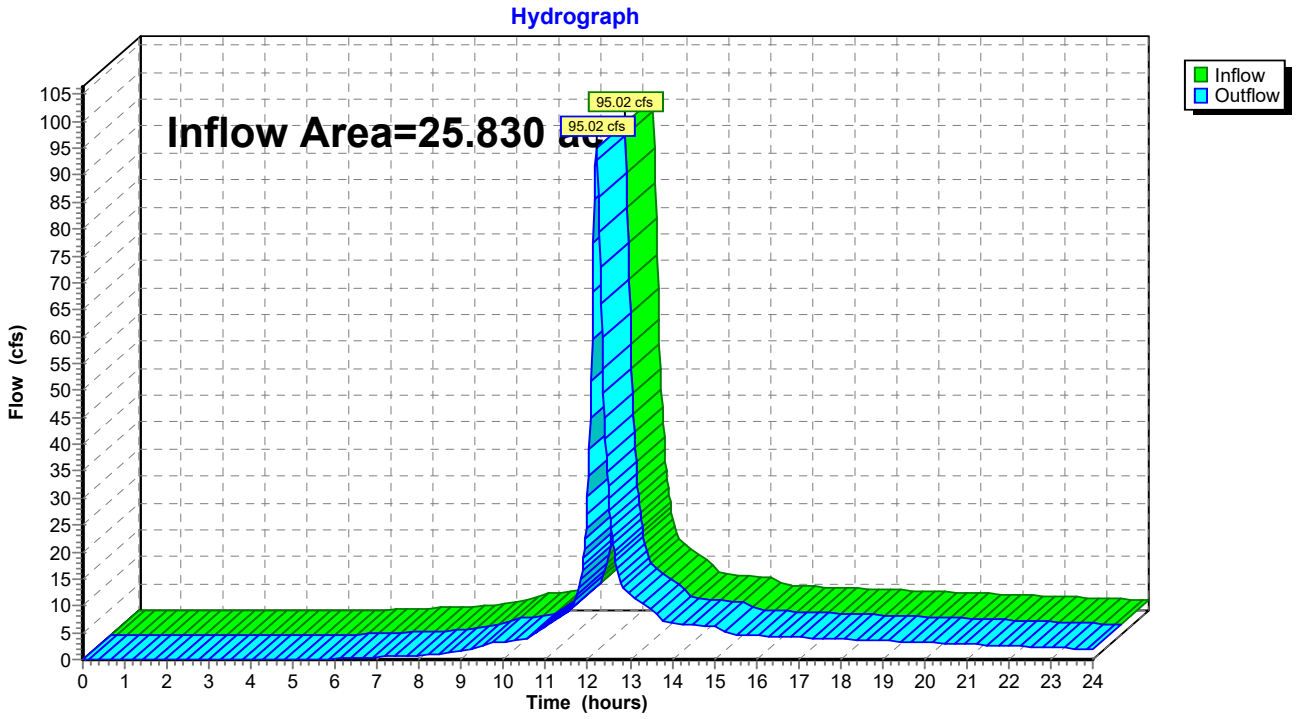
Summary for Reach 1R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 10.26% Impervious, Inflow Depth > 4.03" for 25-Year event
Inflow = 95.02 cfs @ 12.21 hrs, Volume= 8.667 af
Outflow = 95.02 cfs @ 12.21 hrs, Volume= 8.667 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: Batterson Park Pond



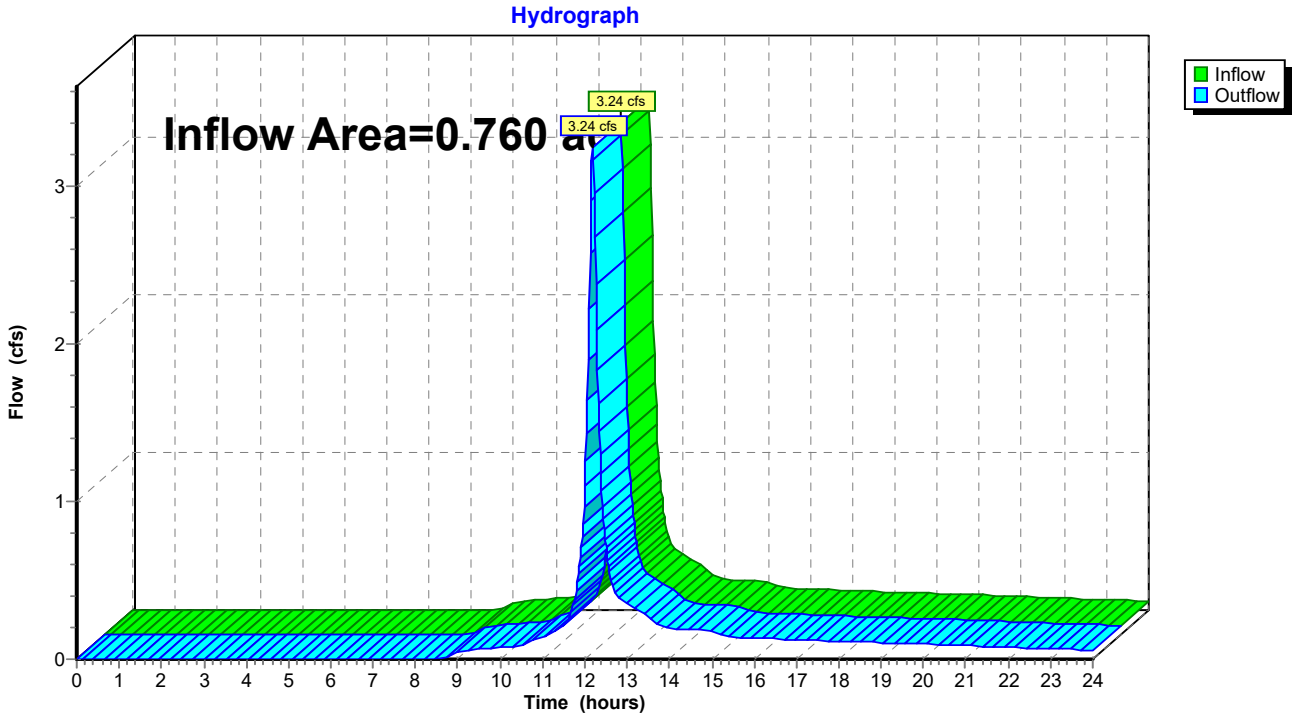
Summary for Reach 2R: Flow to Flared End

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

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 3.91" for 25-Year event
Inflow = 3.24 cfs @ 12.18 hrs, Volume= 0.248 af
Outflow = 3.24 cfs @ 12.18 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Flow to Flared End



Summary for Pond 1P:

Inflow Area = 2.240 ac, 62.05% Impervious, Inflow Depth > 5.38" for 25-Year event
Inflow = 11.13 cfs @ 12.19 hrs, Volume= 1.004 af
Outflow = 11.04 cfs @ 12.20 hrs, Volume= 0.900 af, Atten= 1%, Lag= 0.7 min
Primary = 11.04 cfs @ 12.20 hrs, Volume= 0.900 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 307.58' @ 12.20 hrs Surf.Area= 4,679 sf Storage= 6,120 cf

Plug-Flow detention time= 103.3 min calculated for 0.900 af (90% of inflow)
Center-of-Mass det. time= 47.9 min (844.9 - 797.0)

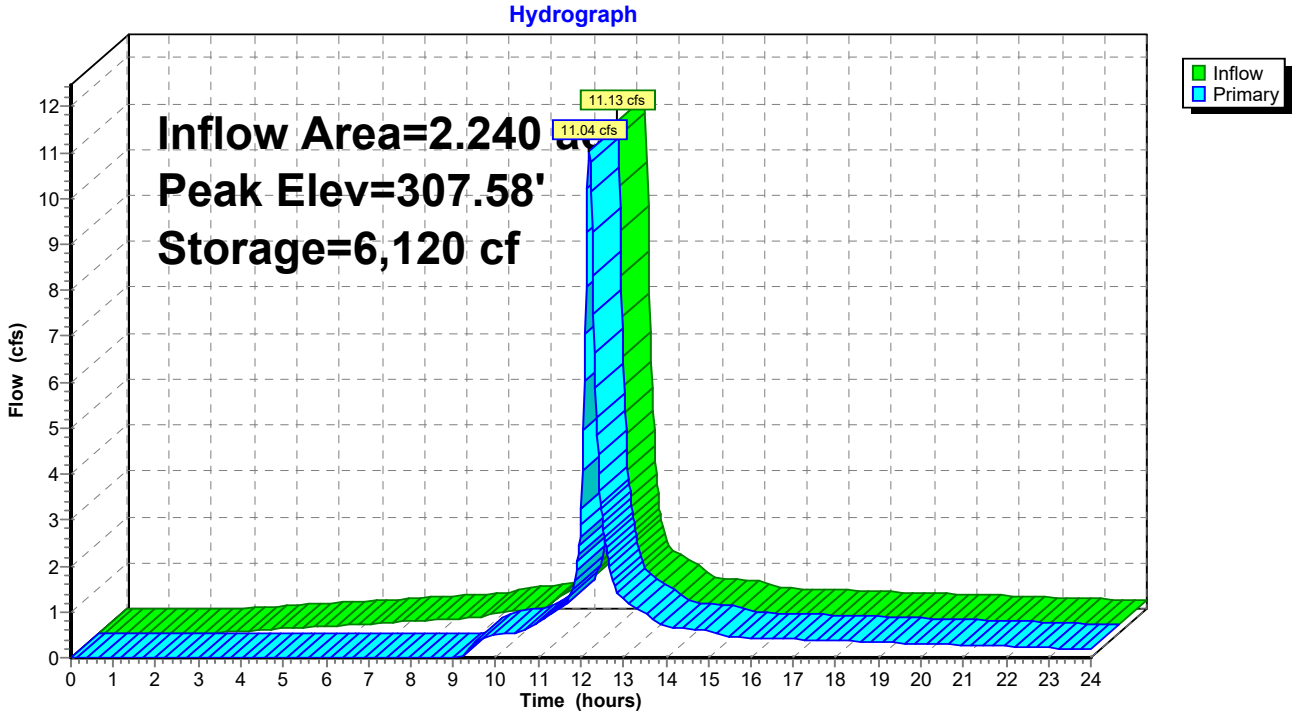
Volume	Invert	Avail.Storage	Storage Description
#1	306.00'	8,662 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.00	353	70.9	0	0	353
306.50	4,079	368.1	939	939	10,736
307.00	4,639	377.5	2,178	3,117	11,324
307.50	5,669	288.9	2,573	5,689	16,026
308.00	1,153	143.1	1,563	7,252	21,039
309.00	1,682	177.1	1,409	8,662	21,920

Device	Routing	Invert	Outlet Devices
#1	Primary	307.25'	**10.0' long x 25.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	307.50'	**90.0' long x 25.0' breadth Top of pond overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=10.97 cfs @ 12.20 hrs HW=307.58' (Free Discharge)
1=Primary Spillway (Weir Controls 5.18 cfs @ 1.55 fps)
2=Top of pond overflow (Weir Controls 5.79 cfs @ 0.77 fps)

Pond 1P:


Hydrograph
Inflow Area=2.240 ac
Peak Elev=307.58'
Storage=6,120 cf
11.13 cfs
11.04 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 1P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
306.00	0.00	307.02	0.00	308.04	114.98
306.02	0.00	307.04	0.00	308.06	121.07
306.04	0.00	307.06	0.00	308.08	127.29
306.06	0.00	307.08	0.00	308.10	133.61
306.08	0.00	307.10	0.00	308.12	139.76
306.10	0.00	307.12	0.00	308.14	145.99
306.12	0.00	307.14	0.00	308.16	152.29
306.14	0.00	307.16	0.00	308.18	158.67
306.16	0.00	307.18	0.00	308.20	165.11
306.18	0.00	307.20	0.00	308.22	171.62
306.20	0.00	307.22	0.00	308.24	178.19
306.22	0.00	307.24	0.00	308.26	184.84
306.24	0.00	307.26	0.03	308.28	191.56
306.26	0.00	307.28	0.14	308.30	198.34
306.28	0.00	307.30	0.30	308.32	205.51
306.30	0.00	307.32	0.50	308.34	212.76
306.32	0.00	307.34	0.72	308.36	220.10
306.34	0.00	307.36	0.98	308.38	227.51
306.36	0.00	307.38	1.26	308.40	235.01
306.38	0.00	307.40	1.56	308.42	242.58
306.40	0.00	307.42	1.88	308.44	250.23
306.42	0.00	307.44	2.22	308.46	257.95
306.44	0.00	307.46	2.58	308.48	265.74
306.46	0.00	307.48	2.96	308.50	273.60
306.48	0.00	307.50	3.36	308.52	281.71
306.50	0.00	307.52	4.45	308.54	289.91
306.52	0.00	307.54	6.13	308.56	298.20
306.54	0.00	307.56	8.19	308.58	306.56
306.56	0.00	307.58	10.56	308.60	315.01
306.58	0.00	307.60	13.21	308.62	323.53
306.60	0.00	307.62	16.10	308.64	332.14
306.62	0.00	307.64	19.21	308.66	340.82
306.64	0.00	307.66	22.53	308.68	349.56
306.66	0.00	307.68	26.03	308.70	358.38
306.68	0.00	307.70	29.72	308.72	367.16
306.70	0.00	307.72	33.61	308.74	376.01
306.72	0.00	307.74	37.66	308.76	384.93
306.74	0.00	307.76	41.88	308.78	393.92
306.76	0.00	307.78	46.26	308.80	402.98
306.78	0.00	307.80	50.79	308.82	412.10
306.80	0.00	307.82	55.48	308.84	421.30
306.82	0.00	307.84	60.30	308.86	430.57
306.84	0.00	307.86	65.26	308.88	439.91
306.86	0.00	307.88	70.34	308.90	449.33
306.88	0.00	307.90	75.55	308.92	458.66
306.90	0.00	307.92	80.83	308.94	468.04
306.92	0.00	307.94	86.24	308.96	477.49
306.94	0.00	307.96	91.77	308.98	486.99
306.96	0.00	307.98	97.41	309.00	**496.56**
306.98	0.00	308.00	103.16		
307.00	0.00	308.02	109.02		

Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
306.00	353	0
306.05	543	22
306.10	773	55
306.15	1,044	100
306.20	1,356	160
306.25	1,708	236
306.30	2,101	332
306.35	2,534	447
306.40	3,009	586
306.45	3,524	749
306.50	4,079	939
306.55	4,133	1,144
306.60	4,188	1,352
306.65	4,243	1,563
306.70	4,299	1,776
306.75	4,354	1,993
306.80	4,411	2,212
306.85	4,467	2,434
306.90	4,524	2,659
306.95	4,581	2,886
307.00	4,639	3,117
307.05	4,737	3,351
307.10	4,837	3,590
307.15	4,937	3,835
307.20	5,039	4,084
307.25	5,141	4,339
307.30	5,245	4,598
307.35	5,349	4,863
307.40	5,455	5,133
307.45	5,561	5,409
307.50	**5,669**	5,689
307.55	5,064	5,958
307.60	4,492	6,196
307.65	3,955	6,407
307.70	3,453	6,592
307.75	2,984	6,753
307.80	2,549	6,891
307.85	2,149	7,009
307.90	1,783	7,107
307.95	1,451	7,188
308.00	1,153	7,252
308.05	1,177	7,311
308.10	1,201	7,370
308.15	1,226	7,431
308.20	1,251	7,493
308.25	1,276	7,556
308.30	1,301	7,620
308.35	1,327	7,686
308.40	1,353	7,753
308.45	1,379	7,821
308.50	1,405	7,891
308.55	1,432	7,962
308.60	1,458	8,034
308.65	1,486	8,108
308.70	1,513	8,183
308.75	1,540	8,259
308.80	1,568	8,337
308.85	1,596	8,416
308.90	1,625	8,496
308.95	1,653	8,578
309.00	1,682	**8,662**

Summary for Pond 2P:

Inflow Area = 1.390 ac, 15.83% Impervious, Inflow Depth > 4.07" for 25-Year event
Inflow = 6.18 cfs @ 12.16 hrs, Volume= 0.471 af
Outflow = 3.69 cfs @ 12.26 hrs, Volume= 0.461 af, Atten= 40%, Lag= 5.7 min
Primary = 3.69 cfs @ 12.26 hrs, Volume= 0.461 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 313.17' @ 12.26 hrs Surf.Area= 2,170 sf Storage= 2,424 cf

Plug-Flow detention time= 26.6 min calculated for 0.461 af (98% of inflow)
Center-of-Mass det. time= 13.7 min (854.4 - 840.7)

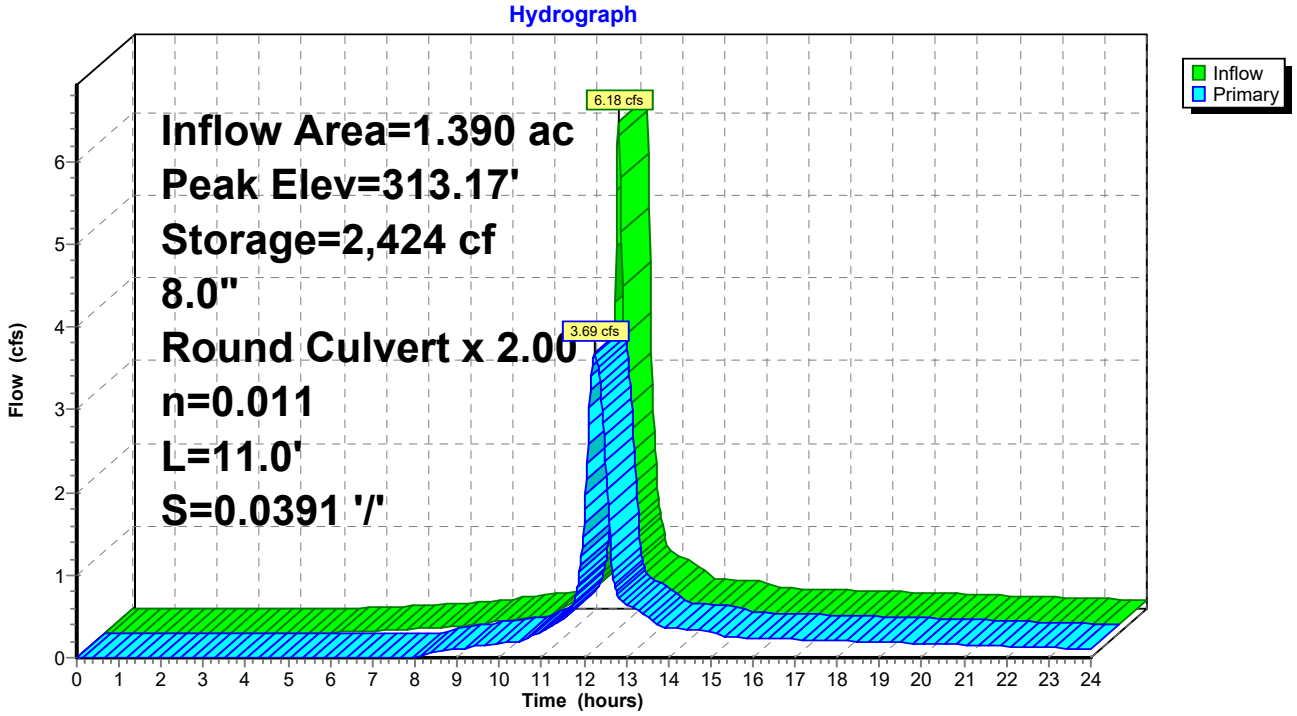
Volume	Invert	Avail.Storage	Storage Description
#1	311.00'	4,013 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
311.00	474	88.9	0	0	474
312.00	872	164.1	663	663	1,993
313.00	2,035	374.0	1,413	2,076	10,985
313.50	2,457	386.0	1,121	3,197	11,736
314.00	928	131.1	816	4,013	22,225

Device	Routing	Invert	Outlet Devices
#1	Primary	311.63'	**8.0" Round Culvert X 2.00** L= 11.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.63' / 311.20' S= 0.0391 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=3.68 cfs @ 12.26 hrs HW=313.16' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.68 cfs @ 5.28 fps)

Pond 2P:


Hydrograph
Inflow Area=1.390 ac
Peak Elev=313.17'
Storage=2,424 cf
8.0"
Round Culvert x 2.00
n=0.011
L=11.0'
S=0.0391 '/'
6.18 cfs
3.69 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 2P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
311.00	0.00	312.02	0.90	313.04	3.49
311.02	0.00	312.04	0.98	313.06	3.52
311.04	0.00	312.06	1.06	313.08	3.55
311.06	0.00	312.08	1.15	313.10	3.58
311.08	0.00	312.10	1.23	313.12	3.62
311.10	0.00	312.12	1.31	313.14	3.65
311.12	0.00	312.14	1.39	313.16	3.68
311.14	0.00	312.16	1.48	313.18	3.71
311.16	0.00	312.18	1.56	313.20	3.74
311.18	0.00	312.20	1.63	313.22	3.77
311.20	0.00	312.22	1.71	313.24	3.80
311.22	0.00	312.24	1.78	313.26	3.83
311.24	0.00	312.26	1.85	313.28	3.86
311.26	0.00	312.28	1.90	313.30	3.89
311.28	0.00	312.30	1.95	313.32	3.92
311.30	0.00	312.32	2.01	313.34	3.94
311.32	0.00	312.34	2.06	313.36	3.97
311.34	0.00	312.36	2.12	313.38	4.00
311.36	0.00	312.38	2.17	313.40	4.03
311.38	0.00	312.40	2.22	313.42	4.06
311.40	0.00	312.42	2.27	313.44	4.08
311.42	0.00	312.44	2.32	313.46	4.11
311.44	0.00	312.46	2.37	313.48	4.14
311.46	0.00	312.48	2.42	313.50	4.17
311.48	0.00	312.50	2.46	313.52	4.19
311.50	0.00	312.52	2.51	313.54	4.22
311.52	0.00	312.54	2.55	313.56	4.25
311.54	0.00	312.56	2.60	313.58	4.27
311.56	0.00	312.58	2.64	313.60	4.30
311.58	0.00	312.60	2.68	313.62	4.33
311.60	0.00	312.62	2.72	313.64	4.35
311.62	0.00	312.64	2.77	313.66	4.38
311.64	0.00	312.66	2.81	313.68	4.40
311.66	0.01	312.68	2.85	313.70	4.43
311.68	0.02	312.70	2.89	313.72	4.46
311.70	0.04	312.72	2.92	313.74	4.48
311.72	0.06	312.74	2.96	313.76	4.51
311.74	0.09	312.76	3.00	313.78	4.53
311.76	0.12	312.78	3.04	313.80	4.56
311.78	0.16	312.80	3.07	313.82	4.58
311.80	0.20	312.82	3.11	313.84	4.60
311.82	0.24	312.84	3.15	313.86	4.63
311.84	0.29	312.86	3.18	313.88	4.65
311.86	0.35	312.88	3.22	313.90	4.68
311.88	0.41	312.90	3.25	313.92	4.70
311.90	0.47	312.92	3.29	313.94	4.73
311.92	0.53	312.94	3.32	313.96	4.75
311.94	0.60	312.96	3.36	313.98	4.77
311.96	0.67	312.98	3.39	314.00	**4.80**
311.98	0.75	313.00	3.42		
312.00	0.82	313.02	3.46		

