STORMWATER MANAGEMENT REPORT

Prepared for:

SAFSTOR REAL ESTATE CO, LLC

Block 507.14, Lot 65.01
471 Elizabeth Avenue

Franklin Township
Somerset County, New Jersey

Prepared by:

BOHLER

N.J. Certificate of Authorization 24GA28161700

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Warren, NJ 07059
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BENJ File No. J200933

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May 2021

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1. Introduction

The subject property is located at 471 Elizabeth Avenue in Franklin Township, Somerset County, New Jersey. The property is identified as Block 507.14, Lot 65.01 on the Franklin Township tax maps and is a total of 4.816 acres in size and will hereafter be referred to as "the site". The site is bordered to the northeast by an active adult community and New Brunswick Road beyond; to the northwest by Elizabeth Avenue and vacant wooded area beyond; to the southwest by a wooded area and residential uses beyond; and to the southeast by a wooded area and residential uses beyond. A tax map and aerial map is included at the beginning of Appendix C for reference.

The site is currently partially developed within the B-I (Business District) Zone. One 1,060 square foot residential house currently exists on the property along Elizabeth Avenue with a 959 square foot detached garage and asphalt driveway. Beyond the detached garage is a 2,666 square foot industrial building with a gravel parking area. A gravel driveway also exists along Elizabeth Avenue which leads to multiple man-made material piles. The undeveloped portions of the lot are wooded or grassed areas. An existing underground septic field is located on the site to handle sewage from the residential house. A proposed stormwater management system will convey the runoff from the proposed development and impervious areas.

This report summarizes the design objectives, methodology, and calculations for the conveyance, detention, treatment and discharge of stormwater runoff leaving the site and is meant to accompany the Site Plan documents prepared by Bohler Engineering. Pre-development and post-development conditions are examined for stormwater quantity analysis, water quality analysis, groundwater recharge, soil erosion and sediment control, and low impact development based on the *NJDEP Stormwater Management Regulations* of March 2020.

2. Pre-Development Site Conditions

The site contains a total area of 4.816 acres. The studied watershed area is a total of 4.816 acres in size and consists of two unique drainage areas: Existing Drainage Area #1 and Existing Drainage Area #2, which are described in more detail below. In the pre-development condition, the site is partially developed with a few buildings, asphalt and gravel driveways and gravel parking area. Undeveloped land consists of grass and wooded areas. Currently, the runoff generated on site outfalls to Block 507.17, Lot 236 along the southeast property line via overland flow and ultimately flows southeast to a tributary of the Raritan River. The Existing Drainage Area Map in Appendix C illustrates the limits of each existing drainage area and how they relate to the existing site conditions.

2.1 Point of Analysis 1

Existing Drainage Area #1 flows to point of analysis #1 located near the south property corner. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.1.1 Existing Drainage Area #1

Located on the southwest area of the site, Existing Drainage Area #1 contains 4.088 acres of land, of which 0.238 acres are impervious surface, and includes a residential house, detached garage, asphalt driveway and a portion of the gravel parking area. The topography of the area slopes from north to south from a maximum elevation of approximately 87.30 to a minimum elevation of approximately 70.60 with slopes ranging from 1% to 45%, including the man-made material piles currently on site. A CN value of 98 and 74 were used for

impervious and pervious areas, respectively, with a calculated time of concentration of 12.4 minutes. The runoff from Existing Drainage Area #1 flows through the site to Block 507.17, lot 236 in both the existing and proposed conditions and will be accounted for in the proposed stormwater management design. Existing Drainage Area #1 discharges to Point of Analysis 1.

2.2 Point of Analysis 2

Existing Drainage Area #2 flows to point of analysis #2 located near the east property corner. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.2.1 Existing Drainage Area #2

The remainder of the area of study in the pre-development condition is contained within Existing Drainage Area #2, which contains 0.728 acres of land, of which 0.129 acres are impervious surface, and includes most of the industrial building and a portion of the asphalt driveway and a portion of the gravel parking area. The topography of the area slopes from north to south from a maximum elevation of approximately 84.30 to a minimum elevation of approximately 74.20 with slopes ranging from 1% to 45%, including the man-made material piles currently on site. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 3.0 minutes. The runoff from Existing Drainage Area #2 flows from north to south and ultimately discharges to Point of Analysis 1.

2.3 Pre-Development Flow Summary

TABLE 2.1

DATA	EXISTING DRAINAGE AREA #1	EXISTING DRAINAGE AREA #2
Area (acres)	4.088	0.728
Impervious (acres)	0.238	0.129
Tc (min)	12.4	3.0
2 Yr. Flow (CFS)	5.61	2.00
10 Yr. Flow (CFS)	11.74	3.44
100 Yr. Flow (CFS)	24.93	6.29

3. Post-Development Site Conditions

The post-development condition for the site includes the construction of one, three story self-storage building with associated parking, driveways, sidewalks, utility infrastructure, stormwater conveyance, aboveground and underground detention facilities, and other site improvements. The proposed site is designed in a manner that generally maintains the existing drainage patterns. The studied watershed area in the post-development condition contains the same 4.816 acre area that was studied in the pre-development condition and consists of four unique drainage areas: Proposed Drainage Area #1A, #1B, #1c and #2, which are described in more detail below.

A proposed stormwater conveyance system will collect the runoff from the proposed buildings and impervious areas via inlets, manholes, and stormwater piping and redirect it to the proposed bioretention basins on the site. The construction of the proposed improvements will occupy approximately 3.73 acres of land and will create approximately 1.47 acres of impervious coverage on the site in the post-development condition. The Proposed Drainage Area Map in Appendix C illustrates the limits of each proposed drainage area and how they relate to the proposed site conditions

3.1 Point of Analysis 1

The Proposed Drainage Area #1A, #1B and #1C in the post development condition flows to the same point of analysis identified in the existing condition, located near the south property corner. As noted above, the Proposed Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the proposed topography on the site.

3.1.1 Proposed Drainage Area #1A

Proposed Drainage Area #1A consists of approximately 2.245 acres of land, of which 1.357 acres are impervious surface, and includes the proposed self-storage building, parking areas, sidewalks, stormwater and utility infrastructure. The drainage area also contains grass, landscape and wooded areas. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 10.7 minutes for pervious surfaces. The runoff from Proposed Drainage Area #1A is routed to bioretention basins #1 and #2 and ultimately flows to Block 507.17, Lot 236 and Point of Analysis 1. The routing of the runoff from Proposed Drainage Area #1A is depicted on the Inlet Area Map in Appendix C.

The proposed peak runoff rates for Proposed Drainage Area #1A are analyzed at Point of Analysis 1. The flows tributary to Point of Analysis 1 from Proposed Drainage Area #1 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.iii. Post-development peak runoff rates for the 2-, 10-, and 100-year storm events for flows tributary to Point of Analysis 1 meet or exceed the

50, 75 and 80 percent reductions, respectively, of the pre-development peak runoff rates. Refer to Section 3.3 for a comparison of pre-development flows to the post-development flows routed through proposed bioretention. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.1.2 Proposed Drainage Area #1B

Proposed Drainage Area #1B consists of approximately 0.342 acres of land, of which 0.147 acres are impervious surface, and includes a loading area, driveway, sidewalk and the bioretention basin #3. The drainage area also contains grass, landscape and wooded areas. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 20.8 minutes for pervious surfaces. The runoff from Proposed Drainage Area #1B is routed to bioretention basins #3 and ultimately flows to Block 507.17, Lot 236 and Point of Analysis 1. The routing of the runoff from Proposed Drainage Area #1B is depicted on the Inlet Area Map in Appendix C.

The proposed peak runoff rates for Proposed Drainage Area #1B are analyzed at Point of Analysis 1. The flows tributary to Point of Analysis 1 from Proposed Drainage Area #1 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.iii. Post-development peak runoff rates for the 2-, 10-, and 100-year storm events for flows tributary to Point of Analysis 1 meet or exceed the 50, 75 and 80 percent reductions, respectively, of the pre-development peak runoff rates. Refer to Section 3.3 for a comparison of pre-development flows to the post-development flows routed through proposed bioretention. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.1.3 Proposed Drainage Area #1C

Proposed Drainage Area #1C consists of approximately 1.404 acres of land, of which 0.053 acres are impervious surface which includes the grass paver fire access lane. The drainage area also contains grass, landscape and wooded areas. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 13.9 minutes for pervious surfaces. The runoff from Proposed Drainage Area #1C is routed to the existing wetlands and ultimately flows to Block 507.17, Lot 236 and Point of Analysis 1. The routing of the runoff from Proposed Drainage Area #1C is depicted on the Inlet Area Map in Appendix C.

The proposed peak runoff rates for Proposed Drainage Area #1C are analyzed at Point of Analysis 1. The flows tributary to Point of Analysis 1 from Proposed Drainage Area #1 meets the stormwater management criteria set forth in NJAC

§ 7:8-5.4(a)3.iii. Post-development peak runoff rates for the 2-, 10-, and 100-year storm events for flows tributary to Point of Analysis 1 meet or exceed the 50, 75 and 80 percent reductions, respectively, of the pre-development peak runoff rates. Refer to Section 3.3 for a comparison of pre-development flows to the post-development flows routed through proposed bioretention. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.2 Point of Analysis 2

The Proposed Drainage Area #2 in the post development condition flows to the same point of analysis identified in the existing condition, located near the east property corner. As noted above, the Proposed Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the proposed topography on the site.

3.2.1 Proposed Drainage Area #2

Proposed Drainage Area #2 consists of approximately 0.826 acres of land, with no impervious surface, and includes grass, landscape and wooded areas as well as the proposed septic field. A CN value of 98 and 74 were used for impervious and pervious areas, respectively, with a calculated time of concentration of 12.2 minutes for pervious surfaces. The runoff from Proposed Drainage Area #2 is routed to the existing wetlands area which ultimately flows to Block 507.17, Lot 236 and Point of Analysis 2. The routing of the runoff from Proposed Drainage Area #2 is depicted on the Proposed Drainage Area Map in Appendix C.

The proposed peak runoff rates for Proposed Drainage Area #2 are analyzed at Point of Analysis 2. The flows tributary to Point of Analysis 2 from Proposed Drainage Area #2 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.iii. Post-development peak runoff rates for the 2-, 10-, and 100-year storm events for flows tributary to Point of Analysis 1 meet or exceed the 50, 75 and 80 percent reductions, respectively, of the pre-development peak runoff rates. Refer to Section 3.3 for a comparison of pre-development flows to the post-development flows. Refer to Sections 2.2 and 3.3 for pre-development and post-development flows, respectively.

3.3 Proposed Structural Stormwater Management Strategies

The four drainage areas in the post development condition flow to the same points of analysis identified in the existing condition. Two of the drainage areas, Proposed

Drainage Areas #1A and #1B, flows through the proposed on-site stormwater management system, which is described in more detail below.

3.3.1 Bio-Retention Systems

As part of the stormwater management design of the proposed site, two bio-retention systems are proposed to capture water from impervious areas. The bio-retention systems meet the minimum requirements outlined in the *New Jersey Stormwater Best Management Practices Manual* by providing 24 inches of soil bed depth, an underdrain system, containment and treatment of the entire Water Quality Design Storm volume, a storage depth of 12 inches maximum in a flat-bottom system and 1 foot minimum of separation between the bottom of the bio-retention basin and the seasonal high ground water table for underdrain systems. The proposed bio-retention systems achieve 80% TSS removal.

TABLE 3.2.1

DESIGN PARAMETERS		
TSS Removal Rate	**Depth of Soil Bed**	**Vegetation**
80%	18 inches	Terrestrial Forested Community
80%	24 inches	Site-Tolerant Grasses
90%	24 inches	Terrestrial Forested Community
Storage Volume	Entire Water Quality Design Storm Volume	
Minimum Density of Vegetation	85%	
Appropriate Species Selection	See Chapter 7 of the *NJ Stormwater Best Management Practices Manual*	
Maximum Design Storm Drain Time	72 Hours, Using Slowest Design Permeability Rate	
Permeability Rate Factor of Safety	2	
Minimum Subsoil Design Permeability Rate	0.5 inches/hour (Under-drain proposed)	
Soil Testing Requirements	Must be consistent with Appendix E of the *NJ Stormwater Best Management Practices Manual*	

3.3.2 Emergency Spillways

The emergency spillways associated with the proposed basins have been designed to pass a design storm that is equivalent to the 100-year storm plus 50%. At least one foot of freeboard is provided above the peak water elevation while the emergency spillway is operating.

3.4 Post-Development Flow Summary

TABLE 3.3

PROPOSED FLOW SUMMARY

	Proposed Drainage Area #1	Proposed Drainage Area #2
Area (acres)	3.980	0.836
Impervious (acres)	1.527	0.000
Tc (min)	10.7, 20.8 & 13.9	12.2
2 yr. Flow (cfs)	2.43	0.91
10 yr. Flow (cfs)	6.30	2.10
100 yr. Flow (cfs)	19.24	4.76

EXISTING/PROPOSED FLOW SUMMARY (DRAINAGE AREA 1)

	Existing Drainage Area 1	Total Flows Requiring Reductions (cfs)	Required Reductions	Maximum Allowable Flow to Point of Analysis 1	Total Proposed Flows to Point of Analysis 1
2 yr. Flow (cfs)	5.61	5.61	50%	2.81	2.43
10 yr. Flow (cfs)	11.74	11.74	25%	8.81	6.30
100 yr. Flow (cfs)	24.93	24.93	20%	19.94	19.24

EXISTING/PROPOSED FLOW SUMMARY (DRAINAGE AREA 2)

	Existing Drainage Area 2	Total Flows Requiring Reductions (cfs)	Required Reductions	Maximum Allowable Flow to Point of Analysis 2	Total Proposed Flows to Point of Analysis 2
2 yr. Flow (cfs)	2.00	2.00	50%	1.00	0.91
10 yr. Flow (cfs)	3.44	3.44	25%	2.58	2.10
100 yr. Flow (cfs)	6.29	6.29	20%	5.03	4.76

4. Stormwater Management Design Methodology

In accordance with the NJDEP Stormwater Management Regulations, the proposed development must meet the requirements, if appropriate, for stormwater quantity reductions, water quality, groundwater recharge, soil erosion and sediment control, and low impact development. The following sections describe how each of the above items are addressed on site in the post-development condition.

4.1 Stormwater Quantity Controls

The Assessment of stormwater quantity has been based upon the Soil Conservation Service Method (SCS) Unit Hydrograph as described in Technical Release Number 55 (TR55), "Urban Hydrology for Small Watersheds". Theoretical storms are modeled with the 24-Hour SCS Unit Dimensionless Hydrograph using the NOAA Atlas 14 Type C rainfall distribution and recurrence intervals of 2, 10, and 100 years. Hydrograph creation and routings are accomplished using the *HydroCAD* Version 10.00 program by HydroCAD Software Solutions, LLC. The following techniques from the *NJDEP Stormwater Management Regulations* is being applied to each drainage area as noted in section 3.3:

1. NJAC § 7:8-5.4(a)3.i states for stormwater runoff leaving the site, post-development runoff hydrographs for the 2-, 10-, and 100-year storms do not exceed, at any point in time, the pre-development runoff hydrographs for the same storm events. The above section of the NJAC will be applied to drainage areas that, under proposed conditions, will remain unchanged or have a net decrease in impervious coverage.

2. NJAC § 7:8-5.4(a)3.iii states the post-development peak runoff rates for the 2-, 10-, and 100-year storm events are 50, 75, and 80 percent, respectively, of the pre-development peak runoff rates. The above section of the NJAC will be applied to drainage areas that are impacted by the proposed development and flow to a detention or retention system.

The project's proposed stormwater management facilities for stormwater peak flow attenuation will consist of three bioretention basins (bioretention basin #1, #2 and #3) addressing the drainage areas outlined in Section 3 of this report. The study requires the establishment of a point of analysis, as indicated in Section 2. Existing and proposed CN and Tc calculations, as well as existing and proposed hydrographs are provided in Appendix A. The information below describes the methodology in which the stormwater calculations were procured.

4.1.1 Site Soils

Site soil information has been obtained from the USDA Natural Resources Conservation Service (NRCS) web soil survey database, last revised in 2015. The major soil types present on site include Penn Silt Loam, which is a somewhat poorly drained soil with 2 to 6 percent slopes. Penn soils are classified as Hydrologic Soil Group Type C soils; therefore, values used in the CN and time of concentration calculations are associated with Type C soils. For areas where the calculated time of concentration is less than 6 minutes, the calculated time was used. For impervious area, an assumed time of concentration of 6 minutes was used.

4.1.2 Rainfall Data

Rainfall data used in the stormwater calculations of this report are obtained from several different sources based on the latest NJDEP stormwater regulations. The Water Quality storm event is based on the NJDEP BMP Manual Chapter 5 definition of having a total rainfall depth of 1.25 inches and a total duration of two (2) hours. Twenty-four-hour rainfall frequency data in Somerset County for all other storms is obtained from the NOAA Atlas 14, Volume 2, Precipitation-Frequency Atlas of the United States, updated in 2006 and listed in the table below:

TABLE 4.1

Event (year)	1	2	5	10	25	50	100
Rainfall (in)	2.76	3.34	4.25	5.01	6.15	7.13	8.21

4.1.3 Pipe Sizing

Calculations for sizing the stormwater pipe networks associated with the proposed stormwater management conveyance system can be found in

Appendix B of this report. The Rational Method has been used to size the storm piping for the 25-year storm event. The calculations are conservatively based on a time of concentration of 6 minutes to any inlet. An Inlet Area Map is included in Appendix C.

4.2 Water Quality Controls

Water quality analysis is based on the requirements of NJAC § 7:8-5.5, which requires 80% TSS removal of post-development runoff from new impervious areas before discharging the runoff. Additionally, 50% TSS removal in post-development runoff from replaced impervious areas must be achieved prior to discharging the runoff. Three bioretention basins are used in the proposed condition that achieves 80% TSS removal which have been designed according to standards in Chapter 9.1 of the latest *New Jersey Stormwater Best Management Practices Manual.*

4.3 Groundwater Recharge

Per the Geotechnical Report, the subject site has poor permeability test rate of < 1 inches/hour. Also, the subsurface geology of the site includes karst topography. Introducing groundwater recharge to the site, could have a negative impact on the subsurface geology. Due to the conditions described above, no groundwater recharge is proposed as part of the stormwater management facilities on site.

4.4 Soil Erosion and Sediment Control

The Soil Erosion and Sediment Control plans and details are included within the Site Plan documents prepared by Bohler Engineering and must be followed throughout construction. Silt fences, stabilized construction entrances, a temporary stockpile and inlet filters are proposed during construction. It is noted that stormwater from the site during construction will discharge to Block 507.17, Lot 236 and the existing Raritan River tributary therefore, the offsite stability is considered stable. This report and the Site Plan documents prepared by Bohler Engineering are being submitted to the Somerset-Union Soil Conservation District for approval.

4.5 Low-Impact Development and Non-Structural Stormwater Management Facilities

In accordance with the NJDEP regulations and the latest *New Jersey Stormwater Best Management Practices Manual*, several non-structural stormwater management strategies have been incorporated into the design of the site and are listed below:

4.5.1 Vegetation and Landscaping

A comprehensive Landscape Plan has been incorporated into the design of the proposed improvements on the site that provides low maintenance landscaping. The use of lawn areas has been minimized where applicable and fertilizers and pesticides are to be used sparingly.

4.5.1.1 Native Ground Cover

Native plants including ground cover, shrubs and trees instead of turf grass have been proposed as part of the landscape design for the site. The native plantings will also require little or no irrigation once they are established.

4.5.2 Minimize Land Disturbance

The proposed design of the site incorporates the preservation of existing vegetative areas that will remain undisturbed. The undisturbed areas will be protected during construction and will have easements and/or deed restrictions established as required by other NJDEP regulations and permits to ensure these areas remain undisturbed in the future

4.5.3 Impervious Area Management

Impervious areas are the primary source of additional runoff in the post-development site condition. The sections below describe the measures that have been taken in the proposed site design to minimize the amount of impervious proposed on site

4.5.3.1 Streets, Sidewalks, and Parking, Driveway Areas

As part of the proposed site design, the minimum allowable parking and drive aisle sizes, in accordance with local ordinances, are used in lieu of larger stalls and aisles to reduce the amount of impervious surface in the post-development condition.

4.5.4 Preventative Source Controls

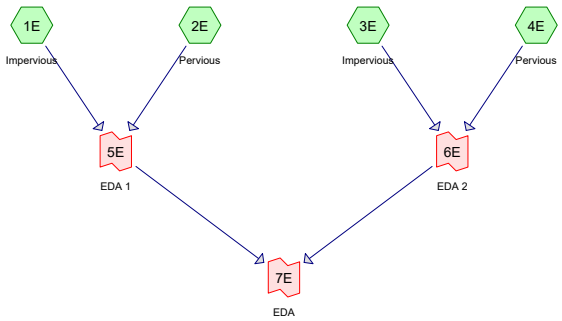
The proposed development complies with this strategy by providing dumpster areas. Additionally, floatable and total suspended solids are routinely eliminated using two bio-detention basins between the last inlet in the pipe network and the above and underground ground basins, thereby intercepting floating debris

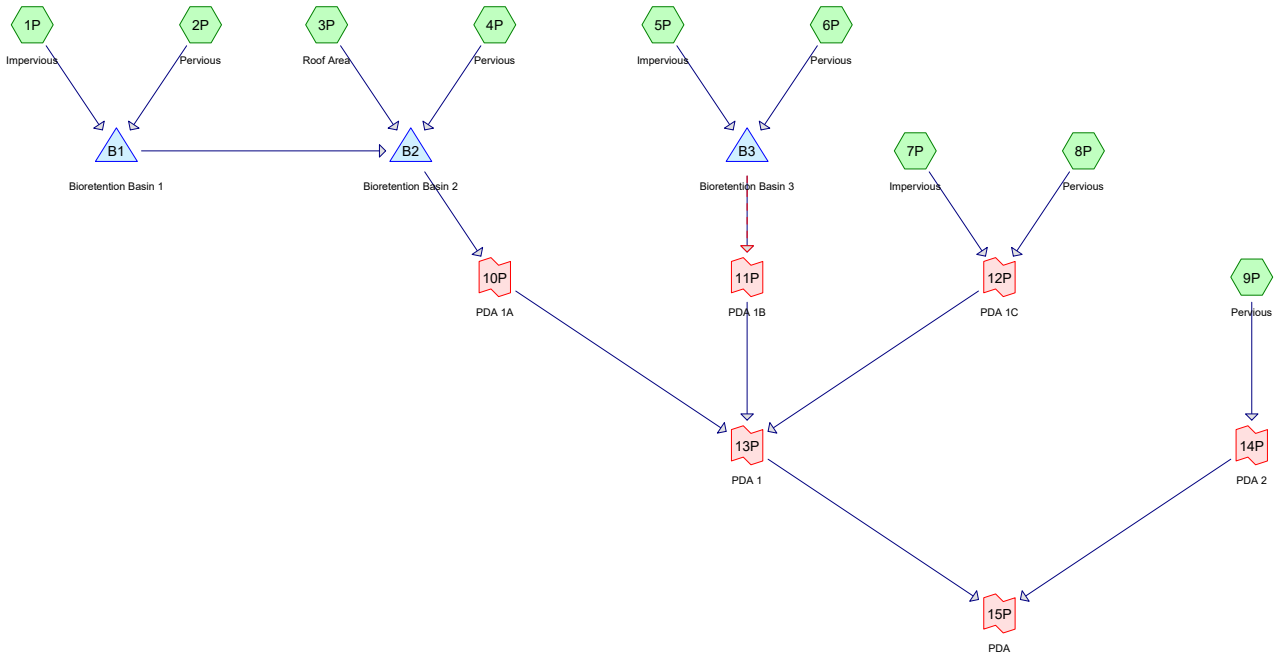
5. Conclusions

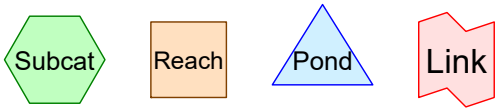
As demonstrated in the above sections, the stormwater management plan for the proposed development meets the *NJDEP Stormwater Management Regulations* of March 2020, and addresses the requirements for stormwater quantity reductions, water quality, groundwater recharge, soil erosion and sediment control, and low impact development. As a result of the design calculations contained herein, Bohler Engineering anticipates that the stormwater design will not have a negative impact to surrounding areas.

A. PRE- vs. POST-DEVELOPMENT HYDROGRAPHS

- **Water Quality Storm Event**
- **2-Year Storm Event**
- **10-Year Storm Event**
- **100-Year Storm Event**







Routing Diagram for Pre vs Post
Prepared by {enter your company name here}, Printed 5/14/2021

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 6602 NJ Burlington-C
Rainfall events imported from "NRCS-Rain.txt" for 6602 NJ Burlington-C

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
216,139	74	>75% Grass cover, Good, HSG C (2E, 2P, 4E, 4P, 6P, 8P, 9P)
40,897	96	Gravel surface, HSG C (2E, 4E, 5P)
41,084	98	Paved parking, HSG C (1E, 1P, 3E, 5P, 7P)
350	98	Unconnected pavement, HSG C (3P)
40,947	98	Unconnected roofs, HSG C (1E, 3E, 3P)
72,991	70	Woods, Good, HSG C (2E, 4E, 6P, 8P, 9P)
7,150	72	Woods/grass comb., Good, HSG C (2E, 2P, 4E)
419,558	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
419,558	HSG C	1E, 1P, 2E, 2P, 3E, 3P, 4E, 4P, 5P, 6P, 7P, 8P, 9P
0	HSG D	
0	Other	
419,558		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	216,139	0	0	216,139	>75% Grass cover, Good	
0	0	40,897	0	0	40,897	Gravel surface	
0	0	41,084	0	0	41,084	Paved parking	
0	0	350	0	0	350	Unconnected pavement	
0	0	40,947	0	0	40,947	Unconnected roofs	
0	0	72,991	0	0	72,991	Woods, Good	
0	0	7,150	0	0	7,150	Woods/grass comb., Good	
0	**0**	**419,558**	**0**	**0**	**419,558**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	0.00	0.00	255.0	0.0050	0.013	15.0	0.0	0.0
2	B1	73.00	72.85	10.0	0.0150	0.013	24.0	0.0	0.0
3	B2	73.00	72.06	47.0	0.0200	0.011	15.0	0.0	0.0
4	B3	77.48	77.00	96.0	0.0050	0.013	15.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Impervious Runoff Area=10,351 sf 100.00% Impervious Runoff Depth=1.03"
Tc=12.4 min CN=0/98 Runoff=0.57 cfs 892 cf

Subcatchment 1P: Impervious Runoff Area=23,576 sf 100.00% Impervious Runoff Depth=1.03"
Tc=10.7 min CN=0/98 Runoff=1.36 cfs 2,033 cf

Subcatchment 2E: Pervious Runoff Area=167,702 sf 0.00% Impervious Runoff Depth=0.10"
Flow Length=630' Tc=12.4 min CN=76/0 Runoff=0.70 cfs 1,415 cf

Subcatchment 2P: Pervious Runoff Area=24,672 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=426' Tc=10.7 min CN=74/0 Runoff=0.07 cfs 152 cf

Subcatchment 3E: Impervious Runoff Area=5,641 sf 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=0/98 Runoff=0.38 cfs 486 cf

Subcatchment 3P: Roof Area Runoff Area=35,418 sf 100.00% Impervious Runoff Depth=1.03"
Tc=10.7 min CN=0/98 Runoff=2.05 cfs 3,054 cf

Subcatchment 4E: Pervious Runoff Area=26,085 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=393' Tc=6.0 min CN=87/0 Runoff=0.66 cfs 804 cf

Subcatchment 4P: Pervious Runoff Area=13,613 sf 0.00% Impervious Runoff Depth=0.07"
Tc=10.7 min CN=74/0 Runoff=0.04 cfs 84 cf

Subcatchment 5P: Impervious Runoff Area=5,021 sf 97.63% Impervious Runoff Depth=1.03"
Tc=20.8 min CN=96/98 Runoff=0.21 cfs 431 cf

Subcatchment 6P: Pervious Runoff Area=6,701 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=172' Tc=20.8 min CN=73/0 Runoff=0.01 cfs 35 cf

Subcatchment 7P: Impervious Runoff Area=2,493 sf 100.00% Impervious Runoff Depth=1.03"
Tc=13.9 min CN=0/98 Runoff=0.13 cfs 215 cf

Subcatchment 8P: Pervious Runoff Area=61,889 sf 0.00% Impervious Runoff Depth=0.05"
Flow Length=409' Tc=13.9 min CN=72/0 Runoff=0.10 cfs 264 cf

Subcatchment 9P: Pervious Runoff Area=36,396 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=471' Tc=12.2 min CN=73/0 Runoff=0.08 cfs 188 cf

Pond B1: Bioretention Basin 1 Peak Elev=77.51' Storage=2,184 cf Inflow=1.39 cfs 2,184 cf
Outflow=0.00 cfs 0 cf

Pond B2: Bioretention Basin 2 Peak Elev=76.94' Storage=3,137 cf Inflow=2.06 cfs 3,137 cf
Outflow=0.00 cfs 0 cf

Pond B3: Bioretention Basin 3 Peak Elev=80.73' Storage=466 cf Inflow=0.22 cfs 466 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Link 5E: EDA 1	Inflow=1.15 cfs 2,308 cf Primary=1.15 cfs 2,308 cf
Link 6E: EDA 2	Inflow=1.03 cfs 1,291 cf Primary=1.03 cfs 1,291 cf
Link 7E: EDA	Inflow=1.82 cfs 3,598 cf Primary=1.82 cfs 3,598 cf
Link 10P: PDA 1A	Inflow=0.00 cfs 0 cf Primary=0.00 cfs 0 cf
Link 11P: PDA 1B	Inflow=0.00 cfs 0 cf Primary=0.00 cfs 0 cf
Link 12P: PDA 1C	Inflow=0.19 cfs 479 cf Primary=0.19 cfs 479 cf
Link 13P: PDA 1	Inflow=0.19 cfs 479 cf Primary=0.19 cfs 479 cf
Link 14P: PDA 2	Inflow=0.08 cfs 188 cf Primary=0.08 cfs 188 cf
Link 15P: PDA	Inflow=0.27 cfs 666 cf Primary=0.27 cfs 666 cf

Total Runoff Area = 419,558 sf Runoff Volume = 10,052 cf Average Runoff Depth = 0.29"
80.36% Pervious = 337,177 sf 19.64% Impervious = 82,381 sf

Summary for Subcatchment 1E: Impervious

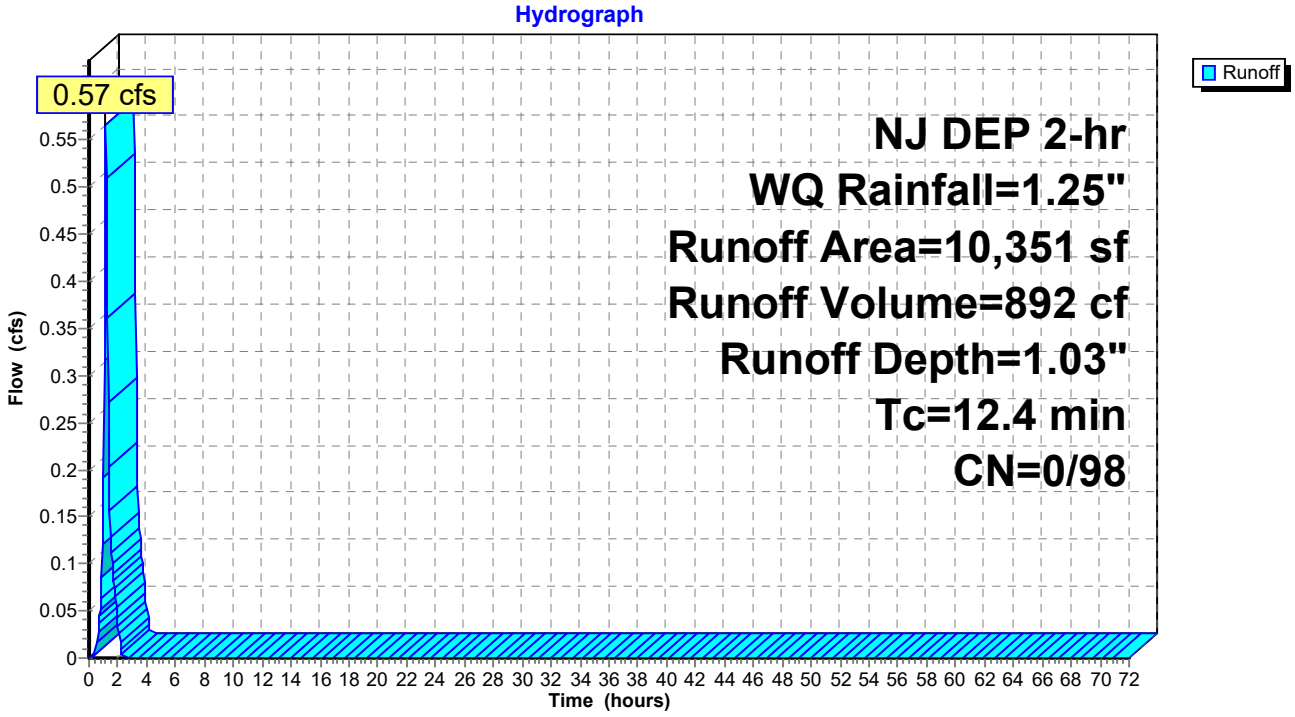
Runoff = 0.57 cfs @ 1.17 hrs, Volume= 892 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
3,299	98	Unconnected roofs, HSG C
7,052	98	Paved parking, HSG C
10,351	98	Weighted Average
10,351	98	100.00% Impervious Area

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

Subcatchment 1E: Impervious



Summary for Subcatchment 1P: Impervious

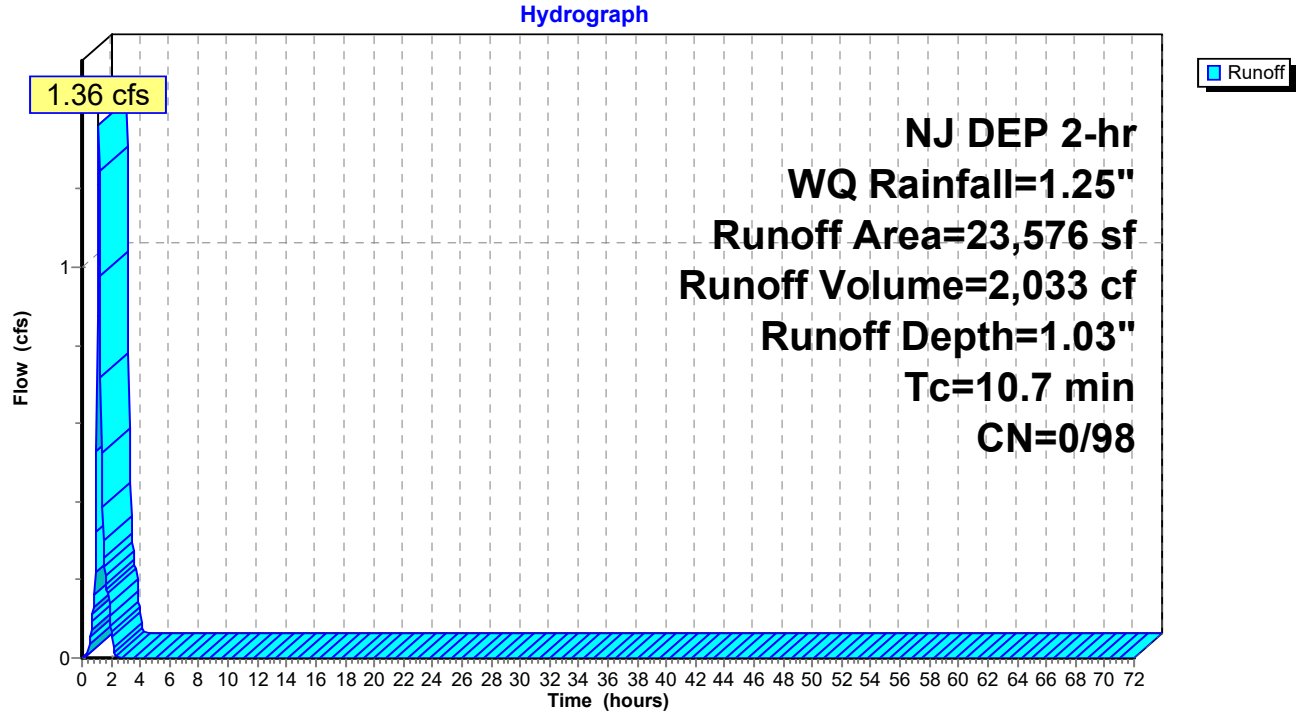
Runoff = 1.36 cfs @ 1.15 hrs, Volume= 2,033 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
23,576	98	Paved parking, HSG C
23,576	98	100.00% Impervious Area

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

Subcatchment 1P: Impervious



Summary for Subcatchment 2E: Pervious

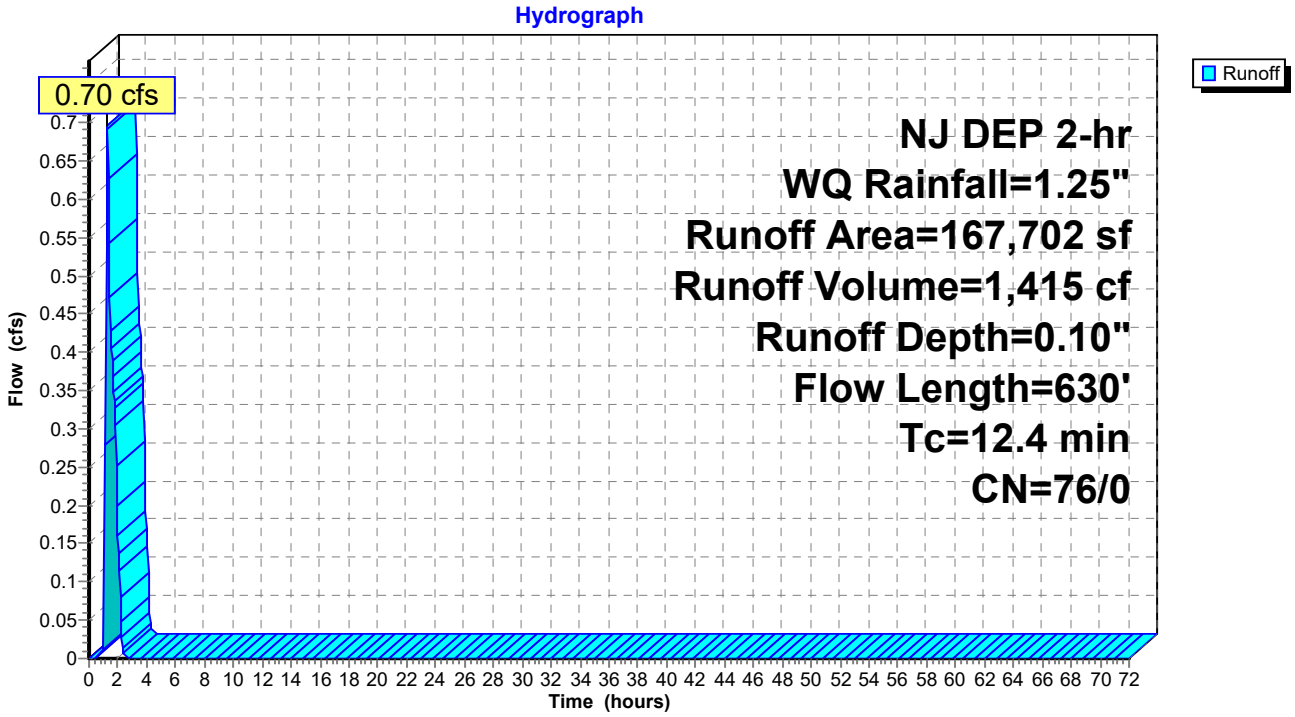
Runoff = 0.70 cfs @ 1.28 hrs, Volume= 1,415 cf, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
24,589	96	Gravel surface, HSG C
36,591	70	Woods, Good, HSG C
105,816	74	>75% Grass cover, Good, HSG C
706	72	Woods/grass comb., Good, HSG C
167,702	76	Weighted Average
167,702	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	27	0.0490	1.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
8.8	73	0.0130	0.14		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.4	54	0.0180	2.16		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
1.2	207	0.0340	2.97		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.5	59	0.0170	2.10		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
0.2	43	0.0470	3.49		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
1.0	167	0.0280	2.69		**Shallow Concentrated Flow, G-H** Unpaved Kv= 16.1 fps
12.4	630	Total			

Subcatchment 2E: Pervious



Summary for Subcatchment 2P: Pervious

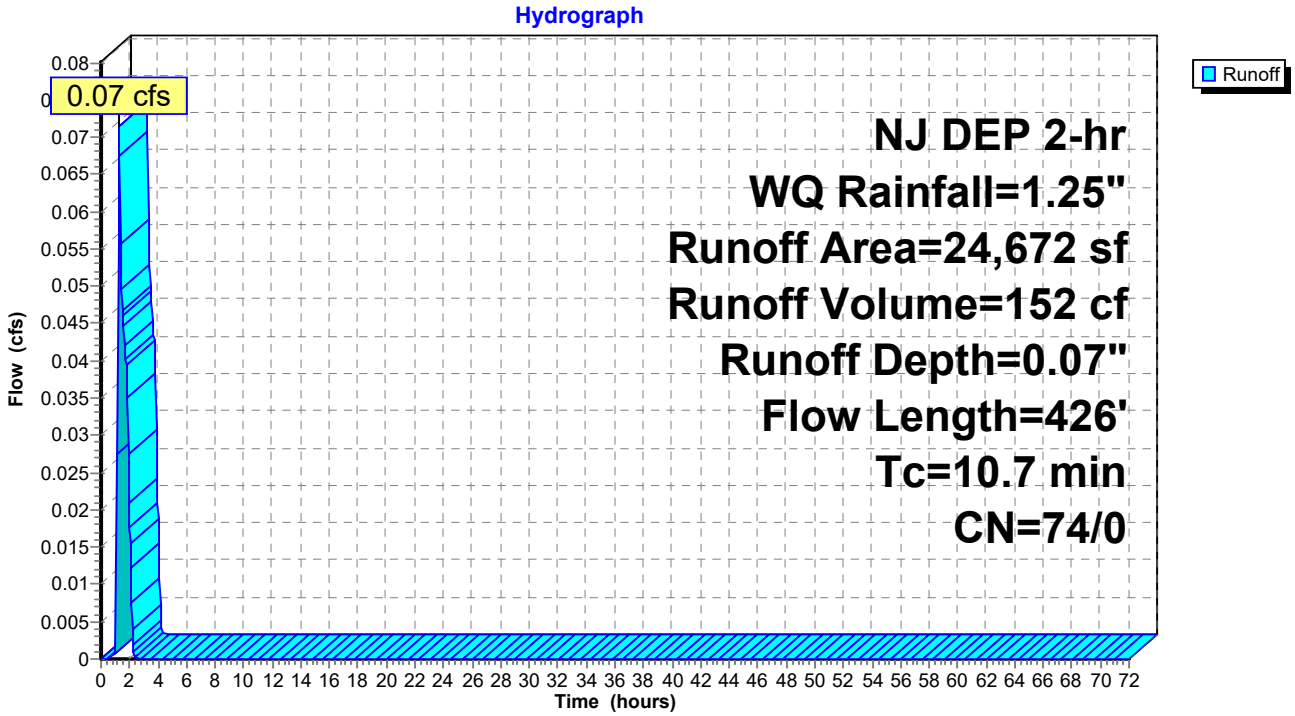
Runoff = 0.07 cfs @ 1.28 hrs, Volume= 152 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
22,852	74	>75% Grass cover, Good, HSG C
1,820	72	Woods/grass comb., Good, HSG C
24,672	74	Weighted Average
24,672	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0222	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.1	23	0.0730	4.35		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.3	48	0.0210	2.94		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
1.1	255	0.0050	3.72	4.57	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
10.7	426	Total			

Subcatchment 2P: Pervious



Summary for Subcatchment 3E: Impervious

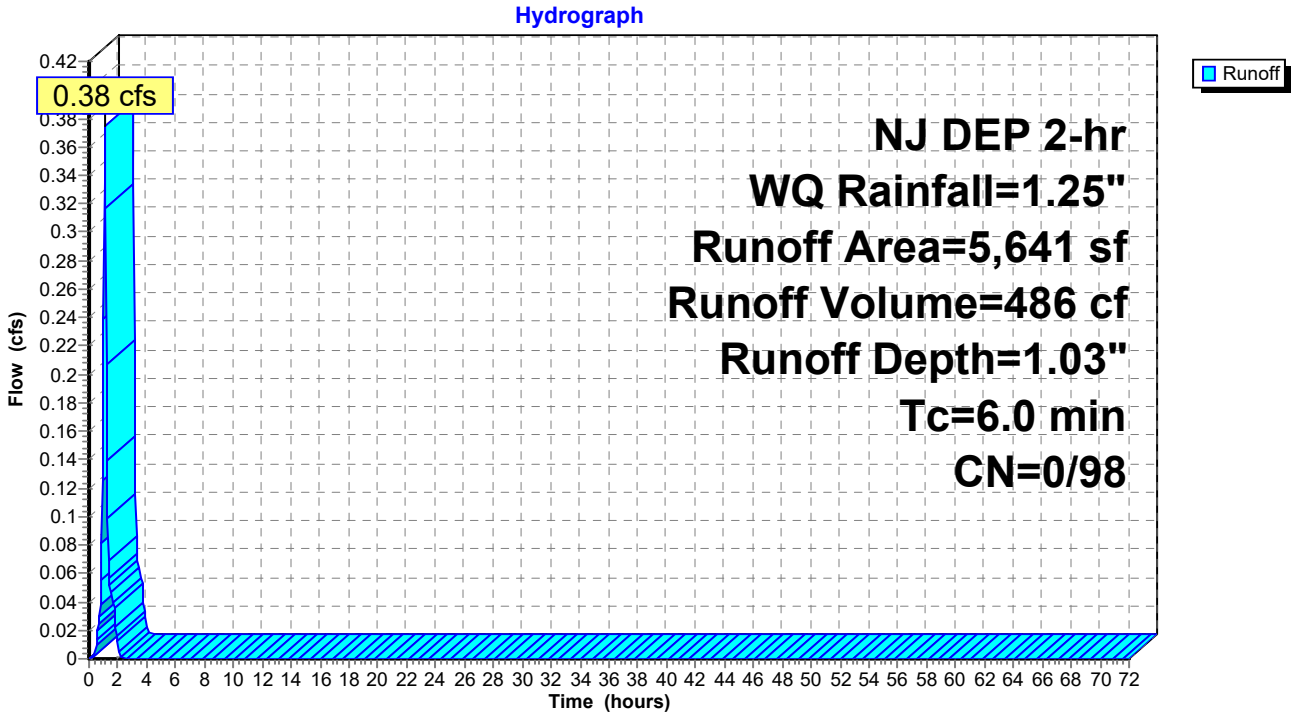
Runoff = 0.38 cfs @ 1.09 hrs, Volume= 486 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
2,580	98	Unconnected roofs, HSG C
3,061	98	Paved parking, HSG C
5,641	98	Weighted Average
5,641	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Tc**
3.0	0	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3E: Impervious



Summary for Subcatchment 3P: Roof Area

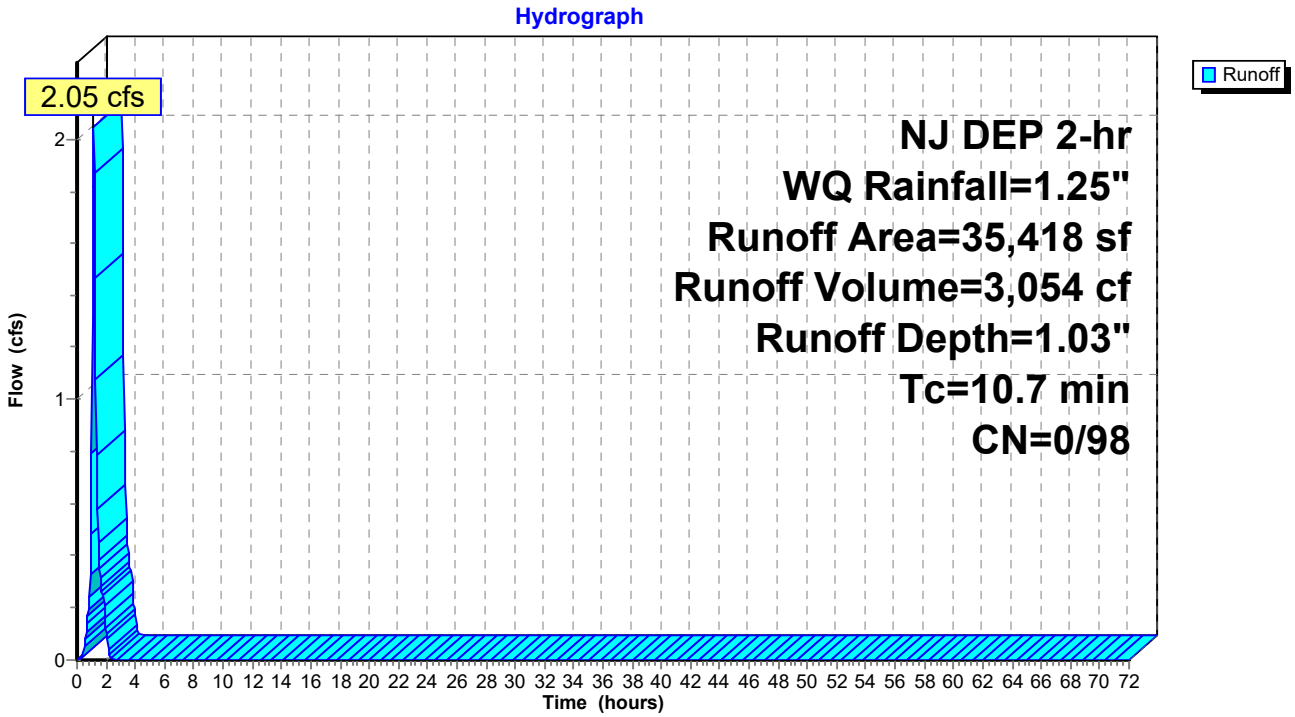
Runoff = 2.05 cfs @ 1.15 hrs, Volume= 3,054 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
35,068	98	Unconnected roofs, HSG C
350	98	Unconnected pavement, HSG C
35,418	98	Weighted Average
35,418	98	100.00% Impervious Area

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

Subcatchment 3P: Roof Area



Summary for Subcatchment 4E: Pervious

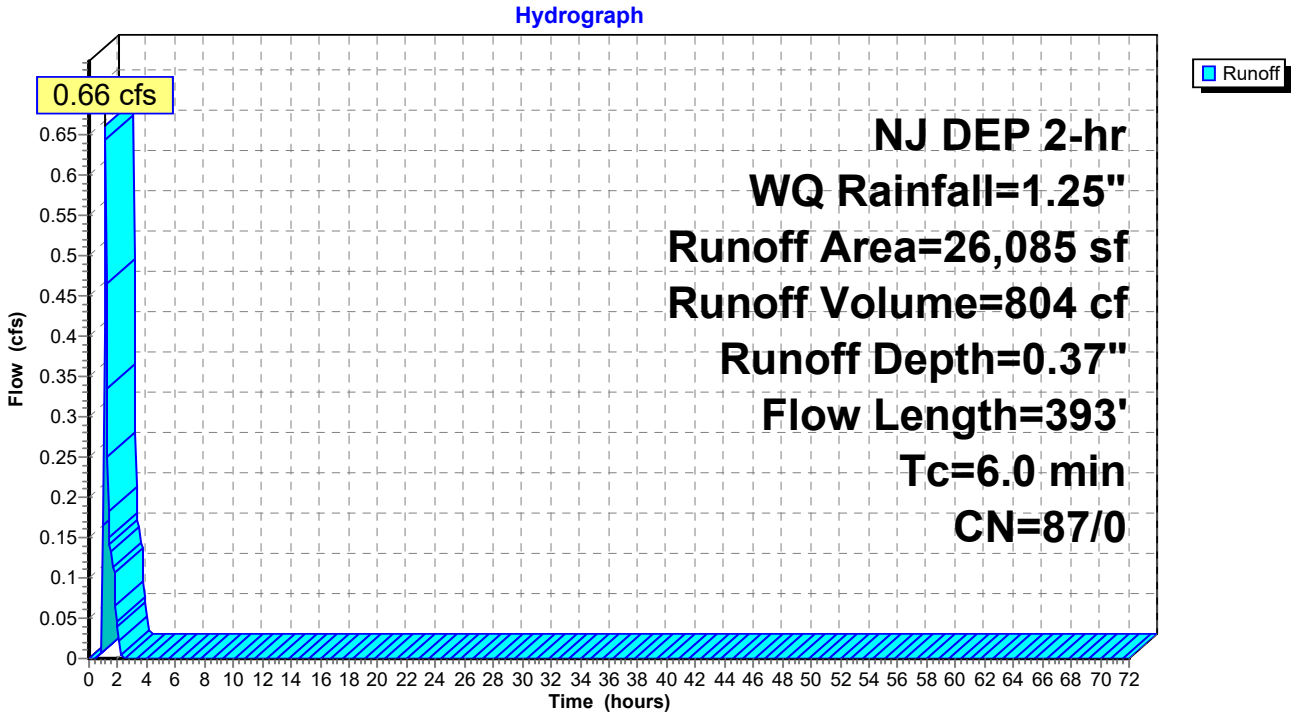
Runoff = 0.66 cfs @ 1.13 hrs, Volume= 804 cf, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
164	70	Woods, Good, HSG C
16,189	96	Gravel surface, HSG C
5,108	74	>75% Grass cover, Good, HSG C
4,624	72	Woods/grass comb., Good, HSG C
26,085	87	Weighted Average
26,085	87	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0160	1.29		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
0.6	97	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.0	175	0.0330	2.92		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	13	0.0230	2.44		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.0	8	0.0480	3.53		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
3.0	393	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4E: Pervious



Summary for Subcatchment 4P: Pervious

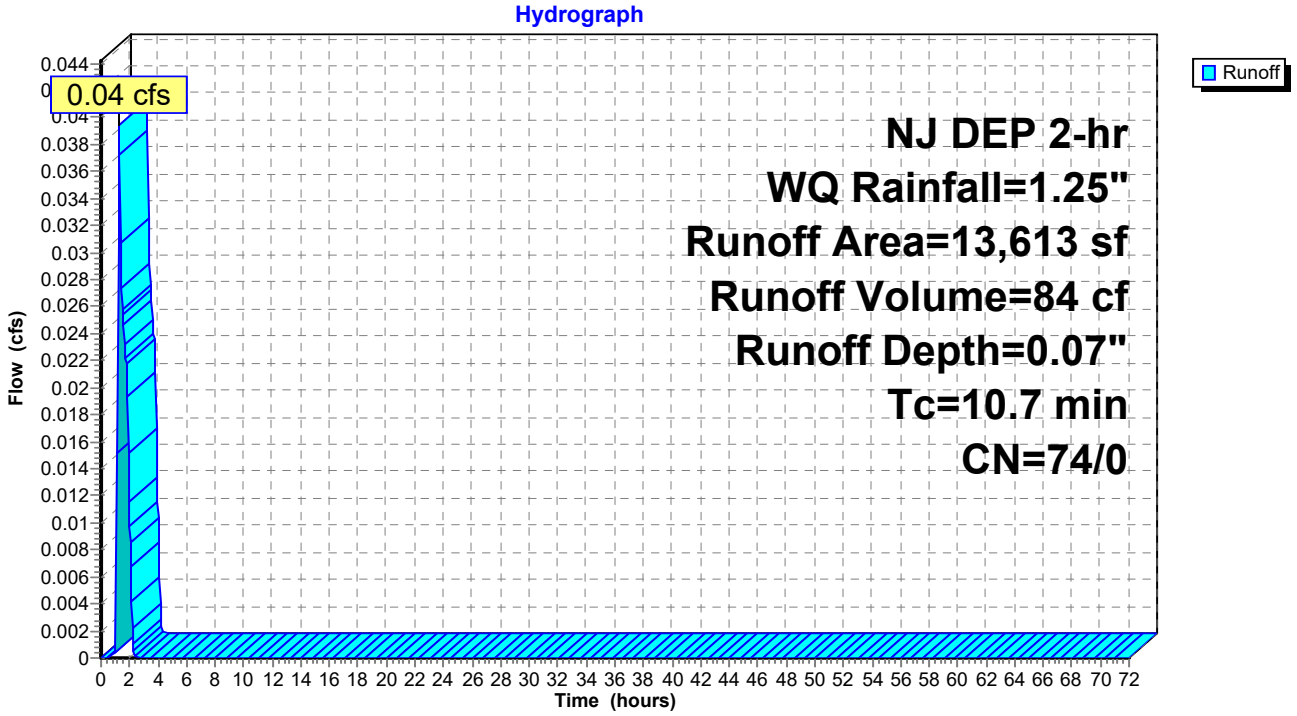
Runoff = 0.04 cfs @ 1.28 hrs, Volume= 84 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
13,613	74	>75% Grass cover, Good, HSG C
13,613	74	100.00% Pervious Area

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

Subcatchment 4P: Pervious



Summary for Subcatchment 5P: Impervious

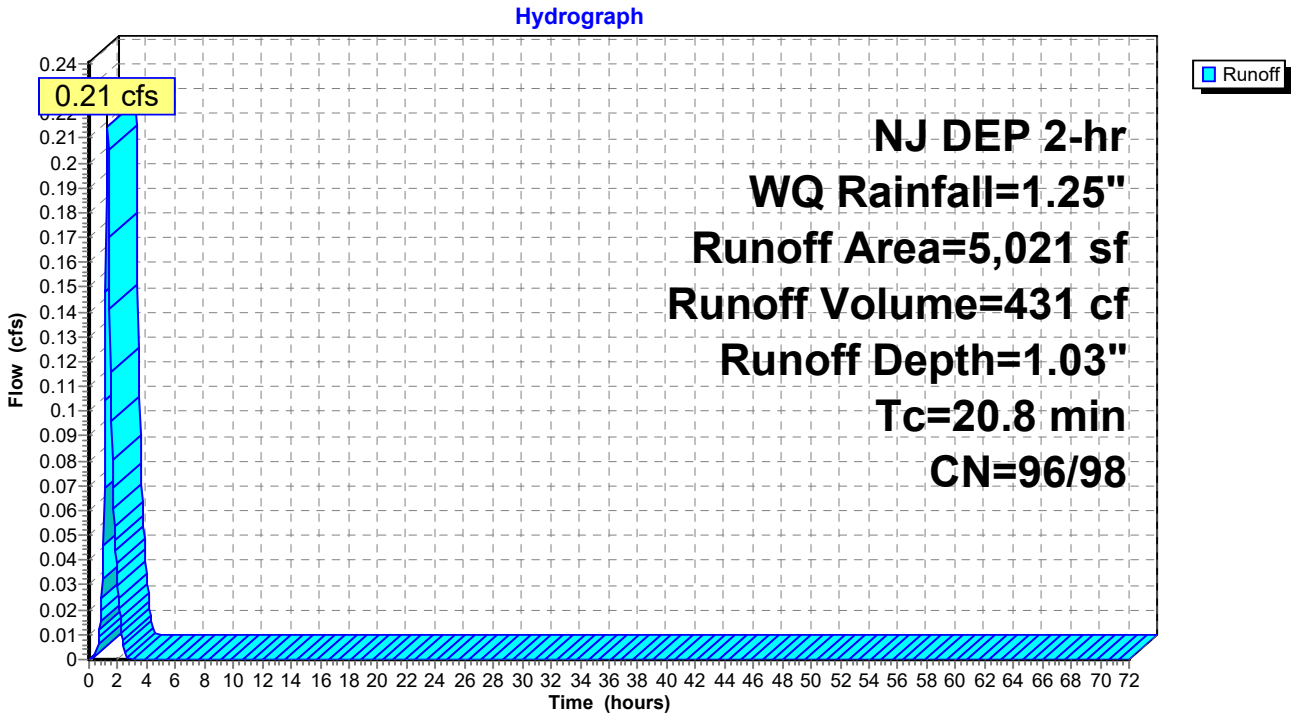
Runoff = 0.21 cfs @ 1.28 hrs, Volume= 431 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
4,902	98	Paved parking, HSG C
119	96	Gravel surface, HSG C
5,021	98	Weighted Average
119	96	2.37% Pervious Area
4,902	98	97.63% Impervious Area

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

Subcatchment 5P: Impervious



Summary for Subcatchment 6P: Pervious

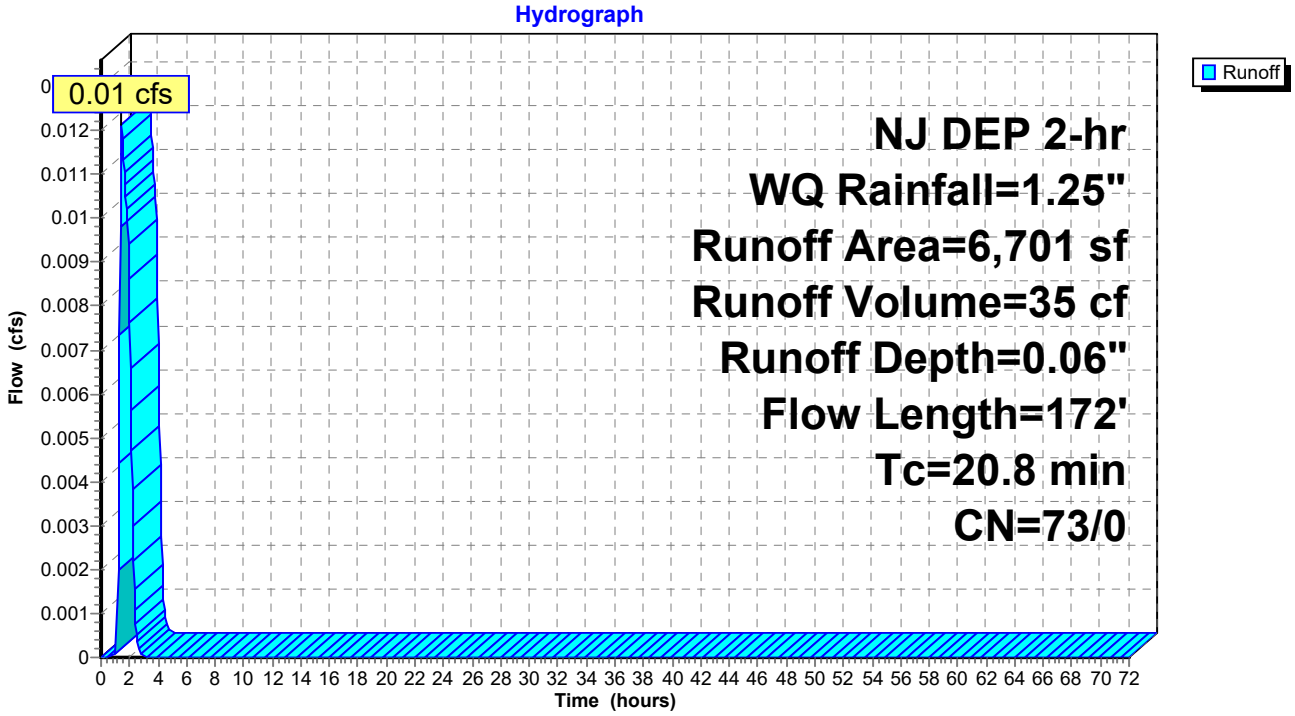
Runoff = 0.01 cfs @ 1.47 hrs, Volume= 35 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
4,509	74	>75% Grass cover, Good, HSG C
2,192	70	Woods, Good, HSG C
6,701	73	Weighted Average
6,701	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	104	0.0230	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	57	0.0230	3.08		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	11	0.0200	2.28		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
20.8	172	Total			

Subcatchment 6P: Pervious



Summary for Subcatchment 7P: Impervious

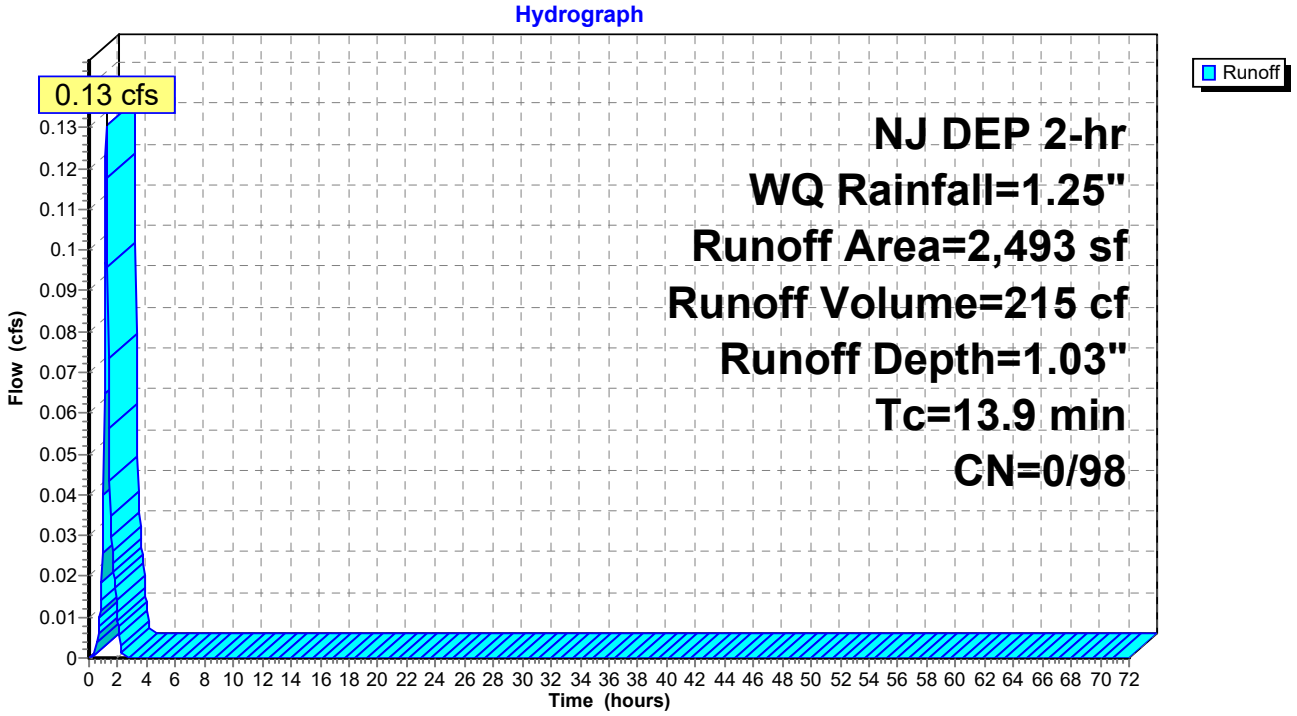
Runoff = 0.13 cfs @ 1.19 hrs, Volume= 215 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
2,493	98	Paved parking, HSG C
2,493	98	100.00% Impervious Area

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

Subcatchment 7P: Impervious



Summary for Subcatchment 8P: Pervious

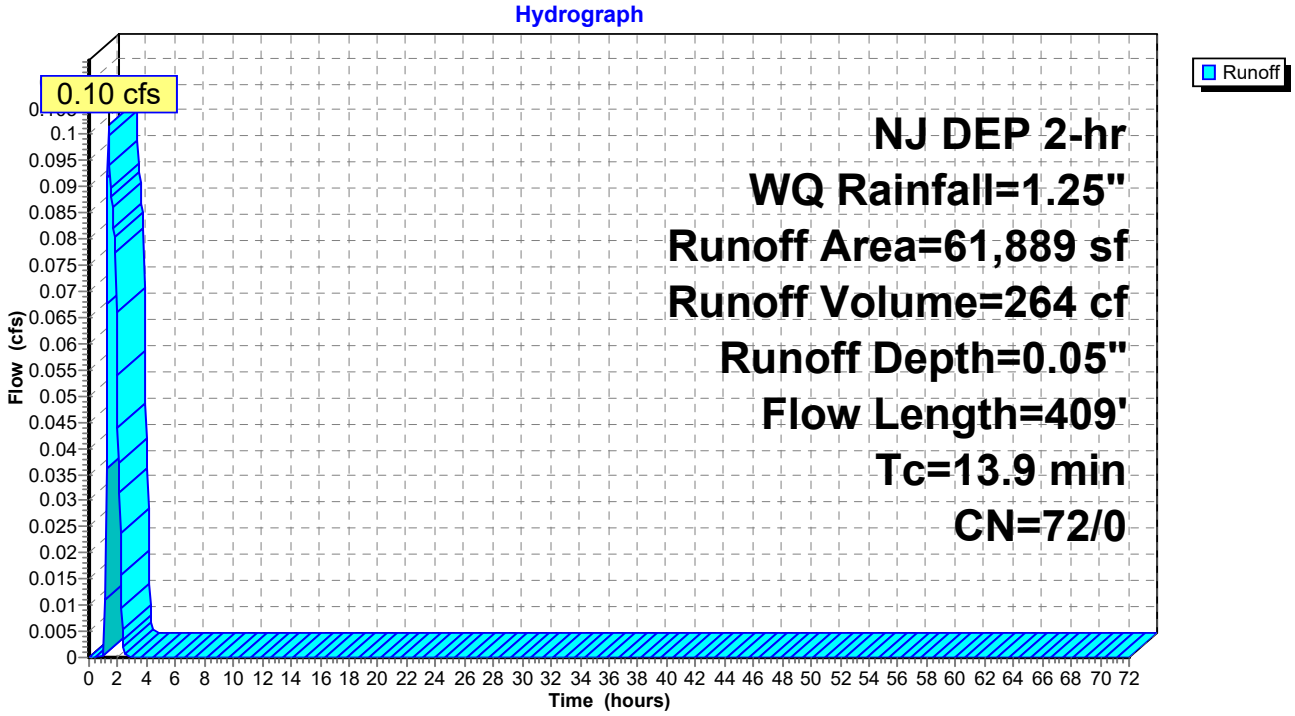
Runoff = 0.10 cfs @ 1.37 hrs, Volume= 264 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
28,675	70	Woods, Good, HSG C
33,214	74	>75% Grass cover, Good, HSG C
61,889	72	Weighted Average
61,889	72	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	36	0.0560	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
4.3	51	0.0390	0.20		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.5	297	0.0230	0.76		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
13.9	409	Total			

Subcatchment 8P: Pervious



Summary for Subcatchment 9P: Pervious

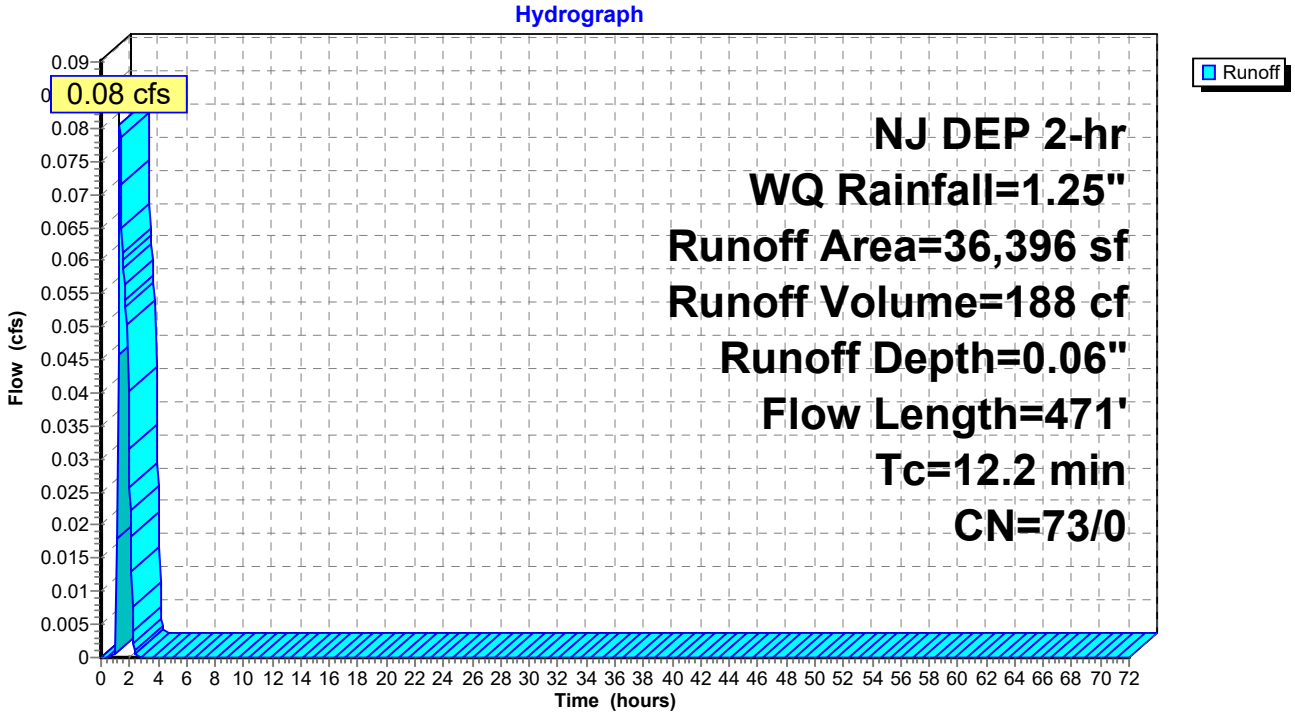
Runoff = 0.08 cfs @ 1.32 hrs, Volume= 188 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (sf)	CN	Description
5,369	70	Woods, Good, HSG C
31,027	74	>75% Grass cover, Good, HSG C
36,396	73	Weighted Average
36,396	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0190	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.7	102	0.0240	2.49		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.8	128	0.0310	2.83		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.8	120	0.0250	2.55		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.1	21	0.0310	2.83		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
12.2	471	Total			

Subcatchment 9P: Pervious



Summary for Pond B1: Bioretention Basin 1

[92] Warning: Device #2 is above defined storage

Inflow Area = 48,248 sf, 48.86% Impervious, Inflow Depth = 0.54" for WQ event
Inflow = 1.39 cfs @ 1.16 hrs, Volume= 2,184 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 77.51' @ 2.65 hrs Surf.Area= 2,466 sf Storage= 2,184 cf

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

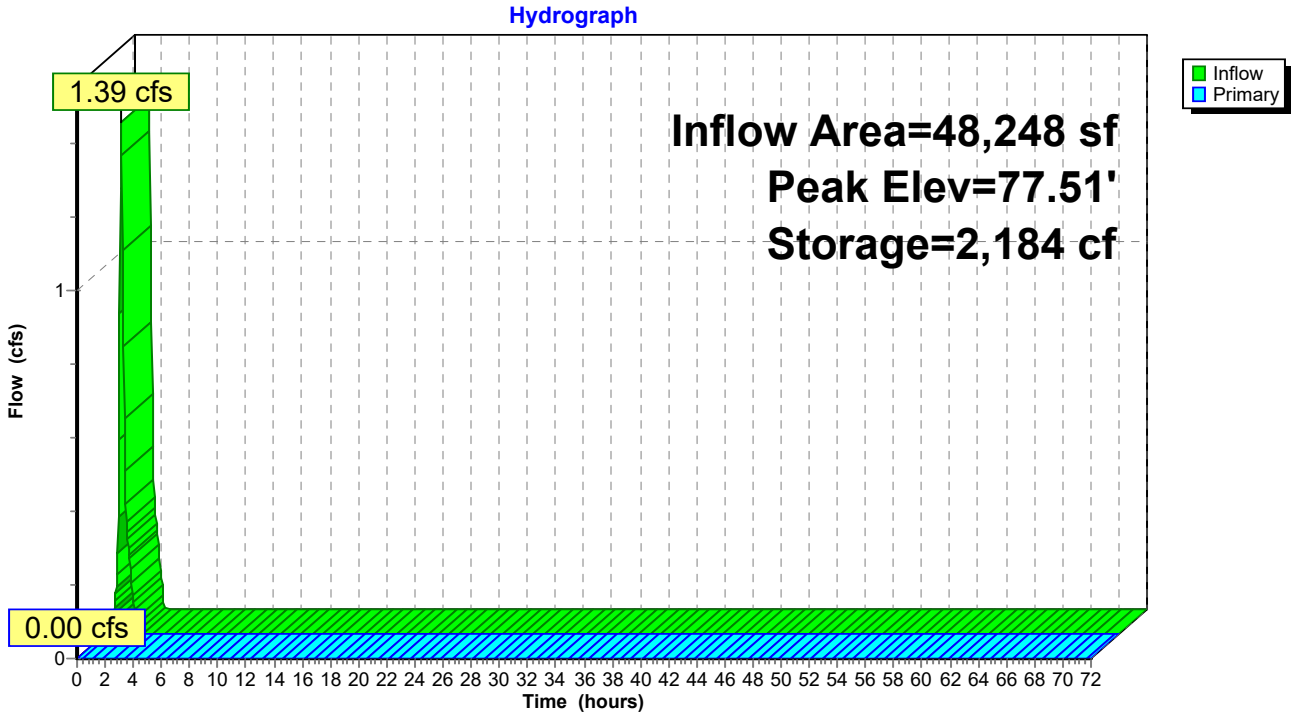
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	4,938 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.50	1,883	0	0	1,883
77.50	2,461	2,166	2,166	2,484
78.50	3,096	2,772	4,938	3,146