Stage-Area-Storage for Pond 2P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
311.00	474	0
311.05	491	24
311.10	508	49
311.15	526	75
311.20	544	102
311.25	562	129
311.30	581	158
311.35	600	187
311.40	619	218
311.45	638	249
311.50	658	282
311.55	678	315
311.60	698	350
311.65	719	385
311.70	740	421
311.75	761	459
311.80	783	498
311.85	805	537
311.90	827	578
311.95	849	620
312.00	872	663
312.05	919	708
312.10	966	755
312.15	1,015	804
312.20	1,066	856
312.25	1,117	911
312.30	1,170	968
312.35	1,224	1,028
312.40	1,279	1,091
312.45	1,335	1,156
312.50	1,393	1,224
312.55	1,452	1,295
312.60	1,512	1,369
312.65	1,573	1,446
312.70	1,635	1,527
312.75	1,699	1,610
312.80	1,764	1,696
312.85	1,830	1,786
312.90	1,897	1,879
312.95	1,965	1,976
313.00	2,035	2,076
313.05	2,075	2,179
313.10	2,116	2,284
313.15	2,157	2,390
313.20	2,199	2,499
313.25	2,241	2,610
313.30	2,283	2,723
313.35	2,326	2,839
313.40	2,369	2,956
313.45	2,413	3,076
313.50	**2,457**	3,197
313.55	2,271	3,316
313.60	2,093	3,425
313.65	1,922	3,525
313.70	1,758	3,617
313.75	1,601	3,701
313.80	1,452	3,777
313.85	1,310	3,846
313.90	1,175	3,908
313.95	1,048	3,964
314.00	928	**4,013**

Summary for Pond 3P:

Inflow Area = 0.620 ac, 8.06% Impervious, Inflow Depth > 3.96" for 25-Year event
Inflow = 2.56 cfs @ 12.17 hrs, Volume= 0.205 af
Outflow = 2.54 cfs @ 12.18 hrs, Volume= 0.199 af, Atten= 1%, Lag= 0.6 min
Primary = 2.54 cfs @ 12.18 hrs, Volume= 0.199 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 314.34' @ 12.18 hrs Surf.Area= 396 sf Storage= 356 cf

Plug-Flow detention time= 27.0 min calculated for 0.199 af (97% of inflow)
Center-of-Mass det. time= 11.6 min (856.4 - 844.7)

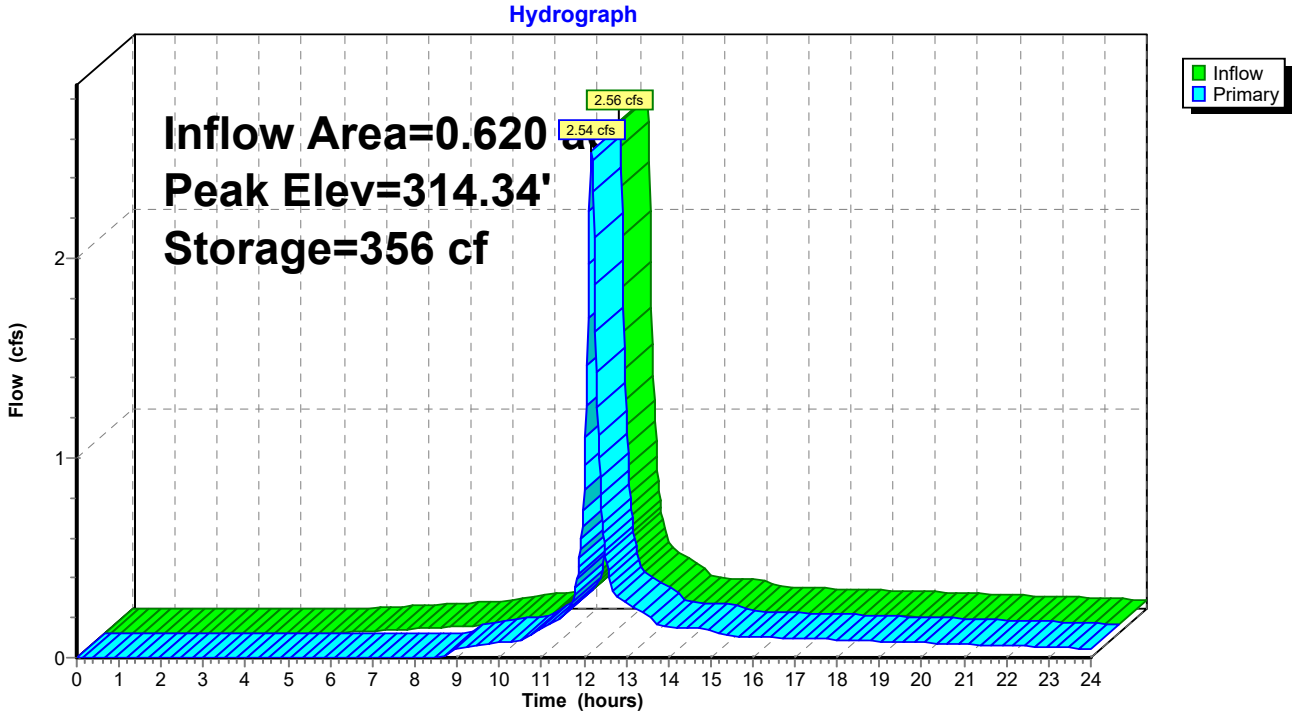
Volume	Invert	Avail.Storage	Storage Description
#1	312.50'	423 cf	**Above-ground bio-retention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.50	47	33.1	0	0	47
313.00	103	42.5	37	37	107
314.00	315	76.7	199	236	436
314.50	437	86.1	187	423	565

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 311.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	314.00'	**15.0" Horiz. Overflow Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.53 cfs @ 12.18 hrs HW=314.34' (Free Discharge)
↑**1=Culvert** (Passes 2.53 cfs of 5.78 cfs potential flow)
↑**2=Overflow Grate** (Weir Controls 2.53 cfs @ 1.90 fps)

Pond 3P:


Hydrograph
Inflow Area=0.620 a
Peak Elev=314.34'
Storage=356 cf
2.56 cfs
2.54 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 3P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.50	0.00	313.01	0.00	313.52	0.00	314.03	0.07
312.51	0.00	313.02	0.00	313.53	0.00	314.04	0.10
312.52	0.00	313.03	0.00	313.54	0.00	314.05	0.14
312.53	0.00	313.04	0.00	313.55	0.00	314.06	0.19
312.54	0.00	313.05	0.00	313.56	0.00	314.07	0.24
312.55	0.00	313.06	0.00	313.57	0.00	314.08	0.29
312.56	0.00	313.07	0.00	313.58	0.00	314.09	0.35
312.57	0.00	313.08	0.00	313.59	0.00	314.10	0.41
312.58	0.00	313.09	0.00	313.60	0.00	314.11	0.47
312.59	0.00	313.10	0.00	313.61	0.00	314.12	0.53
312.60	0.00	313.11	0.00	313.62	0.00	314.13	0.60
312.61	0.00	313.12	0.00	313.63	0.00	314.14	0.67
312.62	0.00	313.13	0.00	313.64	0.00	314.15	0.75
312.63	0.00	313.14	0.00	313.65	0.00	314.16	0.82
312.64	0.00	313.15	0.00	313.66	0.00	314.17	0.90
312.65	0.00	313.16	0.00	313.67	0.00	314.18	0.98
312.66	0.00	313.17	0.00	313.68	0.00	314.19	1.06
312.67	0.00	313.18	0.00	313.69	0.00	314.20	1.15
312.68	0.00	313.19	0.00	313.70	0.00	314.21	1.24
312.69	0.00	313.20	0.00	313.71	0.00	314.22	1.33
312.70	0.00	313.21	0.00	313.72	0.00	314.23	1.42
312.71	0.00	313.22	0.00	313.73	0.00	314.24	1.51
312.72	0.00	313.23	0.00	313.74	0.00	314.25	1.61
312.73	0.00	313.24	0.00	313.75	0.00	314.26	1.70
312.74	0.00	313.25	0.00	313.76	0.00	314.27	1.80
312.75	0.00	313.26	0.00	313.77	0.00	314.28	1.90
312.76	0.00	313.27	0.00	313.78	0.00	314.29	2.01
312.77	0.00	313.28	0.00	313.79	0.00	314.30	2.11
312.78	0.00	313.29	0.00	313.80	0.00	314.31	2.22
312.79	0.00	313.30	0.00	313.81	0.00	314.32	2.32
312.80	0.00	313.31	0.00	313.82	0.00	314.33	2.43
312.81	0.00	313.32	0.00	313.83	0.00	314.34	2.55
312.82	0.00	313.33	0.00	313.84	0.00	314.35	2.66
312.83	0.00	313.34	0.00	313.85	0.00	314.36	2.77
312.84	0.00	313.35	0.00	313.86	0.00	314.37	2.89
312.85	0.00	313.36	0.00	313.87	0.00	314.38	3.01
312.86	0.00	313.37	0.00	313.88	0.00	314.39	3.13
312.87	0.00	313.38	0.00	313.89	0.00	314.40	3.25
312.88	0.00	313.39	0.00	313.90	0.00	314.41	3.37
312.89	0.00	313.40	0.00	313.91	0.00	314.42	3.50
312.90	0.00	313.41	0.00	313.92	0.00	314.43	3.62
312.91	0.00	313.42	0.00	313.93	0.00	314.44	3.75
312.92	0.00	313.43	0.00	313.94	0.00	314.45	3.88
312.93	0.00	313.44	0.00	313.95	0.00	314.46	4.01
312.94	0.00	313.45	0.00	313.96	0.00	314.47	4.05
312.95	0.00	313.46	0.00	313.97	0.00	314.48	4.09
312.96	0.00	313.47	0.00	313.98	0.00	314.49	4.14
312.97	0.00	313.48	0.00	313.99	0.00	314.50	**4.18**
312.98	0.00	313.49	0.00	314.00	0.00		
312.99	0.00	313.50	0.00	314.01	0.01		
313.00	0.00	313.51	0.00	314.02	0.04		

Stage-Area-Storage for Pond 3P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.50	47	0
312.52	49	1
312.54	51	2
312.56	53	3
312.58	55	4
312.60	56	5
312.62	58	6
312.64	60	8
312.66	63	9
312.68	65	10
312.70	67	11
312.72	69	13
312.74	71	14
312.76	73	16
312.78	76	17
312.80	78	19
312.82	80	20
312.84	83	22
312.86	85	23
312.88	88	25
312.90	90	27
312.92	93	29
312.94	95	31
312.96	98	33
312.98	100	35
313.00	103	37
313.02	106	39
313.04	109	41
313.06	112	43
313.08	116	45
313.10	119	48
313.12	122	50
313.14	126	53
313.16	129	55
313.18	133	58
313.20	136	60
313.22	140	63
313.24	143	66
313.26	147	69
313.28	151	72
313.30	154	75
313.32	158	78
313.34	162	81
313.36	166	85
313.38	170	88
313.40	174	91
313.42	178	95
313.44	182	98
313.46	186	102
313.48	190	106
313.50	195	110
313.52	199	114
313.54	203	118
313.56	207	122
313.58	212	126
313.60	216	130
313.62	221	135
313.64	225	139
313.66	230	144
313.68	235	148
313.70	239	153
313.72	244	158
313.74	249	163
313.76	254	168
313.78	258	173
313.80	263	178
313.82	268	184
313.84	273	189
313.86	278	194
313.88	283	200
313.90	289	206
313.92	294	212
313.94	299	218
313.96	304	224
313.98	310	230
314.00	315	236
314.02	319	242
314.04	324	249
314.06	329	255
314.08	333	262
314.10	338	269
314.12	342	275
314.14	347	282
314.16	352	289
314.18	357	296
314.20	361	304
314.22	366	311
314.24	371	318
314.26	376	326
314.28	381	333
314.30	386	341
314.32	391	349
314.34	396	357
314.36	401	365
314.38	406	373
314.40	411	381
314.42	416	389
314.44	421	397
314.46	427	406
314.48	432	414
314.50	**437**	**423**

Summary for Pond 4P:

Inflow Area = 0.140 ac, 50.00% Impervious, Inflow Depth > 5.50" for 25-Year event
Inflow = 0.88 cfs @ 12.13 hrs, Volume= 0.064 af
Outflow = 0.71 cfs @ 12.17 hrs, Volume= 0.049 af, Atten= 20%, Lag= 2.5 min
Primary = 0.71 cfs @ 12.17 hrs, Volume= 0.049 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 313.12' @ 12.17 hrs Surf.Area= 1,193 sf Storage= 904 cf

Plug-Flow detention time= 192.2 min calculated for 0.049 af (76% of inflow)
Center-of-Mass det. time= 87.0 min (875.0 - 788.0)

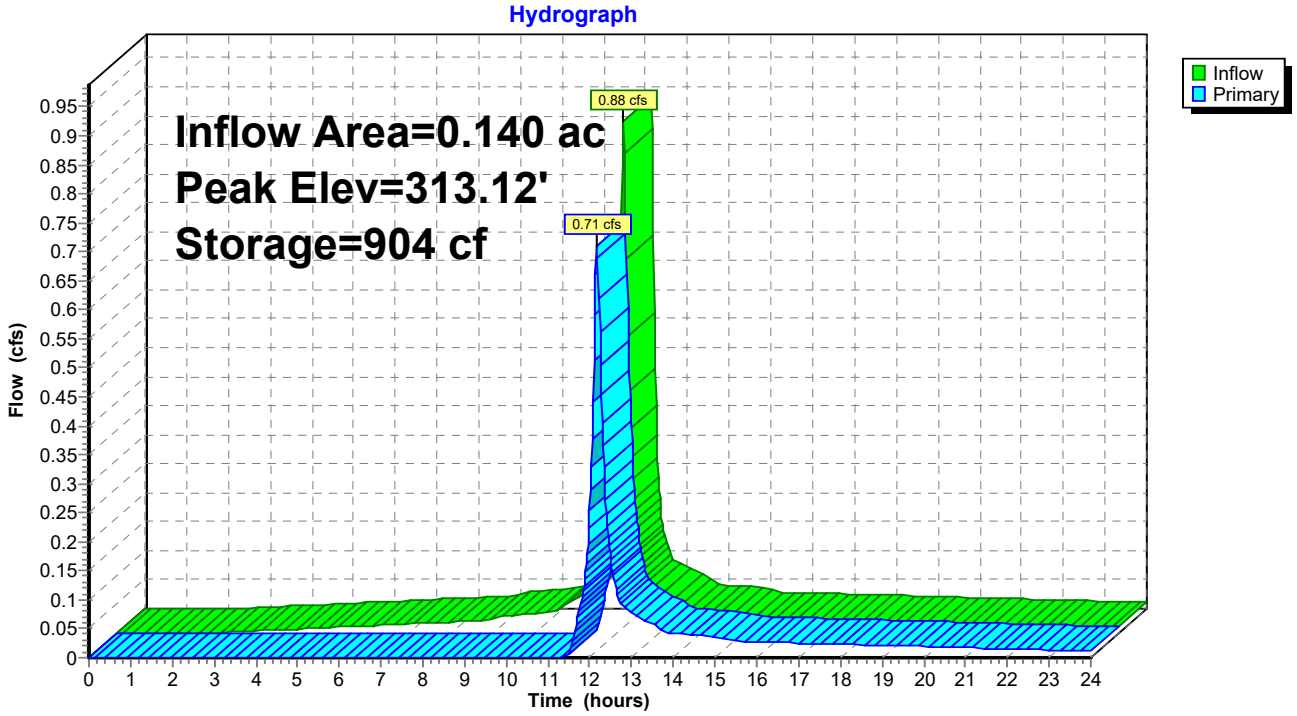
Volume	Invert	Avail.Storage	Storage Description
#1	312.00'	1,405 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.00	460	123.2	0	0	460
313.00	1,118	215.0	765	765	2,936
313.50	1,447	224.4	639	1,405	3,283

Device	Routing	Invert	Outlet Devices
#1	Primary	310.50'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 310.50' / 310.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	312.90'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	313.25'	**10.0' long x 10.0' breadth Overflow Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.70 cfs @ 12.17 hrs HW=313.12' (Free Discharge)
- **1=Culvert** (Passes 0.70 cfs of 5.51 cfs potential flow)
  - **2=Orifice/Grate** (Weir Controls 0.70 cfs @ 1.53 fps)
- **3=Overflow Spillway** (Controls 0.00 cfs)

Pond 4P:


Hydrograph
Inflow Area=0.140 ac
Peak Elev=313.12'
Storage=904 cf
0.88 cfs
0.71 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 4P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.00	0.00	312.51	0.00	313.02	0.28
312.01	0.00	312.52	0.00	313.03	0.32
312.02	0.00	312.53	0.00	313.04	0.36
312.03	0.00	312.54	0.00	313.05	0.40
312.04	0.00	312.55	0.00	313.06	0.44
312.05	0.00	312.56	0.00	313.07	0.48
312.06	0.00	312.57	0.00	313.08	0.52
312.07	0.00	312.58	0.00	313.09	0.57
312.08	0.00	312.59	0.00	313.10	0.61
312.09	0.00	312.60	0.00	313.11	0.66
312.10	0.00	312.61	0.00	313.12	0.71
312.11	0.00	312.62	0.00	313.13	0.76
312.12	0.00	312.63	0.00	313.14	0.81
312.13	0.00	312.64	0.00	313.15	0.84
312.14	0.00	312.65	0.00	313.16	0.86
312.15	0.00	312.66	0.00	313.17	0.87
312.16	0.00	312.67	0.00	313.18	0.89
312.17	0.00	312.68	0.00	313.19	0.91
312.18	0.00	312.69	0.00	313.20	0.92
312.19	0.00	312.70	0.00	313.21	0.94
312.20	0.00	312.71	0.00	313.22	0.95
312.21	0.00	312.72	0.00	313.23	0.97
312.22	0.00	312.73	0.00	313.24	0.98
312.23	0.00	312.74	0.00	313.25	0.99
312.24	0.00	312.75	0.00	313.26	1.03
312.25	0.00	312.76	0.00	313.27	1.09
312.26	0.00	312.77	0.00	313.28	1.17
312.27	0.00	312.78	0.00	313.29	1.25
312.28	0.00	312.79	0.00	313.30	1.34
312.29	0.00	312.80	0.00	313.31	1.44
312.30	0.00	312.81	0.00	313.32	1.55
312.31	0.00	312.82	0.00	313.33	1.67
312.32	0.00	312.83	0.00	313.34	1.79
312.33	0.00	312.84	0.00	313.35	1.91
312.34	0.00	312.85	0.00	313.36	2.05
312.35	0.00	312.86	0.00	313.37	2.19
312.36	0.00	312.87	0.00	313.38	2.33
312.37	0.00	312.88	0.00	313.39	2.48
312.38	0.00	312.89	0.00	313.40	2.64
312.39	0.00	312.90	0.00	313.41	2.79
312.40	0.00	312.91	0.01	313.42	2.96
312.41	0.00	312.92	0.02	313.43	3.13
312.42	0.00	312.93	0.04	313.44	3.30
312.43	0.00	312.94	0.05	313.45	3.47
312.44	0.00	312.95	0.08	313.46	3.66
312.45	0.00	312.96	0.10	313.47	3.85
312.46	0.00	312.97	0.13	313.48	4.04
312.47	0.00	312.98	0.15	313.49	4.24
312.48	0.00	312.99	0.18	313.50	**4.44**
312.49	0.00	313.00	0.22		
312.50	0.00	313.01	0.25		

Stage-Area-Storage for Pond 4P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.00	460	0
312.02	470	9
312.04	481	19
312.06	491	29
312.08	502	38
312.10	513	49
312.12	524	59
312.14	535	70
312.16	546	80
312.18	557	91
312.20	569	103
312.22	580	114
312.24	592	126
312.26	603	138
312.28	615	150
312.30	627	162
312.32	639	175
312.34	651	188
312.36	664	201
312.38	676	215
312.40	689	228
312.42	701	242
312.44	714	256
312.46	727	271
312.48	740	285
312.50	753	300
312.52	766	315
312.54	780	331
312.56	793	347
312.58	807	363
312.60	820	379
312.62	834	395
312.64	848	412
312.66	862	429
312.68	876	447
312.70	890	464
312.72	905	482
312.74	919	501
312.76	934	519
312.78	949	538
312.80	963	557
312.82	978	577
312.84	993	596
312.86	1,009	616
312.88	1,024	637
312.90	1,039	657
312.92	1,055	678
312.94	1,070	699
312.96	1,086	721
312.98	1,102	743
313.00	1,118	765
313.02	1,130	788
313.04	1,143	810
313.06	1,155	833
313.08	1,168	856
313.10	1,180	880
313.12	1,193	904
313.14	1,206	928
313.16	1,219	952
313.18	1,232	976
313.20	1,245	1,001
313.22	1,258	1,026
313.24	1,271	1,051
313.26	1,284	1,077
313.28	1,297	1,103
313.30	1,310	1,129
313.32	1,324	1,155
313.34	1,337	1,182
313.36	1,351	1,209
313.38	1,364	1,236
313.40	1,378	1,263
313.42	1,392	1,291
313.44	1,405	1,319
313.46	1,419	1,347
313.48	1,433	1,376
313.50	**1,447**	**1,405**

Summary for Pond 5P:

Inflow Area = 3.790 ac, 12.40% Impervious, Inflow Depth > 4.38" for 25-Year event
Inflow = 14.98 cfs @ 12.21 hrs, Volume= 1.384 af
Outflow = 14.86 cfs @ 12.23 hrs, Volume= 1.329 af, Atten= 1%, Lag= 0.8 min
Primary = 14.86 cfs @ 12.23 hrs, Volume= 1.329 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 309.63' @ 12.23 hrs Surf.Area= 2,751 sf Storage= 3,368 cf

Plug-Flow detention time= 40.2 min calculated for 1.327 af (96% of inflow)
Center-of-Mass det. time= 17.6 min (851.7 - 834.0)

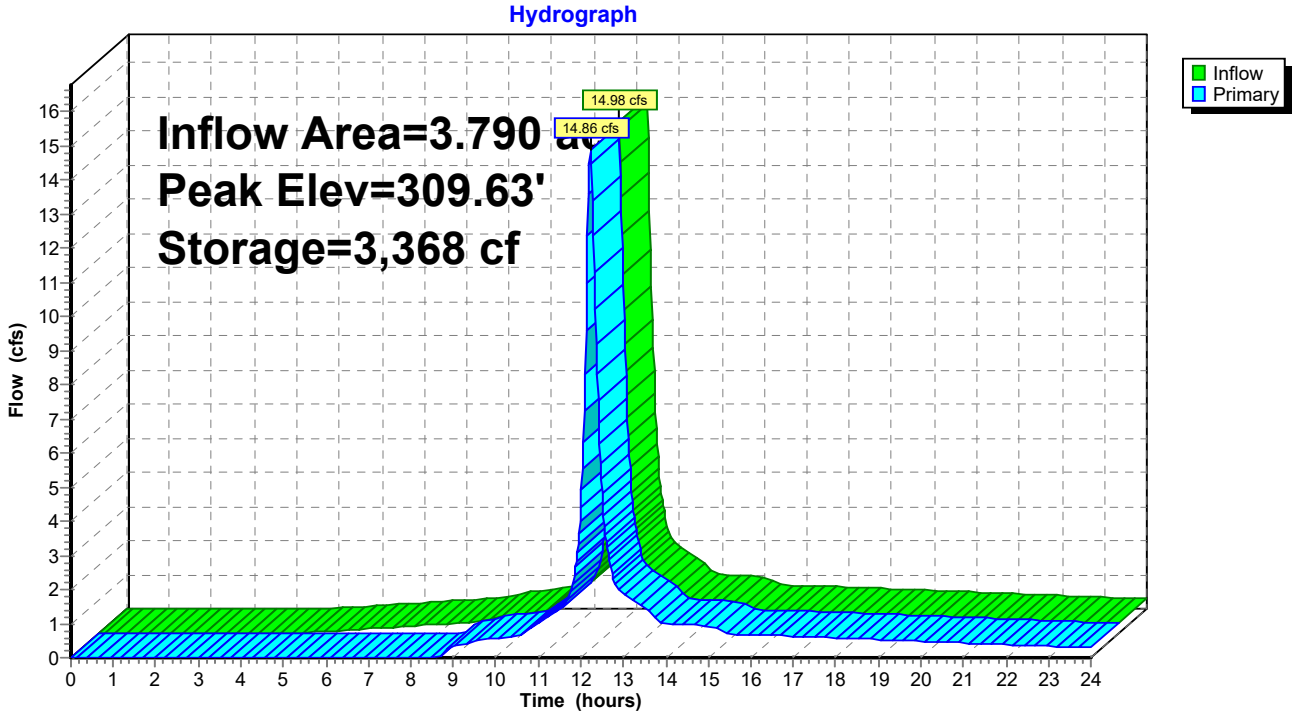
Volume	Invert	Avail.Storage	Storage Description
#1	308.00'	3,691 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.00	1,092	152.1	0	0	1,092
309.00	2,443	239.0	1,723	1,723	3,804
309.75	2,809	248.3	1,968	3,691	4,208

Device	Routing	Invert	Outlet Devices
#1	Primary	309.25'	**25.0' long x 6.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=14.80 cfs @ 12.23 hrs HW=309.63' (Free Discharge)
↑—**1=Primary Spillway** (Weir Controls 14.80 cfs @ 1.55 fps)

Pond 5P:


Hydrograph
Inflow
Primary
14.98 cfs
14.86 cfs
Inflow Area=3.790 ac
Peak Elev=309.63'
Storage=3,368 cf
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 5P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
308.00	0.00	308.51	0.00	309.02	0.00	309.53	8.99
308.01	0.00	308.52	0.00	309.03	0.00	309.54	9.50
308.02	0.00	308.53	0.00	309.04	0.00	309.55	10.02
308.03	0.00	308.54	0.00	309.05	0.00	309.56	10.56
308.04	0.00	308.55	0.00	309.06	0.00	309.57	11.11
308.05	0.00	308.56	0.00	309.07	0.00	309.58	11.66
308.06	0.00	308.57	0.00	309.08	0.00	309.59	12.23
308.07	0.00	308.58	0.00	309.09	0.00	309.60	12.81
308.08	0.00	308.59	0.00	309.10	0.00	309.61	13.40
308.09	0.00	308.60	0.00	309.11	0.00	309.62	14.00
308.10	0.00	308.61	0.00	309.12	0.00	309.63	14.62
308.11	0.00	308.62	0.00	309.13	0.00	309.64	15.24
308.12	0.00	308.63	0.00	309.14	0.00	309.65	15.87
308.13	0.00	308.64	0.00	309.15	0.00	309.66	16.54
308.14	0.00	308.65	0.00	309.16	0.00	309.67	17.21
308.15	0.00	308.66	0.00	309.17	0.00	309.68	17.89
308.16	0.00	308.67	0.00	309.18	0.00	309.69	18.59
308.17	0.00	308.68	0.00	309.19	0.00	309.70	19.30
308.18	0.00	308.69	0.00	309.20	0.00	309.71	20.02
308.19	0.00	308.70	0.00	309.21	0.00	309.72	20.75
308.20	0.00	308.71	0.00	309.22	0.00	309.73	21.50
308.21	0.00	308.72	0.00	309.23	0.00	309.74	22.26
308.22	0.00	308.73	0.00	309.24	0.00	309.75	**23.03**
308.23	0.00	308.74	0.00	309.25	0.00		
308.24	0.00	308.75	0.00	309.26	0.06		
308.25	0.00	308.76	0.00	309.27	0.17		
308.26	0.00	308.77	0.00	309.28	0.31		
308.27	0.00	308.78	0.00	309.29	0.47		
308.28	0.00	308.79	0.00	309.30	0.66		
308.29	0.00	308.80	0.00	309.31	0.87		
308.30	0.00	308.81	0.00	309.32	1.10		
308.31	0.00	308.82	0.00	309.33	1.34		
308.32	0.00	308.83	0.00	309.34	1.60		
308.33	0.00	308.84	0.00	309.35	1.87		
308.34	0.00	308.85	0.00	309.36	2.16		
308.35	0.00	308.86	0.00	309.37	2.46		
308.36	0.00	308.87	0.00	309.38	2.78		
308.37	0.00	308.88	0.00	309.39	3.10		
308.38	0.00	308.89	0.00	309.40	3.44		
308.39	0.00	308.90	0.00	309.41	3.79		
308.40	0.00	308.91	0.00	309.42	4.15		
308.41	0.00	308.92	0.00	309.43	4.52		
308.42	0.00	308.93	0.00	309.44	4.91		
308.43	0.00	308.94	0.00	309.45	5.30		
308.44	0.00	308.95	0.00	309.46	5.72		
308.45	0.00	308.96	0.00	309.47	6.15		
308.46	0.00	308.97	0.00	309.48	6.59		
308.47	0.00	308.98	0.00	309.49	7.05		
308.48	0.00	308.99	0.00	309.50	7.52		
308.49	0.00	309.00	0.00	309.51	7.99		
308.50	0.00	309.01	0.00	309.52	8.48		

Stage-Area-Storage for Pond 5P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
308.00	1,092	0
308.02	1,114	22
308.04	1,136	45
308.06	1,158	67
308.08	1,180	91
308.10	1,203	115
308.12	1,226	139
308.14	1,249	164
308.16	1,272	189
308.18	1,296	215
308.20	1,319	241
308.22	1,343	267
308.24	1,367	294
308.26	1,392	322
308.28	1,416	350
308.30	1,441	379
308.32	1,466	408
308.34	1,491	437
308.36	1,517	467
308.38	1,542	498
308.40	1,568	529
308.42	1,594	561
308.44	1,620	593
308.46	1,647	626
308.48	1,674	659
308.50	1,700	693
308.52	1,728	727
308.54	1,755	762
308.56	1,782	797
308.58	1,810	833
308.60	1,838	869
308.62	1,866	906
308.64	1,895	944
308.66	1,923	982
308.68	1,952	1,021
308.70	1,981	1,060
308.72	2,011	1,100
308.74	2,040	1,141
308.76	2,070	1,182
308.78	2,100	1,224
308.80	2,130	1,266
308.82	2,160	1,309
308.84	2,191	1,352
308.86	2,222	1,396
308.88	2,253	1,441
308.90	2,284	1,486
308.92	2,315	1,532
308.94	2,347	1,579
308.96	2,379	1,626
308.98	2,411	1,674
309.00	2,443	1,723
309.02	2,452	1,772
309.04	2,462	1,821
309.06	2,471	1,870
309.08	2,481	1,920
309.10	2,490	1,969
309.12	2,500	2,019
309.14	2,509	2,069
309.16	2,519	2,120
309.18	2,529	2,170
309.20	2,538	2,221
309.22	2,548	2,272
309.24	2,557	2,323
309.26	2,567	2,374
309.28	2,577	2,425
309.30	2,586	2,477
309.32	2,596	2,529
309.34	2,606	2,581
309.36	2,615	2,633
309.38	2,625	2,686
309.40	2,635	2,738
309.42	2,645	2,791
309.44	2,655	2,844
309.46	2,664	2,897
309.48	2,674	2,951
309.50	2,684	3,004
309.52	2,694	3,058
309.54	2,704	3,112
309.56	2,714	3,166
309.58	2,724	3,220
309.60	2,734	3,275
309.62	2,744	3,330
309.64	2,754	3,385
309.66	2,764	3,440
309.68	2,774	3,495
309.70	2,784	3,551
309.72	2,794	3,607
309.74	**2,804**	**3,663**

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1-1: Runoff Area=2.240 ac 62.05% Impervious Runoff Depth>7.26"
Flow Length=593' Tc=11.5 min CN=90 Runoff=14.76 cfs 1.355 af

SubcatchmentP1-2: Runoff Area=1.390 ac 15.83% Impervious Runoff Depth>5.82"
Flow Length=175' Tc=9.0 min CN=78 Runoff=8.73 cfs 0.675 af

SubcatchmentP1-3: Runoff Area=0.620 ac 8.06% Impervious Runoff Depth>5.70"
Flow Length=334' Tc=10.0 min CN=77 Runoff=3.65 cfs 0.295 af

SubcatchmentP1-4: Runoff Area=0.140 ac 50.00% Impervious Runoff Depth>7.39"
Tc=6.0 min CN=91 Runoff=1.16 cfs 0.086 af

SubcatchmentP1-5: Runoff Area=3.790 ac 12.40% Impervious Runoff Depth>6.18"
Flow Length=412' Tc=13.6 min CN=81 Runoff=20.81 cfs 1.951 af

SubcatchmentP1-6: Runoff Area=2.540 ac 0.00% Impervious Runoff Depth>5.34"
Flow Length=351' Tc=10.7 min CN=74 Runoff=13.75 cfs 1.131 af

SubcatchmentP1-7: Runoff Area=6.000 ac 0.00% Impervious Runoff Depth>5.81"
Flow Length=385' Tc=15.4 min CN=78 Runoff=29.51 cfs 2.907 af

SubcatchmentP1-8: Runoff Area=9.110 ac 4.94% Impervious Runoff Depth>5.58"
Flow Length=496' Tc=12.5 min CN=76 Runoff=47.76 cfs 4.235 af

Reach 1R: Batterson Park Pond Inflow=133.36 cfs 12.442 af
Outflow=133.36 cfs 12.442 af

Reach 2R: Flow to Flared End Inflow=4.49 cfs 0.360 af
Outflow=4.49 cfs 0.360 af

Pond 1P: Peak Elev=307.61' Storage=6,240 cf Inflow=14.76 cfs 1.355 af
Outflow=14.66 cfs 1.251 af

Pond 2P: Peak Elev=313.81' Storage=3,792 cf Inflow=8.73 cfs 0.675 af
8.0" Round Culvert x 2.00 n=0.011 L=11.0' S=0.0391 '/' Outflow=4.57 cfs 0.664 af

Pond 3P: Peak Elev=314.43' Storage=393 cf Inflow=3.65 cfs 0.295 af
Outflow=3.61 cfs 0.289 af

Pond 4P: Peak Elev=313.18' Storage=972 cf Inflow=1.16 cfs 0.086 af
Outflow=0.88 cfs 0.071 af

Pond 5P: Peak Elev=309.72' Storage=3,604 cf Inflow=20.81 cfs 1.951 af
Outflow=20.68 cfs 1.895 af

Total Runoff Area = 25.830 ac Runoff Volume = 12.635 af Average Runoff Depth = 5.87"
89.74% Pervious = 23.180 ac 10.26% Impervious = 2.650 ac

Summary for Subcatchment P1-1:

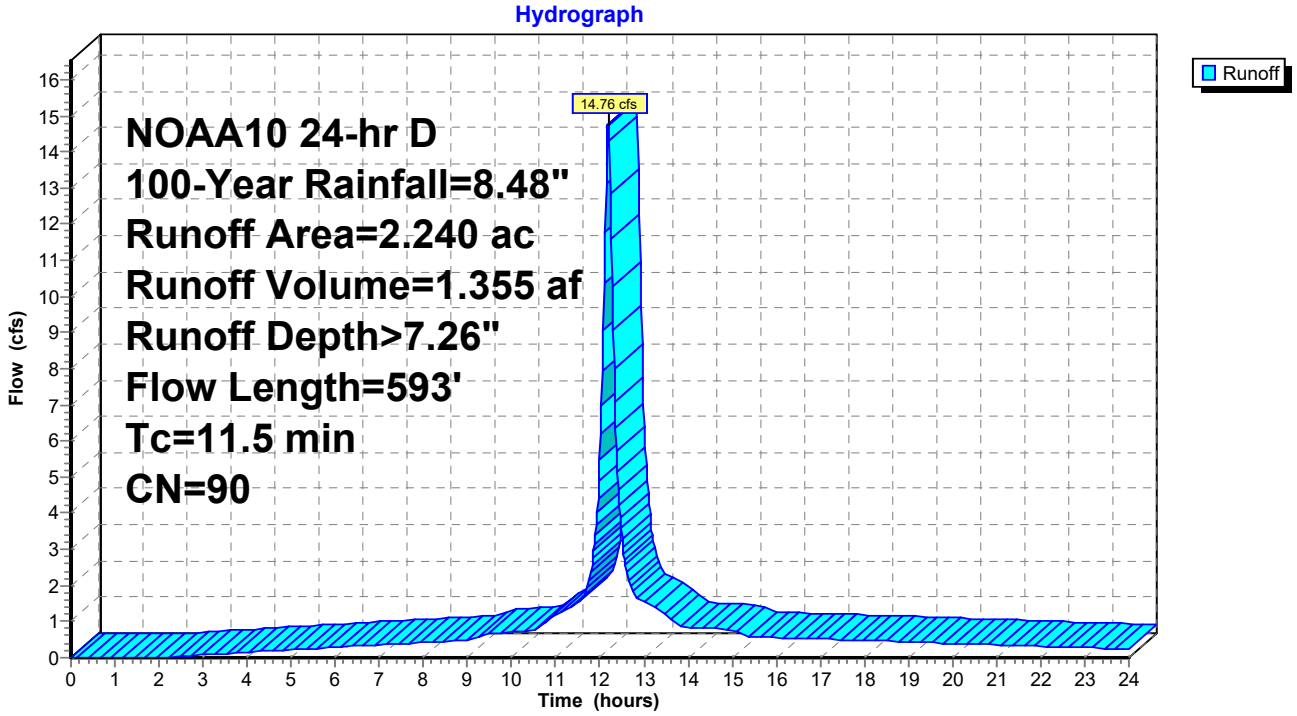
Runoff = 14.76 cfs @ 12.19 hrs, Volume= 1.355 af, Depth> 7.26"
Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

	Area (ac)	CN	Description
	0.170	74	>75% Grass cover, Good, HSG C
	0.460	80	>75% Grass cover, Good, HSG D
	0.220	70	Woods, Good, HSG C
	0.000	77	Woods, Good, HSG D
*	0.000	73	Brush, Good, HSG D
	0.000	96	Gravel surface, HSG D
	1.390	98	Paved parking, HSG D
	2.240	90	Weighted Average
	0.850		37.95% Pervious Area
	1.390		62.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.1700	0.19		**Sheet Flow, Seg 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	96	0.1000	5.09		**Shallow Concentrated Flow, Seg 2** Unpaved Kv= 16.1 fps
0.9	191	0.0340	3.74		**Shallow Concentrated Flow, Seg 3** Paved Kv= 20.3 fps
1.3	206	0.0170	2.65		**Shallow Concentrated Flow, Seg 4** Paved Kv= 20.3 fps
11.5	593	Total			

Subcatchment P1-1:



Summary for Subcatchment P1-2:

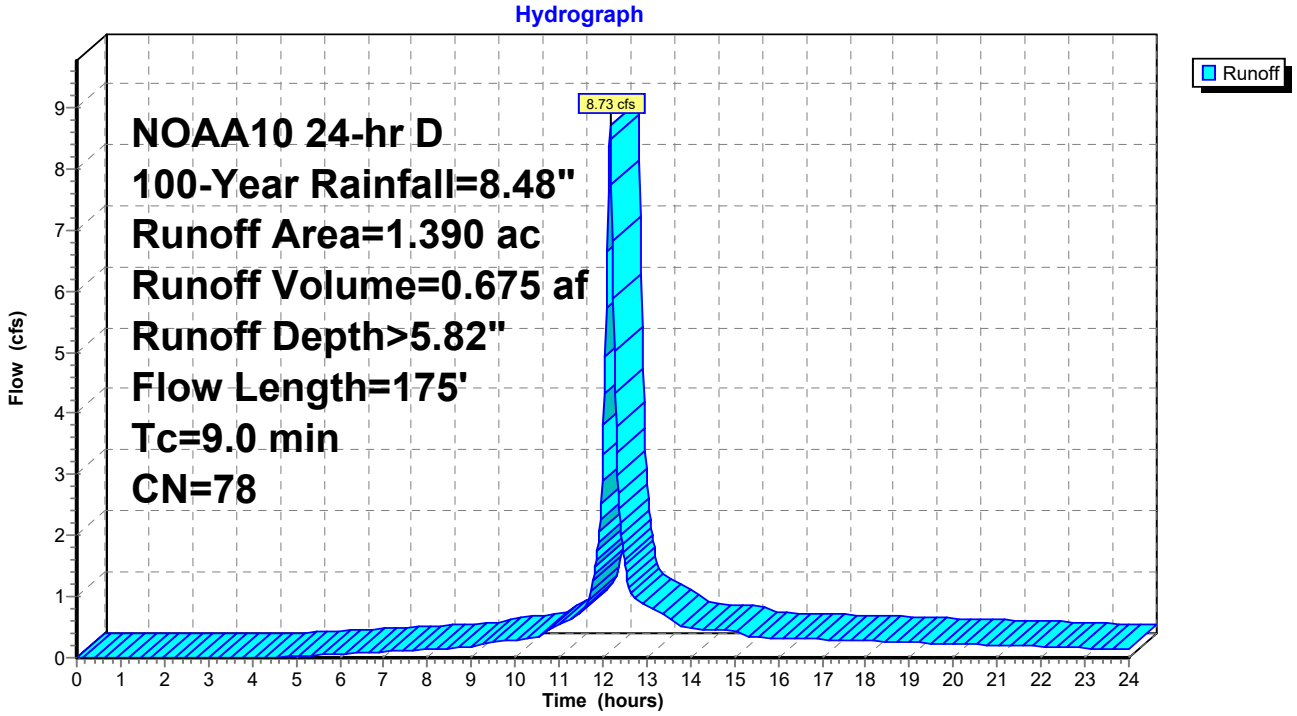
Runoff = 8.73 cfs @ 12.16 hrs, Volume= 0.675 af, Depth> 5.82"
Routed to Pond 2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
1.010	74	>75% Grass cover, Good, HSG C
0.160	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.220	98	Paved parking, HSG D
1.390	78	Weighted Average
1.170		84.17% Pervious Area
0.220		15.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.1800	0.19		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	75	0.1500	6.24		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
9.0	175	Total			

Subcatchment P1-2:



Summary for Subcatchment P1-3:

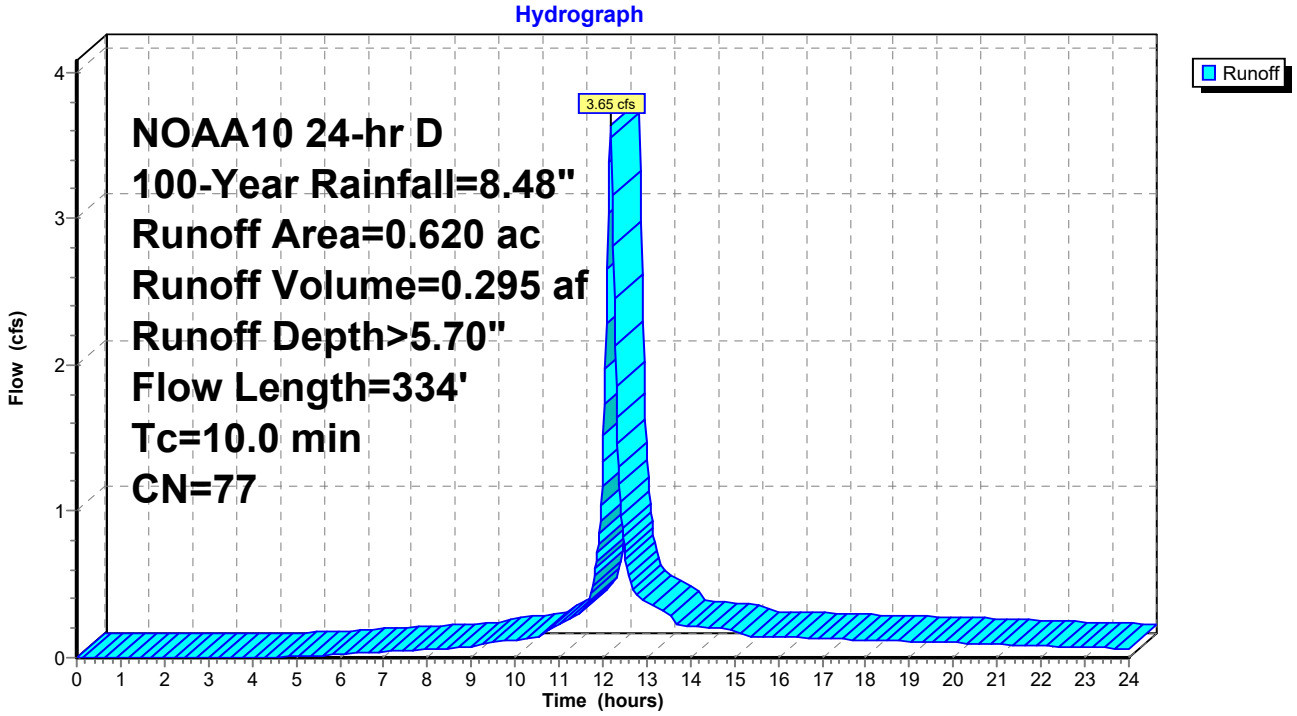
Runoff = 3.65 cfs @ 12.17 hrs, Volume= 0.295 af, Depth> 5.70"
Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
0.080	74	>75% Grass cover, Good, HSG C
0.000	80	>75% Grass cover, Good, HSG D
0.400	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.050	98	Paved parking, HSG D
0.620	77	Weighted Average
0.570		91.94% Pervious Area
0.050		8.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1650	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	111	0.1100	5.34		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	123	0.0500	3.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.0	334	Total			