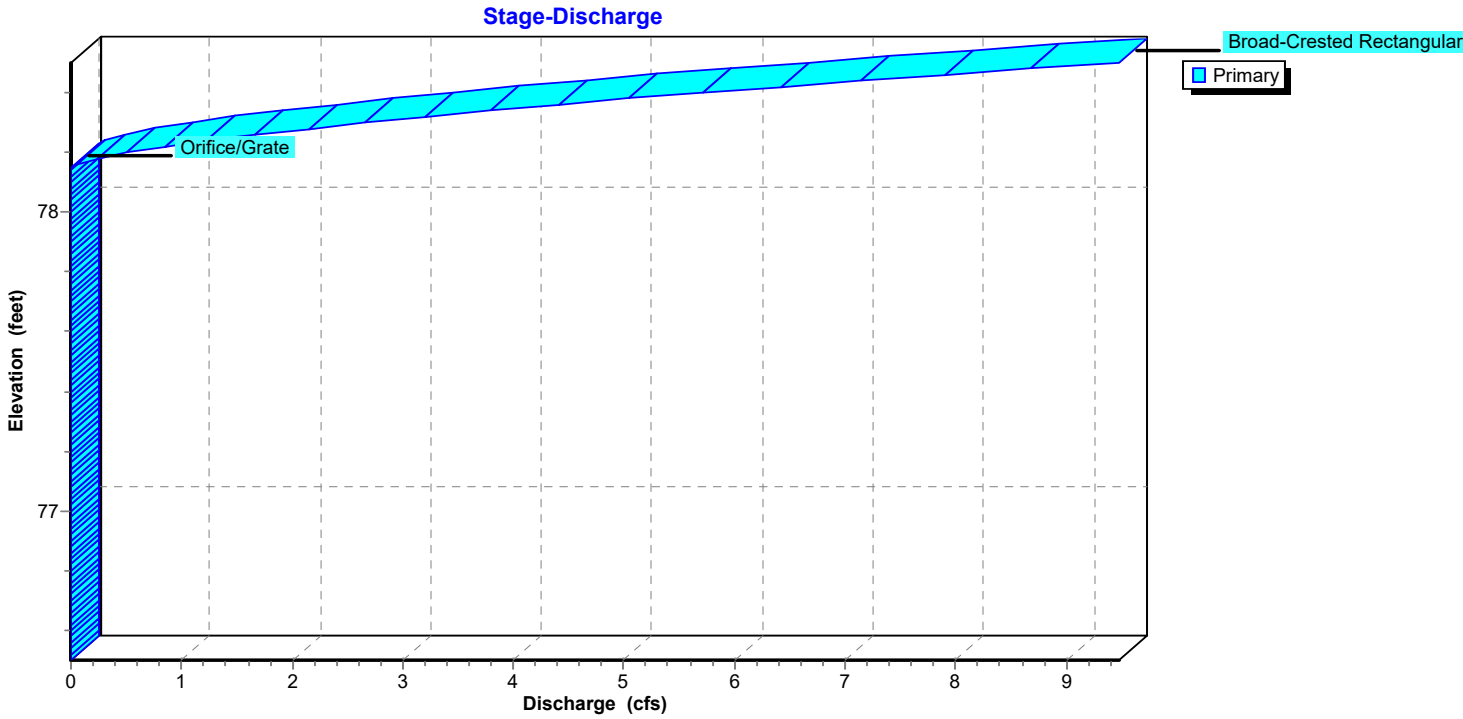
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**24.0" Round CMP_Round 24"** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.85' S= 0.0150 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	78.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	78.15'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.50' (Free Discharge)
└**1=CMP_Round 24"** (Passes 0.00 cfs of 18.88 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

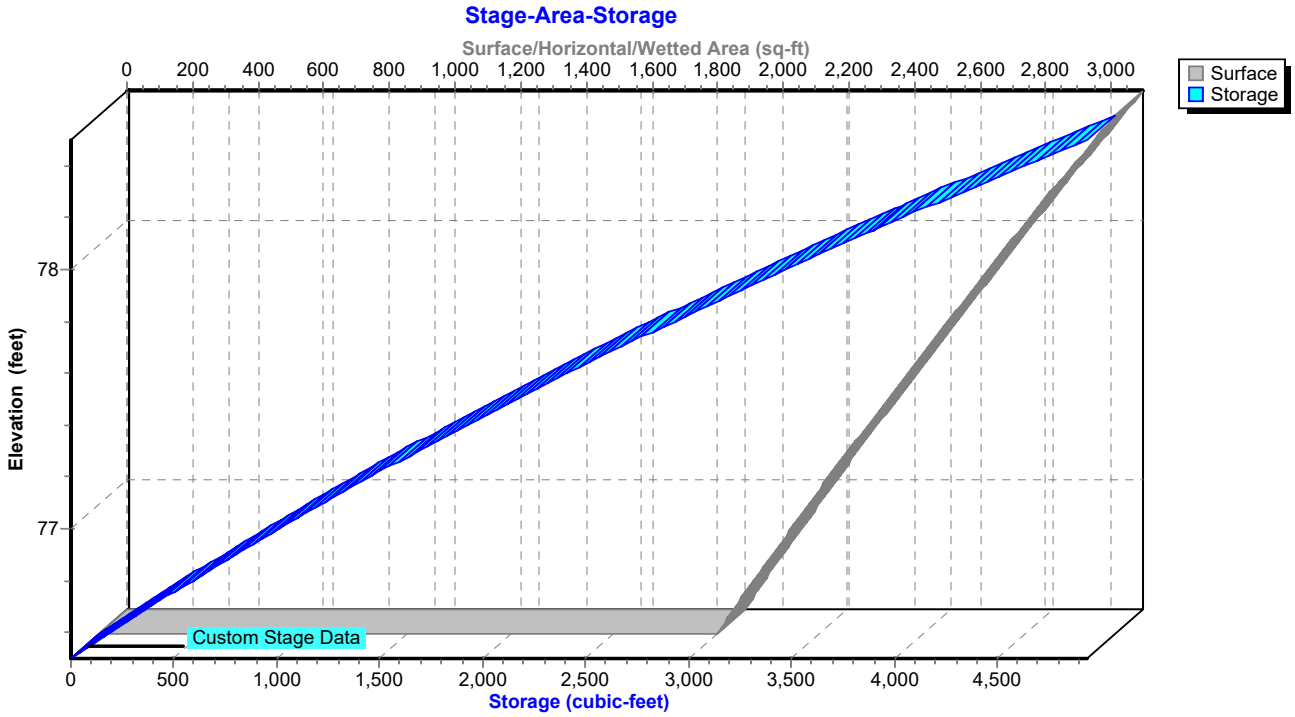
Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Stage-Discharge for Pond B1: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.03	0.00	77.56	0.00	78.09	0.00
76.51	0.00	77.04	0.00	77.57	0.00	78.10	0.00
76.52	0.00	77.05	0.00	77.58	0.00	78.11	0.00
76.53	0.00	77.06	0.00	77.59	0.00	78.12	0.00
76.54	0.00	77.07	0.00	77.60	0.00	78.13	0.00
76.55	0.00	77.08	0.00	77.61	0.00	78.14	0.00
76.56	0.00	77.09	0.00	77.62	0.00	78.15	0.00
76.57	0.00	77.10	0.00	77.63	0.00	78.16	0.05
76.58	0.00	77.11	0.00	77.64	0.00	78.17	0.13
76.59	0.00	77.12	0.00	77.65	0.00	78.18	0.24
76.60	0.00	77.13	0.00	77.66	0.00	78.19	0.37
76.61	0.00	77.14	0.00	77.67	0.00	78.20	0.51
76.62	0.00	77.15	0.00	77.68	0.00	78.21	0.67
76.63	0.00	77.16	0.00	77.69	0.00	78.22	0.85
76.64	0.00	77.17	0.00	77.70	0.00	78.23	1.04
76.65	0.00	77.18	0.00	77.71	0.00	78.24	1.24
76.66	0.00	77.19	0.00	77.72	0.00	78.25	1.45
76.67	0.00	77.20	0.00	77.73	0.00	78.26	1.67
76.68	0.00	77.21	0.00	77.74	0.00	78.27	1.90
76.69	0.00	77.22	0.00	77.75	0.00	78.28	2.15
76.70	0.00	77.23	0.00	77.76	0.00	78.29	2.40
76.71	0.00	77.24	0.00	77.77	0.00	78.30	2.66
76.72	0.00	77.25	0.00	77.78	0.00	78.31	2.93
76.73	0.00	77.26	0.00	77.79	0.00	78.32	3.21
76.74	0.00	77.27	0.00	77.80	0.00	78.33	3.50
76.75	0.00	77.28	0.00	77.81	0.00	78.34	3.79
76.76	0.00	77.29	0.00	77.82	0.00	78.35	4.09
76.77	0.00	77.30	0.00	77.83	0.00	78.36	4.41
76.78	0.00	77.31	0.00	77.84	0.00	78.37	4.72
76.79	0.00	77.32	0.00	77.85	0.00	78.38	5.05
76.80	0.00	77.33	0.00	77.86	0.00	78.39	5.38
76.81	0.00	77.34	0.00	77.87	0.00	78.40	5.72
76.82	0.00	77.35	0.00	77.88	0.00	78.41	6.07
76.83	0.00	77.36	0.00	77.89	0.00	78.42	6.42
76.84	0.00	77.37	0.00	77.90	0.00	78.43	6.78
76.85	0.00	77.38	0.00	77.91	0.00	78.44	7.15
76.86	0.00	77.39	0.00	77.92	0.00	78.45	7.52
76.87	0.00	77.40	0.00	77.93	0.00	78.46	7.90
76.88	0.00	77.41	0.00	77.94	0.00	78.47	8.29
76.89	0.00	77.42	0.00	77.95	0.00	78.48	8.68
76.90	0.00	77.43	0.00	77.96	0.00	78.49	9.08
76.91	0.00	77.44	0.00	77.97	0.00	78.50	**9.48**
76.92	0.00	77.45	0.00	77.98	0.00		
76.93	0.00	77.46	0.00	77.99	0.00		
76.94	0.00	77.47	0.00	78.00	0.00		
76.95	0.00	77.48	0.00	78.01	0.00		
76.96	0.00	77.49	0.00	78.02	0.00		
76.97	0.00	77.50	0.00	78.03	0.00		
76.98	0.00	77.51	0.00	78.04	0.00		
76.99	0.00	77.52	0.00	78.05	0.00		
77.00	0.00	77.53	0.00	78.06	0.00		
77.01	0.00	77.54	0.00	78.07	0.00		
77.02	0.00	77.55	0.00	78.08	0.00		

Stage-Area-Storage for Pond B1: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	1,883	0
76.52	1,894	38
76.54	1,905	76
76.56	1,916	114
76.58	1,926	152
76.60	1,937	191
76.62	1,948	230
76.64	1,959	269
76.66	1,970	308
76.68	1,981	348
76.70	1,992	387
76.72	2,004	427
76.74	2,015	468
76.76	2,026	508
76.78	2,037	549
76.80	2,048	590
76.82	2,060	631
76.84	2,071	672
76.86	2,082	713
76.88	2,094	755
76.90	2,105	797
76.92	2,116	839
76.94	2,128	882
76.96	2,139	924
76.98	2,151	967
77.00	2,162	1,011
77.02	2,174	1,054
77.04	2,186	1,097
77.06	2,197	1,141
77.08	2,209	1,185
77.10	2,221	1,230
77.12	2,232	1,274
77.14	2,244	1,319
77.16	2,256	1,364
77.18	2,268	1,409
77.20	2,279	1,455
77.22	2,291	1,500
77.24	2,303	1,546
77.26	2,315	1,593
77.28	2,327	1,639
77.30	2,339	1,686
77.32	2,351	1,732
77.34	2,363	1,780
77.36	2,375	1,827
77.38	2,388	1,875
77.40	2,400	1,923
77.42	2,412	1,971
77.44	2,424	2,019
77.46	2,436	2,068
77.48	2,449	2,116
77.50	2,461	2,166
77.52	2,473	2,215
77.54	2,485	2,264
77.56	2,497	2,314
77.58	2,509	2,364
77.60	2,521	2,415
77.62	2,533	2,465
77.64	2,546	2,516
77.66	2,558	2,567
77.68	2,570	2,618
77.70	2,582	2,670
77.72	2,594	2,722
77.74	2,607	2,774
77.76	2,619	2,826
77.78	2,631	2,878
77.80	2,644	2,931
77.82	2,656	2,984
77.84	2,669	3,037
77.86	2,681	3,091
77.88	2,694	3,145
77.90	2,706	3,199
77.92	2,719	3,253
77.94	2,731	3,307
77.96	2,744	3,362
77.98	2,757	3,417
78.00	2,769	3,472
78.02	2,782	3,528
78.04	2,795	3,584
78.06	2,808	3,640
78.08	2,820	3,696
78.10	2,833	3,753
78.12	2,846	3,809
78.14	2,859	3,866
78.16	2,872	3,924
78.18	2,885	3,981
78.20	2,898	4,039
78.22	2,911	4,097
78.24	2,924	4,156
78.26	2,937	4,214
78.28	2,950	4,273
78.30	2,963	4,332
78.32	2,976	4,392
78.34	2,990	4,451
78.36	3,003	4,511
78.38	3,016	4,571
78.40	3,029	4,632
78.42	3,043	4,692
78.44	3,056	4,753
78.46	3,069	4,815
78.48	3,083	4,876
78.50	**3,096**	**4,938**

Summary for Pond B2: Bioretention Basin 2

[79] Warning: Submerged Pond B1 Primary device # 1 INLET by 3.94'

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 0.39" for WQ event
Inflow = 2.06 cfs @ 1.16 hrs, Volume= 3,137 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 76.94' @ 2.65 hrs Surf.Area= 7,437 sf Storage= 3,137 cf

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

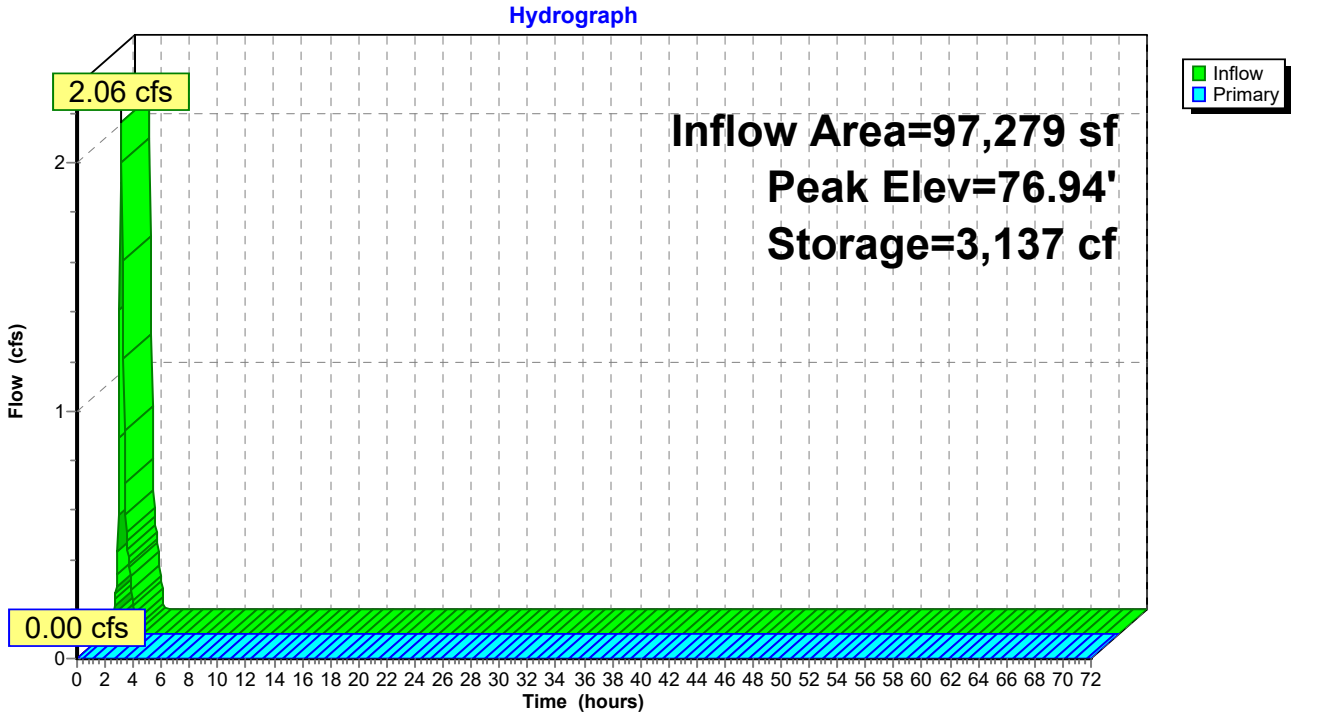
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	26,647 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	6,877	0	0
77.50	8,155	7,516	7,516
78.50	9,522	8,839	16,355
79.50	11,063	10,293	26,647

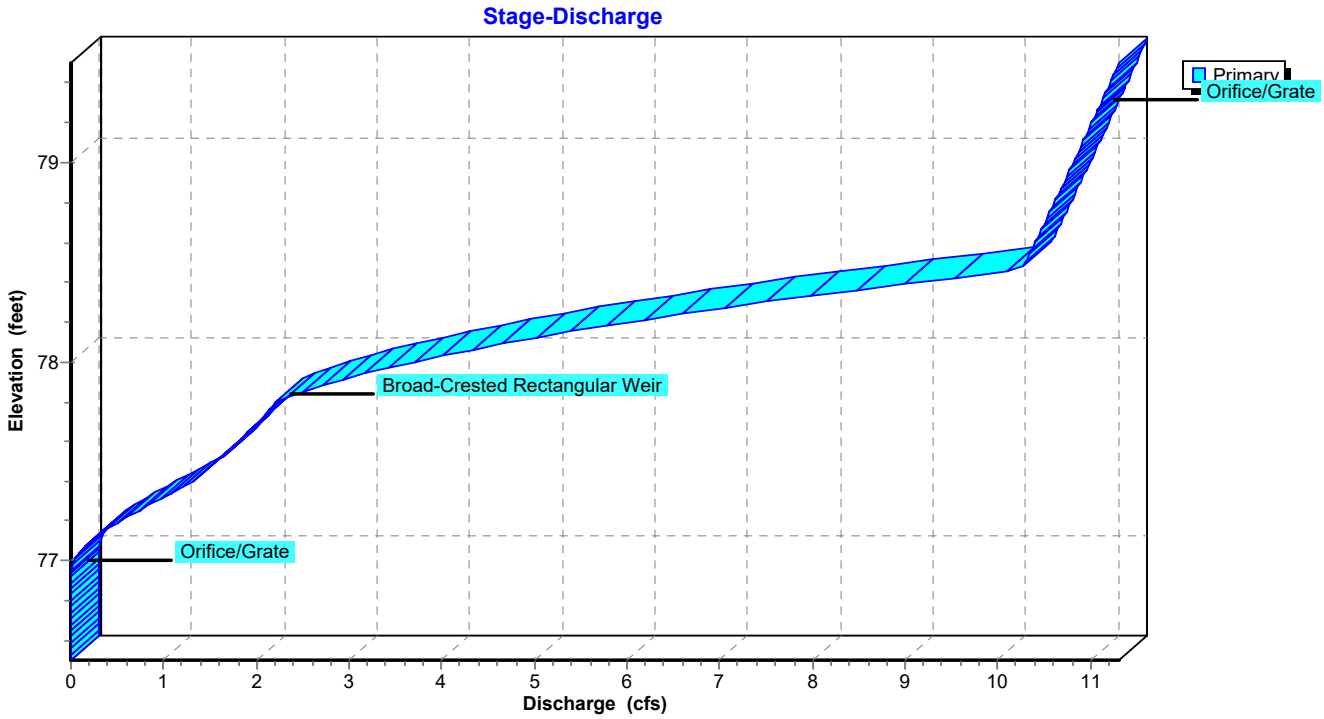
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.06' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	76.94'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	77.78'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	79.25'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.50' (Free Discharge)
└**1=Culvert** (Passes 0.00 cfs of 7.91 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

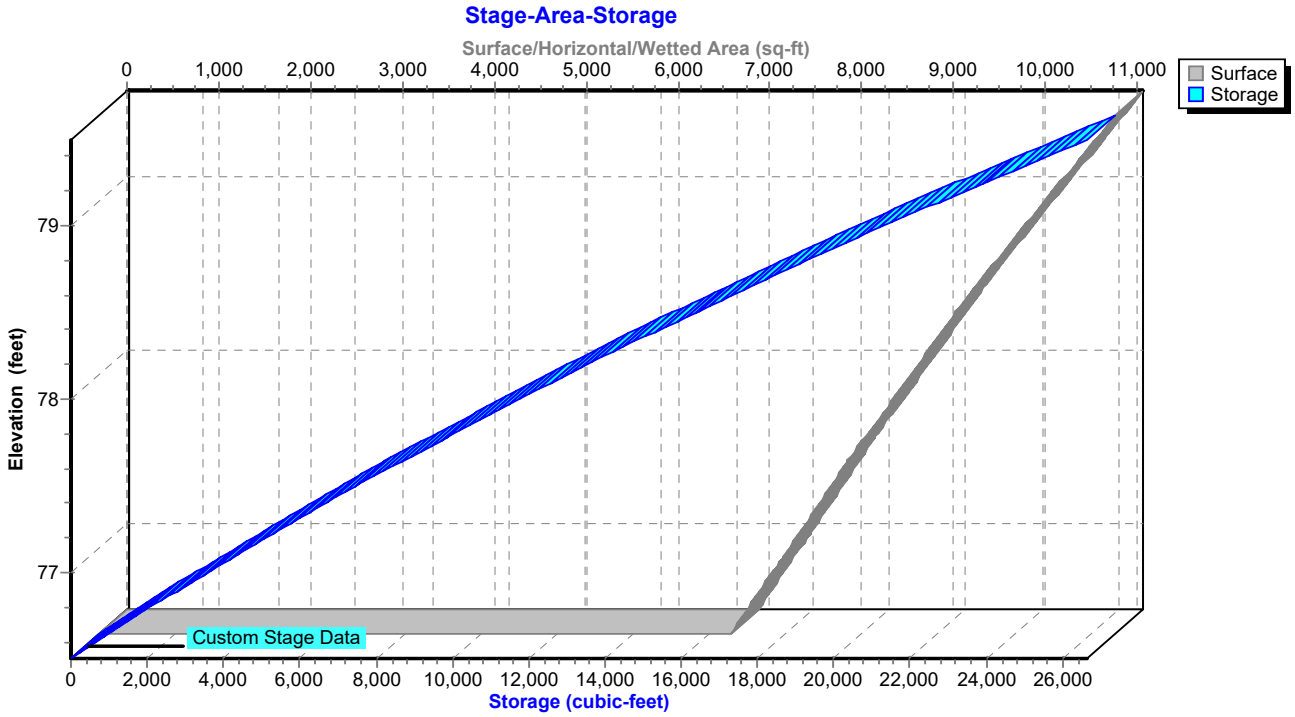
Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Stage-Discharge for Pond B2: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.56	1.73	78.62	10.43
76.52	0.00	77.58	1.77	78.64	10.45
76.54	0.00	77.60	1.82	78.66	10.47
76.56	0.00	77.62	1.86	78.68	10.49
76.58	0.00	77.64	1.90	78.70	10.51
76.60	0.00	77.66	1.94	78.72	10.53
76.62	0.00	77.68	1.99	78.74	10.55
76.64	0.00	77.70	2.03	78.76	10.57
76.66	0.00	77.72	2.06	78.78	10.59
76.68	0.00	77.74	2.10	78.80	10.61
76.70	0.00	77.76	2.14	78.82	10.63
76.72	0.00	77.78	2.18	78.84	10.65
76.74	0.00	77.80	2.25	78.86	10.67
76.76	0.00	77.82	2.34	78.88	10.69
76.78	0.00	77.84	2.45	78.90	10.71
76.80	0.00	77.86	2.58	78.92	10.73
76.82	0.00	77.88	2.71	78.94	10.75
76.84	0.00	77.90	2.86	78.96	10.77
76.86	0.00	77.92	3.01	78.98	10.79
76.88	0.00	77.94	3.17	79.00	10.82
76.90	0.00	77.96	3.34	79.02	10.84
76.92	0.00	77.98	3.52	79.04	10.86
76.94	0.00	78.00	3.71	79.06	10.88
76.96	0.00	78.02	3.91	79.08	10.90
76.98	0.02	78.04	4.12	79.10	10.92
77.00	0.03	78.06	4.33	79.12	10.94
77.02	0.06	78.08	4.56	79.14	10.96
77.04	0.09	78.10	4.79	79.16	10.97
77.06	0.13	78.12	5.02	79.18	10.99
77.08	0.17	78.14	5.27	79.20	11.01
77.10	0.22	78.16	5.52	79.22	11.03
77.12	0.28	78.18	5.78	79.24	11.05
77.14	0.34	78.20	6.05	79.26	11.07
77.16	0.40	78.22	6.32	79.28	11.09
77.18	0.47	78.24	6.61	79.30	11.11
77.20	0.54	78.26	6.90	79.32	11.13
77.22	0.61	78.28	7.20	79.34	11.15
77.24	0.69	78.30	7.51	79.36	11.17
77.26	0.77	78.32	7.83	79.38	11.19
77.28	0.85	78.34	8.15	79.40	11.21
77.30	0.93	78.36	8.48	79.42	11.23
77.32	1.01	78.38	8.82	79.44	11.25
77.34	1.09	78.40	9.18	79.46	11.27
77.36	1.17	78.42	9.54	79.48	11.29
77.38	1.24	78.44	9.92	79.50	**11.31**
77.40	1.31	78.46	10.26		
77.42	1.37	78.48	10.28		
77.44	1.42	78.50	10.30		
77.46	1.47	78.52	10.32		
77.48	1.53	78.54	10.34		
77.50	1.58	78.56	10.36		
77.52	1.63	78.58	10.38		
77.54	1.68	78.60	10.40		

Stage-Area-Storage for Pond B2: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	6,877	0
76.55	6,941	345
76.60	7,005	694
76.65	7,069	1,046
76.70	7,133	1,401
76.75	7,197	1,759
76.80	7,260	2,121
76.85	7,324	2,485
76.90	7,388	2,853
76.95	7,452	3,224
77.00	7,516	3,598
77.05	7,580	3,976
77.10	7,644	4,356
77.15	7,708	4,740
77.20	7,772	5,127
77.25	7,836	5,517
77.30	7,899	5,911
77.35	7,963	6,307
77.40	8,027	6,707
77.45	8,091	7,110
77.50	8,155	7,516
77.55	8,223	7,925
77.60	8,292	8,338
77.65	8,360	8,755
77.70	8,428	9,174
77.75	8,497	9,597
77.80	8,565	10,024
77.85	8,633	10,454
77.90	8,702	10,887
77.95	8,770	11,324
78.00	8,839	11,764
78.05	8,907	12,208
78.10	8,975	12,655
78.15	9,044	13,106
78.20	9,112	13,559
78.25	9,180	14,017
78.30	9,249	14,477
78.35	9,317	14,942
78.40	9,385	15,409
78.45	9,454	15,880
78.50	9,522	16,355
78.55	9,599	16,833
78.60	9,676	17,314
78.65	9,753	17,800
78.70	9,830	18,290
78.75	9,907	18,783
78.80	9,984	19,280
78.85	10,061	19,782
78.90	10,138	20,287
78.95	10,215	20,795
79.00	10,293	21,308
79.05	10,370	21,825
79.10	10,447	22,345
79.15	10,524	22,869
79.20	10,601	23,397
79.25	10,678	23,929
79.30	10,755	24,465
79.35	10,832	25,005
79.40	10,909	25,548
79.45	10,986	26,096
79.50	**11,063**	**26,647**

Summary for Pond B3: Bioretention Basin 3

[92] Warning: Device #2 is above defined storage

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 0.48" for WQ event
Inflow = 0.22 cfs @ 1.29 hrs, Volume= 466 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 80.73' @ 3.25 hrs Surf.Area= 832 sf Storage= 466 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	79.98'	694 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

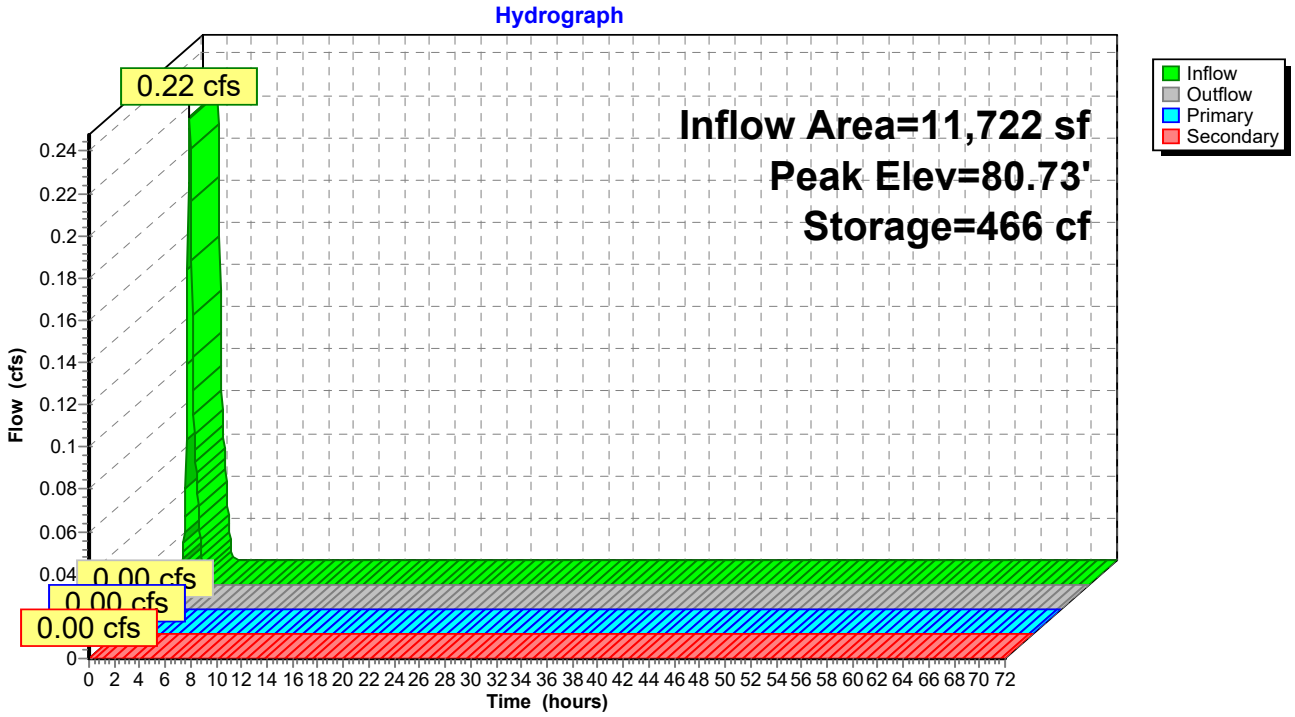
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
79.98	432	0	0	432
80.98	995	694	694	1,003

Device	Routing	Invert	Outlet Devices
#1	Primary	77.48'	**15.0" Round CMP_Round 15"** L= 96.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 77.48' / 77.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Secondary	80.98'	**15.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	80.74'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

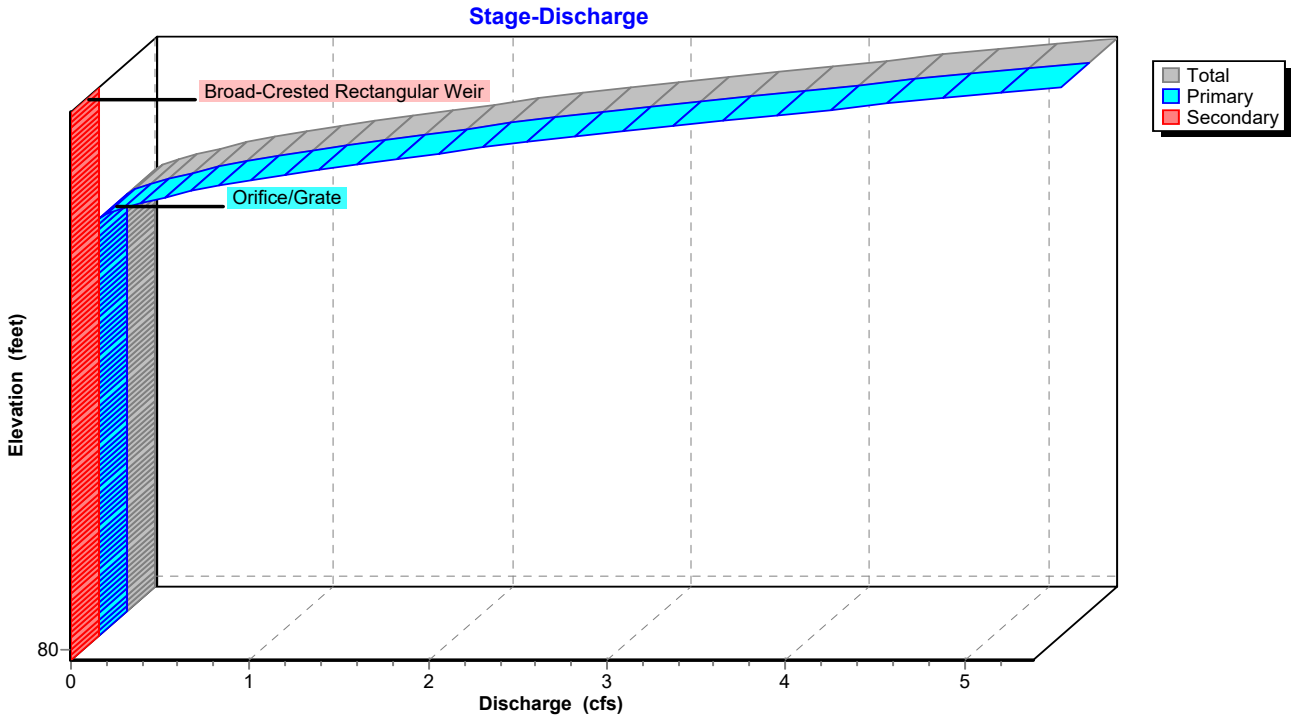
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.98' (Free Discharge)
└**1=CMP_Round 15"** (Passes 0.00 cfs of 6.37 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.98' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

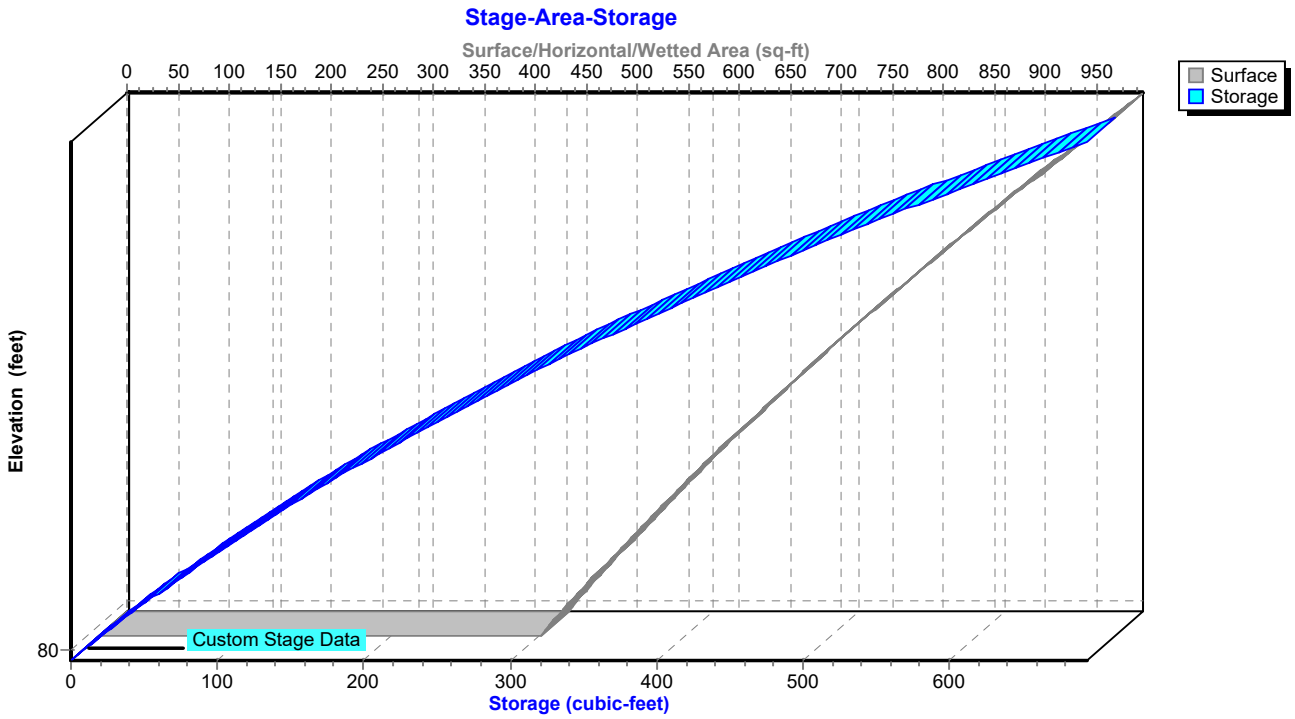
Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Stage-Discharge for Pond B3: Bioretention Basin 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
79.98	0.00	0.00	**0.00**
79.99	0.00	0.00	0.00
80.00	0.00	0.00	0.00
80.01	0.00	0.00	0.00
80.02	0.00	0.00	0.00
80.03	0.00	0.00	0.00
80.04	0.00	0.00	0.00
80.05	0.00	0.00	0.00
80.06	0.00	0.00	0.00
80.07	0.00	0.00	0.00
80.08	0.00	0.00	0.00
80.09	0.00	0.00	0.00
80.10	0.00	0.00	0.00
80.11	0.00	0.00	0.00
80.12	0.00	0.00	0.00
80.13	0.00	0.00	0.00
80.14	0.00	0.00	0.00
80.15	0.00	0.00	0.00
80.16	0.00	0.00	0.00
80.17	0.00	0.00	0.00
80.18	0.00	0.00	0.00
80.19	0.00	0.00	0.00
80.20	0.00	0.00	0.00
80.21	0.00	0.00	0.00
80.22	0.00	0.00	0.00
80.23	0.00	0.00	0.00
80.24	0.00	0.00	0.00
80.25	0.00	0.00	0.00
80.26	0.00	0.00	0.00
80.27	0.00	0.00	0.00
80.28	0.00	0.00	0.00
80.29	0.00	0.00	0.00
80.30	0.00	0.00	0.00
80.31	0.00	0.00	0.00
80.32	0.00	0.00	0.00
80.33	0.00	0.00	0.00
80.34	0.00	0.00	0.00
80.35	0.00	0.00	0.00
80.36	0.00	0.00	0.00
80.37	0.00	0.00	0.00
80.38	0.00	0.00	0.00
80.39	0.00	0.00	0.00
80.40	0.00	0.00	0.00
80.41	0.00	0.00	0.00
80.42	0.00	0.00	0.00
80.43	0.00	0.00	0.00
80.44	0.00	0.00	0.00
80.45	0.00	0.00	0.00
80.46	0.00	0.00	0.00
80.47	0.00	0.00	0.00
80.48	0.00	0.00	0.00
80.49	0.00	0.00	0.00
80.50	0.00	0.00	0.00
80.51	0.00	0.00	0.00
80.52	0.00	0.00	0.00
80.53	0.00	0.00	0.00
80.54	0.00	0.00	0.00
80.55	0.00	0.00	0.00
80.56	0.00	0.00	0.00
80.57	0.00	0.00	0.00
80.58	0.00	0.00	0.00
80.59	0.00	0.00	0.00
80.60	0.00	0.00	0.00
80.61	0.00	0.00	0.00
80.62	0.00	0.00	0.00
80.63	0.00	0.00	0.00
80.64	0.00	0.00	0.00
80.65	0.00	0.00	0.00
80.66	0.00	0.00	0.00
80.67	0.00	0.00	0.00
80.68	0.00	0.00	0.00
80.69	0.00	0.00	0.00
80.70	0.00	0.00	0.00
80.71	0.00	0.00	0.00
80.72	0.00	0.00	0.00
80.73	0.00	0.00	0.00
80.74	0.00	0.00	0.00
80.75	0.05	0.05	0.00
80.76	0.13	0.13	0.00
80.77	0.24	0.24	0.00
80.78	0.37	0.37	0.00
80.79	0.51	0.51	0.00
80.80	0.67	0.67	0.00
80.81	0.85	0.85	0.00
80.82	1.04	1.04	0.00
80.83	1.24	1.24	0.00
80.84	1.45	1.45	0.00
80.85	1.67	1.67	0.00
80.86	1.90	1.90	0.00
80.87	2.15	2.15	0.00
80.88	2.40	2.40	0.00
80.89	2.66	2.66	0.00
80.90	2.93	2.93	0.00
80.91	3.21	3.21	0.00
80.92	3.50	3.50	0.00
80.93	3.79	3.79	0.00
80.94	4.09	4.09	0.00
80.95	4.41	4.41	0.00
80.96	4.72	4.72	0.00
80.97	5.05	5.05	0.00
80.98	**5.38**	**5.38**	0.00

Stage-Area-Storage for Pond B3: Bioretention Basin 3

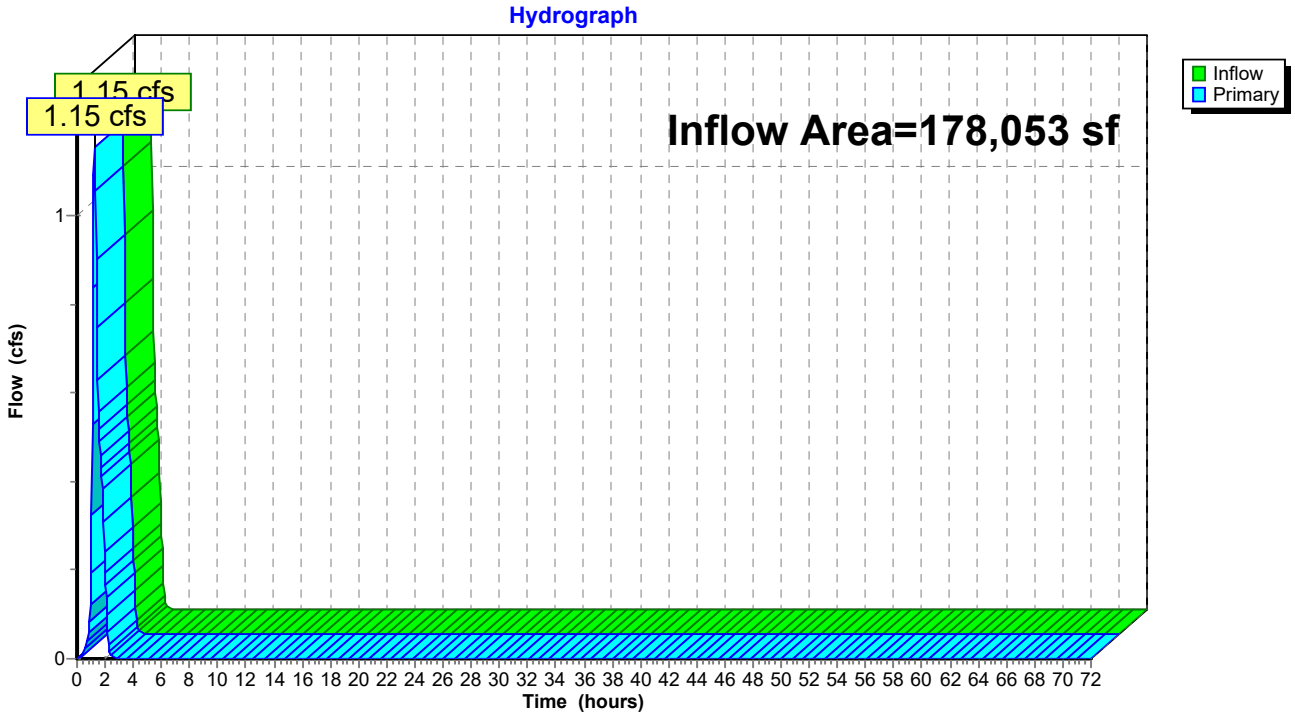
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
79.98	432	0
79.99	436	4
80.00	441	9
80.01	446	13
80.02	450	18
80.03	455	22
80.04	459	27
80.05	464	31
80.06	469	36
80.07	473	41
80.08	478	45
80.09	483	50
80.10	487	55
80.11	492	60
80.12	497	65
80.13	502	70
80.14	507	75
80.15	511	80
80.16	516	85
80.17	521	90
80.18	526	96
80.19	531	101
80.20	536	106
80.21	541	112
80.22	546	117
80.23	551	123
80.24	556	128
80.25	561	134
80.26	566	139
80.27	571	145
80.28	577	151
80.29	582	157
80.30	587	162
80.31	592	168
80.32	597	174
80.33	603	180
80.34	608	186
80.35	613	192
80.36	619	199
80.37	624	205
80.38	629	211
80.39	635	217
80.40	640	224
80.41	646	230
80.42	651	237
80.43	657	243
80.44	662	250
80.45	668	256
80.46	673	263
80.47	679	270
80.48	685	277
80.49	690	284
80.50	696	291
80.51	702	298
80.52	707	305
80.53	713	312
80.54	719	319
80.55	725	326
80.56	730	333
80.57	736	341
80.58	742	348
80.59	748	355
80.60	754	363
80.61	760	371
80.62	766	378
80.63	772	386
80.64	778	394
80.65	784	401
80.66	790	409
80.67	796	417
80.68	802	425
80.69	808	433
80.70	814	441
80.71	820	450
80.72	826	458
80.73	833	466
80.74	839	474
80.75	845	483
80.76	851	491
80.77	858	500
80.78	864	508
80.79	870	517
80.80	877	526
80.81	883	535
80.82	889	544
80.83	896	552
80.84	902	561
80.85	909	571
80.86	915	580
80.87	922	589
80.88	928	598
80.89	935	607
80.90	941	617
80.91	948	626
80.92	955	636
80.93	961	645
80.94	968	655
80.95	975	665
80.96	981	674
80.97	988	684
80.98	**995**	**694**

Summary for Link 5E: EDA 1

Inflow Area = 178,053 sf, 5.81% Impervious, Inflow Depth = 0.16" for WQ event
Inflow = 1.15 cfs @ 1.24 hrs, Volume= 2,308 cf
Primary = 1.15 cfs @ 1.24 hrs, Volume= 2,308 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5E: EDA 1

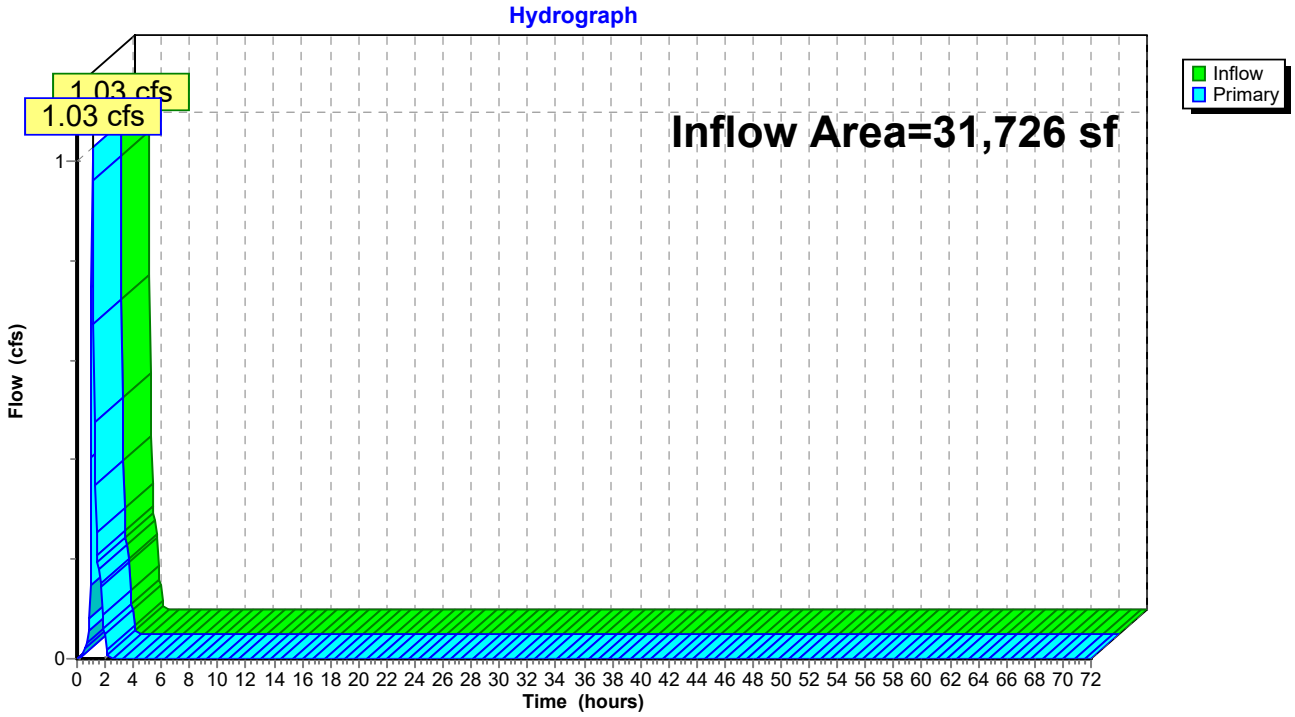


Summary for Link 6E: EDA 2

Inflow Area = 31,726 sf, 17.78% Impervious, Inflow Depth = 0.49" for WQ event
Inflow = 1.03 cfs @ 1.12 hrs, Volume= 1,291 cf
Primary = 1.03 cfs @ 1.12 hrs, Volume= 1,291 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 6E: EDA 2

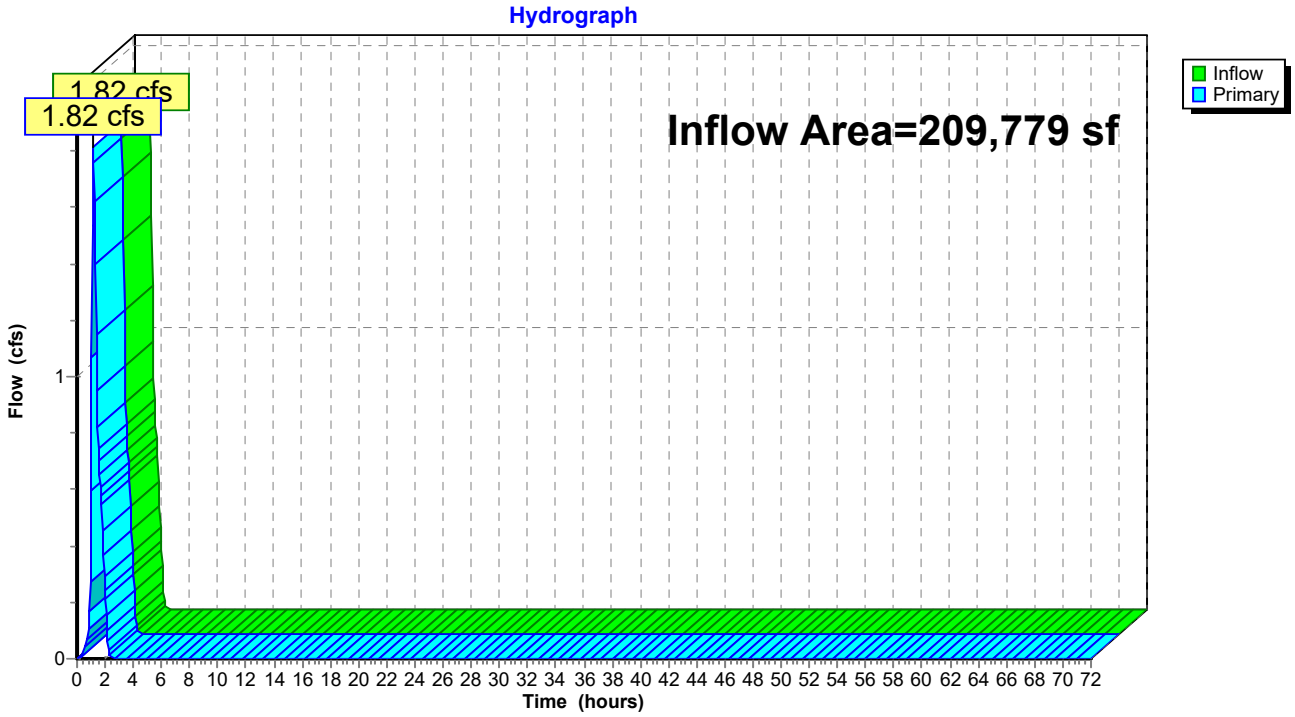


Summary for Link 7E: EDA

Inflow Area = 209,779 sf, 7.62% Impervious, Inflow Depth = 0.21" for WQ event
Inflow = 1.82 cfs @ 1.17 hrs, Volume= 3,598 cf
Primary = 1.82 cfs @ 1.17 hrs, Volume= 3,598 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7E: EDA

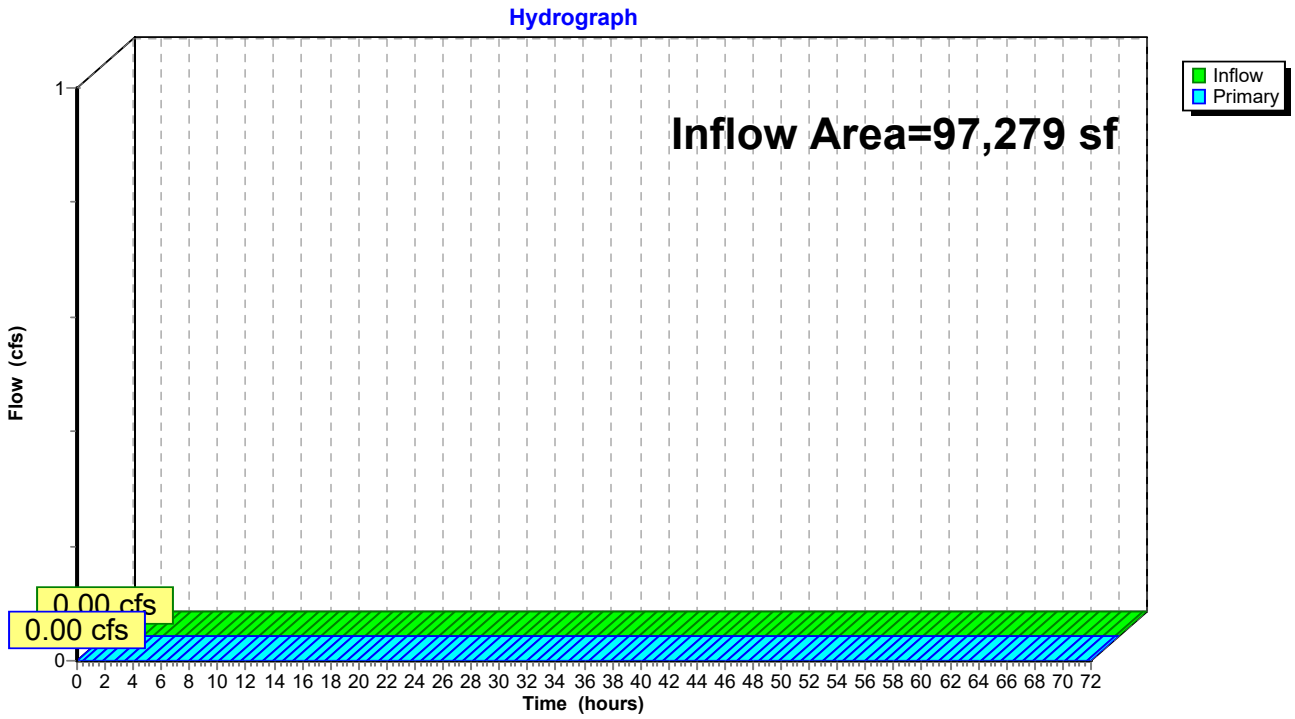


Summary for Link 10P: PDA 1A

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 0.00" for WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10P: PDA 1A

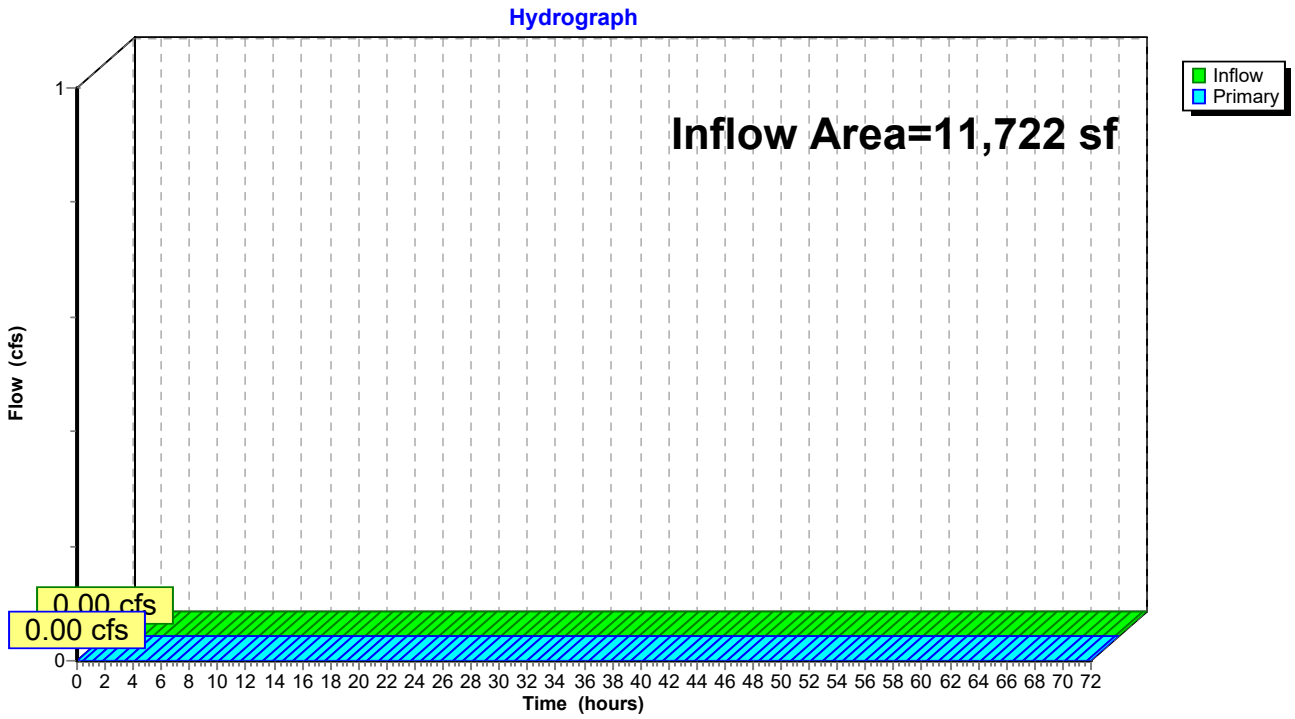


Summary for Link 11P: PDA 1B

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 0.00" for WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11P: PDA 1B

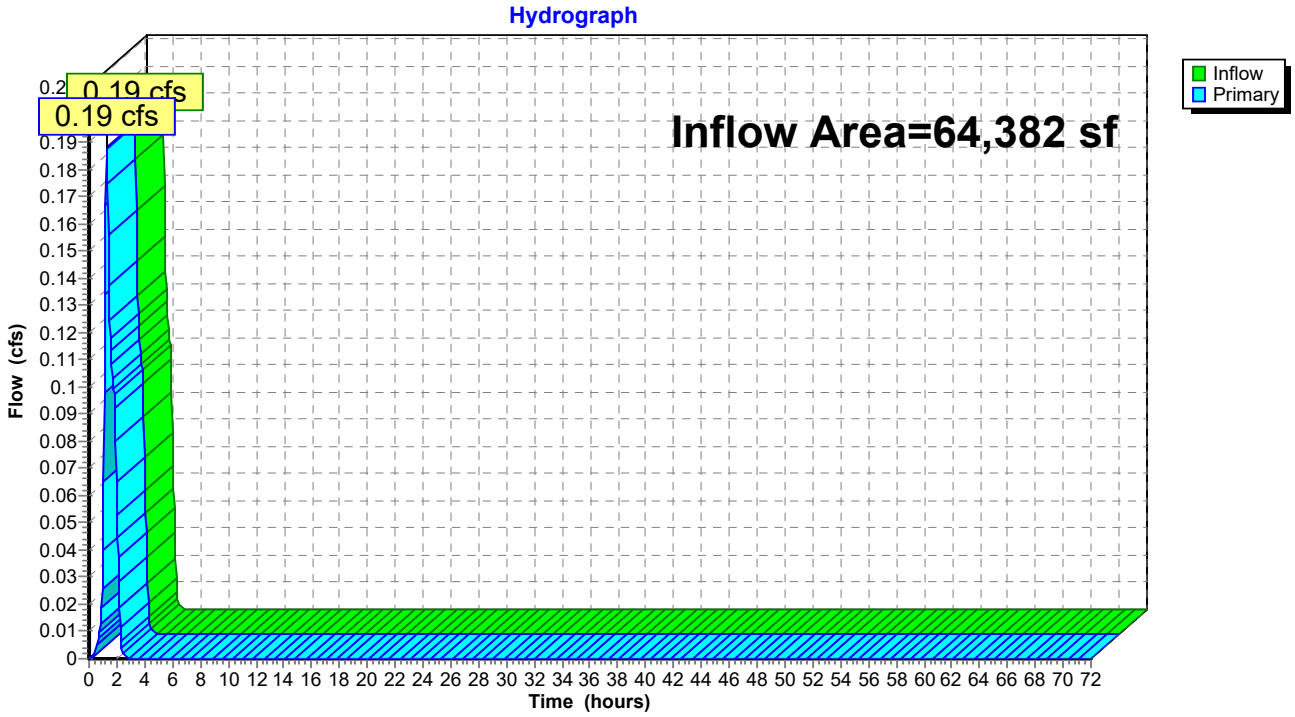


Summary for Link 12P: PDA 1C

Inflow Area = 64,382 sf, 3.87% Impervious, Inflow Depth = 0.09" for WQ event
Inflow = 0.19 cfs @ 1.28 hrs, Volume= 479 cf
Primary = 0.19 cfs @ 1.28 hrs, Volume= 479 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12P: PDA 1C

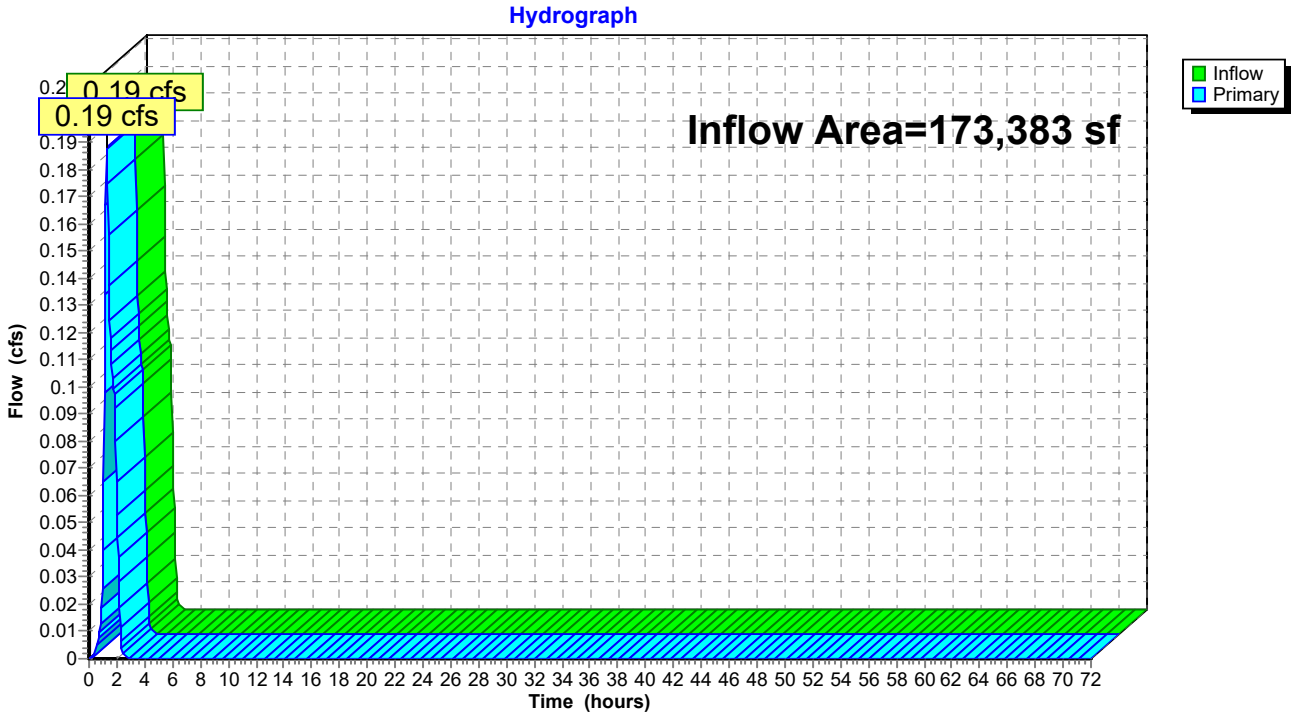


Summary for Link 13P: PDA 1

Inflow Area = 173,383 sf, 38.29% Impervious, Inflow Depth = 0.03" for WQ event
Inflow = 0.19 cfs @ 1.28 hrs, Volume= 479 cf
Primary = 0.19 cfs @ 1.28 hrs, Volume= 479 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13P: PDA 1

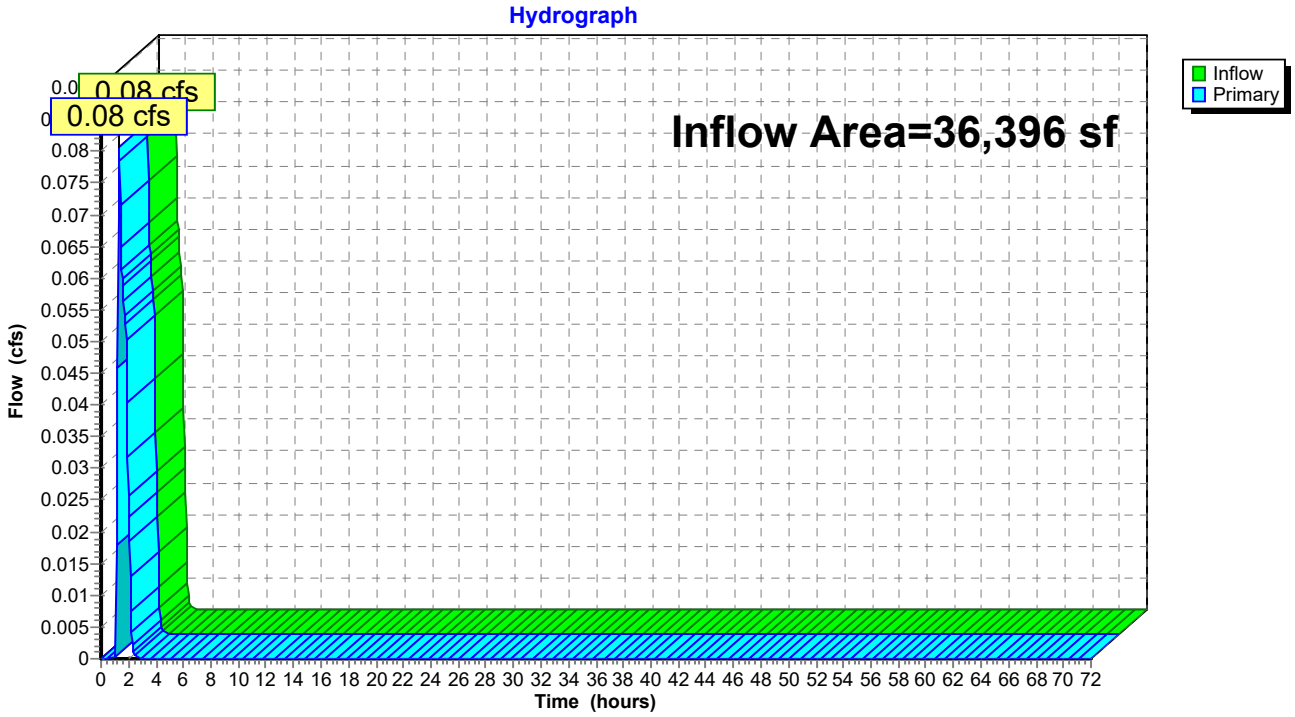


Summary for Link 14P: PDA 2

Inflow Area = 36,396 sf, 0.00% Impervious, Inflow Depth = 0.06" for WQ event
Inflow = 0.08 cfs @ 1.32 hrs, Volume= 188 cf
Primary = 0.08 cfs @ 1.32 hrs, Volume= 188 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 14P: PDA 2

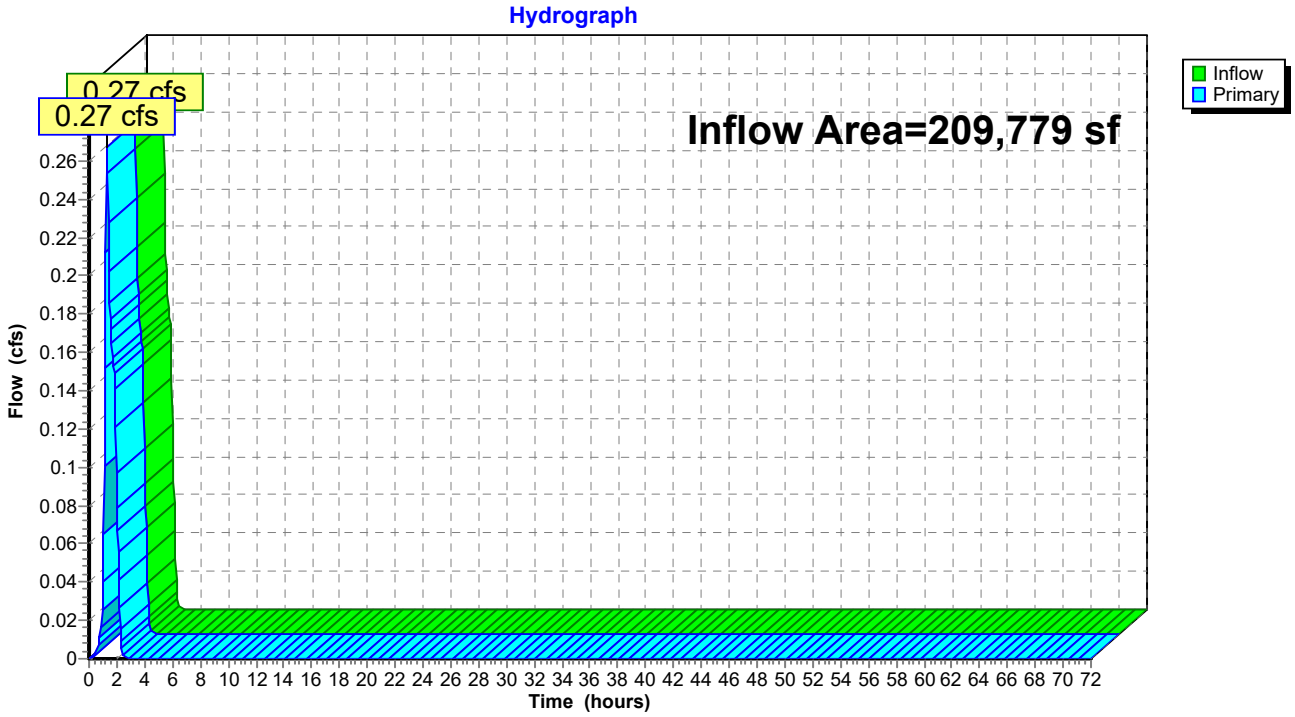


Summary for Link 15P: PDA

Inflow Area = 209,779 sf, 31.65% Impervious, Inflow Depth = 0.04" for WQ event
Inflow = 0.27 cfs @ 1.30 hrs, Volume= 666 cf
Primary = 0.27 cfs @ 1.30 hrs, Volume= 666 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 15P: PDA



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Impervious Runoff Area=10,351 sf 100.00% Impervious Runoff Depth=3.13"
Tc=12.4 min CN=0/98 Runoff=0.68 cfs 2,697 cf

Subcatchment 1P: Impervious Runoff Area=23,576 sf 100.00% Impervious Runoff Depth=3.13"
Tc=10.7 min CN=0/98 Runoff=1.61 cfs 6,143 cf

Subcatchment 2E: Pervious Runoff Area=167,702 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=630' Tc=12.4 min CN=76/0 Runoff=4.94 cfs 17,674 cf

Subcatchment 2P: Pervious Runoff Area=24,672 sf 0.00% Impervious Runoff Depth=1.14"
Flow Length=426' Tc=10.7 min CN=74/0 Runoff=0.68 cfs 2,353 cf

Subcatchment 3E: Impervious Runoff Area=5,641 sf 100.00% Impervious Runoff Depth=3.13"
Tc=6.0 min CN=0/98 Runoff=0.45 cfs 1,470 cf

Subcatchment 3P: Roof Area Runoff Area=35,418 sf 100.00% Impervious Runoff Depth=3.13"
Tc=10.7 min CN=0/98 Runoff=2.42 cfs 9,229 cf

Subcatchment 4E: Pervious Runoff Area=26,085 sf 0.00% Impervious Runoff Depth=2.06"
Flow Length=393' Tc=6.0 min CN=87/0 Runoff=1.55 cfs 4,471 cf

Subcatchment 4P: Pervious Runoff Area=13,613 sf 0.00% Impervious Runoff Depth=1.14"
Tc=10.7 min CN=74/0 Runoff=0.38 cfs 1,298 cf

Subcatchment 5P: Impervious Runoff Area=5,021 sf 97.63% Impervious Runoff Depth=3.12"
Tc=20.8 min CN=96/98 Runoff=0.27 cfs 1,306 cf

Subcatchment 6P: Pervious Runoff Area=6,701 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=172' Tc=20.8 min CN=73/0 Runoff=0.13 cfs 607 cf

Subcatchment 7P: Impervious Runoff Area=2,493 sf 100.00% Impervious Runoff Depth=3.13"
Tc=13.9 min CN=0/98 Runoff=0.16 cfs 650 cf

Subcatchment 8P: Pervious Runoff Area=61,889 sf 0.00% Impervious Runoff Depth=1.03"
Flow Length=409' Tc=13.9 min CN=72/0 Runoff=1.36 cfs 5,314 cf

Subcatchment 9P: Pervious Runoff Area=36,396 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=471' Tc=12.2 min CN=73/0 Runoff=0.91 cfs 3,296 cf

Pond B1: Bioretention Basin 1 Peak Elev=78.24' Storage=4,156 cf Inflow=2.29 cfs 8,496 cf
Outflow=1.24 cfs 4,601 cf

Pond B2: Bioretention Basin 2 Peak Elev=77.37' Storage=6,451 cf Inflow=2.75 cfs 15,128 cf
Outflow=1.20 cfs 11,962 cf

Pond B3: Bioretention Basin 3 Peak Elev=80.78' Storage=510 cf Inflow=0.40 cfs 1,913 cf
Primary=0.40 cfs 1,439 cf Secondary=0.00 cfs 0 cf Outflow=0.40 cfs 1,439 cf

Link 5E: EDA 1 Inflow=5.61 cfs 20,371 cf
Primary=5.61 cfs 20,371 cf

Link 6E: EDA 2 Inflow=2.00 cfs 5,941 cf
Primary=2.00 cfs 5,941 cf

Link 7E: EDA Inflow=6.99 cfs 26,313 cf
Primary=6.99 cfs 26,313 cf

Link 10P: PDA 1A Inflow=1.20 cfs 11,962 cf
Primary=1.20 cfs 11,962 cf

Link 11P: PDA 1B Inflow=0.40 cfs 1,439 cf
Primary=0.40 cfs 1,439 cf

Link 12P: PDA 1C Inflow=1.52 cfs 5,964 cf
Primary=1.52 cfs 5,964 cf

Link 13P: PDA 1 Inflow=2.43 cfs 19,365 cf
Primary=2.43 cfs 19,365 cf

Link 14P: PDA 2 Inflow=0.91 cfs 3,296 cf
Primary=0.91 cfs 3,296 cf

Link 15P: PDA Inflow=3.25 cfs 22,660 cf
Primary=3.25 cfs 22,660 cf

Total Runoff Area = 419,558 sf Runoff Volume = 56,508 cf Average Runoff Depth = 1.62"
80.36% Pervious = 337,177 sf 19.64% Impervious = 82,381 sf

Summary for Subcatchment 1E: Impervious

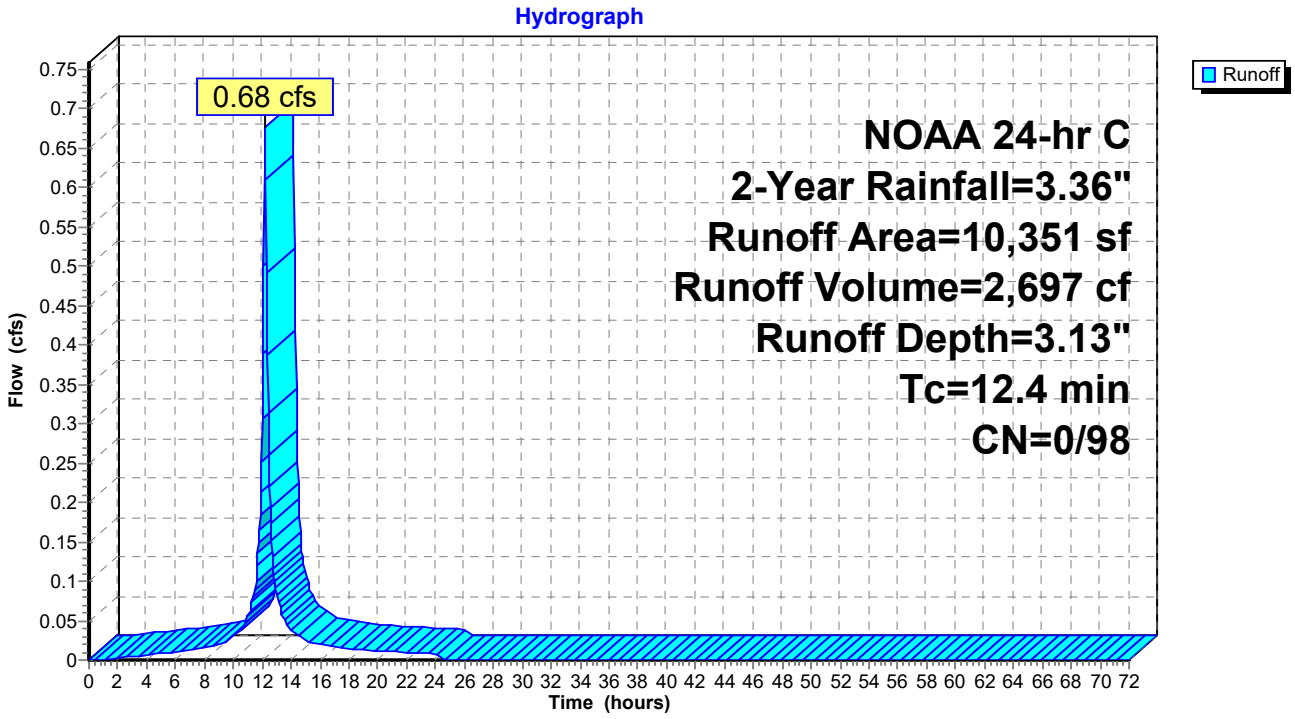
Runoff = 0.68 cfs @ 12.20 hrs, Volume= 2,697 cf, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
3,299	98	Unconnected roofs, HSG C
7,052	98	Paved parking, HSG C
10,351	98	Weighted Average
10,351	98	100.00% Impervious Area