Subcatchment P1-3:



Summary for Subcatchment P1-4:

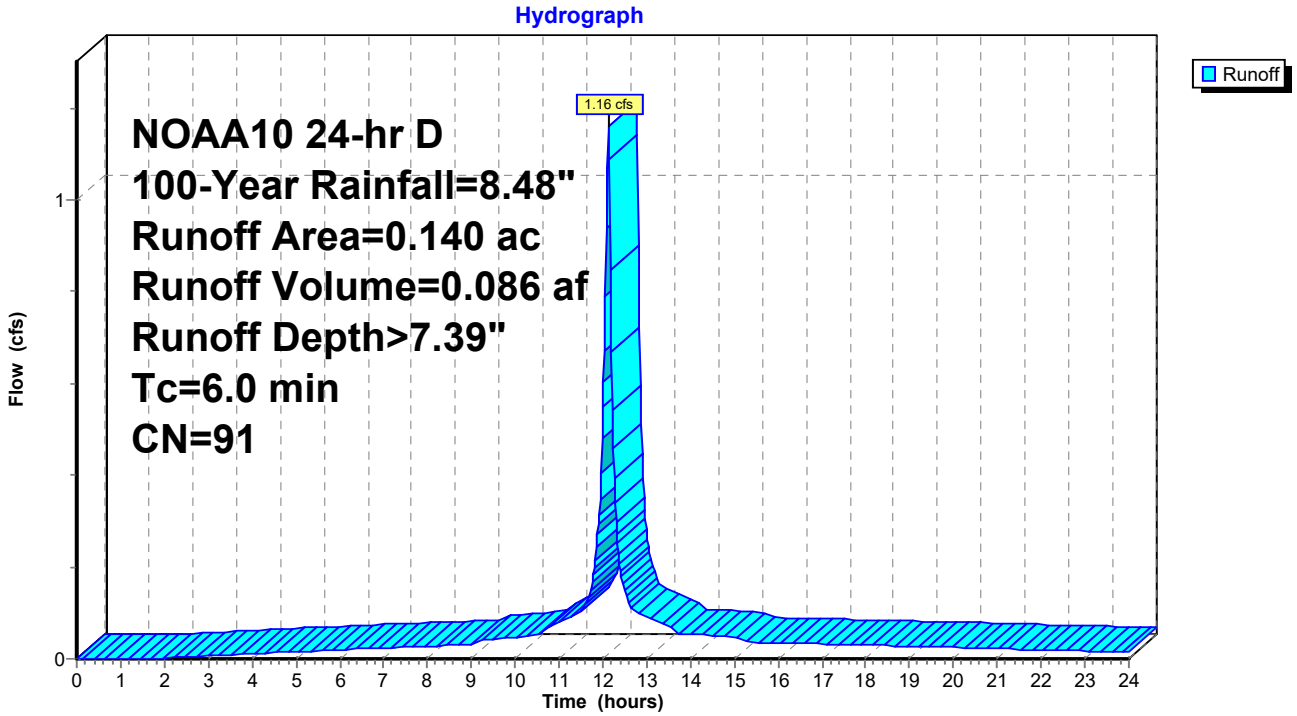
Runoff = 1.16 cfs @ 12.13 hrs, Volume= 0.086 af, Depth> 7.39"
Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.050	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.020	96	Gravel surface, HSG D
0.070	98	Paved parking, HSG D
0.140	91	Weighted Average
0.070		50.00% Pervious Area
0.070		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. time to pond**

Subcatchment P1-4:



Summary for Subcatchment P1-5:

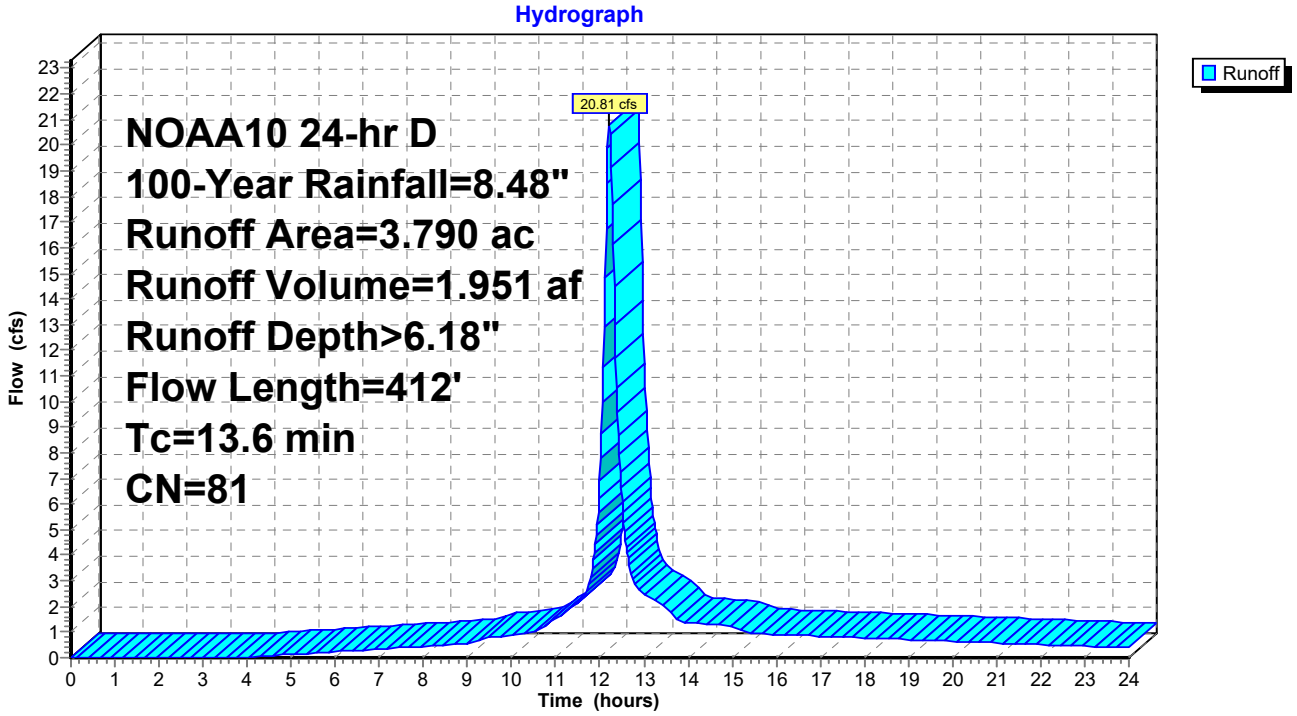
Runoff = 20.81 cfs @ 12.21 hrs, Volume= 1.951 af, Depth> 6.18"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
0.210	74	>75% Grass cover, Good, HSG C
2.470	80	>75% Grass cover, Good, HSG D
0.150	70	Woods, Good, HSG C
0.440	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.050	96	Gravel surface, HSG D
0.470	98	Paved parking, HSG D
3.790	81	Weighted Average
3.320		87.60% Pervious Area
0.470		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0750	0.13		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	185	0.0680	4.20		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.5	127	0.0600	3.94		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
13.6	412	Total			

Subcatchment P1-5:



Summary for Subcatchment P1-6:

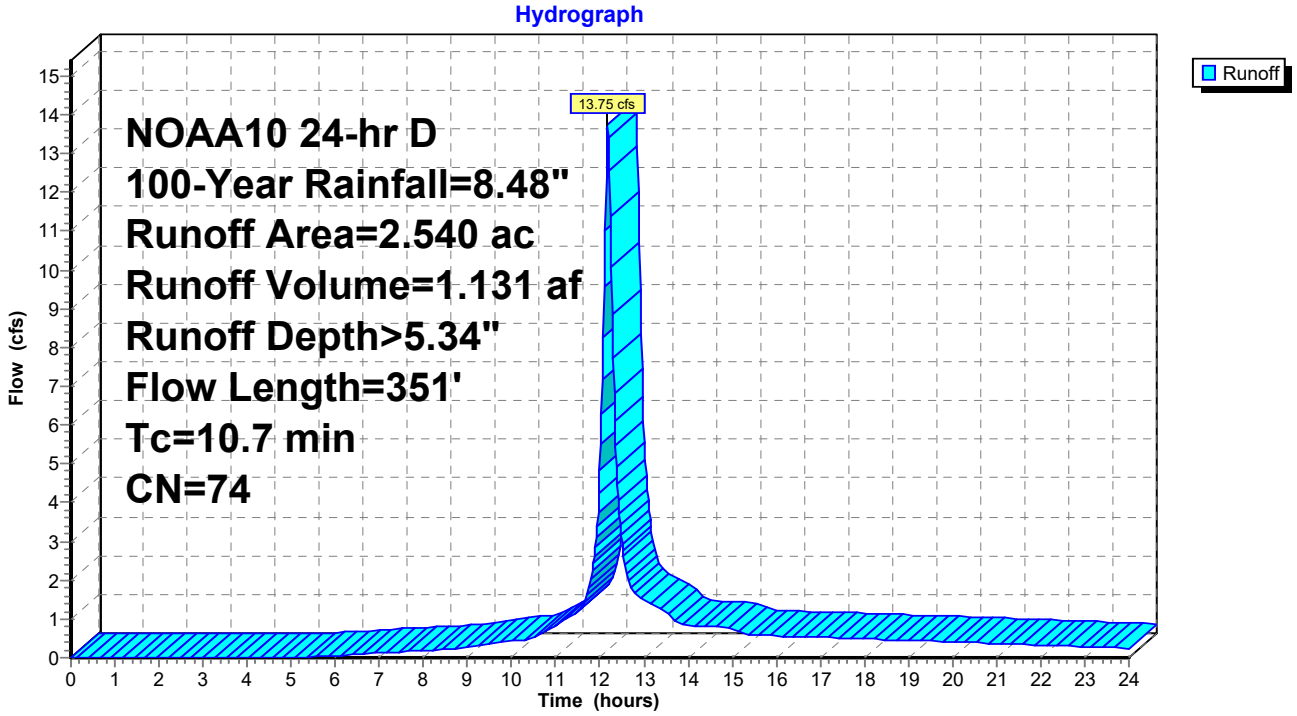
Runoff = 13.75 cfs @ 12.18 hrs, Volume= 1.131 af, Depth> 5.34"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
0.190	74	>75% Grass cover, Good, HSG C
0.190	80	>75% Grass cover, Good, HSG D
0.990	70	Woods, Good, HSG C
1.170	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.000	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
2.540	74	Weighted Average
2.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1500	0.18		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.2	81	0.2040	7.27		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
1.1	170	0.0260	2.60		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
10.7	351	Total			

Subcatchment P1-6:



Summary for Subcatchment P1-7:

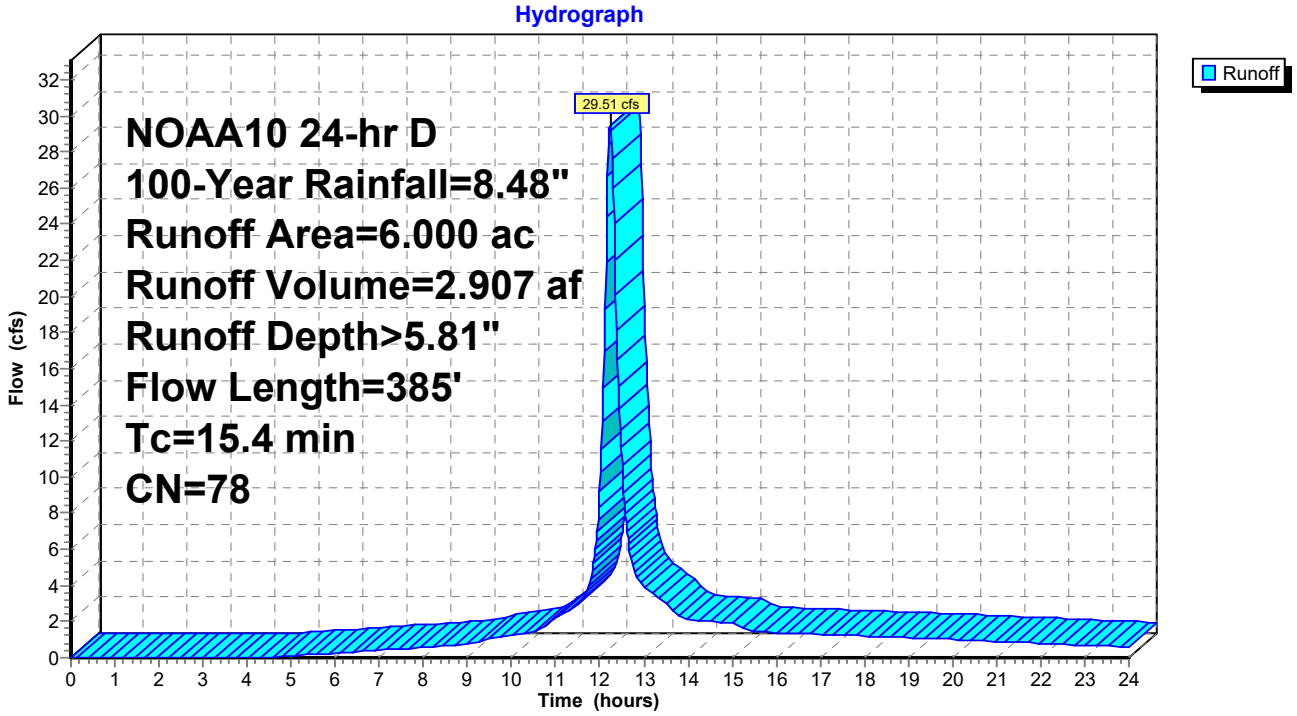
Runoff = 29.51 cfs @ 12.23 hrs, Volume= 2.907 af, Depth> 5.81"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
2.620	74	>75% Grass cover, Good, HSG C
1.990	80	>75% Grass cover, Good, HSG D
0.000	70	Woods, Good, HSG C
1.030	77	Woods, Good, HSG D
0.000	73	Brush, Good, HSG D
0.360	96	Gravel surface, HSG D
0.000	98	Paved parking, HSG D
6.000	78	Weighted Average
6.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0550	0.12		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.7	176	0.0650	4.10		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
0.6	109	0.0400	3.22		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
15.4	385	Total			

Subcatchment P1-7:



Summary for Subcatchment P1-8:

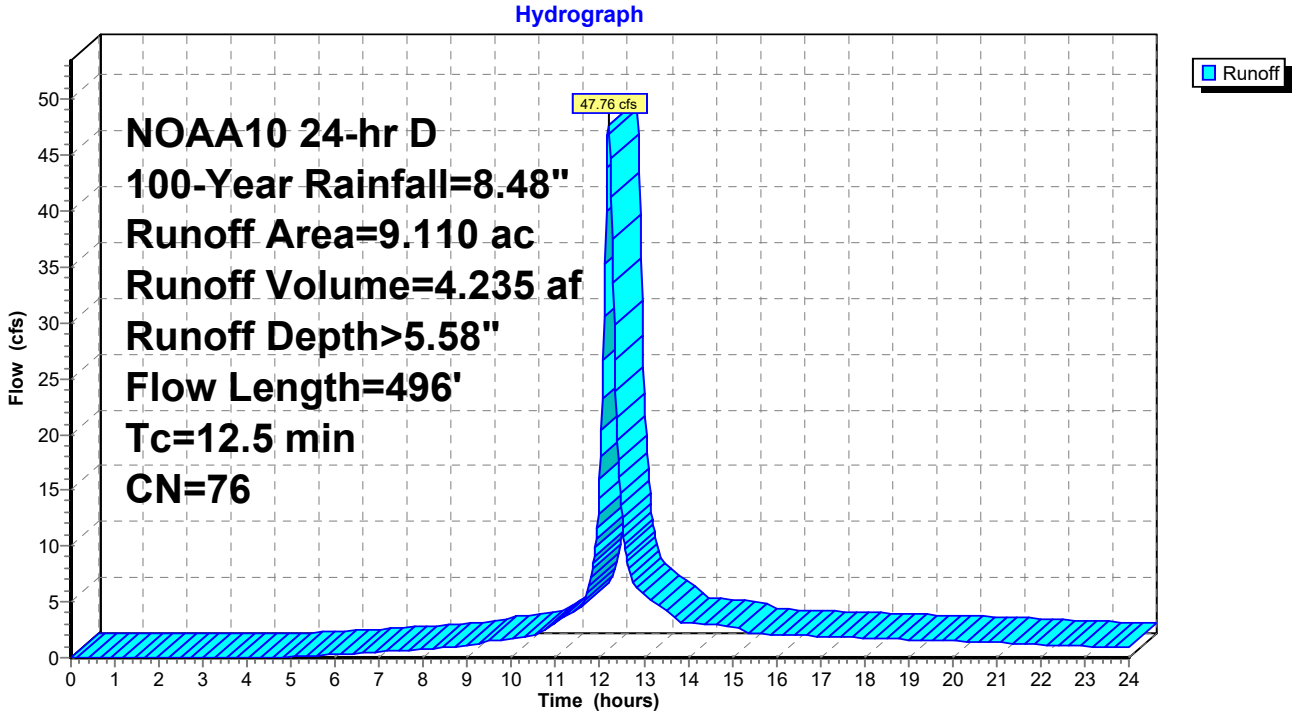
Runoff = 47.76 cfs @ 12.20 hrs, Volume= 4.235 af, Depth> 5.58"
Routed to Reach 1R : Batterson Park Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NOAA10 24-hr D 100-Year Rainfall=8.48"

Area (ac)	CN	Description
2.470	74	>75% Grass cover, Good, HSG C
2.130	80	>75% Grass cover, Good, HSG D
1.020	70	Woods, Good, HSG C
0.000	77	Woods, Good, HSG D
2.950	73	Brush, Good, HSG D
0.090	96	Gravel surface, HSG D
0.450	98	Paved parking, HSG D
9.110	76	Weighted Average
8.660		95.06% Pervious Area
0.450		4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1320	0.17		**Sheet Flow, SEG 1** Woods: Light underbrush n= 0.400 P2= 3.32"
0.4	122	0.0890	4.80		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
2.2	274	0.0160	2.04		**Shallow Concentrated Flow, SEG 3** Unpaved Kv= 16.1 fps
12.5	496	Total			

Subcatchment P1-8:



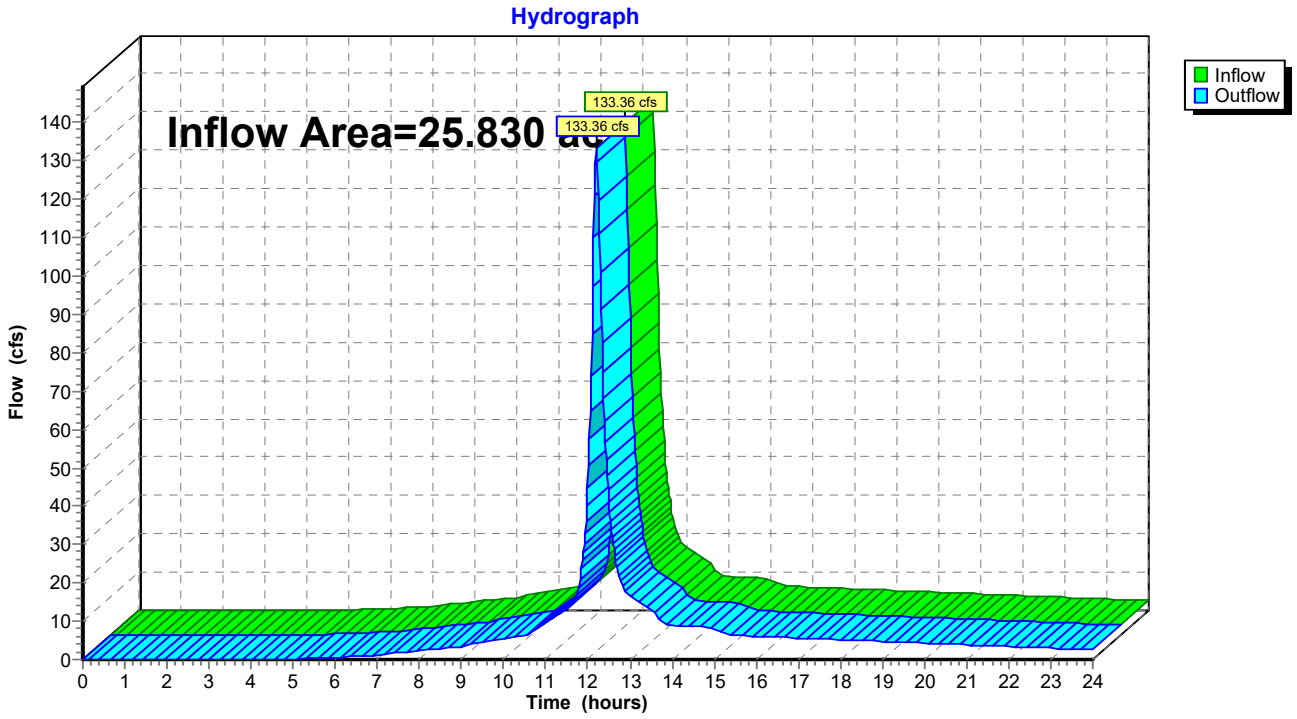
Summary for Reach 1R: Batterson Park Pond

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

Inflow Area = 25.830 ac, 10.26% Impervious, Inflow Depth > 5.78" for 100-Year event
Inflow = 133.36 cfs @ 12.21 hrs, Volume= 12.442 af
Outflow = 133.36 cfs @ 12.21 hrs, Volume= 12.442 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: Batterson Park Pond



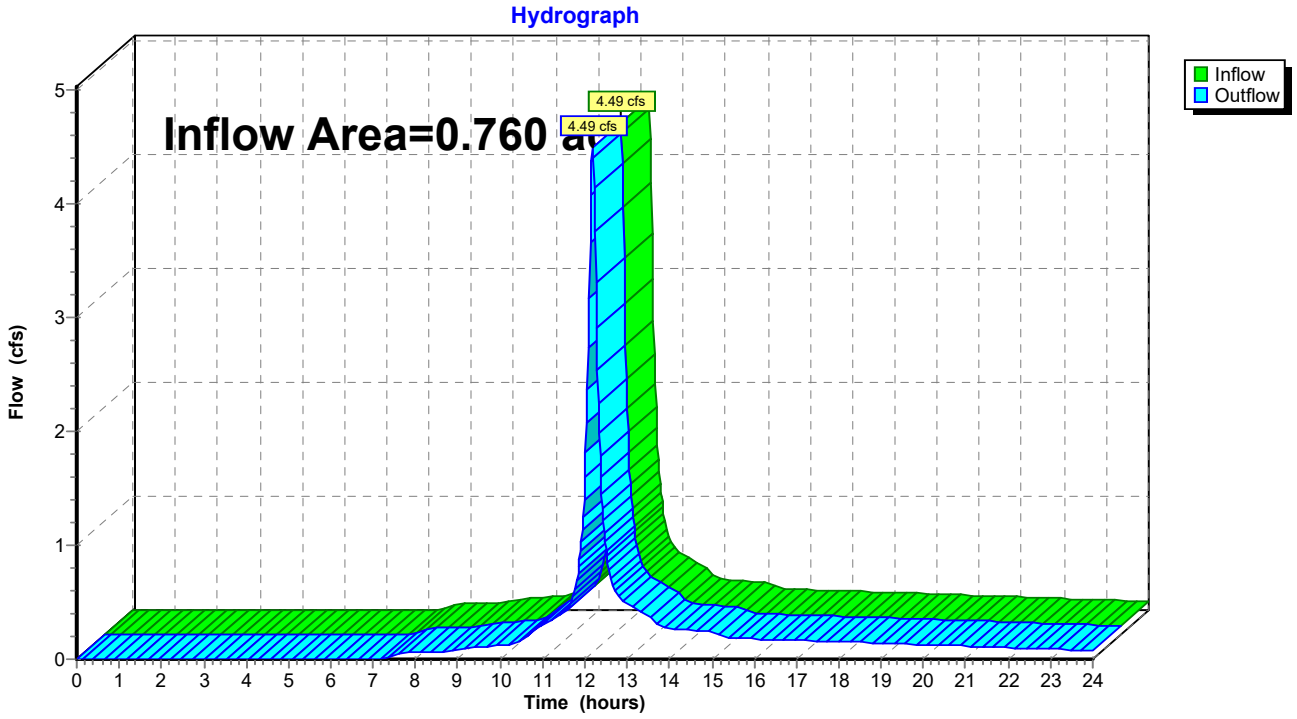
Summary for Reach 2R: Flow to Flared End

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

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 5.68" for 100-Year event
Inflow = 4.49 cfs @ 12.18 hrs, Volume= 0.360 af
Outflow = 4.49 cfs @ 12.18 hrs, Volume= 0.360 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: Flow to Flared End



Summary for Pond 1P:

Inflow Area = 2.240 ac, 62.05% Impervious, Inflow Depth > 7.26" for 100-Year event
Inflow = 14.76 cfs @ 12.19 hrs, Volume= 1.355 af
Outflow = 14.66 cfs @ 12.20 hrs, Volume= 1.251 af, Atten= 1%, Lag= 0.5 min
Primary = 14.66 cfs @ 12.20 hrs, Volume= 1.251 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 307.61' @ 12.20 hrs Surf.Area= 4,384 sf Storage= 6,240 cf

Plug-Flow detention time= 84.1 min calculated for 1.250 af (92% of inflow)
Center-of-Mass det. time= 40.6 min (827.5 - 786.9)

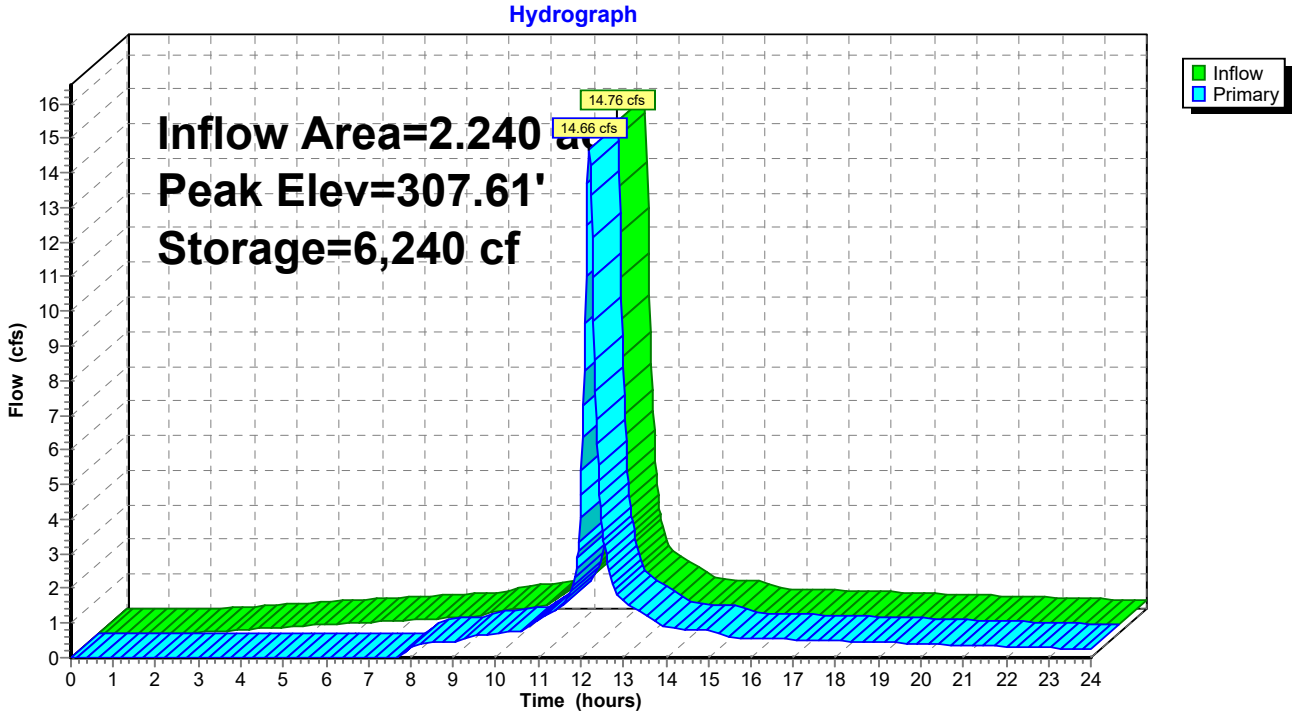
Volume	Invert	Avail.Storage	Storage Description
#1	306.00'	8,662 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.00	353	70.9	0	0	353
306.50	4,079	368.1	939	939	10,736
307.00	4,639	377.5	2,178	3,117	11,324
307.50	5,669	288.9	2,573	5,689	16,026
308.00	1,153	143.1	1,563	7,252	21,039
309.00	1,682	177.1	1,409	8,662	21,920

Device	Routing	Invert	Outlet Devices
#1	Primary	307.25'	**10.0' long x 25.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	307.50'	**90.0' long x 25.0' breadth Top of pond overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=14.55 cfs @ 12.20 hrs HW=307.61' (Free Discharge)
1=Primary Spillway (Weir Controls 5.81 cfs @ 1.62 fps)
2=Top of pond overflow (Weir Controls 8.74 cfs @ 0.89 fps)

Pond 1P:


Hydrograph
Inflow Area=2.240 ac
Peak Elev=307.61'
Storage=6,240 cf
14.76 cfs
14.66 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 1P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
306.00	0.00	307.02	0.00	308.04	114.98
306.02	0.00	307.04	0.00	308.06	121.07
306.04	0.00	307.06	0.00	308.08	127.29
306.06	0.00	307.08	0.00	308.10	133.61
306.08	0.00	307.10	0.00	308.12	139.76
306.10	0.00	307.12	0.00	308.14	145.99
306.12	0.00	307.14	0.00	308.16	152.29
306.14	0.00	307.16	0.00	308.18	158.67
306.16	0.00	307.18	0.00	308.20	165.11
306.18	0.00	307.20	0.00	308.22	171.62
306.20	0.00	307.22	0.00	308.24	178.19
306.22	0.00	307.24	0.00	308.26	184.84
306.24	0.00	307.26	0.03	308.28	191.56
306.26	0.00	307.28	0.14	308.30	198.34
306.28	0.00	307.30	0.30	308.32	205.51
306.30	0.00	307.32	0.50	308.34	212.76
306.32	0.00	307.34	0.72	308.36	220.10
306.34	0.00	307.36	0.98	308.38	227.51
306.36	0.00	307.38	1.26	308.40	235.01
306.38	0.00	307.40	1.56	308.42	242.58
306.40	0.00	307.42	1.88	308.44	250.23
306.42	0.00	307.44	2.22	308.46	257.95
306.44	0.00	307.46	2.58	308.48	265.74
306.46	0.00	307.48	2.96	308.50	273.60
306.48	0.00	307.50	3.36	308.52	281.71
306.50	0.00	307.52	4.45	308.54	289.91
306.52	0.00	307.54	6.13	308.56	298.20
306.54	0.00	307.56	8.19	308.58	306.56
306.56	0.00	307.58	10.56	308.60	315.01
306.58	0.00	307.60	13.21	308.62	323.53
306.60	0.00	307.62	16.10	308.64	332.14
306.62	0.00	307.64	19.21	308.66	340.82
306.64	0.00	307.66	22.53	308.68	349.56
306.66	0.00	307.68	26.03	308.70	358.38
306.68	0.00	307.70	29.72	308.72	367.16
306.70	0.00	307.72	33.61	308.74	376.01
306.72	0.00	307.74	37.66	308.76	384.93
306.74	0.00	307.76	41.88	308.78	393.92
306.76	0.00	307.78	46.26	308.80	402.98
306.78	0.00	307.80	50.79	308.82	412.10
306.80	0.00	307.82	55.48	308.84	421.30
306.82	0.00	307.84	60.30	308.86	430.57
306.84	0.00	307.86	65.26	308.88	439.91
306.86	0.00	307.88	70.34	308.90	449.33
306.88	0.00	307.90	75.55	308.92	458.66
306.90	0.00	307.92	80.83	308.94	468.04
306.92	0.00	307.94	86.24	308.96	477.49
306.94	0.00	307.96	91.77	308.98	486.99
306.96	0.00	307.98	97.41	309.00	**496.56**
306.98	0.00	308.00	103.16		
307.00	0.00	308.02	109.02		

Stage-Area-Storage for Pond 1P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
306.00	353	0
306.05	543	22
306.10	773	55
306.15	1,044	100
306.20	1,356	160
306.25	1,708	236
306.30	2,101	332
306.35	2,534	447
306.40	3,009	586
306.45	3,524	749
306.50	4,079	939
306.55	4,133	1,144
306.60	4,188	1,352
306.65	4,243	1,563
306.70	4,299	1,776
306.75	4,354	1,993
306.80	4,411	2,212
306.85	4,467	2,434
306.90	4,524	2,659
306.95	4,581	2,886
307.00	4,639	3,117
307.05	4,737	3,351
307.10	4,837	3,590
307.15	4,937	3,835
307.20	5,039	4,084
307.25	5,141	4,339
307.30	5,245	4,598
307.35	5,349	4,863
307.40	5,455	5,133
307.45	5,561	5,409
307.50	**5,669**	5,689
307.55	5,064	5,958
307.60	4,492	6,196
307.65	3,955	6,407
307.70	3,453	6,592
307.75	2,984	6,753
307.80	2,549	6,891
307.85	2,149	7,009
307.90	1,783	7,107
307.95	1,451	7,188
308.00	1,153	7,252
308.05	1,177	7,311
308.10	1,201	7,370
308.15	1,226	7,431
308.20	1,251	7,493
308.25	1,276	7,556
308.30	1,301	7,620
308.35	1,327	7,686
308.40	1,353	7,753
308.45	1,379	7,821
308.50	1,405	7,891
308.55	1,432	7,962
308.60	1,458	8,034
308.65	1,486	8,108
308.70	1,513	8,183
308.75	1,540	8,259
308.80	1,568	8,337
308.85	1,596	8,416
308.90	1,625	8,496
308.95	1,653	8,578
309.00	1,682	**8,662**

Summary for Pond 2P:

Inflow Area = 1.390 ac, 15.83% Impervious, Inflow Depth > 5.82" for 100-Year event
Inflow = 8.73 cfs @ 12.16 hrs, Volume= 0.675 af
Outflow = 4.57 cfs @ 12.27 hrs, Volume= 0.664 af, Atten= 48%, Lag= 6.7 min
Primary = 4.57 cfs @ 12.27 hrs, Volume= 0.664 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 313.81' @ 12.27 hrs Surf.Area= 1,421 sf Storage= 3,792 cf

Plug-Flow detention time= 22.2 min calculated for 0.664 af (98% of inflow)
Center-of-Mass det. time= 12.6 min (839.3 - 826.7)

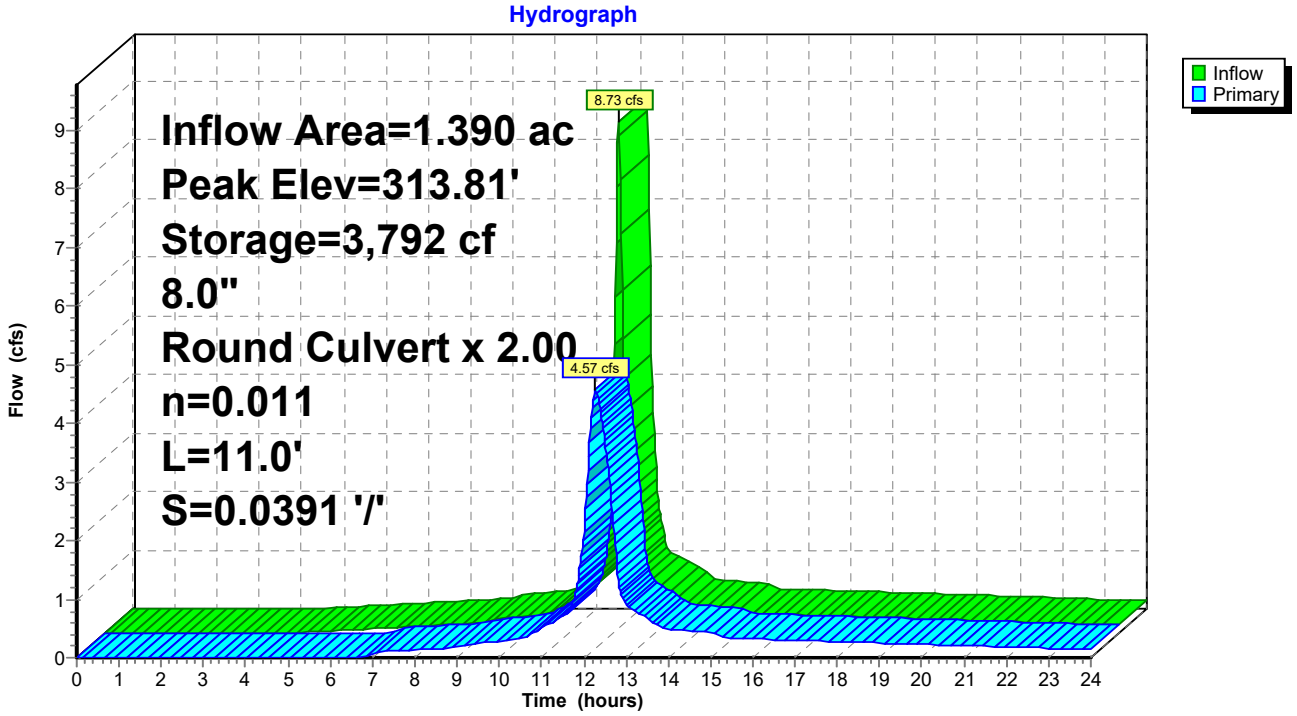
Volume	Invert	Avail.Storage	Storage Description
#1	311.00'	4,013 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
311.00	474	88.9	0	0	474
312.00	872	164.1	663	663	1,993
313.00	2,035	374.0	1,413	2,076	10,985
313.50	2,457	386.0	1,121	3,197	11,736
314.00	928	131.1	816	4,013	22,225

Device	Routing	Invert	Outlet Devices
#1	Primary	311.63'	**8.0" Round Culvert X 2.00** L= 11.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.63' / 311.20' S= 0.0391 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=4.56 cfs @ 12.27 hrs HW=313.81' (Free Discharge)
1=Culvert (Inlet Controls 4.56 cfs @ 6.54 fps)

Pond 2P:


Hydrograph
Inflow
Primary
8.73 cfs
4.57 cfs
Inflow Area=1.390 ac
Peak Elev=313.81'
Storage=3,792 cf
8.0"
Round Culvert x 2.00
n=0.011
L=11.0'
S=0.0391 '/'
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 2P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
311.00	0.00	312.02	0.90	313.04	3.49
311.02	0.00	312.04	0.98	313.06	3.52
311.04	0.00	312.06	1.06	313.08	3.55
311.06	0.00	312.08	1.15	313.10	3.58
311.08	0.00	312.10	1.23	313.12	3.62
311.10	0.00	312.12	1.31	313.14	3.65
311.12	0.00	312.14	1.39	313.16	3.68
311.14	0.00	312.16	1.48	313.18	3.71
311.16	0.00	312.18	1.56	313.20	3.74
311.18	0.00	312.20	1.63	313.22	3.77
311.20	0.00	312.22	1.71	313.24	3.80
311.22	0.00	312.24	1.78	313.26	3.83
311.24	0.00	312.26	1.85	313.28	3.86
311.26	0.00	312.28	1.90	313.30	3.89
311.28	0.00	312.30	1.95	313.32	3.92
311.30	0.00	312.32	2.01	313.34	3.94
311.32	0.00	312.34	2.06	313.36	3.97
311.34	0.00	312.36	2.12	313.38	4.00
311.36	0.00	312.38	2.17	313.40	4.03
311.38	0.00	312.40	2.22	313.42	4.06
311.40	0.00	312.42	2.27	313.44	4.08
311.42	0.00	312.44	2.32	313.46	4.11
311.44	0.00	312.46	2.37	313.48	4.14
311.46	0.00	312.48	2.42	313.50	4.17
311.48	0.00	312.50	2.46	313.52	4.19
311.50	0.00	312.52	2.51	313.54	4.22
311.52	0.00	312.54	2.55	313.56	4.25
311.54	0.00	312.56	2.60	313.58	4.27
311.56	0.00	312.58	2.64	313.60	4.30
311.58	0.00	312.60	2.68	313.62	4.33
311.60	0.00	312.62	2.72	313.64	4.35
311.62	0.00	312.64	2.77	313.66	4.38
311.64	0.00	312.66	2.81	313.68	4.40
311.66	0.01	312.68	2.85	313.70	4.43
311.68	0.02	312.70	2.89	313.72	4.46
311.70	0.04	312.72	2.92	313.74	4.48
311.72	0.06	312.74	2.96	313.76	4.51
311.74	0.09	312.76	3.00	313.78	4.53
311.76	0.12	312.78	3.04	313.80	4.56
311.78	0.16	312.80	3.07	313.82	4.58
311.80	0.20	312.82	3.11	313.84	4.60
311.82	0.24	312.84	3.15	313.86	4.63
311.84	0.29	312.86	3.18	313.88	4.65
311.86	0.35	312.88	3.22	313.90	4.68
311.88	0.41	312.90	3.25	313.92	4.70
311.90	0.47	312.92	3.29	313.94	4.73
311.92	0.53	312.94	3.32	313.96	4.75
311.94	0.60	312.96	3.36	313.98	4.77
311.96	0.67	312.98	3.39	314.00	**4.80**
311.98	0.75	313.00	3.42		
312.00	0.82	313.02	3.46		

Stage-Area-Storage for Pond 2P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
311.00	474	0
311.05	491	24
311.10	508	49
311.15	526	75
311.20	544	102
311.25	562	129
311.30	581	158
311.35	600	187
311.40	619	218
311.45	638	249
311.50	658	282
311.55	678	315
311.60	698	350
311.65	719	385
311.70	740	421
311.75	761	459
311.80	783	498
311.85	805	537
311.90	827	578
311.95	849	620
312.00	872	663
312.05	919	708
312.10	966	755
312.15	1,015	804
312.20	1,066	856
312.25	1,117	911
312.30	1,170	968
312.35	1,224	1,028
312.40	1,279	1,091
312.45	1,335	1,156
312.50	1,393	1,224
312.55	1,452	1,295
312.60	1,512	1,369
312.65	1,573	1,446
312.70	1,635	1,527
312.75	1,699	1,610
312.80	1,764	1,696
312.85	1,830	1,786
312.90	1,897	1,879
312.95	1,965	1,976
313.00	2,035	2,076
313.05	2,075	2,179
313.10	2,116	2,284
313.15	2,157	2,390
313.20	2,199	2,499
313.25	2,241	2,610
313.30	2,283	2,723
313.35	2,326	2,839
313.40	2,369	2,956
313.45	2,413	3,076
313.50	**2,457**	3,197
313.55	2,271	3,316
313.60	2,093	3,425
313.65	1,922	3,525
313.70	1,758	3,617
313.75	1,601	3,701
313.80	1,452	3,777
313.85	1,310	3,846
313.90	1,175	3,908
313.95	1,048	3,964
314.00	928	**4,013**

Summary for Pond 3P:

Inflow Area = 0.620 ac, 8.06% Impervious, Inflow Depth > 5.70" for 100-Year event
Inflow = 3.65 cfs @ 12.17 hrs, Volume= 0.295 af
Outflow = 3.61 cfs @ 12.18 hrs, Volume= 0.289 af, Atten= 1%, Lag= 0.5 min
Primary = 3.61 cfs @ 12.18 hrs, Volume= 0.289 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 314.43' @ 12.18 hrs Surf.Area= 419 sf Storage= 393 cf

Plug-Flow detention time= 20.6 min calculated for 0.289 af (98% of inflow)
Center-of-Mass det. time= 9.4 min (839.9 - 830.5)