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

Subcatchment 1E: Impervious



Summary for Subcatchment 1P: Impervious

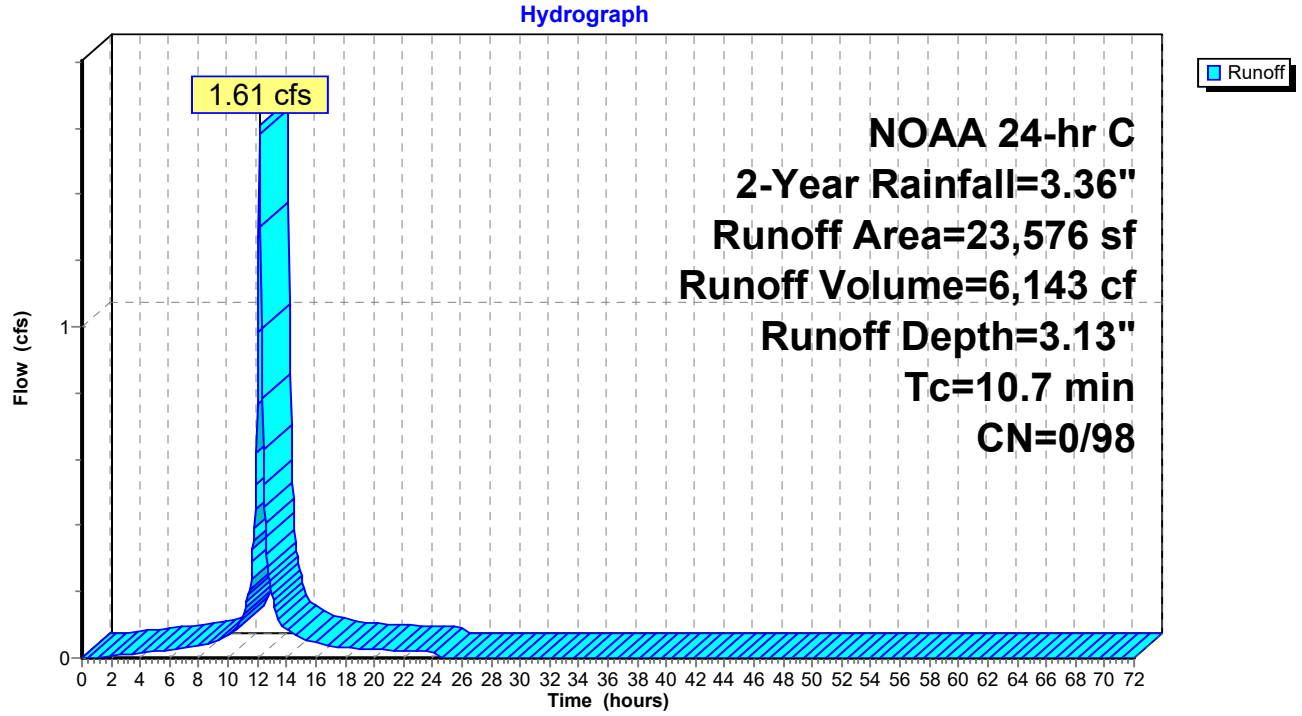
Runoff = 1.61 cfs @ 12.18 hrs, Volume= 6,143 cf, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
23,576	98	Paved parking, HSG C
23,576	98	100.00% Impervious Area

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

Subcatchment 1P: Impervious



Summary for Subcatchment 2E: Pervious

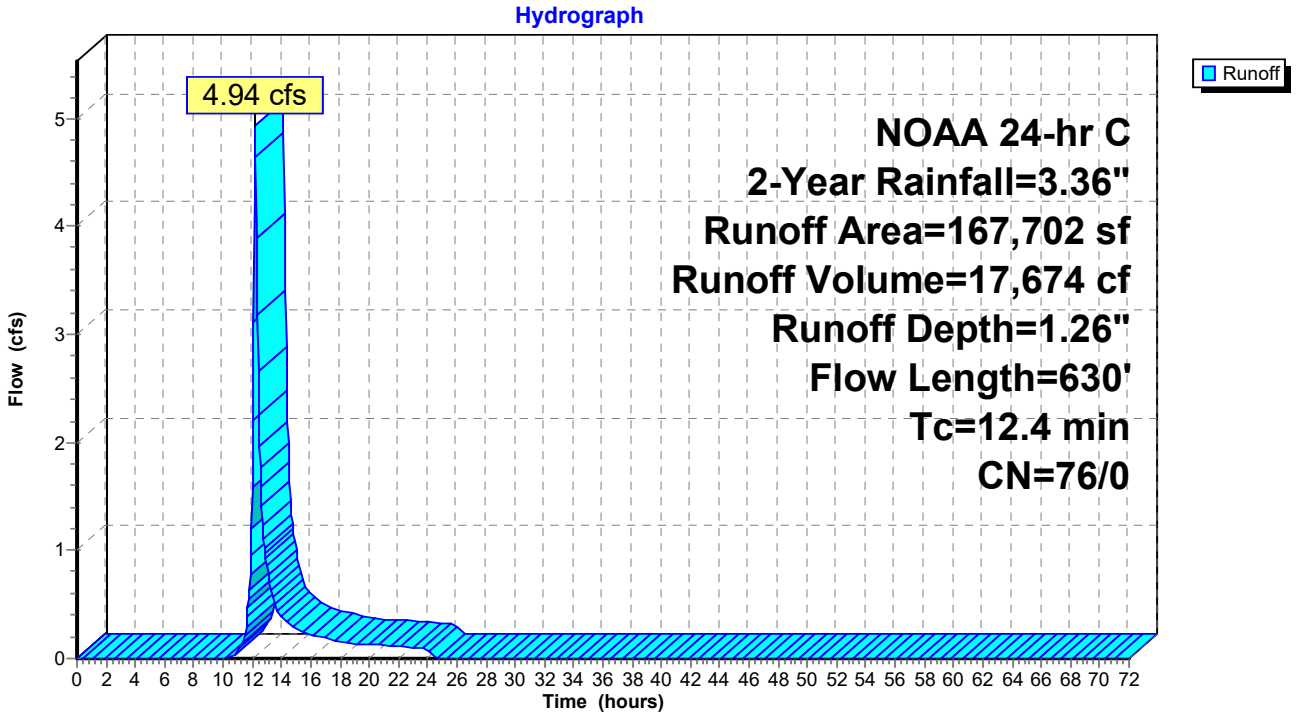
Runoff = 4.94 cfs @ 12.21 hrs, Volume= 17,674 cf, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
24,589	96	Gravel surface, HSG C
36,591	70	Woods, Good, HSG C
105,816	74	>75% Grass cover, Good, HSG C
706	72	Woods/grass comb., Good, HSG C
167,702	76	Weighted Average
167,702	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	27	0.0490	1.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
8.8	73	0.0130	0.14		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.4	54	0.0180	2.16		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
1.2	207	0.0340	2.97		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.5	59	0.0170	2.10		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
0.2	43	0.0470	3.49		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
1.0	167	0.0280	2.69		**Shallow Concentrated Flow, G-H** Unpaved Kv= 16.1 fps
12.4	630	Total			

Subcatchment 2E: Pervious



Summary for Subcatchment 2P: Pervious

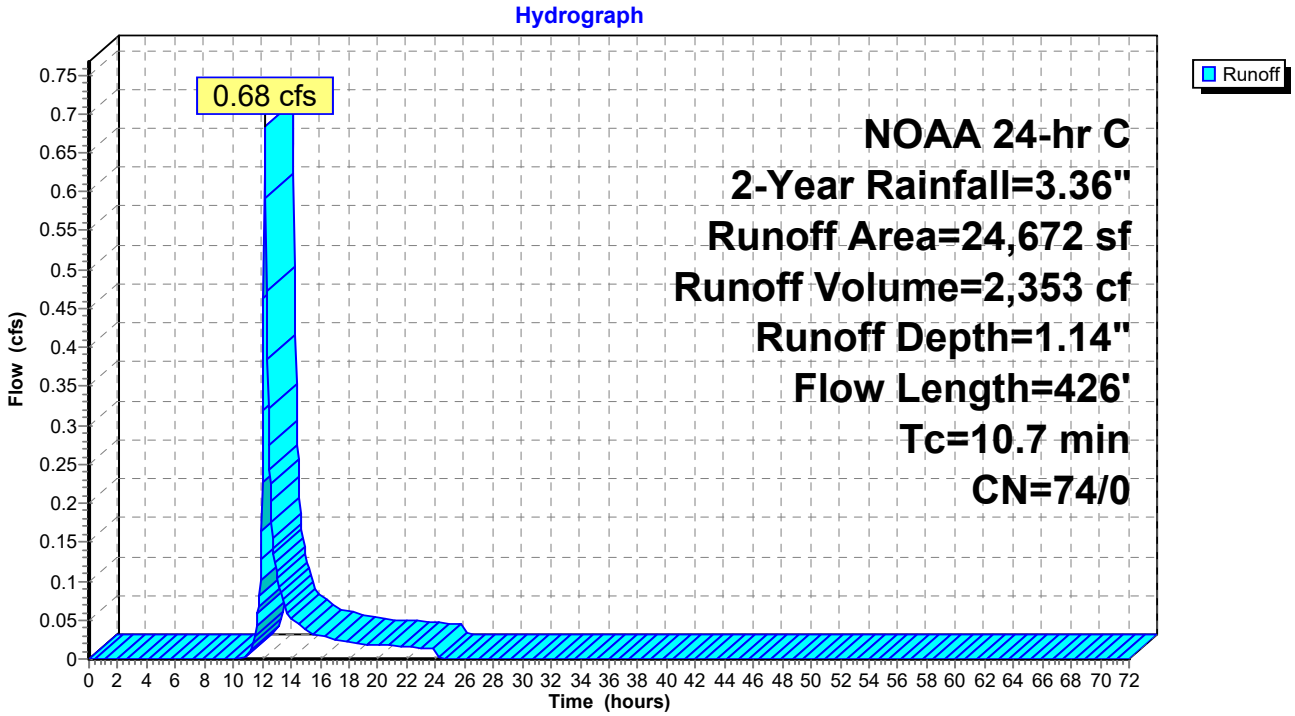
Runoff = 0.68 cfs @ 12.19 hrs, Volume= 2,353 cf, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
22,852	74	>75% Grass cover, Good, HSG C
1,820	72	Woods/grass comb., Good, HSG C
24,672	74	Weighted Average
24,672	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0222	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.1	23	0.0730	4.35		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.3	48	0.0210	2.94		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
1.1	255	0.0050	3.72	4.57	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
10.7	426	Total			

Subcatchment 2P: Pervious



Summary for Subcatchment 3E: Impervious

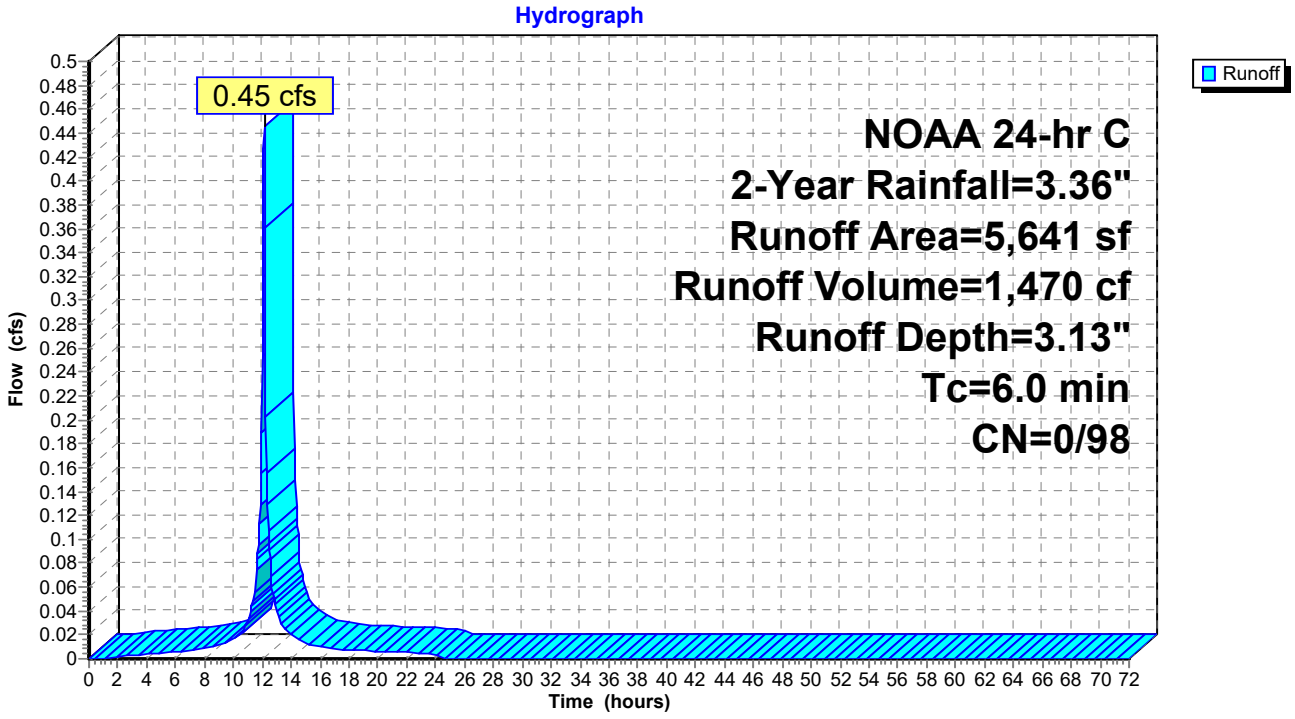
Runoff = 0.45 cfs @ 12.13 hrs, Volume= 1,470 cf, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
2,580	98	Unconnected roofs, HSG C
3,061	98	Paved parking, HSG C
5,641	98	Weighted Average
5,641	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Tc**
3.0	0	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3E: Impervious



Summary for Subcatchment 3P: Roof Area

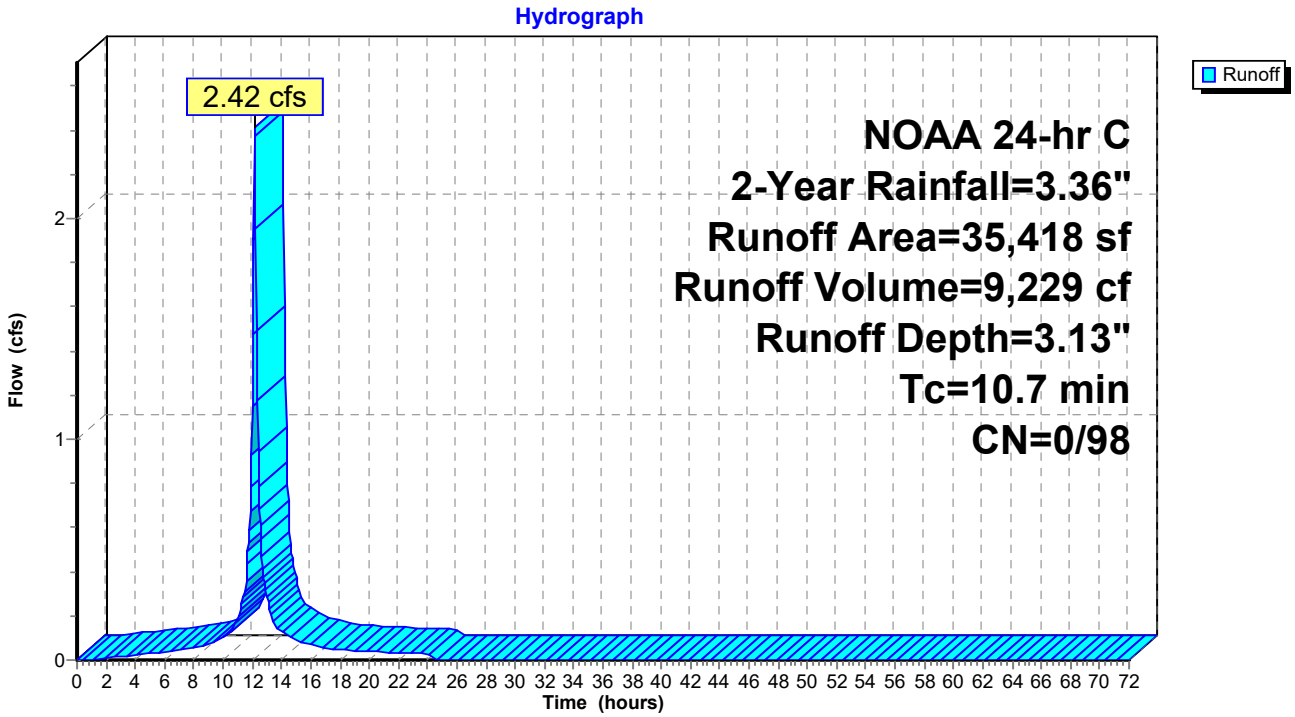
Runoff = 2.42 cfs @ 12.18 hrs, Volume= 9,229 cf, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
35,068	98	Unconnected roofs, HSG C
350	98	Unconnected pavement, HSG C
35,418	98	Weighted Average
35,418	98	100.00% Impervious Area

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

Subcatchment 3P: Roof Area



Summary for Subcatchment 4E: Pervious

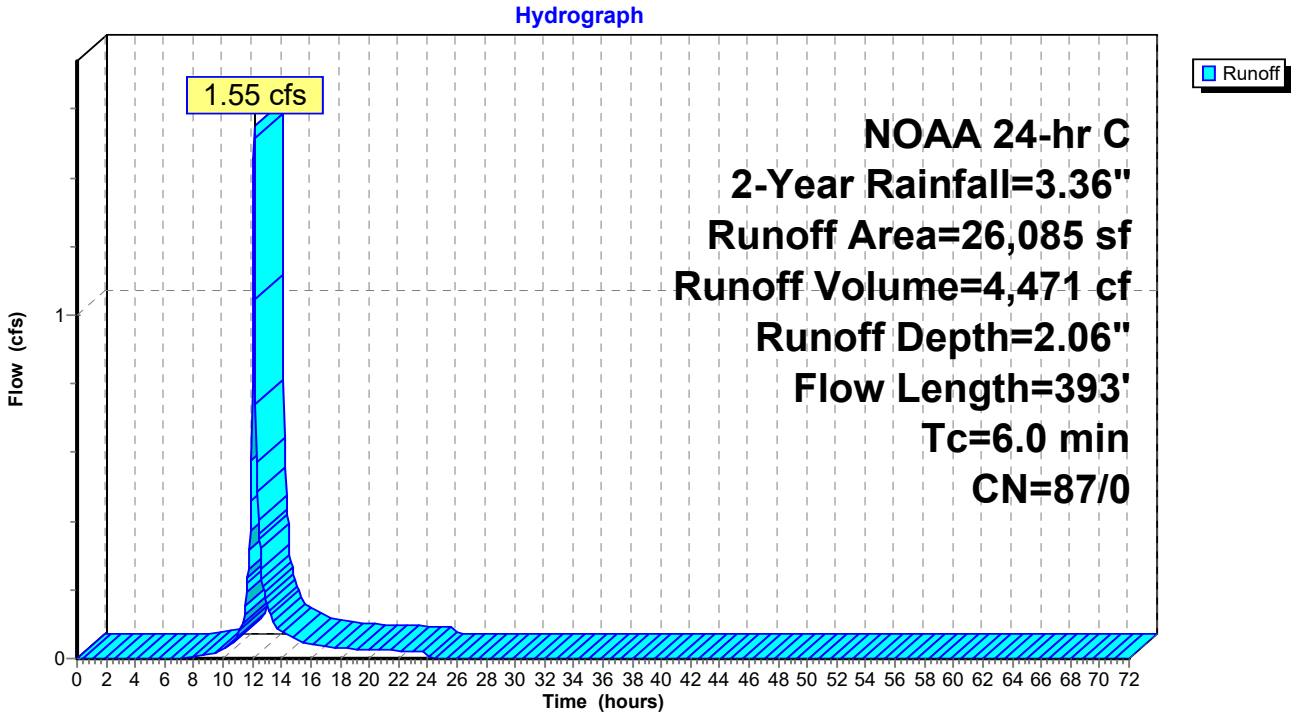
Runoff = 1.55 cfs @ 12.13 hrs, Volume= 4,471 cf, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
164	70	Woods, Good, HSG C
16,189	96	Gravel surface, HSG C
5,108	74	>75% Grass cover, Good, HSG C
4,624	72	Woods/grass comb., Good, HSG C
26,085	87	Weighted Average
26,085	87	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0160	1.29		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
0.6	97	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.0	175	0.0330	2.92		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	13	0.0230	2.44		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.0	8	0.0480	3.53		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
3.0	393	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4E: Pervious



Summary for Subcatchment 4P: Pervious

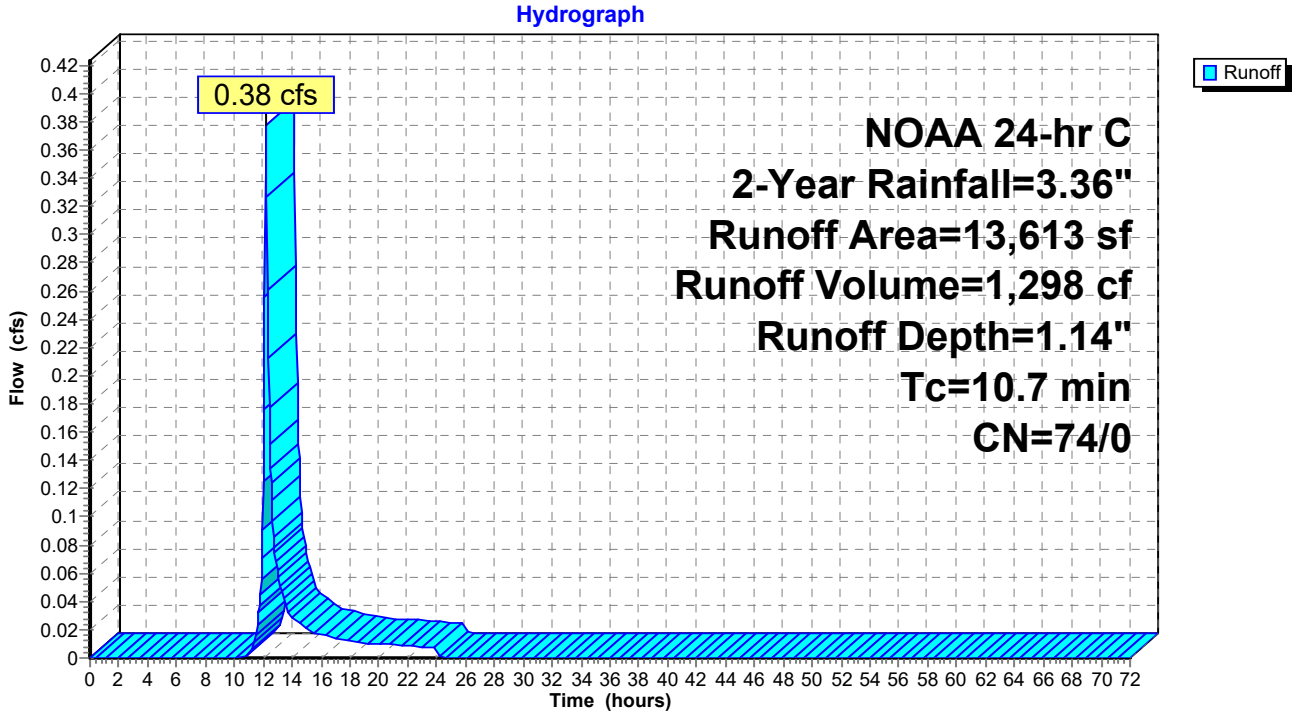
Runoff = 0.38 cfs @ 12.19 hrs, Volume= 1,298 cf, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
13,613	74	>75% Grass cover, Good, HSG C
13,613	74	100.00% Pervious Area

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

Subcatchment 4P: Pervious



Summary for Subcatchment 5P: Impervious

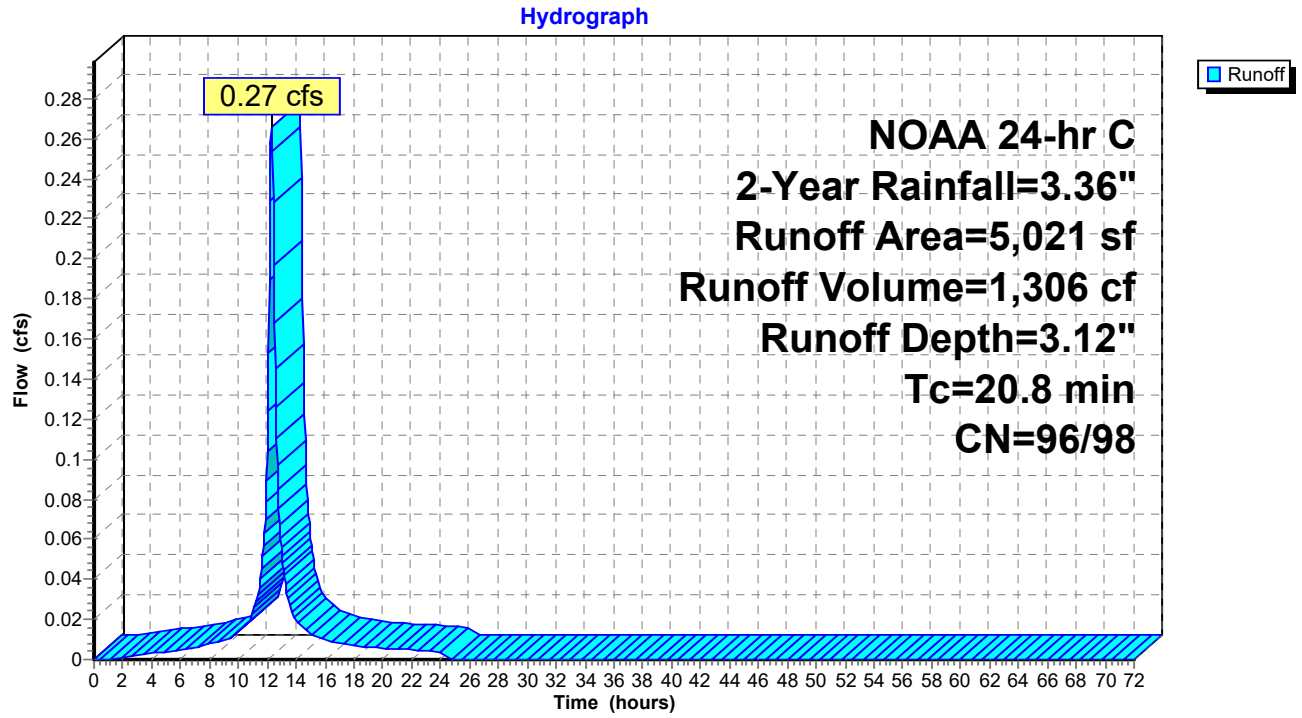
Runoff = 0.27 cfs @ 12.29 hrs, Volume= 1,306 cf, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
4,902	98	Paved parking, HSG C
119	96	Gravel surface, HSG C
5,021	98	Weighted Average
119	96	2.37% Pervious Area
4,902	98	97.63% Impervious Area

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

Subcatchment 5P: Impervious



Summary for Subcatchment 6P: Pervious

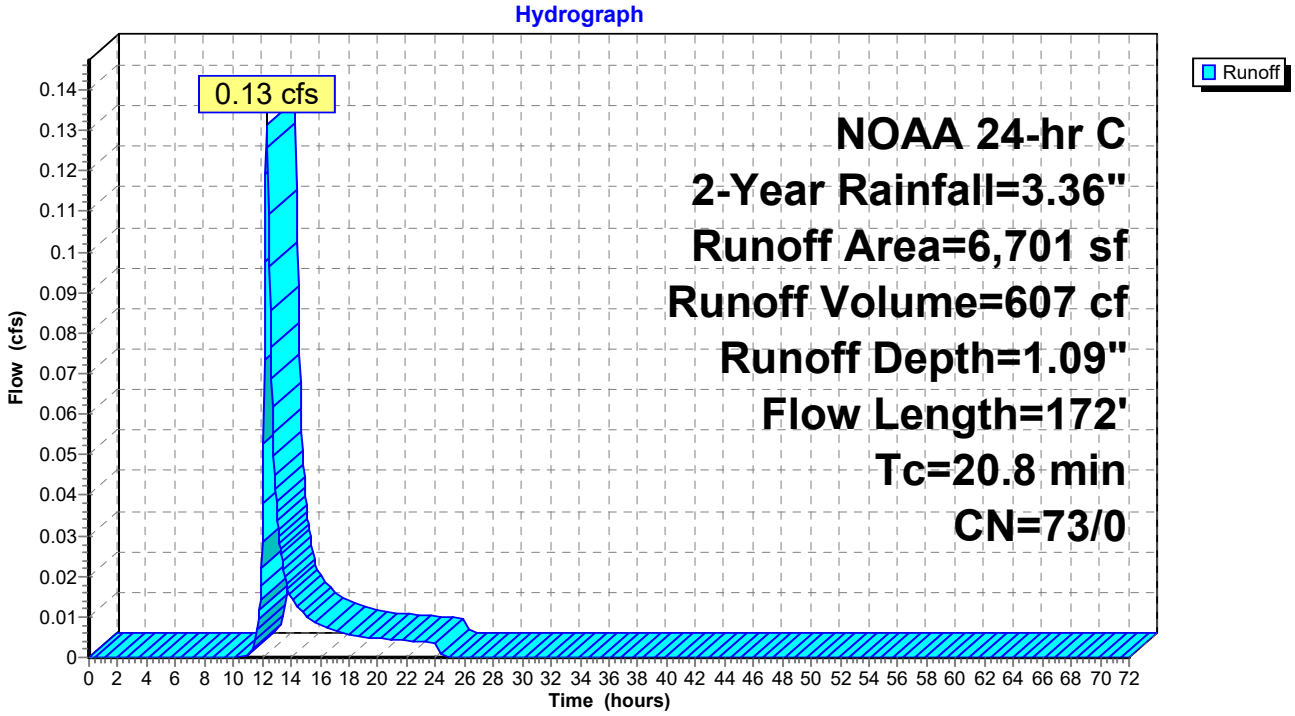
Runoff = 0.13 cfs @ 12.32 hrs, Volume= 607 cf, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
4,509	74	>75% Grass cover, Good, HSG C
2,192	70	Woods, Good, HSG C
6,701	73	Weighted Average
6,701	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	104	0.0230	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	57	0.0230	3.08		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	11	0.0200	2.28		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
20.8	172	Total			

Subcatchment 6P: Pervious



Summary for Subcatchment 7P: Impervious

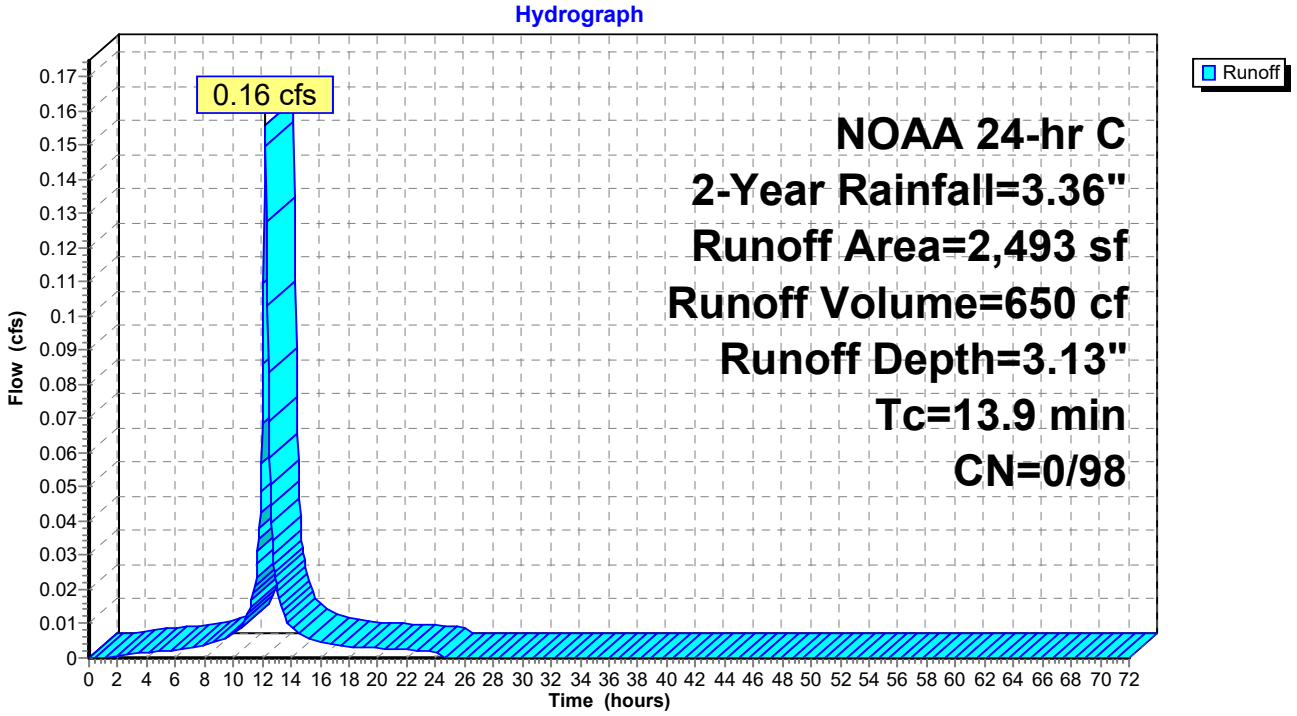
Runoff = 0.16 cfs @ 12.21 hrs, Volume= 650 cf, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
2,493	98	Paved parking, HSG C
2,493	98	100.00% Impervious Area

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

Subcatchment 7P: Impervious



Summary for Subcatchment 8P: Pervious

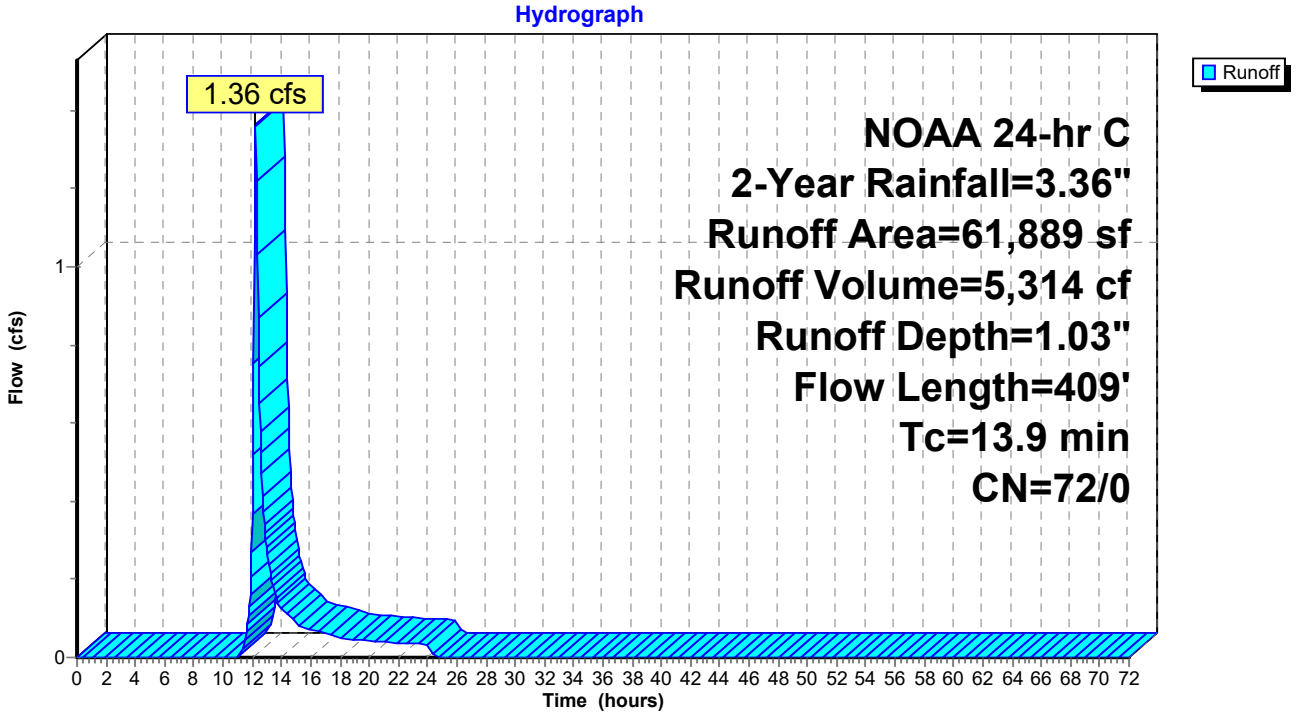
Runoff = 1.36 cfs @ 12.24 hrs, Volume= 5,314 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
28,675	70	Woods, Good, HSG C
33,214	74	>75% Grass cover, Good, HSG C
61,889	72	Weighted Average
61,889	72	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	36	0.0560	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
4.3	51	0.0390	0.20		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.5	297	0.0230	0.76		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
13.9	409	Total			

Subcatchment 8P: Pervious



Summary for Subcatchment 9P: Pervious

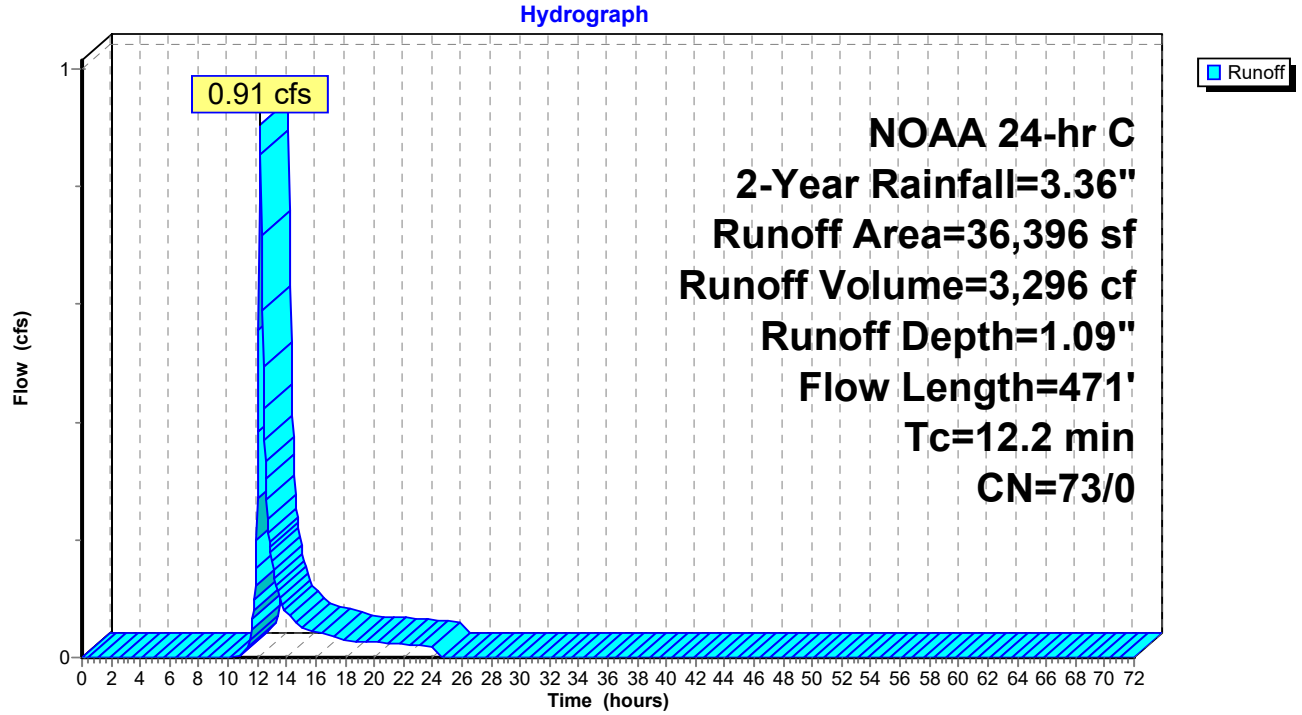
Runoff = 0.91 cfs @ 12.21 hrs, Volume= 3,296 cf, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.36"

Area (sf)	CN	Description
5,369	70	Woods, Good, HSG C
31,027	74	>75% Grass cover, Good, HSG C
36,396	73	Weighted Average
36,396	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0190	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.7	102	0.0240	2.49		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.8	128	0.0310	2.83		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.8	120	0.0250	2.55		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.1	21	0.0310	2.83		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
12.2	471	Total			

Subcatchment 9P: Pervious



Summary for Pond B1: Bioretention Basin 1

[92] Warning: Device #2 is above defined storage

Inflow Area = 48,248 sf, 48.86% Impervious, Inflow Depth = 2.11" for 2-Year event
Inflow = 2.29 cfs @ 12.18 hrs, Volume= 8,496 cf
Outflow = 1.24 cfs @ 12.36 hrs, Volume= 4,601 cf, Atten= 46%, Lag= 10.5 min
Primary = 1.24 cfs @ 12.36 hrs, Volume= 4,601 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 78.24' @ 12.36 hrs Surf.Area= 2,924 sf Storage= 4,156 cf

Plug-Flow detention time= 247.9 min calculated for 4,598 cf (54% of inflow)
Center-of-Mass det. time= 123.7 min (913.9 - 790.2)

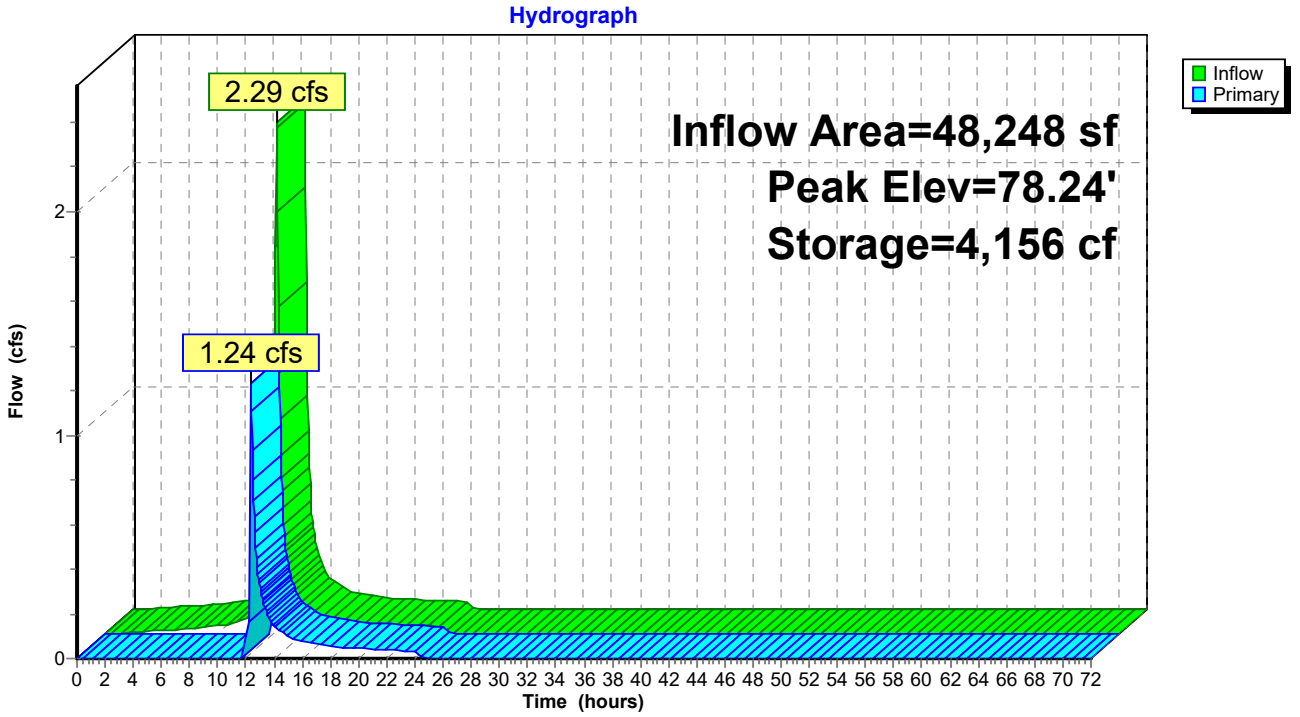
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	4,938 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.50	1,883	0	0	1,883
77.50	2,461	2,166	2,166	2,484
78.50	3,096	2,772	4,938	3,146

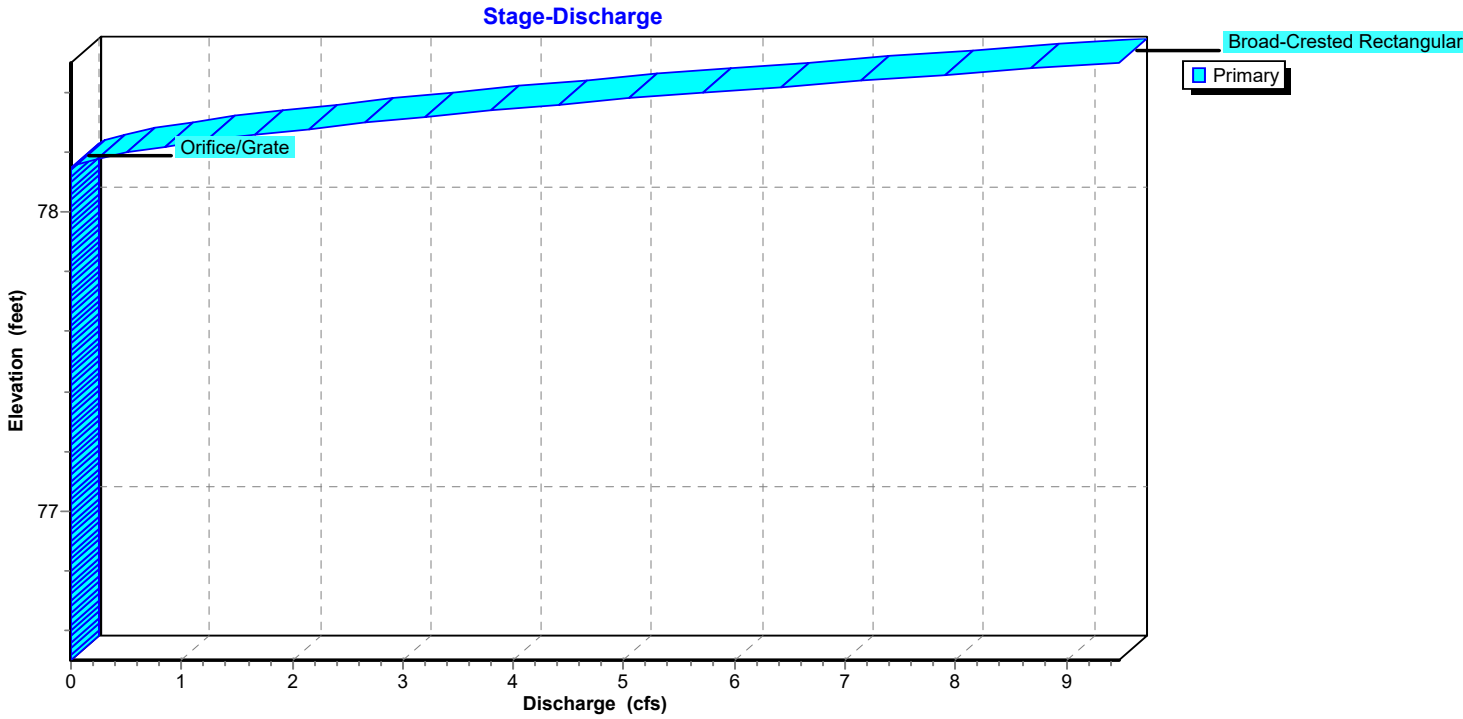
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**24.0" Round CMP_Round 24"** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.85' S= 0.0150 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	78.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	78.15'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=1.21 cfs @ 12.36 hrs HW=78.24' (Free Discharge)
└**1=CMP_Round 24"** (Passes 1.21 cfs of 24.59 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Weir Controls 1.21 cfs @ 0.97 fps)

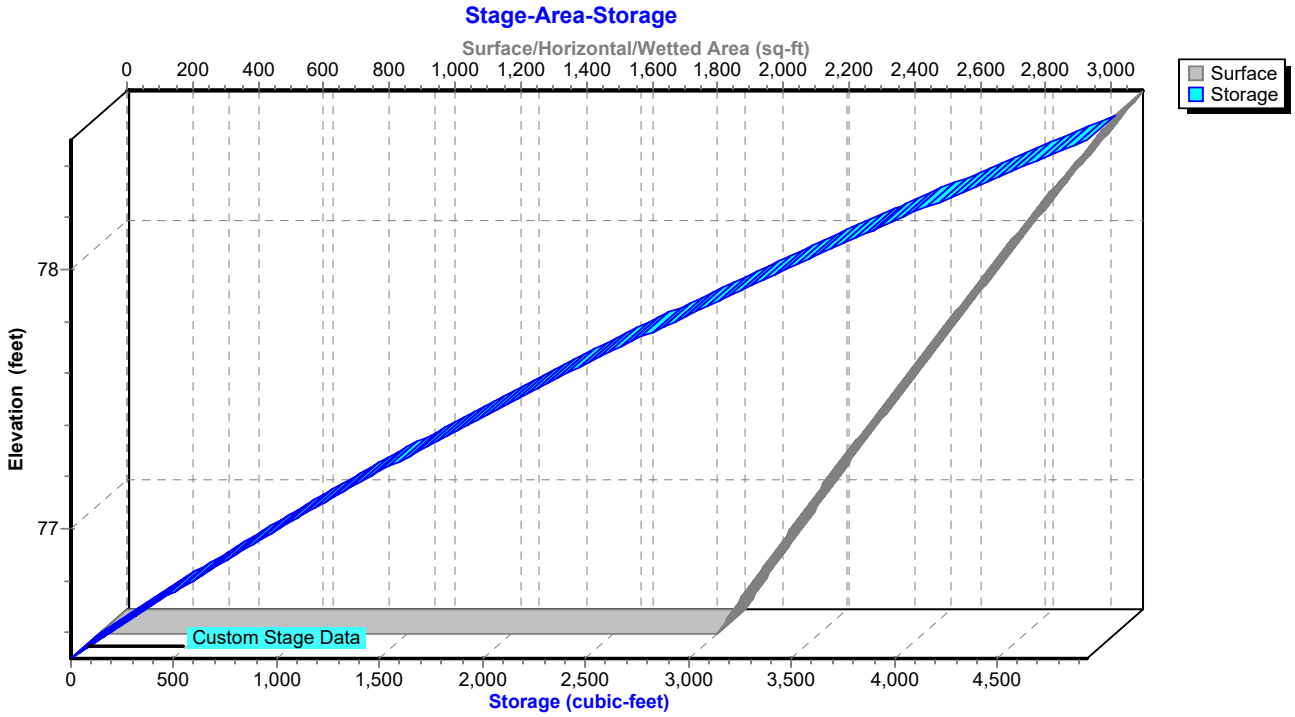
Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Stage-Discharge for Pond B1: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.03	0.00	77.56	0.00	78.09	0.00
76.51	0.00	77.04	0.00	77.57	0.00	78.10	0.00
76.52	0.00	77.05	0.00	77.58	0.00	78.11	0.00
76.53	0.00	77.06	0.00	77.59	0.00	78.12	0.00
76.54	0.00	77.07	0.00	77.60	0.00	78.13	0.00
76.55	0.00	77.08	0.00	77.61	0.00	78.14	0.00
76.56	0.00	77.09	0.00	77.62	0.00	78.15	0.00
76.57	0.00	77.10	0.00	77.63	0.00	78.16	0.05
76.58	0.00	77.11	0.00	77.64	0.00	78.17	0.13
76.59	0.00	77.12	0.00	77.65	0.00	78.18	0.24
76.60	0.00	77.13	0.00	77.66	0.00	78.19	0.37
76.61	0.00	77.14	0.00	77.67	0.00	78.20	0.51
76.62	0.00	77.15	0.00	77.68	0.00	78.21	0.67
76.63	0.00	77.16	0.00	77.69	0.00	78.22	0.85
76.64	0.00	77.17	0.00	77.70	0.00	78.23	1.04
76.65	0.00	77.18	0.00	77.71	0.00	78.24	1.24
76.66	0.00	77.19	0.00	77.72	0.00	78.25	1.45
76.67	0.00	77.20	0.00	77.73	0.00	78.26	1.67
76.68	0.00	77.21	0.00	77.74	0.00	78.27	1.90
76.69	0.00	77.22	0.00	77.75	0.00	78.28	2.15
76.70	0.00	77.23	0.00	77.76	0.00	78.29	2.40
76.71	0.00	77.24	0.00	77.77	0.00	78.30	2.66
76.72	0.00	77.25	0.00	77.78	0.00	78.31	2.93
76.73	0.00	77.26	0.00	77.79	0.00	78.32	3.21
76.74	0.00	77.27	0.00	77.80	0.00	78.33	3.50
76.75	0.00	77.28	0.00	77.81	0.00	78.34	3.79
76.76	0.00	77.29	0.00	77.82	0.00	78.35	4.09
76.77	0.00	77.30	0.00	77.83	0.00	78.36	4.41
76.78	0.00	77.31	0.00	77.84	0.00	78.37	4.72
76.79	0.00	77.32	0.00	77.85	0.00	78.38	5.05
76.80	0.00	77.33	0.00	77.86	0.00	78.39	5.38
76.81	0.00	77.34	0.00	77.87	0.00	78.40	5.72
76.82	0.00	77.35	0.00	77.88	0.00	78.41	6.07
76.83	0.00	77.36	0.00	77.89	0.00	78.42	6.42
76.84	0.00	77.37	0.00	77.90	0.00	78.43	6.78
76.85	0.00	77.38	0.00	77.91	0.00	78.44	7.15
76.86	0.00	77.39	0.00	77.92	0.00	78.45	7.52
76.87	0.00	77.40	0.00	77.93	0.00	78.46	7.90
76.88	0.00	77.41	0.00	77.94	0.00	78.47	8.29
76.89	0.00	77.42	0.00	77.95	0.00	78.48	8.68
76.90	0.00	77.43	0.00	77.96	0.00	78.49	9.08
76.91	0.00	77.44	0.00	77.97	0.00	78.50	**9.48**
76.92	0.00	77.45	0.00	77.98	0.00		
76.93	0.00	77.46	0.00	77.99	0.00		
76.94	0.00	77.47	0.00	78.00	0.00		
76.95	0.00	77.48	0.00	78.01	0.00		
76.96	0.00	77.49	0.00	78.02	0.00		
76.97	0.00	77.50	0.00	78.03	0.00		
76.98	0.00	77.51	0.00	78.04	0.00		
76.99	0.00	77.52	0.00	78.05	0.00		
77.00	0.00	77.53	0.00	78.06	0.00		
77.01	0.00	77.54	0.00	78.07	0.00		
77.02	0.00	77.55	0.00	78.08	0.00		

Stage-Area-Storage for Pond B1: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	1,883	0
76.52	1,894	38
76.54	1,905	76
76.56	1,916	114
76.58	1,926	152
76.60	1,937	191
76.62	1,948	230
76.64	1,959	269
76.66	1,970	308
76.68	1,981	348
76.70	1,992	387
76.72	2,004	427
76.74	2,015	468
76.76	2,026	508
76.78	2,037	549
76.80	2,048	590
76.82	2,060	631
76.84	2,071	672
76.86	2,082	713
76.88	2,094	755
76.90	2,105	797
76.92	2,116	839
76.94	2,128	882
76.96	2,139	924
76.98	2,151	967
77.00	2,162	1,011
77.02	2,174	1,054
77.04	2,186	1,097
77.06	2,197	1,141
77.08	2,209	1,185
77.10	2,221	1,230
77.12	2,232	1,274
77.14	2,244	1,319
77.16	2,256	1,364
77.18	2,268	1,409
77.20	2,279	1,455
77.22	2,291	1,500
77.24	2,303	1,546
77.26	2,315	1,593
77.28	2,327	1,639
77.30	2,339	1,686
77.32	2,351	1,732
77.34	2,363	1,780
77.36	2,375	1,827
77.38	2,388	1,875
77.40	2,400	1,923
77.42	2,412	1,971
77.44	2,424	2,019
77.46	2,436	2,068
77.48	2,449	2,116
77.50	2,461	2,166
77.52	2,473	2,215
77.54	2,485	2,264
77.56	2,497	2,314
77.58	2,509	2,364
77.60	2,521	2,415
77.62	2,533	2,465
77.64	2,546	2,516
77.66	2,558	2,567
77.68	2,570	2,618
77.70	2,582	2,670
77.72	2,594	2,722
77.74	2,607	2,774
77.76	2,619	2,826
77.78	2,631	2,878
77.80	2,644	2,931
77.82	2,656	2,984
77.84	2,669	3,037
77.86	2,681	3,091
77.88	2,694	3,145
77.90	2,706	3,199
77.92	2,719	3,253
77.94	2,731	3,307
77.96	2,744	3,362
77.98	2,757	3,417
78.00	2,769	3,472
78.02	2,782	3,528
78.04	2,795	3,584
78.06	2,808	3,640
78.08	2,820	3,696
78.10	2,833	3,753
78.12	2,846	3,809
78.14	2,859	3,866
78.16	2,872	3,924
78.18	2,885	3,981
78.20	2,898	4,039
78.22	2,911	4,097
78.24	2,924	4,156
78.26	2,937	4,214
78.28	2,950	4,273
78.30	2,963	4,332
78.32	2,976	4,392
78.34	2,990	4,451
78.36	3,003	4,511
78.38	3,016	4,571
78.40	3,029	4,632
78.42	3,043	4,692
78.44	3,056	4,753
78.46	3,069	4,815
78.48	3,083	4,876
78.50	**3,096**	**4,938**

Summary for Pond B2: Bioretention Basin 2

[79] Warning: Submerged Pond B1 Primary device # 1 INLET by 4.37'

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 1.87" for 2-Year event
Inflow = 2.75 cfs @ 12.20 hrs, Volume= 15,128 cf
Outflow = 1.20 cfs @ 12.63 hrs, Volume= 11,962 cf, Atten= 57%, Lag= 25.9 min
Primary = 1.20 cfs @ 12.63 hrs, Volume= 11,962 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 77.37' @ 12.63 hrs Surf.Area= 7,986 sf Storage= 6,451 cf

Plug-Flow detention time= 240.9 min calculated for 11,962 cf (79% of inflow)
Center-of-Mass det. time= 150.5 min (967.0 - 816.5)

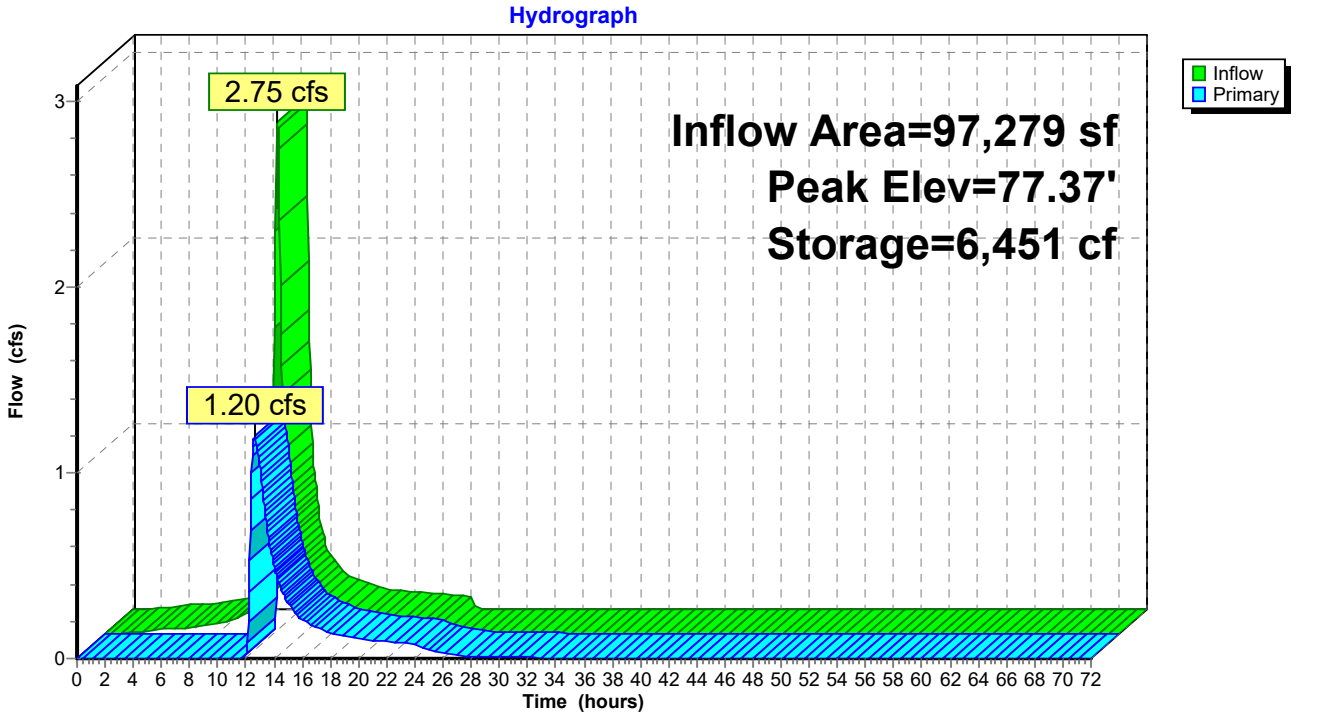
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	26,647 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	6,877	0	0
77.50	8,155	7,516	7,516
78.50	9,522	8,839	16,355
79.50	11,063	10,293	26,647

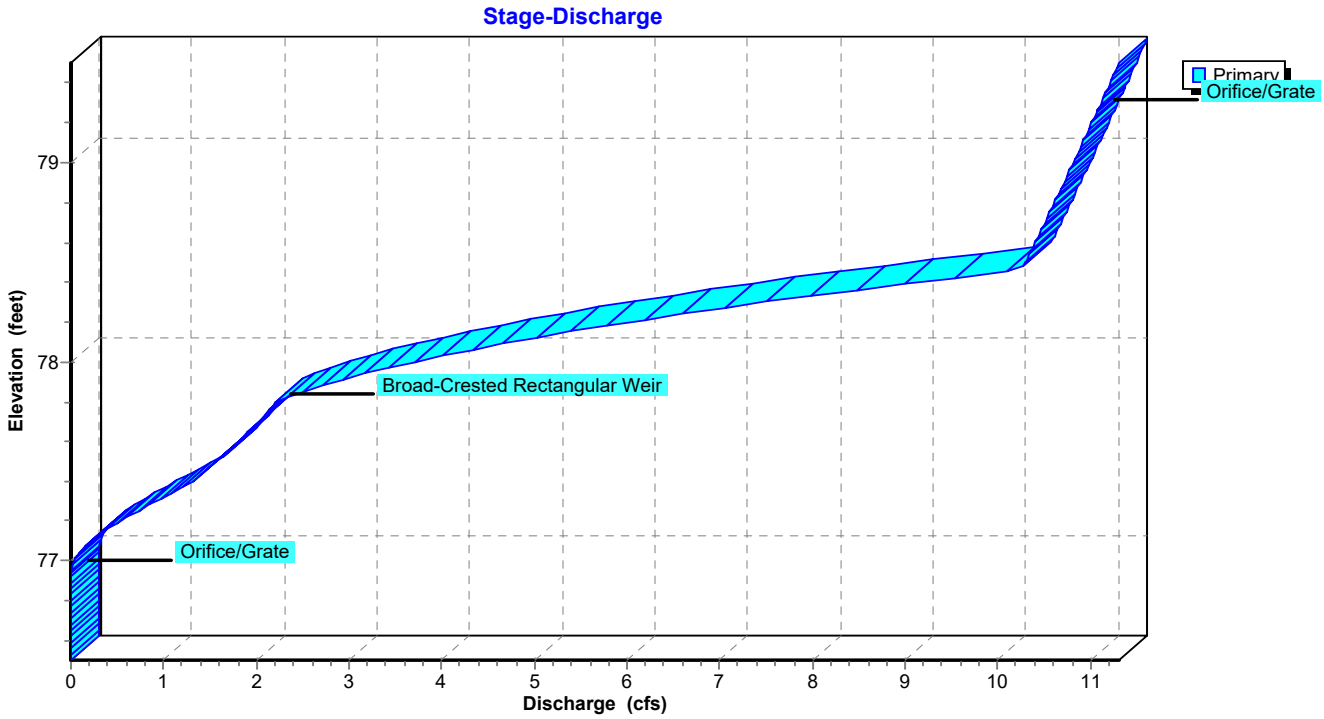
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.06' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	76.94'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	77.78'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	79.25'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 12.63 hrs HW=77.37' (Free Discharge)
└**1=Culvert** (Passes 1.19 cfs of 9.02 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.19 cfs @ 2.23 fps)
  ├**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

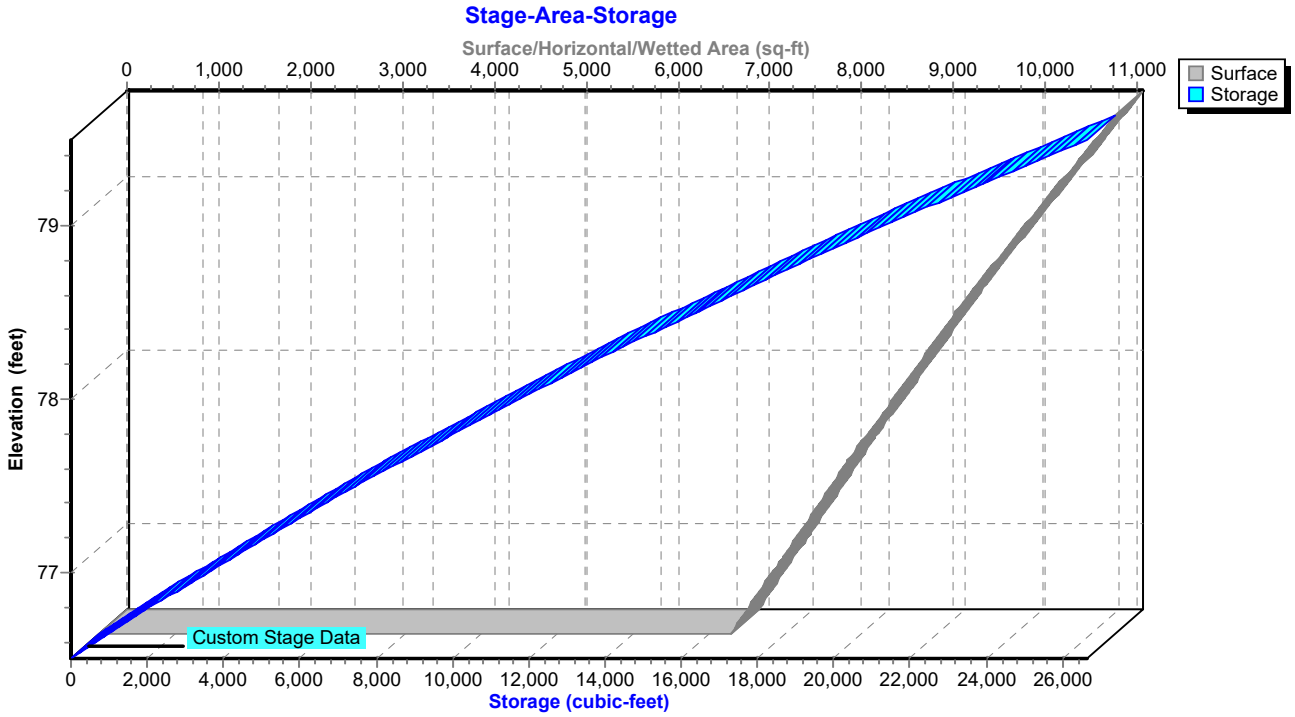
Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Stage-Discharge for Pond B2: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.56	1.73	78.62	10.43
76.52	0.00	77.58	1.77	78.64	10.45
76.54	0.00	77.60	1.82	78.66	10.47
76.56	0.00	77.62	1.86	78.68	10.49
76.58	0.00	77.64	1.90	78.70	10.51
76.60	0.00	77.66	1.94	78.72	10.53
76.62	0.00	77.68	1.99	78.74	10.55
76.64	0.00	77.70	2.03	78.76	10.57
76.66	0.00	77.72	2.06	78.78	10.59
76.68	0.00	77.74	2.10	78.80	10.61
76.70	0.00	77.76	2.14	78.82	10.63
76.72	0.00	77.78	2.18	78.84	10.65
76.74	0.00	77.80	2.25	78.86	10.67
76.76	0.00	77.82	2.34	78.88	10.69
76.78	0.00	77.84	2.45	78.90	10.71
76.80	0.00	77.86	2.58	78.92	10.73
76.82	0.00	77.88	2.71	78.94	10.75
76.84	0.00	77.90	2.86	78.96	10.77
76.86	0.00	77.92	3.01	78.98	10.79
76.88	0.00	77.94	3.17	79.00	10.82
76.90	0.00	77.96	3.34	79.02	10.84
76.92	0.00	77.98	3.52	79.04	10.86
76.94	0.00	78.00	3.71	79.06	10.88
76.96	0.00	78.02	3.91	79.08	10.90
76.98	0.02	78.04	4.12	79.10	10.92
77.00	0.03	78.06	4.33	79.12	10.94
77.02	0.06	78.08	4.56	79.14	10.96
77.04	0.09	78.10	4.79	79.16	10.97
77.06	0.13	78.12	5.02	79.18	10.99
77.08	0.17	78.14	5.27	79.20	11.01
77.10	0.22	78.16	5.52	79.22	11.03
77.12	0.28	78.18	5.78	79.24	11.05
77.14	0.34	78.20	6.05	79.26	11.07
77.16	0.40	78.22	6.32	79.28	11.09
77.18	0.47	78.24	6.61	79.30	11.11
77.20	0.54	78.26	6.90	79.32	11.13
77.22	0.61	78.28	7.20	79.34	11.15
77.24	0.69	78.30	7.51	79.36	11.17
77.26	0.77	78.32	7.83	79.38	11.19
77.28	0.85	78.34	8.15	79.40	11.21
77.30	0.93	78.36	8.48	79.42	11.23
77.32	1.01	78.38	8.82	79.44	11.25
77.34	1.09	78.40	9.18	79.46	11.27
77.36	1.17	78.42	9.54	79.48	11.29
77.38	1.24	78.44	9.92	79.50	**11.31**
77.40	1.31	78.46	10.26		
77.42	1.37	78.48	10.28		
77.44	1.42	78.50	10.30		
77.46	1.47	78.52	10.32		
77.48	1.53	78.54	10.34		
77.50	1.58	78.56	10.36		
77.52	1.63	78.58	10.38		
77.54	1.68	78.60	10.40		

Stage-Area-Storage for Pond B2: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	6,877	0
76.55	6,941	345
76.60	7,005	694
76.65	7,069	1,046
76.70	7,133	1,401
76.75	7,197	1,759
76.80	7,260	2,121
76.85	7,324	2,485
76.90	7,388	2,853
76.95	7,452	3,224
77.00	7,516	3,598
77.05	7,580	3,976
77.10	7,644	4,356
77.15	7,708	4,740
77.20	7,772	5,127
77.25	7,836	5,517
77.30	7,899	5,911
77.35	7,963	6,307
77.40	8,027	6,707
77.45	8,091	7,110
77.50	8,155	7,516
77.55	8,223	7,925
77.60	8,292	8,338
77.65	8,360	8,755
77.70	8,428	9,174
77.75	8,497	9,597
77.80	8,565	10,024
77.85	8,633	10,454
77.90	8,702	10,887
77.95	8,770	11,324
78.00	8,839	11,764
78.05	8,907	12,208
78.10	8,975	12,655
78.15	9,044	13,106
78.20	9,112	13,559
78.25	9,180	14,017
78.30	9,249	14,477
78.35	9,317	14,942
78.40	9,385	15,409
78.45	9,454	15,880
78.50	9,522	16,355
78.55	9,599	16,833
78.60	9,676	17,314
78.65	9,753	17,800
78.70	9,830	18,290
78.75	9,907	18,783
78.80	9,984	19,280
78.85	10,061	19,782
78.90	10,138	20,287
78.95	10,215	20,795
79.00	10,293	21,308
79.05	10,370	21,825
79.10	10,447	22,345
79.15	10,524	22,869
79.20	10,601	23,397
79.25	10,678	23,929
79.30	10,755	24,465
79.35	10,832	25,005
79.40	10,909	25,548
79.45	10,986	26,096
79.50	**11,063**	**26,647**

Summary for Pond B3: Bioretention Basin 3

[92] Warning: Device #2 is above defined storage

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 1.96" for 2-Year event
Inflow = 0.40 cfs @ 12.30 hrs, Volume= 1,913 cf
Outflow = 0.40 cfs @ 12.32 hrs, Volume= 1,439 cf, Atten= 0%, Lag= 1.0 min
Primary = 0.40 cfs @ 12.32 hrs, Volume= 1,439 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 80.78' @ 12.32 hrs Surf.Area= 865 sf Storage= 510 cf

Plug-Flow detention time= 163.2 min calculated for 1,439 cf (75% of inflow)
Center-of-Mass det. time= 68.3 min (873.5 - 805.2)

Volume	Invert	Avail.Storage	Storage Description
#1	79.98'	694 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

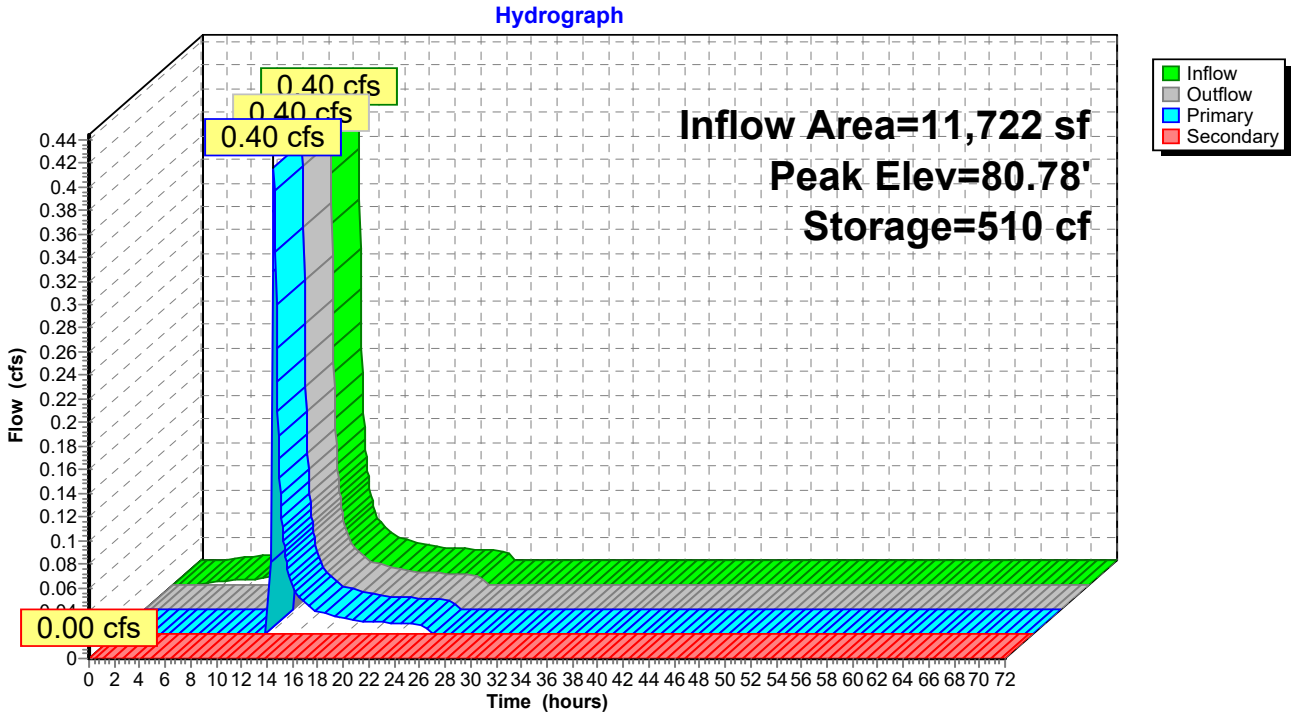
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
79.98	432	0	0	432
80.98	995	694	694	1,003

Device	Routing	Invert	Outlet Devices
#1	Primary	77.48'	**15.0" Round CMP_Round 15"** L= 96.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 77.48' / 77.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Secondary	80.98'	**15.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	80.74'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

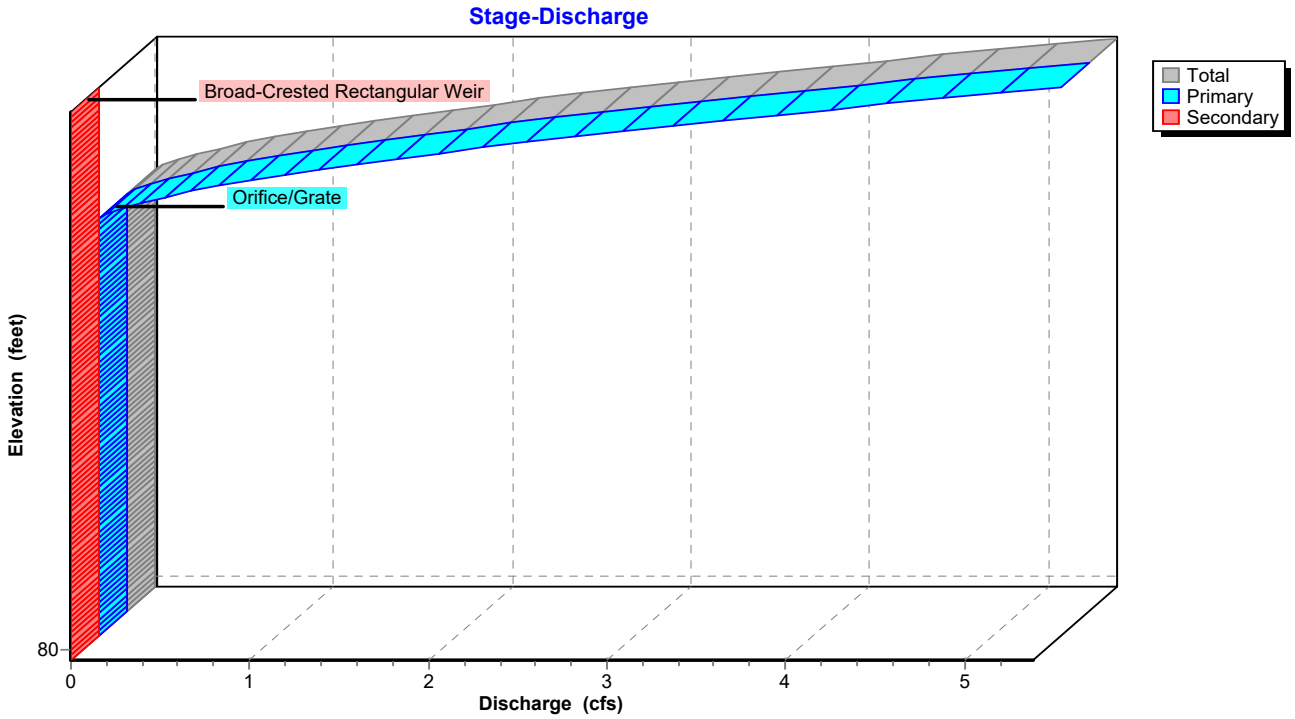
Primary OutFlow Max=0.39 cfs @ 12.32 hrs HW=80.78' (Free Discharge)
└**1=CMP_Round 15"** (Passes 0.39 cfs of 7.63 cfs potential flow)
└**3=Orifice/Grate** (Weir Controls 0.39 cfs @ 0.67 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.98' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

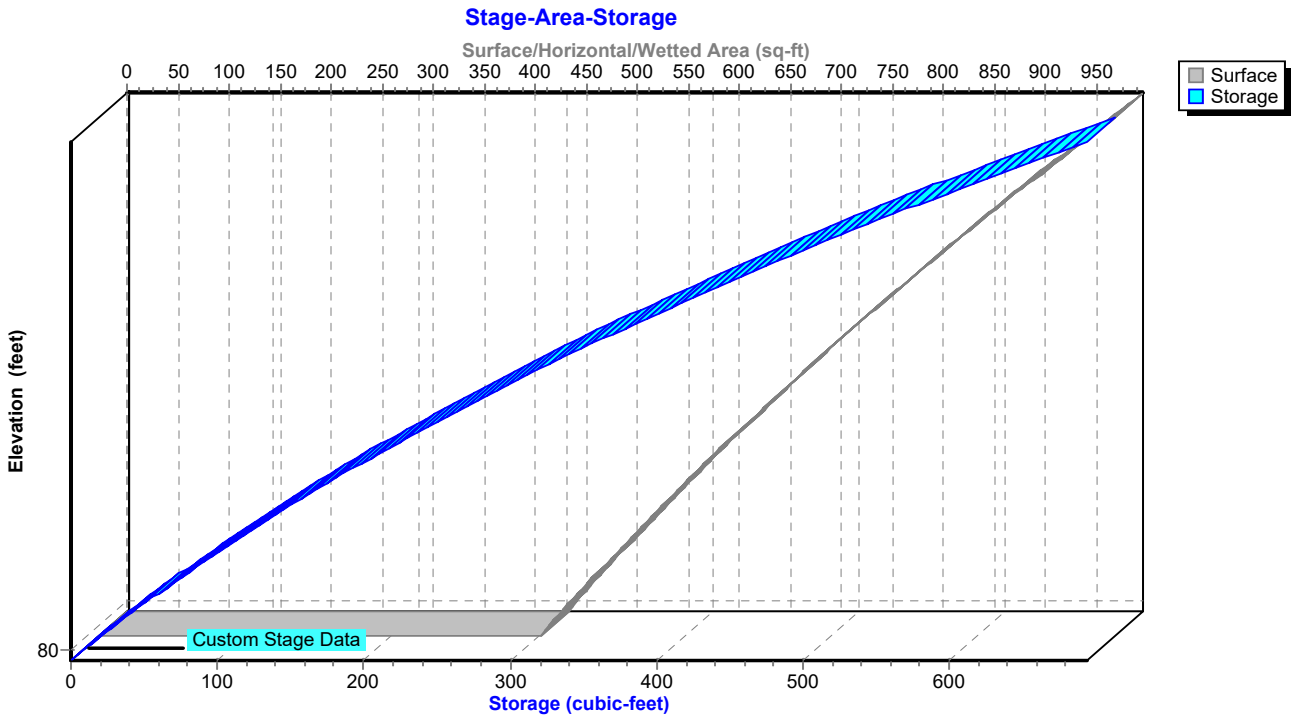
Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Stage-Discharge for Pond B3: Bioretention Basin 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
79.98	0.00	0.00	**0.00**
79.99	0.00	0.00	0.00
80.00	0.00	0.00	0.00
80.01	0.00	0.00	0.00
80.02	0.00	0.00	0.00
80.03	0.00	0.00	0.00
80.04	0.00	0.00	0.00
80.05	0.00	0.00	0.00
80.06	0.00	0.00	0.00
80.07	0.00	0.00	0.00
80.08	0.00	0.00	0.00
80.09	0.00	0.00	0.00
80.10	0.00	0.00	0.00
80.11	0.00	0.00	0.00
80.12	0.00	0.00	0.00
80.13	0.00	0.00	0.00
80.14	0.00	0.00	0.00
80.15	0.00	0.00	0.00
80.16	0.00	0.00	0.00
80.17	0.00	0.00	0.00
80.18	0.00	0.00	0.00
80.19	0.00	0.00	0.00
80.20	0.00	0.00	0.00
80.21	0.00	0.00	0.00
80.22	0.00	0.00	0.00
80.23	0.00	0.00	0.00
80.24	0.00	0.00	0.00
80.25	0.00	0.00	0.00
80.26	0.00	0.00	0.00
80.27	0.00	0.00	0.00
80.28	0.00	0.00	0.00
80.29	0.00	0.00	0.00
80.30	0.00	0.00	0.00
80.31	0.00	0.00	0.00
80.32	0.00	0.00	0.00
80.33	0.00	0.00	0.00
80.34	0.00	0.00	0.00
80.35	0.00	0.00	0.00
80.36	0.00	0.00	0.00
80.37	0.00	0.00	0.00
80.38	0.00	0.00	0.00
80.39	0.00	0.00	0.00
80.40	0.00	0.00	0.00
80.41	0.00	0.00	0.00
80.42	0.00	0.00	0.00
80.43	0.00	0.00	0.00
80.44	0.00	0.00	0.00
80.45	0.00	0.00	0.00
80.46	0.00	0.00	0.00
80.47	0.00	0.00	0.00
80.48	0.00	0.00	0.00
80.49	0.00	0.00	0.00
80.50	0.00	0.00	0.00
80.51	0.00	0.00	0.00
80.52	0.00	0.00	0.00
80.53	0.00	0.00	0.00
80.54	0.00	0.00	0.00
80.55	0.00	0.00	0.00
80.56	0.00	0.00	0.00
80.57	0.00	0.00	0.00
80.58	0.00	0.00	0.00
80.59	0.00	0.00	0.00
80.60	0.00	0.00	0.00
80.61	0.00	0.00	0.00
80.62	0.00	0.00	0.00
80.63	0.00	0.00	0.00
80.64	0.00	0.00	0.00
80.65	0.00	0.00	0.00
80.66	0.00	0.00	0.00
80.67	0.00	0.00	0.00
80.68	0.00	0.00	0.00
80.69	0.00	0.00	0.00
80.70	0.00	0.00	0.00
80.71	0.00	0.00	0.00
80.72	0.00	0.00	0.00
80.73	0.00	0.00	0.00
80.74	0.00	0.00	0.00
80.75	0.05	0.05	0.00
80.76	0.13	0.13	0.00
80.77	0.24	0.24	0.00
80.78	0.37	0.37	0.00
80.79	0.51	0.51	0.00
80.80	0.67	0.67	0.00
80.81	0.85	0.85	0.00
80.82	1.04	1.04	0.00
80.83	1.24	1.24	0.00
80.84	1.45	1.45	0.00
80.85	1.67	1.67	0.00
80.86	1.90	1.90	0.00
80.87	2.15	2.15	0.00
80.88	2.40	2.40	0.00
80.89	2.66	2.66	0.00
80.90	2.93	2.93	0.00
80.91	3.21	3.21	0.00
80.92	3.50	3.50	0.00
80.93	3.79	3.79	0.00
80.94	4.09	4.09	0.00
80.95	4.41	4.41	0.00
80.96	4.72	4.72	0.00
80.97	5.05	5.05	0.00
80.98	**5.38**	**5.38**	0.00

Stage-Area-Storage for Pond B3: Bioretention Basin 3

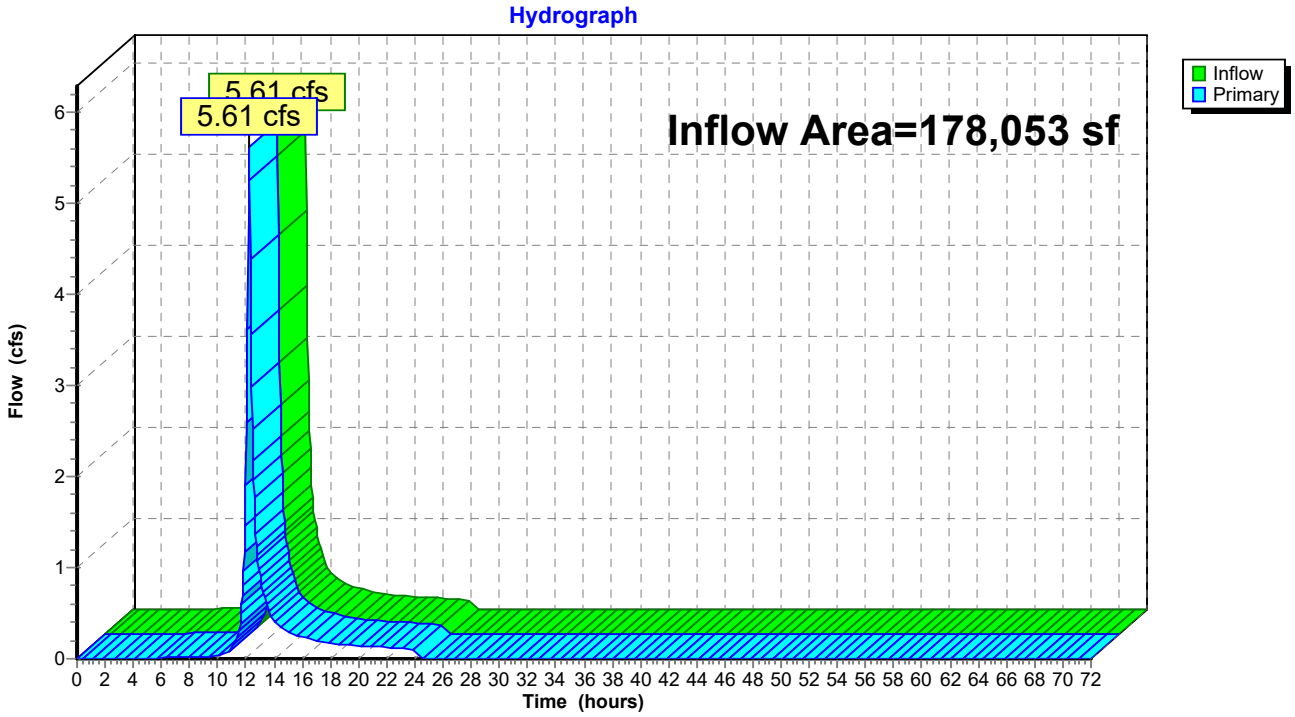
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
79.98	432	0
79.99	436	4
80.00	441	9
80.01	446	13
80.02	450	18
80.03	455	22
80.04	459	27
80.05	464	31
80.06	469	36
80.07	473	41
80.08	478	45
80.09	483	50
80.10	487	55
80.11	492	60
80.12	497	65
80.13	502	70
80.14	507	75
80.15	511	80
80.16	516	85
80.17	521	90
80.18	526	96
80.19	531	101
80.20	536	106
80.21	541	112
80.22	546	117
80.23	551	123
80.24	556	128
80.25	561	134
80.26	566	139
80.27	571	145
80.28	577	151
80.29	582	157
80.30	587	162
80.31	592	168
80.32	597	174
80.33	603	180
80.34	608	186
80.35	613	192
80.36	619	199
80.37	624	205
80.38	629	211
80.39	635	217
80.40	640	224
80.41	646	230
80.42	651	237
80.43	657	243
80.44	662	250
80.45	668	256
80.46	673	263
80.47	679	270
80.48	685	277
80.49	690	284
80.50	696	291
80.51	702	298
80.52	707	305
80.53	713	312
80.54	719	319
80.55	725	326
80.56	730	333
80.57	736	341
80.58	742	348
80.59	748	355
80.60	754	363
80.61	760	371
80.62	766	378
80.63	772	386
80.64	778	394
80.65	784	401
80.66	790	409
80.67	796	417
80.68	802	425
80.69	808	433
80.70	814	441
80.71	820	450
80.72	826	458
80.73	833	466
80.74	839	474
80.75	845	483
80.76	851	491
80.77	858	500
80.78	864	508
80.79	870	517
80.80	877	526
80.81	883	535
80.82	889	544
80.83	896	552
80.84	902	561
80.85	909	571
80.86	915	580
80.87	922	589
80.88	928	598
80.89	935	607
80.90	941	617
80.91	948	626
80.92	955	636
80.93	961	645
80.94	968	655
80.95	975	665
80.96	981	674
80.97	988	684
80.98	**995**	**694**

Summary for Link 5E: EDA 1

Inflow Area = 178,053 sf, 5.81% Impervious, Inflow Depth = 1.37" for 2-Year event
Inflow = 5.61 cfs @ 12.21 hrs, Volume= 20,371 cf
Primary = 5.61 cfs @ 12.21 hrs, Volume= 20,371 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5E: EDA 1

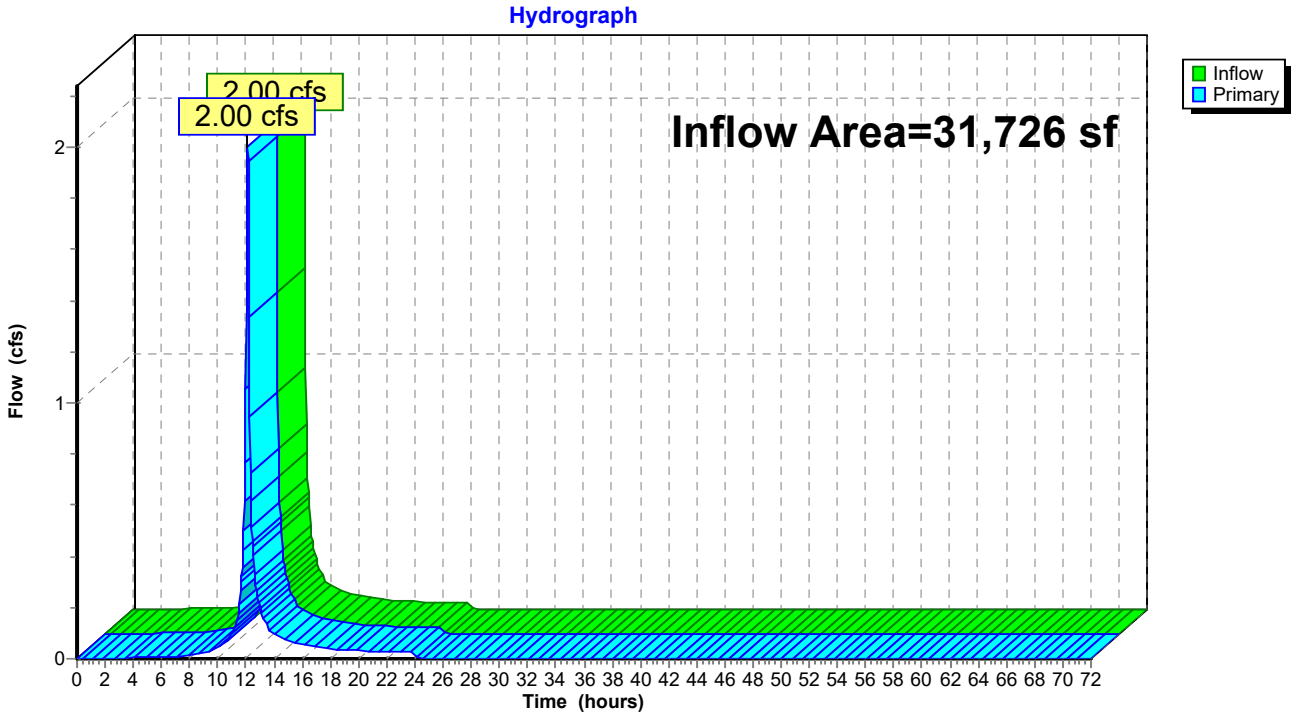


Summary for Link 6E: EDA 2

Inflow Area = 31,726 sf, 17.78% Impervious, Inflow Depth = 2.25" for 2-Year event
Inflow = 2.00 cfs @ 12.13 hrs, Volume= 5,941 cf
Primary = 2.00 cfs @ 12.13 hrs, Volume= 5,941 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 6E: EDA 2

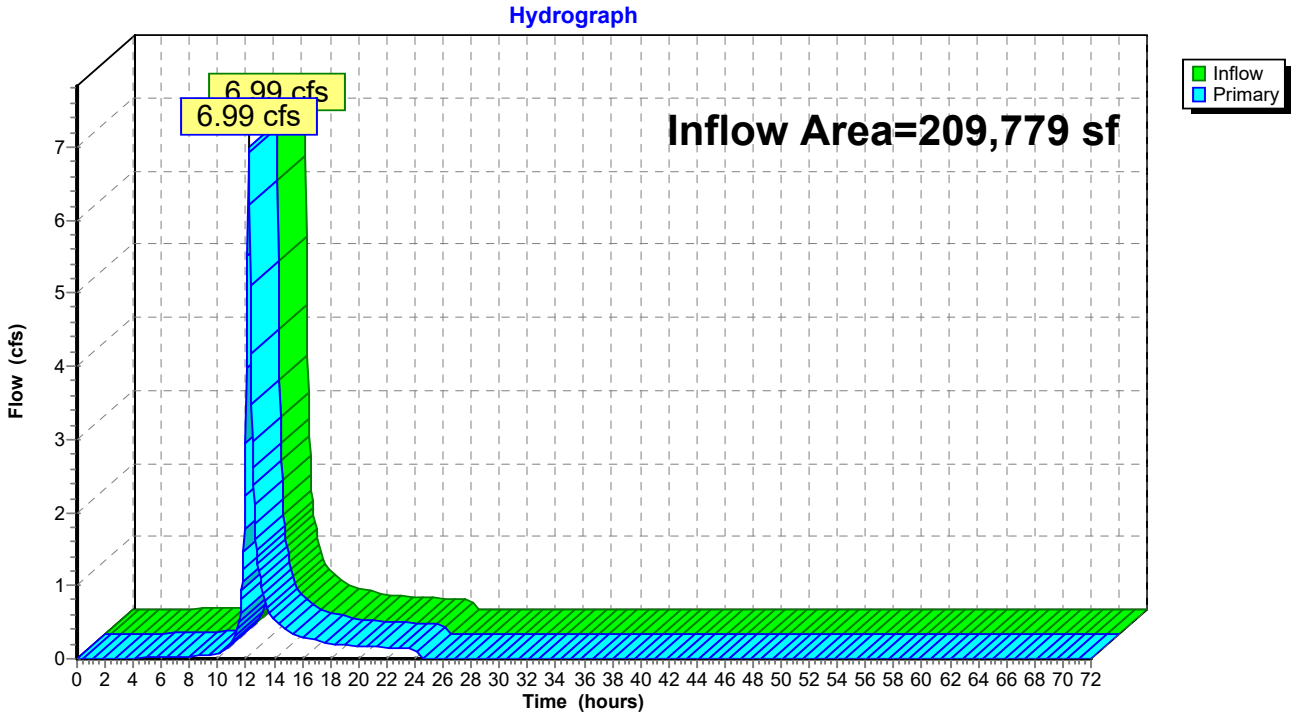


Summary for Link 7E: EDA

Inflow Area = 209,779 sf, 7.62% Impervious, Inflow Depth = 1.51" for 2-Year event
Inflow = 6.99 cfs @ 12.18 hrs, Volume= 26,313 cf
Primary = 6.99 cfs @ 12.18 hrs, Volume= 26,313 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7E: EDA

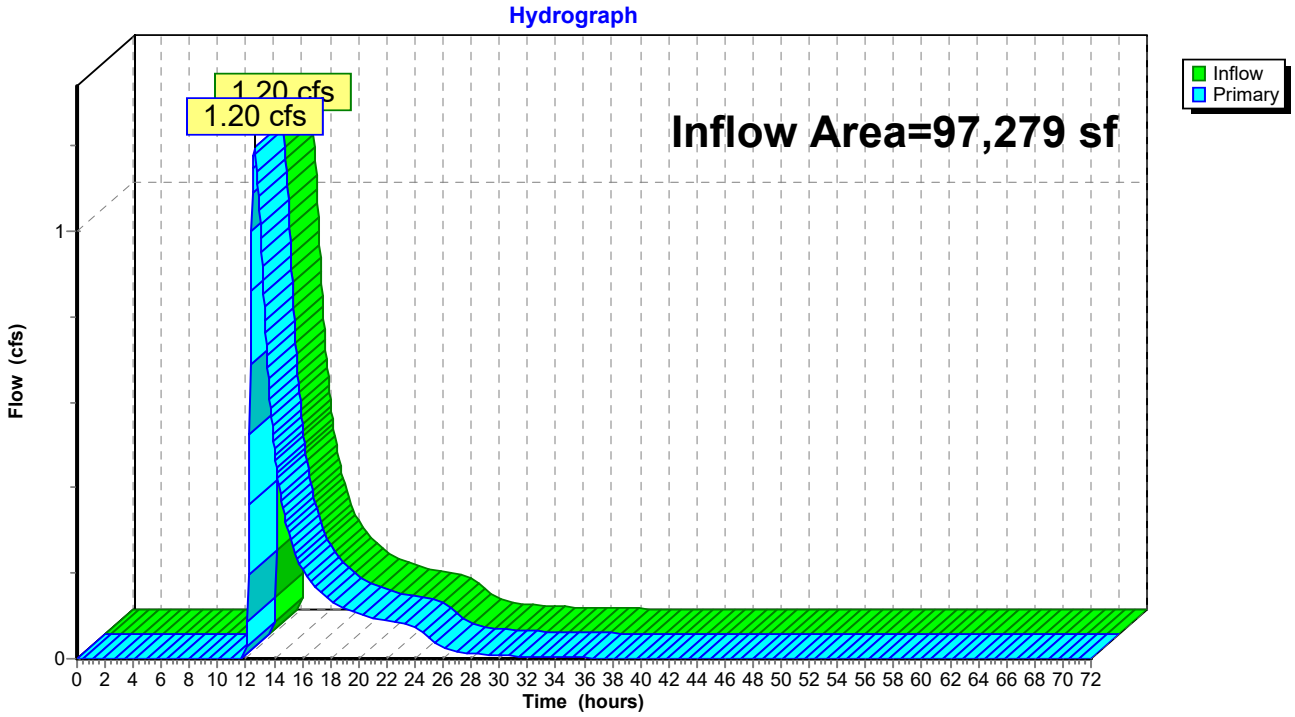


Summary for Link 10P: PDA 1A

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth > 1.48" for 2-Year event
Inflow = 1.20 cfs @ 12.63 hrs, Volume= 11,962 cf
Primary = 1.20 cfs @ 12.63 hrs, Volume= 11,962 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10P: PDA 1A

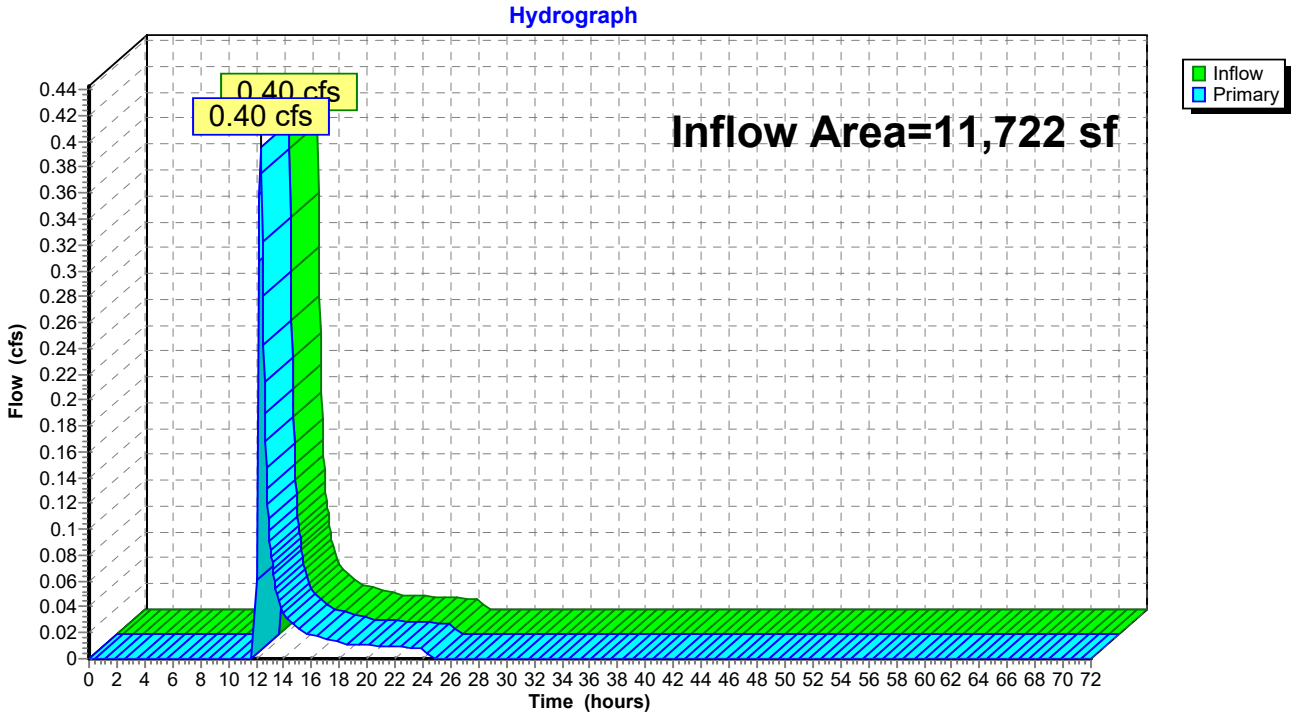


Summary for Link 11P: PDA 1B

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 1.47" for 2-Year event
Inflow = 0.40 cfs @ 12.32 hrs, Volume= 1,439 cf
Primary = 0.40 cfs @ 12.32 hrs, Volume= 1,439 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11P: PDA 1B

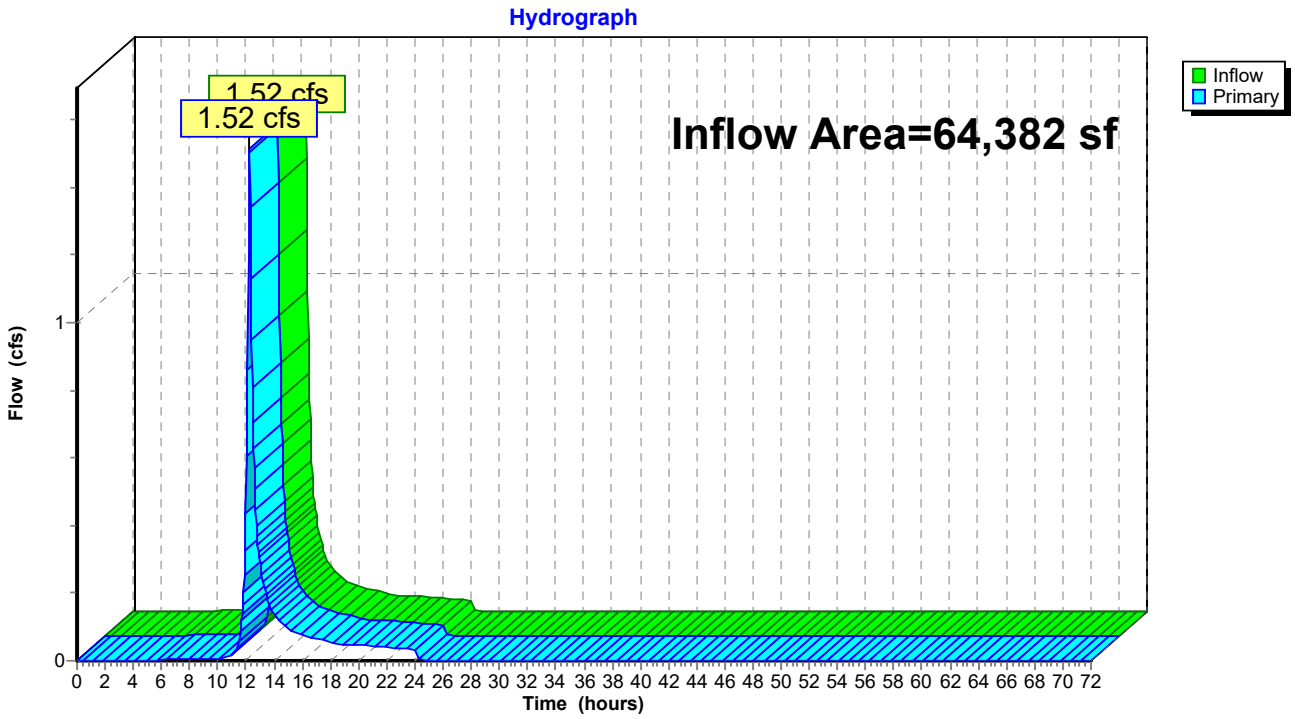


Summary for Link 12P: PDA 1C

Inflow Area = 64,382 sf, 3.87% Impervious, Inflow Depth = 1.11" for 2-Year event
Inflow = 1.52 cfs @ 12.23 hrs, Volume= 5,964 cf
Primary = 1.52 cfs @ 12.23 hrs, Volume= 5,964 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12P: PDA 1C

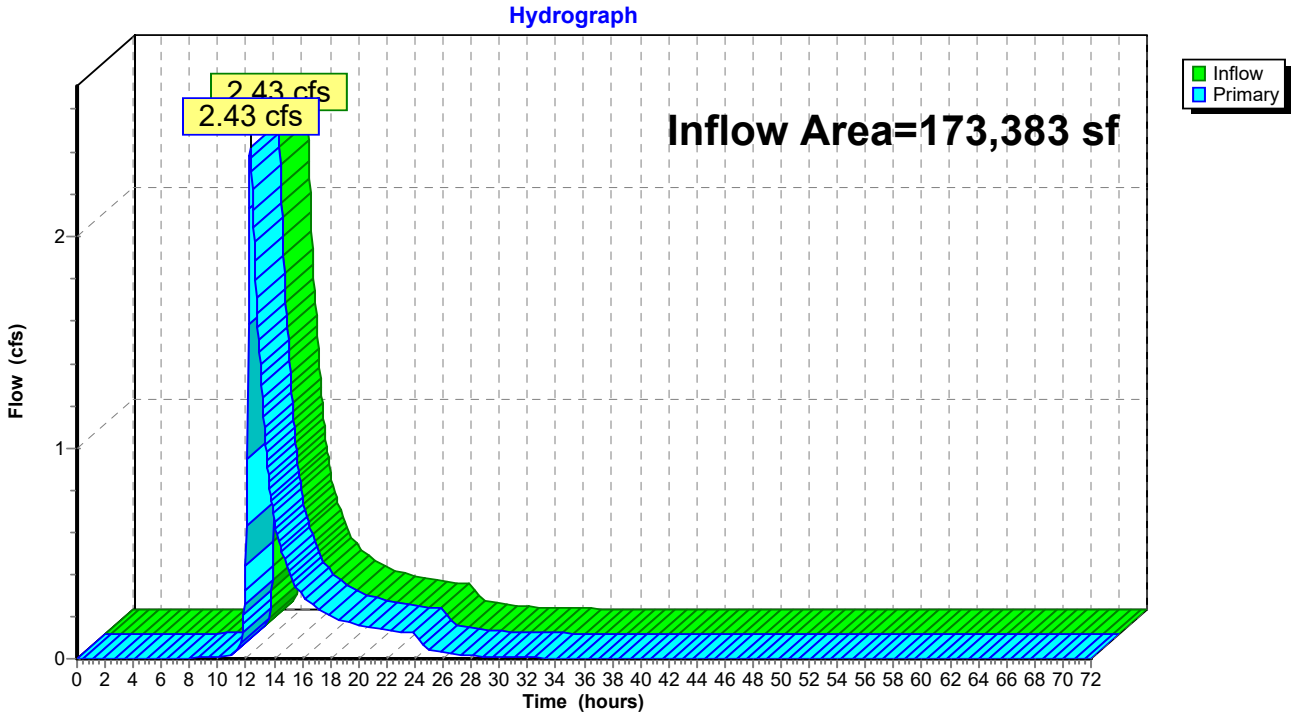


Summary for Link 13P: PDA 1

Inflow Area = 173,383 sf, 38.29% Impervious, Inflow Depth = 1.34" for 2-Year event
Inflow = 2.43 cfs @ 12.30 hrs, Volume= 19,365 cf
Primary = 2.43 cfs @ 12.30 hrs, Volume= 19,365 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13P: PDA 1

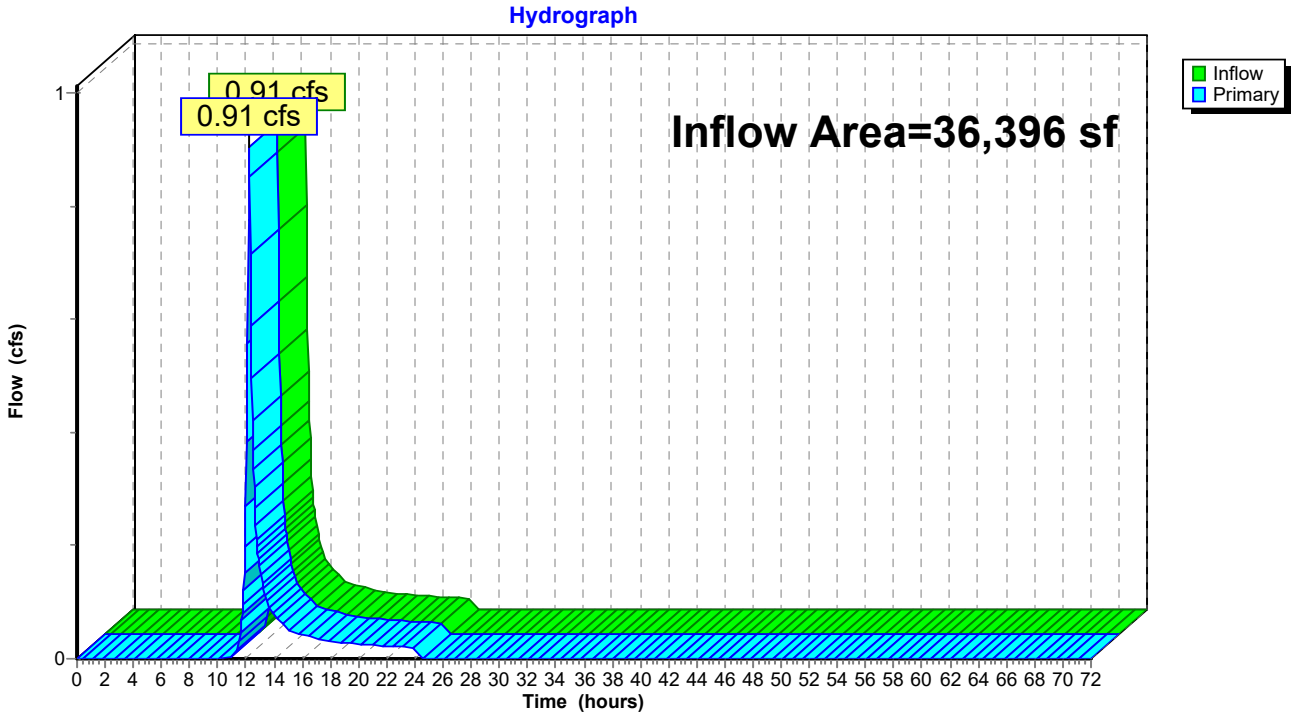


Summary for Link 14P: PDA 2

Inflow Area = 36,396 sf, 0.00% Impervious, Inflow Depth = 1.09" for 2-Year event
Inflow = 0.91 cfs @ 12.21 hrs, Volume= 3,296 cf
Primary = 0.91 cfs @ 12.21 hrs, Volume= 3,296 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 14P: PDA 2

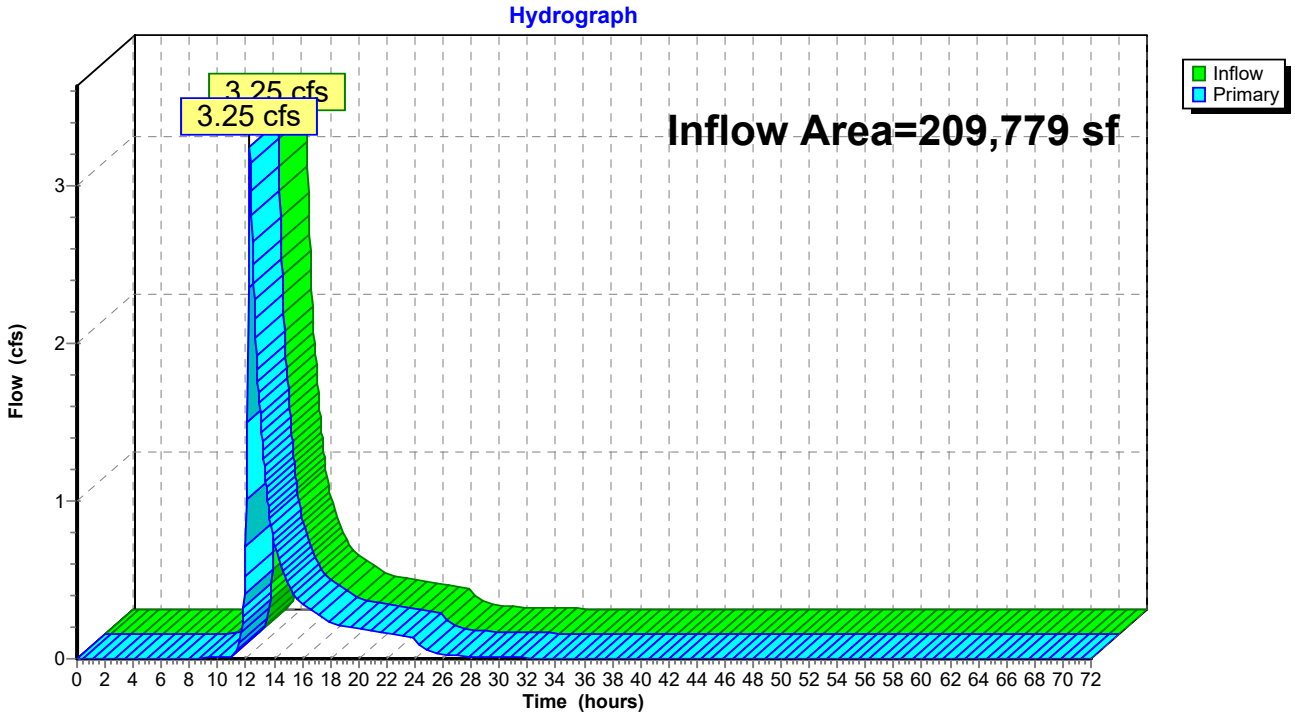


Summary for Link 15P: PDA

Inflow Area = 209,779 sf, 31.65% Impervious, Inflow Depth = 1.30" for 2-Year event
Inflow = 3.25 cfs @ 12.26 hrs, Volume= 22,660 cf
Primary = 3.25 cfs @ 12.26 hrs, Volume= 22,660 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 15P: PDA



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Impervious Runoff Area=10,351 sf 100.00% Impervious Runoff Depth=4.94"
Tc=12.4 min CN=0/98 Runoff=1.05 cfs 4,264 cf

Subcatchment 1P: Impervious Runoff Area=23,576 sf 100.00% Impervious Runoff Depth=4.94"
Tc=10.7 min CN=0/98 Runoff=2.50 cfs 9,711 cf

Subcatchment 2E: Pervious Runoff Area=167,702 sf 0.00% Impervious Runoff Depth=2.68"
Flow Length=630' Tc=12.4 min CN=76/0 Runoff=10.69 cfs 37,517 cf

Subcatchment 2P: Pervious Runoff Area=24,672 sf 0.00% Impervious Runoff Depth=2.51"
Flow Length=426' Tc=10.7 min CN=74/0 Runoff=1.54 cfs 5,158 cf

Subcatchment 3E: Impervious Runoff Area=5,641 sf 100.00% Impervious Runoff Depth=4.94"
Tc=6.0 min CN=0/98 Runoff=0.69 cfs 2,324 cf

Subcatchment 3P: Roof Area Runoff Area=35,418 sf 100.00% Impervious Runoff Depth=4.94"
Tc=10.7 min CN=0/98 Runoff=3.76 cfs 14,589 cf

Subcatchment 4E: Pervious Runoff Area=26,085 sf 0.00% Impervious Runoff Depth=3.74"
Flow Length=393' Tc=6.0 min CN=87/0 Runoff=2.75 cfs 8,124 cf

Subcatchment 4P: Pervious Runoff Area=13,613 sf 0.00% Impervious Runoff Depth=2.51"
Tc=10.7 min CN=74/0 Runoff=0.85 cfs 2,846 cf

Subcatchment 5P: Impervious Runoff Area=5,021 sf 97.63% Impervious Runoff Depth=4.94"
Tc=20.8 min CN=96/98 Runoff=0.41 cfs 2,066 cf

Subcatchment 6P: Pervious Runoff Area=6,701 sf 0.00% Impervious Runoff Depth=2.42"
Flow Length=172' Tc=20.8 min CN=73/0 Runoff=0.31 cfs 1,353 cf

Subcatchment 7P: Impervious Runoff Area=2,493 sf 100.00% Impervious Runoff Depth=4.94"
Tc=13.9 min CN=0/98 Runoff=0.24 cfs 1,027 cf

Subcatchment 8P: Pervious Runoff Area=61,889 sf 0.00% Impervious Runoff Depth=2.34"
Flow Length=409' Tc=13.9 min CN=72/0 Runoff=3.24 cfs 12,055 cf

Subcatchment 9P: Pervious Runoff Area=36,396 sf 0.00% Impervious Runoff Depth=2.42"
Flow Length=471' Tc=12.2 min CN=73/0 Runoff=2.10 cfs 7,347 cf

Pond B1: Bioretention Basin 1 Peak Elev=78.34' Storage=4,464 cf Inflow=4.04 cfs 14,869 cf
Outflow=3.92 cfs 10,974 cf

Pond B2: Bioretention Basin 2 Peak Elev=77.94' Storage=11,272 cf Inflow=8.46 cfs 28,409 cf
Outflow=3.21 cfs 25,242 cf

Pond B3: Bioretention Basin 3 Peak Elev=80.80' Storage=528 cf Inflow=0.72 cfs 3,419 cf
Primary=0.72 cfs 2,944 cf Secondary=0.00 cfs 0 cf Outflow=0.72 cfs 2,944 cf

Link 5E: EDA 1 Inflow=11.74 cfs 41,781 cf
Primary=11.74 cfs 41,781 cf

Link 6E: EDA 2 Inflow=3.44 cfs 10,447 cf
Primary=3.44 cfs 10,447 cf

Link 7E: EDA Inflow=14.14 cfs 52,228 cf
Primary=14.14 cfs 52,228 cf

Link 10P: PDA 1A Inflow=3.21 cfs 25,242 cf
Primary=3.21 cfs 25,242 cf

Link 11P: PDA 1B Inflow=0.72 cfs 2,944 cf
Primary=0.72 cfs 2,944 cf

Link 12P: PDA 1C Inflow=3.50 cfs 13,082 cf
Primary=3.50 cfs 13,082 cf

Link 13P: PDA 1 Inflow=6.33 cfs 41,268 cf
Primary=6.33 cfs 41,268 cf

Link 14P: PDA 2 Inflow=2.10 cfs 7,347 cf
Primary=2.10 cfs 7,347 cf

Link 15P: PDA Inflow=8.20 cfs 48,616 cf
Primary=8.20 cfs 48,616 cf

Total Runoff Area = 419,558 sf Runoff Volume = 108,380 cf Average Runoff Depth = 3.10"
80.36% Pervious = 337,177 sf 19.64% Impervious = 82,381 sf

Summary for Subcatchment 1E: Impervious

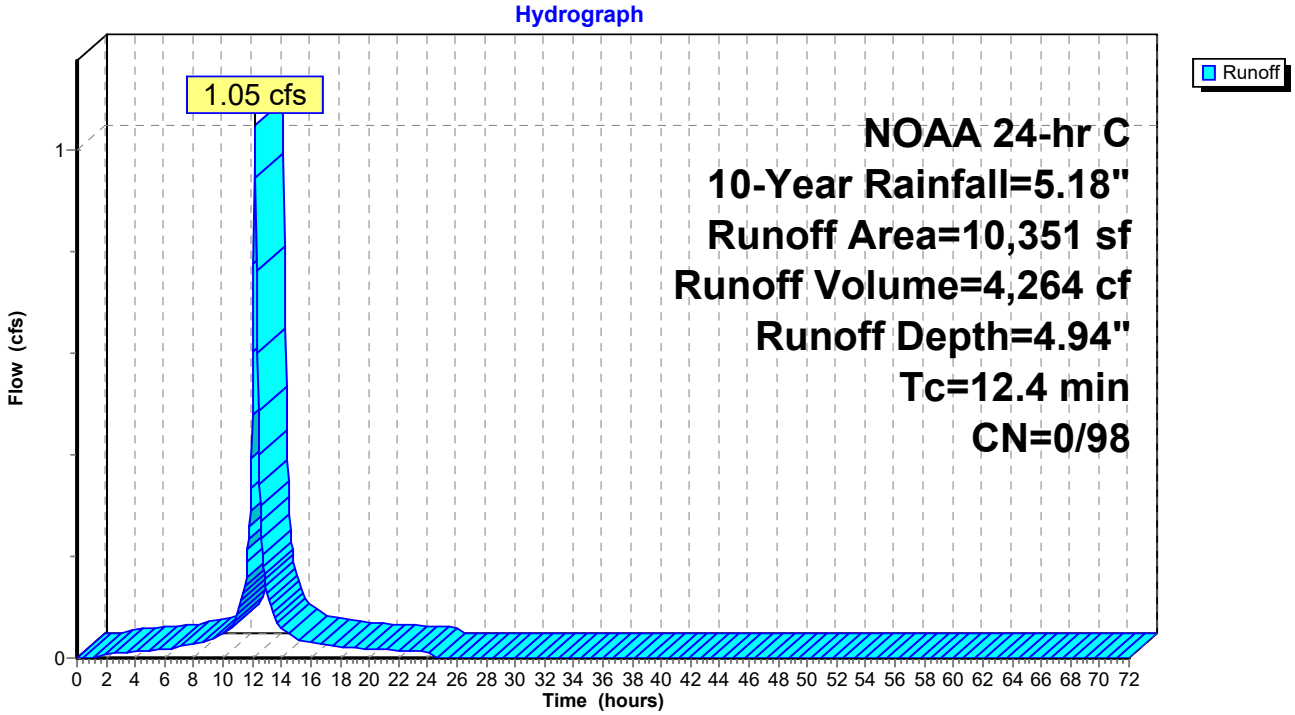
Runoff = 1.05 cfs @ 12.20 hrs, Volume= 4,264 cf, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
3,299	98	Unconnected roofs, HSG C
7,052	98	Paved parking, HSG C
10,351	98	Weighted Average
10,351	98	100.00% Impervious Area

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

Subcatchment 1E: Impervious



Summary for Subcatchment 1P: Impervious

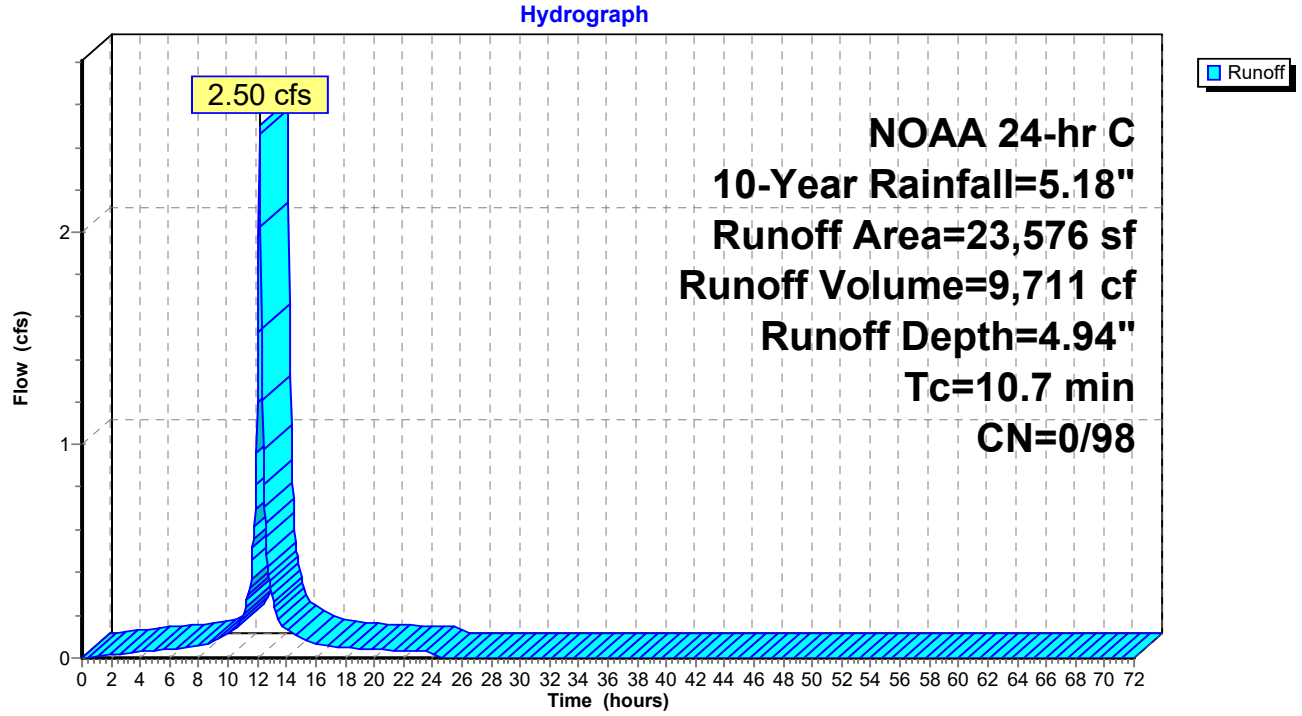
Runoff = 2.50 cfs @ 12.18 hrs, Volume= 9,711 cf, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
23,576	98	Paved parking, HSG C
23,576	98	100.00% Impervious Area

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

Subcatchment 1P: Impervious



Summary for Subcatchment 2E: Pervious

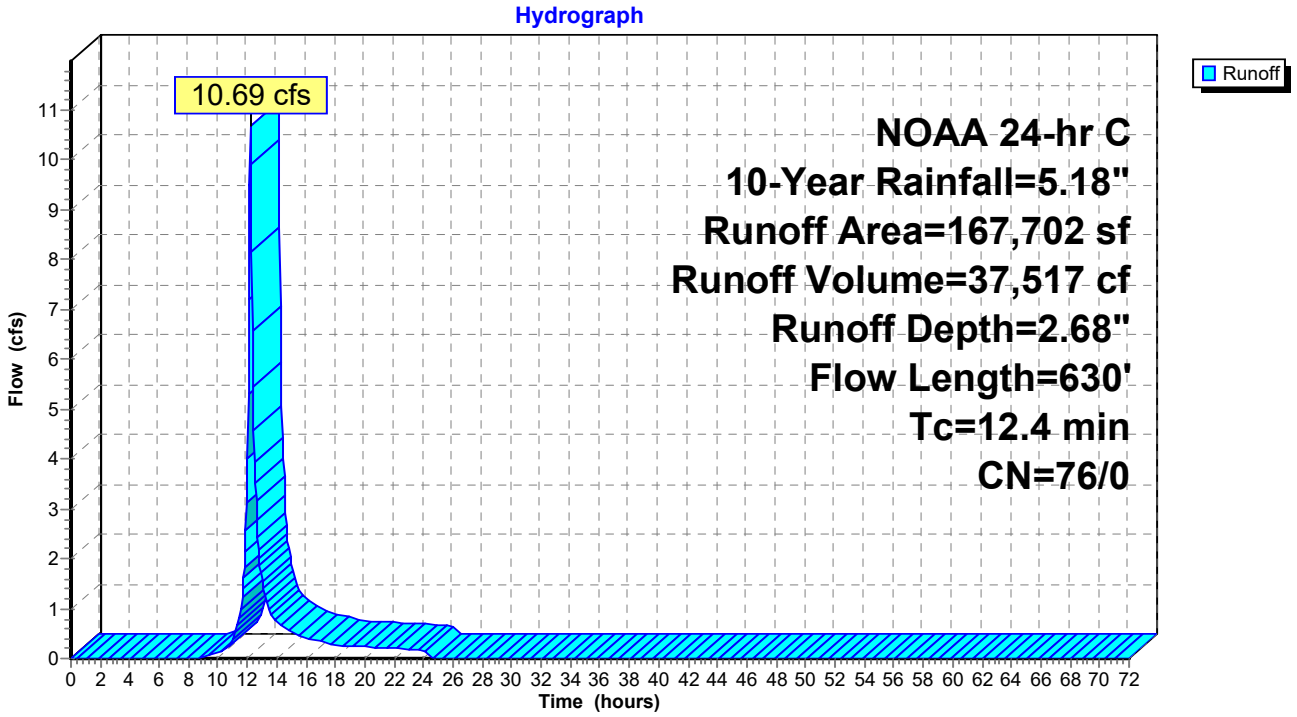
Runoff = 10.69 cfs @ 12.20 hrs, Volume= 37,517 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
24,589	96	Gravel surface, HSG C
36,591	70	Woods, Good, HSG C
105,816	74	>75% Grass cover, Good, HSG C
706	72	Woods/grass comb., Good, HSG C
167,702	76	Weighted Average
167,702	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	27	0.0490	1.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
8.8	73	0.0130	0.14		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.4	54	0.0180	2.16		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
1.2	207	0.0340	2.97		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.5	59	0.0170	2.10		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
0.2	43	0.0470	3.49		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
1.0	167	0.0280	2.69		**Shallow Concentrated Flow, G-H** Unpaved Kv= 16.1 fps
12.4	630	Total			

Subcatchment 2E: Pervious



Summary for Subcatchment 2P: Pervious

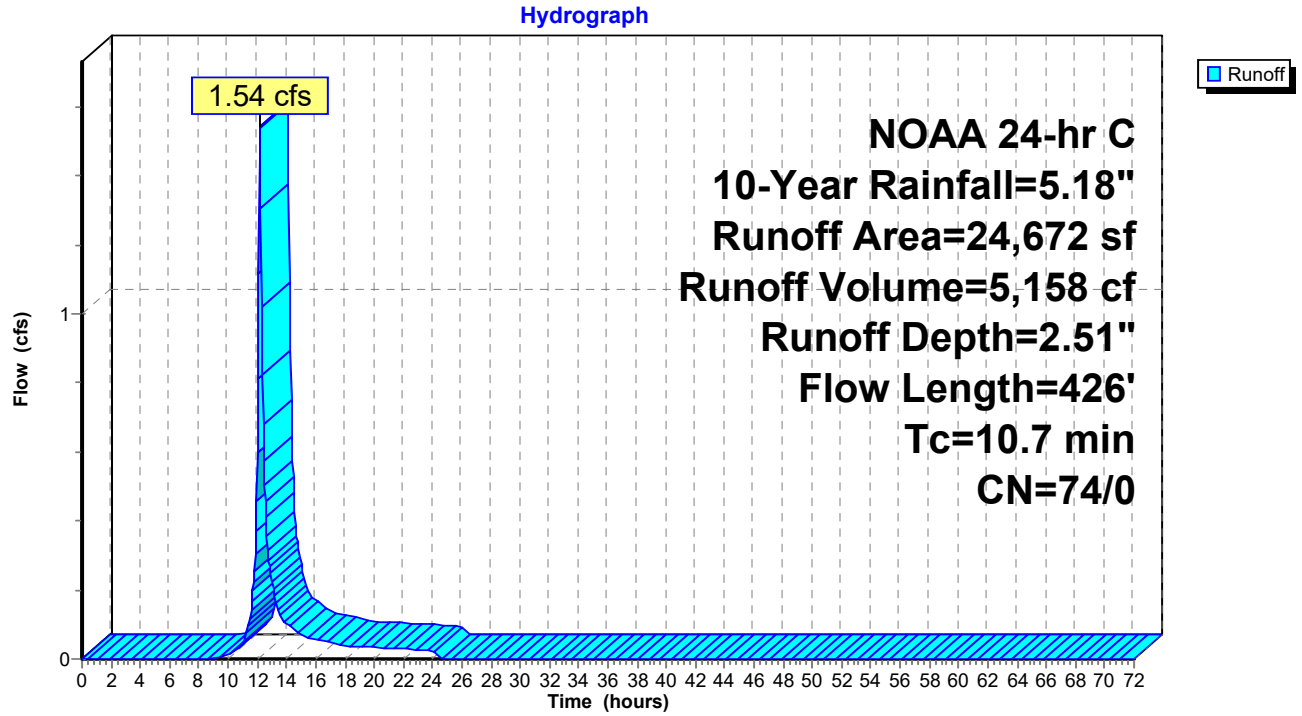
Runoff = 1.54 cfs @ 12.19 hrs, Volume= 5,158 cf, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
22,852	74	>75% Grass cover, Good, HSG C
1,820	72	Woods/grass comb., Good, HSG C
24,672	74	Weighted Average
24,672	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0222	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.1	23	0.0730	4.35		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.3	48	0.0210	2.94		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
1.1	255	0.0050	3.72	4.57	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
10.7	426	Total			

Subcatchment 2P: Pervious



Summary for Subcatchment 3E: Impervious

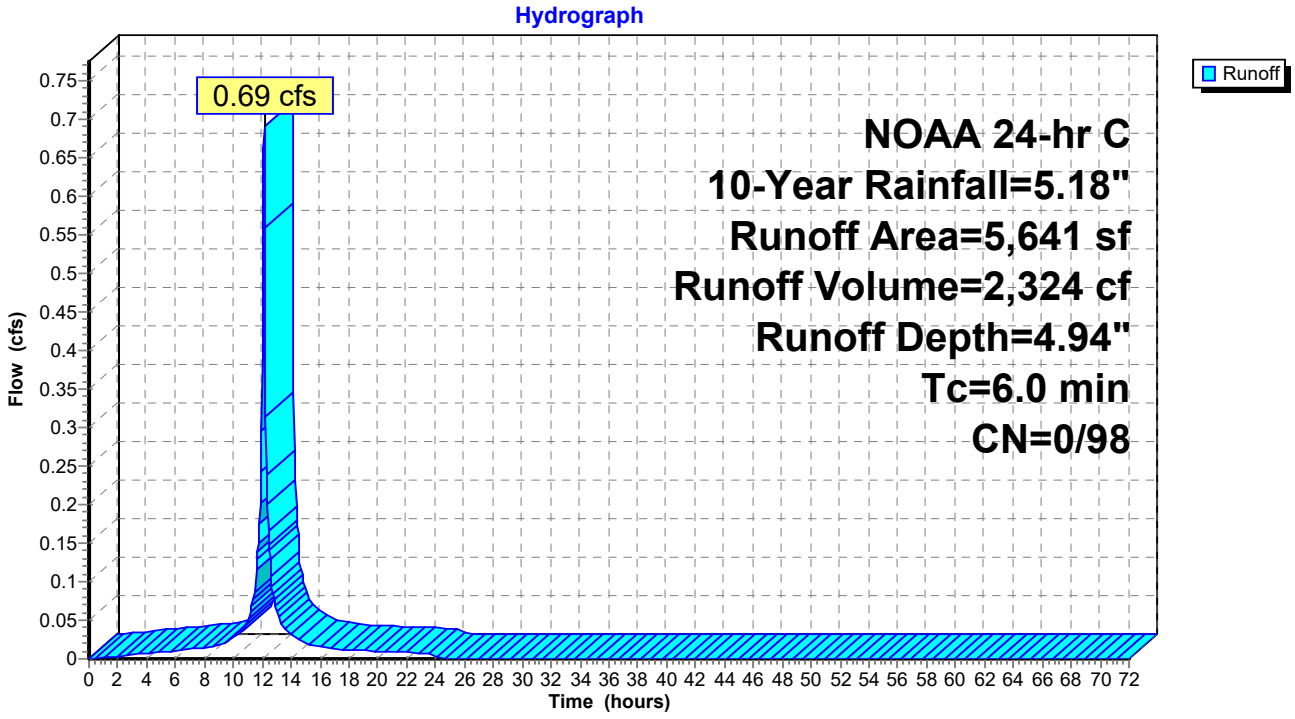
Runoff = 0.69 cfs @ 12.13 hrs, Volume= 2,324 cf, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
2,580	98	Unconnected roofs, HSG C
3,061	98	Paved parking, HSG C
5,641	98	Weighted Average
5,641	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Tc**
3.0	0	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3E: Impervious



Summary for Subcatchment 3P: Roof Area

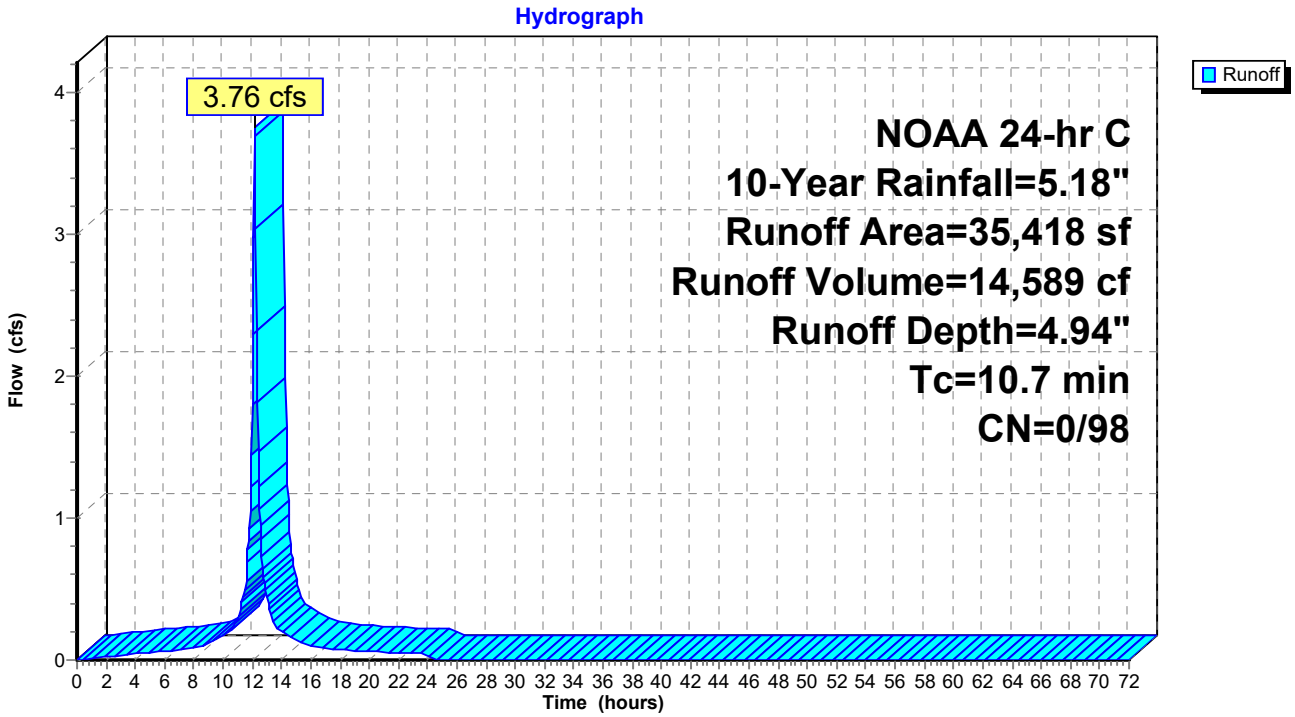
Runoff = 3.76 cfs @ 12.18 hrs, Volume= 14,589 cf, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
35,068	98	Unconnected roofs, HSG C
350	98	Unconnected pavement, HSG C
35,418	98	Weighted Average
35,418	98	100.00% Impervious Area

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

Subcatchment 3P: Roof Area



Summary for Subcatchment 4E: Pervious

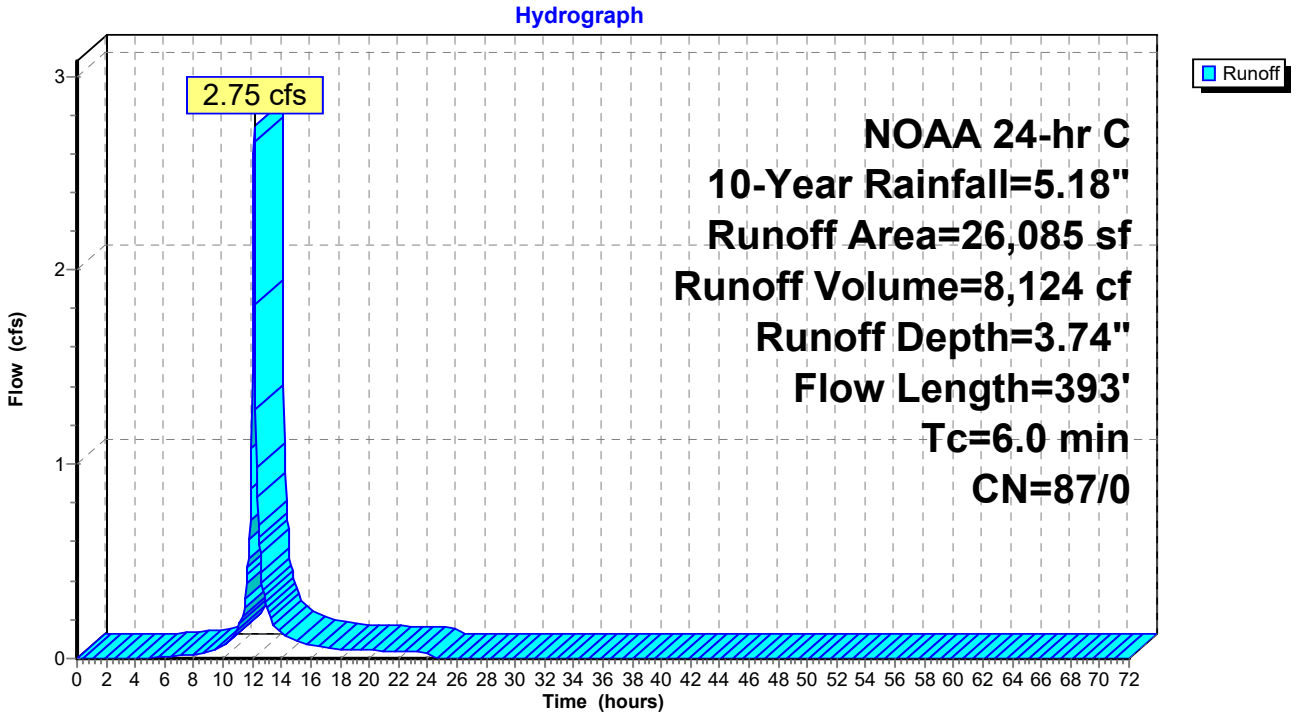
Runoff = 2.75 cfs @ 12.13 hrs, Volume= 8,124 cf, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
164	70	Woods, Good, HSG C
16,189	96	Gravel surface, HSG C
5,108	74	>75% Grass cover, Good, HSG C
4,624	72	Woods/grass comb., Good, HSG C
26,085	87	Weighted Average
26,085	87	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0160	1.29		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
0.6	97	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.0	175	0.0330	2.92		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	13	0.0230	2.44		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.0	8	0.0480	3.53		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
3.0	393	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4E: Pervious



Summary for Subcatchment 4P: Pervious

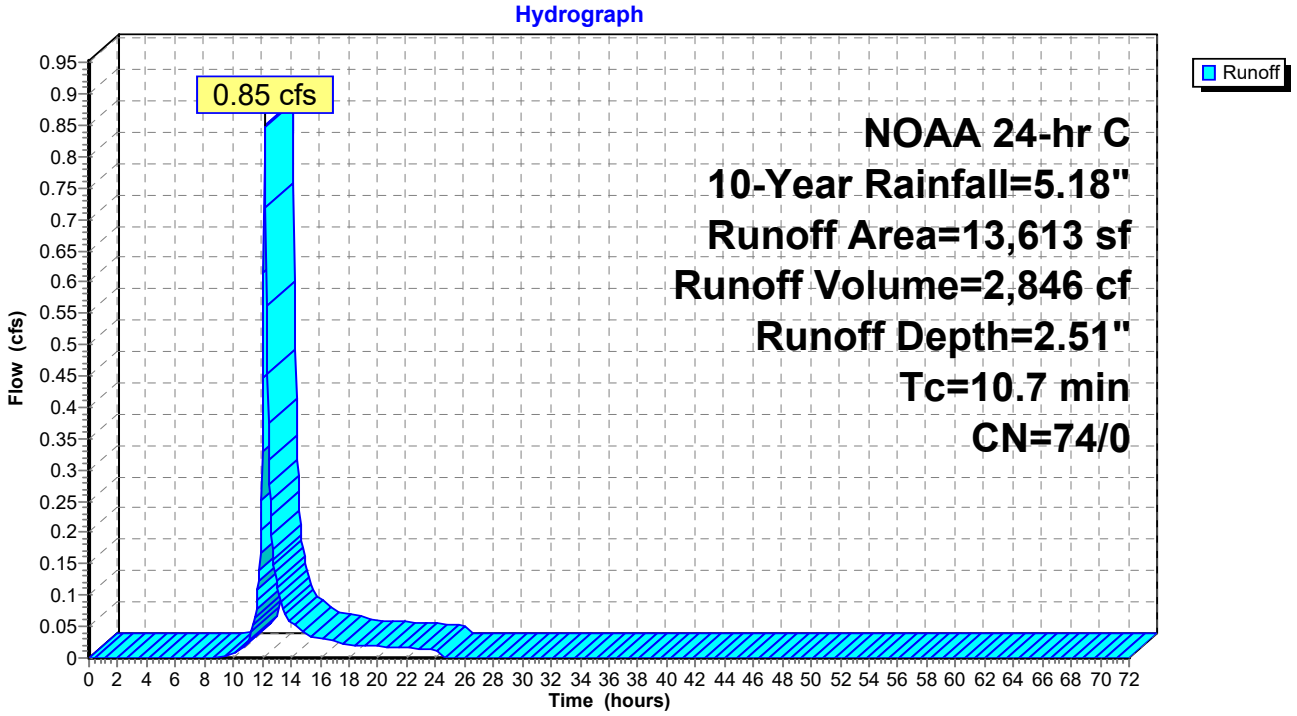
Runoff = 0.85 cfs @ 12.19 hrs, Volume= 2,846 cf, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
13,613	74	>75% Grass cover, Good, HSG C
13,613	74	100.00% Pervious Area

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

Subcatchment 4P: Pervious



Summary for Subcatchment 5P: Impervious

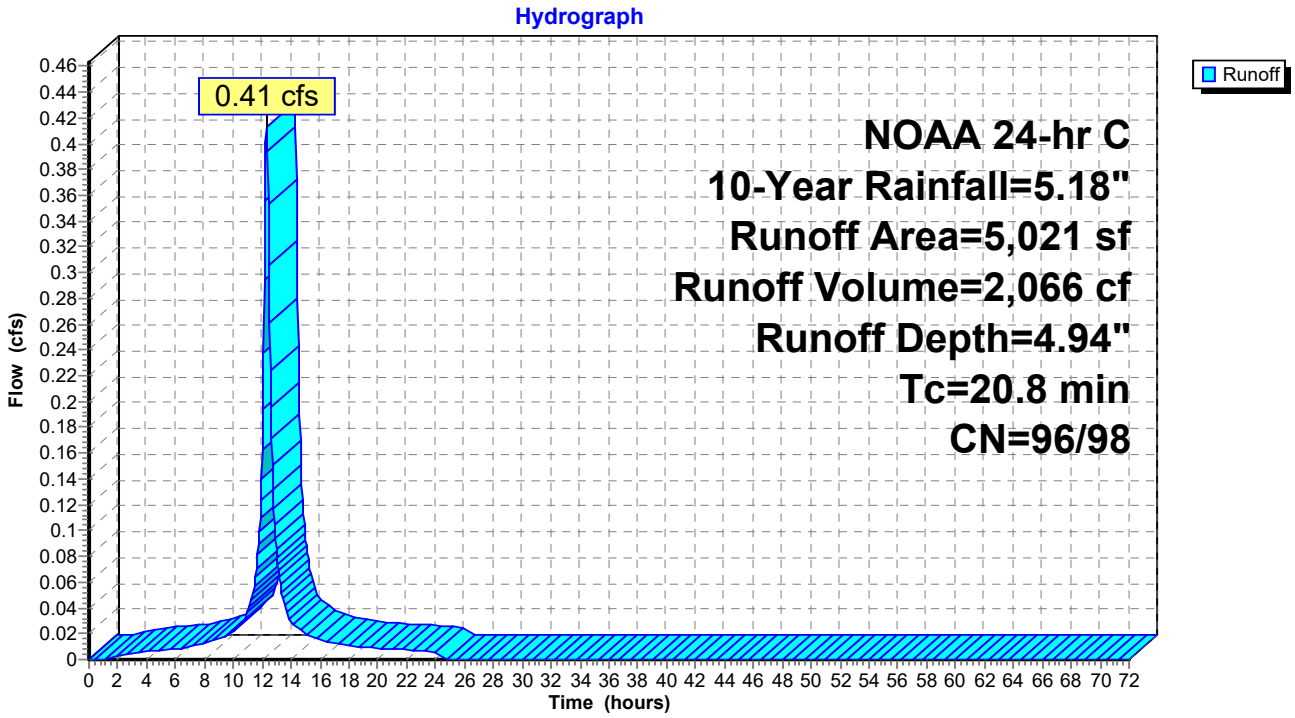
Runoff = 0.41 cfs @ 12.29 hrs, Volume= 2,066 cf, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
4,902	98	Paved parking, HSG C
119	96	Gravel surface, HSG C
5,021	98	Weighted Average
119	96	2.37% Pervious Area
4,902	98	97.63% Impervious Area

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

Subcatchment 5P: Impervious



Summary for Subcatchment 6P: Pervious

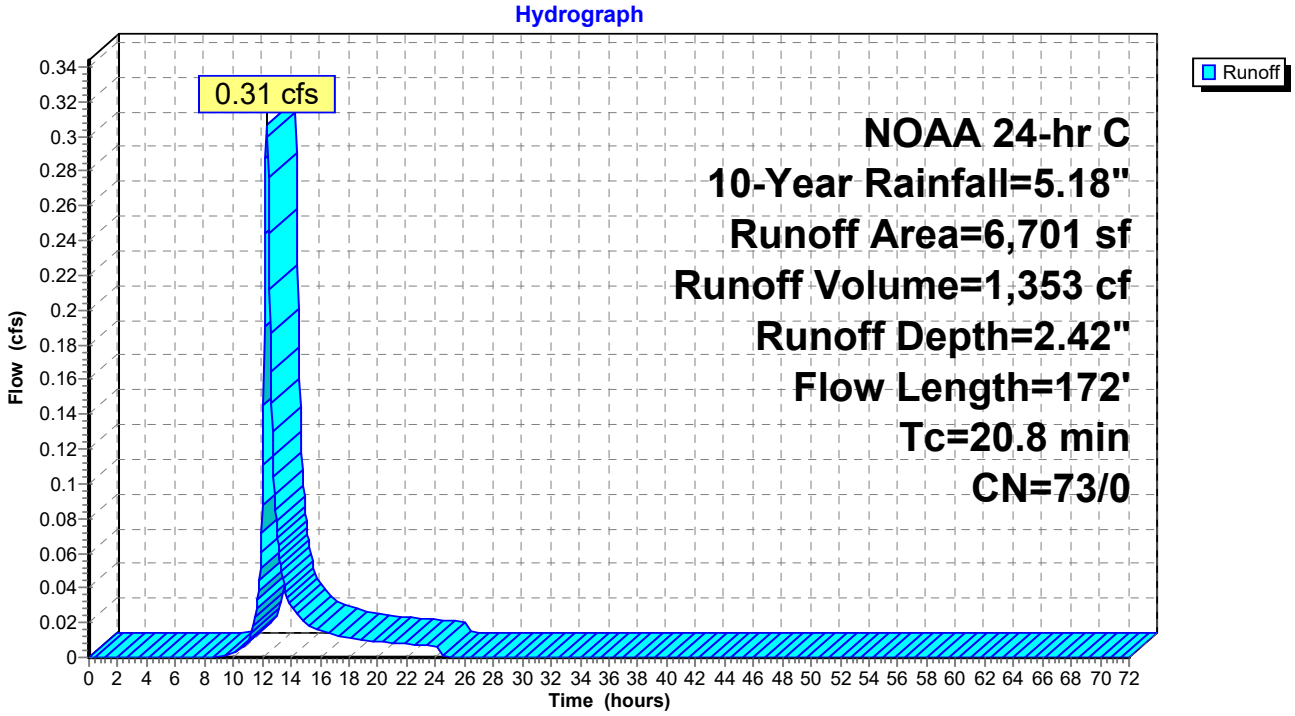
Runoff = 0.31 cfs @ 12.31 hrs, Volume= 1,353 cf, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
4,509	74	>75% Grass cover, Good, HSG C
2,192	70	Woods, Good, HSG C
6,701	73	Weighted Average
6,701	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	104	0.0230	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	57	0.0230	3.08		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	11	0.0200	2.28		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
20.8	172	Total			