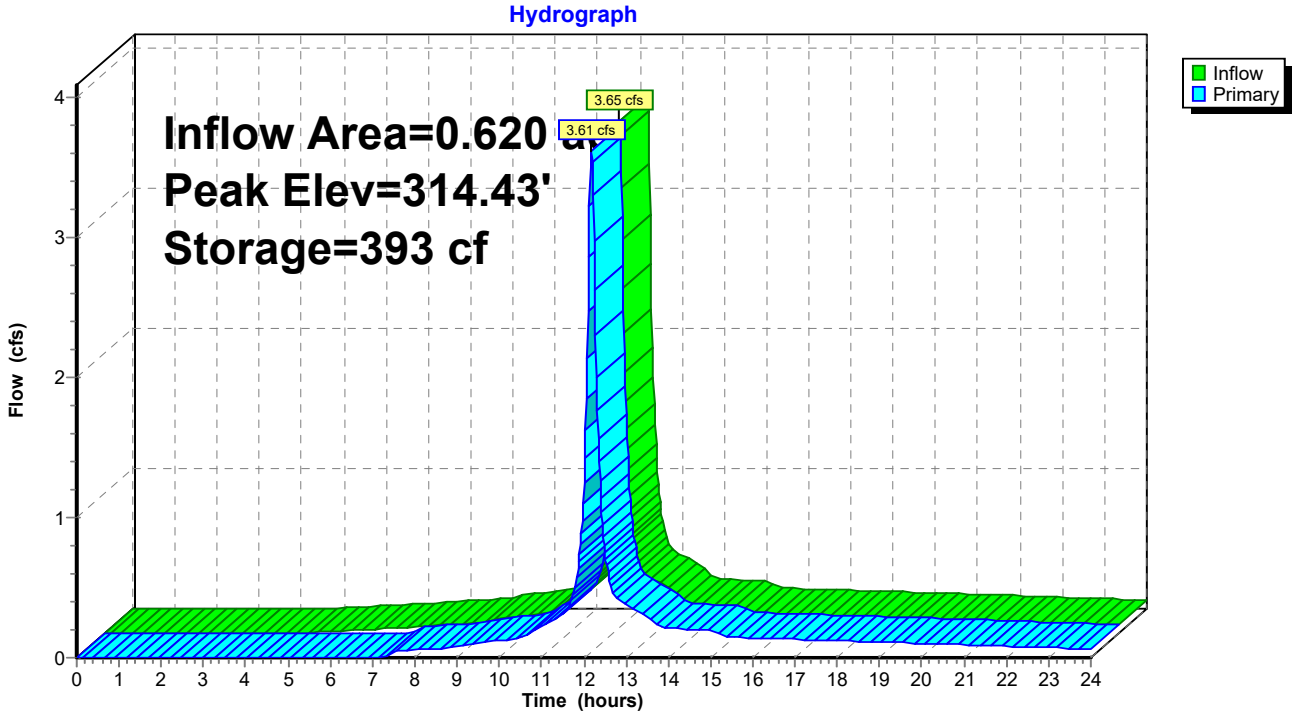
Volume	Invert	Avail.Storage	Storage Description
#1	312.50'	423 cf	**Above-ground bio-retention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.50	47	33.1	0	0	47
313.00	103	42.5	37	37	107
314.00	315	76.7	199	236	436
314.50	437	86.1	187	423	565

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 311.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Device 1	314.00'	**15.0" Horiz. Overflow Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.60 cfs @ 12.18 hrs HW=314.43' (Free Discharge)
↑**1=Culvert** (Passes 3.60 cfs of 5.89 cfs potential flow)
↑**2=Overflow Grate** (Weir Controls 3.60 cfs @ 2.14 fps)

Pond 3P:


Hydrograph
Inflow Area=0.620 a
Peak Elev=314.43'
Storage=393 cf
3.65 cfs
3.61 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 3P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.50	0.00	313.01	0.00	313.52	0.00	314.03	0.07
312.51	0.00	313.02	0.00	313.53	0.00	314.04	0.10
312.52	0.00	313.03	0.00	313.54	0.00	314.05	0.14
312.53	0.00	313.04	0.00	313.55	0.00	314.06	0.19
312.54	0.00	313.05	0.00	313.56	0.00	314.07	0.24
312.55	0.00	313.06	0.00	313.57	0.00	314.08	0.29
312.56	0.00	313.07	0.00	313.58	0.00	314.09	0.35
312.57	0.00	313.08	0.00	313.59	0.00	314.10	0.41
312.58	0.00	313.09	0.00	313.60	0.00	314.11	0.47
312.59	0.00	313.10	0.00	313.61	0.00	314.12	0.53
312.60	0.00	313.11	0.00	313.62	0.00	314.13	0.60
312.61	0.00	313.12	0.00	313.63	0.00	314.14	0.67
312.62	0.00	313.13	0.00	313.64	0.00	314.15	0.75
312.63	0.00	313.14	0.00	313.65	0.00	314.16	0.82
312.64	0.00	313.15	0.00	313.66	0.00	314.17	0.90
312.65	0.00	313.16	0.00	313.67	0.00	314.18	0.98
312.66	0.00	313.17	0.00	313.68	0.00	314.19	1.06
312.67	0.00	313.18	0.00	313.69	0.00	314.20	1.15
312.68	0.00	313.19	0.00	313.70	0.00	314.21	1.24
312.69	0.00	313.20	0.00	313.71	0.00	314.22	1.33
312.70	0.00	313.21	0.00	313.72	0.00	314.23	1.42
312.71	0.00	313.22	0.00	313.73	0.00	314.24	1.51
312.72	0.00	313.23	0.00	313.74	0.00	314.25	1.61
312.73	0.00	313.24	0.00	313.75	0.00	314.26	1.70
312.74	0.00	313.25	0.00	313.76	0.00	314.27	1.80
312.75	0.00	313.26	0.00	313.77	0.00	314.28	1.90
312.76	0.00	313.27	0.00	313.78	0.00	314.29	2.01
312.77	0.00	313.28	0.00	313.79	0.00	314.30	2.11
312.78	0.00	313.29	0.00	313.80	0.00	314.31	2.22
312.79	0.00	313.30	0.00	313.81	0.00	314.32	2.32
312.80	0.00	313.31	0.00	313.82	0.00	314.33	2.43
312.81	0.00	313.32	0.00	313.83	0.00	314.34	2.55
312.82	0.00	313.33	0.00	313.84	0.00	314.35	2.66
312.83	0.00	313.34	0.00	313.85	0.00	314.36	2.77
312.84	0.00	313.35	0.00	313.86	0.00	314.37	2.89
312.85	0.00	313.36	0.00	313.87	0.00	314.38	3.01
312.86	0.00	313.37	0.00	313.88	0.00	314.39	3.13
312.87	0.00	313.38	0.00	313.89	0.00	314.40	3.25
312.88	0.00	313.39	0.00	313.90	0.00	314.41	3.37
312.89	0.00	313.40	0.00	313.91	0.00	314.42	3.50
312.90	0.00	313.41	0.00	313.92	0.00	314.43	3.62
312.91	0.00	313.42	0.00	313.93	0.00	314.44	3.75
312.92	0.00	313.43	0.00	313.94	0.00	314.45	3.88
312.93	0.00	313.44	0.00	313.95	0.00	314.46	4.01
312.94	0.00	313.45	0.00	313.96	0.00	314.47	4.05
312.95	0.00	313.46	0.00	313.97	0.00	314.48	4.09
312.96	0.00	313.47	0.00	313.98	0.00	314.49	4.14
312.97	0.00	313.48	0.00	313.99	0.00	314.50	**4.18**
312.98	0.00	313.49	0.00	314.00	0.00		
312.99	0.00	313.50	0.00	314.01	0.01		
313.00	0.00	313.51	0.00	314.02	0.04		

Stage-Area-Storage for Pond 3P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.50	47	0
312.52	49	1
312.54	51	2
312.56	53	3
312.58	55	4
312.60	56	5
312.62	58	6
312.64	60	8
312.66	63	9
312.68	65	10
312.70	67	11
312.72	69	13
312.74	71	14
312.76	73	16
312.78	76	17
312.80	78	19
312.82	80	20
312.84	83	22
312.86	85	23
312.88	88	25
312.90	90	27
312.92	93	29
312.94	95	31
312.96	98	33
312.98	100	35
313.00	103	37
313.02	106	39
313.04	109	41
313.06	112	43
313.08	116	45
313.10	119	48
313.12	122	50
313.14	126	53
313.16	129	55
313.18	133	58
313.20	136	60
313.22	140	63
313.24	143	66
313.26	147	69
313.28	151	72
313.30	154	75
313.32	158	78
313.34	162	81
313.36	166	85
313.38	170	88
313.40	174	91
313.42	178	95
313.44	182	98
313.46	186	102
313.48	190	106
313.50	195	110
313.52	199	114
313.54	203	118
313.56	207	122
313.58	212	126
313.60	216	130
313.62	221	135
313.64	225	139
313.66	230	144
313.68	235	148
313.70	239	153
313.72	244	158
313.74	249	163
313.76	254	168
313.78	258	173
313.80	263	178
313.82	268	184
313.84	273	189
313.86	278	194
313.88	283	200
313.90	289	206
313.92	294	212
313.94	299	218
313.96	304	224
313.98	310	230
314.00	315	236
314.02	319	242
314.04	324	249
314.06	329	255
314.08	333	262
314.10	338	269
314.12	342	275
314.14	347	282
314.16	352	289
314.18	357	296
314.20	361	304
314.22	366	311
314.24	371	318
314.26	376	326
314.28	381	333
314.30	386	341
314.32	391	349
314.34	396	357
314.36	401	365
314.38	406	373
314.40	411	381
314.42	416	389
314.44	421	397
314.46	427	406
314.48	432	414
314.50	**437**	**423**

Summary for Pond 4P:

Inflow Area = 0.140 ac, 50.00% Impervious, Inflow Depth > 7.39" for 100-Year event
Inflow = 1.16 cfs @ 12.13 hrs, Volume= 0.086 af
Outflow = 0.88 cfs @ 12.18 hrs, Volume= 0.071 af, Atten= 24%, Lag= 2.9 min
Primary = 0.88 cfs @ 12.18 hrs, Volume= 0.071 af
Routed to Reach 2R : Flow to Flared End

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 313.18' @ 12.18 hrs Surf.Area= 1,229 sf Storage= 972 cf

Plug-Flow detention time= 163.2 min calculated for 0.071 af (82% of inflow)
Center-of-Mass det. time= 75.9 min (854.2 - 778.4)

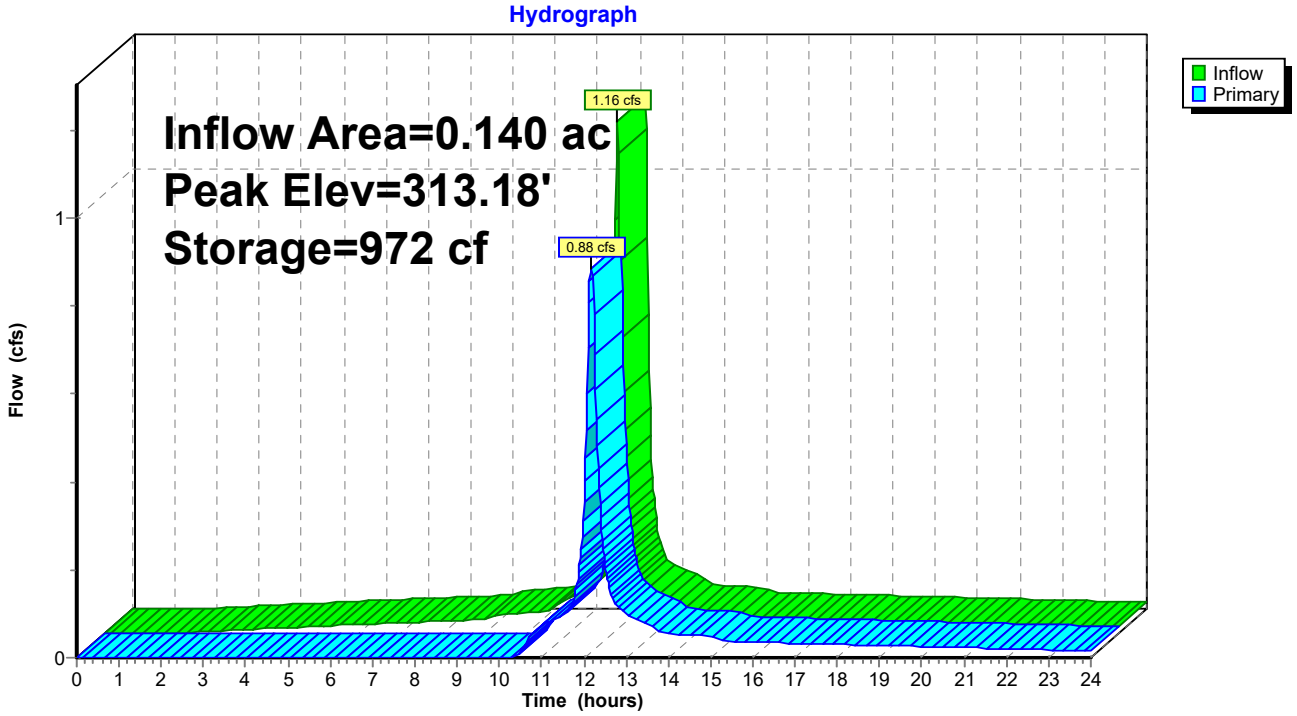
Volume	Invert	Avail.Storage	Storage Description
#1	312.00'	1,405 cf	**Above-ground detention basin (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
312.00	460	123.2	0	0	460
313.00	1,118	215.0	765	765	2,936
313.50	1,447	224.4	639	1,405	3,283

Device	Routing	Invert	Outlet Devices
#1	Primary	310.50'	**12.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 310.50' / 310.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	312.90'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	313.25'	**10.0' long x 10.0' breadth Overflow Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.88 cfs @ 12.18 hrs HW=313.18' (Free Discharge)
- **1=Culvert** (Passes 0.88 cfs of 5.58 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.88 cfs @ 2.53 fps)
- **3=Overflow Spillway** (Controls 0.00 cfs)

Pond 4P:


Hydrograph
Inflow Area=0.140 ac
Peak Elev=313.18'
Storage=972 cf
1.16 cfs
0.88 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond 4P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
312.00	0.00	312.51	0.00	313.02	0.28
312.01	0.00	312.52	0.00	313.03	0.32
312.02	0.00	312.53	0.00	313.04	0.36
312.03	0.00	312.54	0.00	313.05	0.40
312.04	0.00	312.55	0.00	313.06	0.44
312.05	0.00	312.56	0.00	313.07	0.48
312.06	0.00	312.57	0.00	313.08	0.52
312.07	0.00	312.58	0.00	313.09	0.57
312.08	0.00	312.59	0.00	313.10	0.61
312.09	0.00	312.60	0.00	313.11	0.66
312.10	0.00	312.61	0.00	313.12	0.71
312.11	0.00	312.62	0.00	313.13	0.76
312.12	0.00	312.63	0.00	313.14	0.81
312.13	0.00	312.64	0.00	313.15	0.84
312.14	0.00	312.65	0.00	313.16	0.86
312.15	0.00	312.66	0.00	313.17	0.87
312.16	0.00	312.67	0.00	313.18	0.89
312.17	0.00	312.68	0.00	313.19	0.91
312.18	0.00	312.69	0.00	313.20	0.92
312.19	0.00	312.70	0.00	313.21	0.94
312.20	0.00	312.71	0.00	313.22	0.95
312.21	0.00	312.72	0.00	313.23	0.97
312.22	0.00	312.73	0.00	313.24	0.98
312.23	0.00	312.74	0.00	313.25	0.99
312.24	0.00	312.75	0.00	313.26	1.03
312.25	0.00	312.76	0.00	313.27	1.09
312.26	0.00	312.77	0.00	313.28	1.17
312.27	0.00	312.78	0.00	313.29	1.25
312.28	0.00	312.79	0.00	313.30	1.34
312.29	0.00	312.80	0.00	313.31	1.44
312.30	0.00	312.81	0.00	313.32	1.55
312.31	0.00	312.82	0.00	313.33	1.67
312.32	0.00	312.83	0.00	313.34	1.79
312.33	0.00	312.84	0.00	313.35	1.91
312.34	0.00	312.85	0.00	313.36	2.05
312.35	0.00	312.86	0.00	313.37	2.19
312.36	0.00	312.87	0.00	313.38	2.33
312.37	0.00	312.88	0.00	313.39	2.48
312.38	0.00	312.89	0.00	313.40	2.64
312.39	0.00	312.90	0.00	313.41	2.79
312.40	0.00	312.91	0.01	313.42	2.96
312.41	0.00	312.92	0.02	313.43	3.13
312.42	0.00	312.93	0.04	313.44	3.30
312.43	0.00	312.94	0.05	313.45	3.47
312.44	0.00	312.95	0.08	313.46	3.66
312.45	0.00	312.96	0.10	313.47	3.85
312.46	0.00	312.97	0.13	313.48	4.04
312.47	0.00	312.98	0.15	313.49	4.24
312.48	0.00	312.99	0.18	313.50	**4.44**
312.49	0.00	313.00	0.22		
312.50	0.00	313.01	0.25		

Stage-Area-Storage for Pond 4P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
312.00	460	0
312.02	470	9
312.04	481	19
312.06	491	29
312.08	502	38
312.10	513	49
312.12	524	59
312.14	535	70
312.16	546	80
312.18	557	91
312.20	569	103
312.22	580	114
312.24	592	126
312.26	603	138
312.28	615	150
312.30	627	162
312.32	639	175
312.34	651	188
312.36	664	201
312.38	676	215
312.40	689	228
312.42	701	242
312.44	714	256
312.46	727	271
312.48	740	285
312.50	753	300
312.52	766	315
312.54	780	331
312.56	793	347
312.58	807	363
312.60	820	379
312.62	834	395
312.64	848	412
312.66	862	429
312.68	876	447
312.70	890	464
312.72	905	482
312.74	919	501
312.76	934	519
312.78	949	538
312.80	963	557
312.82	978	577
312.84	993	596
312.86	1,009	616
312.88	1,024	637
312.90	1,039	657
312.92	1,055	678
312.94	1,070	699
312.96	1,086	721
312.98	1,102	743
313.00	1,118	765
313.02	1,130	788
313.04	1,143	810
313.06	1,155	833
313.08	1,168	856
313.10	1,180	880
313.12	1,193	904
313.14	1,206	928
313.16	1,219	952
313.18	1,232	976
313.20	1,245	1,001
313.22	1,258	1,026
313.24	1,271	1,051
313.26	1,284	1,077
313.28	1,297	1,103
313.30	1,310	1,129
313.32	1,324	1,155
313.34	1,337	1,182
313.36	1,351	1,209
313.38	1,364	1,236
313.40	1,378	1,263
313.42	1,392	1,291
313.44	1,405	1,319
313.46	1,419	1,347
313.48	1,433	1,376
313.50	**1,447**	**1,405**

Summary for Pond 5P:

Inflow Area = 3.790 ac, 12.40% Impervious, Inflow Depth > 6.18" for 100-Year event
Inflow = 20.81 cfs @ 12.21 hrs, Volume= 1.951 af
Outflow = 20.68 cfs @ 12.22 hrs, Volume= 1.895 af, Atten= 1%, Lag= 0.7 min
Primary = 20.68 cfs @ 12.22 hrs, Volume= 1.895 af
Routed to Reach 1R : Batterson Park Pond

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 309.72' @ 12.22 hrs Surf.Area= 2,793 sf Storage= 3,604 cf

Plug-Flow detention time= 31.2 min calculated for 1.893 af (97% of inflow)
Center-of-Mass det. time= 14.5 min (835.3 - 820.8)

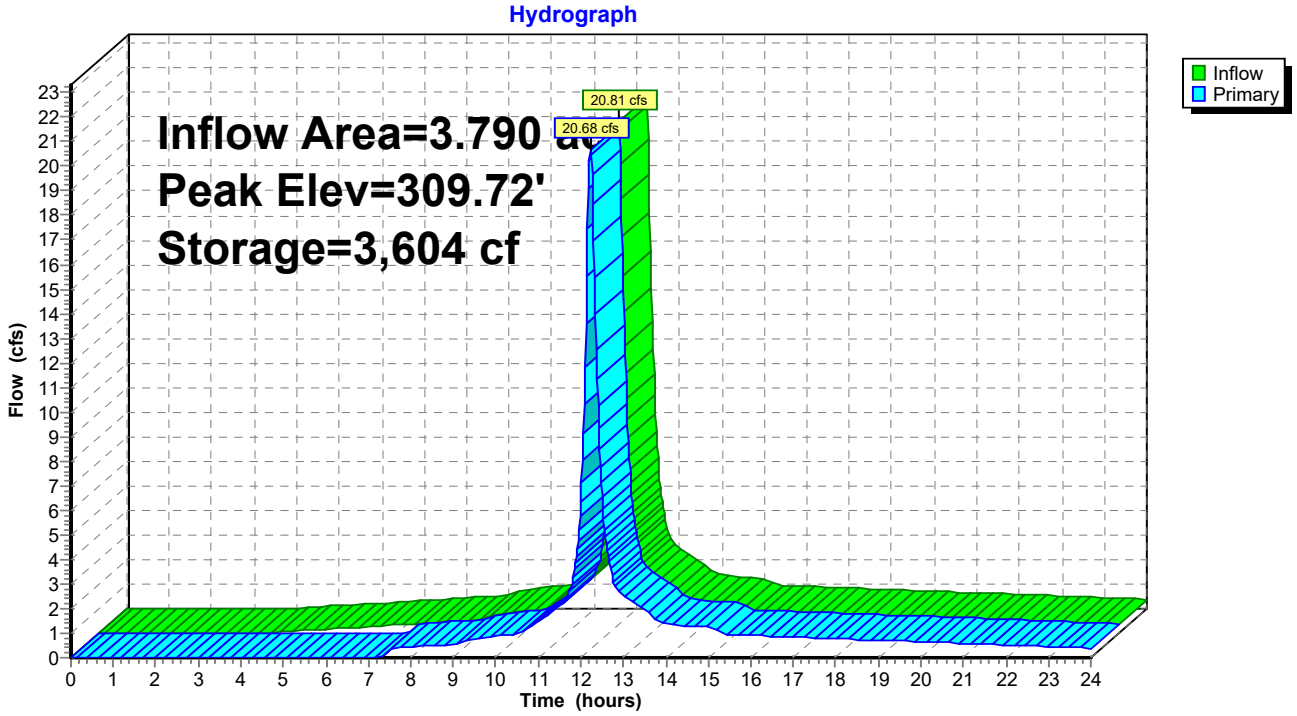
Volume	Invert	Avail.Storage	Storage Description
#1	308.00'	3,691 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.00	1,092	152.1	0	0	1,092
309.00	2,443	239.0	1,723	1,723	3,804
309.75	2,809	248.3	1,968	3,691	4,208