Subcatchment 6P: Pervious



Summary for Subcatchment 7P: Impervious

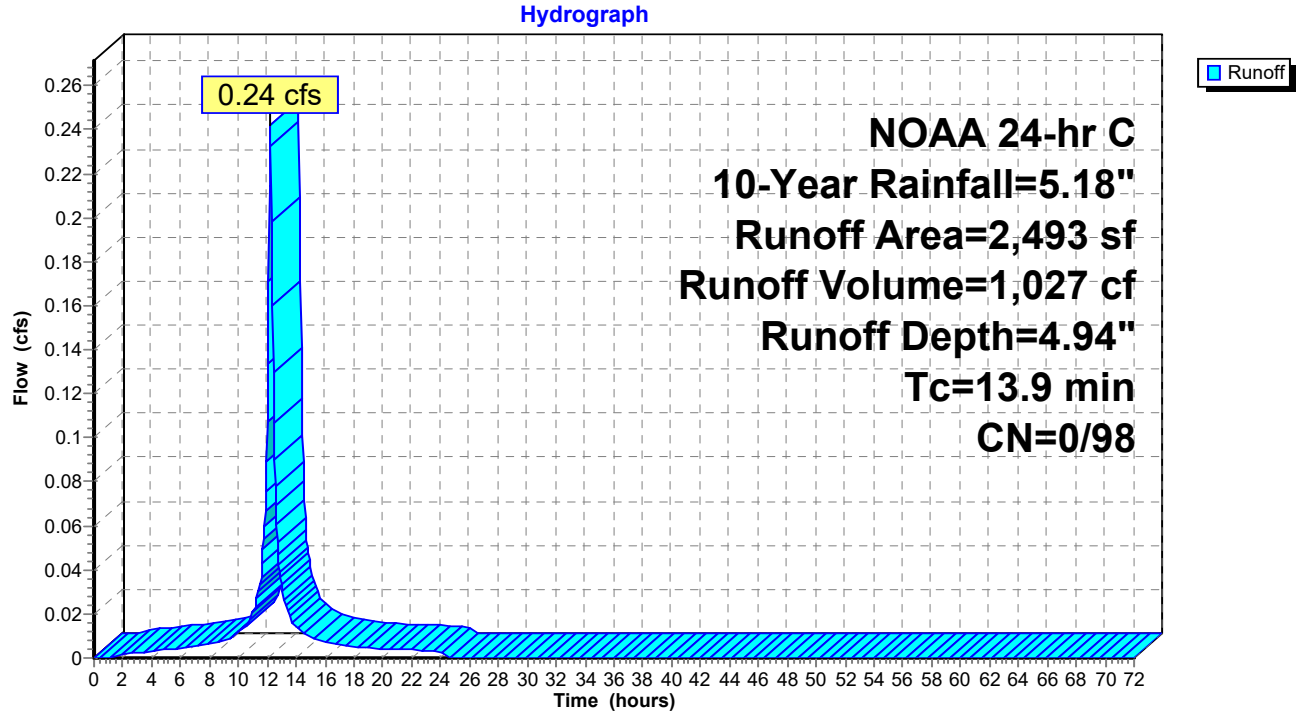
Runoff = 0.24 cfs @ 12.21 hrs, Volume= 1,027 cf, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
2,493	98	Paved parking, HSG C
2,493	98	100.00% Impervious Area

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

Subcatchment 7P: Impervious



Summary for Subcatchment 8P: Pervious

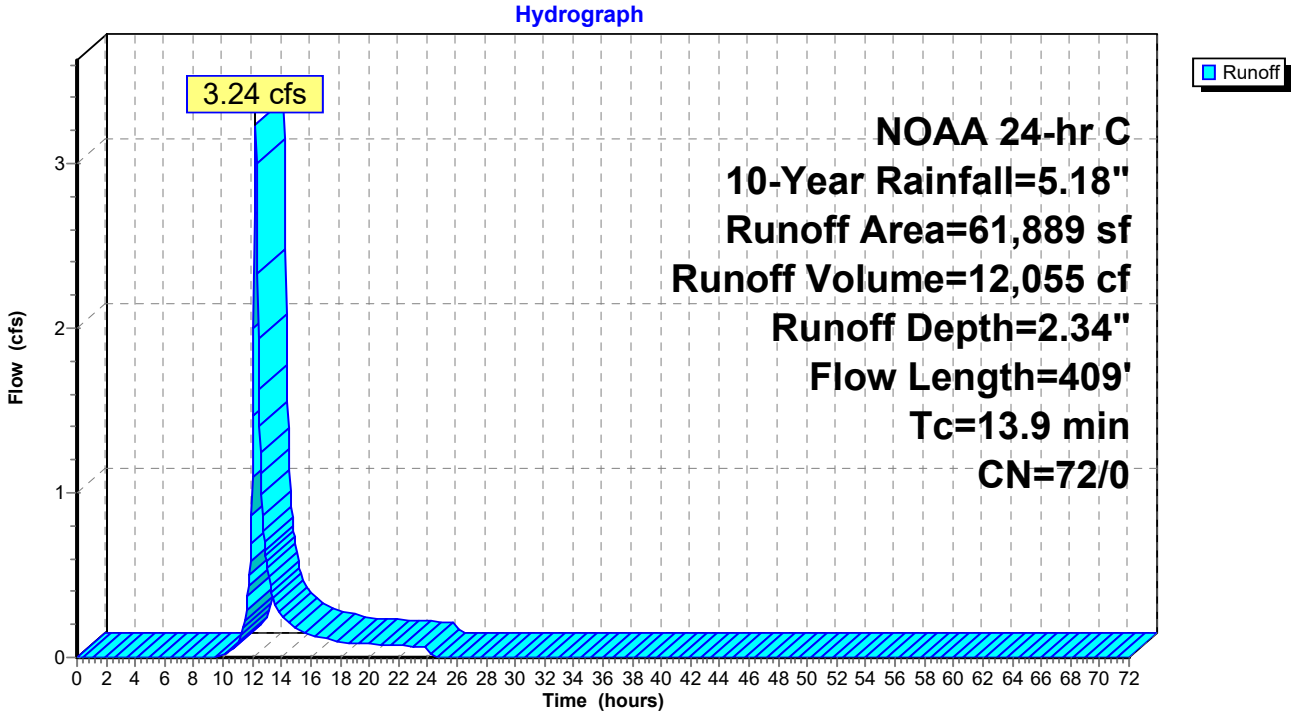
Runoff = 3.24 cfs @ 12.23 hrs, Volume= 12,055 cf, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
28,675	70	Woods, Good, HSG C
33,214	74	>75% Grass cover, Good, HSG C
61,889	72	Weighted Average
61,889	72	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	36	0.0560	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
4.3	51	0.0390	0.20		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.5	297	0.0230	0.76		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
13.9	409	Total			

Subcatchment 8P: Pervious



Summary for Subcatchment 9P: Pervious

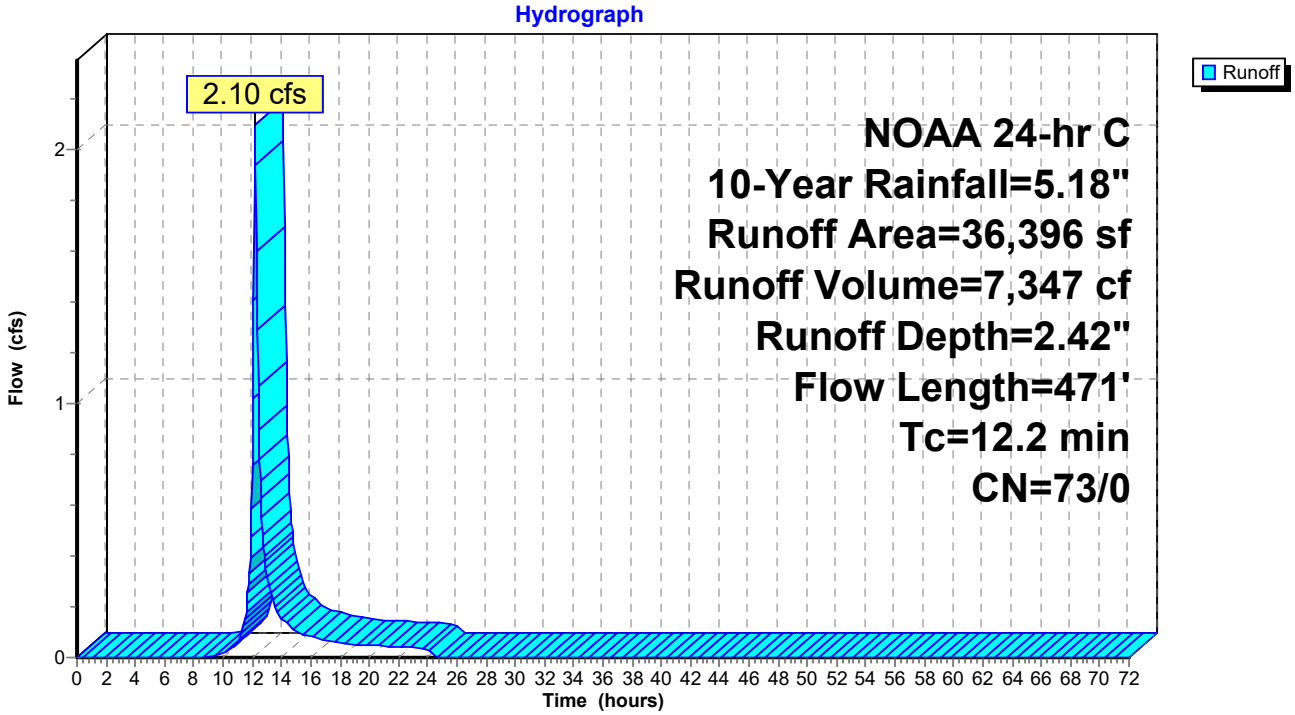
Runoff = 2.10 cfs @ 12.20 hrs, Volume= 7,347 cf, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.18"

Area (sf)	CN	Description
5,369	70	Woods, Good, HSG C
31,027	74	>75% Grass cover, Good, HSG C
36,396	73	Weighted Average
36,396	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0190	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.7	102	0.0240	2.49		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.8	128	0.0310	2.83		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.8	120	0.0250	2.55		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.1	21	0.0310	2.83		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
12.2	471	Total			

Subcatchment 9P: Pervious



Summary for Pond B1: Bioretention Basin 1

[92] Warning: Device #2 is above defined storage

Inflow Area = 48,248 sf, 48.86% Impervious, Inflow Depth = 3.70" for 10-Year event
Inflow = 4.04 cfs @ 12.18 hrs, Volume= 14,869 cf
Outflow = 3.92 cfs @ 12.21 hrs, Volume= 10,974 cf, Atten= 3%, Lag= 1.6 min
Primary = 3.92 cfs @ 12.21 hrs, Volume= 10,974 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 78.34' @ 12.21 hrs Surf.Area= 2,992 sf Storage= 4,464 cf

Plug-Flow detention time= 169.1 min calculated for 10,966 cf (74% of inflow)
Center-of-Mass det. time= 74.7 min (858.8 - 784.1)

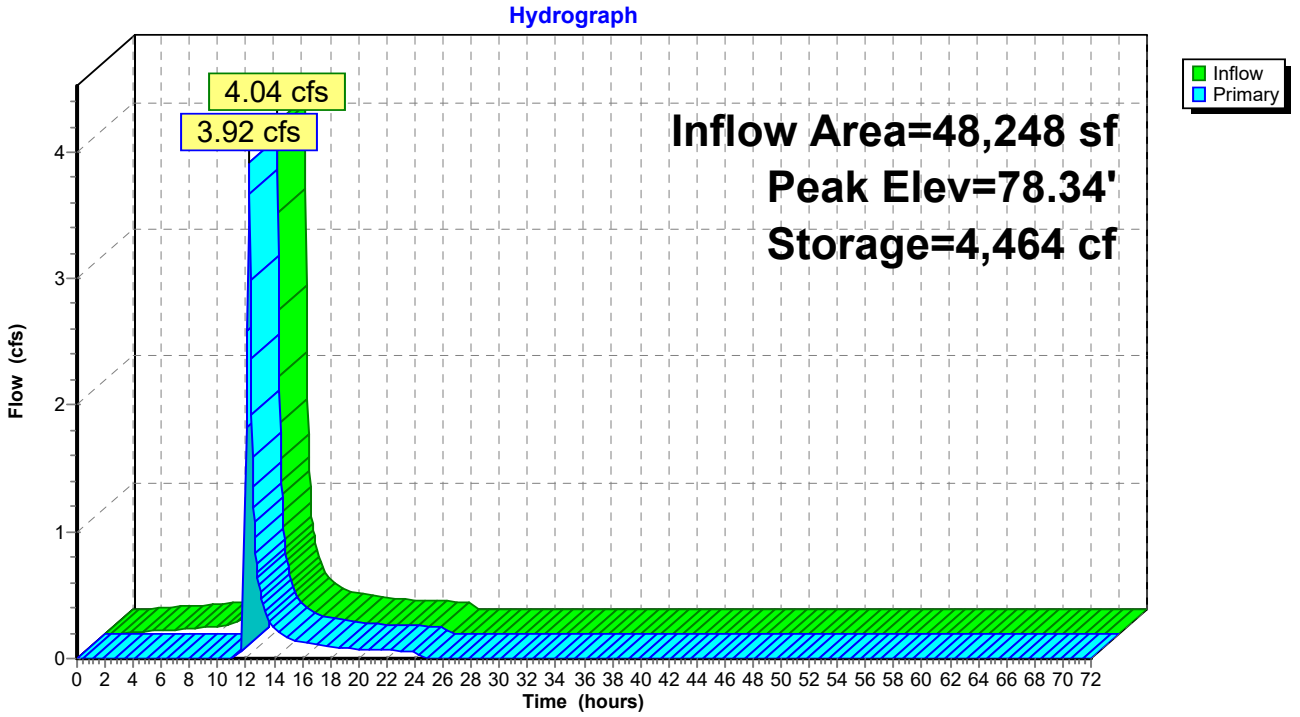
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	4,938 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.50	1,883	0	0	1,883
77.50	2,461	2,166	2,166	2,484
78.50	3,096	2,772	4,938	3,146

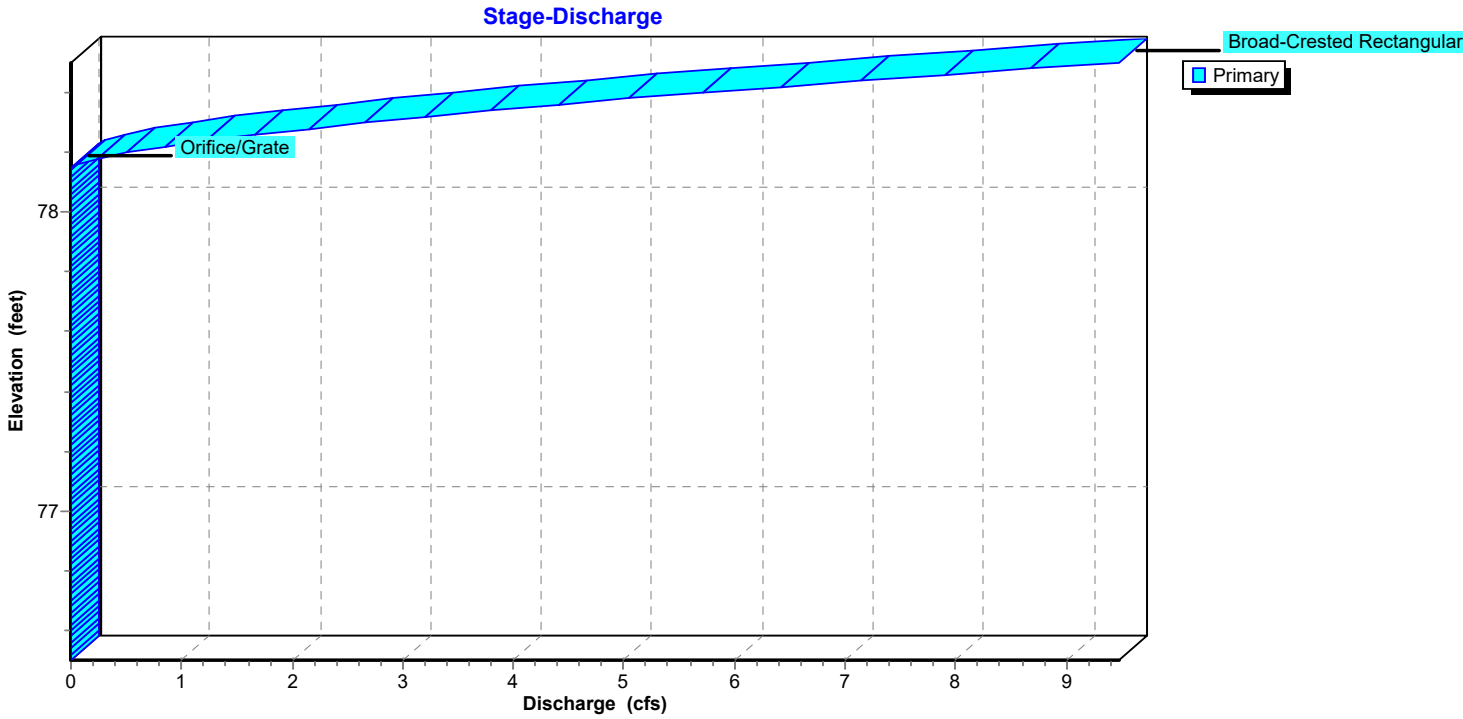
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**24.0" Round CMP_Round 24"** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.85' S= 0.0150 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	78.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	78.15'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=3.86 cfs @ 12.21 hrs HW=78.34' (Free Discharge)
└**1=CMP_Round 24"** (Passes 3.86 cfs of 24.89 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Weir Controls 3.86 cfs @ 1.43 fps)

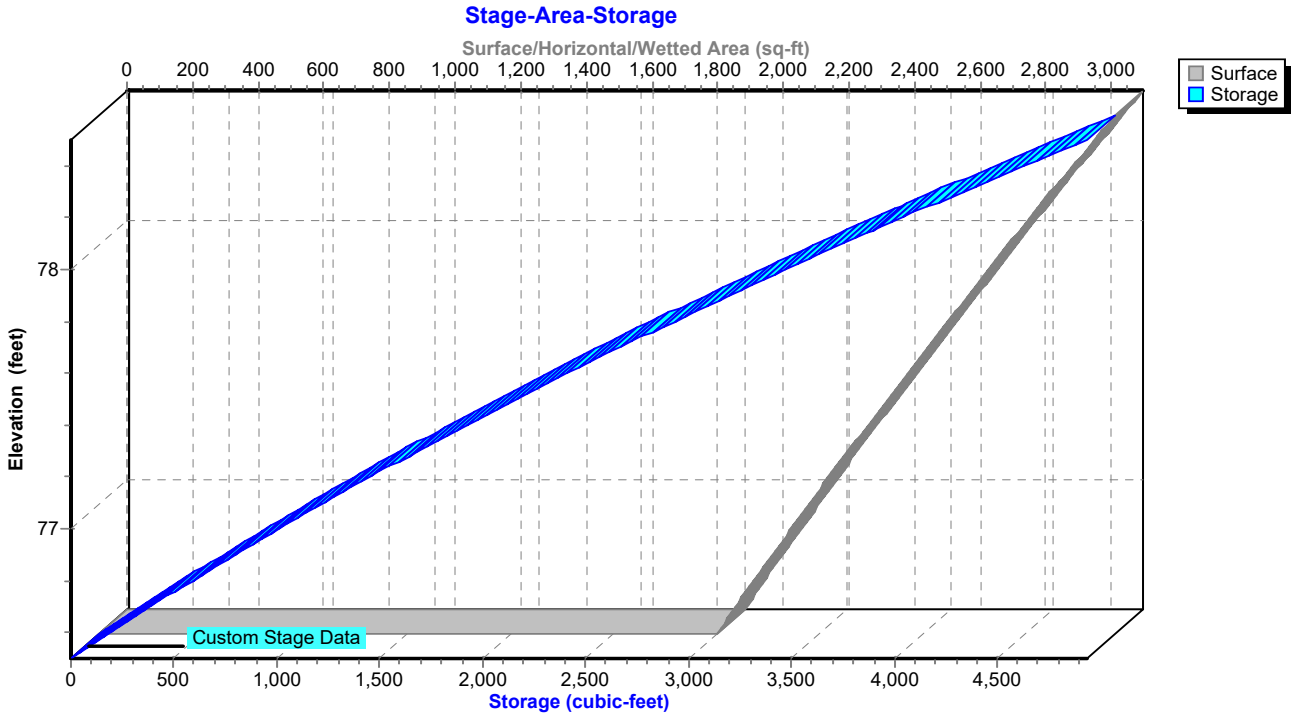
Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Stage-Discharge for Pond B1: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.03	0.00	77.56	0.00	78.09	0.00
76.51	0.00	77.04	0.00	77.57	0.00	78.10	0.00
76.52	0.00	77.05	0.00	77.58	0.00	78.11	0.00
76.53	0.00	77.06	0.00	77.59	0.00	78.12	0.00
76.54	0.00	77.07	0.00	77.60	0.00	78.13	0.00
76.55	0.00	77.08	0.00	77.61	0.00	78.14	0.00
76.56	0.00	77.09	0.00	77.62	0.00	78.15	0.00
76.57	0.00	77.10	0.00	77.63	0.00	78.16	0.05
76.58	0.00	77.11	0.00	77.64	0.00	78.17	0.13
76.59	0.00	77.12	0.00	77.65	0.00	78.18	0.24
76.60	0.00	77.13	0.00	77.66	0.00	78.19	0.37
76.61	0.00	77.14	0.00	77.67	0.00	78.20	0.51
76.62	0.00	77.15	0.00	77.68	0.00	78.21	0.67
76.63	0.00	77.16	0.00	77.69	0.00	78.22	0.85
76.64	0.00	77.17	0.00	77.70	0.00	78.23	1.04
76.65	0.00	77.18	0.00	77.71	0.00	78.24	1.24
76.66	0.00	77.19	0.00	77.72	0.00	78.25	1.45
76.67	0.00	77.20	0.00	77.73	0.00	78.26	1.67
76.68	0.00	77.21	0.00	77.74	0.00	78.27	1.90
76.69	0.00	77.22	0.00	77.75	0.00	78.28	2.15
76.70	0.00	77.23	0.00	77.76	0.00	78.29	2.40
76.71	0.00	77.24	0.00	77.77	0.00	78.30	2.66
76.72	0.00	77.25	0.00	77.78	0.00	78.31	2.93
76.73	0.00	77.26	0.00	77.79	0.00	78.32	3.21
76.74	0.00	77.27	0.00	77.80	0.00	78.33	3.50
76.75	0.00	77.28	0.00	77.81	0.00	78.34	3.79
76.76	0.00	77.29	0.00	77.82	0.00	78.35	4.09
76.77	0.00	77.30	0.00	77.83	0.00	78.36	4.41
76.78	0.00	77.31	0.00	77.84	0.00	78.37	4.72
76.79	0.00	77.32	0.00	77.85	0.00	78.38	5.05
76.80	0.00	77.33	0.00	77.86	0.00	78.39	5.38
76.81	0.00	77.34	0.00	77.87	0.00	78.40	5.72
76.82	0.00	77.35	0.00	77.88	0.00	78.41	6.07
76.83	0.00	77.36	0.00	77.89	0.00	78.42	6.42
76.84	0.00	77.37	0.00	77.90	0.00	78.43	6.78
76.85	0.00	77.38	0.00	77.91	0.00	78.44	7.15
76.86	0.00	77.39	0.00	77.92	0.00	78.45	7.52
76.87	0.00	77.40	0.00	77.93	0.00	78.46	7.90
76.88	0.00	77.41	0.00	77.94	0.00	78.47	8.29
76.89	0.00	77.42	0.00	77.95	0.00	78.48	8.68
76.90	0.00	77.43	0.00	77.96	0.00	78.49	9.08
76.91	0.00	77.44	0.00	77.97	0.00	78.50	**9.48**
76.92	0.00	77.45	0.00	77.98	0.00		
76.93	0.00	77.46	0.00	77.99	0.00		
76.94	0.00	77.47	0.00	78.00	0.00		
76.95	0.00	77.48	0.00	78.01	0.00		
76.96	0.00	77.49	0.00	78.02	0.00		
76.97	0.00	77.50	0.00	78.03	0.00		
76.98	0.00	77.51	0.00	78.04	0.00		
76.99	0.00	77.52	0.00	78.05	0.00		
77.00	0.00	77.53	0.00	78.06	0.00		
77.01	0.00	77.54	0.00	78.07	0.00		
77.02	0.00	77.55	0.00	78.08	0.00		

Stage-Area-Storage for Pond B1: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	1,883	0
76.52	1,894	38
76.54	1,905	76
76.56	1,916	114
76.58	1,926	152
76.60	1,937	191
76.62	1,948	230
76.64	1,959	269
76.66	1,970	308
76.68	1,981	348
76.70	1,992	387
76.72	2,004	427
76.74	2,015	468
76.76	2,026	508
76.78	2,037	549
76.80	2,048	590
76.82	2,060	631
76.84	2,071	672
76.86	2,082	713
76.88	2,094	755
76.90	2,105	797
76.92	2,116	839
76.94	2,128	882
76.96	2,139	924
76.98	2,151	967
77.00	2,162	1,011
77.02	2,174	1,054
77.04	2,186	1,097
77.06	2,197	1,141
77.08	2,209	1,185
77.10	2,221	1,230
77.12	2,232	1,274
77.14	2,244	1,319
77.16	2,256	1,364
77.18	2,268	1,409
77.20	2,279	1,455
77.22	2,291	1,500
77.24	2,303	1,546
77.26	2,315	1,593
77.28	2,327	1,639
77.30	2,339	1,686
77.32	2,351	1,732
77.34	2,363	1,780
77.36	2,375	1,827
77.38	2,388	1,875
77.40	2,400	1,923
77.42	2,412	1,971
77.44	2,424	2,019
77.46	2,436	2,068
77.48	2,449	2,116
77.50	2,461	2,166
77.52	2,473	2,215
77.54	2,485	2,264
77.56	2,497	2,314
77.58	2,509	2,364
77.60	2,521	2,415
77.62	2,533	2,465
77.64	2,546	2,516
77.66	2,558	2,567
77.68	2,570	2,618
77.70	2,582	2,670
77.72	2,594	2,722
77.74	2,607	2,774
77.76	2,619	2,826
77.78	2,631	2,878
77.80	2,644	2,931
77.82	2,656	2,984
77.84	2,669	3,037
77.86	2,681	3,091
77.88	2,694	3,145
77.90	2,706	3,199
77.92	2,719	3,253
77.94	2,731	3,307
77.96	2,744	3,362
77.98	2,757	3,417
78.00	2,769	3,472
78.02	2,782	3,528
78.04	2,795	3,584
78.06	2,808	3,640
78.08	2,820	3,696
78.10	2,833	3,753
78.12	2,846	3,809
78.14	2,859	3,866
78.16	2,872	3,924
78.18	2,885	3,981
78.20	2,898	4,039
78.22	2,911	4,097
78.24	2,924	4,156
78.26	2,937	4,214
78.28	2,950	4,273
78.30	2,963	4,332
78.32	2,976	4,392
78.34	2,990	4,451
78.36	3,003	4,511
78.38	3,016	4,571
78.40	3,029	4,632
78.42	3,043	4,692
78.44	3,056	4,753
78.46	3,069	4,815
78.48	3,083	4,876
78.50	**3,096**	**4,938**

Summary for Pond B2: Bioretention Basin 2

[79] Warning: Submerged Pond B1 Primary device # 1 INLET by 4.94'

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 3.50" for 10-Year event
Inflow = 8.46 cfs @ 12.19 hrs, Volume= 28,409 cf
Outflow = 3.21 cfs @ 12.45 hrs, Volume= 25,242 cf, Atten= 62%, Lag= 15.4 min
Primary = 3.21 cfs @ 12.45 hrs, Volume= 25,242 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 77.94' @ 12.45 hrs Surf.Area= 8,762 sf Storage= 11,272 cf

Plug-Flow detention time= 163.2 min calculated for 25,242 cf (89% of inflow)
Center-of-Mass det. time= 106.6 min (909.3 - 802.7)

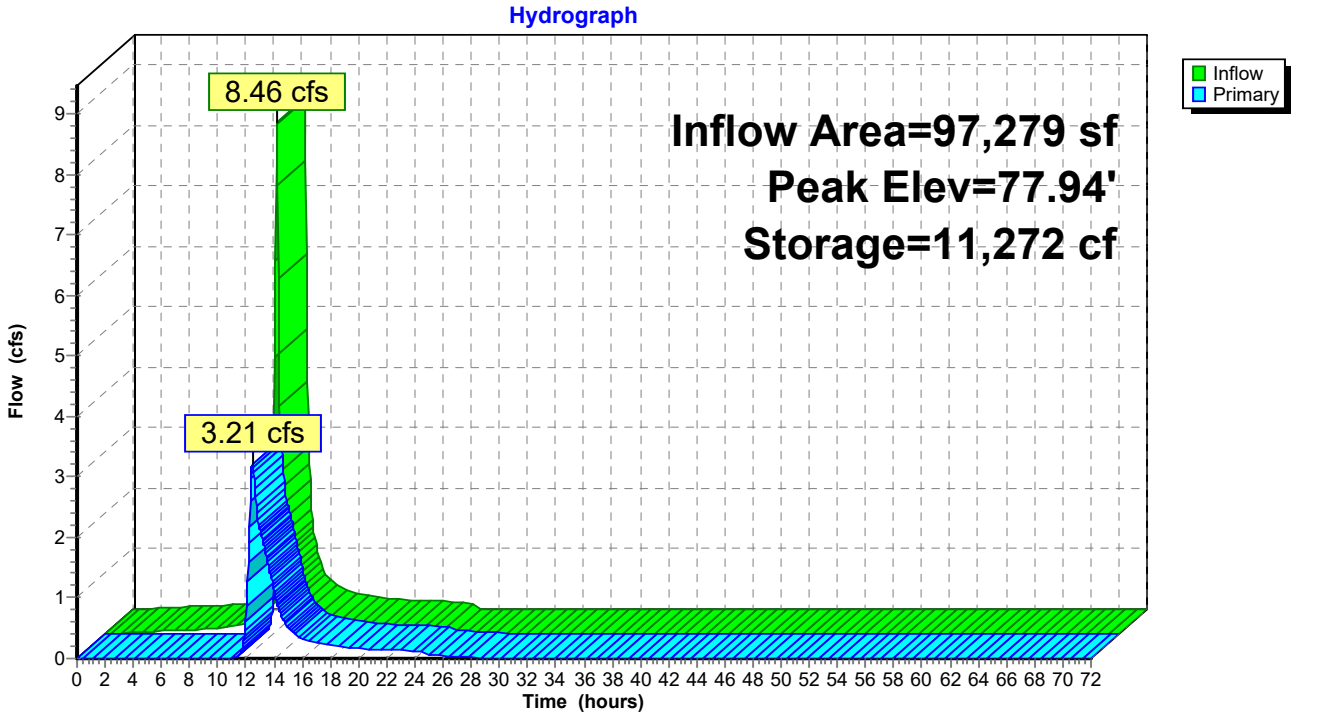
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	26,647 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	6,877	0	0
77.50	8,155	7,516	7,516
78.50	9,522	8,839	16,355
79.50	11,063	10,293	26,647

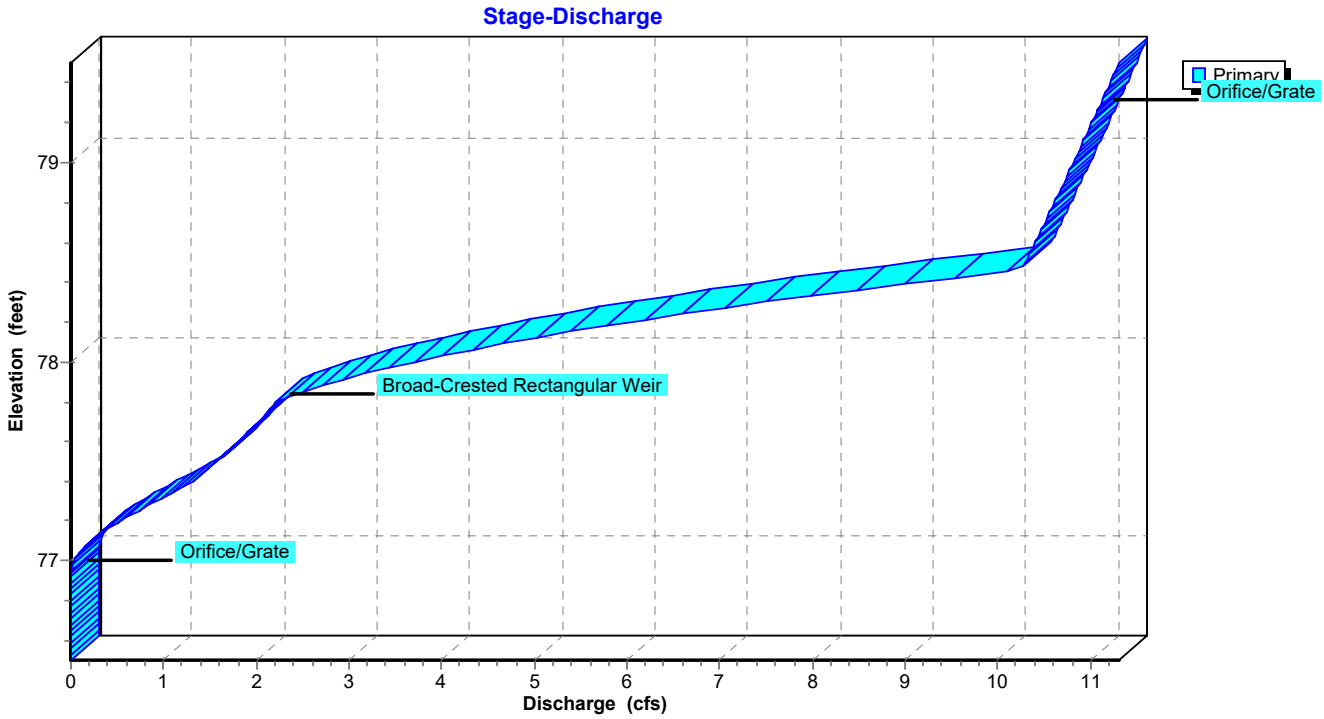
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.06' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	76.94'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	77.78'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	79.25'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=3.21 cfs @ 12.45 hrs HW=77.94' (Free Discharge)
└**1=Culvert** (Passes 3.21 cfs of 9.69 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.46 cfs @ 4.18 fps)
  ├**3=Broad-Crested Rectangular Weir** (Weir Controls 0.74 cfs @ 1.13 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

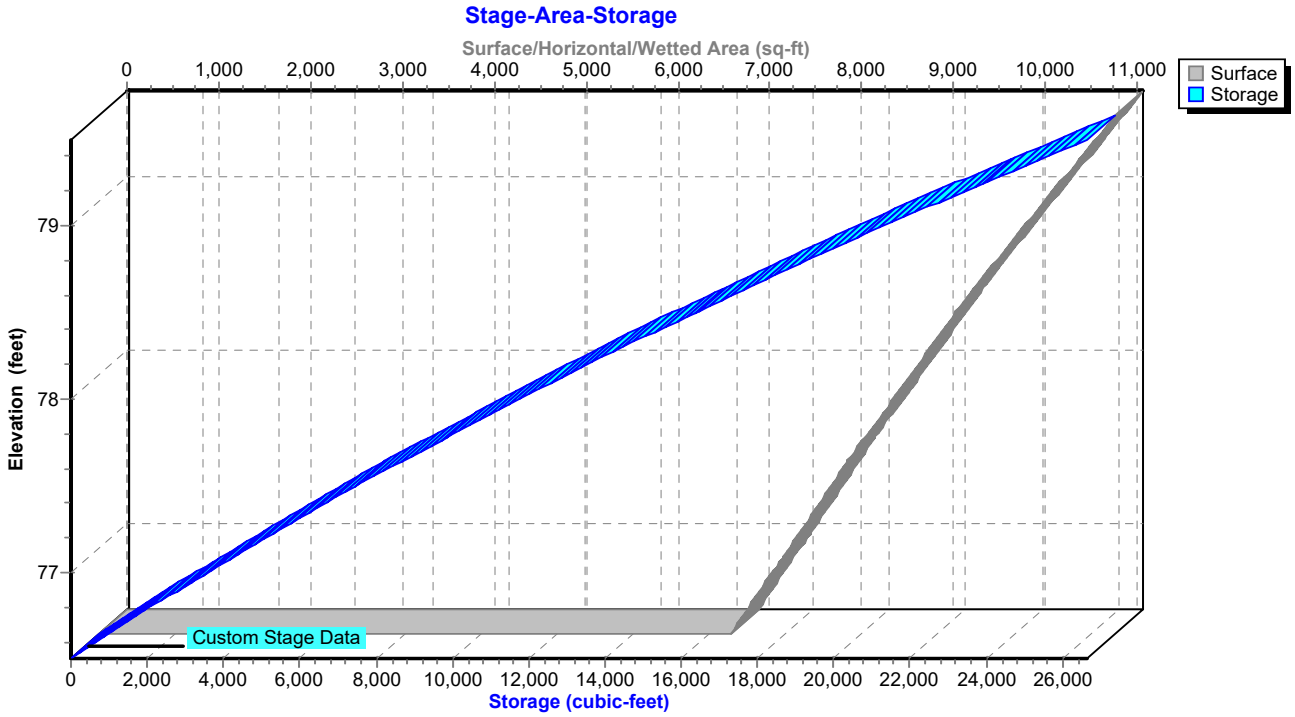
Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Stage-Discharge for Pond B2: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.56	1.73	78.62	10.43
76.52	0.00	77.58	1.77	78.64	10.45
76.54	0.00	77.60	1.82	78.66	10.47
76.56	0.00	77.62	1.86	78.68	10.49
76.58	0.00	77.64	1.90	78.70	10.51
76.60	0.00	77.66	1.94	78.72	10.53
76.62	0.00	77.68	1.99	78.74	10.55
76.64	0.00	77.70	2.03	78.76	10.57
76.66	0.00	77.72	2.06	78.78	10.59
76.68	0.00	77.74	2.10	78.80	10.61
76.70	0.00	77.76	2.14	78.82	10.63
76.72	0.00	77.78	2.18	78.84	10.65
76.74	0.00	77.80	2.25	78.86	10.67
76.76	0.00	77.82	2.34	78.88	10.69
76.78	0.00	77.84	2.45	78.90	10.71
76.80	0.00	77.86	2.58	78.92	10.73
76.82	0.00	77.88	2.71	78.94	10.75
76.84	0.00	77.90	2.86	78.96	10.77
76.86	0.00	77.92	3.01	78.98	10.79
76.88	0.00	77.94	3.17	79.00	10.82
76.90	0.00	77.96	3.34	79.02	10.84
76.92	0.00	77.98	3.52	79.04	10.86
76.94	0.00	78.00	3.71	79.06	10.88
76.96	0.00	78.02	3.91	79.08	10.90
76.98	0.02	78.04	4.12	79.10	10.92
77.00	0.03	78.06	4.33	79.12	10.94
77.02	0.06	78.08	4.56	79.14	10.96
77.04	0.09	78.10	4.79	79.16	10.97
77.06	0.13	78.12	5.02	79.18	10.99
77.08	0.17	78.14	5.27	79.20	11.01
77.10	0.22	78.16	5.52	79.22	11.03
77.12	0.28	78.18	5.78	79.24	11.05
77.14	0.34	78.20	6.05	79.26	11.07
77.16	0.40	78.22	6.32	79.28	11.09
77.18	0.47	78.24	6.61	79.30	11.11
77.20	0.54	78.26	6.90	79.32	11.13
77.22	0.61	78.28	7.20	79.34	11.15
77.24	0.69	78.30	7.51	79.36	11.17
77.26	0.77	78.32	7.83	79.38	11.19
77.28	0.85	78.34	8.15	79.40	11.21
77.30	0.93	78.36	8.48	79.42	11.23
77.32	1.01	78.38	8.82	79.44	11.25
77.34	1.09	78.40	9.18	79.46	11.27
77.36	1.17	78.42	9.54	79.48	11.29
77.38	1.24	78.44	9.92	79.50	**11.31**
77.40	1.31	78.46	10.26		
77.42	1.37	78.48	10.28		
77.44	1.42	78.50	10.30		
77.46	1.47	78.52	10.32		
77.48	1.53	78.54	10.34		
77.50	1.58	78.56	10.36		
77.52	1.63	78.58	10.38		
77.54	1.68	78.60	10.40		

Stage-Area-Storage for Pond B2: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	6,877	0
76.55	6,941	345
76.60	7,005	694
76.65	7,069	1,046
76.70	7,133	1,401
76.75	7,197	1,759
76.80	7,260	2,121
76.85	7,324	2,485
76.90	7,388	2,853
76.95	7,452	3,224
77.00	7,516	3,598
77.05	7,580	3,976
77.10	7,644	4,356
77.15	7,708	4,740
77.20	7,772	5,127
77.25	7,836	5,517
77.30	7,899	5,911
77.35	7,963	6,307
77.40	8,027	6,707
77.45	8,091	7,110
77.50	8,155	7,516
77.55	8,223	7,925
77.60	8,292	8,338
77.65	8,360	8,755
77.70	8,428	9,174
77.75	8,497	9,597
77.80	8,565	10,024
77.85	8,633	10,454
77.90	8,702	10,887
77.95	8,770	11,324
78.00	8,839	11,764
78.05	8,907	12,208
78.10	8,975	12,655
78.15	9,044	13,106
78.20	9,112	13,559
78.25	9,180	14,017
78.30	9,249	14,477
78.35	9,317	14,942
78.40	9,385	15,409
78.45	9,454	15,880
78.50	9,522	16,355
78.55	9,599	16,833
78.60	9,676	17,314
78.65	9,753	17,800
78.70	9,830	18,290
78.75	9,907	18,783
78.80	9,984	19,280
78.85	10,061	19,782
78.90	10,138	20,287
78.95	10,215	20,795
79.00	10,293	21,308
79.05	10,370	21,825
79.10	10,447	22,345
79.15	10,524	22,869
79.20	10,601	23,397
79.25	10,678	23,929
79.30	10,755	24,465
79.35	10,832	25,005
79.40	10,909	25,548
79.45	10,986	26,096
79.50	**11,063**	**26,647**

Summary for Pond B3: Bioretention Basin 3

[92] Warning: Device #2 is above defined storage

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 3.50" for 10-Year event
Inflow = 0.72 cfs @ 12.30 hrs, Volume= 3,419 cf
Outflow = 0.72 cfs @ 12.32 hrs, Volume= 2,944 cf, Atten= 0%, Lag= 0.8 min
Primary = 0.72 cfs @ 12.32 hrs, Volume= 2,944 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 80.80' @ 12.32 hrs Surf.Area= 878 sf Storage= 528 cf

Plug-Flow detention time= 114.2 min calculated for 2,942 cf (86% of inflow)
Center-of-Mass det. time= 48.3 min (847.4 - 799.1)

Volume	Invert	Avail.Storage	Storage Description
#1	79.98'	694 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

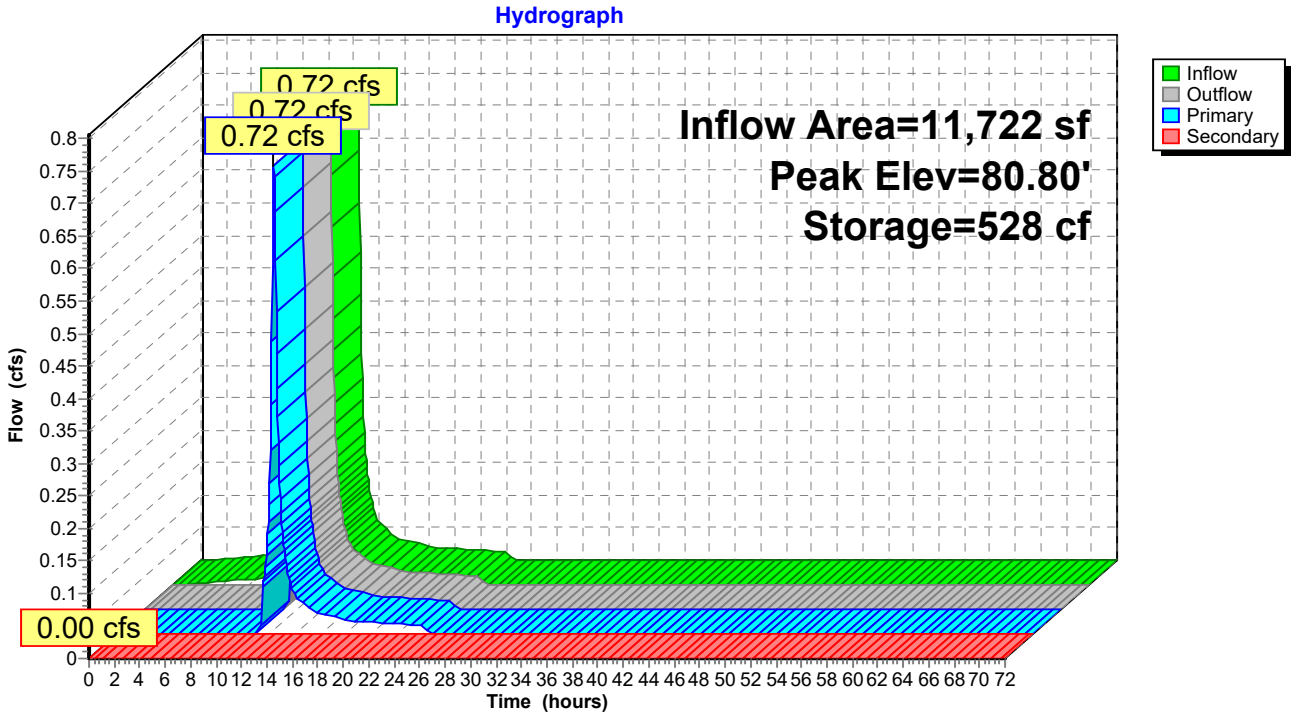
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
79.98	432	0	0	432
80.98	995	694	694	1,003

Device	Routing	Invert	Outlet Devices
#1	Primary	77.48'	**15.0" Round CMP_Round 15"** L= 96.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 77.48' / 77.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Secondary	80.98'	**15.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	80.74'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

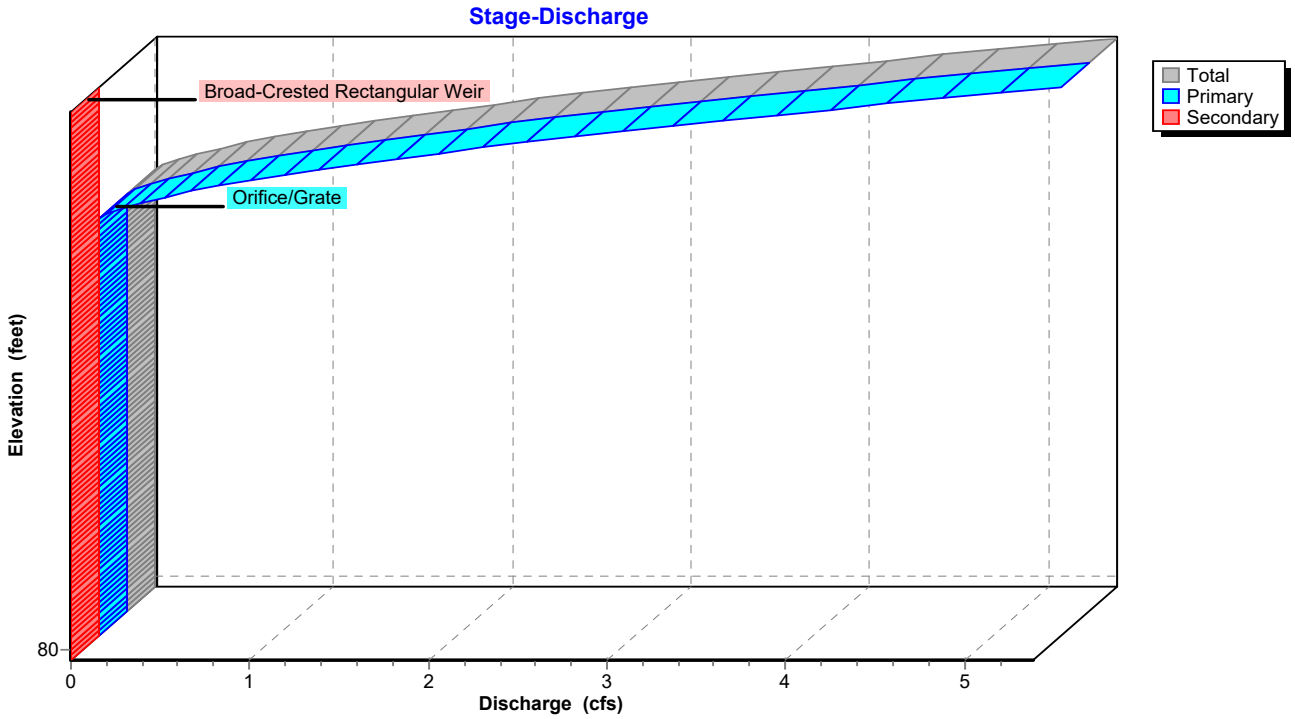
Primary OutFlow Max=0.71 cfs @ 12.32 hrs HW=80.80' (Free Discharge)
└**1=CMP_Round 15"** (Passes 0.71 cfs of 7.66 cfs potential flow)
└**3=Orifice/Grate** (Weir Controls 0.71 cfs @ 0.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.98' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

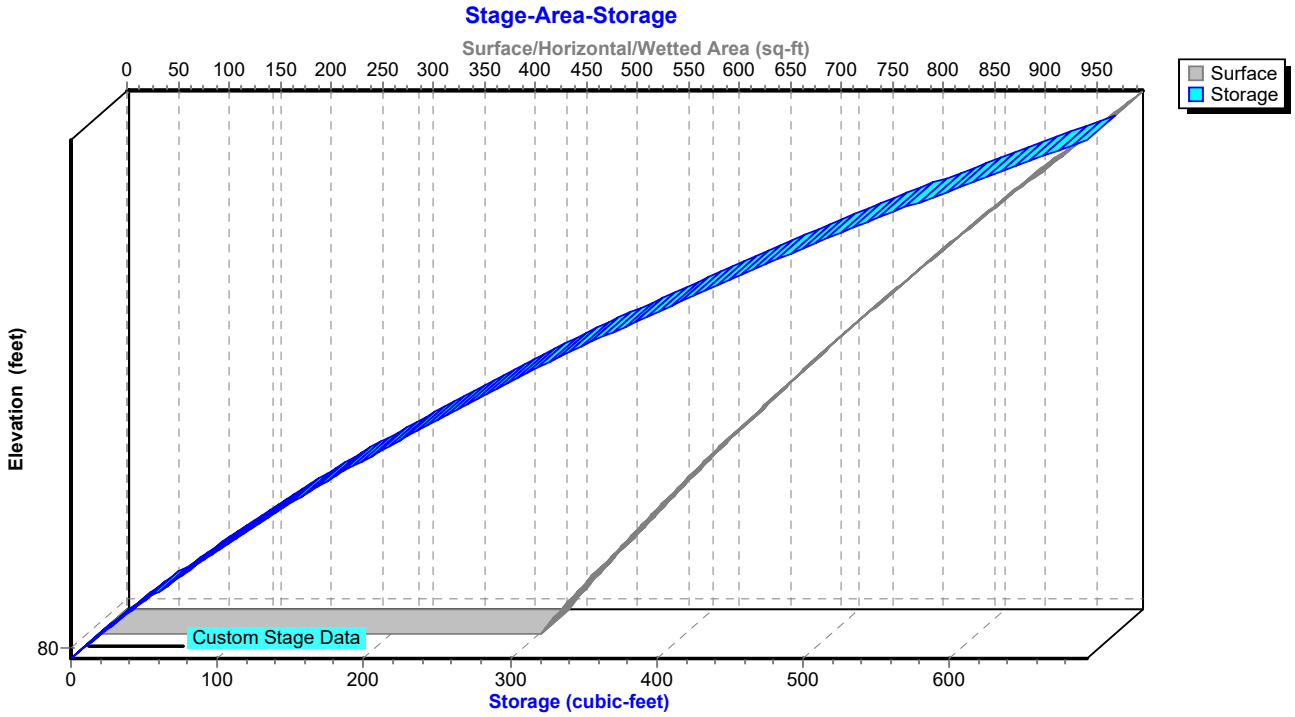
Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Stage-Discharge for Pond B3: Bioretention Basin 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
79.98	0.00	0.00	**0.00**
79.99	0.00	0.00	0.00
80.00	0.00	0.00	0.00
80.01	0.00	0.00	0.00
80.02	0.00	0.00	0.00
80.03	0.00	0.00	0.00
80.04	0.00	0.00	0.00
80.05	0.00	0.00	0.00
80.06	0.00	0.00	0.00
80.07	0.00	0.00	0.00
80.08	0.00	0.00	0.00
80.09	0.00	0.00	0.00
80.10	0.00	0.00	0.00
80.11	0.00	0.00	0.00
80.12	0.00	0.00	0.00
80.13	0.00	0.00	0.00
80.14	0.00	0.00	0.00
80.15	0.00	0.00	0.00
80.16	0.00	0.00	0.00
80.17	0.00	0.00	0.00
80.18	0.00	0.00	0.00
80.19	0.00	0.00	0.00
80.20	0.00	0.00	0.00
80.21	0.00	0.00	0.00
80.22	0.00	0.00	0.00
80.23	0.00	0.00	0.00
80.24	0.00	0.00	0.00
80.25	0.00	0.00	0.00
80.26	0.00	0.00	0.00
80.27	0.00	0.00	0.00
80.28	0.00	0.00	0.00
80.29	0.00	0.00	0.00
80.30	0.00	0.00	0.00
80.31	0.00	0.00	0.00
80.32	0.00	0.00	0.00
80.33	0.00	0.00	0.00
80.34	0.00	0.00	0.00
80.35	0.00	0.00	0.00
80.36	0.00	0.00	0.00
80.37	0.00	0.00	0.00
80.38	0.00	0.00	0.00
80.39	0.00	0.00	0.00
80.40	0.00	0.00	0.00
80.41	0.00	0.00	0.00
80.42	0.00	0.00	0.00
80.43	0.00	0.00	0.00
80.44	0.00	0.00	0.00
80.45	0.00	0.00	0.00
80.46	0.00	0.00	0.00
80.47	0.00	0.00	0.00
80.48	0.00	0.00	0.00
80.49	0.00	0.00	0.00
80.50	0.00	0.00	0.00
80.51	0.00	0.00	0.00
80.52	0.00	0.00	0.00
80.53	0.00	0.00	0.00
80.54	0.00	0.00	0.00
80.55	0.00	0.00	0.00
80.56	0.00	0.00	0.00
80.57	0.00	0.00	0.00
80.58	0.00	0.00	0.00
80.59	0.00	0.00	0.00
80.60	0.00	0.00	0.00
80.61	0.00	0.00	0.00
80.62	0.00	0.00	0.00
80.63	0.00	0.00	0.00
80.64	0.00	0.00	0.00
80.65	0.00	0.00	0.00
80.66	0.00	0.00	0.00
80.67	0.00	0.00	0.00
80.68	0.00	0.00	0.00
80.69	0.00	0.00	0.00
80.70	0.00	0.00	0.00
80.71	0.00	0.00	0.00
80.72	0.00	0.00	0.00
80.73	0.00	0.00	0.00
80.74	0.00	0.00	0.00
80.75	0.05	0.05	0.00
80.76	0.13	0.13	0.00
80.77	0.24	0.24	0.00
80.78	0.37	0.37	0.00
80.79	0.51	0.51	0.00
80.80	0.67	0.67	0.00
80.81	0.85	0.85	0.00
80.82	1.04	1.04	0.00
80.83	1.24	1.24	0.00
80.84	1.45	1.45	0.00
80.85	1.67	1.67	0.00
80.86	1.90	1.90	0.00
80.87	2.15	2.15	0.00
80.88	2.40	2.40	0.00
80.89	2.66	2.66	0.00
80.90	2.93	2.93	0.00
80.91	3.21	3.21	0.00
80.92	3.50	3.50	0.00
80.93	3.79	3.79	0.00
80.94	4.09	4.09	0.00
80.95	4.41	4.41	0.00
80.96	4.72	4.72	0.00
80.97	5.05	5.05	0.00
80.98	**5.38**	**5.38**	0.00

Stage-Area-Storage for Pond B3: Bioretention Basin 3

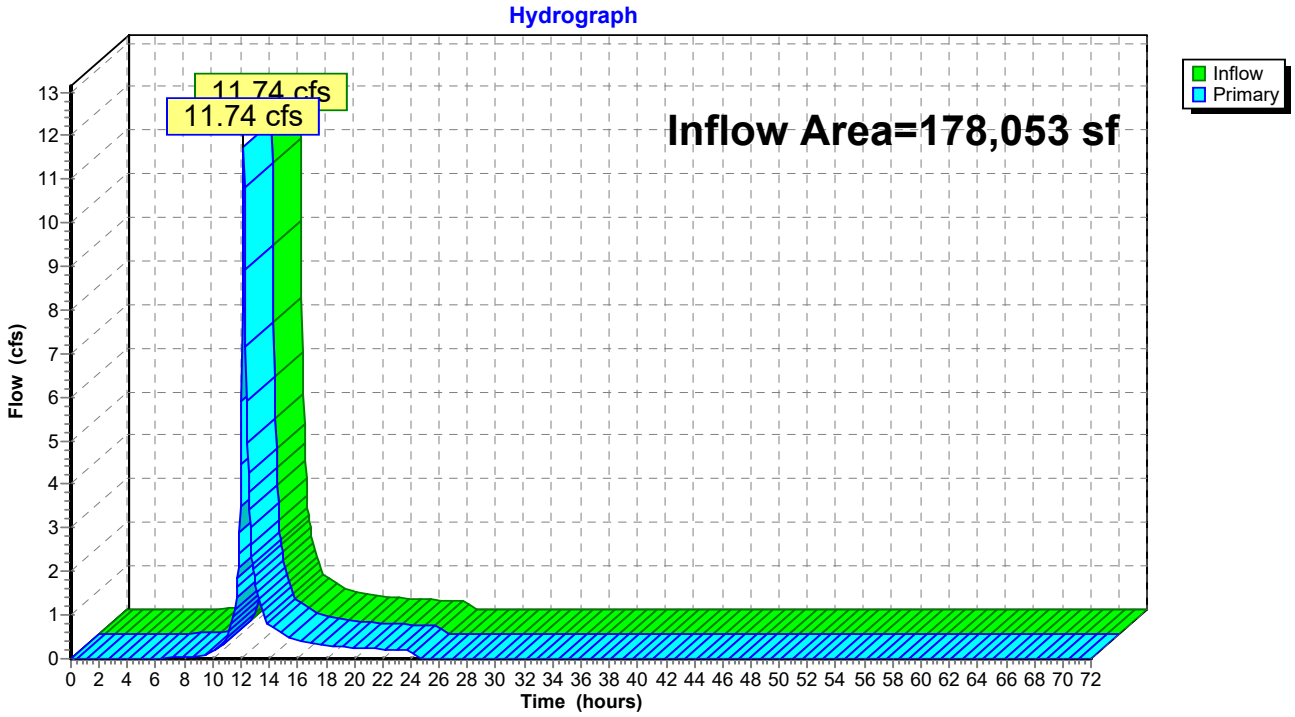
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
79.98	432	0
79.99	436	4
80.00	441	9
80.01	446	13
80.02	450	18
80.03	455	22
80.04	459	27
80.05	464	31
80.06	469	36
80.07	473	41
80.08	478	45
80.09	483	50
80.10	487	55
80.11	492	60
80.12	497	65
80.13	502	70
80.14	507	75
80.15	511	80
80.16	516	85
80.17	521	90
80.18	526	96
80.19	531	101
80.20	536	106
80.21	541	112
80.22	546	117
80.23	551	123
80.24	556	128
80.25	561	134
80.26	566	139
80.27	571	145
80.28	577	151
80.29	582	157
80.30	587	162
80.31	592	168
80.32	597	174
80.33	603	180
80.34	608	186
80.35	613	192
80.36	619	199
80.37	624	205
80.38	629	211
80.39	635	217
80.40	640	224
80.41	646	230
80.42	651	237
80.43	657	243
80.44	662	250
80.45	668	256
80.46	673	263
80.47	679	270
80.48	685	277
80.49	690	284
80.50	696	291
80.51	702	298
80.52	707	305
80.53	713	312
80.54	719	319
80.55	725	326
80.56	730	333
80.57	736	341
80.58	742	348
80.59	748	355
80.60	754	363
80.61	760	371
80.62	766	378
80.63	772	386
80.64	778	394
80.65	784	401
80.66	790	409
80.67	796	417
80.68	802	425
80.69	808	433
80.70	814	441
80.71	820	450
80.72	826	458
80.73	833	466
80.74	839	474
80.75	845	483
80.76	851	491
80.77	858	500
80.78	864	508
80.79	870	517
80.80	877	526
80.81	883	535
80.82	889	544
80.83	896	552
80.84	902	561
80.85	909	571
80.86	915	580
80.87	922	589
80.88	928	598
80.89	935	607
80.90	941	617
80.91	948	626
80.92	955	636
80.93	961	645
80.94	968	655
80.95	975	665
80.96	981	674
80.97	988	684
80.98	**995**	**694**

Summary for Link 5E: EDA 1

Inflow Area = 178,053 sf, 5.81% Impervious, Inflow Depth = 2.82" for 10-Year event
Inflow = 11.74 cfs @ 12.20 hrs, Volume= 41,781 cf
Primary = 11.74 cfs @ 12.20 hrs, Volume= 41,781 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5E: EDA 1

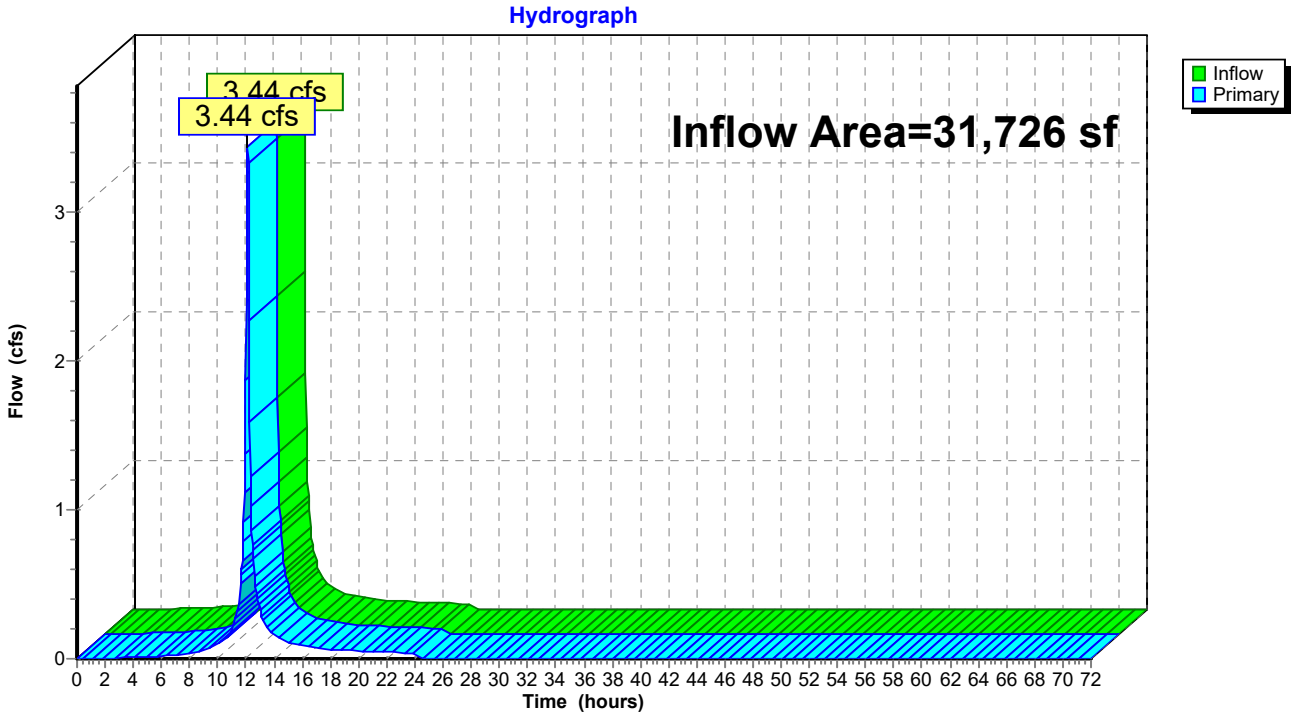


Summary for Link 6E: EDA 2

Inflow Area = 31,726 sf, 17.78% Impervious, Inflow Depth = 3.95" for 10-Year event
Inflow = 3.44 cfs @ 12.13 hrs, Volume= 10,447 cf
Primary = 3.44 cfs @ 12.13 hrs, Volume= 10,447 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 6E: EDA 2

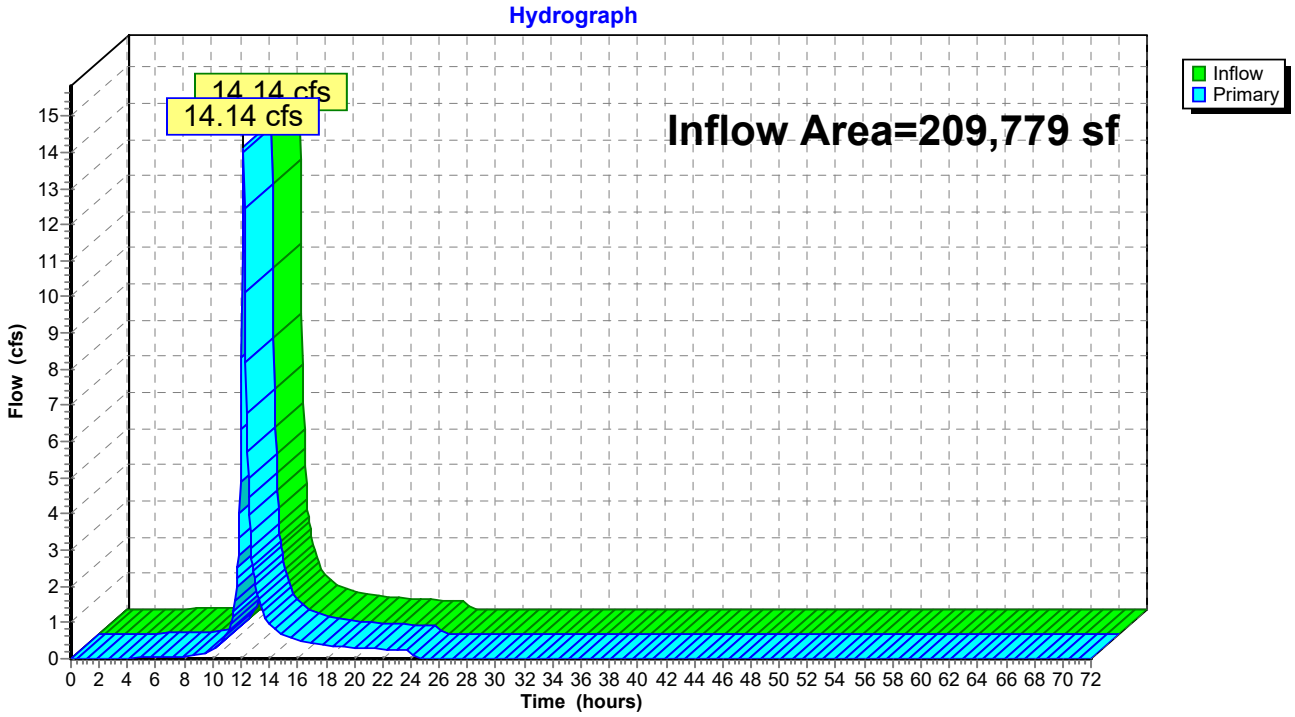


Summary for Link 7E: EDA

Inflow Area = 209,779 sf, 7.62% Impervious, Inflow Depth = 2.99" for 10-Year event
Inflow = 14.14 cfs @ 12.18 hrs, Volume= 52,228 cf
Primary = 14.14 cfs @ 12.18 hrs, Volume= 52,228 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7E: EDA

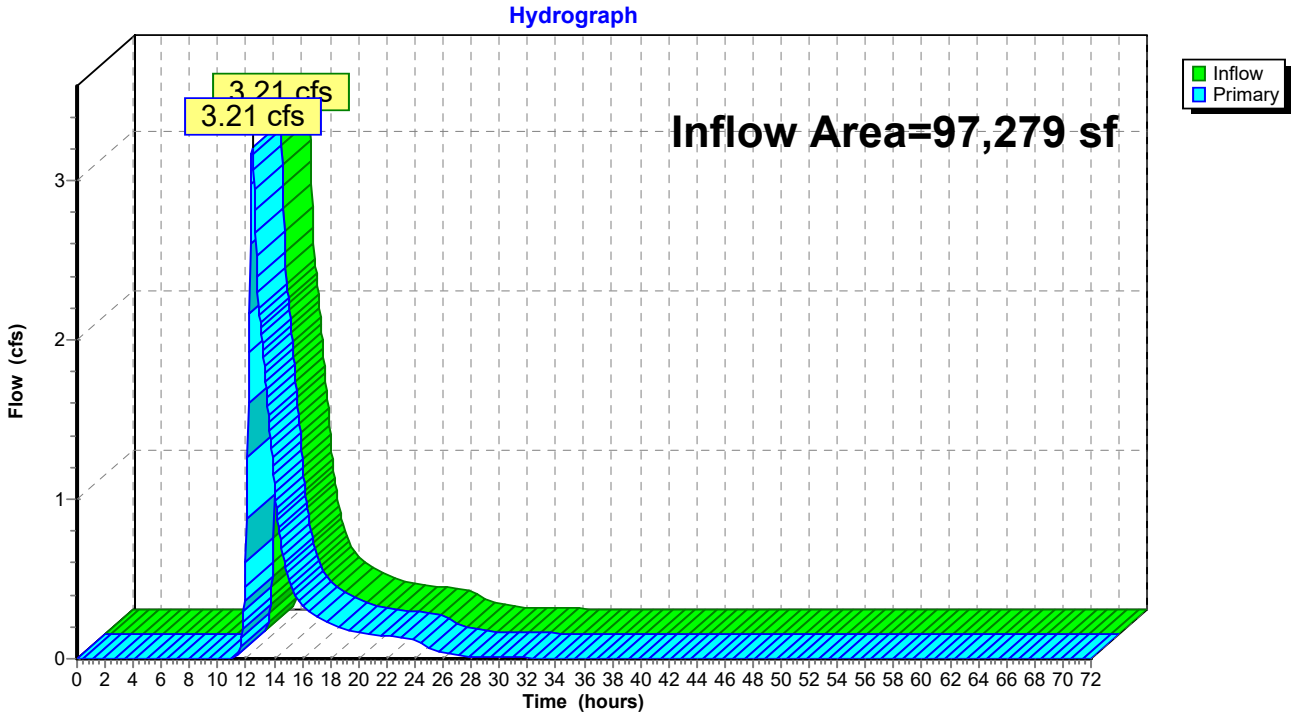


Summary for Link 10P: PDA 1A

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 3.11" for 10-Year event
Inflow = 3.21 cfs @ 12.45 hrs, Volume= 25,242 cf
Primary = 3.21 cfs @ 12.45 hrs, Volume= 25,242 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10P: PDA 1A

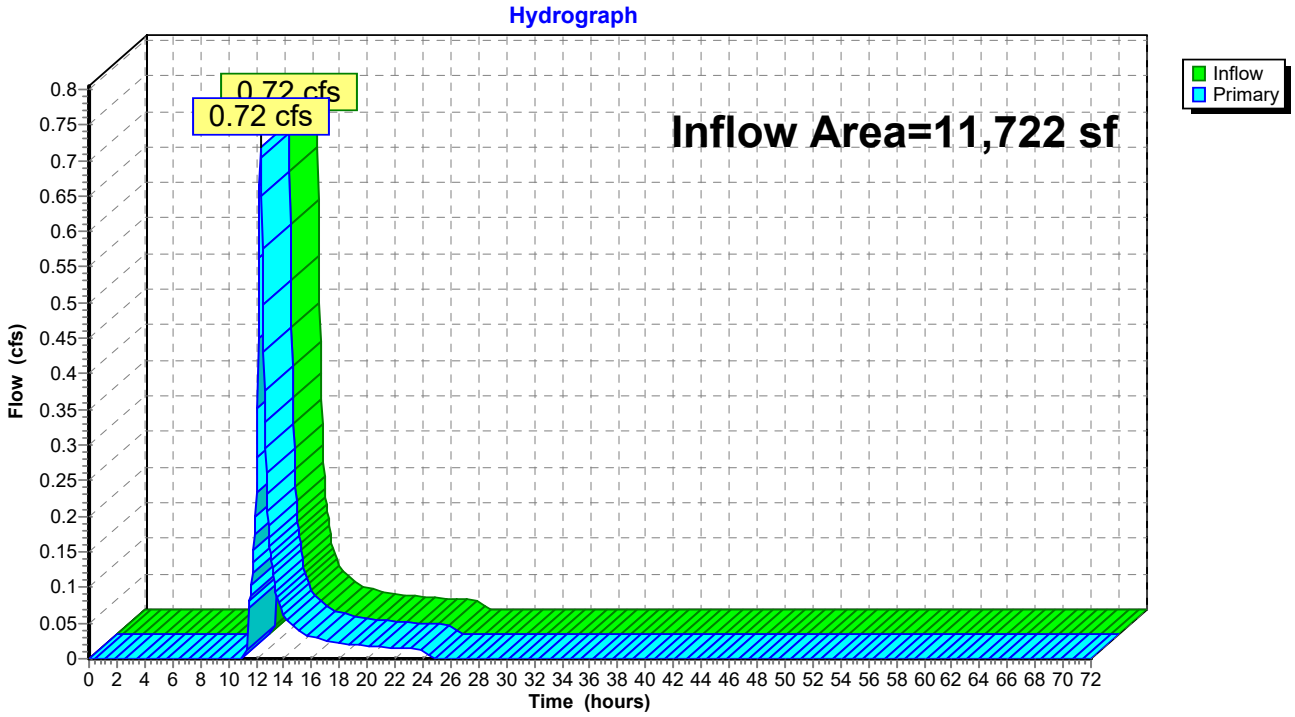


Summary for Link 11P: PDA 1B

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 3.01" for 10-Year event
Inflow = 0.72 cfs @ 12.32 hrs, Volume= 2,944 cf
Primary = 0.72 cfs @ 12.32 hrs, Volume= 2,944 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11P: PDA 1B

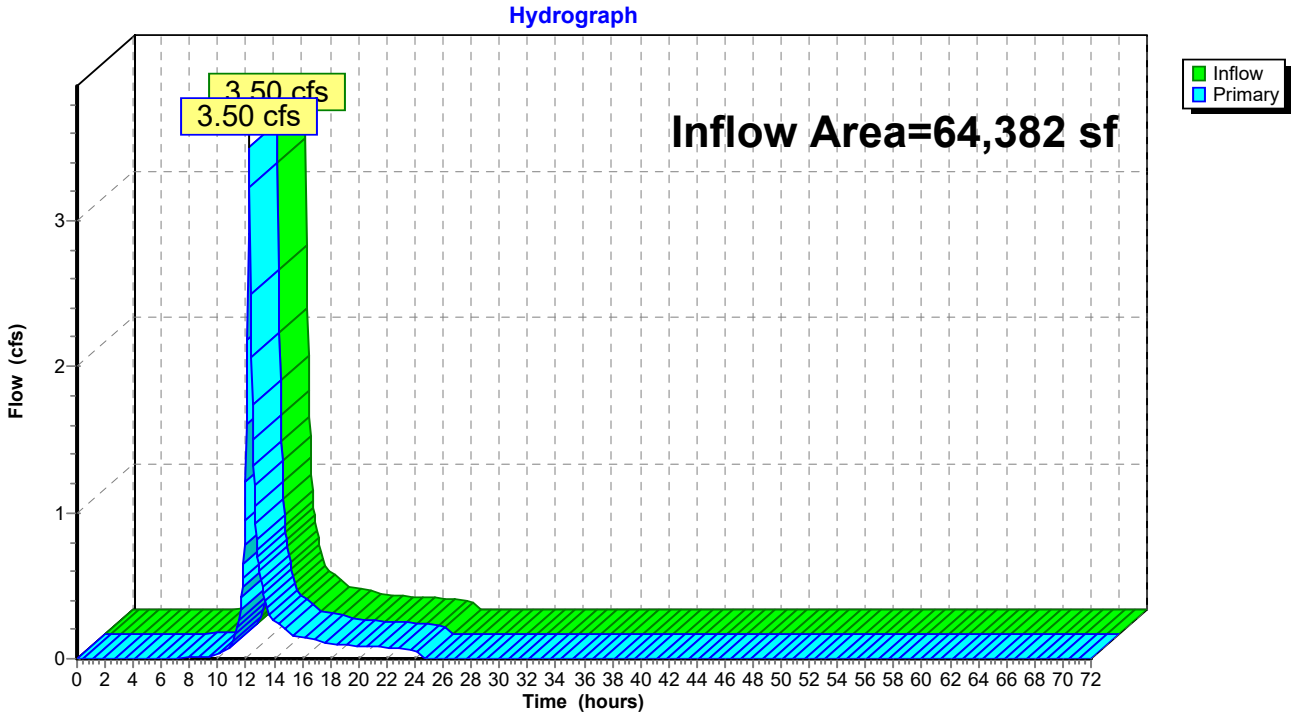


Summary for Link 12P: PDA 1C

Inflow Area = 64,382 sf, 3.87% Impervious, Inflow Depth = 2.44" for 10-Year event
Inflow = 3.50 cfs @ 12.22 hrs, Volume= 13,082 cf
Primary = 3.50 cfs @ 12.22 hrs, Volume= 13,082 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12P: PDA 1C

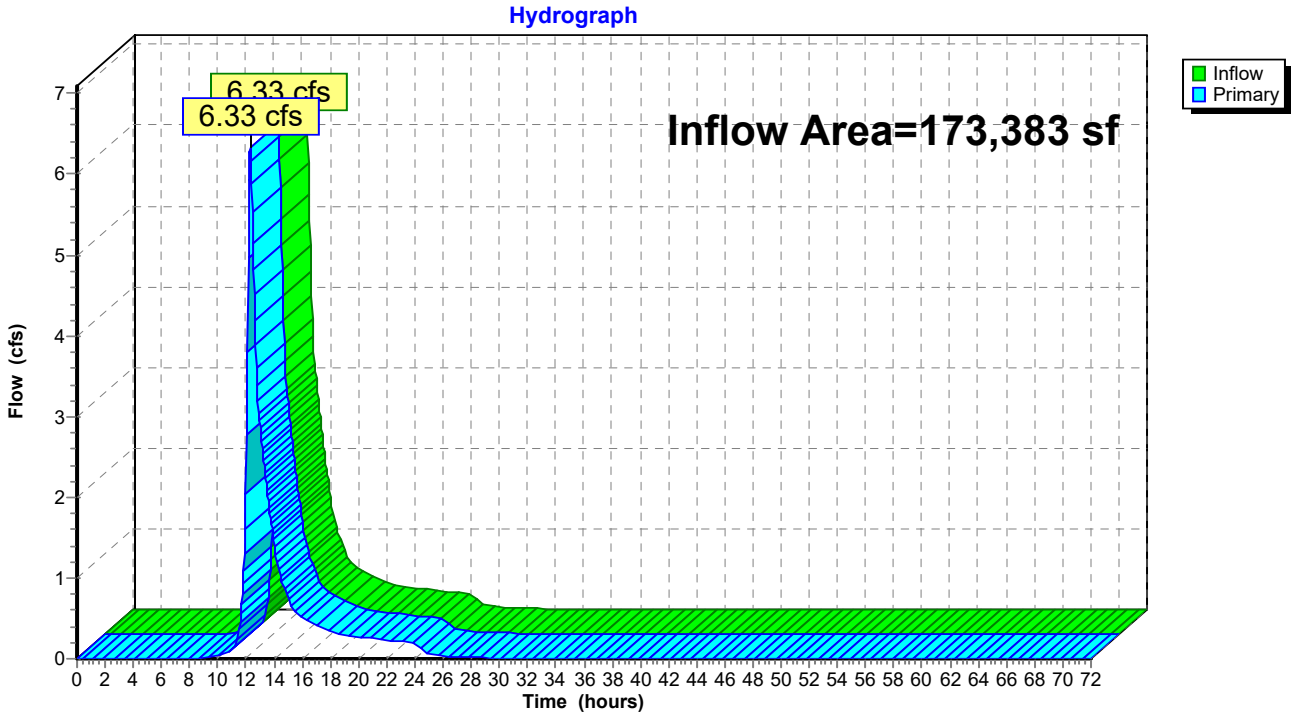


Summary for Link 13P: PDA 1

Inflow Area = 173,383 sf, 38.29% Impervious, Inflow Depth = 2.86" for 10-Year event
Inflow = 6.33 cfs @ 12.29 hrs, Volume= 41,268 cf
Primary = 6.33 cfs @ 12.29 hrs, Volume= 41,268 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13P: PDA 1

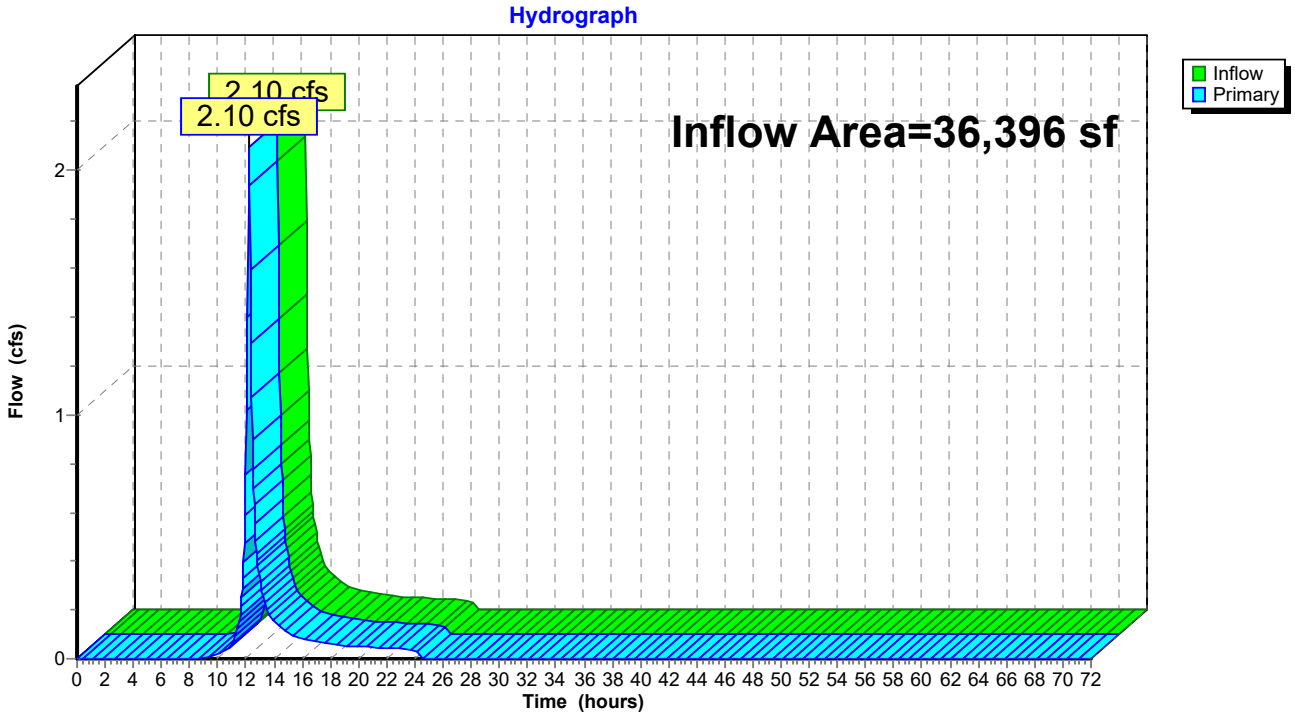


Summary for Link 14P: PDA 2

Inflow Area = 36,396 sf, 0.00% Impervious, Inflow Depth = 2.42" for 10-Year event
Inflow = 2.10 cfs @ 12.20 hrs, Volume= 7,347 cf
Primary = 2.10 cfs @ 12.20 hrs, Volume= 7,347 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 14P: PDA 2

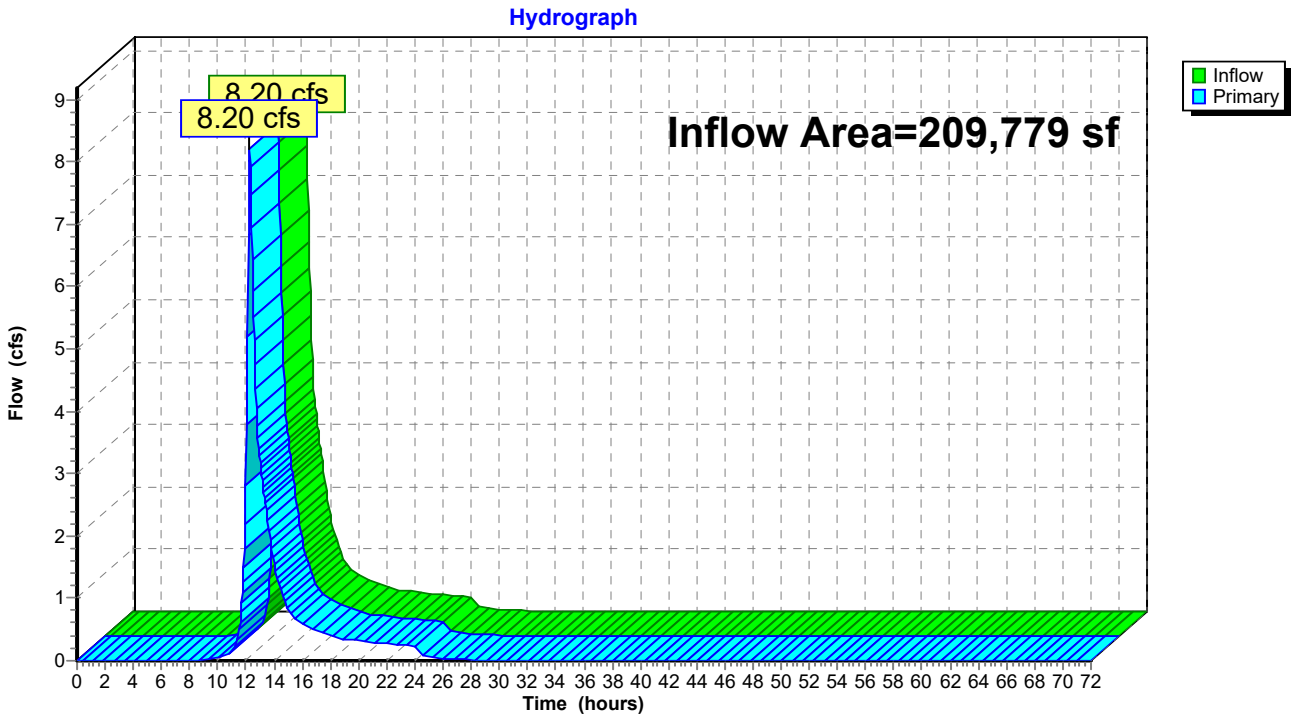


Summary for Link 15P: PDA

Inflow Area = 209,779 sf, 31.65% Impervious, Inflow Depth = 2.78" for 10-Year event
Inflow = 8.20 cfs @ 12.25 hrs, Volume= 48,616 cf
Primary = 8.20 cfs @ 12.25 hrs, Volume= 48,616 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 15P: PDA



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Impervious Runoff Area=10,351 sf 100.00% Impervious Runoff Depth=8.57"
Tc=12.4 min CN=0/98 Runoff=1.79 cfs 7,392 cf

Subcatchment 1P: Impervious Runoff Area=23,576 sf 100.00% Impervious Runoff Depth=8.57"
Tc=10.7 min CN=0/98 Runoff=4.27 cfs 16,837 cf

Subcatchment 2E: Pervious Runoff Area=167,702 sf 0.00% Impervious Runoff Depth=5.90"
Flow Length=630' Tc=12.4 min CN=76/0 Runoff=23.14 cfs 82,456 cf

Subcatchment 2P: Pervious Runoff Area=24,672 sf 0.00% Impervious Runoff Depth=5.66"
Flow Length=426' Tc=10.7 min CN=74/0 Runoff=3.44 cfs 11,629 cf

Subcatchment 3E: Impervious Runoff Area=5,641 sf 100.00% Impervious Runoff Depth=8.57"
Tc=6.0 min CN=0/98 Runoff=1.18 cfs 4,028 cf

Subcatchment 3P: Roof Area Runoff Area=35,418 sf 100.00% Impervious Runoff Depth=8.57"
Tc=10.7 min CN=0/98 Runoff=6.41 cfs 25,294 cf

Subcatchment 4E: Pervious Runoff Area=26,085 sf 0.00% Impervious Runoff Depth=7.24"
Flow Length=393' Tc=6.0 min CN=87/0 Runoff=5.11 cfs 15,738 cf

Subcatchment 4P: Pervious Runoff Area=13,613 sf 0.00% Impervious Runoff Depth=5.66"
Tc=10.7 min CN=74/0 Runoff=1.90 cfs 6,416 cf

Subcatchment 5P: Impervious Runoff Area=5,021 sf 97.63% Impervious Runoff Depth=8.56"
Tc=20.8 min CN=96/98 Runoff=0.71 cfs 3,583 cf

Subcatchment 6P: Pervious Runoff Area=6,701 sf 0.00% Impervious Runoff Depth=5.53"
Flow Length=172' Tc=20.8 min CN=73/0 Runoff=0.70 cfs 3,090 cf

Subcatchment 7P: Impervious Runoff Area=2,493 sf 100.00% Impervious Runoff Depth=8.57"
Tc=13.9 min CN=0/98 Runoff=0.41 cfs 1,780 cf

Subcatchment 8P: Pervious Runoff Area=61,889 sf 0.00% Impervious Runoff Depth=5.41"
Flow Length=409' Tc=13.9 min CN=72/0 Runoff=7.54 cfs 27,912 cf

Subcatchment 9P: Pervious Runoff Area=36,396 sf 0.00% Impervious Runoff Depth=5.53"
Flow Length=471' Tc=12.2 min CN=73/0 Runoff=4.76 cfs 16,785 cf

Pond B1: Bioretention Basin 1 Peak Elev=78.45' Storage=4,786 cf Inflow=7.70 cfs 28,466 cf
Outflow=7.55 cfs 24,571 cf

Pond B2: Bioretention Basin 2 Peak Elev=78.50' Storage=16,324 cf Inflow=15.77 cfs 56,281 cf
Outflow=10.31 cfs 53,114 cf

Pond B3: Bioretention Basin 3 Peak Elev=80.84' Storage=560 cf Inflow=1.41 cfs 6,674 cf
Primary=1.41 cfs 6,199 cf Secondary=0.00 cfs 0 cf Outflow=1.41 cfs 6,199 cf

Link 5E: EDA 1 Inflow=24.93 cfs 89,848 cf
Primary=24.93 cfs 89,848 cf

Link 6E: EDA 2 Inflow=6.29 cfs 19,767 cf
Primary=6.29 cfs 19,767 cf

Link 7E: EDA Inflow=29.37 cfs 109,615 cf
Primary=29.37 cfs 109,615 cf

Link 10P: PDA 1A Inflow=10.31 cfs 53,114 cf
Primary=10.31 cfs 53,114 cf

Link 11P: PDA 1B Inflow=1.41 cfs 6,199 cf
Primary=1.41 cfs 6,199 cf

Link 12P: PDA 1C Inflow=7.95 cfs 29,692 cf
Primary=7.95 cfs 29,692 cf

Link 13P: PDA 1 Inflow=19.24 cfs 89,005 cf
Primary=19.24 cfs 89,005 cf

Link 14P: PDA 2 Inflow=4.76 cfs 16,785 cf
Primary=4.76 cfs 16,785 cf

Link 15P: PDA Inflow=23.53 cfs 105,790 cf
Primary=23.53 cfs 105,790 cf

Total Runoff Area = 419,558 sf Runoff Volume = 222,941 cf Average Runoff Depth = 6.38"
80.36% Pervious = 337,177 sf 19.64% Impervious = 82,381 sf

Summary for Subcatchment 1E: Impervious

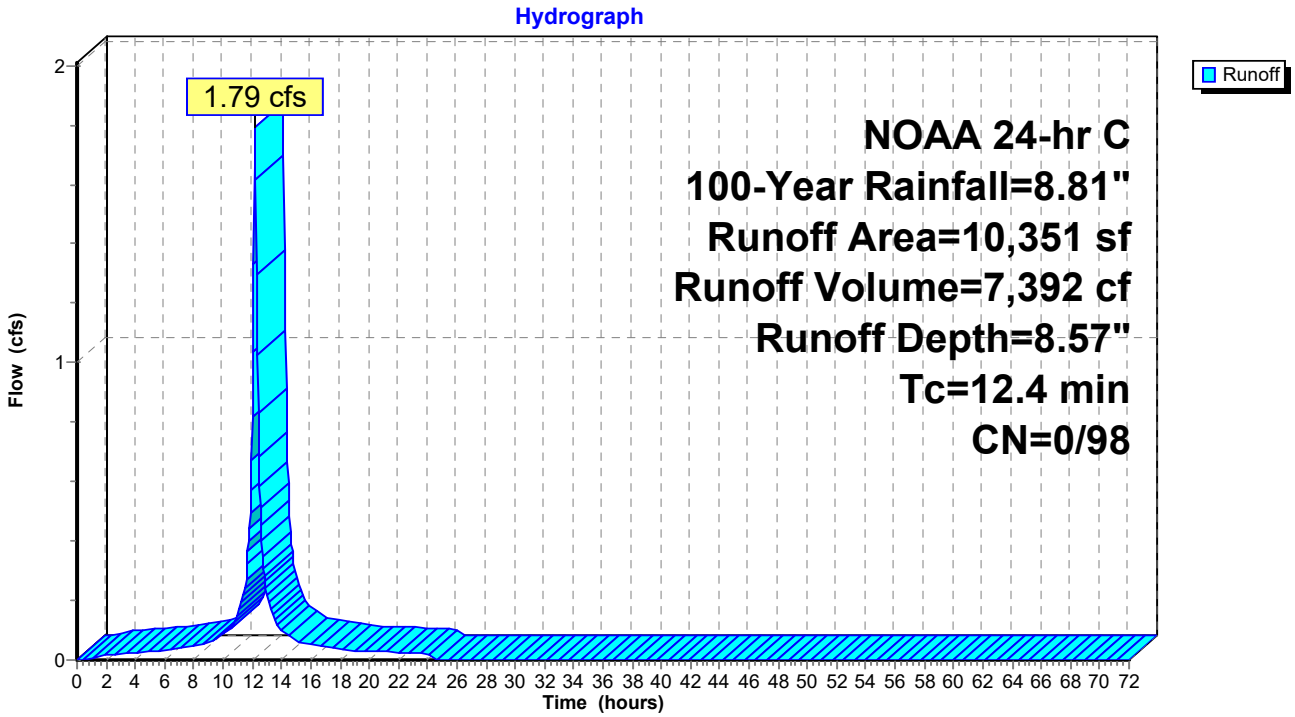
Runoff = 1.79 cfs @ 12.20 hrs, Volume= 7,392 cf, Depth= 8.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
3,299	98	Unconnected roofs, HSG C
7,052	98	Paved parking, HSG C
10,351	98	Weighted Average
10,351	98	100.00% Impervious Area

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

Subcatchment 1E: Impervious



Summary for Subcatchment 1P: Impervious

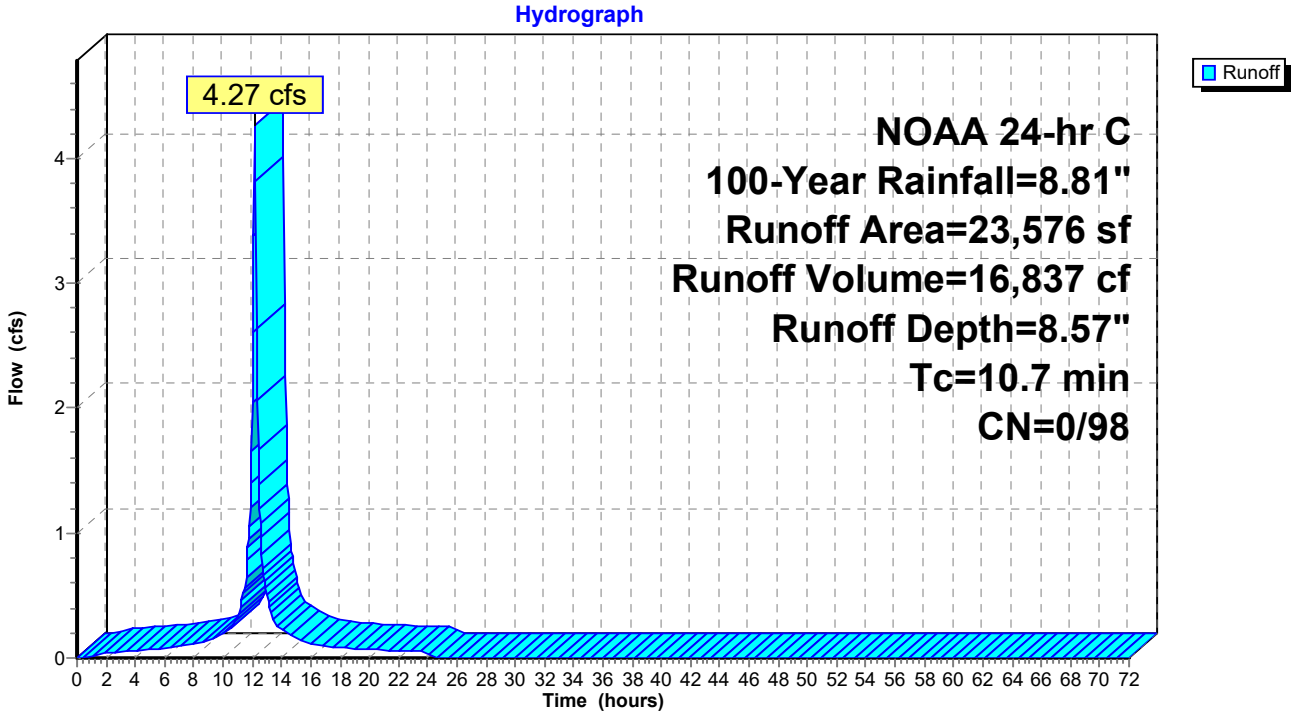
Runoff = 4.27 cfs @ 12.18 hrs, Volume= 16,837 cf, Depth= 8.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
23,576	98	Paved parking, HSG C
23,576	98	100.00% Impervious Area

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

Subcatchment 1P: Impervious



Summary for Subcatchment 2E: Pervious

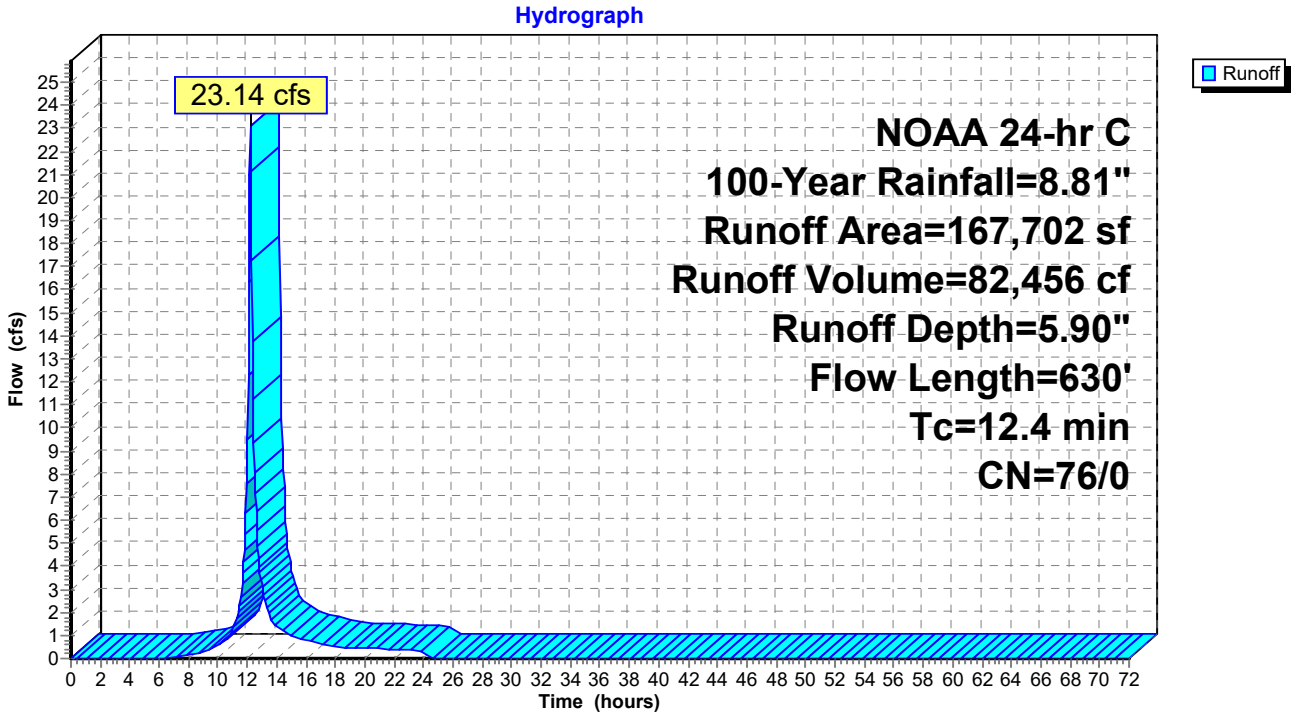
Runoff = 23.14 cfs @ 12.20 hrs, Volume= 82,456 cf, Depth= 5.90"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
24,589	96	Gravel surface, HSG C
36,591	70	Woods, Good, HSG C
105,816	74	>75% Grass cover, Good, HSG C
706	72	Woods/grass comb., Good, HSG C
167,702	76	Weighted Average
167,702	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	27	0.0490	1.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
8.8	73	0.0130	0.14		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.4	54	0.0180	2.16		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
1.2	207	0.0340	2.97		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.5	59	0.0170	2.10		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
0.2	43	0.0470	3.49		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
1.0	167	0.0280	2.69		**Shallow Concentrated Flow, G-H** Unpaved Kv= 16.1 fps
12.4	630	Total			

Subcatchment 2E: Pervious



Summary for Subcatchment 2P: Pervious

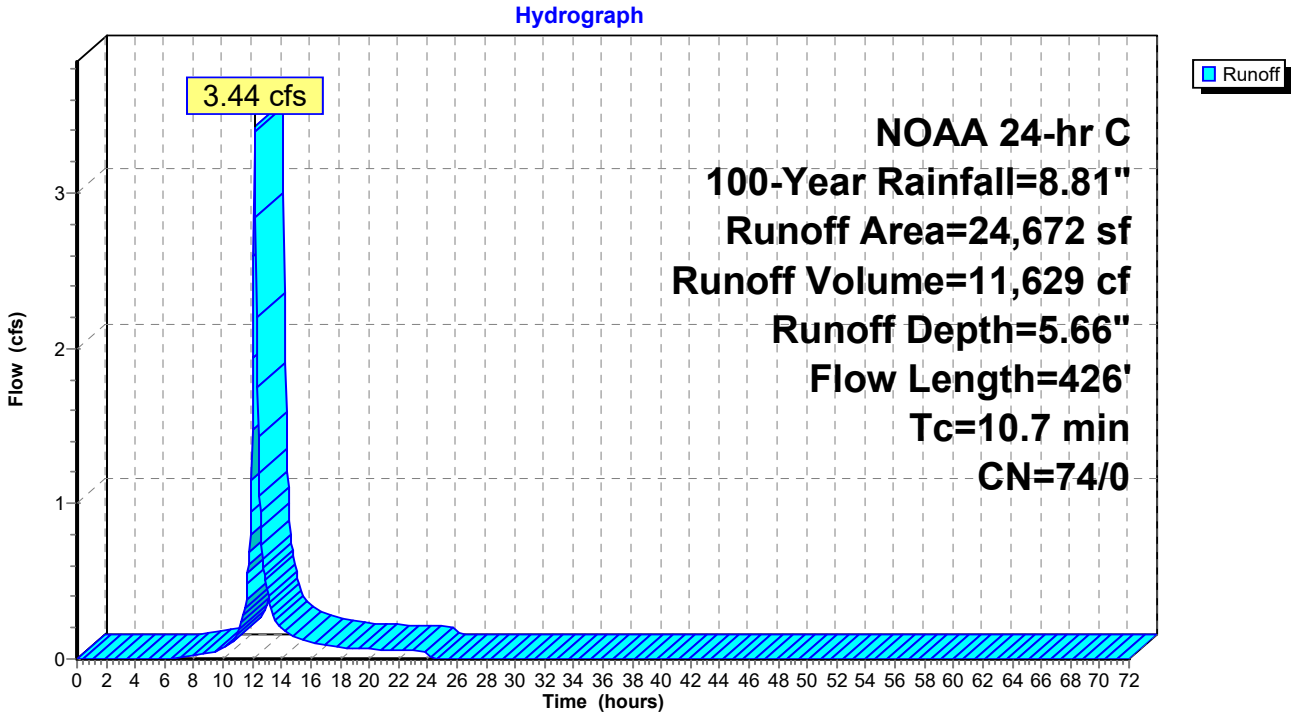
Runoff = 3.44 cfs @ 12.18 hrs, Volume= 11,629 cf, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
22,852	74	>75% Grass cover, Good, HSG C
1,820	72	Woods/grass comb., Good, HSG C
24,672	74	Weighted Average
24,672	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0222	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.1	23	0.0730	4.35		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.3	48	0.0210	2.94		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
1.1	255	0.0050	3.72	4.57	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
10.7	426	Total			

Subcatchment 2P: Pervious



Summary for Subcatchment 3E: Impervious

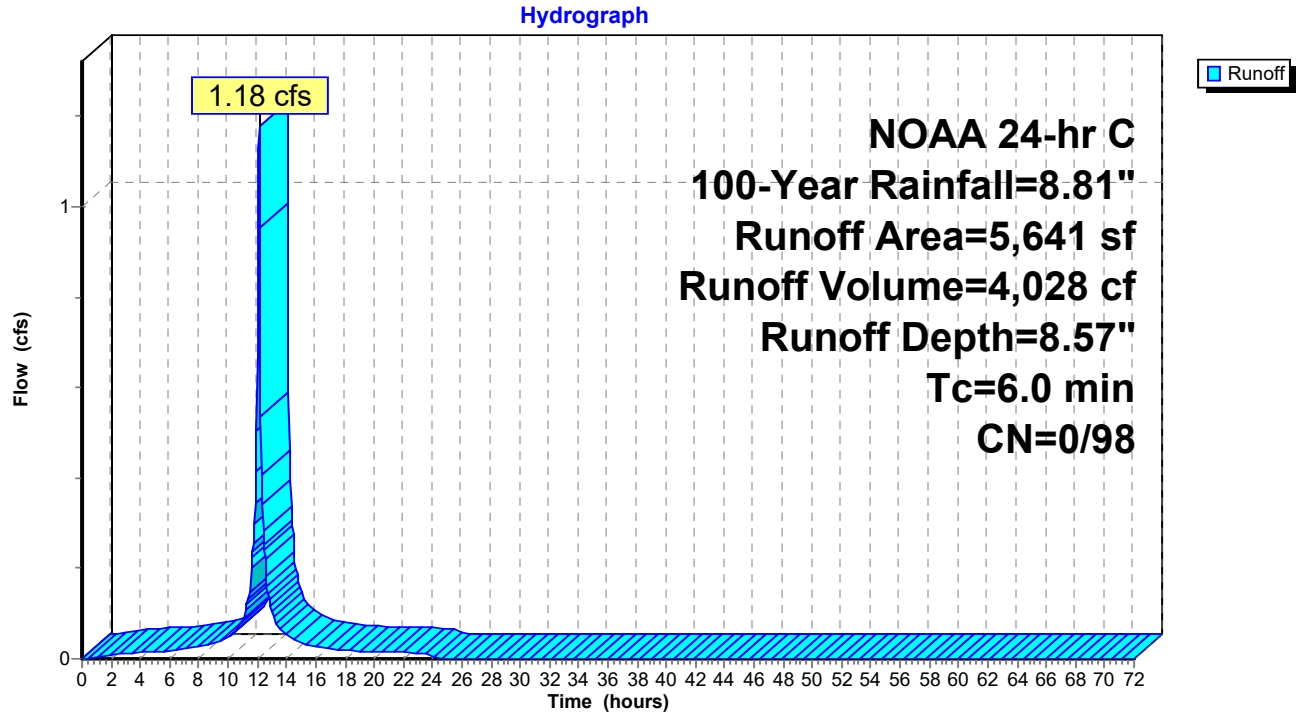
Runoff = 1.18 cfs @ 12.13 hrs, Volume= 4,028 cf, Depth= 8.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
2,580	98	Unconnected roofs, HSG C
3,061	98	Paved parking, HSG C
5,641	98	Weighted Average
5,641	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Tc**
3.0	0	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 3E: Impervious



Summary for Subcatchment 3P: Roof Area

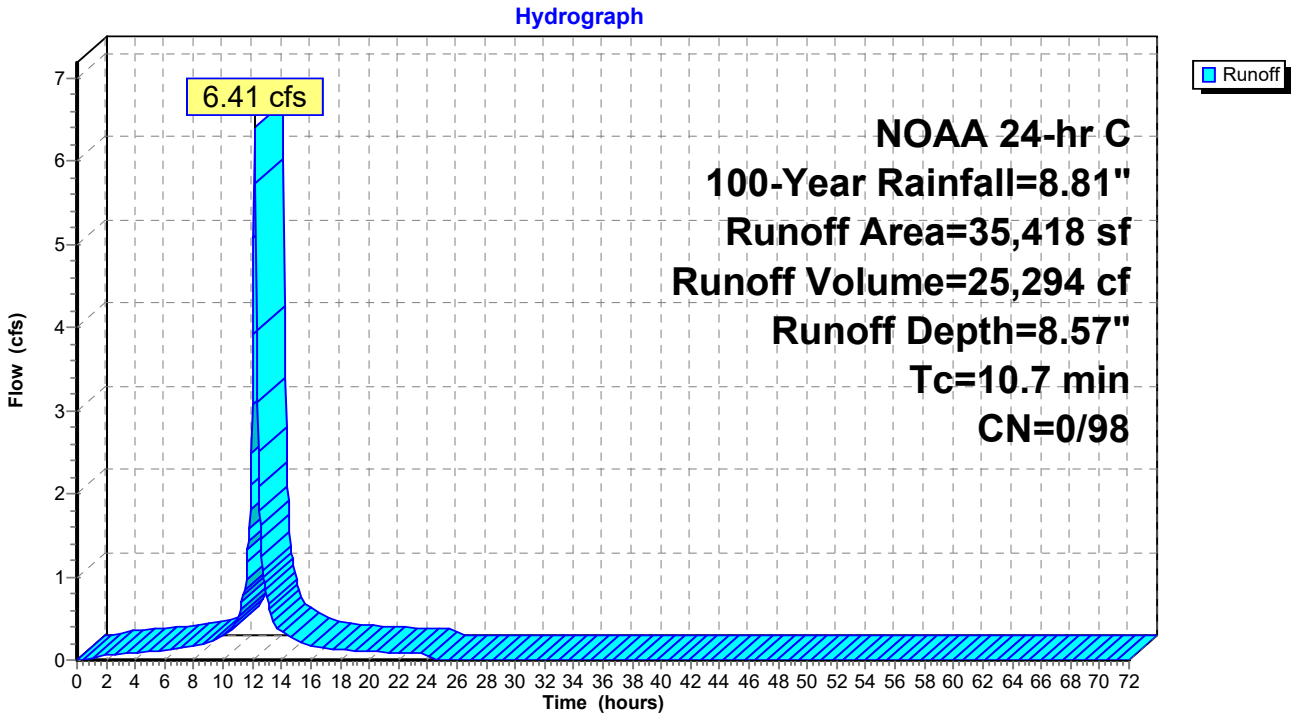
Runoff = 6.41 cfs @ 12.18 hrs, Volume= 25,294 cf, Depth= 8.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
35,068	98	Unconnected roofs, HSG C
350	98	Unconnected pavement, HSG C
35,418	98	Weighted Average
35,418	98	100.00% Impervious Area

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

Subcatchment 3P: Roof Area



Summary for Subcatchment 4E: Pervious

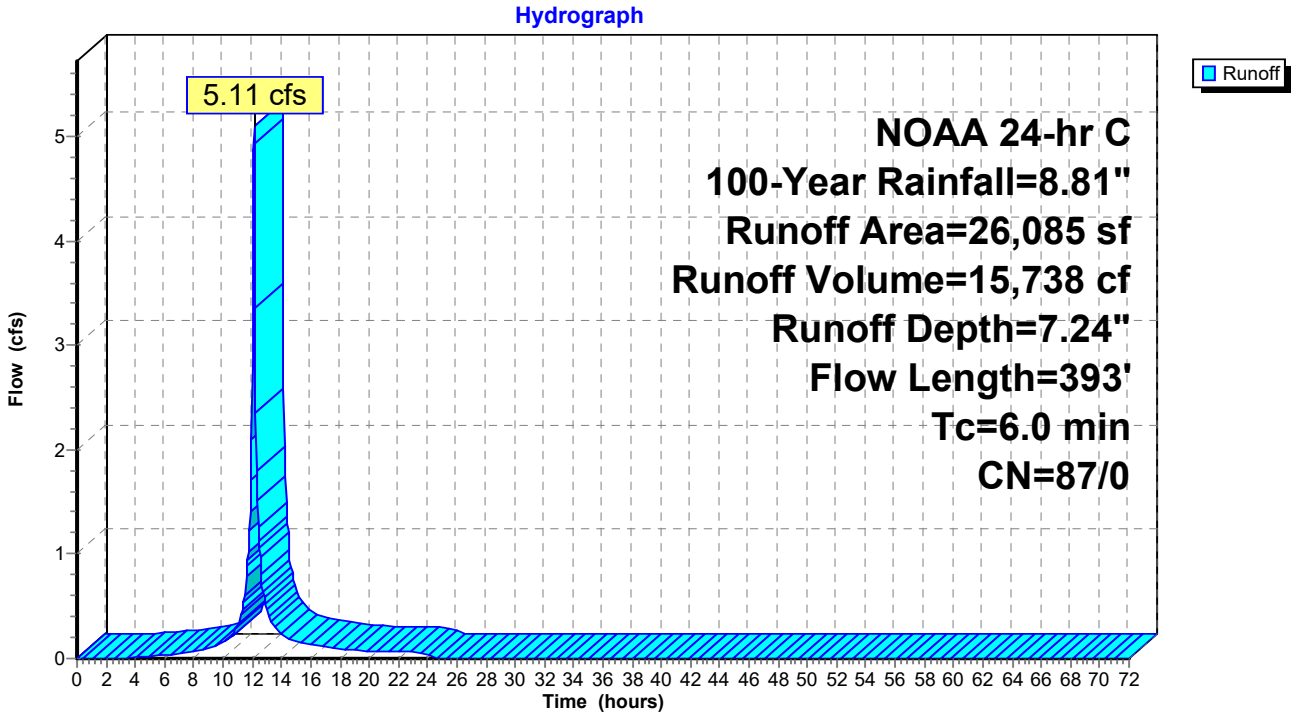
Runoff = 5.11 cfs @ 12.13 hrs, Volume= 15,738 cf, Depth= 7.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
164	70	Woods, Good, HSG C
16,189	96	Gravel surface, HSG C
5,108	74	>75% Grass cover, Good, HSG C
4,624	72	Woods/grass comb., Good, HSG C
26,085	87	Weighted Average
26,085	87	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0160	1.29		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.36"
0.6	97	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.0	175	0.0330	2.92		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	13	0.0230	2.44		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.0	8	0.0480	3.53		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
3.0	393	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4E: Pervious



Summary for Subcatchment 4P: Pervious

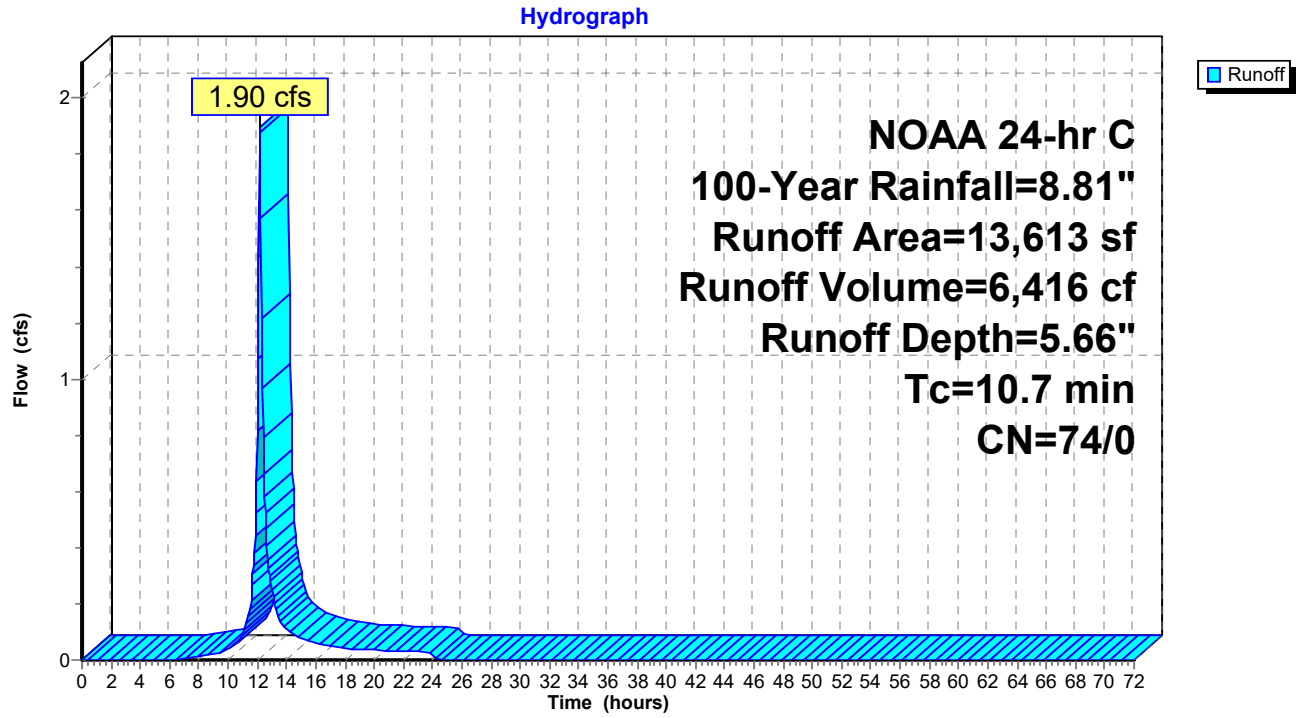
Runoff = 1.90 cfs @ 12.18 hrs, Volume= 6,416 cf, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
13,613	74	>75% Grass cover, Good, HSG C
13,613	74	100.00% Pervious Area

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

Subcatchment 4P: Pervious



Summary for Subcatchment 5P: Impervious

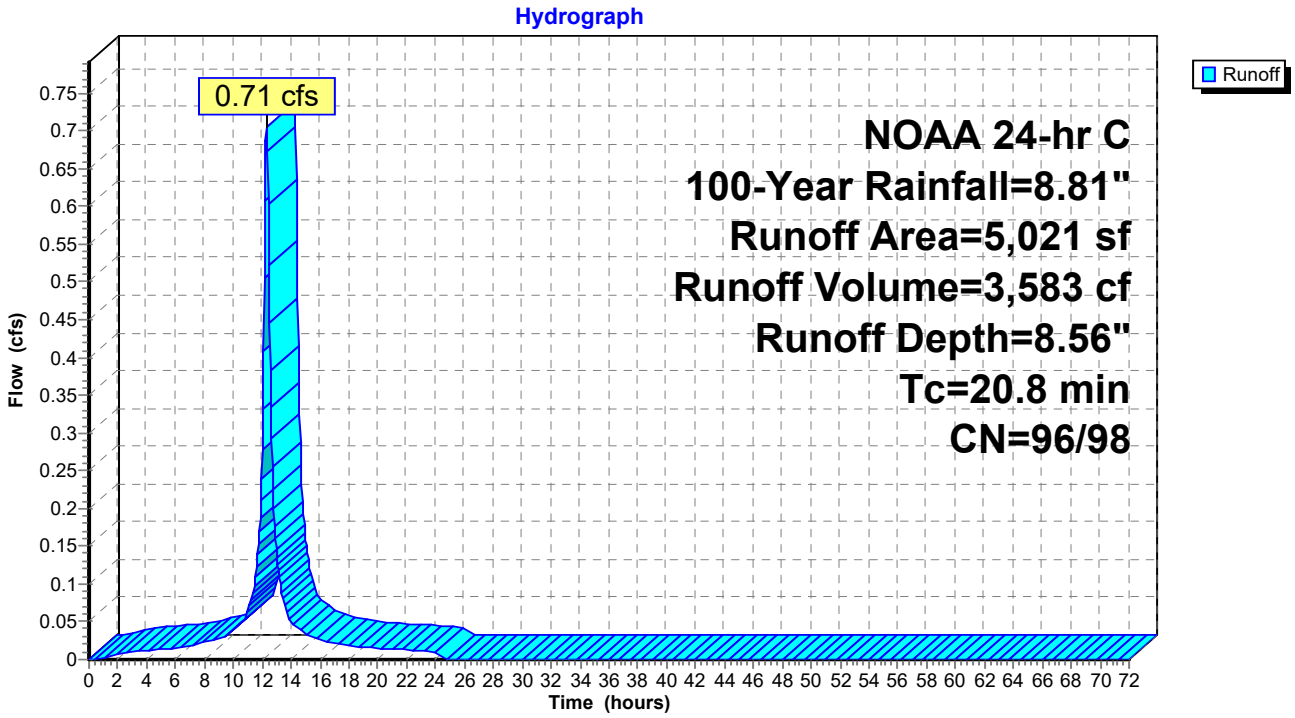
Runoff = 0.71 cfs @ 12.29 hrs, Volume= 3,583 cf, Depth= 8.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
4,902	98	Paved parking, HSG C
119	96	Gravel surface, HSG C
5,021	98	Weighted Average
119	96	2.37% Pervious Area
4,902	98	97.63% Impervious Area

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

Subcatchment 5P: Impervious



Summary for Subcatchment 6P: Pervious

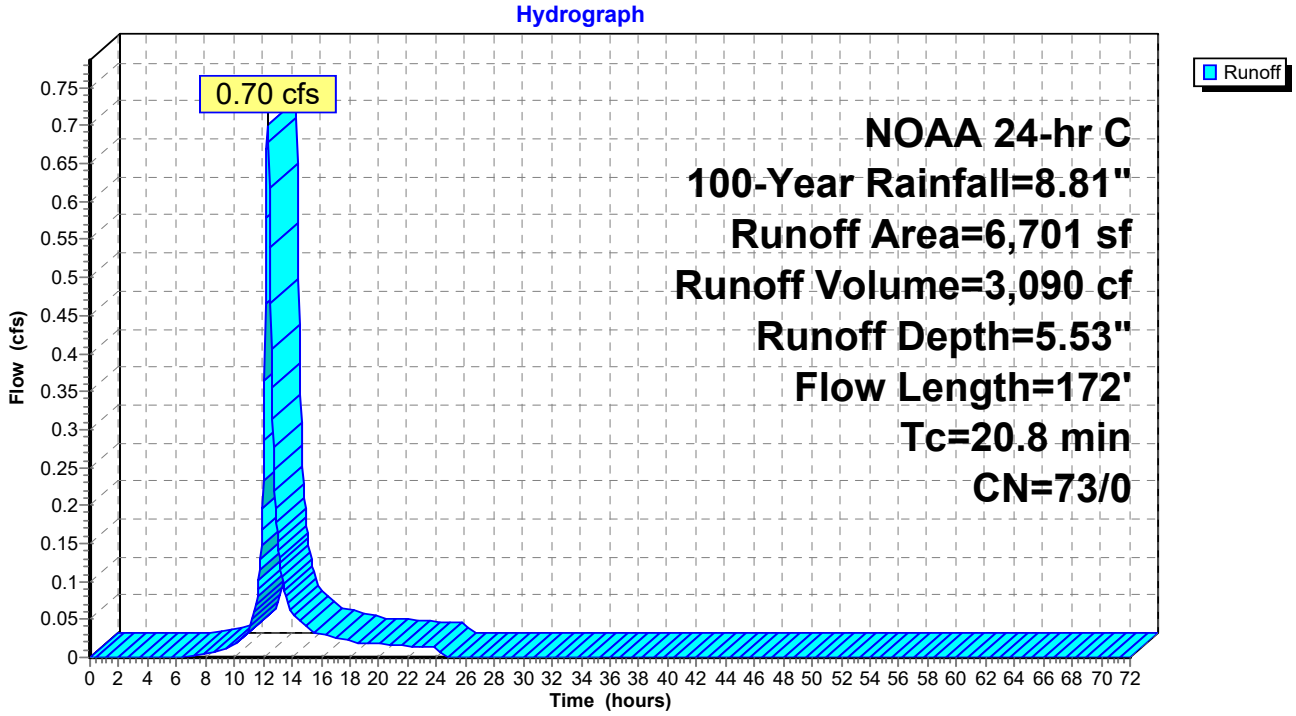
Runoff = 0.70 cfs @ 12.30 hrs, Volume= 3,090 cf, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
4,509	74	>75% Grass cover, Good, HSG C
2,192	70	Woods, Good, HSG C
6,701	73	Weighted Average
6,701	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	104	0.0230	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	57	0.0230	3.08		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	11	0.0200	2.28		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
20.8	172	Total			

Subcatchment 6P: Pervious



Summary for Subcatchment 7P: Impervious

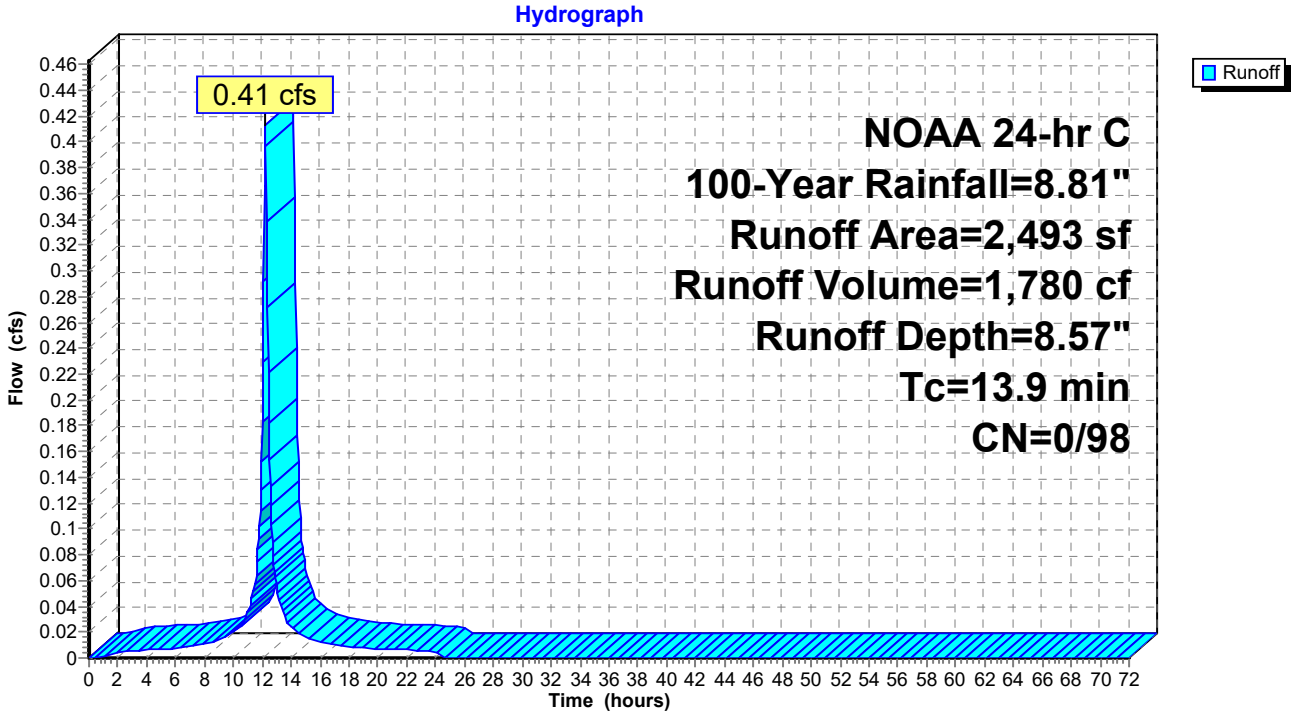
Runoff = 0.41 cfs @ 12.21 hrs, Volume= 1,780 cf, Depth= 8.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
2,493	98	Paved parking, HSG C
2,493	98	100.00% Impervious Area

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

Subcatchment 7P: Impervious



Summary for Subcatchment 8P: Pervious

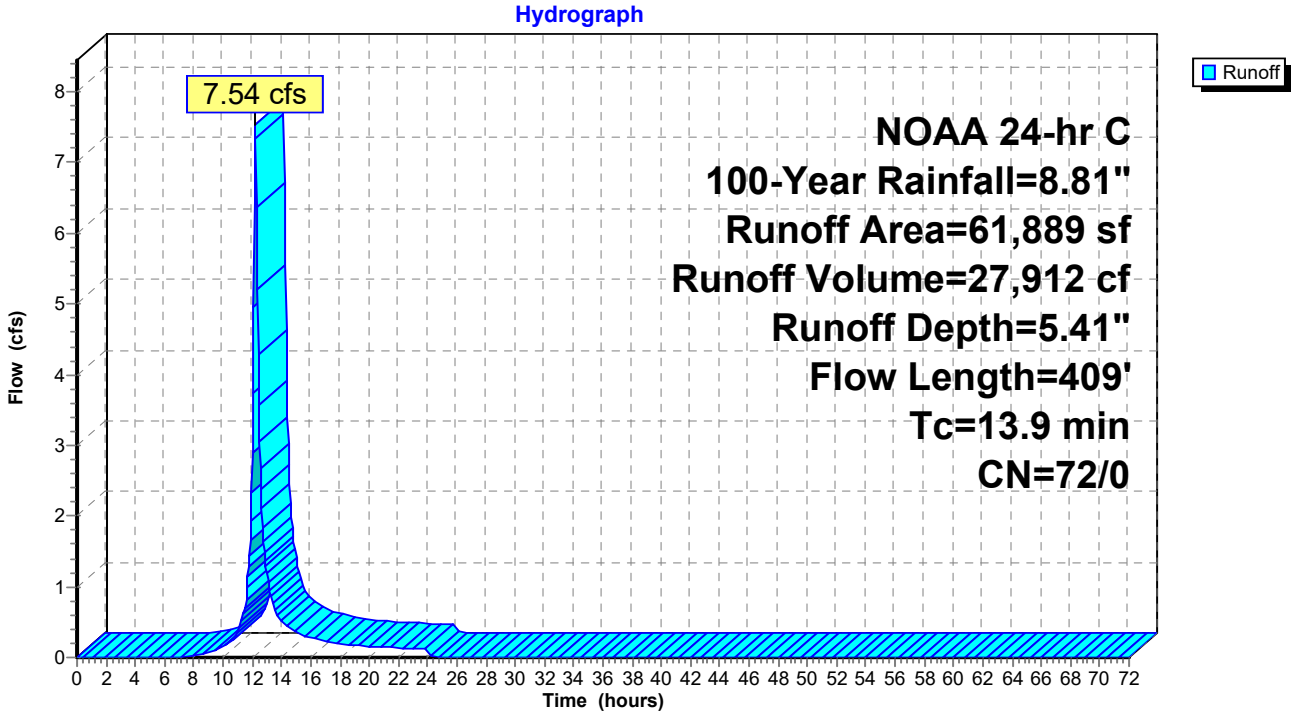
Runoff = 7.54 cfs @ 12.22 hrs, Volume= 27,912 cf, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
28,675	70	Woods, Good, HSG C
33,214	74	>75% Grass cover, Good, HSG C
61,889	72	Weighted Average
61,889	72	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	36	0.0560	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
4.3	51	0.0390	0.20		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.36"
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.5	297	0.0230	0.76		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
13.9	409	Total			

Subcatchment 8P: Pervious



Summary for Subcatchment 9P: Pervious

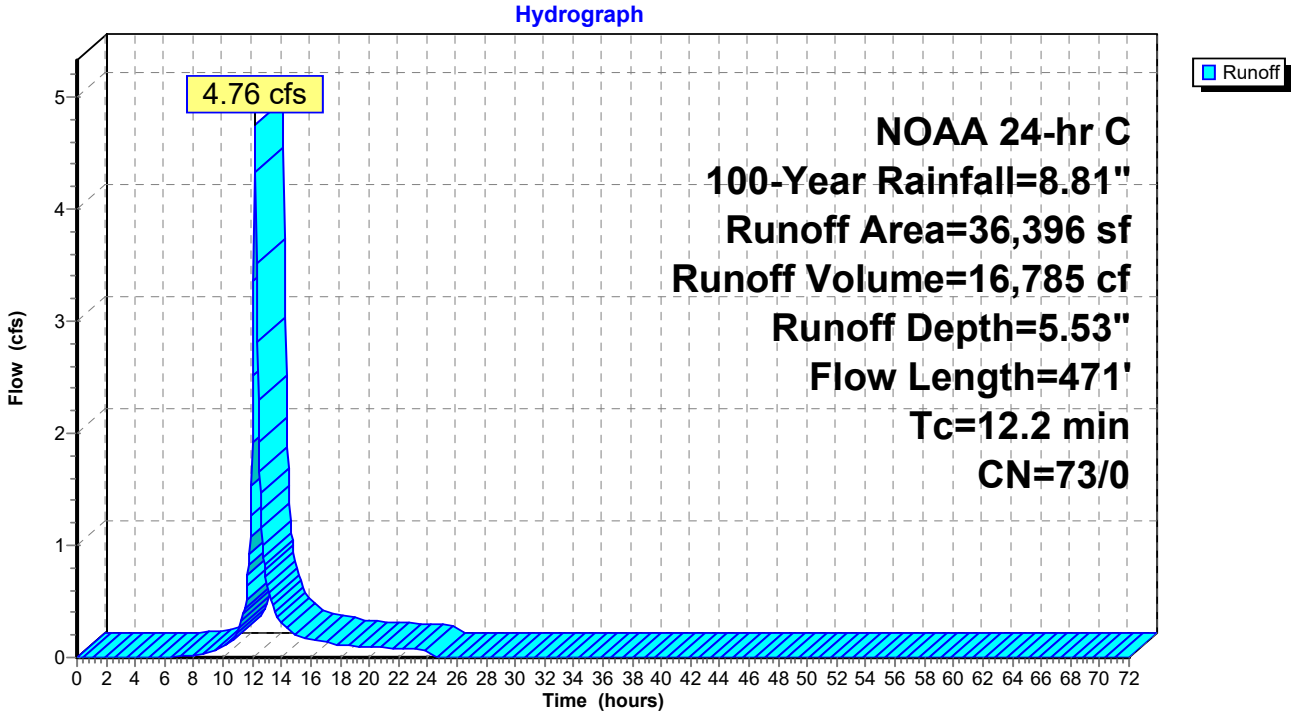
Runoff = 4.76 cfs @ 12.20 hrs, Volume= 16,785 cf, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.81"

Area (sf)	CN	Description
5,369	70	Woods, Good, HSG C
31,027	74	>75% Grass cover, Good, HSG C
36,396	73	Weighted Average
36,396	73	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0190	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.36"
0.7	102	0.0240	2.49		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.8	128	0.0310	2.83		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.8	120	0.0250	2.55		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.1	21	0.0310	2.83		**Shallow Concentrated Flow, E-F** Unpaved Kv= 16.1 fps
12.2	471	Total			

Subcatchment 9P: Pervious



Summary for Pond B1: Bioretention Basin 1

[92] Warning: Device #2 is above defined storage

Inflow Area = 48,248 sf, 48.86% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 7.70 cfs @ 12.18 hrs, Volume= 28,466 cf
Outflow = 7.55 cfs @ 12.20 hrs, Volume= 24,571 cf, Atten= 2%, Lag= 1.4 min
Primary = 7.55 cfs @ 12.20 hrs, Volume= 24,571 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 78.45' @ 12.20 hrs Surf.Area= 3,063 sf Storage= 4,786 cf

Plug-Flow detention time= 117.1 min calculated for 24,554 cf (86% of inflow)
Center-of-Mass det. time= 52.5 min (828.0 - 775.5)

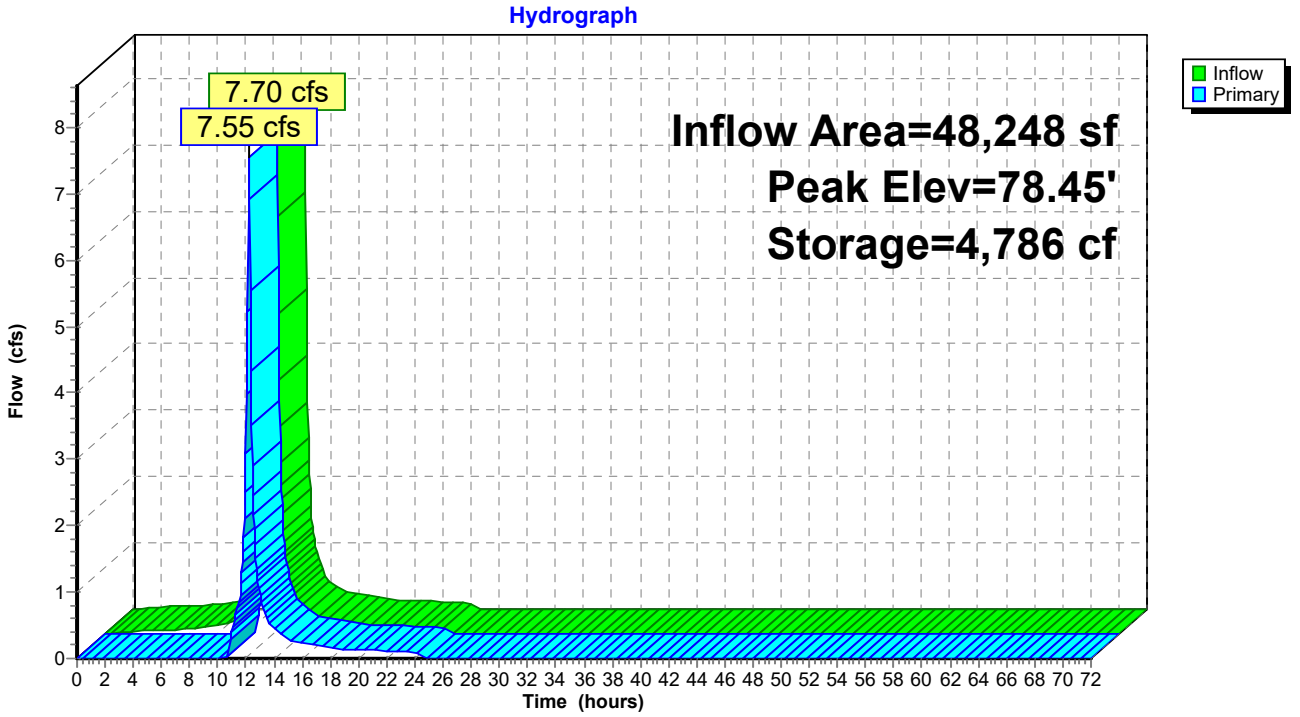
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	4,938 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.50	1,883	0	0	1,883
77.50	2,461	2,166	2,166	2,484
78.50	3,096	2,772	4,938	3,146

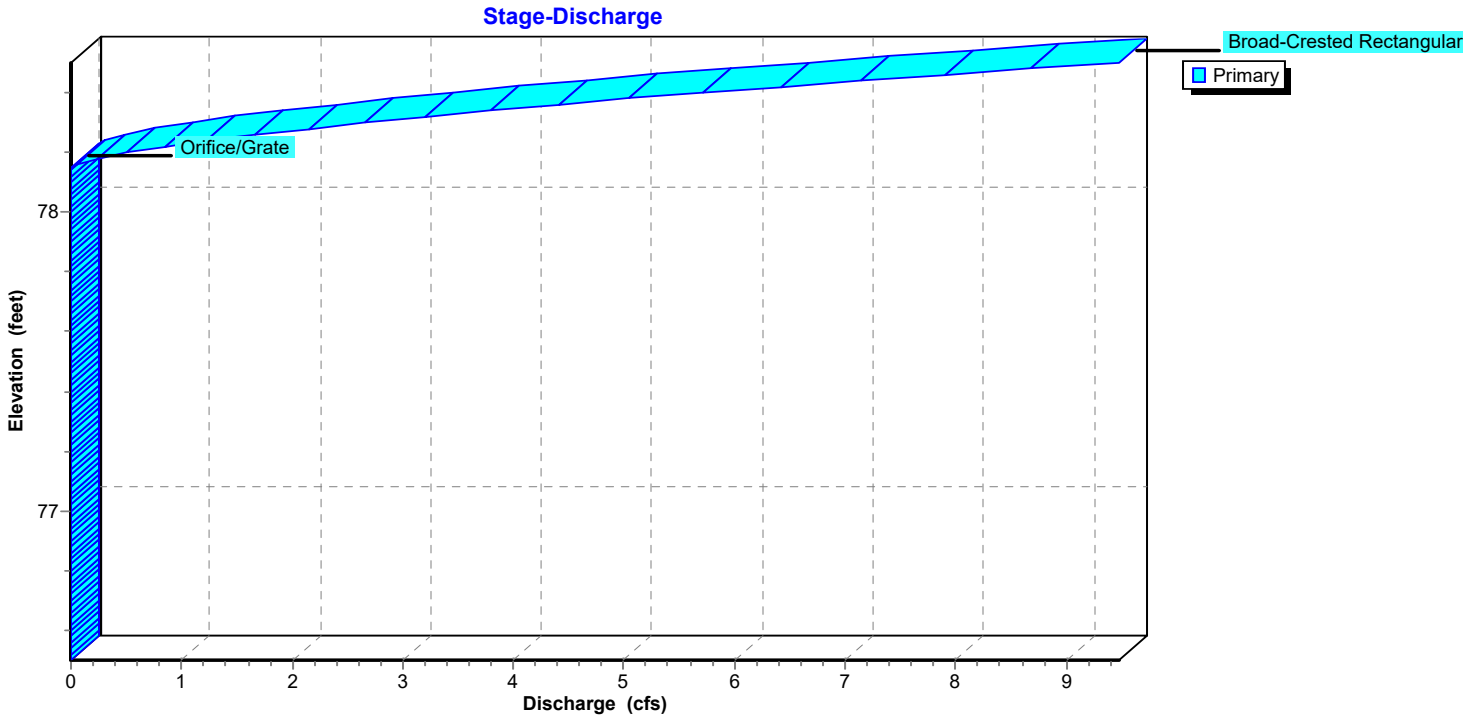
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**24.0" Round CMP_Round 24"** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.85' S= 0.0150 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	78.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	78.15'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=7.50 cfs @ 12.20 hrs HW=78.45' (Free Discharge)
↑—**1=CMP_Round 24"** (Passes 7.50 cfs of 25.19 cfs potential flow)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
—**3=Orifice/Grate** (Weir Controls 7.50 cfs @ 1.79 fps)

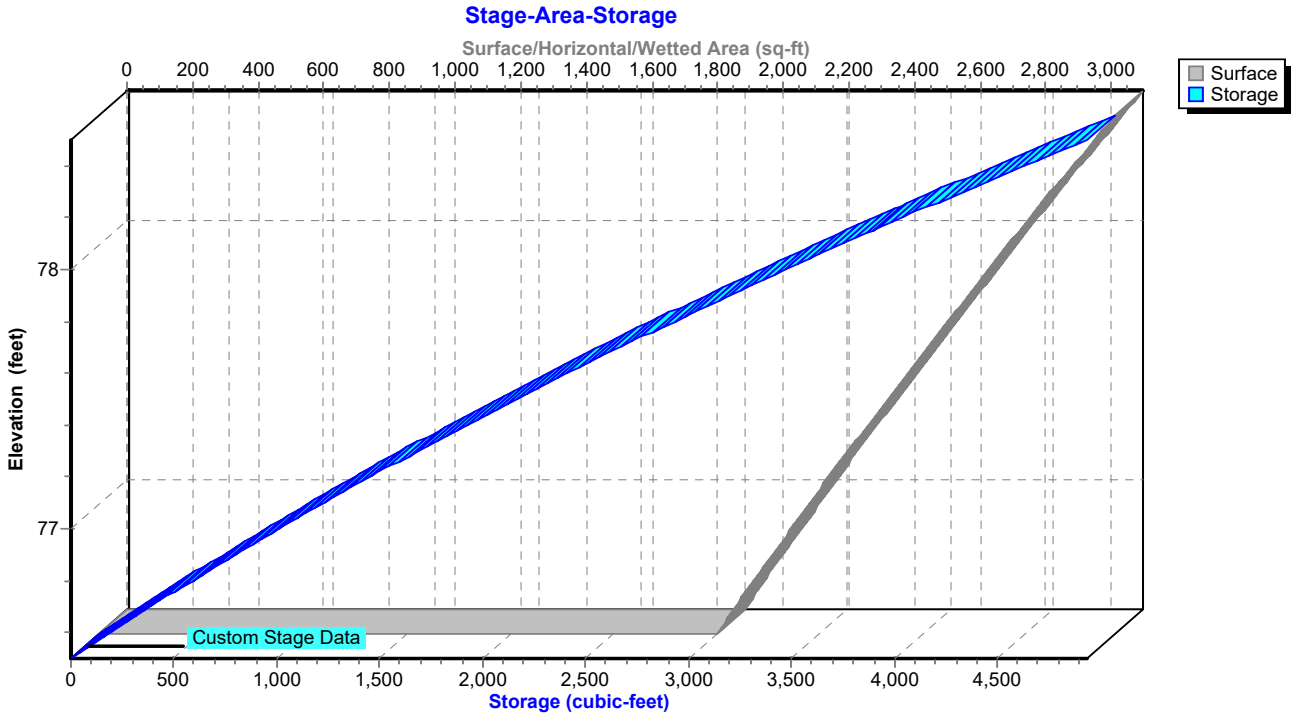
Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Stage-Discharge for Pond B1: Bioretention Basin 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.03	0.00	77.56	0.00	78.09	0.00
76.51	0.00	77.04	0.00	77.57	0.00	78.10	0.00
76.52	0.00	77.05	0.00	77.58	0.00	78.11	0.00
76.53	0.00	77.06	0.00	77.59	0.00	78.12	0.00
76.54	0.00	77.07	0.00	77.60	0.00	78.13	0.00
76.55	0.00	77.08	0.00	77.61	0.00	78.14	0.00
76.56	0.00	77.09	0.00	77.62	0.00	78.15	0.00
76.57	0.00	77.10	0.00	77.63	0.00	78.16	0.05
76.58	0.00	77.11	0.00	77.64	0.00	78.17	0.13
76.59	0.00	77.12	0.00	77.65	0.00	78.18	0.24
76.60	0.00	77.13	0.00	77.66	0.00	78.19	0.37
76.61	0.00	77.14	0.00	77.67	0.00	78.20	0.51
76.62	0.00	77.15	0.00	77.68	0.00	78.21	0.67
76.63	0.00	77.16	0.00	77.69	0.00	78.22	0.85
76.64	0.00	77.17	0.00	77.70	0.00	78.23	1.04
76.65	0.00	77.18	0.00	77.71	0.00	78.24	1.24
76.66	0.00	77.19	0.00	77.72	0.00	78.25	1.45
76.67	0.00	77.20	0.00	77.73	0.00	78.26	1.67
76.68	0.00	77.21	0.00	77.74	0.00	78.27	1.90
76.69	0.00	77.22	0.00	77.75	0.00	78.28	2.15
76.70	0.00	77.23	0.00	77.76	0.00	78.29	2.40
76.71	0.00	77.24	0.00	77.77	0.00	78.30	2.66
76.72	0.00	77.25	0.00	77.78	0.00	78.31	2.93
76.73	0.00	77.26	0.00	77.79	0.00	78.32	3.21
76.74	0.00	77.27	0.00	77.80	0.00	78.33	3.50
76.75	0.00	77.28	0.00	77.81	0.00	78.34	3.79
76.76	0.00	77.29	0.00	77.82	0.00	78.35	4.09
76.77	0.00	77.30	0.00	77.83	0.00	78.36	4.41
76.78	0.00	77.31	0.00	77.84	0.00	78.37	4.72
76.79	0.00	77.32	0.00	77.85	0.00	78.38	5.05
76.80	0.00	77.33	0.00	77.86	0.00	78.39	5.38
76.81	0.00	77.34	0.00	77.87	0.00	78.40	5.72
76.82	0.00	77.35	0.00	77.88	0.00	78.41	6.07
76.83	0.00	77.36	0.00	77.89	0.00	78.42	6.42
76.84	0.00	77.37	0.00	77.90	0.00	78.43	6.78
76.85	0.00	77.38	0.00	77.91	0.00	78.44	7.15
76.86	0.00	77.39	0.00	77.92	0.00	78.45	7.52
76.87	0.00	77.40	0.00	77.93	0.00	78.46	7.90
76.88	0.00	77.41	0.00	77.94	0.00	78.47	8.29
76.89	0.00	77.42	0.00	77.95	0.00	78.48	8.68
76.90	0.00	77.43	0.00	77.96	0.00	78.49	9.08
76.91	0.00	77.44	0.00	77.97	0.00	78.50	**9.48**
76.92	0.00	77.45	0.00	77.98	0.00		
76.93	0.00	77.46	0.00	77.99	0.00		
76.94	0.00	77.47	0.00	78.00	0.00		
76.95	0.00	77.48	0.00	78.01	0.00		
76.96	0.00	77.49	0.00	78.02	0.00		
76.97	0.00	77.50	0.00	78.03	0.00		
76.98	0.00	77.51	0.00	78.04	0.00		
76.99	0.00	77.52	0.00	78.05	0.00		
77.00	0.00	77.53	0.00	78.06	0.00		
77.01	0.00	77.54	0.00	78.07	0.00		
77.02	0.00	77.55	0.00	78.08	0.00		

Stage-Area-Storage for Pond B1: Bioretention Basin 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	1,883	0
76.52	1,894	38
76.54	1,905	76
76.56	1,916	114
76.58	1,926	152
76.60	1,937	191
76.62	1,948	230
76.64	1,959	269
76.66	1,970	308
76.68	1,981	348
76.70	1,992	387
76.72	2,004	427
76.74	2,015	468
76.76	2,026	508
76.78	2,037	549
76.80	2,048	590
76.82	2,060	631
76.84	2,071	672
76.86	2,082	713
76.88	2,094	755
76.90	2,105	797
76.92	2,116	839
76.94	2,128	882
76.96	2,139	924
76.98	2,151	967
77.00	2,162	1,011
77.02	2,174	1,054
77.04	2,186	1,097
77.06	2,197	1,141
77.08	2,209	1,185
77.10	2,221	1,230
77.12	2,232	1,274
77.14	2,244	1,319
77.16	2,256	1,364
77.18	2,268	1,409
77.20	2,279	1,455
77.22	2,291	1,500
77.24	2,303	1,546
77.26	2,315	1,593
77.28	2,327	1,639
77.30	2,339	1,686
77.32	2,351	1,732
77.34	2,363	1,780
77.36	2,375	1,827
77.38	2,388	1,875
77.40	2,400	1,923
77.42	2,412	1,971
77.44	2,424	2,019
77.46	2,436	2,068
77.48	2,449	2,116
77.50	2,461	2,166
77.52	2,473	2,215
77.54	2,485	2,264
77.56	2,497	2,314
77.58	2,509	2,364
77.60	2,521	2,415
77.62	2,533	2,465
77.64	2,546	2,516
77.66	2,558	2,567
77.68	2,570	2,618
77.70	2,582	2,670
77.72	2,594	2,722
77.74	2,607	2,774
77.76	2,619	2,826
77.78	2,631	2,878
77.80	2,644	2,931
77.82	2,656	2,984
77.84	2,669	3,037
77.86	2,681	3,091
77.88	2,694	3,145
77.90	2,706	3,199
77.92	2,719	3,253
77.94	2,731	3,307
77.96	2,744	3,362
77.98	2,757	3,417
78.00	2,769	3,472
78.02	2,782	3,528
78.04	2,795	3,584
78.06	2,808	3,640
78.08	2,820	3,696
78.10	2,833	3,753
78.12	2,846	3,809
78.14	2,859	3,866
78.16	2,872	3,924
78.18	2,885	3,981
78.20	2,898	4,039
78.22	2,911	4,097
78.24	2,924	4,156
78.26	2,937	4,214
78.28	2,950	4,273
78.30	2,963	4,332
78.32	2,976	4,392
78.34	2,990	4,451
78.36	3,003	4,511
78.38	3,016	4,571
78.40	3,029	4,632
78.42	3,043	4,692
78.44	3,056	4,753
78.46	3,069	4,815
78.48	3,083	4,876
78.50	**3,096**	**4,938**

Summary for Pond B2: Bioretention Basin 2

[81] Warning: Exceeded Pond B1 by 0.12' @ 12.35 hrs

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 6.94" for 100-Year event
Inflow = 15.77 cfs @ 12.19 hrs, Volume= 56,281 cf
Outflow = 10.31 cfs @ 12.32 hrs, Volume= 53,114 cf, Atten= 35%, Lag= 7.8 min
Primary = 10.31 cfs @ 12.32 hrs, Volume= 53,114 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 78.50' @ 12.31 hrs Surf.Area= 9,518 sf Storage= 16,324 cf

Plug-Flow detention time= 105.9 min calculated for 53,077 cf (94% of inflow)
Center-of-Mass det. time= 75.0 min (864.8 - 789.8)

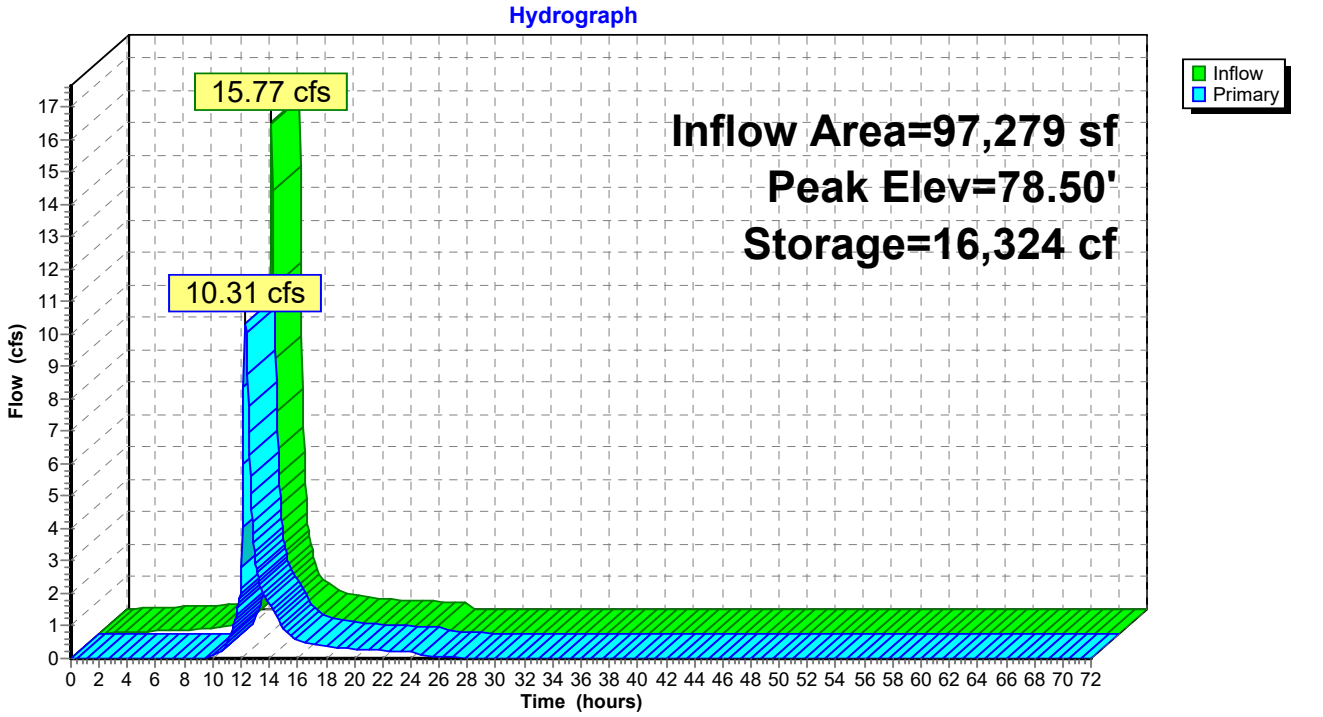
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	26,647 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	6,877	0	0
77.50	8,155	7,516	7,516
78.50	9,522	8,839	16,355
79.50	11,063	10,293	26,647

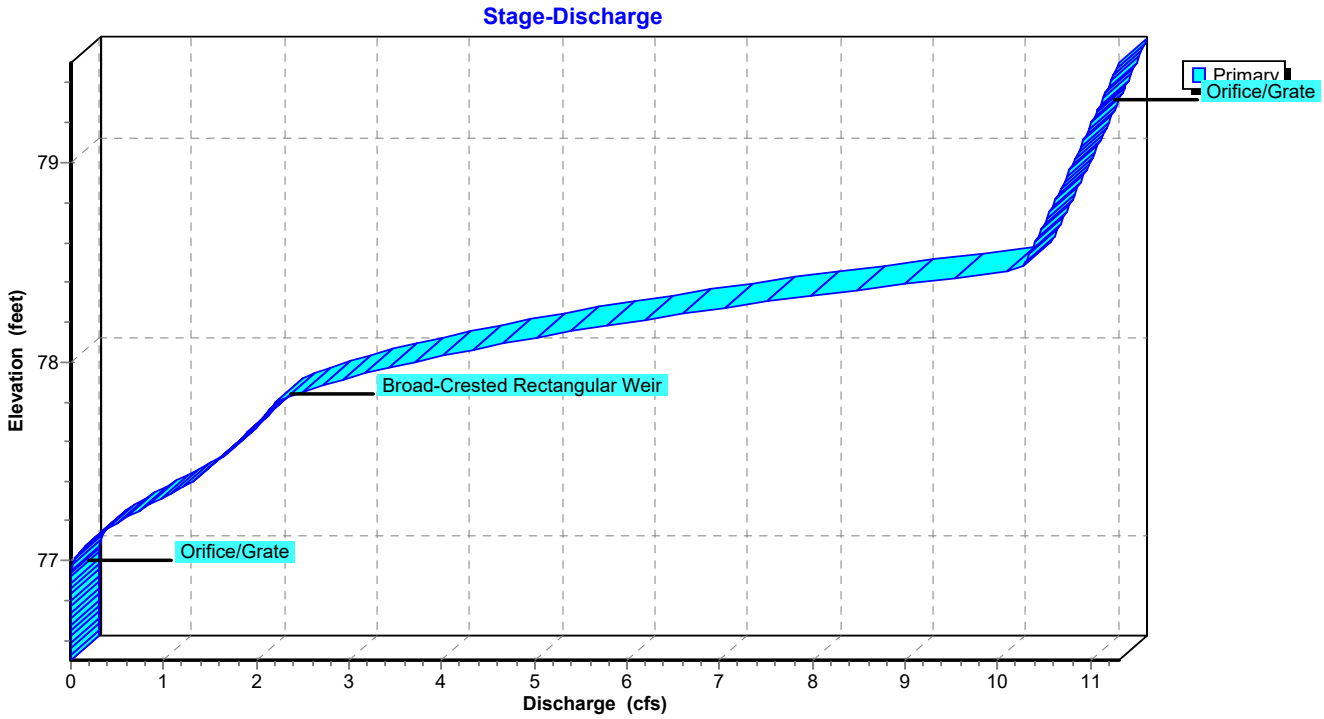
Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.06' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	76.94'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	77.78'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	79.25'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

Primary OutFlow Max=10.29 cfs @ 12.32 hrs HW=78.49' (Free Discharge)
└**1=Culvert** (Inlet Controls 10.29 cfs @ 8.38 fps)
  ├**2=Orifice/Grate** (Passes < 3.23 cfs potential flow)
  ├**3=Broad-Crested Rectangular Weir** (Passes < 7.66 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

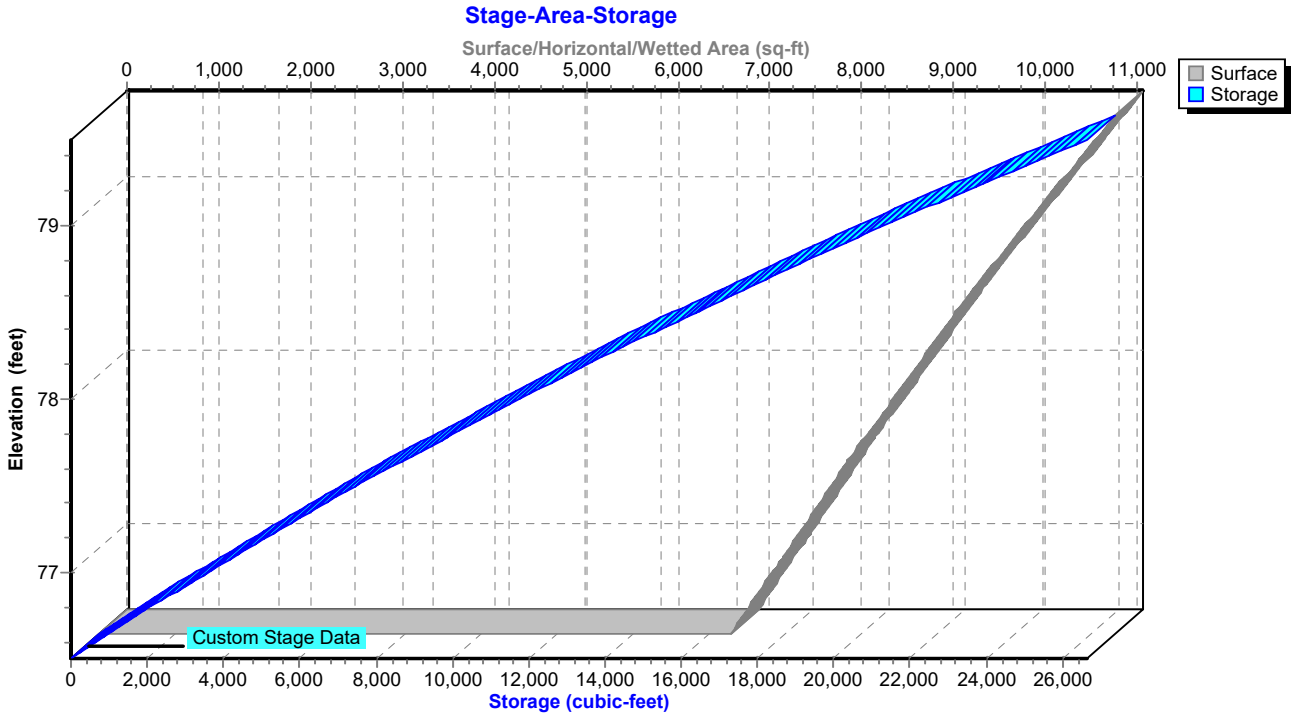
Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Stage-Discharge for Pond B2: Bioretention Basin 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.56	1.73	78.62	10.43
76.52	0.00	77.58	1.77	78.64	10.45
76.54	0.00	77.60	1.82	78.66	10.47
76.56	0.00	77.62	1.86	78.68	10.49
76.58	0.00	77.64	1.90	78.70	10.51
76.60	0.00	77.66	1.94	78.72	10.53
76.62	0.00	77.68	1.99	78.74	10.55
76.64	0.00	77.70	2.03	78.76	10.57
76.66	0.00	77.72	2.06	78.78	10.59
76.68	0.00	77.74	2.10	78.80	10.61
76.70	0.00	77.76	2.14	78.82	10.63
76.72	0.00	77.78	2.18	78.84	10.65
76.74	0.00	77.80	2.25	78.86	10.67
76.76	0.00	77.82	2.34	78.88	10.69
76.78	0.00	77.84	2.45	78.90	10.71
76.80	0.00	77.86	2.58	78.92	10.73
76.82	0.00	77.88	2.71	78.94	10.75
76.84	0.00	77.90	2.86	78.96	10.77
76.86	0.00	77.92	3.01	78.98	10.79
76.88	0.00	77.94	3.17	79.00	10.82
76.90	0.00	77.96	3.34	79.02	10.84
76.92	0.00	77.98	3.52	79.04	10.86
76.94	0.00	78.00	3.71	79.06	10.88
76.96	0.00	78.02	3.91	79.08	10.90
76.98	0.02	78.04	4.12	79.10	10.92
77.00	0.03	78.06	4.33	79.12	10.94
77.02	0.06	78.08	4.56	79.14	10.96
77.04	0.09	78.10	4.79	79.16	10.97
77.06	0.13	78.12	5.02	79.18	10.99
77.08	0.17	78.14	5.27	79.20	11.01
77.10	0.22	78.16	5.52	79.22	11.03
77.12	0.28	78.18	5.78	79.24	11.05
77.14	0.34	78.20	6.05	79.26	11.07
77.16	0.40	78.22	6.32	79.28	11.09
77.18	0.47	78.24	6.61	79.30	11.11
77.20	0.54	78.26	6.90	79.32	11.13
77.22	0.61	78.28	7.20	79.34	11.15
77.24	0.69	78.30	7.51	79.36	11.17
77.26	0.77	78.32	7.83	79.38	11.19
77.28	0.85	78.34	8.15	79.40	11.21
77.30	0.93	78.36	8.48	79.42	11.23
77.32	1.01	78.38	8.82	79.44	11.25
77.34	1.09	78.40	9.18	79.46	11.27
77.36	1.17	78.42	9.54	79.48	11.29
77.38	1.24	78.44	9.92	79.50	**11.31**
77.40	1.31	78.46	10.26		
77.42	1.37	78.48	10.28		
77.44	1.42	78.50	10.30		
77.46	1.47	78.52	10.32		
77.48	1.53	78.54	10.34		
77.50	1.58	78.56	10.36		
77.52	1.63	78.58	10.38		
77.54	1.68	78.60	10.40		

Stage-Area-Storage for Pond B2: Bioretention Basin 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.50	6,877	0
76.55	6,941	345
76.60	7,005	694
76.65	7,069	1,046
76.70	7,133	1,401
76.75	7,197	1,759
76.80	7,260	2,121
76.85	7,324	2,485
76.90	7,388	2,853
76.95	7,452	3,224
77.00	7,516	3,598
77.05	7,580	3,976
77.10	7,644	4,356
77.15	7,708	4,740
77.20	7,772	5,127
77.25	7,836	5,517
77.30	7,899	5,911
77.35	7,963	6,307
77.40	8,027	6,707
77.45	8,091	7,110
77.50	8,155	7,516
77.55	8,223	7,925
77.60	8,292	8,338
77.65	8,360	8,755
77.70	8,428	9,174
77.75	8,497	9,597
77.80	8,565	10,024
77.85	8,633	10,454
77.90	8,702	10,887
77.95	8,770	11,324
78.00	8,839	11,764
78.05	8,907	12,208
78.10	8,975	12,655
78.15	9,044	13,106
78.20	9,112	13,559
78.25	9,180	14,017
78.30	9,249	14,477
78.35	9,317	14,942
78.40	9,385	15,409
78.45	9,454	15,880
78.50	9,522	16,355
78.55	9,599	16,833
78.60	9,676	17,314
78.65	9,753	17,800
78.70	9,830	18,290
78.75	9,907	18,783
78.80	9,984	19,280
78.85	10,061	19,782
78.90	10,138	20,287
78.95	10,215	20,795
79.00	10,293	21,308
79.05	10,370	21,825
79.10	10,447	22,345
79.15	10,524	22,869
79.20	10,601	23,397
79.25	10,678	23,929
79.30	10,755	24,465
79.35	10,832	25,005
79.40	10,909	25,548
79.45	10,986	26,096
79.50	**11,063**	**26,647**

Summary for Pond B3: Bioretention Basin 3

[92] Warning: Device #2 is above defined storage

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 6.83" for 100-Year event
Inflow = 1.41 cfs @ 12.30 hrs, Volume= 6,674 cf
Outflow = 1.41 cfs @ 12.31 hrs, Volume= 6,199 cf, Atten= 0%, Lag= 0.7 min
Primary = 1.41 cfs @ 12.31 hrs, Volume= 6,199 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 80.84' @ 12.31 hrs Surf.Area= 901 sf Storage= 560 cf

Plug-Flow detention time= 73.0 min calculated for 6,195 cf (93% of inflow)
Center-of-Mass det. time= 33.5 min (823.5 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	79.98'	694 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

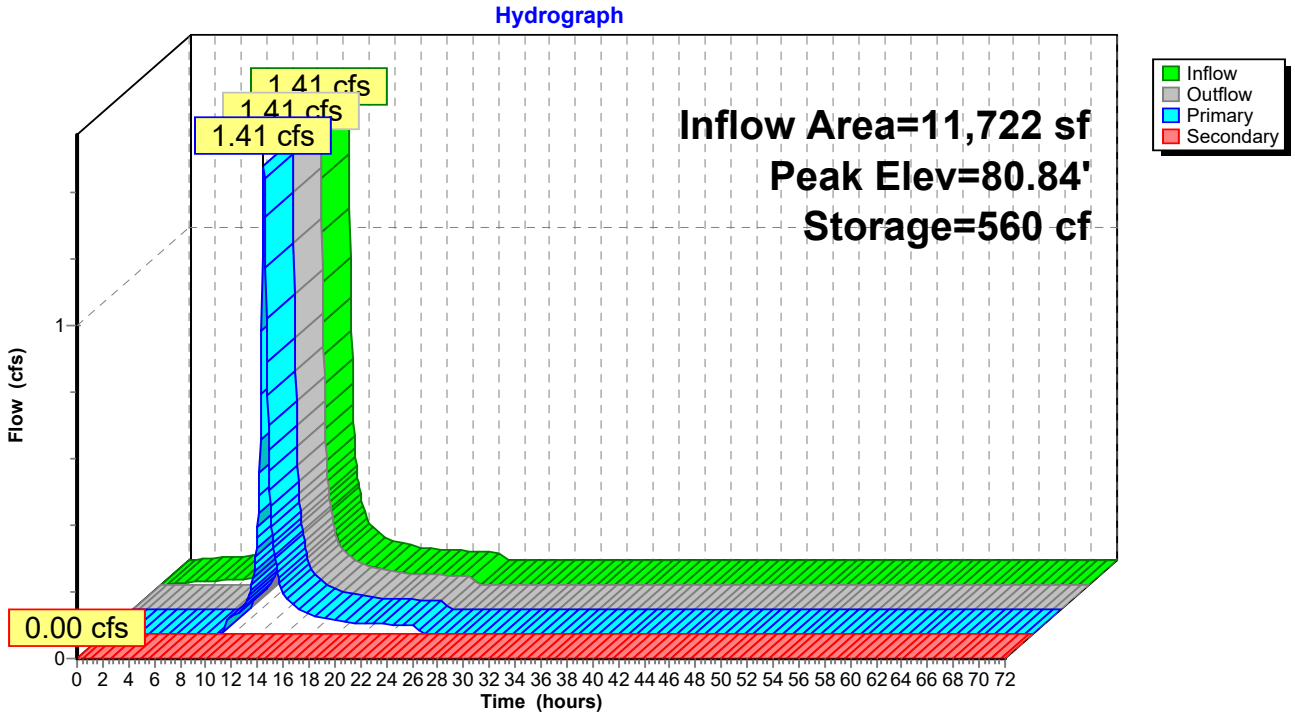
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
79.98	432	0	0	432
80.98	995	694	694	1,003

Device	Routing	Invert	Outlet Devices
#1	Primary	77.48'	**15.0" Round CMP_Round 15"** L= 96.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 77.48' / 77.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Secondary	80.98'	**15.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	80.74'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

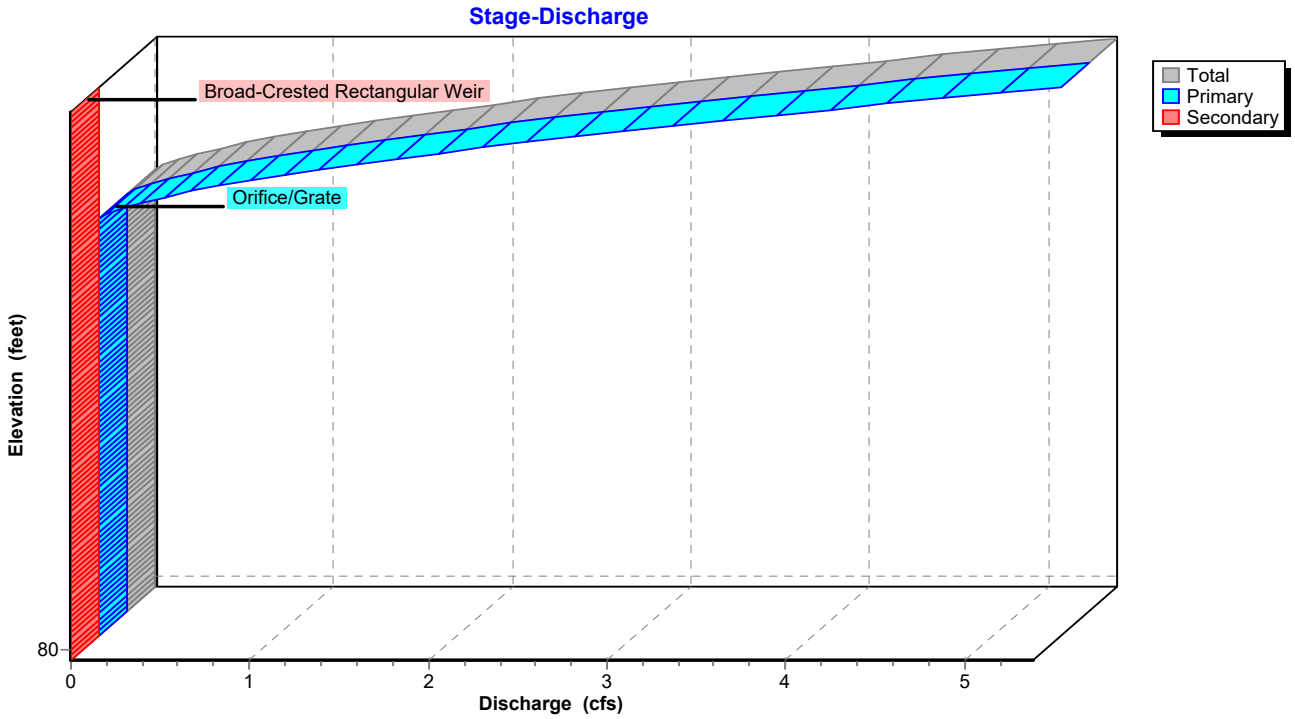
Primary OutFlow Max=1.39 cfs @ 12.31 hrs HW=80.84' (Free Discharge)
└**1=CMP_Round 15"** (Passes 1.39 cfs of 7.71 cfs potential flow)
└**3=Orifice/Grate** (Weir Controls 1.39 cfs @ 1.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.98' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

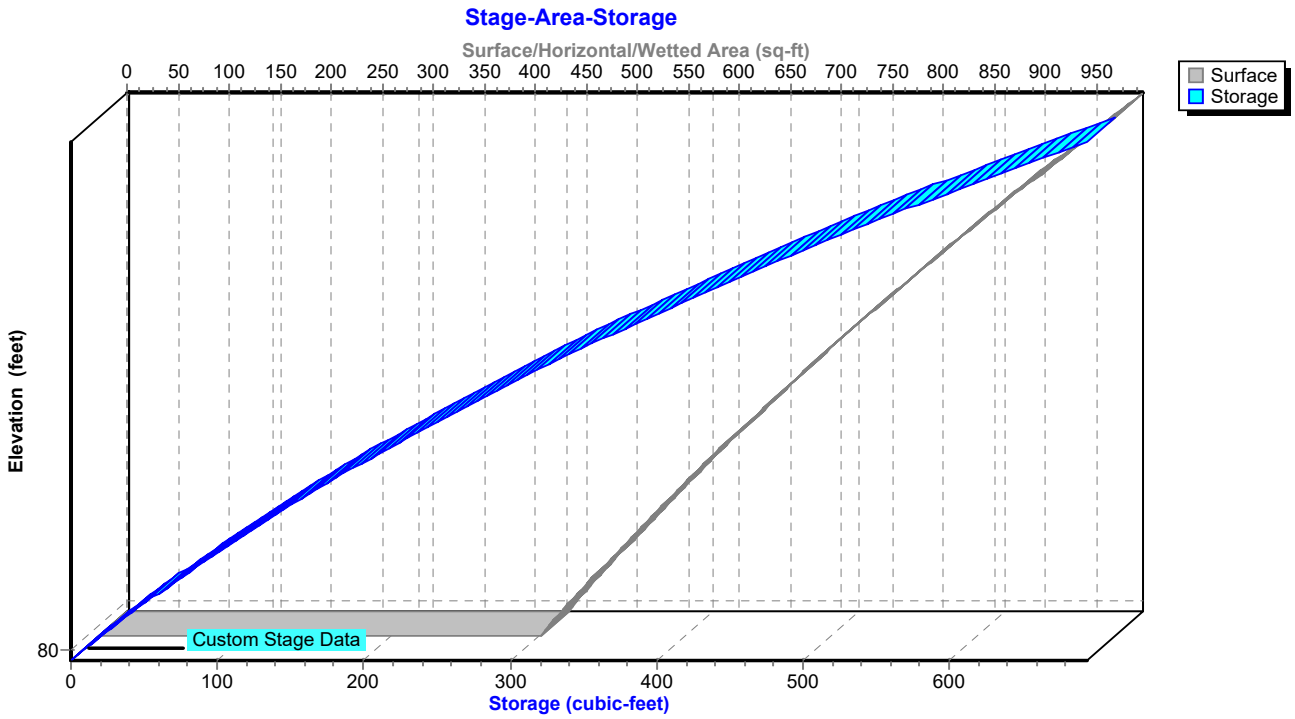
Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



Stage-Discharge for Pond B3: Bioretention Basin 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
79.98	0.00	0.00	**0.00**
79.99	0.00	0.00	0.00
80.00	0.00	0.00	0.00
80.01	0.00	0.00	0.00
80.02	0.00	0.00	0.00
80.03	0.00	0.00	0.00
80.04	0.00	0.00	0.00
80.05	0.00	0.00	0.00
80.06	0.00	0.00	0.00
80.07	0.00	0.00	0.00
80.08	0.00	0.00	0.00
80.09	0.00	0.00	0.00
80.10	0.00	0.00	0.00
80.11	0.00	0.00	0.00
80.12	0.00	0.00	0.00
80.13	0.00	0.00	0.00
80.14	0.00	0.00	0.00
80.15	0.00	0.00	0.00
80.16	0.00	0.00	0.00
80.17	0.00	0.00	0.00
80.18	0.00	0.00	0.00
80.19	0.00	0.00	0.00
80.20	0.00	0.00	0.00
80.21	0.00	0.00	0.00
80.22	0.00	0.00	0.00
80.23	0.00	0.00	0.00
80.24	0.00	0.00	0.00
80.25	0.00	0.00	0.00
80.26	0.00	0.00	0.00
80.27	0.00	0.00	0.00
80.28	0.00	0.00	0.00
80.29	0.00	0.00	0.00
80.30	0.00	0.00	0.00
80.31	0.00	0.00	0.00
80.32	0.00	0.00	0.00
80.33	0.00	0.00	0.00
80.34	0.00	0.00	0.00
80.35	0.00	0.00	0.00
80.36	0.00	0.00	0.00
80.37	0.00	0.00	0.00
80.38	0.00	0.00	0.00
80.39	0.00	0.00	0.00
80.40	0.00	0.00	0.00
80.41	0.00	0.00	0.00
80.42	0.00	0.00	0.00
80.43	0.00	0.00	0.00
80.44	0.00	0.00	0.00
80.45	0.00	0.00	0.00
80.46	0.00	0.00	0.00
80.47	0.00	0.00	0.00
80.48	0.00	0.00	0.00
80.49	0.00	0.00	0.00
80.50	0.00	0.00	0.00
80.51	0.00	0.00	0.00
80.52	0.00	0.00	0.00
80.53	0.00	0.00	0.00
80.54	0.00	0.00	0.00
80.55	0.00	0.00	0.00
80.56	0.00	0.00	0.00
80.57	0.00	0.00	0.00
80.58	0.00	0.00	0.00
80.59	0.00	0.00	0.00
80.60	0.00	0.00	0.00
80.61	0.00	0.00	0.00
80.62	0.00	0.00	0.00
80.63	0.00	0.00	0.00
80.64	0.00	0.00	0.00
80.65	0.00	0.00	0.00
80.66	0.00	0.00	0.00
80.67	0.00	0.00	0.00
80.68	0.00	0.00	0.00
80.69	0.00	0.00	0.00
80.70	0.00	0.00	0.00
80.71	0.00	0.00	0.00
80.72	0.00	0.00	0.00
80.73	0.00	0.00	0.00
80.74	0.00	0.00	0.00
80.75	0.05	0.05	0.00
80.76	0.13	0.13	0.00
80.77	0.24	0.24	0.00
80.78	0.37	0.37	0.00
80.79	0.51	0.51	0.00
80.80	0.67	0.67	0.00
80.81	0.85	0.85	0.00
80.82	1.04	1.04	0.00
80.83	1.24	1.24	0.00
80.84	1.45	1.45	0.00
80.85	1.67	1.67	0.00
80.86	1.90	1.90	0.00
80.87	2.15	2.15	0.00
80.88	2.40	2.40	0.00
80.89	2.66	2.66	0.00
80.90	2.93	2.93	0.00
80.91	3.21	3.21	0.00
80.92	3.50	3.50	0.00
80.93	3.79	3.79	0.00
80.94	4.09	4.09	0.00
80.95	4.41	4.41	0.00
80.96	4.72	4.72	0.00
80.97	5.05	5.05	0.00
80.98	**5.38**	**5.38**	0.00

Stage-Area-Storage for Pond B3: Bioretention Basin 3

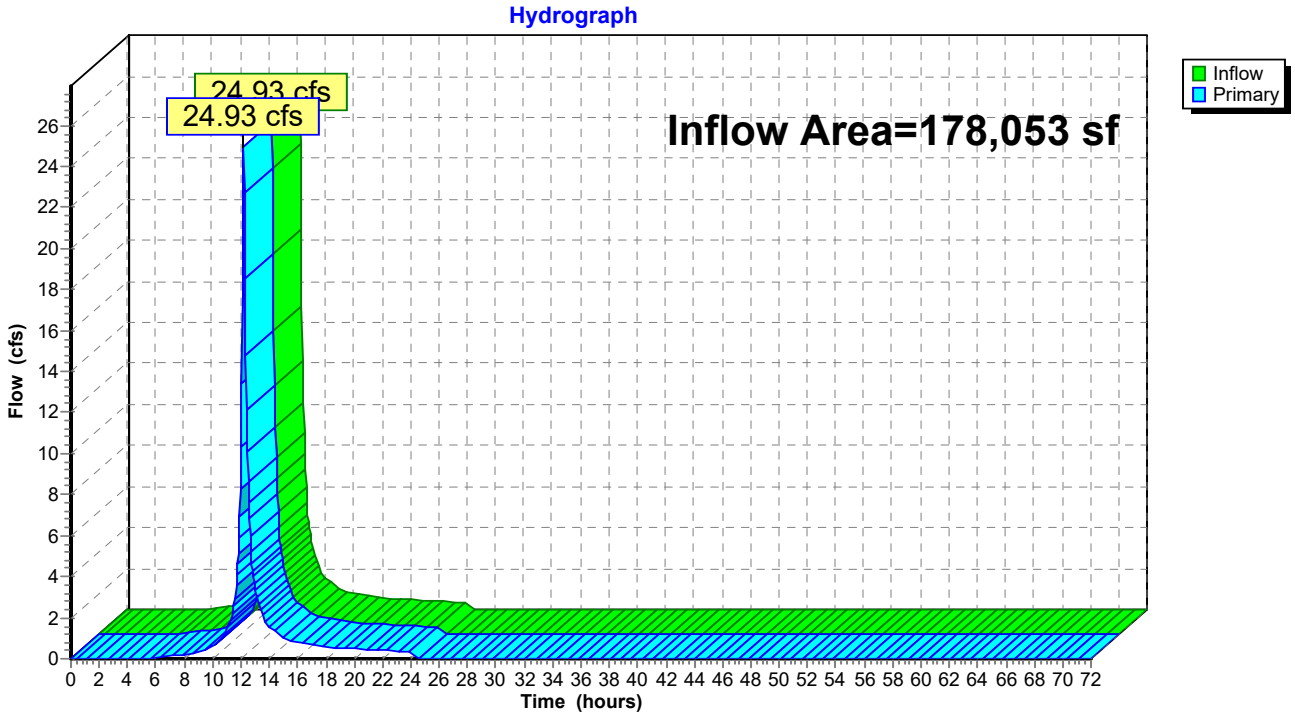
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
79.98	432	0
79.99	436	4
80.00	441	9
80.01	446	13
80.02	450	18
80.03	455	22
80.04	459	27
80.05	464	31
80.06	469	36
80.07	473	41
80.08	478	45
80.09	483	50
80.10	487	55
80.11	492	60
80.12	497	65
80.13	502	70
80.14	507	75
80.15	511	80
80.16	516	85
80.17	521	90
80.18	526	96
80.19	531	101
80.20	536	106
80.21	541	112
80.22	546	117
80.23	551	123
80.24	556	128
80.25	561	134
80.26	566	139
80.27	571	145
80.28	577	151
80.29	582	157
80.30	587	162
80.31	592	168
80.32	597	174
80.33	603	180
80.34	608	186
80.35	613	192
80.36	619	199
80.37	624	205
80.38	629	211
80.39	635	217
80.40	640	224
80.41	646	230
80.42	651	237
80.43	657	243
80.44	662	250
80.45	668	256
80.46	673	263
80.47	679	270
80.48	685	277
80.49	690	284
80.50	696	291
80.51	702	298
80.52	707	305
80.53	713	312
80.54	719	319
80.55	725	326
80.56	730	333
80.57	736	341
80.58	742	348
80.59	748	355
80.60	754	363
80.61	760	371
80.62	766	378
80.63	772	386
80.64	778	394
80.65	784	401
80.66	790	409
80.67	796	417
80.68	802	425
80.69	808	433
80.70	814	441
80.71	820	450
80.72	826	458
80.73	833	466
80.74	839	474
80.75	845	483
80.76	851	491
80.77	858	500
80.78	864	508
80.79	870	517
80.80	877	526
80.81	883	535
80.82	889	544
80.83	896	552
80.84	902	561
80.85	909	571
80.86	915	580
80.87	922	589
80.88	928	598
80.89	935	607
80.90	941	617
80.91	948	626
80.92	955	636
80.93	961	645
80.94	968	655
80.95	975	665
80.96	981	674
80.97	988	684
80.98	**995**	**694**

Summary for Link 5E: EDA 1

Inflow Area = 178,053 sf, 5.81% Impervious, Inflow Depth = 6.06" for 100-Year event
Inflow = 24.93 cfs @ 12.20 hrs, Volume= 89,848 cf
Primary = 24.93 cfs @ 12.20 hrs, Volume= 89,848 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5E: EDA 1

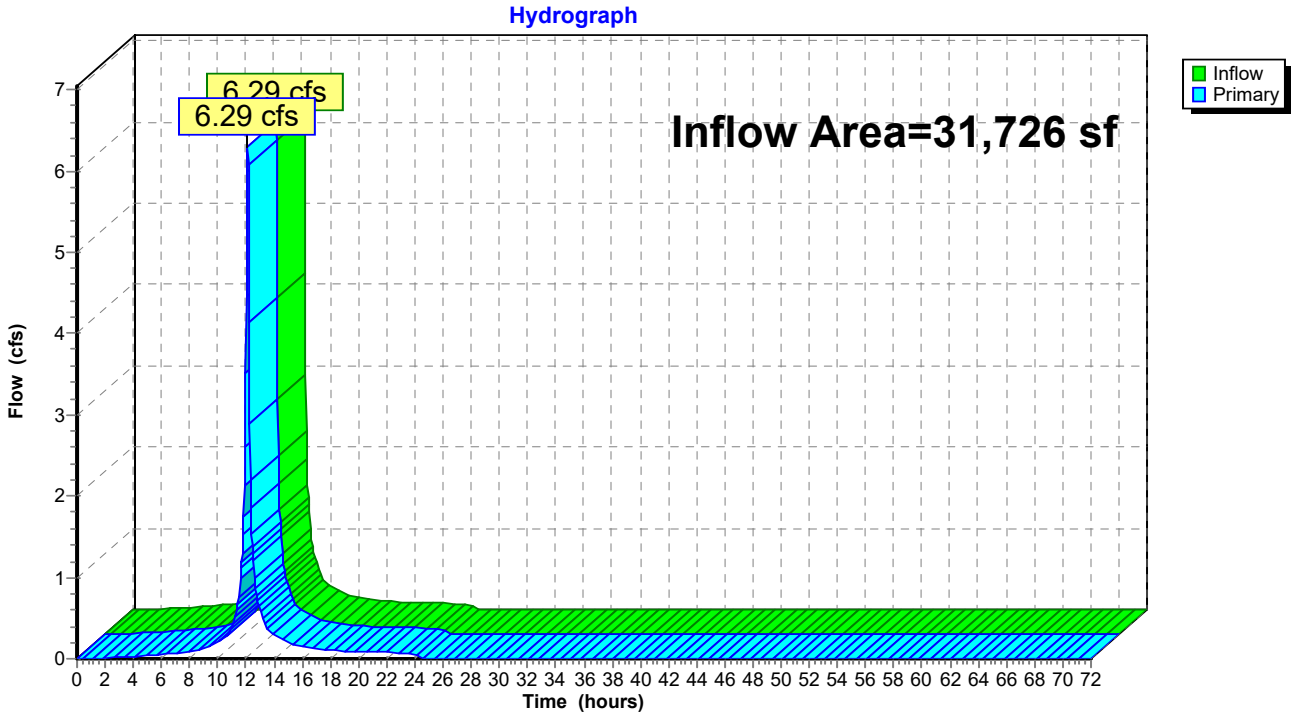


Summary for Link 6E: EDA 2

Inflow Area = 31,726 sf, 17.78% Impervious, Inflow Depth = 7.48" for 100-Year event
Inflow = 6.29 cfs @ 12.13 hrs, Volume= 19,767 cf
Primary = 6.29 cfs @ 12.13 hrs, Volume= 19,767 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 6E: EDA 2

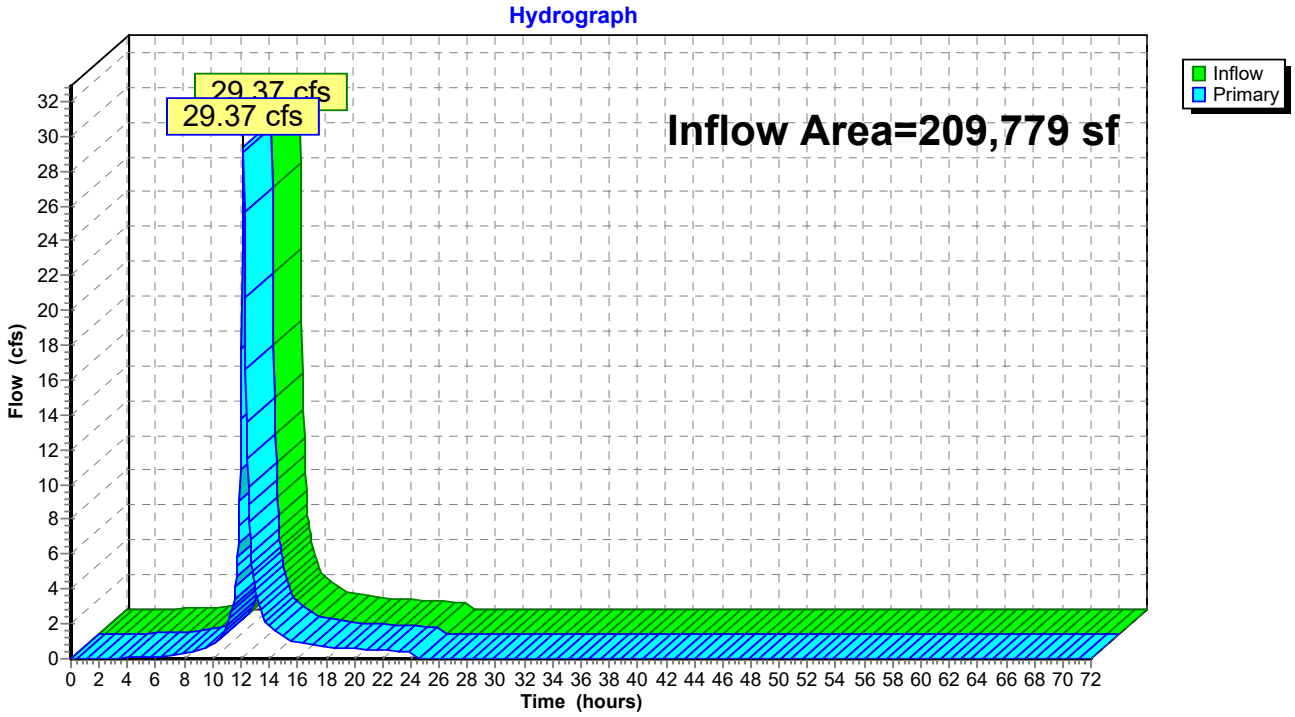


Summary for Link 7E: EDA

Inflow Area = 209,779 sf, 7.62% Impervious, Inflow Depth = 6.27" for 100-Year event
Inflow = 29.37 cfs @ 12.18 hrs, Volume= 109,615 cf
Primary = 29.37 cfs @ 12.18 hrs, Volume= 109,615 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7E: EDA

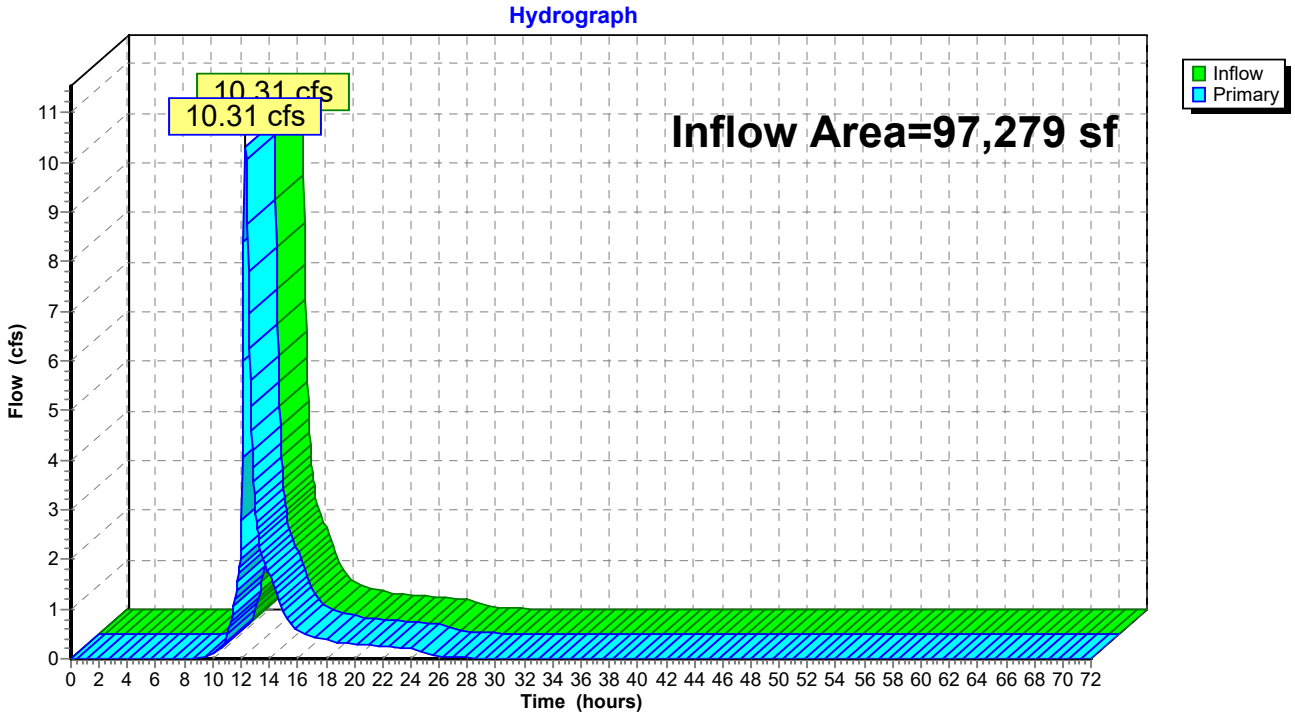


Summary for Link 10P: PDA 1A

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 6.55" for 100-Year event
Inflow = 10.31 cfs @ 12.32 hrs, Volume= 53,114 cf
Primary = 10.31 cfs @ 12.32 hrs, Volume= 53,114 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10P: PDA 1A

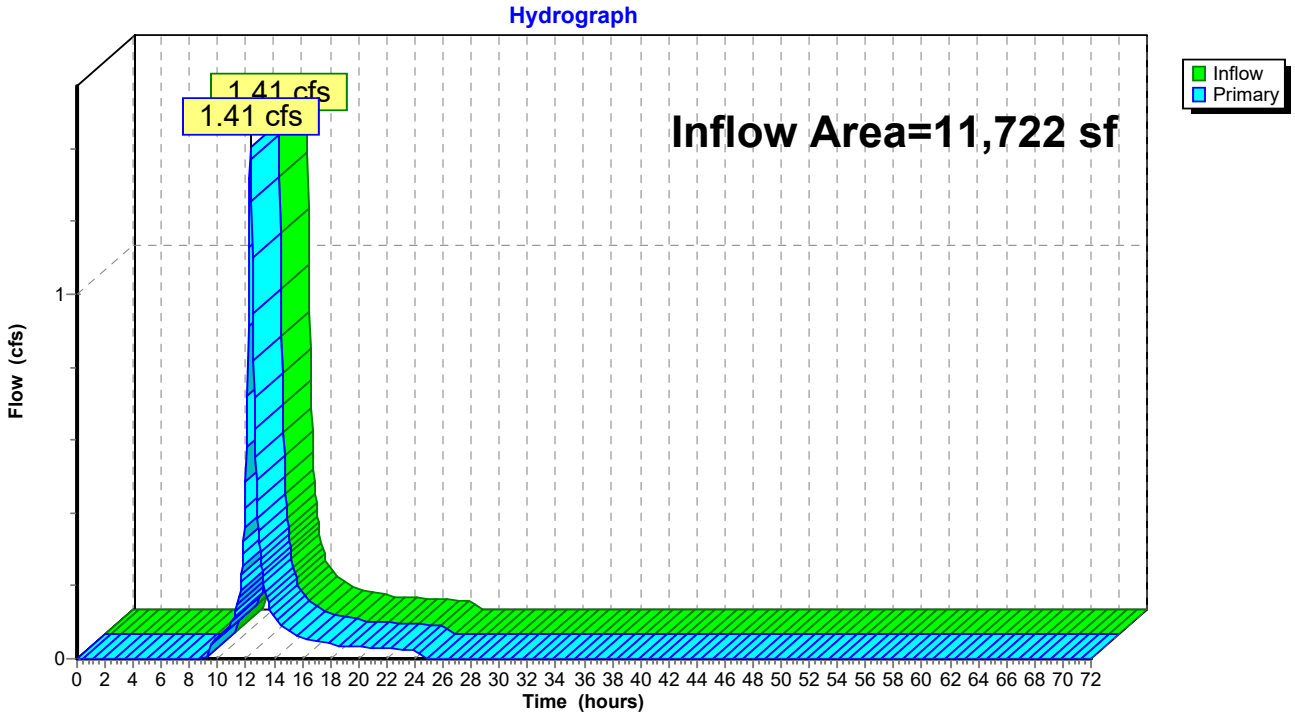


Summary for Link 11P: PDA 1B

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 6.35" for 100-Year event
Inflow = 1.41 cfs @ 12.31 hrs, Volume= 6,199 cf
Primary = 1.41 cfs @ 12.31 hrs, Volume= 6,199 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11P: PDA 1B

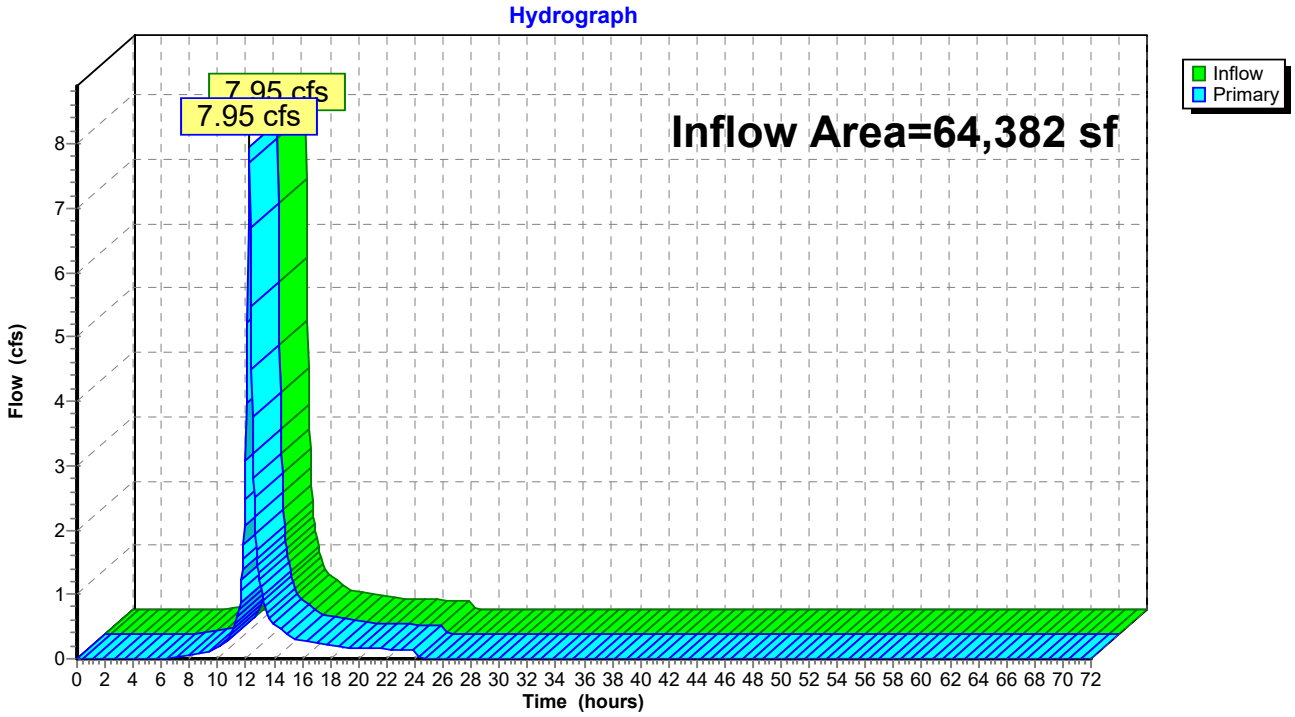


Summary for Link 12P: PDA 1C

Inflow Area = 64,382 sf, 3.87% Impervious, Inflow Depth = 5.53" for 100-Year event
Inflow = 7.95 cfs @ 12.22 hrs, Volume= 29,692 cf
Primary = 7.95 cfs @ 12.22 hrs, Volume= 29,692 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12P: PDA 1C

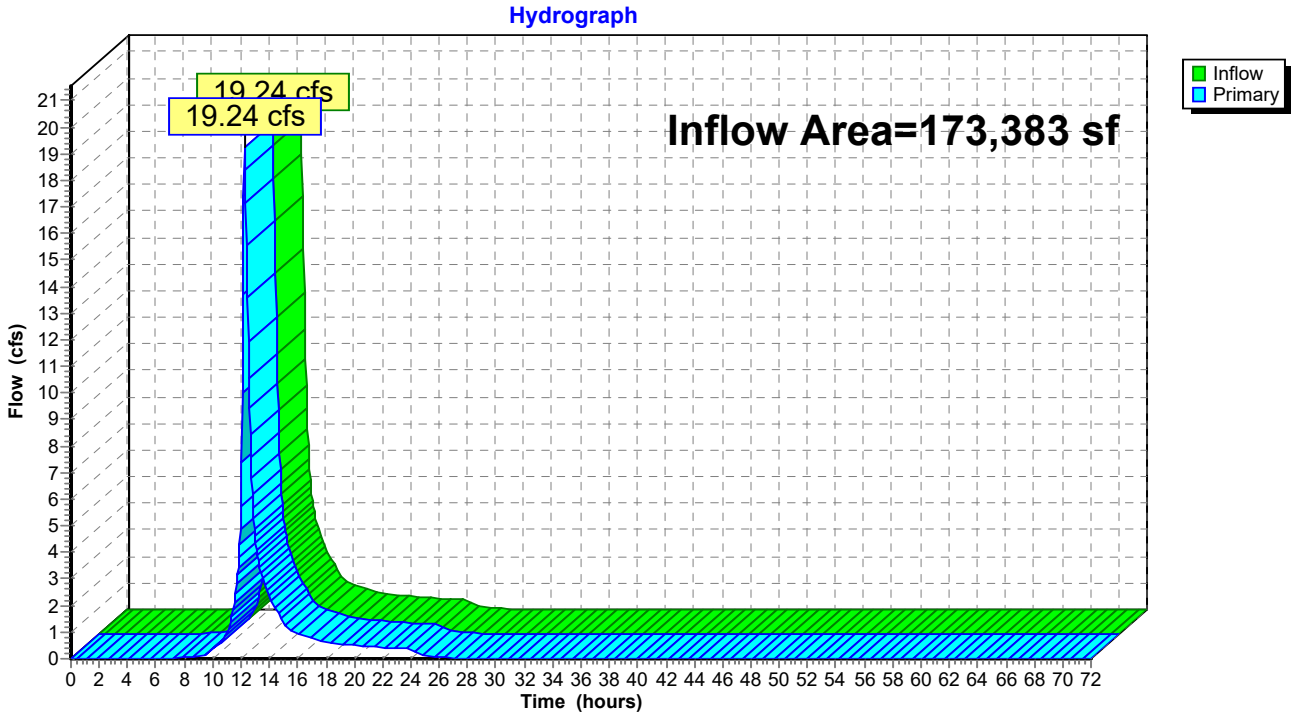


Summary for Link 13P: PDA 1

Inflow Area = 173,383 sf, 38.29% Impervious, Inflow Depth = 6.16" for 100-Year event
Inflow = 19.24 cfs @ 12.26 hrs, Volume= 89,005 cf
Primary = 19.24 cfs @ 12.26 hrs, Volume= 89,005 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13P: PDA 1

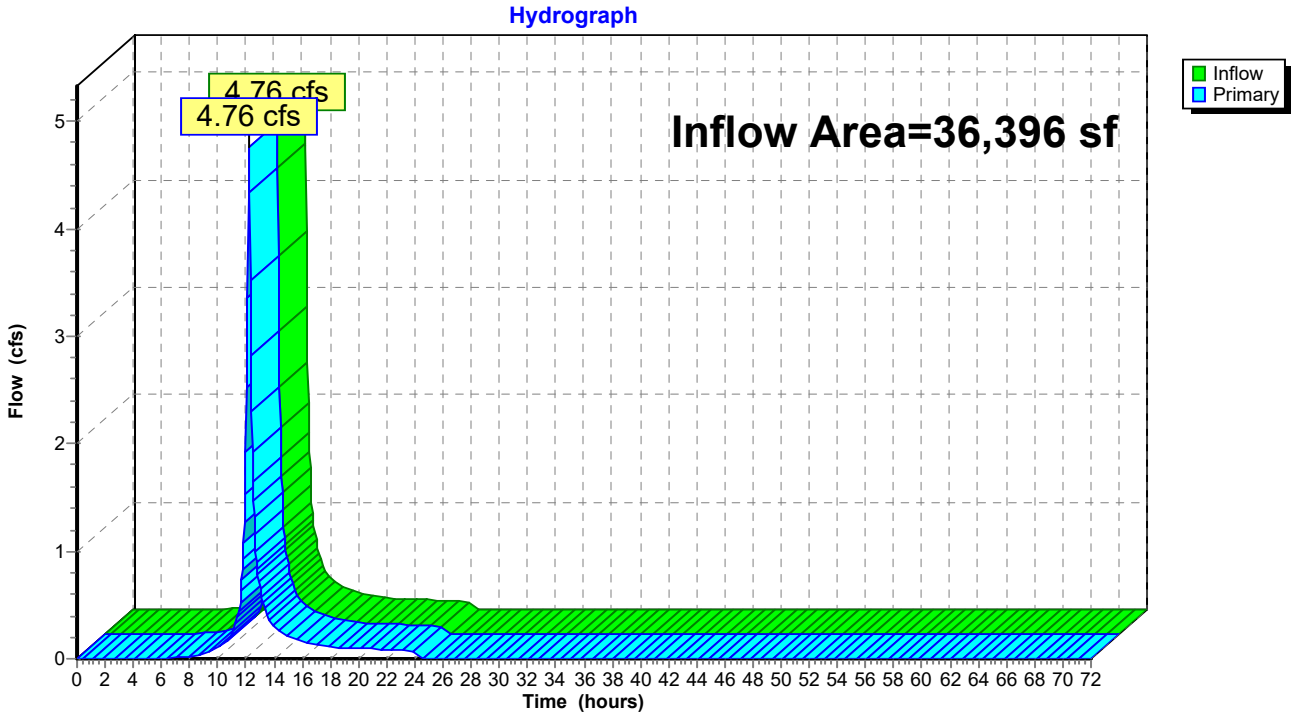


Summary for Link 14P: PDA 2

Inflow Area = 36,396 sf, 0.00% Impervious, Inflow Depth = 5.53" for 100-Year event
Inflow = 4.76 cfs @ 12.20 hrs, Volume= 16,785 cf
Primary = 4.76 cfs @ 12.20 hrs, Volume= 16,785 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 14P: PDA 2

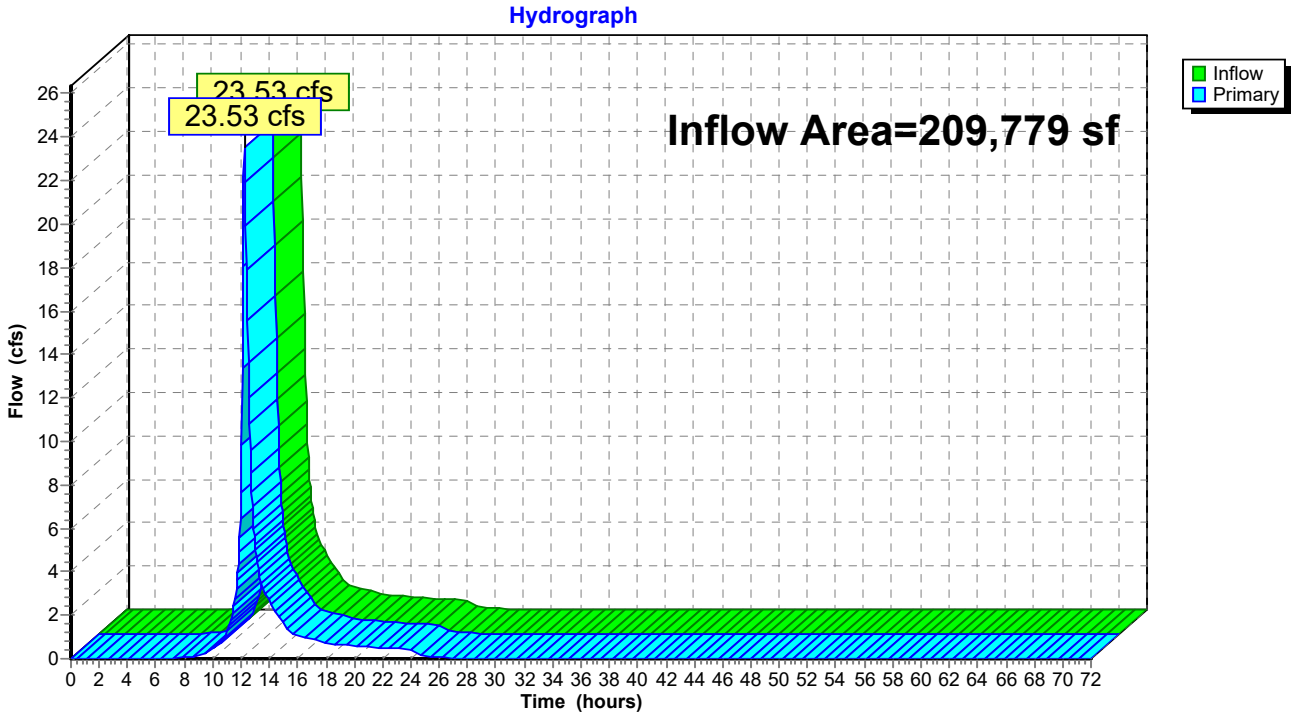


Summary for Link 15P: PDA

Inflow Area = 209,779 sf, 31.65% Impervious, Inflow Depth = 6.05" for 100-Year event
Inflow = 23.53 cfs @ 12.25 hrs, Volume= 105,790 cf
Primary = 23.53 cfs @ 12.25 hrs, Volume= 105,790 cf, Atten= 0%, Lag= 0.0 min

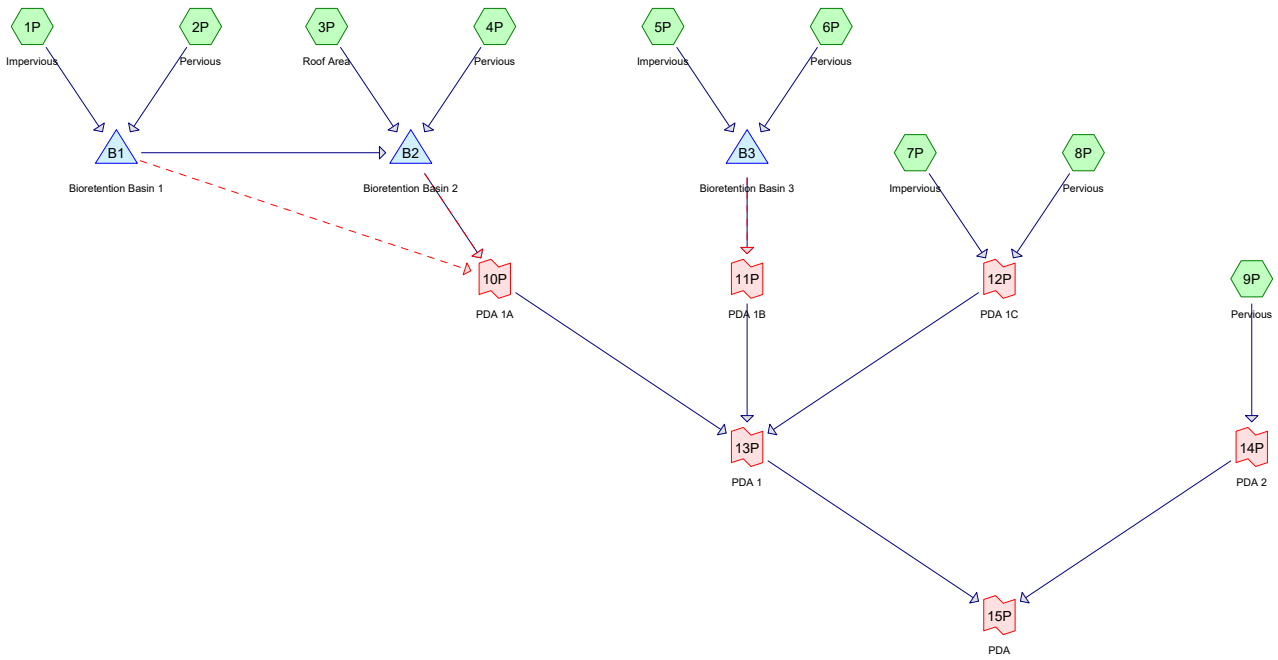
Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 15P: PDA



B. DESIGN CALCULATIONS

- **Emergency Spillway**
- **Rip Rap**
  - **Rip Rap #100**
  - **Rip Rap #400**
- **Scour Hole**
- **Basin Drain Time**
- **Pipe Sizing**
- **NJDEP Nonstructural Strategies Points System (NSPS)**
- **Low Impact Development Checklist**
- **Geotechnical Report**



Subcat Reach Pond Link

Routing Diagram for Emergency Spillway

Prepared by {enter your company name here}, Printed 5/17/2021

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	0.00	0.00	255.0	0.0050	0.013	15.0	0.0	0.0
2	B1	73.00	72.85	10.0	0.0150	0.013	24.0	0.0	0.0
3	B2	73.00	72.06	47.0	0.0200	0.011	15.0	0.0	0.0
4	B3	77.48	77.00	96.0	0.0050	0.013	15.0	0.0	0.0

Summary for Pond B1: Bioretention Basin 1

[92] Warning: Device #2 is above defined storage

Inflow Area = 48,248 sf, 48.86% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 7.70 cfs @ 12.18 hrs, Volume= 28,466 cf
Outflow = 7.55 cfs @ 12.20 hrs, Volume= 24,571 cf, Atten= 2%, Lag= 1.4 min
Primary = 7.55 cfs @ 12.20 hrs, Volume= 24,571 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 78.45' @ 12.20 hrs Surf.Area= 3,063 sf Storage= 4,786 cf

Plug-Flow detention time= 117.1 min calculated for 24,554 cf (86% of inflow)
Center-of-Mass det. time= 52.5 min (828.0 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	4,938 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

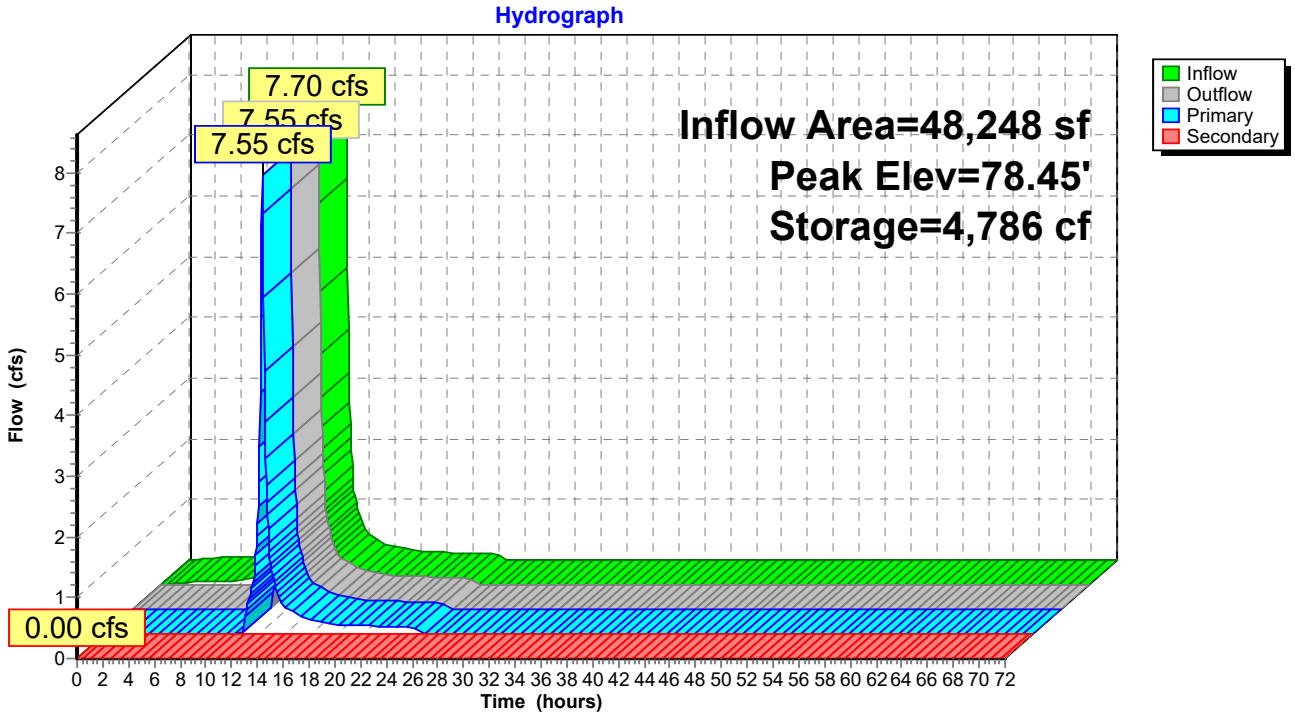
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.50	1,883	0	0	1,883
77.50	2,461	2,166	2,166	2,484
78.50	3,096	2,772	4,938	3,146

Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**24.0" Round CMP_Round 24"** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.85' S= 0.0150 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Secondary	78.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Device 1	78.15'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

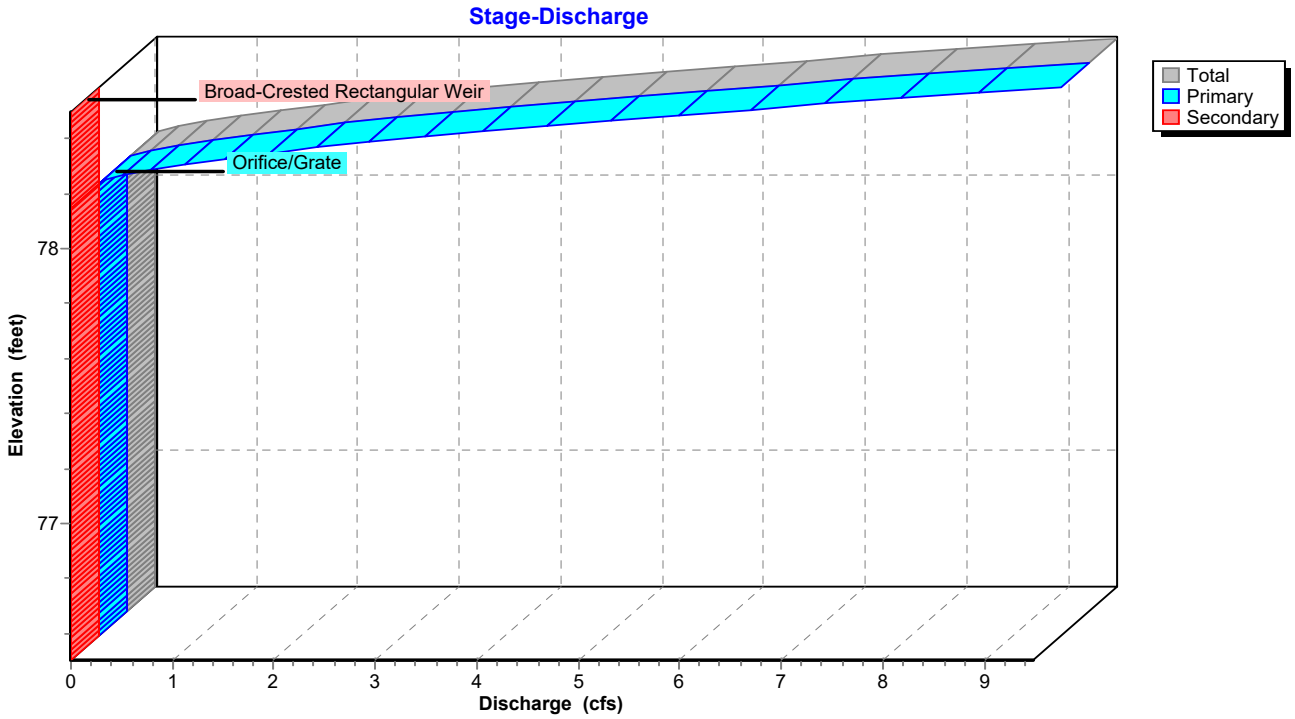
Primary OutFlow Max=7.50 cfs @ 12.20 hrs HW=78.45' (Free Discharge)
↑**1=CMP_Round 24"** (Passes 7.50 cfs of 25.19 cfs potential flow)
↑**3=Orifice/Grate** (Weir Controls 7.50 cfs @ 1.79 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.50' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B1: Bioretention Basin 1



Pond B1: Bioretention Basin 1



Summary for Pond B2: Bioretention Basin 2

[81] Warning: Exceeded Pond B1 by 0.12' @ 12.35 hrs

Inflow Area = 97,279 sf, 60.64% Impervious, Inflow Depth = 6.94" for 100-Year event
Inflow = 15.77 cfs @ 12.19 hrs, Volume= 56,281 cf
Outflow = 10.31 cfs @ 12.32 hrs, Volume= 53,114 cf, Atten= 35%, Lag= 7.8 min
Primary = 10.31 cfs @ 12.32 hrs, Volume= 53,114 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 78.50' @ 12.31 hrs Surf.Area= 9,518 sf Storage= 16,324 cf

Plug-Flow detention time= 105.9 min calculated for 53,077 cf (94% of inflow)
Center-of-Mass det. time= 75.0 min (864.8 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	26,647 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

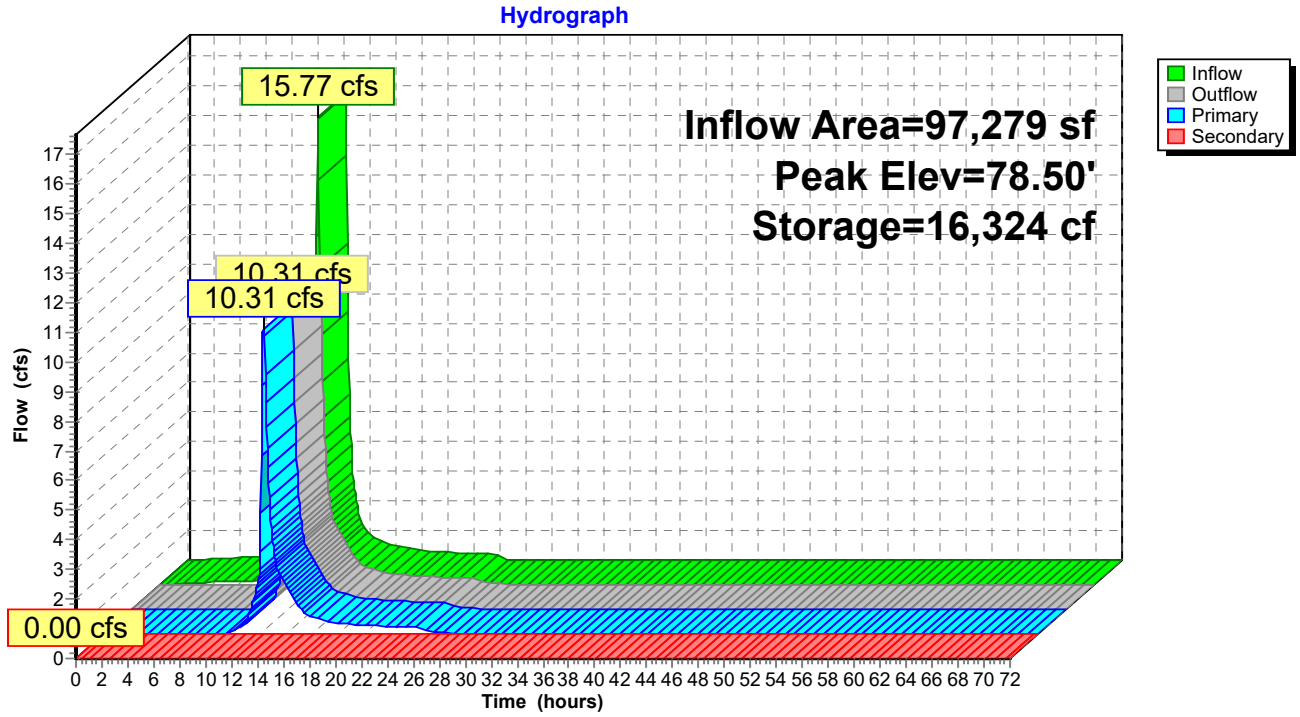
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	6,877	0	0
77.50	8,155	7,516	7,516
78.50	9,522	8,839	16,355
79.50	11,063	10,293	26,647

Device	Routing	Invert	Outlet Devices
#1	Primary	73.00'	**15.0" Round Culvert** L= 47.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.00' / 72.06' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	76.94'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	77.78'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	79.25'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads
#5	Secondary	78.50'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

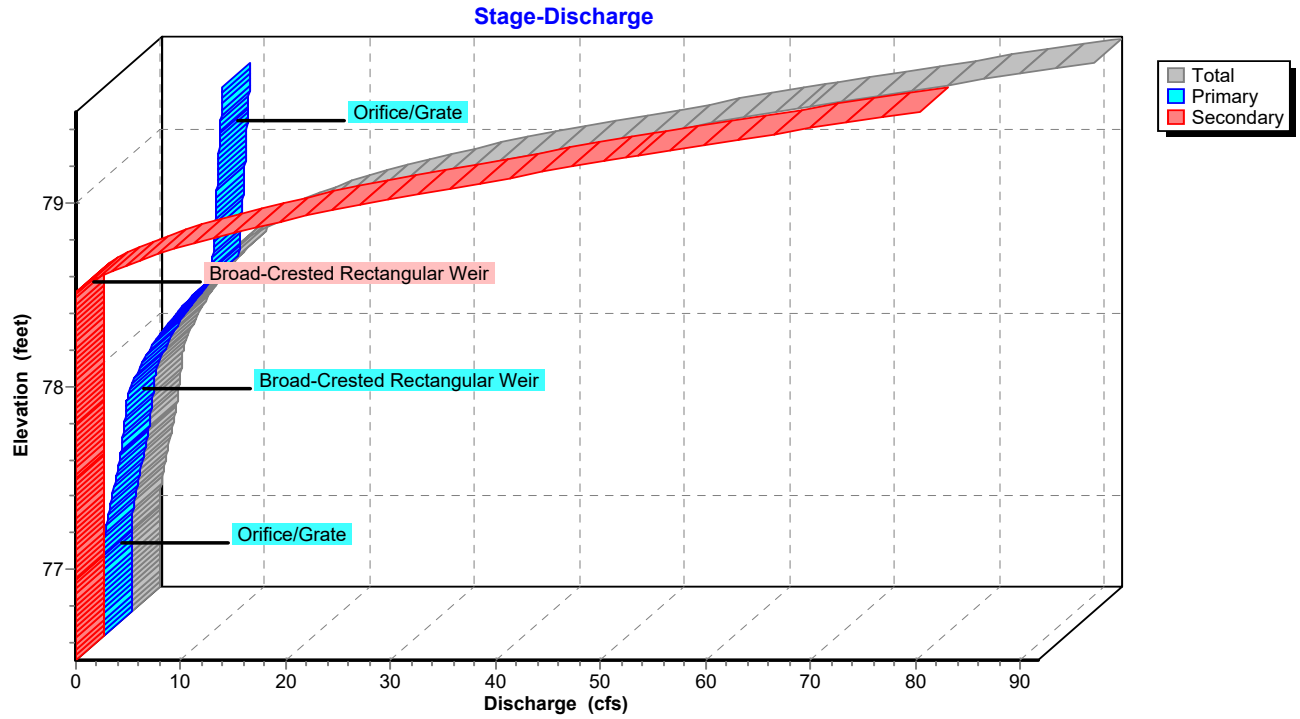
Primary OutFlow Max=10.29 cfs @ 12.32 hrs HW=78.49' (Free Discharge)
- **1=Culvert** (Inlet Controls 10.29 cfs @ 8.38 fps)
  - **2=Orifice/Grate** (Passes < 3.23 cfs potential flow)
  - **3=Broad-Crested Rectangular Weir** (Passes < 7.66 cfs potential flow)
  - **4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.50' (Free Discharge)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B2: Bioretention Basin 2



Pond B2: Bioretention Basin 2



Summary for Pond B3: Bioretention Basin 3

[92] Warning: Device #2 is above defined storage

Inflow Area = 11,722 sf, 41.82% Impervious, Inflow Depth = 6.83" for 100-Year event
Inflow = 1.41 cfs @ 12.30 hrs, Volume= 6,674 cf
Outflow = 1.41 cfs @ 12.31 hrs, Volume= 6,199 cf, Atten= 0%, Lag= 0.7 min
Primary = 1.41 cfs @ 12.31 hrs, Volume= 6,199 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 80.84' @ 12.31 hrs Surf.Area= 901 sf Storage= 560 cf

Plug-Flow detention time= 73.0 min calculated for 6,195 cf (93% of inflow)
Center-of-Mass det. time= 33.5 min (823.5 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	79.98'	694 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

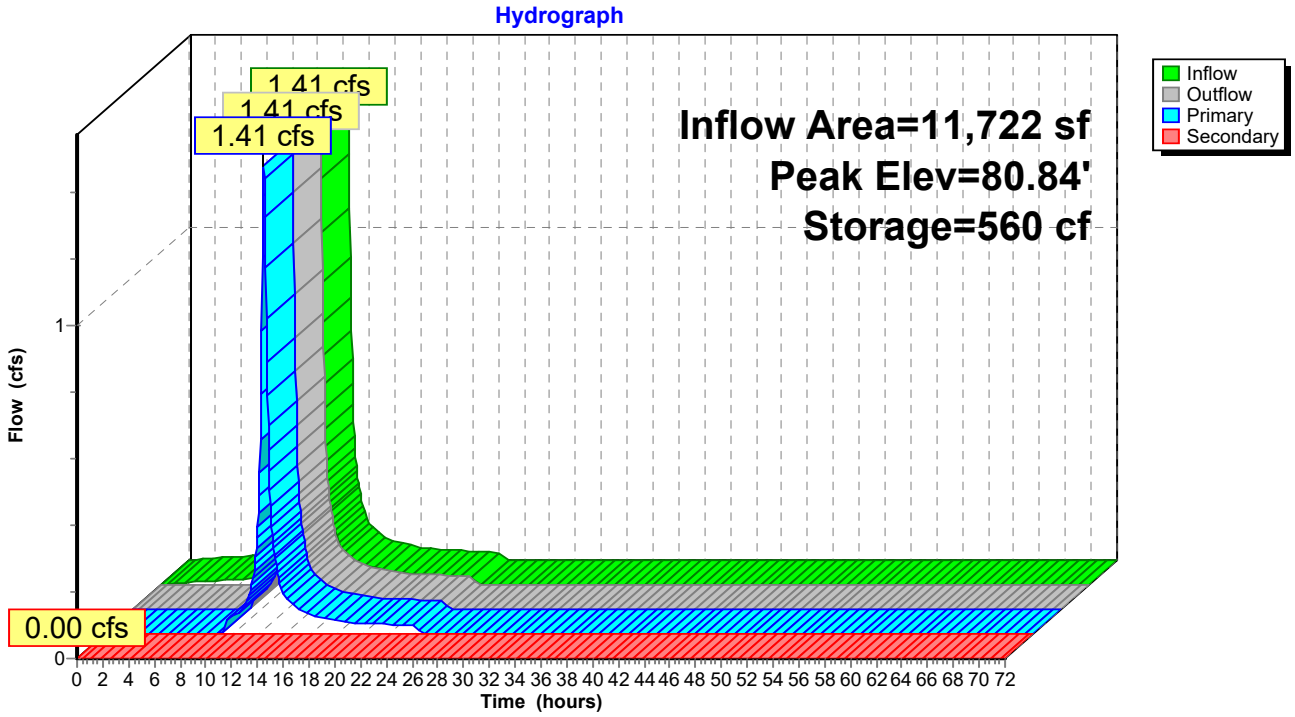
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
79.98	432	0	0	432
80.98	995	694	694	1,003

Device	Routing	Invert	Outlet Devices
#1	Primary	77.48'	**15.0" Round CMP_Round 15"** L= 96.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 77.48' / 77.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Secondary	80.98'	**15.0' long x 1.0' breadth Broad-Crested Rectangular Weir** 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	80.74'	**42.0" x 42.0" Horiz. Orifice/Grate** C= 0.600 in 42.0" x 42.0" Grate (100% open area) Limited to weir flow at low heads

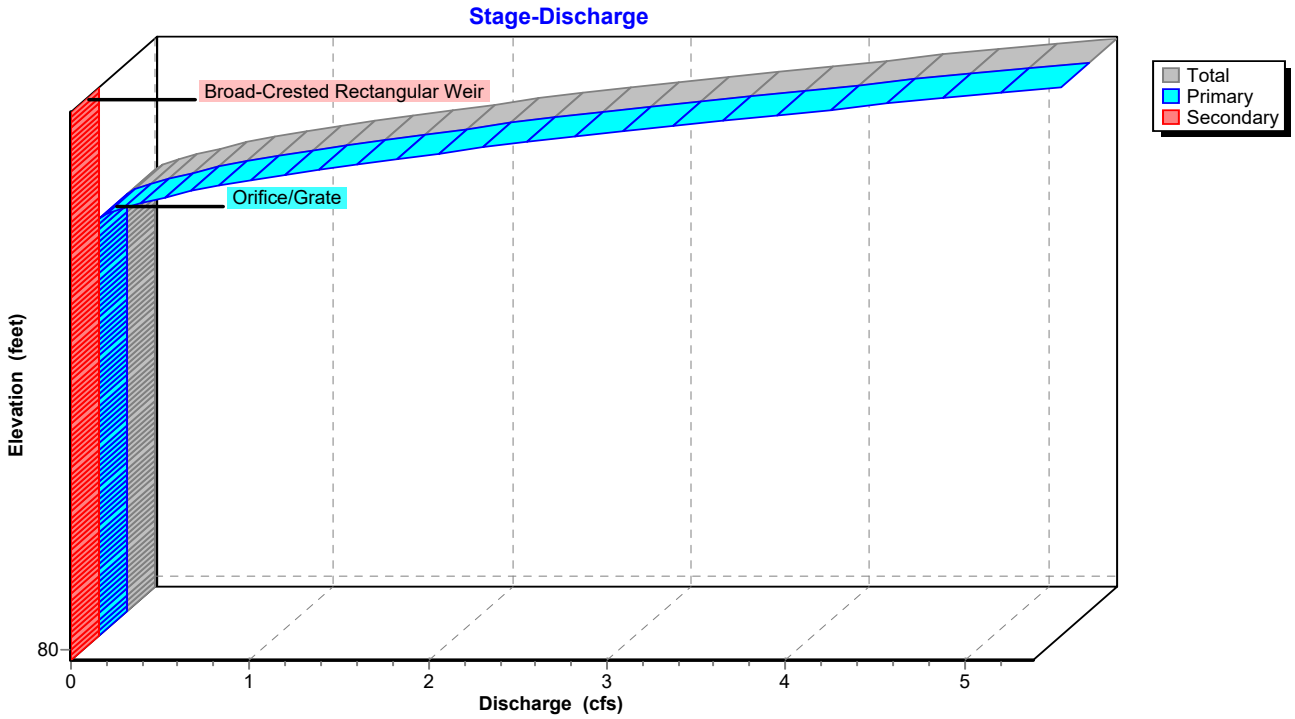
Primary OutFlow Max=1.39 cfs @ 12.31 hrs HW=80.84' (Free Discharge)
└**1=CMP_Round 15"** (Passes 1.39 cfs of 7.71 cfs potential flow)
└**3=Orifice/Grate** (Weir Controls 1.39 cfs @ 1.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.98' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B3: Bioretention Basin 3



Pond B3: Bioretention Basin 3



BOHLER

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 5/14/2021
Project: SAFStor
Project No: J200933

Calculated By: CR
Checked By: KM

Conduit Outlet Protection Calculations

Rip Rap Pad # 1

Design Parameters:

Design Storm Flow for 25 Year, Q	8.55	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW [1]	0.87	ft

Apron Dimension Calculations:

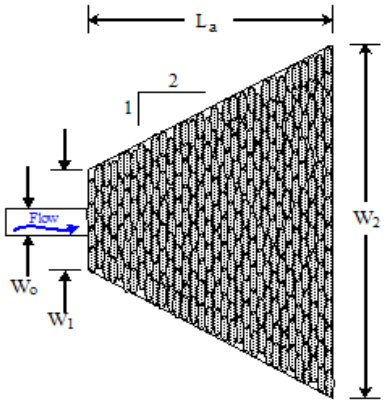
Unit Dicharge, $q = Q/W_o$ = 6.84 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

  Width, $W_1 = 3W_o$ = W_1 =

  Width, $W_2 = 3W_o + L_a$ = W_2 =

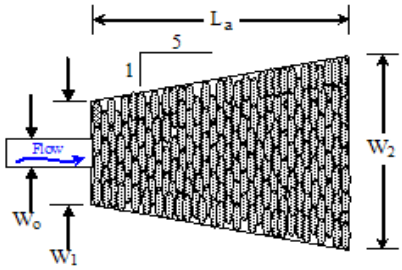


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 18.35 ft or L_a = **19 ft**

  Width, $W_1 = 3W_o$ = 3.75 ft or W_1 = **6 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 11.09 ft or W_2 = **12 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 3.56 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

BOHLER

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 5/14/2021
Project: SAFStor
Project No: J200933

Calculated By: CR
Checked By: KM

Conduit Outlet Protection Calculations

Rip Rap Pad # 2

Design Parameters:

Design Storm Flow for 25 Year, Q	4.95	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW [1]	0.80	ft

Apron Dimension Calculations:

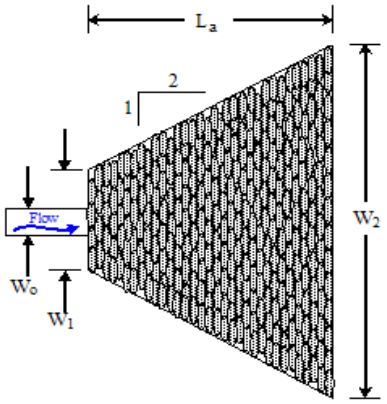
Unit Dicharge, $q = Q/W_o$ = 3.96 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

  Width, $W_1 = 3W_o$ = W_1 =

  Width, $W_2 = 3W_o + L_a$ = W_2 =

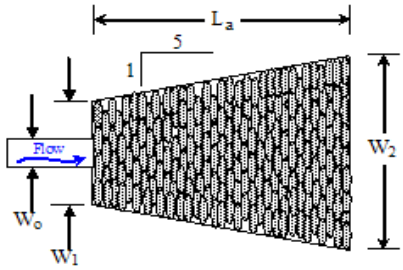


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 10.63 ft or L_a = **11 ft**

  Width, $W_1 = 3W_o$ = 3.75 ft or W_1 = **6 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 8. ft or W_2 = **9 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 1.87 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

BOHLER

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 5/14/2021
Project: SAFStor
Project No: J200933

Calculated By: CR
Checked By: KM

Conduit Outlet Protection Calculations

Scour Hole # 200

Design Parameters:

Design Storm Flow for 25 Year, Q	11.38	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW [1]	0.87	ft
Scour Hole Depth, y (1/2 D_o or D_o)	9	in

Apron Dimension Calculations:

Minimum Bottom Width, $W_1 = 2W_o$	W_1 =	3.00 ft
Minimum Bottom Length, $L_1 = 3D_o$	L_1 =	4.50 ft
Minimum Top Width *(max side slope of 3:1)*, W_2	W_2 =	7.50 ft
Minimum Top Length *(max side slope of 3:1)*, L_2	L_2 =	9.00 ft

Rip Rap Stone Size Calculations:

Unit Dicharge, $q = Q/D_o$ = 7.59 cfs per foot

- **Case I: $y = 1/2\ D_o$**

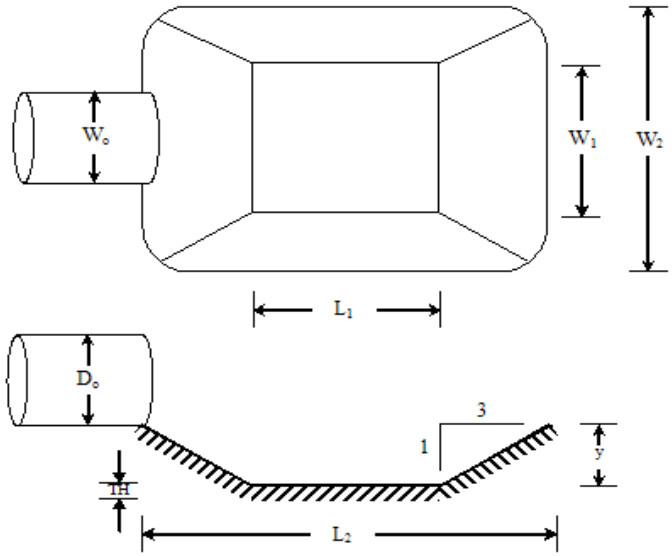
  Median Stone, $d_{50} = \dfrac{0.0125\ q^{1.33}}{TW}$ = 2.55 in Therefore, use $d50$ = 6 in

  Apron Thickness, $TH = 2 \times d_{50}$ with filter fabric . . . . . TH = 12 in

- **Case II: $y = D_o$**

  Median Stone, $d_{50} = \dfrac{0.0082\ q^{1.33}}{TW}$ =

  Apron Thickness, $TH = 2 \times d_{50}$ with filter fabric . . . . . .



Notes:

1. The side slopes shall be 3:1 or flatter.
2. The bottom grade shall be 0.0% (level).
3. There shall be no overfall at the end of the apron or at the end of the culvert.
4. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
5. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
6. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
7. Where the scour hole is to be placed within an existing or proposed waterway:
   a. The scour hole sidewalls should be eliminated to maintain a smooth hydraulic line along the waterway bottom to avoid inviting turbulent flow from a sudden depression in the waterway.
   b. If the flow in the waterway is greater than the flow from the proposed outlet, the rip-rap used to construct the scour hole should be sized based on the greater flow value according to the standard rip-rap.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

Hydrograph for Pond B1: Bioretention Basin 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	76.50	0.00
2.50	0.04	187	76.60	0.00
5.00	0.07	693	76.85	0.00
7.50	0.11	1,431	77.19	0.00
10.00	**0.27**	**2,937**	**77.80**	**0.00**
12.50	**2.24**	**4,310**	**78.29**	**2.47**
15.00	0.29	3,994	78.18	0.30
17.50	0.18	3,964	78.17	0.18
20.00	0.13	3,950	78.17	0.13
22.50	0.11	3,943	78.17	0.11
25.00	0.00	3,895	78.15	0.00
27.50	0.00	3,895	78.15	0.00
30.00	0.00	3,895	78.15	0.00
32.50	0.00	3,895	78.15	0.00
35.00	0.00	3,895	78.15	0.00
37.50	0.00	3,895	78.15	0.00
40.00	0.00	3,895	78.15	0.00
42.50	0.00	3,895	78.15	0.00
45.00	0.00	3,895	78.15	0.00
47.50	0.00	3,895	78.15	0.00
50.00	0.00	3,895	78.15	0.00
52.50	0.00	3,895	78.15	0.00
55.00	0.00	3,895	78.15	0.00
57.50	0.00	3,895	78.15	0.00
60.00	0.00	3,895	78.15	0.00
62.50	0.00	3,895	78.15	0.00
65.00	0.00	3,895	78.15	0.00
67.50	0.00	3,895	78.15	0.00
70.00	0.00	3,895	78.15	0.00

Basin Drain Time = 25 - 12.50 = 12.5 hours

Hydrograph for Pond B2: Bioretention Basin 2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	76.50	0.00
2.50	0.07	281	76.54	0.00
5.00	0.10	1,042	76.65	0.00
7.50	0.16	2,124	76.80	0.00
10.00	**0.33**	**3,965**	**77.05**	**0.11**
12.50	**4.84**	**14,639**	**78.32**	**7.79**
15.00	0.60	5,900	77.30	0.92
17.50	0.36	4,853	77.16	0.41
20.00	0.27	4,547	77.12	0.29
22.50	0.23	4,411	77.11	0.24
25.00	0.00	3,935	77.04	0.10
27.50	0.00	3,505	76.99	0.02
30.00	0.00	3,374	76.97	0.01
32.50	0.00	3,303	76.96	0.01
35.00	0.00	3,262	76.96	0.00
37.50	0.00	3,239	76.95	0.00
40.00	0.00	3,226	76.95	0.00
42.50	0.00	3,218	76.95	0.00
45.00	0.00	3,210	76.95	0.00
47.50	0.00	3,204	76.95	0.00
50.00	0.00	3,198	76.95	0.00
52.50	0.00	3,192	76.95	0.00
55.00	0.00	3,188	76.95	0.00
57.50	0.00	3,184	76.94	0.00
60.00	0.00	3,180	76.94	0.00
62.50	0.00	3,177	76.94	0.00
65.00	0.00	3,174	76.94	0.00
67.50	0.00	3,171	76.94	0.00
70.00	0.00	3,169	76.94	0.00

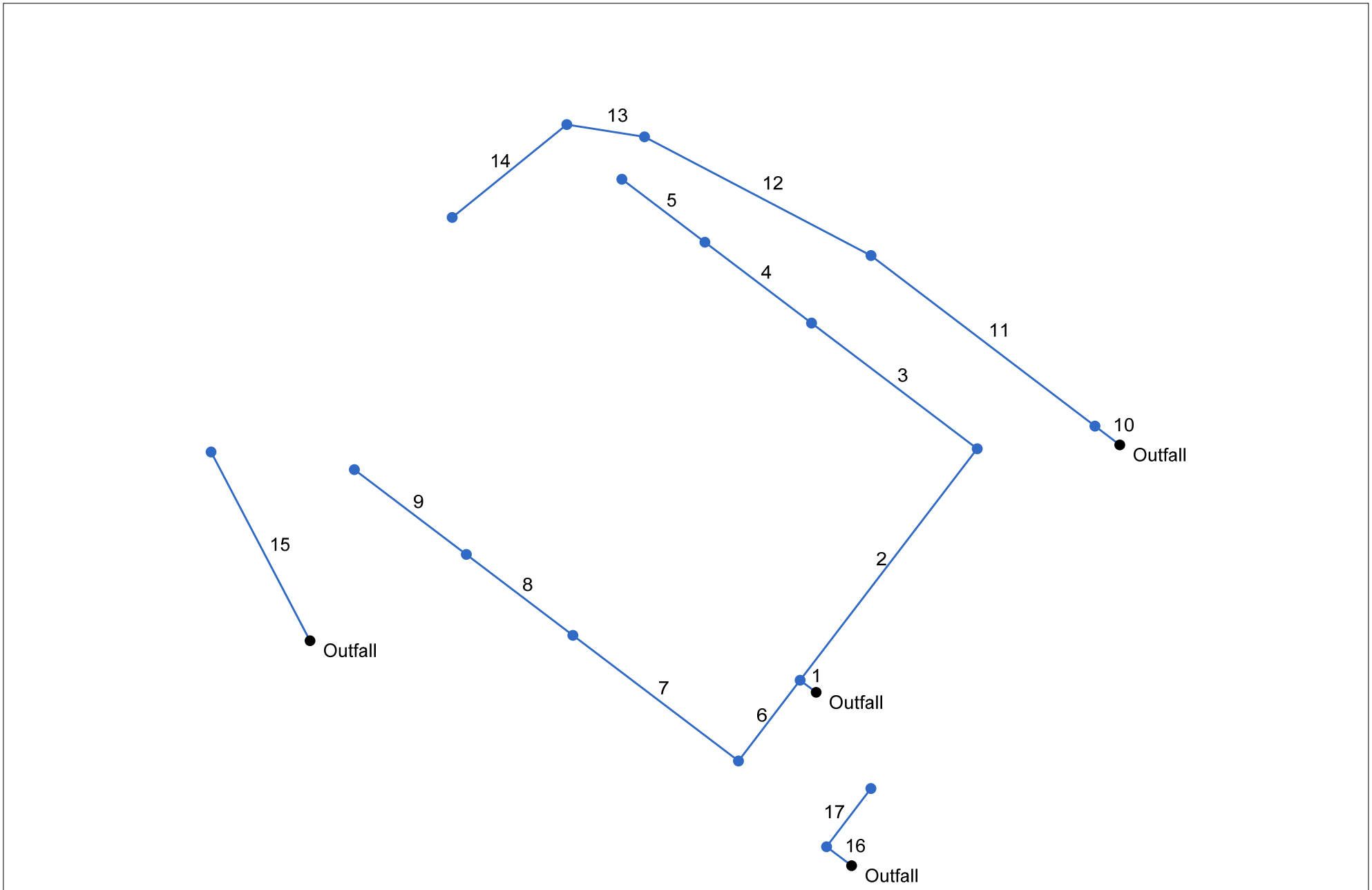
Basin Drain Time = 35 - 12.5 = 22.5 hours

Hydrograph for Pond B3: Bioretention Basin 3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	79.98	0.00	0.00	**0.00**
2.50	0.01	34	80.06	0.00	0.00	0.00
5.00	0.01	139	80.26	0.00	0.00	0.00
7.50	0.02	289	80.50	0.00	0.00	0.00
10.00	**0.06**	**484**	**80.75**	**0.05**	**0.05**	0.00
12.50	**0.91**	**539**	**80.82**	**0.95**	**0.95**	0.00
15.00	0.07	486	80.75	0.08	0.08	0.00
17.50	0.04	483	80.75	0.04	0.04	0.00
20.00	0.03	480	80.75	0.03	0.03	0.00
22.50	0.03	479	80.75	0.03	0.03	0.00
25.00	0.00	474	80.74	0.00	0.00	0.00
27.50	0.00	474	80.74	0.00	0.00	0.00
30.00	0.00	474	80.74	0.00	0.00	0.00
32.50	0.00	474	80.74	0.00	0.00	0.00
35.00	0.00	474	80.74	0.00	0.00	0.00
37.50	0.00	474	80.74	0.00	0.00	0.00
40.00	0.00	474	80.74	0.00	0.00	0.00
42.50	0.00	474	80.74	0.00	0.00	0.00
45.00	0.00	474	80.74	0.00	0.00	0.00
47.50	0.00	474	80.74	0.00	0.00	0.00
50.00	0.00	474	80.74	0.00	0.00	0.00
52.50	0.00	474	80.74	0.00	0.00	0.00
55.00	0.00	474	80.74	0.00	0.00	0.00
57.50	0.00	474	80.74	0.00	0.00	0.00
60.00	0.00	474	80.74	0.00	0.00	0.00
62.50	0.00	474	80.74	0.00	0.00	0.00
65.00	0.00	474	80.74	0.00	0.00	0.00
67.50	0.00	474	80.74	0.00	0.00	0.00
70.00	0.00	474	80.74	0.00	0.00	0.00

Basin Drain Time = 25 - 12.5 = 12.5 hours

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: Pipe Calcs.stm	Number of lines: 17	Date: 5/14/2021

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	9.000	0.00	0.82	0.00	0.00	0.80	6.0	7.7	7.0	5.64	11.38	4.98	18	1.00	76.50	76.59	77.42	77.51	78.44	81.34	HW 200 - MH 210
2	1	130.861	0.11	0.41	0.98	0.11	0.40	6.0	7.1	7.2	2.89	11.38	3.46	18	1.00	76.69	78.00	77.51	78.65	81.34	82.19	MH 210 - MH 220
3	2	93.240	0.10	0.30	0.98	0.10	0.29	6.0	6.6	7.3	2.15	8.08	3.67	18	0.50	78.10	78.57	78.65	79.12	82.19	82.70	MH 220 - CO 230
4	3	60.000	0.10	0.20	0.98	0.10	0.20	6.0	6.3	7.4	1.45	8.04	2.85	18	0.50	78.57	78.87	79.12	79.32	82.70	82.95	CO 230 - MH 240
5	4	46.756	0.10	0.10	0.98	0.10	0.10	6.0	6.0	7.5	0.73	4.91	2.82	15	0.49	79.12	79.35	79.45	79.68	82.95	82.82	MH 240 - MH 250
6	1	45.577	0.11	0.41	0.98	0.11	0.40	6.0	7.1	7.2	2.88	7.03	4.28	15	1.01	76.84	77.30	77.51	77.98	81.34	80.44	MH 210 - MH 260
7	6	93.240	0.10	0.30	0.98	0.10	0.29	6.0	6.7	7.3	2.14	6.99	3.82	15	1.00	77.40	78.33	77.98	78.91	80.44	82.01	MH 260 - CO 270
8	7	60.000	0.10	0.20	0.98	0.10	0.20	6.0	6.4	7.4	1.44	7.00	3.34	15	1.00	78.43	79.03	78.91	79.51	82.01	82.22	CO 270 - CO 280
9	8	62.997	0.10	0.10	0.98	0.10	0.10	6.0	6.0	7.5	0.73	7.00	2.57	15	1.00	79.13	79.76	79.51	80.09	82.22	82.57	CO 280 - MH 290
10	End	13.939	0.19	1.02	0.93	0.18	0.88	6.0	7.4	7.1	6.26	8.06	4.99	18	0.50	76.50	76.57	77.51	77.56	78.44	80.28	HW 300 - IN 310
11	10	126.269	0.18	0.83	0.90	0.16	0.70	6.0	6.9	7.2	5.09	8.04	4.55	18	0.50	76.67	77.30	77.62	78.17	80.28	81.24	IN 310 - IN 320
12	11	114.634	0.29	0.65	0.80	0.23	0.54	6.0	6.5	7.4	3.98	4.93	4.47	15	0.50	77.55	78.12	78.40	78.97	81.24	81.90	IN 320 - IN 330
13	12	35.240	0.00	0.36	0.98	0.00	0.31	6.0	6.3	7.4	2.29	5.00	3.21	15	0.51	78.22	78.40	79.09	79.00	81.90	82.86	IN 330 - MH 340
14	13	66.170	0.36	0.36	0.86	0.31	0.31	6.0	6.0	7.5	2.32	4.94	3.94	15	0.50	78.50	78.83	79.10	79.44	82.86	81.76	MH 340 - IN 350
15	End	95.713	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	0.96	4.95	3.02	15	0.50	77.00	77.48	77.38	77.86	78.39	80.41	FES 400 - OS 410
16	End	14.058	0.00	0.00	0.98	0.00	0.00	6.0	6.1	0.0	5.74	8.55	6.04	15	1.49	72.20	72.41	73.05	73.38	74.48	76.57	HW 100 - MH 110
17	16	32.859	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	5.74	8.54	5.96	15	1.49	72.51	73.00	73.38	73.97	76.57	77.00	MH 110 - OS 120

Project File: Pipe Calcs.stm

Number of lines: 17

Run Date: 5/14/2021

NOTES:Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99; Return period =Yrs. 25 ; c = cir e = ellip b = box

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project:	J200933 (SafStor)
Date:	May 14, 2021
User:	
Notes:	

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 4.8 **Acres**

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:	PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5	Total % Area
Percent of Each Planning Area within Site:		100.0%					100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals		Points
		HSG A	HSG B	HSG C	HSG D			
1	Wetlands and Undisturbed Stream Buffers			0.2		0.2		13
2	Lawn and Open Space			1.6		1.6		78
3	Brush and Shrub					0.0		0
4	Meadow, Pasture, Grassland, or Range					0.0		0
5	Row Crop					0.0		0
6	Small Grain and Legumes					0.0		0
7	Woods - Indigenous			1.7		1.7		115
8	Woods - Planted					0.0		0
9	Woods and Grass Combination					0.0		0
10	Ponds, Lakes, and Other Open Water					0.0		0
11	Gravel and Dirt			0.9		0.9		27
12	Porous and Permeable Paving					0.0		0
13	Directly Connected Impervious			0.4		0.4		0
14	Unconnected Impervious with Small D/S Pervious					0.0		0
15	Unconnected Impervious with Large D/S Pervious					0.0		0
	HSG Subtotals (Acres):	0.0	0.0	4.8	0.0		**Total Area:**	4.8
	HSG Subtotals (%):	0.0%	0.0%	100.0%	0.0%		**Total % Area:**	100.0%

Points Subtotal: **234**

Total Existing Site Points: **234**

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals		Points
		HSG A	HSG B	HSG C	HSG D			
1	Wetlands and Undisturbed Stream Buffers			0.2		0.2		13
2	Lawn and Open Space			2.3		2.3		109
3	Brush and Shrub					0.0		0
4	Meadow, Pasture, Grassland, or Range					0.0		0
5	Row Crop					0.0		0
6	Small Grain and Legumes					0.0		0
7	Woods - Indigenous			0.9		0.9		58
8	Woods - Planted					0.0		0
9	Woods and Grass Combination					0.0		0
10	Ponds, Lakes, and Other Open Water					0.0		0
11	Gravel and Dirt					0.0		0
12	Porous and Permeable Paving					0.0		0
13	Directly Connected Impervious			1.5		1.5		0
14	Unconnected Impervious with Small D/S Pervious					0.0		0
15	Unconnected Impervious with Large D/S Pervious					0.0		0
	HSG Subtotals (Acres):	0.0	0.0	4.8	0.0		**Total Area:**	4.8
	HSG Subtotals (%):	0.0%	0.0%	100.0%	0.0%		**Total % Area:**	100.0%
							Points Subtotal:	**180**

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =	32%	% of Site
Total Unconnected Impervious Coverage with Small D/S Pervious =	0%	% of Site
Total Unconnected Impervious Coverage with Large D/S Pervious =	0%	% of Site
Total Site Impervious Coverage =	32%	% of Site
Effective Site Impervious Coverage =	32%	% of Site
Specify Source of Maximum Allowable Impervious Coverage:	None	(None or Table)

Points Subtotal: 0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =	30%	% of Site
Maximum Allowable Site Disturbance by Municipal Ordinance =	60%	% of Site

Points Subtotal: 23

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =		Feet
Length of Vegetated Runoff Conveyance System =		Feet
% of Total Runoff Conveyance System That is Vegetated =	0%	

Points Subtotal: 0

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =		% of Site
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =		Acres
Maximum Proposed Cluster Lot Size (Note:1/4 Acre or Less) =		Acres
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =		% of Clustered Site Portion

Points Subtotal: 0

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:	Yes	(Yes or No)
Percent of Proposed Lawn Areas to be Graded with Such Equipment:	100%	% of Lawn Areas

Points Subtotal: 23

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):	No	(Yes or No)
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):	Yes	(Yes or No)
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):	No	(Yes or No)

Points Subtotal: 68

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points: 294

Ratio of Proposed to Existing Site Points: 126%

Required Site Points Ratio: 88%

Nonstructural Point System Results: Proposed Nonstructural Measures are Adequate

New Jersey Stormwater Best Management Practices Manual

February 2004

A P P E N D I X A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: _____

County: _____ Date: _____

Review board or agency:_____

Proposed land development name: _____

Lot(s): _____ Block(s): _____

Project or application number: _____

Applicant's name: _____

Applicant's address: _____

_____

Telephone: _____ Fax: _____

Email address: _____

Designer's name: _____

Designer's address: _____

_____

Telephone:_____ Fax:_____

Email address:_____

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

_____

Do regulations include nonstructural requirements? Yes: _____ No: _____

If yes, briefly describe: _____

_____

_____

List LID-BMPs prohibited by local regulations: _____

_____

_____

Pre-design meeting held? Yes: _____ Date: _____ No: _____

Meeting held with: _____

_____

_____

Pre-design site walk held? Yes: _____ Date: _____ No: _____

Site walk held with: _____

_____

_____

Other agencies with stormwater review jurisdiction:

Name: _____

Required approval: _____

Name: _____

Required approval: _____

Name: _____

Required approval: _____

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: _____ No: _____

If yes, was this inventory a factor in the site's layout and design? Yes: _____ No: _____

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: _____ If yes, specify % of site: _____

Native ground cover? Yes: _____ No: _____ If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: _____ If yes, specify % of site: _____

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: _____ If yes, specify % of site: _____

Native ground cover? Yes: _____ No: _____ If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: _____ If yes, specify % of site: _____

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: _____ No: _____

Reduce runoff pollutant loads through runoff treatment: Yes: _____ No: _____

Maintain groundwater recharge by preserving natural areas: Yes: _____ No: _____

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: _____ No: _____

If yes, were these inventories factors in the site's layout and design? Yes: _____ No: _____

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: _____ No: _____

If yes, how: _____

_____

Restrict temporary site disturbance during construction? Yes: _____ No: _____

If yes, how: _____

_____

Consider soils and slopes in selecting disturbance limits? Yes: _____ No: _____

If yes, how: _____

_____

C. Specify percentage of site to be cleared: _____ Regraded: _____

D. Specify percentage of cleared areas done so for buildings: _____

For driveways and parking: _____ For roadways: _____

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

_____

_____

_____

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: _____ HSG B: _____ HSG C: _____ HSG D: _____

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: _____ HSG C: _____ HSG D: _____

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

_____

_____

_____

I. Does the site include Karst topography? Yes: _____ No: _____

If yes, discuss measures taken to limit Karst impacts:

_____

_____

_____

_____

_____

_____

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: _____ Proposed: _____

B. Specify maximum site impervious coverage allowed by regulations: _____

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity		
Residential access – medium intensity		
Residential access – high intensity with parking		
Residential access – high intensity without parking		
Neighborhood		
Minor collector – low intensity without parking		
Minor collector – with one parking lane		
Minor collector – with two parking lanes		
Minor collector – without parking		
Major collector		

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: _____ Regulations: _____

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: _____ Regulations: _____

F. Specify percentage of total site impervious cover created by buildings:

By driveways and parking: _____ By roadways: _____

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

_____

_____

_____

_____

H. Specify percentage of total impervious area that will be unconnected:

Total site: _____ Buildings: _____ Driveways and parking: _____ Roads: _____

I. Specify percentage of total impervious area that will be porous:

Total site: _____ Buildings: _____ Driveways and parking: _____ Roads: _____

J. Specify percentage of total building roof area that will be vegetated: _____

K. Specify percentage of total parking area located beneath buildings: _____

L. Specify percentage of total parking located within multi-level parking deck: _____

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: _____ Vegetated swale: _____ Natural channel: _____

Stormwater management facility: _____ Other: _____

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

_____

_____

_____

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: _____

_____

_____

Increase overland flow roughness: _____

_____

_____

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: _____

Specify the spacing between the trash receptacles: _____

Compare trash receptacles proposed with those required by regulations:

Proposed: _____ Regulations: _____

B. Pet Waste Stations

Specify the number of pet waste stations provided: _____

Specify the spacing between the pet waste stations: _____

Compare pet waste stations proposed with those required by regulations:

Proposed: _____ Regulations: _____

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: _____

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: _____ Regulations: _____

Litter collection: Proposed: _____ Regulations: _____

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

_____

_____

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1.	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.		
2.	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.		
3.	Maximize the protection of natural drainage features and vegetation.		
4.	Minimize the decrease in the pre-construction time of concentration.		
5.	Minimize land disturbance including clearing and grading.		
6.	Minimize soil compaction.		
7.	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.		
8.	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.		
9.	Provide preventative source controls.		

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

_____

_____

_____

_____

_____

_____

_____

_____

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

30 INDEPENDENCE BOULEVARD
SUITE 250
WARREN, NJ 07059
908.668.7777
whitestoneassoc.com

March 4, 2021

via email

SAFSTOR REAL ESTATE CO, LLC
c/o W&A ENGINEERING
355 Oneta Street
Suite D100
Athens, Georgia 30601

Attention: Mr. Jim Burtt
Project Manager

Regarding: SWM AREA EVALUATION & ON-SITE WASTEWATER MANAGEMENT EVALUATION SERVICES
PROPOSED SELF-STORAGE FACILITY
471 ELIZABETH AVENUE
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NEW JERSEY
WHITESTONE PROJECT NO.: GJ2117698.000

Dear Mr. Burtt:

Whitestone Associates, Inc. (Whitestone) has completed a stormwater management (SWM) area evaluation and on-site wastewater management evaluation services at the above-referenced site. The results of the evaluation presented below are based on the soil conditions disclosed by the profile pits performed during Whitestone's February 2021 field investigation.

1.0 PROJECT DESCRIPTION

The subject property located at 471 Elizabeth Avenue in Franklin Township, Somerset County, New Jersey currently consists of an undeveloped lot. Based on the January 18, 2021 *Conceptual Grading, Drainage & Utility Plan* prepared by Bohler Engineering NJ, LLC (Bohler), the proposed development will include construction of a three-story, self-storage facility with new pavements, landscaping, SWM area, septic area, and utilities. The SWM facility will be located within the southern portion of the site. The septic area preliminarily is anticipated to be located within the eastern portion of the site. Final details regarding the type, bottom elevation, and size of the proposed SWM/septic facilities have not been established at the time of this report.

2.0 FIELD EXPLORATION

Whitestone's scope of services consisted of conducting an engineering evaluation of the subsurface conditions disclosed by nine profile pits (identified as SPP-1A, SPP-2A, SPP-3 through SPP-6, and offsets SPP-3A, SPP-4A, and SPP-5A). The subsurface tests extended to depths ranging from approximately five feet below ground surface (fbgs) to 8.5 fbgs. The subsurface tests were located in the field using normal taping procedures and estimated right angles from existing features and are presumed

to be accurate within a few feet. Upon completion, the test locations were backfilled to existing surface levels using soils generated during excavation of the test pits. Soil profile pits and associated infiltration testing performed for the proposed septic system were witnessed by a representative of the Franklin Township Health Department.

3.0 SWM AREA TEST RESULTS

General: The SWM area investigation included four profile pits (identified as SPP-4, SPP-5, and associated offsets SPP-4A and SPP-5A for basin flood testing) performed within the anticipated location of the SWM area. The test locations are shown on the *Test Location Plan* included as Figure 1. Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A.

Estimated Seasonal High Groundwater Levels: The methods used in determining the estimated seasonal high groundwater (ESHGW) level include evaluating the soil morphology within a test location and identifying irregular spots or blotches of different colors or minerals unlike that of the surrounding soils (mottles). Mottling is the result of the oxidation of minerals within a soil structure as a water level slowly fluctuates.

Groundwater and indications of seasonal high groundwater levels were encountered within the profile pits performed at the depths/elevations indicated in the *Records of Subsurface Exploration.* Groundwater conditions likely will fluctuate seasonally and following periods of precipitation.

Infiltration Testing: Basin flood tests were conducted within the weathered rock/bedrock strata encountered at profile pits SPP-4A and SPP-5A. The basin flood tests performed within the profile pits were conducted in general accordance with the *New Jersey Stormwater Best Management Practices Manual* (BMP Manual). The results of the in-situ testing indicated that basin flood tests did not drain the required 12 inches within 24 hours of filling. Therefore, per the BMP Manual, the limiting zone is considered to be a massive rock substratum and a infiltration rate cannot be assigned. Detailed in-situ infiltration test results are available in Appendix C.

Additionally, representative samples within profile pits SPP-4 and SPP-5 were subjected to tube permeameter analysis as detailed in *New Jersey Stormwater Best Practices Manual.* Laboratory tube permeameter testing resulted in a infiltration rate of less than 0.2 iph. Individual tube permeameter test results are provided in Appendix B.

4.0 SEPTIC AREA TEST RESULTS

General: The septic area investigation included four profile pits (identified as SPP-1A, SPP-2A, SPP-3 and associated offset SPP-3A for basin flood testing) performed within the potential locations of the septic disposal bed areas. The test locations are shown on the *Test Location Plan* included as Figure 1. Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A.

Estimated Seasonal High Groundwater Levels: Groundwater and indications of seasonal high groundwater levels were encountered within the profile pits performed at the depths/elevations indicated in the *Records of Subsurface Exploration.* Groundwater conditions likely will fluctuate seasonally and following periods of precipitation.

Infiltration Testing: A pit-bailing test was conducted within the weathered rock strata encountered at profile pit SPP-2A at a depth of approximately eight fbgs. The pit-bailing test was conducted in general accordance with the *Standards for Individual Subsurface Sewage Disposal Systems (N.J.A.C. 7:9A)* and was witnessed by a Township of Franklin Health Department representative. The results of the pit-bailing test indicated a permeability rate (K) of approximately 3.4 inches per hour.

Additionally, a basin flood test was conducted at profile pit SPP-3A and tube permeameter testing was conducted at profile pit SPP-3. The basin flood test was conducted within the weathered rock strata encountered within SPP-3A. The basin flood test was conducted in general accordance with the *Standards for Individual Subsurface Sewage Disposal Systems (N.J.A.C. 7:9A)*. The results of the in-situ testing indicated that basin flood test did not drain the required 12 inches within 24 hours of filling. Therefore, the limiting zone is considered to be a massive rock substratum and a permeability rate cannot be assigned. Detailed in-situ permeability test results are available in Appendix C. The laboratory tube permeameter testing conducted for SPP-3 resulted in a permeability rate of less than 0.2 iph. Individual tube permeameter test results are provided in Appendix B.

5.0 CLOSING

Whitestone appreciates the opportunity to be of service to SAFStor Real Estate Co, LLC and W&A Engineering and trusts that this information will be helpful for evaluating the proposed development of this property. Please contact us at (908) 668-7777 to further discuss these findings.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Mudar Khantamr, P.E.
Project Manager

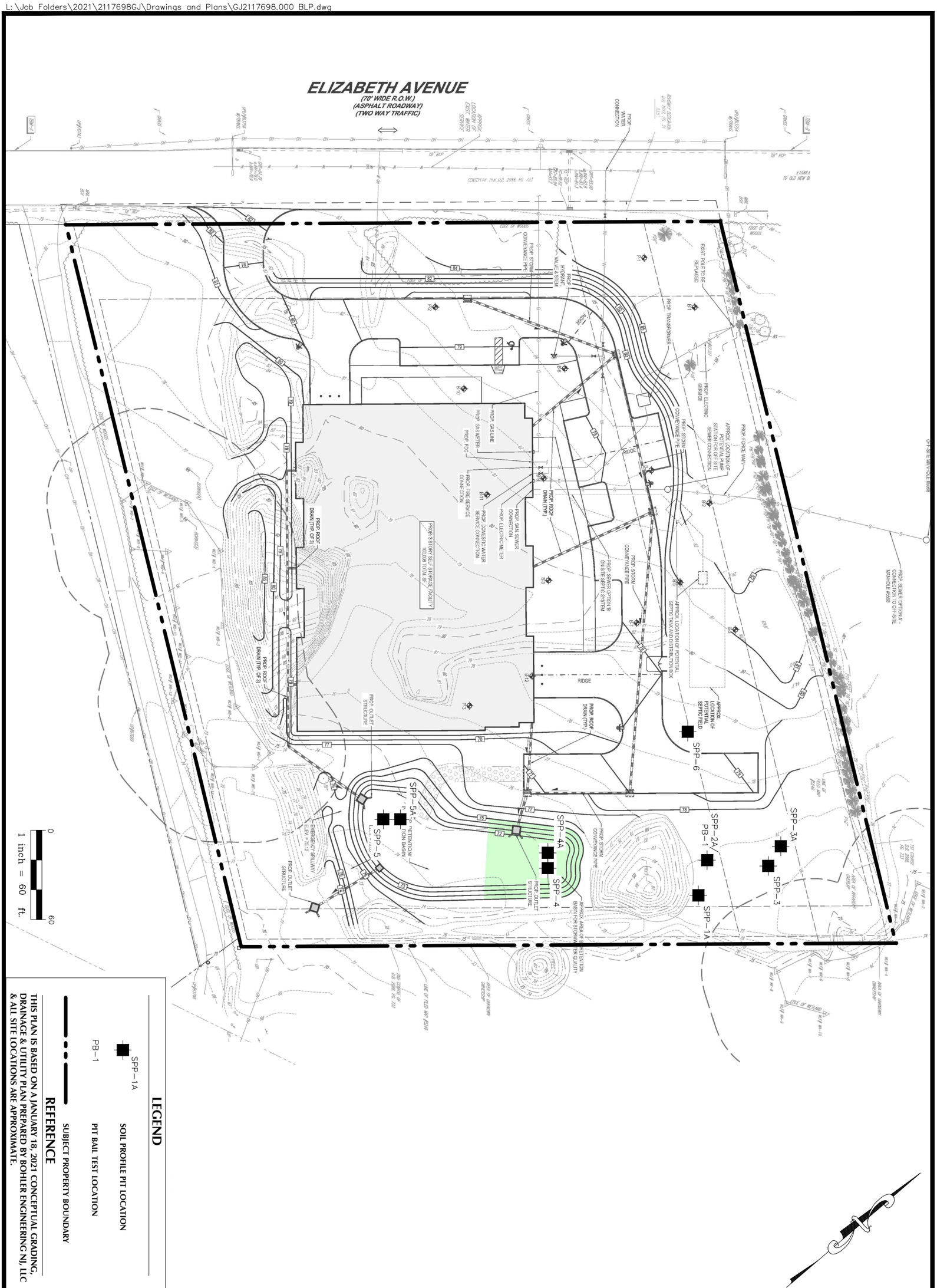
Kevin A. Feath, P.E.
Associate

MK/pwd L:\Job Folders\2021\2117698GJ\Reports and Submittals\17698 SWM&Septic.docx
Enclosures
Copy: Kyle McKenna, P.E., Bohler Engineering NJ, LLC
Laurence W. Keller, P.E., Whitestone Associates, Inc.

WHITESTONE ASSOCIATES, INC.

FIGURE 1
Test Location Plan

L:\Job Folders\2021\2117698GJ\Drawings and Plans\GJ2117698.000 BLP.dwg



LEGEND

SPP-1A — SOIL PROFILE PIT LOCATION

PB-1 — PIT BAIL TEST LOCATION

SUBJECT PROPERTY BOUNDARY

REFERENCE

THIS PLAN IS BASED ON A JANUARY 18, 2021 CONCEPTUAL GRADING, DRAINAGE & UTILITY PLAN PREPARED BY BOHLER ENGINEERING NJ, LLC & ALL SITE LOCATIONS ARE APPROXIMATE.

PROJECT #:	GJ2117698.000
DESIGNED BY:	GR
DATE:	3/3/21
SCALE:	1" = 60'
PROD. MGR.:	KAF
FIGURE:	1

DRAWING TITLE:
TEST LOCATION PLAN

CLIENT:
SAFSTOR REAL ESTATE CO, LLC

PROJECT:
PROPOSED SELF-STORAGE FACILITY
471 ELIZABETH AVENUE
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NJ

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
30 INDEPENDENCE BOULEVARD, SUITE 250, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

WHITESTONE ASSOCIATES, INC.

APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-1A

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

					Water Depth (feet bgs)	Elevation (feet)	Estimated Seasonal High Groundwater Depth (feet bgs)	Elevation (feet)
Surface Elevation:	± 77.0 feet	**Date Started:**	2/8/2021	**During:**	6.0	71.0		
Termination Depth:	8.5 feet bgs	**Date Completed:**	2/8/2021	**At Completion:**	---	---	**At Completion:**	4.0	73.0
Proposed Location:	Septic	**Logged By:**	CN	**24 Hours:**	---	---		
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR					
Test Method:	Visual Observation	**Rig Type:**	PC88MR					

SAMPLE INFORMATION			DEPTH (feet)		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type					
			0.0				
0 - 3			1.0 / 2.0 / 3.0	0 - 3	FILL	30" Asphalt Millings	Water Seeping in All Sidewalls 2"/10 Minutes
3 - 6			4.0 / 5.0 / 6.0	3 - 6	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Moist to Wet; Friable; No Roots; >15MM Mottling Starting at 4.0 fbgs; Clear Boundary	Mottling @ 4.0 fbgs to 8.5 fbgs Water Sitting on Weathered Rock
6 - 8.5			7.0 / 8.0	6 - 8.5	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling; Clear Boundary	
			9.0 / 10.0 / 11.0 / 12.0 / 13.0 / 14.0 / 15.0			Soil Profile Pit SPP-1A Terminated at a Depth of 8.5 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-2A

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

				Water Depth (feet bgs)	Elevation (feet)	Estimated Seasonal High Groundwater Depth (feet bgs)	Elevation (feet)
Surface Elevation:	± 77.0 feet	**Date Started:**	2/6/2021				
Termination Depth:	8.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	Septic	**Logged By:**	CN	**During:**	5.5 | 71.5		
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	--- | ---	**At Completion:**	4.0 | 73.0
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	--- | ---		

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
			0.0				
0 - 2			1.0	0 - 2	FILL	24" Asphalt Millings	Water Seeping in All Sidewalls 2"/10 Minutes 0.0 fbgs to 5.0 fbgs
			2.0				
2 - 5.5			3.0	2 - 5.5	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Moist to Wet; Friable; No Roots; >15MM Mottling at 4.0 fbgs; Clear Boundary	
			4.0				Mottling @ 4.0 fbgs
			5.0				Water Sitting on Weathered Rock
5.5 - 8			6.0	5.5 - 8	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; No Mottling; Clear Boundary	
			7.0				
			8.0				
			9.0			Soil Profile Pit SPP-2A Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	SPP-2A Used for Pit Bail Test (PB-1)
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-3

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

				Water Depth (feet bgs)	Elevation (feet)	Estimated Seasonal High Groundwater Depth (feet bgs)	Elevation (feet)
Surface Elevation:	± 77.0 feet	**Date Started:**	2/6/2021				
Termination Depth:	6.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	Septic	**Logged By:**	CN	**During:**	4.0 / 73.0		
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	--- / ---	**At Completion:**	3.8 / 73.2
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	--- / ---		

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
			0.0				
0 - 2.5			1.0	0 - 2.5	FILL	30" Asphalt Millings	
			2.0				
2.5 - 4	S-1	BAG	3.0	2.5 - 4	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Wet; Friable; No Roots; >15MM Mottling at 3.8 fbgs; Clear Boundary	Bag/Tubes Taken @ 3.0 fbgs Water Sitting on Weathered Rock
			4.0				
4 - 6			5.0	4 - 7	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling; Clear Boundary	
			6.0				
			7.0			Soil Profile Pit SPP-3 Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	
			8.0				
			9.0				
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-3A

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

				Water Depth (feet bgs)	Elevation (feet)	Estimated Seasonal High Groundwater Depth (feet bgs)	Elevation (feet)
Surface Elevation:	± 77.0 feet	**Date Started:**	2/6/2021				
Termination Depth:	6.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	Septic	**Logged By:**	CN	**During:**	4.0 / 73.0		
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	--- / ---	**At Completion:**	3.8 / 73.2
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	--- / ---		

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
			0.0				
0 - 2.5			1.0	0 - 2.5	FILL	30" Asphalt Millings	
			2.0				
2.5 - 4	S-1	BAG	3.0	2.5 - 4	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Wet; Friable; No Roots; >15MM Mottling at 3.8 fbgs; Clear Boundary	Bag/Tubes Taken @ 3.0 fbgs Water Sitting on Weathered Rock
			4.0				
4 - 6			5.0	4 - 7	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling; Clear Boundary	
			6.0				
			7.0			Soil Profile Pit SPP-3A Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	
			8.0				
			9.0				
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-4

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

Surface Elevation:	± 75.0 feet	**Date Started:**	2/6/2021		**Water Depth (feet bgs)**	**Elevation (feet)**	**Estimated Seasonal High Groundwater Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	Proposed SWM	**Logged By:**	CN	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	---	---	**At Completion:** 3.0 / 72.0
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
			0.0				
0 - 1			1.0	0 - 1	FILL	12" to 18" Asphalt Millings	
1 - 2			2.0	1 - 2	TOPSOIL	6" to 12" Topsoil	
2 - 4	S-1	BAG	3.0 4.0	2 - 4	GLACIAL DEPOSITS	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Wet; Friable; Sticky; No Roots; >15MM Mottling at 3.0 fbgs; Clear Boundary	Tubes/Bags Taken @ 2.0 fbgs >15MM Mottling 3.0 fbgs to 6.0 fbgs
4 - 6			5.0 6.0	4 - 6	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling	
			7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0			Soil Profile Pit SPP-4 Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-4A

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

Surface Elevation:	± 75.0 feet	**Date Started:**	2/6/2021		**Water Depth (feet bgs)**	**Elevation (feet)**	**Estimated Seasonal High Groundwater Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	Proposed SWM	**Logged By:**	CN	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	---	---	**At Completion:** 3.0 / 72.0
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
			0.0				
0 - 1			1.0	0 - 1	FILL	12" to 18" Asphalt Millings	
1 - 2			2.0	1 - 2	TOPSOIL	6" to 12" Topsoil	
2 - 4	S-1	BAG	3.0	2 - 4	GLACIAL DEPOSITS	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Wet; Friable; Sticky; No Roots; >15MM Mottling at 3.0 fbgs; Clear Boundary	Tubes/Bags Taken @ 2.0 fbgs >15MM Mottling 3.0 fbgs to 6.0 fbgs
4 - 6			4.0 5.0 6.0	4 - 6	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling	
			7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0			Soil Profile Pit SPP-4A Terminated at a Depth of 6.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-5

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

Surface Elevation:	± 74.5 feet	**Date Started:**	2/6/2021		**Water Depth (feet bgs)**	**Elevation (feet)**	**Estimated Seasonal High Groundwater Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	5.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	SWM	**Logged By:**	CN	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	---	---	**At Completion:** 2.5 / 72.0
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH (feet)		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type					
			0.0				
0 - 1.5			1.0	0 - 1.5	FILL	18" Asphalt Millings	
1.5 - 3	S-1	BAG	2.0 3.0	1.5 - 3	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Moist; Friable; Sticky; No Roots; >15MM Mottling @ 2.5 fbgs; Clear Boundary	Tubes/Bag Taken @ 2.0 fbgs Mottling from 2.5 fbgs to 5.0 fbgs
3 - 5			4.0 5.0	3 - 5	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling	
			6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0			Soil Profile Pit SPP-5 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-5A

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

Surface Elevation:	± 74.5 feet	**Date Started:**	2/6/2021		**Water Depth (feet bgs)**	**Elevation (feet)**	**Estimated Seasonal High Groundwater Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	5.0 feet bgs	**Date Completed:**	2/6/2021				
Proposed Location:	SWM	**Logged By:**	CN	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:**	---	---	**At Completion:** 2.5 / 72.0
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH (feet)		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type					
			0.0				
0 - 1.5			1.0	0 - 1.5	FILL	18" Asphalt Millings	
1.5 - 3	S-1	BAG	2.0 3.0	1.5 - 3	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Moist; Friable; Sticky; No Roots; >15MM Mottling @ 2.5 fbgs; Clear Boundary	Tubes/Bag Taken @ 2.0 fbgs Mottling from 2.5 fbgs to 5.0 fbgs
3 - 5			4.0 5.0	3 - 5	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling	
			6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0			Soil Profile Pit SPP-5A Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-6

Project:	Proposed Self-Storage Facility	**WAI Project No.:**	GJ2117698.000
Location:	471 Elizabeth Avenue; Franklin Township, Somerset County, New Jersey	**Client:**	SAFStor Real Estate Co, LLC

				Water Depth (feet bgs) | Elevation (feet)	Estimated Seasonal High Groundwater Depth (feet bgs) | Elevation (feet)
Surface Elevation:	± 78.5 feet	**Date Started:**	2/6/2021		
Termination Depth:	5.0 feet bgs	**Date Completed:**	2/6/2021		
Proposed Location:	Septic	**Logged By:**	CN	**During:** 3.0 | 75.5	
Excavating Method:	Test Pit Excavation	**Contractor:**	LNR	**At Completion:** --- | ---	**At Completion:** 3.0 | 75.5
Test Method:	Visual Observation	**Rig Type:**	PC88MR	**24 Hours:** --- | ---	

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
			0.0				
0 - 1.5			1.0	0 - 1.5	FILL	18" Asphalt Millings	
1.5 - 2.2			2.0	1.5 - 2.2	TOPSOIL	8" Topsoil	
2.2 - 3	S-1	BAG	3.0	2.2 - 3	RESIDUAL	Reddish-Brown (5YR 5/4) CLAY LOAM; 10% Gravel; Moderate, Medium Blocky Structure; Wet; Friable; No Roots; No Mottling; Clear Boundary	Tubes/Bags Taken @ 2.5 fbgs
3 - 5			4.0	3 - 5	WEATHERED ROCK	Dark Reddish-Brown (5YR 4/3) Fractured WEATHERED SHALE; Strong, Coarse Structure; Moist; Very Hard; No Roots; Mottling	Mottling from 3.0 fbgs to 5.0 fbgs
			5.0				
			6.0			Soil Profile Pit SPP-6 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Refusal on Weathered Rock/Bedrock	
			7.0				
			8.0				
			9.0				
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

APPENDIX B
Laboratory Test Results

Tube Permeameter Test Data

Job Number: GJ2117698.000
Project: Proposed Self-Storage Facility
Client: Safstor Real Estate Co, LLC
Lab Tech: T. Jovanov

Sample ID: **Profile Pit No.:** SPP-3 **Sample No.:** T-1 **Depth:** 3.0'

COUNTY/MUNICIPALITY Franklin Twp, Somerset Co BLOCK _____ LOT _____

1. Test Number 1 Replicate (letter) A Date Collected 2/6/2021

2. Material Tested: _____ Fill _____ Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

   Wt. of Tube Containing Sample _____
   Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 101.30

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.75

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		92.00
		96.00
		92.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 93.33

    K (in/hr) = 0.12 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    _____ None

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117698.000
Project: Proposed Self-Storage Facility
Client: Safstor Real Estate Co, LLC
Lab Tech: T. Jovanov

Sample ID: **Profile Pit No.:** SPP-3 **Sample No.:** T-1 **Depth:** 3.0'

COUNTY/MUNICIPALITY Franklin Twp, Somerset Co BLOCK _____ LOT _____

1. Test Number 1 Replicate (letter) B Date Collected 2/6/2021

2. Material Tested: _____ Fill _____ Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
   Length of Sample, L, in inches 3.25

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

   Wt. of Tube Containing Sample _____
   Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 94.07

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1	5.00
At the End of Each Test Interval, H2	4.99

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		240.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 240.00

K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117698.000
Project: Proposed Self-Storage Facility
Client: Safstor Real Estate Co, LLC
Lab Tech: T. Jovanov

Sample ID: **Profile Pit No.:** SPP-4 **Sample No.:** T-1 **Depth:** 2.0'

COUNTY/MUNICIPALITY Franklin Twp, Somerset Co BLOCK _____ LOT _____

1. Test Number 1 Replicate (letter) A Date Collected 2/6/2021

2. Material Tested: _____ Fill _____ Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

   Wt. of Tube Containing Sample _____
   Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 101.30

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.75

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		72.00
		73.00
		69.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 71.33

    K (in/hr) = 0.15 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117698.000
Project: Proposed Self-Storage Facility
Client: Safstor Real Estate Co, LLC
Lab Tech: T. Jovanov

Sample ID: **Profile Pit No.:** SPP-4 **Sample No.:** T-1 **Depth:** 2.0'

COUNTY/MUNICIPALITY Franklin Twp, Somerset Co BLOCK _____ LOT _____

1. Test Number 1 Replicate (letter) B Date Collected 2/6/2021

2. Material Tested: _____ Fill _____ Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
   Length of Sample, L, in inches 3.25

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

   Wt. of Tube Containing Sample _____
   Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 94.07

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1	4.50
At the End of Each Test Interval, H2	4.49

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		240.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 240.00

K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117698.000
Project: Proposed Self-Storage Facility
Client: Safstor Real Estate Co, LLC
Lab Tech: T. Jovanov

Sample ID: **Profile Pit No.:** SPP-5 **Sample No.:** T-1 **Depth:** 3.0'

COUNTY/MUNICIPALITY Franklin Twp, Somerset Co BLOCK _____ LOT _____

1. Test Number 1 Replicate (letter) A Date Collected 2/6/2021

2. Material Tested: _____ Fill _____ Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

   Wt. of Tube Containing Sample _____
   Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 101.30

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.99

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		240.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 240.00

    K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117698.000
Project: Proposed Self-Storage Facility
Client: Safstor Real Estate Co, LLC
Lab Tech: T. Jovanov

Sample ID: **Profile Pit No.:** SPP-5 **Sample No.:** T-1 **Depth:** 3.0'

COUNTY/MUNICIPALITY Franklin Twp, Somerset Co BLOCK _____ LOT _____

1. Test Number 1 Replicate (letter) B Date Collected 2/6/2021

2. Material Tested: _____ Fill _____ Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
   Length of Sample, L, in inches 2.25

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

   Wt. of Tube Containing Sample _____
   Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 65.12

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.99

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		240.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 240.00

    K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    _____ None

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

WHITESTONE ASSOCIATES, INC.

APPENDIX C
Basin Flood Test Data

WHITESTONE ASSOCIATES, INC.

BASIN FLOOD TEST DATA

Client:	SAFStor Real Estate Co, LLC	**Basin No.:**	SPP-3A
Project:	Proposed Self-Storage Facility	**Date:**	2/8/21 - 2/10/21
Location:	471 Elizabeth Ave., Franklin Twp., NJ	**Weather:**	Overcast, Light Snow, 20-35°F
File No.	GJ2117698.000	**Field Engineer:**	C. Naugle
Surf. Elev.	± 77.0	**Test Depth/Elev.:**	5.0 72.0

Reading No.	Date	Time	Water Level Reading		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
			Depth (inches)	Water Surface (IBGS)			
1	2/8/2021	1:15 PM	12.0	42.0	---	---	---
2	2/8/2021	3:15 PM	13.0	41.0	1.0	2.0	---
3	2/9/2021	8:15 AM	14.0	40.0	2.0	19.0	---
4	2/9/2021	10:15 AM	14.0	40.0	2.0	21.0	---
5	2/9/2021	12:15 PM	15.0	39.0	3.0	23.0	---
6	2/9/2021	1:15 PM	15.0	39.0	3.0	24.0	---

BFT: basin flood test
IBGS: inches below ground surface

WHITESTONE ASSOCIATES, INC.

BASIN FLOOD TEST DATA

Client:	SAFStor Real Estate Co, LLC	**Basin No.:**	SPP-4A
Project:	Proposed Self-Storage Facility	**Date:**	2/8/21 - 2/10/21
Location:	471 Elizabeth Ave., Franklin Twp., NJ	**Weather:**	Overcast, Light Snow, 20-35°F
File No.	GJ2117698.000	**Field Engineer:**	C. Naugle
Surf. Elev.	± 75.0	**Test Depth/Elev.:**	4.0 71.0

Reading No.	Date	Time	Water Level Reading		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
			Depth (inches)	Water Surface (IBGS)			
1	2/8/2021	1:15 PM	12.0	32.0	---	---	---
2	2/8/2021	3:15 PM	12.0	32.0	0.0	2.0	---
3	2/9/2021	8:15 AM	15.5	28.5	3.5	19.0	---
4	2/9/2021	10:15 AM	15.5	28.5	3.5	21.0	---
5	2/9/2021	12:15 PM	15.5	28.5	3.5	23.0	---
6	2/9/2021	1:15 PM	15.5	28.5	3.5	24.0	---

BFT: basin flood test
IBGS: inches below ground surface

WHITESTONE ASSOCIATES, INC.

BASIN FLOOD TEST DATA

Client:	SAFStor Real Estate Co, LLC	**Basin No.:**	SPP-5A
Project:	Proposed Self-Storage Facility	**Date:**	2/8/21 - 2/10/21
Location:	471 Elizabeth Ave., Franklin Twp., NJ	**Weather:**	Overcast, Light Snow, 20-35°F
File No.	GJ2117698.000	**Field Engineer:**	C. Naugle
Surf. Elev.	± 75.0	**Test Depth/Elev.:**	4.0 71.0

Reading No.	Date	Time	Water Level Reading		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
			Depth (inches)	Water Surface (IBGS)			
1	2/8/2021	1:15 PM	12.0	35.0	---	---	---
2	2/8/2021	3:15 PM	12.0	35.0	0.0	2.0	---
3	2/9/2021	8:15 AM	17.0	30.0	5.0	19.0	---
4	2/9/2021	10:15 AM	17.0	30.0	5.0	21.0	---
5	2/9/2021	12:15 PM	17.5	29.5	5.5	23.0	---
6	2/9/2021	1:15 PM	18.0	29.0	6.0	24.0	---

BFT: basin flood test
IBGS: inches below ground surface

WHITESTONE ASSOCIATES, INC.

APPENDIX D
Supplemental Information (USCS, Terms & Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

30 INDEPENDENCE BOULEVARD
SUITE 250
WARREN, NJ 07059
908.668.7777
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM NJ.docx

Other Office Locations:

CHALFONT, PA 215.712.2700
SOUTHBOROUGH, MA 508.485.0755
ROCKY HILL, CT 860.726.7889
WALL, NJ 732.592.2101
PHILADELPHIA, PA 215.848.2323

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

30 INDEPENDENCE BOULEVARD
SUITE 250
WARREN, NJ 07059
908.668.7777
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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

Other Office Locations:

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ROCKY HILL, CT 860.726.7889
WALL, NJ 732.592.2101
PHILADELPHIA, PA 215.848.2323

C. MAPS

- **Aerial Map**
- **Soil Map**
- **USGS**
- **HUC14 Location Map**
- **Flood Map**
- **Drainage Area Maps**
  - **Existing Drainage Area Map**
  - **Proposed Drainage Area Map**
  - **Inlet Drainage Area Map**

Aerial Map

Source: NearMaps

Date Access: 05/17/2021

SafStor Real Estate CO, LLC

471 Elizabeth Avenue **Block 507.14; Lot 65.01**	**Township of Franklin, Somerset County, New Jersey**
BENJ# J200933	BOHLER
Prepared by: CR / Date: 4/13/2021	
Checked by: KM / Scale: NTS	

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PenB	Penn silt loam, 2 to 6 percent slopes	C	4.8	100.0%
Totals for Area of Interest			**4.8**	**100.0%**

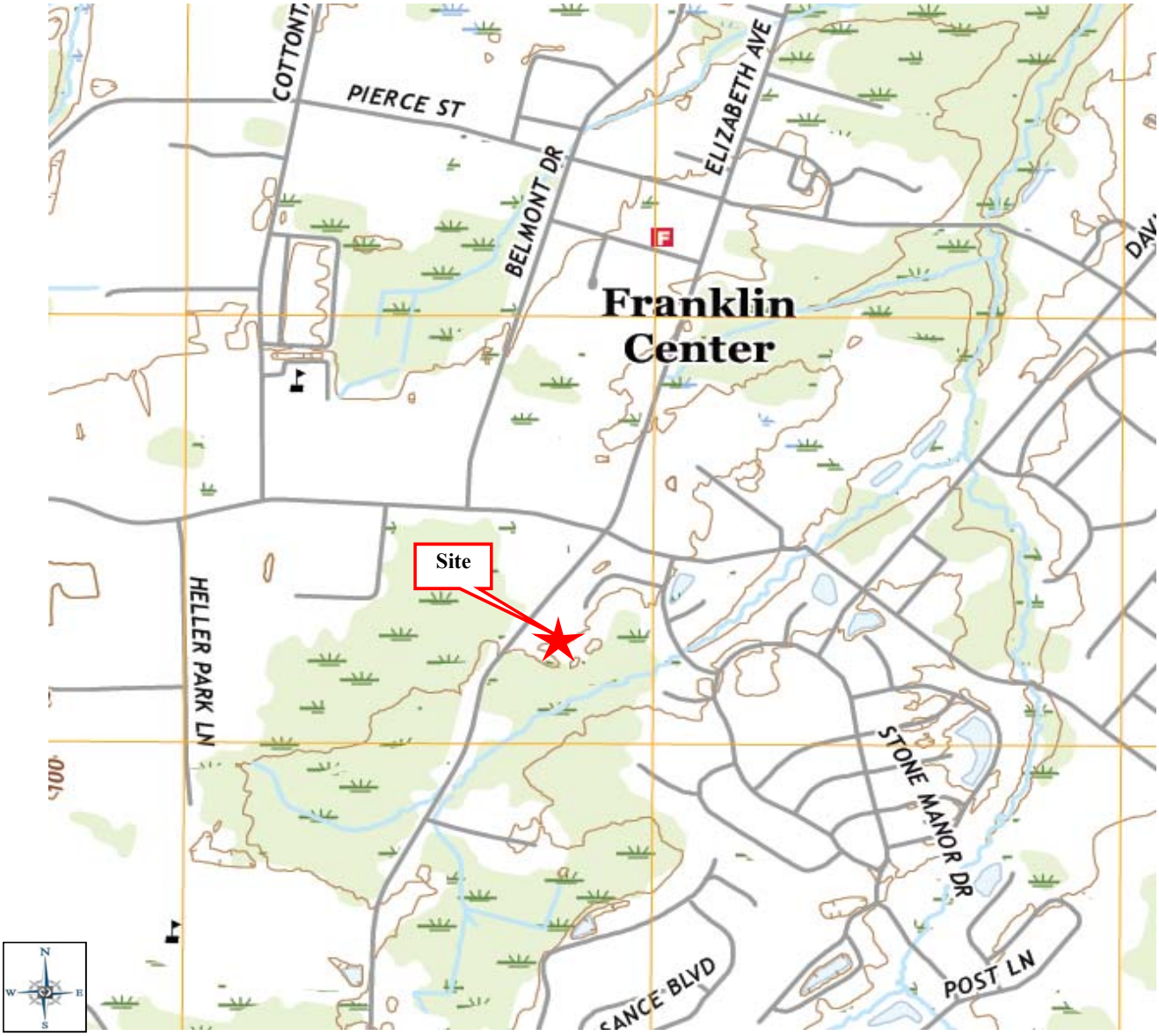
Soils Map

Source: NRCS Web Soil Survey, 2012

Date Access: 05/17/2021

SafStor Real Estate CO, LLC

471 Elizabeth Avenue **Block 507.14; Lot 65.01**	**Township of Franklin, Somerset County, New Jersey**
BENJ# J200933	
Prepared by: CR — Date: 4/13/2021	BOHLER
Checked by: KM — Scale: NTS	

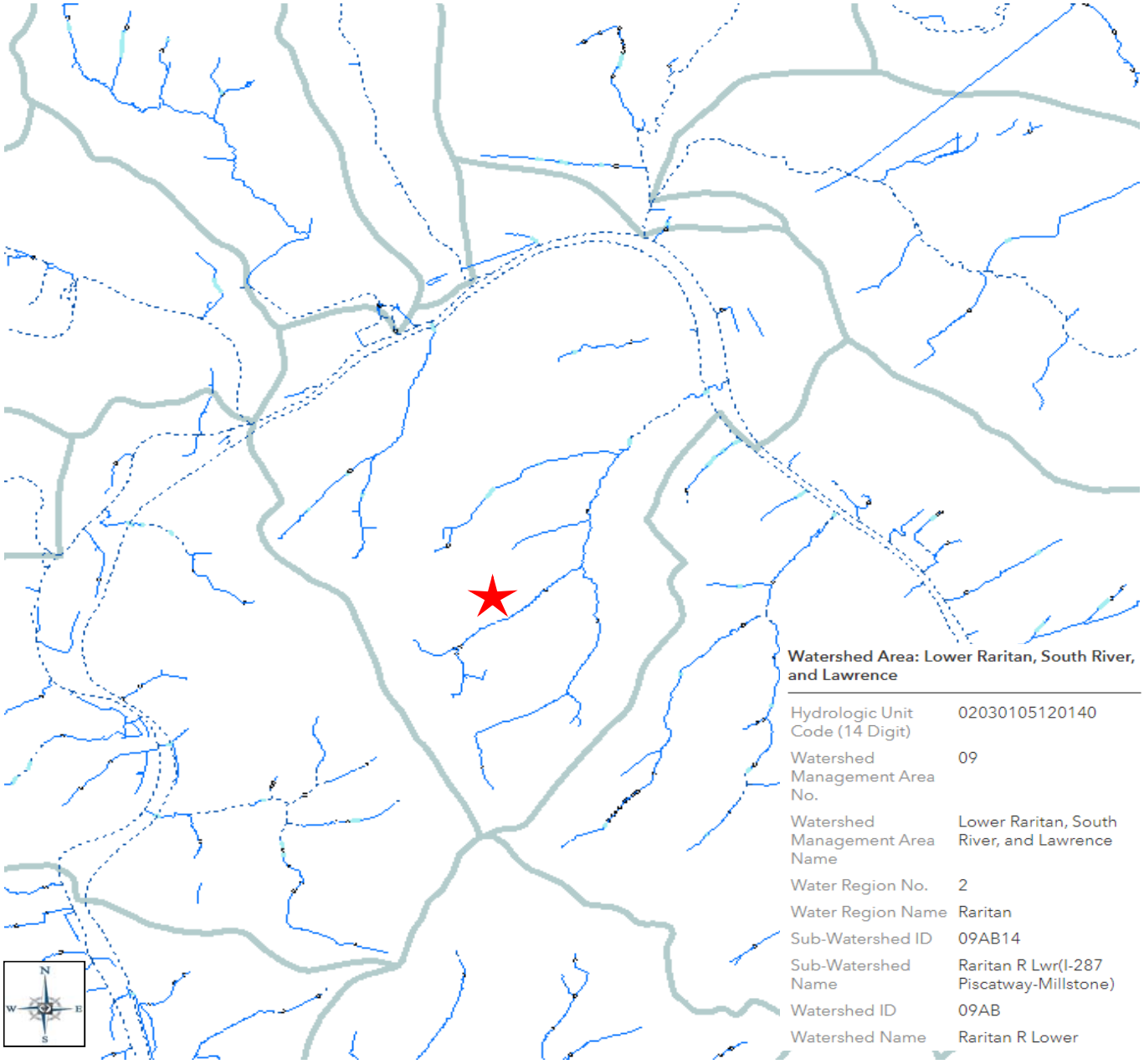


USGS Map
479,828-ft. E; 619,071-ft. N
Bound Brook Quadrangle

Source: USGS, 2019

Date Access: 05/17/2021

SafStor Real Estate CO, LLC	
471 Elizabeth Avenue **Block 507.14; Lot 65.01**	**Township of Franklin, Somerset County, New Jersey**
BENJ# J200933	
Prepared by: CR	Date: 4/13/2021
Checked by: KM	Scale: NTS



HUC-14 Sub-Watershed Map

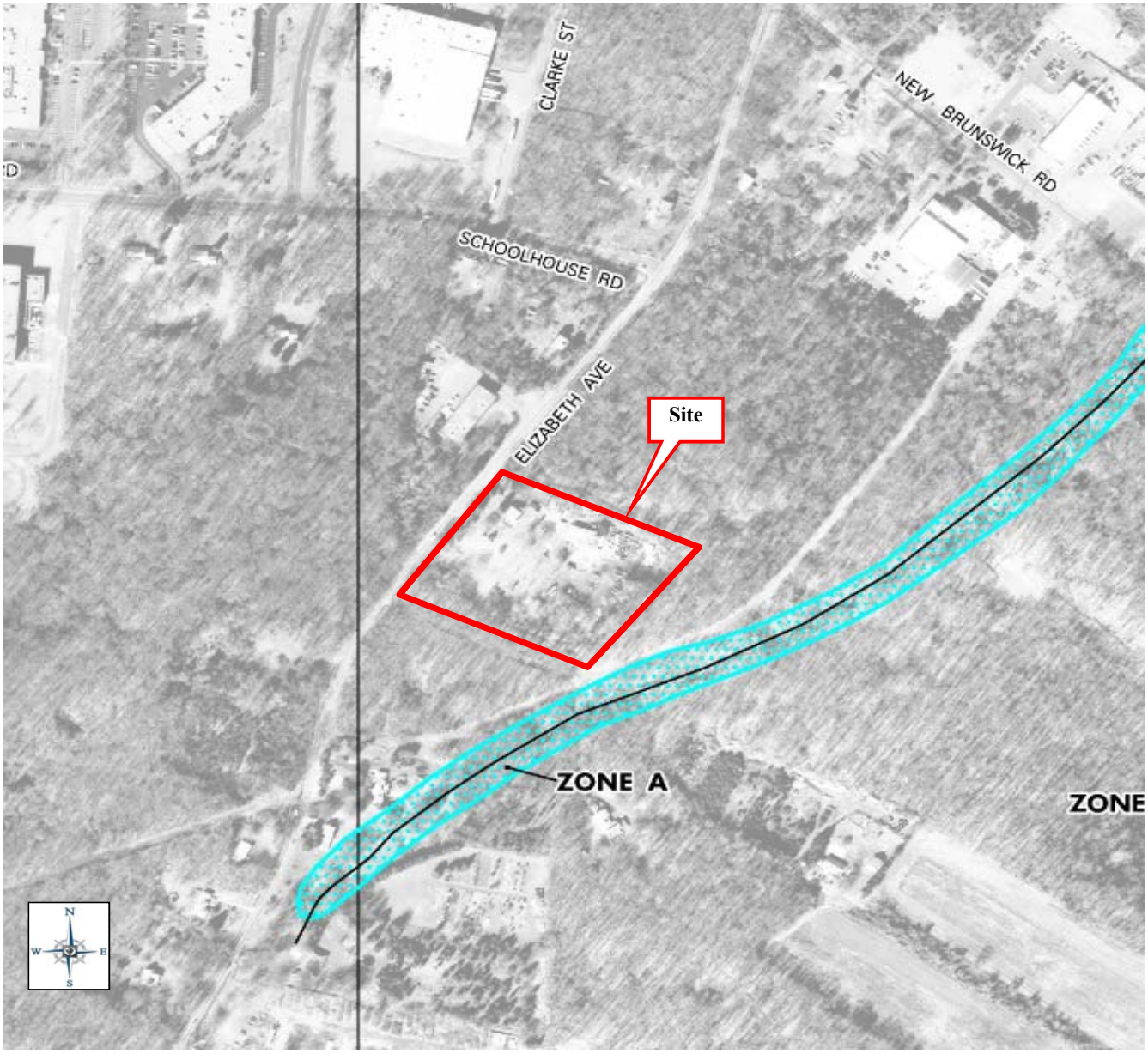
Source: NJ GeoWeb

Date Access: 05/17/2021

SafStor Real Estate CO, LLC

471 Elizabeth Avenue **Block 507.14; Lot 65.01**	**Township of Franklin, Somerset County, New Jersey**
BENJ# J200933	
Prepared by: CR	Date: 4/13/2021
Checked by: KM	Scale: NTS

BOHLER



FEMA Flood Map

Source:FEMA FIRM Map #34023C0043F, Date July 6, 2010

Date Access: 05/17/2021

SafStor Real Estate CO, LLC

471 Elizabeth Avenue **Block 507.14; Lot 65.01**	**Township of Franklin, Somerset County, New Jersey**
BENJ# J200933	
Prepared by: CR — Date: 4/13/2021	BOHLER
Checked by: KM — Scale: NTS	