Device	Routing	Invert	Outlet Devices
#1	Primary	309.25'	**25.0' long x 6.0' breadth Primary Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=20.63 cfs @ 12.22 hrs HW=309.72' (Free Discharge)
↑—**1=Primary Spillway** (Weir Controls 20.63 cfs @ 1.76 fps)

Pond 5P:


Hydrograph
Inflow Area=3.790 ac
Peak Elev=309.72'
Storage=3,604 cf
20.81 cfs
20.68 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond 5P:

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
308.00	0.00	308.51	0.00	309.02	0.00	309.53	8.99
308.01	0.00	308.52	0.00	309.03	0.00	309.54	9.50
308.02	0.00	308.53	0.00	309.04	0.00	309.55	10.02
308.03	0.00	308.54	0.00	309.05	0.00	309.56	10.56
308.04	0.00	308.55	0.00	309.06	0.00	309.57	11.11
308.05	0.00	308.56	0.00	309.07	0.00	309.58	11.66
308.06	0.00	308.57	0.00	309.08	0.00	309.59	12.23
308.07	0.00	308.58	0.00	309.09	0.00	309.60	12.81
308.08	0.00	308.59	0.00	309.10	0.00	309.61	13.40
308.09	0.00	308.60	0.00	309.11	0.00	309.62	14.00
308.10	0.00	308.61	0.00	309.12	0.00	309.63	14.62
308.11	0.00	308.62	0.00	309.13	0.00	309.64	15.24
308.12	0.00	308.63	0.00	309.14	0.00	309.65	15.87
308.13	0.00	308.64	0.00	309.15	0.00	309.66	16.54
308.14	0.00	308.65	0.00	309.16	0.00	309.67	17.21
308.15	0.00	308.66	0.00	309.17	0.00	309.68	17.89
308.16	0.00	308.67	0.00	309.18	0.00	309.69	18.59
308.17	0.00	308.68	0.00	309.19	0.00	309.70	19.30
308.18	0.00	308.69	0.00	309.20	0.00	309.71	20.02
308.19	0.00	308.70	0.00	309.21	0.00	309.72	20.75
308.20	0.00	308.71	0.00	309.22	0.00	309.73	21.50
308.21	0.00	308.72	0.00	309.23	0.00	309.74	22.26
308.22	0.00	308.73	0.00	309.24	0.00	309.75	**23.03**
308.23	0.00	308.74	0.00	309.25	0.00		
308.24	0.00	308.75	0.00	309.26	0.06		
308.25	0.00	308.76	0.00	309.27	0.17		
308.26	0.00	308.77	0.00	309.28	0.31		
308.27	0.00	308.78	0.00	309.29	0.47		
308.28	0.00	308.79	0.00	309.30	0.66		
308.29	0.00	308.80	0.00	309.31	0.87		
308.30	0.00	308.81	0.00	309.32	1.10		
308.31	0.00	308.82	0.00	309.33	1.34		
308.32	0.00	308.83	0.00	309.34	1.60		
308.33	0.00	308.84	0.00	309.35	1.87		
308.34	0.00	308.85	0.00	309.36	2.16		
308.35	0.00	308.86	0.00	309.37	2.46		
308.36	0.00	308.87	0.00	309.38	2.78		
308.37	0.00	308.88	0.00	309.39	3.10		
308.38	0.00	308.89	0.00	309.40	3.44		
308.39	0.00	308.90	0.00	309.41	3.79		
308.40	0.00	308.91	0.00	309.42	4.15		
308.41	0.00	308.92	0.00	309.43	4.52		
308.42	0.00	308.93	0.00	309.44	4.91		
308.43	0.00	308.94	0.00	309.45	5.30		
308.44	0.00	308.95	0.00	309.46	5.72		
308.45	0.00	308.96	0.00	309.47	6.15		
308.46	0.00	308.97	0.00	309.48	6.59		
308.47	0.00	308.98	0.00	309.49	7.05		
308.48	0.00	308.99	0.00	309.50	7.52		
308.49	0.00	309.00	0.00	309.51	7.99		
308.50	0.00	309.01	0.00	309.52	8.48		

Stage-Area-Storage for Pond 5P:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
308.00	1,092	0
308.02	1,114	22
308.04	1,136	45
308.06	1,158	67
308.08	1,180	91
308.10	1,203	115
308.12	1,226	139
308.14	1,249	164
308.16	1,272	189
308.18	1,296	215
308.20	1,319	241
308.22	1,343	267
308.24	1,367	294
308.26	1,392	322
308.28	1,416	350
308.30	1,441	379
308.32	1,466	408
308.34	1,491	437
308.36	1,517	467
308.38	1,542	498
308.40	1,568	529
308.42	1,594	561
308.44	1,620	593
308.46	1,647	626
308.48	1,674	659
308.50	1,700	693
308.52	1,728	727
308.54	1,755	762
308.56	1,782	797
308.58	1,810	833
308.60	1,838	869
308.62	1,866	906
308.64	1,895	944
308.66	1,923	982
308.68	1,952	1,021
308.70	1,981	1,060
308.72	2,011	1,100
308.74	2,040	1,141
308.76	2,070	1,182
308.78	2,100	1,224
308.80	2,130	1,266
308.82	2,160	1,309
308.84	2,191	1,352
308.86	2,222	1,396
308.88	2,253	1,441
308.90	2,284	1,486
308.92	2,315	1,532
308.94	2,347	1,579
308.96	2,379	1,626
308.98	2,411	1,674
309.00	2,443	1,723
309.02	2,452	1,772
309.04	2,462	1,821
309.06	2,471	1,870
309.08	2,481	1,920
309.10	2,490	1,969
309.12	2,500	2,019
309.14	2,509	2,069
309.16	2,519	2,120
309.18	2,529	2,170
309.20	2,538	2,221
309.22	2,548	2,272
309.24	2,557	2,323
309.26	2,567	2,374
309.28	2,577	2,425
309.30	2,586	2,477
309.32	2,596	2,529
309.34	2,606	2,581
309.36	2,615	2,633
309.38	2,625	2,686
309.40	2,635	2,738
309.42	2,645	2,791
309.44	2,655	2,844
309.46	2,664	2,897
309.48	2,674	2,951
309.50	2,684	3,004
309.52	2,694	3,058
309.54	2,704	3,112
309.56	2,714	3,166
309.58	2,724	3,220
309.60	2,734	3,275
309.62	2,744	3,330
309.64	2,754	3,385
309.66	2,764	3,440
309.68	2,774	3,495
309.70	2,784	3,551
309.72	2,794	3,607
309.74	**2,804**	**3,663**

SECTION 6.0

ADDITIONAL DRAINAGE CALCULATIONS

6.01 WATER QUALITY VOLUME CALCULATIONS

PROJECT NAME: BATTERSON PARK IMPROVEMENTS
DATE: 9/25/2024
CALCS BY: EN
CHECKED BY: MS

Water Quality Volume Calculation - Pond 1 and 1A

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV = 6,418 cf

P =	1.3	in
I =	61.83	%
R =	0.61	unitless
A =	2.242	ac
A =	97,678	sf

User input
Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects

WQV = 3,209 cf *Total WQV required to retain on-site*

Water Quality Volume Calculation - Pond 2 and 2A

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV = 1,251 cf

P =	1.3	in
I =	15.58	%
R =	0.19	unitless
A =	1.394	ac
A =	60,744	sf

User input
Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects

WQV = 626 cf *Total WQV required to retain on-site*

Water Quality Volume Calculation - Pond 3

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV = 323 cf

P =	1.3	in
I =	6.78	%
R =	0.11	unitless
A =	0.616	ac
A =	26,843	sf

User input
Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects

WQV = 161 cf *Total WQV required to retain on-site*

Water Quality Volume Calculation - Pond 4

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV = 307 cf

P =	1.3	in
I =	45.87	%
R =	0.46	unitless
A =	0.141	ac
A =	6,132	sf

User input
Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects

WQV = 154 cf *Total WQV required to retain on-site*

Water Quality Volume Calculation - Pond 5

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV = 2,865 cf

P =	1.3	in
I =	12.25	%
R =	0.16	unitless
A =	3.788	ac
A =	165,003	sf

User input
Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects

WQV = 1,432 cf *Total WQV required to retain on-site*

Water Quality Volume Calculation - Uncontrolled

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)
P = 1.3 inches (90th percentile rainfall event)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A = post-development total drainage area of site or design point (square feet)

WQV = 4,052 cf

P =	1.3	in
I =	4.93	%
R =	0.09	unitless
A =	9.103	ac
A =	396,533	sf

User input
Calculated value

Water Quality Volume shall be 50% for Redevelopment Projects

WQV = 2,026 cf *Total WQV required to retain on-site*

6.02 RIPRAP APRON SIZING

PROJECT NAME: BATTERSON PARK IMPROVEMENTS
DATE: 9/25/2024
CALCS BY: EN
CHECKED BY: MS

OUTLET CONTROL SIZING TABLE

USER INPUT	INPUT FROM OPEN CHANNEL FLOW CALCULATOR				OUTPUT DATA							
OUTLET CONTROL ID#	FLOW RATE, Q (cfs)	TAILWATER DEPTH, TW (FT)	PIPE DIAMETER, R_P (FT)	VELOCITY, V (ft/s)	RIPRAP APRON TYPE	RIPRAP SIZE	DEPTH OF RIPRAP (IN)	DEPTH OF GRANULAR FILL (IN)	LENGTH OF APRON, L_a (FT)	USE LENGTH (FT)	WIDTH OF APRON AT PIPE, W_1 (FT)	WIDTH OF APRON AT END, W_2 (FT)
1	3.24	0.66	1.00	5.92	TYPE B	MODIFIED	12	6	4.7	10.0	3.0	7.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0
					N/A	N/A	0	0	0.0	10.0	0.0	0.0

APPENDIX A

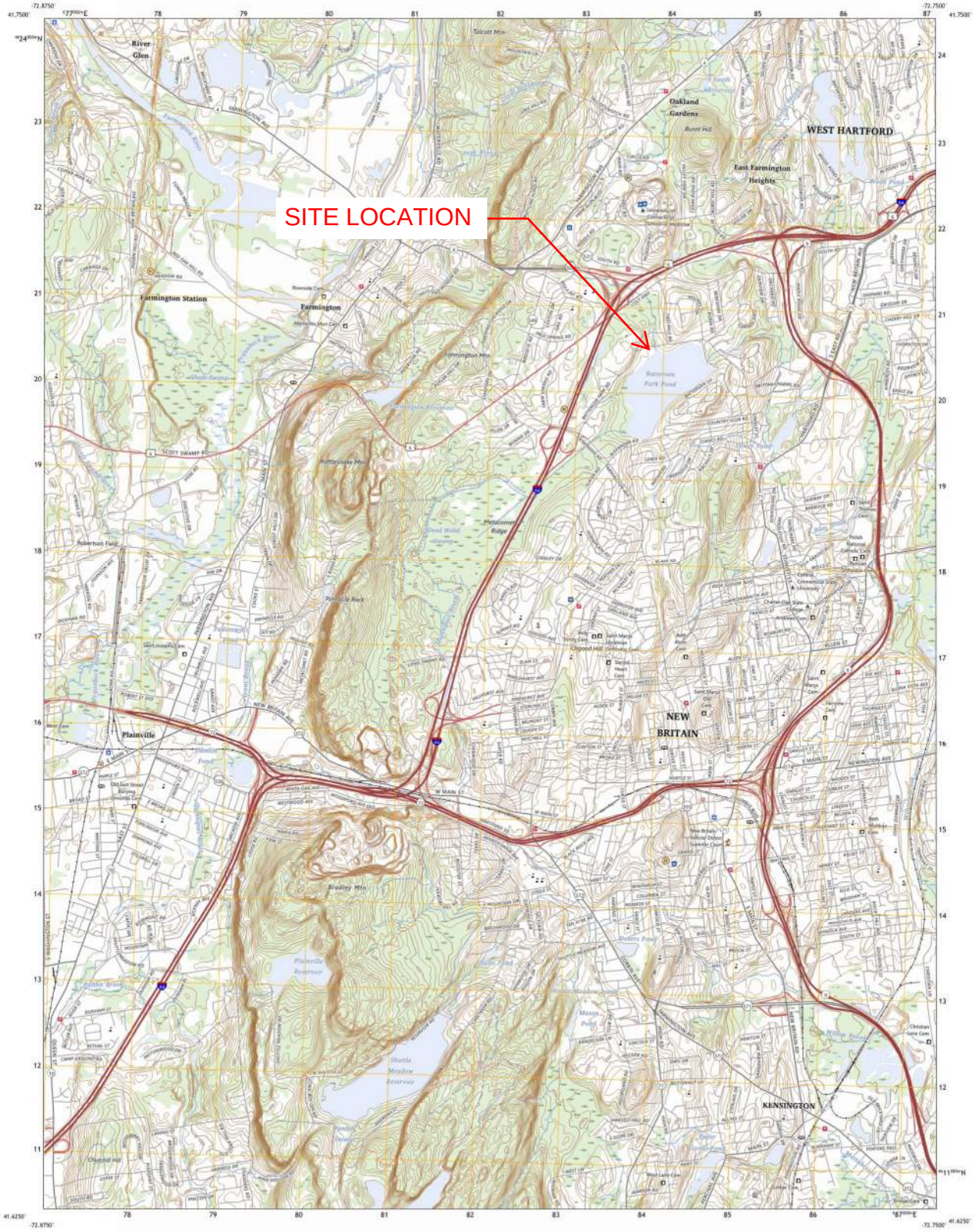
USGS LOCUS MAP

USGS science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

NEW BRITAIN QUADRANGLE
CONNECTICUT - CAPITOL PLANNING REGION
7.5-MINUTE SERIES



Produced by the United States Geological Survey

North American Datum of 1983 (NAD83). Projection and 1 000-meter grid Universal Transverse Mercator, Zone 18T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery	NAIP, August 2018 - August 2018	
Roads	U.S. Census Bureau,	2016
Names	GNIS, 1979 -	2023
Hydrography	National Hydrography Dataset, 2004 -	2022
Contours	National Elevation Dataset,	2021
Boundaries	Multiple sources; see metadata file	2021 - 2022
Wetlands	FWS National Wetlands Inventory	2010

UTM GRID AND 2023 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.

ADJOINING QUADRANGLES

1 Collinsville
2 Avon
3 Hartford North
4 Bristol
5 Hartford South
6 Southington
7 Meriden
8 Middletown

ROAD CLASSIFICATION

Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

NEW BRITAIN, CT
2024

APPENDIX B

FEMA MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevation** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD). Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map is Universal Transverse Mercator (UTM) zone 18. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East West Highway
Silver Spring, Maryland 20910
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by CT DEP.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for information on all related products available from FEMA:

Phone: 800-358-9616
FAX: 800-358-9620
http://msc.fema.gov/

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
ZONE A99	Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
++++++++++++++++	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
513	Base Flood Elevation line and value; elevation in 0*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in 0*

*Referenced to the North American Vertical Datum of 1988

(A)—(A)	Cross Section Line
(23)- - - -(23)	Transect Line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000M	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
SEPTEMBER 26, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0483F

FIRM

FLOOD INSURANCE RATE MAP

HARTFORD COUNTY,
CONNECTICUT
(ALL JURISDICTIONS)

PANEL 483 OF 675

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FARMINGTON, TOWN OF	090029	0483	F
NEW BRITAIN, CITY OF	090032	0483	F

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

MAP NUMBER
09003C0483F

EFFECTIVE DATE:
SEPTEMBER 26, 2008

Federal Emergency Management Agency

APPENDIX C

WEB SOIL SURVEY

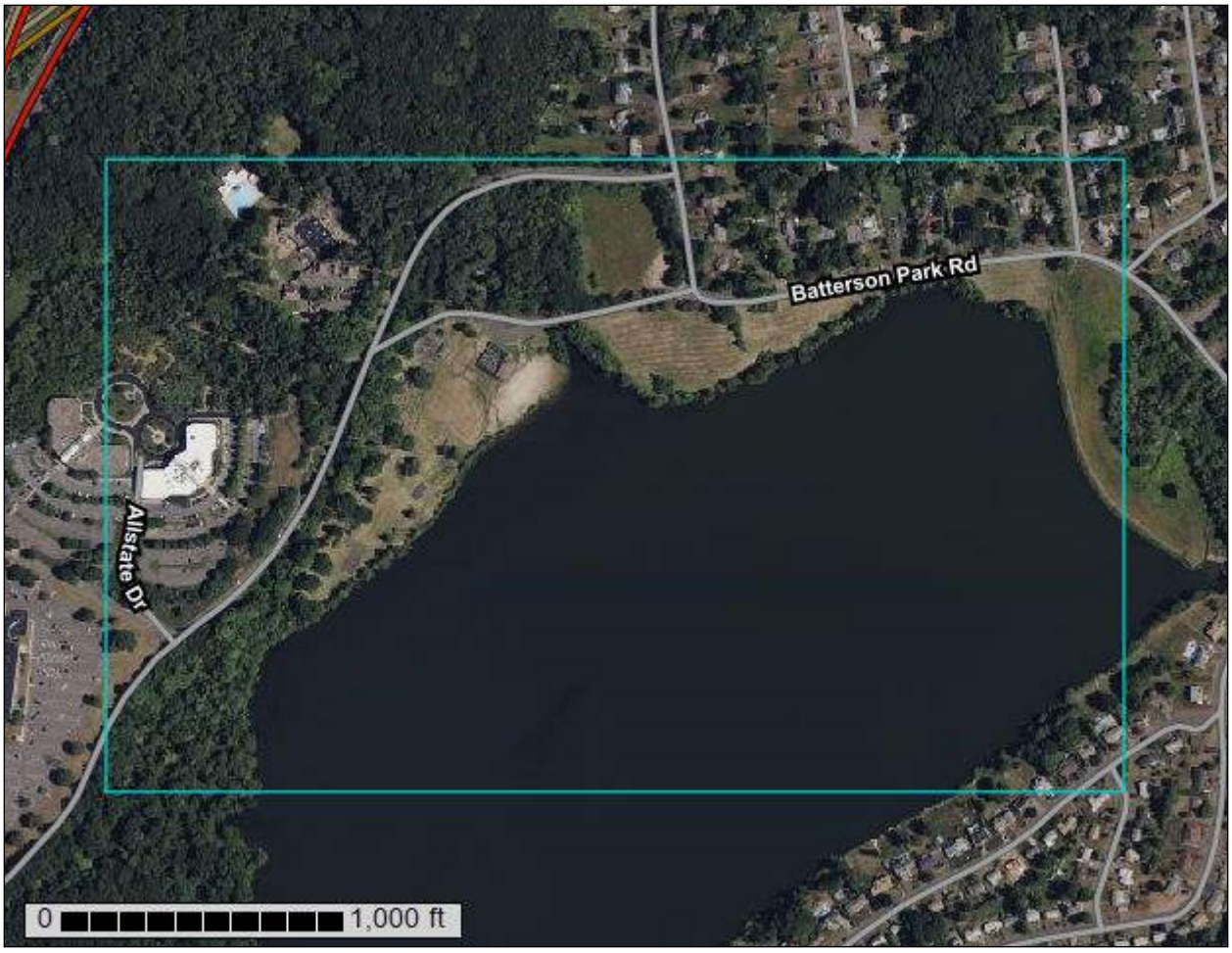
United States Department of Agriculture

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, Western Part



September 5, 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

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

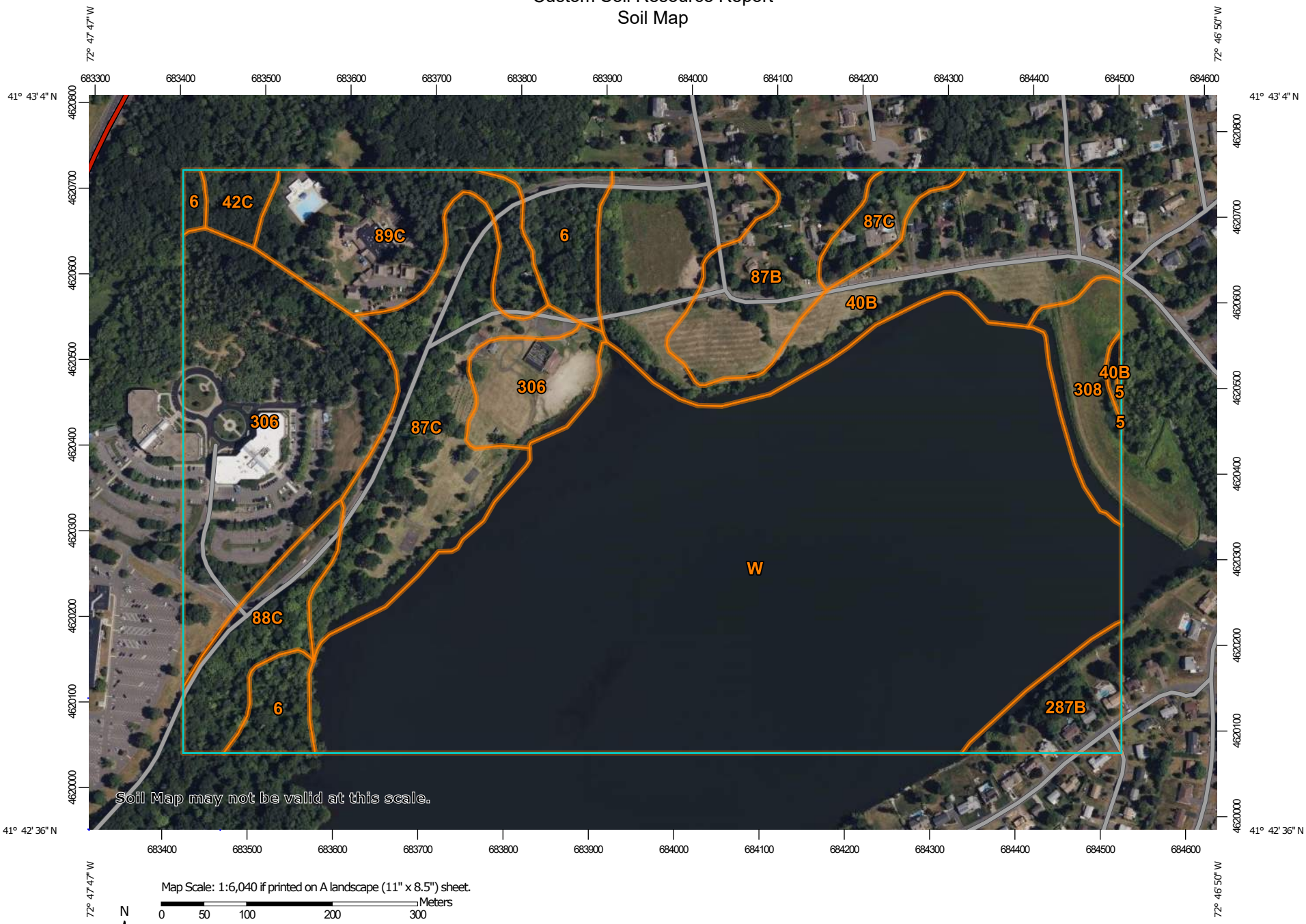
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:6,040 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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.

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

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

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

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

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

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

Soil Survey Area: State of Connecticut, Western 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
5	Wilbraham silt loam, 0 to 3 percent slopes	0.0	0.0%
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	6.2	3.4%
40B	Ludlow silt loam, 3 to 8 percent slopes	21.1	11.3%
42C	Ludlow silt loam, 2 to 15 percent slopes, extremely stony	1.5	0.8%
87B	Wethersfield loam, 3 to 8 percent slopes	7.5	4.0%
87C	Wethersfield loam, 8 to 15 percent slopes	17.0	9.1%
88C	Wethersfield loam, 8 to 15 percent slopes, very stony	5.0	2.7%
89C	Wethersfield loam, 3 to 15 percent slopes, extremely stony	9.6	5.2%
287B	Wethersfield-Urban land complex, 3 to 8 percent slopes	3.9	2.1%
306	Udorthents-Urban land complex	24.0	12.9%
308	Udorthents, smoothed	4.3	2.3%
W	Water	85.6	46.1%
Totals for Area of Interest		**185.8**	**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, Western Part

5—Wilbraham silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2wh26
Elevation: 0 to 770 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 41 to 54 degrees F
Frost-free period: 140 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Wilbraham

Setting

Landform: Depressions, drainageways, hills, drumlins, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Red coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 19 inches: silt loam
Bw2 - 19 to 25 inches: silt loam
Cd - 25 to 61 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 16 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Low
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 10 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ludlow

Percent of map unit: 10 percent
Landform: Drumlins, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Menlo

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

6—Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wh25
Elevation: 0 to 790 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 41 to 54 degrees F
Frost-free period: 140 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Wilbraham, extremely stony, and similar soils: 60 percent
Menlo, extremely stony, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wilbraham, Extremely Stony

Setting

Landform: Depressions, drainageways, hills, drumlins, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Red coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
Ap - 2 to 10 inches: silt loam
Bw1 - 10 to 21 inches: silt loam
Bw2 - 21 to 27 inches: silt loam

Cd - 27 to 63 inches: gravelly loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 16 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Low
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 10 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 5.9 inches)

Interpretive groups

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

Description of Menlo, Extremely Stony

Setting

Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Oa - 0 to 5 inches: highly decomposed plant material
A - 5 to 16 inches: mucky silt loam
Bg1 - 16 to 22 inches: flaggy very fine sandy loam
Bg2 - 22 to 27 inches: flaggy fine sandy loam
Cd1 - 27 to 40 inches: fine sandy loam
Cd2 - 40 to 60 inches: 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: 20 to 36 inches to densic material
Drainage class: Very poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D

Ecological site: F144AY041MA - Very Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ludlow
Percent of map unit: 5 percent
Landform: Drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

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

40B—Ludlow silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9lnj
Elevation: 0 to 1,200 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
Ludlow and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ludlow

Setting
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile
Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 20 inches: silt loam

Bw2 - 20 to 26 inches: silt loam
Cd - 26 to 65 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F145XY014CT - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Wethersfield

Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Wilbraham

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Watchaug

Percent of map unit: 3 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Cheshire

Percent of map unit: 3 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Menlo

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

Yalesville
Percent of map unit: 1 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, stony surface
Percent of map unit: 1 percent
Hydric soil rating: No

42C—Ludlow silt loam, 2 to 15 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: 9lnl
Elevation: 0 to 1,200 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: Not prime farmland

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

Description of Ludlow

Setting
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile
A - 0 to 8 inches: silt loam
Bw1 - 8 to 20 inches: silt loam
Bw2 - 20 to 26 inches: silt loam
Cd - 26 to 65 inches: gravelly loam

Properties and qualities
Slope: 2 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F145XY014CT - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Wilbraham

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wethersfield

Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Cheshire

Percent of map unit: 3 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Watchaug

Percent of map unit: 3 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Menlo

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

Unnamed, stony surface

Percent of map unit: 1 percent
Hydric soil rating: No

Yalesville

Percent of map unit: 1 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

87B—Wethersfield loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lrh
Elevation: 0 to 1,200 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

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

Description of Wethersfield

Setting

Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 3 inches: loam
Bw1 - 3 to 13 inches: loam
Bw2 - 13 to 27 inches: gravelly loam
Cd - 27 to 65 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
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: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Ludlow
Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Cheshire
Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Yalesville
Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wilbraham
Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

87C—Wethersfield loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9lrj
Elevation: 0 to 1,200 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: Farmland of statewide importance

Map Unit Composition
Wethersfield and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wethersfield

Setting

Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 3 inches: loam
Bw1 - 3 to 13 inches: loam
Bw2 - 13 to 27 inches: gravelly loam
Cd - 27 to 65 inches: gravelly loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Ludlow

Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Cheshire

Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Yalesville

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wilbraham

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo

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

88C—Wethersfield loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9lrm
Elevation: 0 to 1,200 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: Farmland of statewide importance

Map Unit Composition

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

Description of Wethersfield

Setting

Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loam
Bw1 - 3 to 13 inches: loam
Bw2 - 13 to 27 inches: gravelly loam
Cd - 27 to 65 inches: gravelly loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
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: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Cheshire

Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ludlow

Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Yalesville

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wilbraham

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo

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

89C—Wethersfield loam, 3 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 9lrn
Elevation: 0 to 1,200 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: Not prime farmland

Map Unit Composition

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

Description of Wethersfield

Setting

Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loam
Bw1 - 3 to 13 inches: loam
Bw2 - 13 to 27 inches: gravelly loam
Cd - 27 to 65 inches: gravelly loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Ludlow
Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Cheshire
Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Yalesville
Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wilbraham
Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

287B—Wethersfield-Urban land complex, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9llx
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
Wethersfield and similar soils: 40 percent
Urban land: 35 percent

Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wethersfield

Setting

Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 3 inches: loam
Bw1 - 3 to 13 inches: loam
Bw2 - 13 to 27 inches: gravelly loam
Cd - 27 to 65 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
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: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

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

Ludlow

Percent of map unit: 5 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Cheshire

Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Wilbraham

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Udorthents

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Yalesville

Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Menlo

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

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

308—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9lmj
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: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
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 35 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

Minor Components

Udorthents, wet substratum

Percent of map unit: 7 percent

Hydric soil rating: No

Urban land

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

Rock outcrop

Percent of map unit: 1 percent
Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

W—Water

Map Unit Composition

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

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX D

NOAA 14++ PRECIPITATION TABLES

NOAA Atlas 14, Volume 10, Version 3
Location name: Farmington, Connecticut, USA*
Latitude: 41.7138°, Longitude: -72.7928°
Elevation: 335 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.342** (0.265-0.440)	**0.413** (0.319-0.532)	**0.529** (0.407-0.684)	**0.626** (0.480-0.815)	**0.759** (0.564-1.04)	**0.859** (0.626-1.20)	**0.964** (0.683-1.40)	**1.08** (0.727-1.61)	**1.25** (0.808-1.93)	**1.38** (0.877-2.19)
10-min	**0.484** (0.375-0.623)	**0.585** (0.453-0.754)	**0.750** (0.578-0.970)	**0.887** (0.680-1.16)	**1.08** (0.799-1.47)	**1.22** (0.888-1.70)	**1.37** (0.968-1.98)	**1.53** (1.03-2.28)	**1.77** (1.15-2.74)	**1.96** (1.24-3.10)
15-min	**0.570** (0.441-0.733)	**0.688** (0.532-0.887)	**0.882** (0.679-1.14)	**1.04** (0.799-1.36)	**1.26** (0.940-1.73)	**1.43** (1.04-2.00)	**1.61** (1.14-2.33)	**1.80** (1.21-2.68)	**2.08** (1.35-3.22)	**2.31** (1.46-3.65)
30-min	**0.772** (0.598-0.994)	**0.933** (0.722-1.20)	**1.20** (0.922-1.55)	**1.41** (1.08-1.84)	**1.71** (1.27-2.34)	**1.94** (1.41-2.71)	**2.18** (1.54-3.16)	**2.44** (1.64-3.64)	**2.82** (1.83-4.36)	**3.13** (1.98-4.94)
60-min	**0.975** (0.755-1.26)	**1.18** (0.911-1.52)	**1.51** (1.16-1.95)	**1.78** (1.37-2.32)	**2.16** (1.61-2.95)	**2.45** (1.78-3.42)	**2.75** (1.95-3.99)	**3.08** (2.07-4.59)	**3.56** (2.30-5.50)	**3.95** (2.50-6.24)
2-hr	**1.26** (0.984-1.61)	**1.52** (1.18-1.94)	**1.94** (1.51-2.50)	**2.29** (1.77-2.96)	**2.77** (2.08-3.77)	**3.13** (2.30-4.37)	**3.52** (2.52-5.12)	**3.97** (2.68-5.89)	**4.65** (3.02-7.16)	**5.22** (3.31-8.22)
3-hr	**1.46** (1.14-1.86)	**1.76** (1.37-2.24)	**2.25** (1.75-2.88)	**2.65** (2.06-3.42)	**3.21** (2.42-4.36)	**3.63** (2.68-5.05)	**4.07** (2.94-5.94)	**4.62** (3.12-6.83)	**5.44** (3.54-8.36)	**6.14** (3.91-9.65)
6-hr	**1.84** (1.45-2.33)	**2.23** (1.76-2.83)	**2.87** (2.25-3.65)	**3.40** (2.65-4.36)	**4.14** (3.13-5.60)	**4.68** (3.48-6.50)	**5.27** (3.82-7.67)	**5.99** (4.06-8.84)	**7.12** (4.65-10.9)	**8.09** (5.16-12.7)
12-hr	**2.27** (1.80-2.85)	**2.78** (2.20-3.50)	**3.63** (2.86-4.58)	**4.33** (3.40-5.51)	**5.30** (4.04-7.13)	**6.01** (4.50-8.31)	**6.78** (4.96-9.86)	**7.76** (5.28-11.4)	**9.27** (6.07-14.1)	**10.6** (6.77-16.5)
24-hr	**2.65** (2.11-3.31)	**3.32** (2.64-4.15)	**4.41** (3.50-5.53)	**5.32** (4.19-6.71)	**6.56** (5.04-8.82)	**7.47** (5.64-10.3)	**8.48** (6.27-12.4)	**9.79** (6.68-14.3)	**11.9** (7.80-18.1)	**13.7** (8.81-21.3)
2-day	**2.96** (2.37-3.67)	**3.79** (3.04-4.70)	**5.14** (4.11-6.41)	**6.26** (4.98-7.86)	**7.81** (6.05-10.5)	**8.93** (6.81-12.4)	**10.2** (7.64-15.0)	**11.9** (8.16-17.4)	**14.8** (9.73-22.4)	**17.4** (11.2-26.9)
3-day	**3.21** (2.59-3.96)	**4.12** (3.32-5.10)	**5.62** (4.51-6.98)	**6.86** (5.47-8.58)	**8.56** (6.66-11.5)	**9.79** (7.50-13.6)	**11.2** (8.43-16.4)	**13.1** (9.00-19.1)	**16.4** (10.8-24.8)	**19.3** (12.5-29.9)
4-day	**3.45** (2.79-4.25)	**4.42** (3.57-5.45)	**6.01** (4.84-7.44)	**7.33** (5.86-9.14)	**9.15** (7.13-12.2)	**10.5** (8.03-14.4)	**11.9** (9.02-17.5)	**14.0** (9.62-20.3)	**17.5** (11.5-26.4)	**20.6** (13.3-31.8)
7-day	**4.11** (3.34-5.04)	**5.20** (4.22-6.38)	**6.98** (5.64-8.59)	**8.45** (6.79-10.5)	**10.5** (8.20-13.9)	**11.9** (9.19-16.4)	**13.6** (10.3-19.7)	**15.8** (10.9-22.9)	**19.6** (13.0-29.5)	**22.9** (14.8-35.2)
10-day	**4.79** (3.90-5.84)	**5.93** (4.83-7.25)	**7.80** (6.33-9.57)	**9.35** (7.54-11.6)	**11.5** (9.00-15.1)	**13.0** (10.0-17.7)	**14.8** (11.1-21.2)	**17.1** (11.8-24.6)	**20.8** (13.8-31.3)	**24.2** (15.7-37.1)
20-day	**6.92** (5.68-8.39)	**8.12** (6.66-9.86)	**10.1** (8.24-12.3)	**11.7** (9.50-14.4)	**14.0** (11.0-18.2)	**15.6** (12.0-20.9)	**17.4** (13.0-24.5)	**19.7** (13.7-28.2)	**23.1** (15.4-34.6)	**26.1** (17.0-40.0)
30-day	**8.71** (7.18-10.5)	**9.94** (8.18-12.0)	**11.9** (9.79-14.5)	**13.6** (11.1-16.6)	**15.9** (12.5-20.5)	**17.6** (13.5-23.3)	**19.4** (14.5-27.0)	**21.6** (15.1-30.8)	**24.7** (16.5-36.8)	**27.4** (17.8-41.8)
45-day	**10.9** (9.03-13.1)	**12.2** (10.1-14.7)	**14.3** (11.7-17.2)	**16.0** (13.1-19.5)	**18.4** (14.5-23.4)	**20.2** (15.5-26.4)	**22.0** (16.3-30.1)	**24.0** (16.8-34.1)	**26.7** (18.0-39.7)	**28.9** (18.9-44.0)
60-day	**12.8** (10.6-15.3)	**14.1** (11.7-16.9)	**16.2** (13.4-19.6)	**18.0** (14.8-21.9)	**20.5** (16.1-26.0)	**22.4** (17.2-29.1)	**24.3** (17.9-32.8)	**26.1** (18.4-37.0)	**28.5** (19.2-42.2)	**30.3** (19.8-46.1)

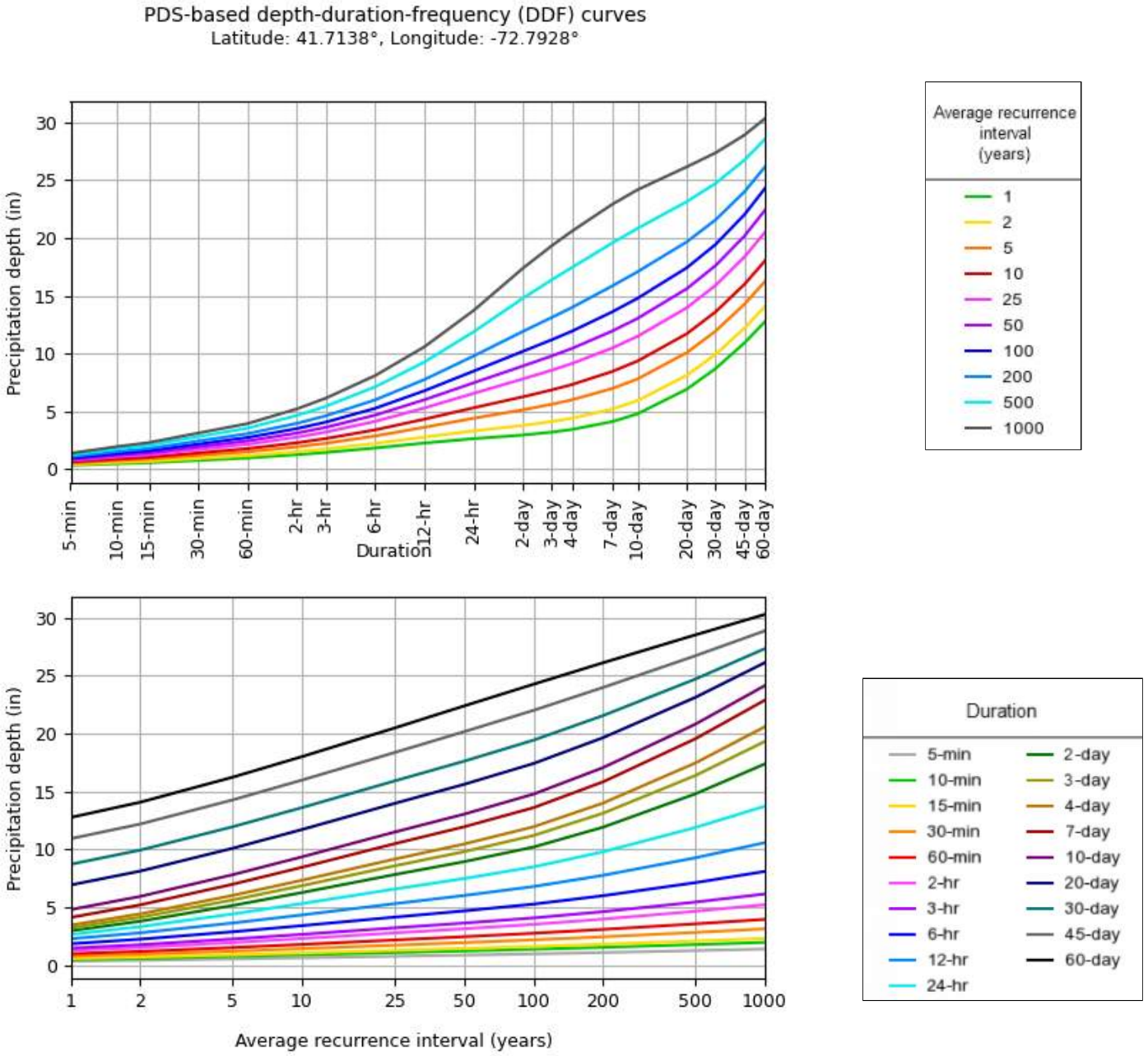
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



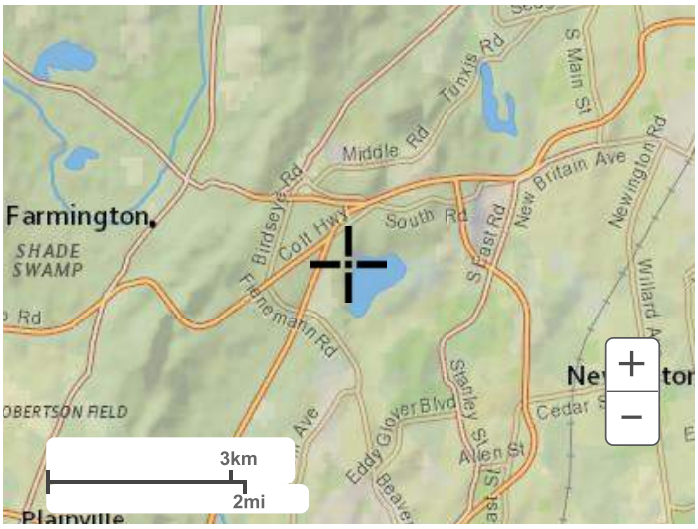
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Fri Sep 6 13:44:16 2024

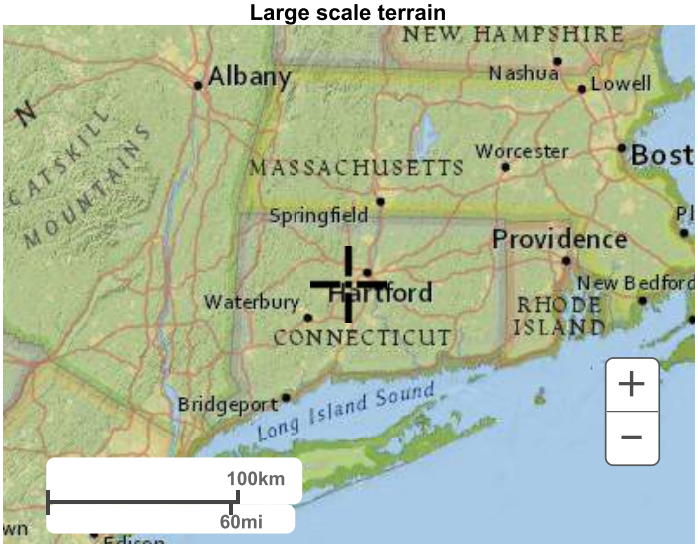
Back to Top

Maps & aerials

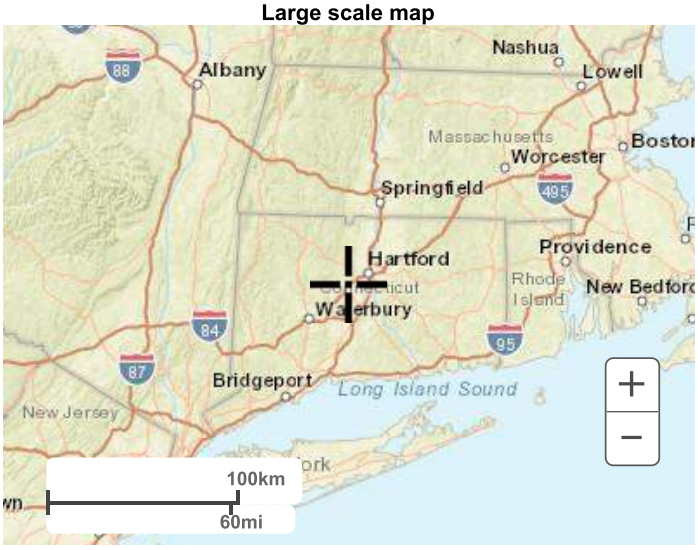
Small scale terrain



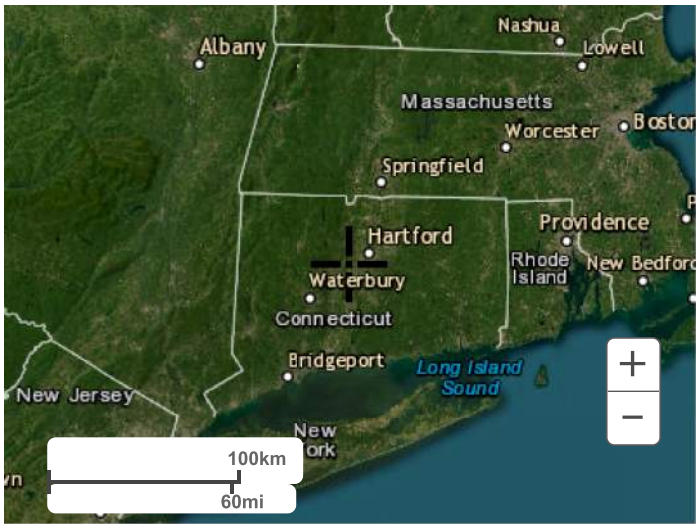
Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov