



Stormwater Management Report

For

174 Church Street, LLC

Lots 4-10 & 13, Block 85
Borough of Keyport
Monmouth County, NJ

November 30, 2021
Revised August 15, 2022

Project #20152

Prepared by:

A handwritten signature in black ink, appearing to read 'W. Hopkin', with a long horizontal stroke extending to the right. The signature is positioned over a faint, circular professional engineer's seal.

Walter Joseph Hopkin
New Jersey Professional Engineer
License Number 40673

257 MONMOUTH ROAD, BLDG. A, STE. 7 • OAKHURST, NJ 07755
PHONE: 732-223-1313 • WJHENGINEERING.COM

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I. INTRODUCTION

The subject property is located on the north side of Hurley Street between Church Street and Osborn Street in the Borough of Keyport, Monmouth County, New Jersey. The parcel, Block 85, Lots 4-10 & 13, consists of approximately 1.07 acres. The parcel currently is occupied with a one-story framed dwelling along Church Street, a two-story framed dwelling on the western corner of Church Street and Hurley Street, and a one-story commercial masonry building on the corner of Hurley Street and Osborn Street. Each existing dwelling has an access driveway and typical building appurtenances. In addition, a paved parking/access area exists on the south side and frontage of the commercial building. The northwestern portion of the site is wooded. Currently, the northern end of Osborn Street is not improved.

The applicant proposes to develop the site with the construction of six (6) duplex buildings, two (2) single-family dwellings, associated access driveways, utility connections, lighting and landscaping improvements, and stormwater management facilities. Additionally, the north end of Osborn Street is proposed to be improved to provide access to the proposed duplex units fronting that portion of Osborn Street. The existing dwelling located on the western corner of Church Street and Hurley Street is proposed to remain. The project proposes an increase of 19,950 sf of impervious surfaces, in which 2,396 sf is the increase of motor vehicle surfaces.

This report is prepared in accordance with the Borough of Keyport Ordinance, New Jersey Department of Environmental Protection (NJDEP) regulations, and current industry standards and practices for stormwater management. The purpose of this report is to summarize the stormwater management design as it pertains to the stormwater rules and to provide calculations to support the design. The stormwater management measures proposed for the site have been designed to meet the standards as set forth by N.J.A.C 7:8 (stormwater runoff quantity, quality, and groundwater recharge) and the standards

as enforced by the Freehold Soil Conservation District (soil erosion and sediment control).

This report was revised to include a drainage pipe system in Hurley Street, and connecting to the existing drainage system in Church Street, add yard inlets and pipe to connect the infiltration/detention basins located on the rear of proposed Lot 10.01, addition of and infiltration/detention basin on proposed Lot 10.01 along Hurley Street, including outlet control structures and discharge pipe into the proposed drainage pipe in Hurley Street.

II. SOILS CHARACTERISTICS

The existing soil classifications for the site are based on the USDA NRCS Web Soil Survey. The survey is useful at the planning level to draw general conclusions about the suitability of a site for certain land uses. Based on the web site data, the site consists of the following soil types:

Urban Land-Klej Complex, 0 to 2 percent slopes - The Urban Land-Klej series consists of somewhat poorly drained sandy fluviomarine deposits. The Urban Land-Klej series is a hydrologic soil group "A/D."

For the purposes of this report, to be conservative, the entire site was considered "A" soils.

Soil logs were performed within the site area to confirm the on-site soils, soils permeability, and estimate seasonal highwater table. A copy of the soil logs and performed permeability tests are located in the Appendix.

III. PRE-DEVELOPED DRAINAGE CONDITIONS

Currently, the parcel consists of a one-story framed dwelling along Church Street, a two-story framed dwelling on the corner of Church Street and Hurley Street, and a one-story commercial masonry building on the corner of Hurley Street

and Osborn Street. There are access driveways and appurtenances on the existing dwelling and a parking area and access driveway on the commercial building. The northwestern corner of the site is wooded area.

Based on the existing topography of the site, the eastern portion of the site drains eastwards towards Church Street into the existing drainage system in Church Street. The western most portion of the site drains southwards towards Hurley Street. Hurley Street drains overland into an existing drainage inlet located at the corner of Church Street and Hurley Street, part of the Church Street drainage system.

As a result, one (1) drainage area and, subsequently, one (1) point of comparison for stormwater management analysis is created.

The Drainage Areas #1 and #1A are comprised of the on-site and off-site areas that drains towards the existing Church Street drainage system.

Calculations, performed for the 2-, 10-, 25-, and 100-year storm events, are included in the appendix of this report and summarized below.

Pre-Development Analysis to POA #1

Storm Event	Pre-DA #1 Peak Discharge (cfs)	Pre-DA #1A Peak Discharge (cfs)
2-Yr	0.30	0.39
10-Yr	0.47	0.61
25-Yr	0.59	0.77
100-Yr	0.84	1.30

IV. POST-DEVELOPED DRAINAGE CONDITIONS

The project consists of the construction of six (6) duplex buildings, two (2) single-family dwellings, associated access driveways, utility connections, light and landscaping improvements, and stormwater management facilities. Additionally,

the northern end of Osborn Street is proposed to be improved to provide access to the duplex units fronting that portion of Osborn Street. The stormwater management system consists of five (5) underground infiltration/detention basins. The stormwater runoff generated from the majority of the redeveloped site will be directed into the underground basins. The infiltration/detention basins B, C, D, and E are designed to store and infiltrate the entire runoff volume generated by the 100-year storm event by the area directed into them. The infiltration/detention basin A is designed to store and manage the increase of stormwater runoff generated by the proposed driveways and front yards on Osborn Street. The infiltration/detention basins within the duplexes lot are proposed to overflow into the proposed drainage system in Hurley Street, that ultimately discharges into the existing drainage system in Church Street. Stormwater runoff generated by Osborn Street and by the driveways and front yards of the single-family homes fronting Church Street will continue to flow overland towards Hurley Street and Church Street drainage system.

Calculations, performed for the 2, 10, 25, and 100-year storm events, are included in the appendix of this report and summarized below.

Post-Development Analysis to POA #1

Storm Event	Post-DA #1 Peak Discharge (cfs)
2-Yr	0.47
10-Yr	0.83
25-Yr	1.21
100-Yr	1.88

V. STORMWATER COMPLIANCE STATEMENT

This project is designed in accordance with N.J.A.C. 7:8. The proposed stormwater measures have been designed to meet the Borough of Keyport and

NJDEP Standards. Compliance in each of these areas is explained in detail in the remainder of this report and verified with calculations as appropriate in the Appendix.

VI. STORMWATER MANAGEMENT METHODOLOGY

In order to mitigate the increase in stormwater runoff from the redevelopment of the site, four (4) underground infiltration/detention basins and one (1) underground detention basin are proposed. This methodology is consistent with Best Management Practices for controlling both runoff rates and volumes to the points of analysis.

As required, this report takes a point-by-point comparative approach in determining the effect of stormwater runoff as a result of this redevelopment. After determining the stormwater runoff drainage areas, parameters and points of analysis, the direct calculation of peak stormwater runoff from the drainage areas under existing and proposed conditions can be calculated.

To quantitatively assess the existing and proposed stormwater runoff conveyed to the point of analysis, the Delmarva Hydrograph Method and the Hydraflow Hydrographs Extension for Autodesk Civil 3D were utilized. The hydrologic parameters are determined as required by the standard engineering practice using the worksheets enclosed within the Appendix of this report. These procedures are applicable in small watersheds, especially urbanizing watersheds, in the United States and are consistent with the current engineering standard of practice.

Storm events with return frequencies of 2-, 10-, 25-, and 100-years are included in the peak flow computations shown in the report appendix. The TR55 was utilized for determining the times of concentration (T_c) with a minimum T_c of 6 minutes.

To meet the Borough of Keyport and NJDEP standards, the stormwater management system must be designed so that the post-development peak runoff rate for the 2-year storm event is 50%, 10-year storm is 75% and 100-year storm is 80% of the pre-development peak runoff rate from the developed portion of the site.

VII. PRE- VS. POST-DEVELOPED DRAINAGE CONDITIONS

The intent of this report is to demonstrate that the required runoff reductions for the proposed site development have been achieved. The runoff from the site will be reduced by the proposed development through the use of infiltration/detention basins. In accordance with the NJAC 7:8-5.6(c) the stormwater runoff quantity standards shall be applied at the site's boundary to each abutting lot, roadway, watercourse, or receiving storm sewer system. As such, the project analysis is separated into two areas for the computations of required reductions. The on-site area DA #1A and the off-site Osborn Street DA #1. The required reductions have been applied to the on-site area DA #1A. The Osborn Street, including the proposed extension of the street improvements will meet the existing pre-development flows.

Allowable Flow to Point of Analysis POA #1

Storm Event	Pre-DA #1A Peak Discharge (cfs)	Required Reductions	Allowable (cfs)	Pre-DA #1 Peak Discharge (cfs)	Total Allowable to POA #1
2-Yr	0.39	50%	0.19	0.30	0.49
10-Yr	0.61	25%	0.46	0.47	0.93
25-Yr	0.77	-	-	0.59	-
100-Yr	1.30	20%	1.04	0.84	1.88

The allowed peak discharge is compared to the post-developed peak discharge below. As shown, runoff has been reduced for all the storm events and the required reductions for the development of the site are met.

Pre vs. Post-Developed Flow Comparison to POA #1

Storm Event	Allowable Post Development Peak Discharge (cfs)	Total Post Development Peak Discharge (cfs)
2-Yr	0.49	0.47
10-Yr	0.93	0.83
25-Yr	-	1.21
100-Yr	1.88	1.88

VIII. WATER QUALITY N.J.A.C.7:8-5.5

NJDEP regulations require that water quality treatment be provided for major developments that result in an increase of one-quarter acre or more of regulated motor vehicle surfaces. The project, as proposed, increases the motor vehicle surfaces in 2,396 sf or 0.055 acre and therefore, the development is exempt from water quality requirements.

IX. GROUNDWATER RECHARGE

The proposed development is located entirely within Planning Area 1 (Metropolitan Planning Area) and meets the requirements of Urban Redevelopment. Therefore, the project is exempt from groundwater recharge requirements.

Although not required, the installation of the four (4) underground infiltration/detention basins will enhance groundwater recharge throughout the site as the systems have been designed to store and infiltrate the stormwater runoff volume generated from all proposed rooftops and portions of yard areas for the 100-year storm event.

X. NON-STRUCTURAL STORMWATER MANAGEMENT STRATEGIES

Several non-structural and structural stormwater management strategies have been implemented into the design of the site to reduce the impacts of development on the surrounding environment and ecological system. The following list demonstrates some of the non-structural strategies employed into the site, which are in addition to the structural strategies previously explained:

- Stormwater runoff generated from all proposed rooftops are infiltrated through the infiltration/detention basins.
- Soil erosion and sediment control measures will be implemented throughout the site during construction activity.
- Impervious surfaces have been minimized by utilizing minimum roadway widths.
- Upon final grading, measures may be implemented to either till or scarify the top layer of soil to minimize soil compaction.
- Low maintenance landscaping will be implemented to encourage stormwater retention and minimize the use of lawns, fertilizers, and pesticides. In addition, a note outlining the requirements for fertilizer application, as outlined in the State's Standard for Permanent Vegetative Cover for Soil Stabilization, is included to the Soils Erosion Control Specifications.
- Preventative source controls at inlets and outlet structure help to contain floatable debris and promote public awareness.
- Grassed swales are utilized to the maximum extent practical to convey stormwater.

XI. SOIL EROSION AND SEDIMENT CONTROL

In accordance with the Soil Erosion and Sediment Control Act, soil erosion measures were incorporated into the design and graphically depicted on the Soil

Erosion and Sediment Control Plans. These measures include, but are not limited to:

- Sediment Barriers and Silt Fences
- Stabilized Construction Access
- Topsoil Stockpiles
- Storm Sewer Inlet Protection

The Standards for Soil Erosion and Sediment Control require that the Point of Discharge Stability Analysis be performed as a failure analysis. The ‘failure’ hydrograph analysis shows no increase in the pre-developed runoff rate as proposed.

Failure Analysis calculations, performed for 2, 10, and 25-year storm events, are included in the appendix of this report and summarized below.

Point of Analysis 1 (POA #1) SW Discharge:

Storm Event	Existing Discharge to POA #1 (cfs)	Post Developed Discharge to POA#1 (cfs)	Flow Reduction
2-Yr	0.69	0.64	-7.2%
10-Yr	1.08	0.99	-8.3%
25-Yr	1.36	1.26	-7.4%

XII. CONCLUSION

The tables provided earlier in this report show a comparison of existing and developed conditions. These comparisons show that the required reductions will be met. The proposed development will lead to an increase in stormwater runoff volume due to the addition of impervious surfaces from the development of the site. The proposed stormwater management facilities will limit the post-development runoff discharge rates to less than peak pre-development rates.

Although not required, groundwater recharge is promoted with the installation of five (5) infiltration/detention basins as described above.

Since all requirements of the Borough of Keyport and N.J.A.C. 7:8 are met, no adverse stormwater runoff impacts to the site and to off-site areas are anticipated as a result of this development.

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A-1 – ROUTING DIAGRAM



Pre - DA #1 - Osborn Street



Pre - DA #1A - Project Site



Post DA #1A



Post - DA #1B



Post - DA #1C



Post - DA #1D



Inf./Detention Basin A



Inf./Detention Basin B



Inf./Detention Basin C



Inf./Detention Basins 'D'



Post - DA #1E



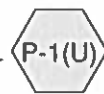
Inf./Detention Basins 'E'



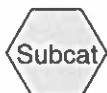
Post - DA#1 (Osborn St)



Post - Total



Post DA #1(Undetained)



Routing Diagram for 174 Church Street

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A-2 – PRE-DEVELOPED DRAINAGE CONDITIONS

174 Church Street

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment E-1: Pre - DA #1 - Osborn Street

Runoff = 0.30 cfs @ 12.17 hrs, Volume= 1,531 cf, Depth= 1.53"

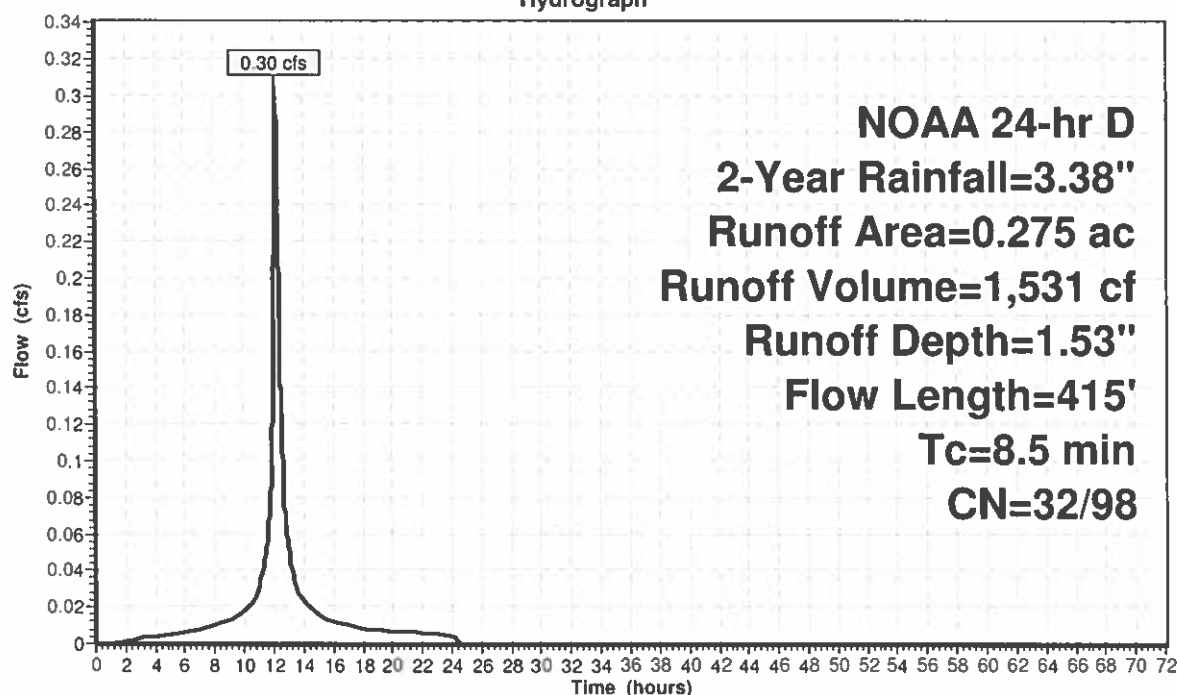
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
0.111	30	Woods, Good, HSG A
* 0.134	98	Pavement
0.275	64	Weighted Average
0.141	32	51.27% Pervious Area
0.134	98	48.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	30	0.0730	0.11		Sheet Flow, sheet flow woods Woods: Light underbrush n= 0.400 P2= 3.38"
1.1	5	0.0120	0.08		Sheet Flow, sheet flow grass Grass: Short n= 0.150 P2= 3.38"
2.6	380	0.0140	2.40		Shallow Concentrated Flow, shallow concent. paved Paved Kv= 20.3 fps
8.5	415	Total			

Subcatchment E-1: Pre - DA #1 - Osborn Street

Hydrograph



174 Church Street

Prepared by WJH Engineering

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment E-1: Pre - DA #1 - Osborn Street

Runoff = 0.47 cfs @ 12.17 hrs, Volume= 2,451 cf, Depth= 2.46"

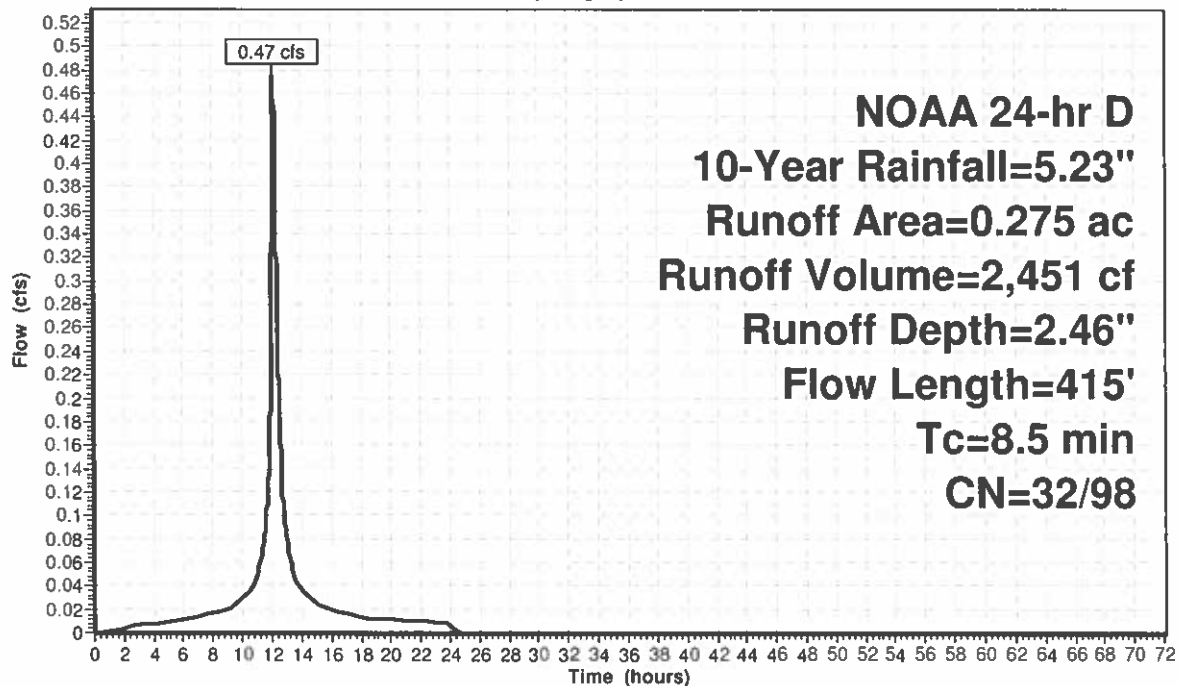
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
0.111	30	Woods, Good, HSG A
* 0.134	98	Pavement
0.275	64	Weighted Average
0.141	32	51.27% Pervious Area
0.134	98	48.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	30	0.0730	0.11		Sheet Flow, sheet flow woods Woods: Light underbrush n= 0.400 P2= 3.38"
1.1	5	0.0120	0.08		Sheet Flow, sheet flow grass Grass: Short n= 0.150 P2= 3.38"
2.6	380	0.0140	2.40		Shallow Concentrated Flow, shallow concent. paved Paved Kv= 20.3 fps
8.5	415	Total			

Subcatchment E-1: Pre - DA #1 - Osborn Street

Hydrograph



174 Church Street

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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment E-1: Pre - DA #1 - Osborn Street

Runoff = 0.59 cfs @ 12.17 hrs, Volume= 3,173 cf, Depth= 3.18"

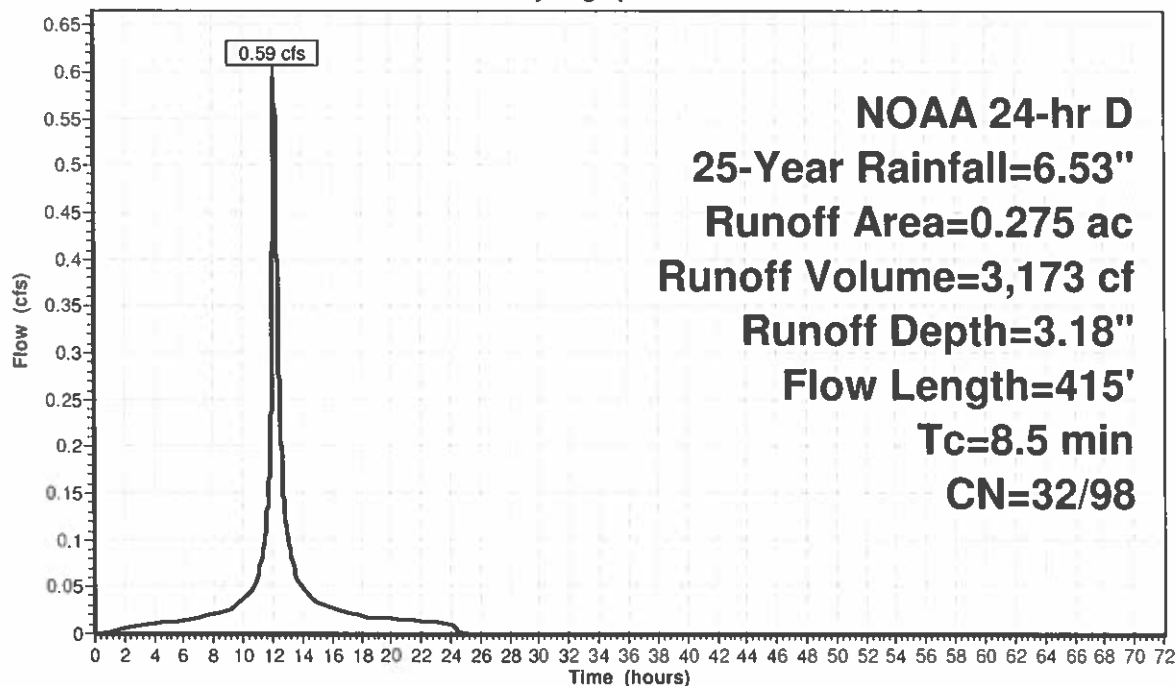
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
0.111	30	Woods, Good, HSG A
* 0.134	98	Pavement
0.275	64	Weighted Average
0.141	32	51.27% Pervious Area
0.134	98	48.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	30	0.0730	0.11		Sheet Flow, sheet flow woods Woods: Light underbrush n= 0.400 P2= 3.38"
1.1	5	0.0120	0.08		Sheet Flow, sheet flow grass Grass: Short n= 0.150 P2= 3.38"
2.6	380	0.0140	2.40		Shallow Concentrated Flow, shallow concent. paved Paved Kv= 20.3 fps
8.5	415	Total			

Subcatchment E-1: Pre - DA #1 - Osborn Street

Hydrograph



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NOAA 24-hr D 100-Year Rainfall=8.94"

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Summary for Subcatchment E-1: Pre - DA #1 - Osborn Street

Runoff = 0.84 cfs @ 12.17 hrs, Volume= 4,666 cf, Depth= 4.67"

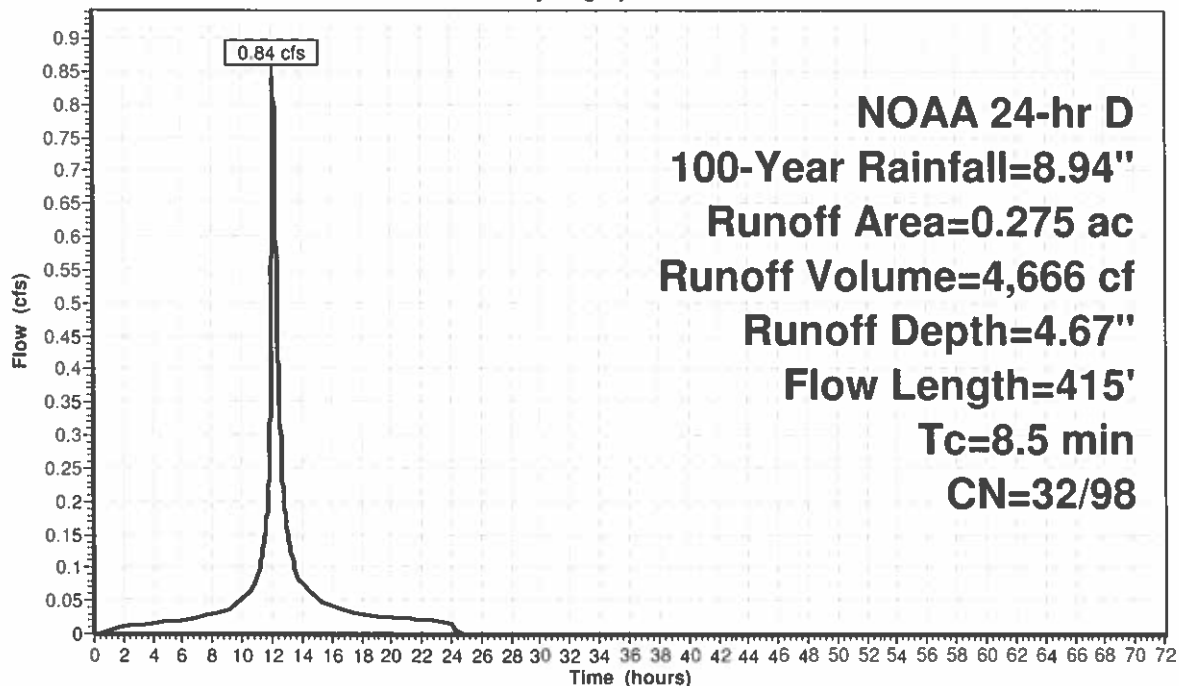
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
0.111	30	Woods, Good, HSG A
* 0.134	98	Pavement
0.275	64	Weighted Average
0.141	32	51.27% Pervious Area
0.134	98	48.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	30	0.0730	0.11		Sheet Flow, sheet flow woods Woods: Light underbrush n= 0.400 P2= 3.38"
1.1	5	0.0120	0.08		Sheet Flow, sheet flow grass Grass: Short n= 0.150 P2= 3.38"
2.6	380	0.0140	2.40		Shallow Concentrated Flow, shallow concent. paved Paved Kv= 20.3 fps
8.5	415	Total			

Subcatchment E-1: Pre - DA #1 - Osborn Street

Hydrograph



Summary for Subcatchment E-1A: Pre - DA #1A - Project Site

Runoff = 0.39 cfs @ 12.24 hrs, Volume= 2,525 cf, Depth= 0.74"

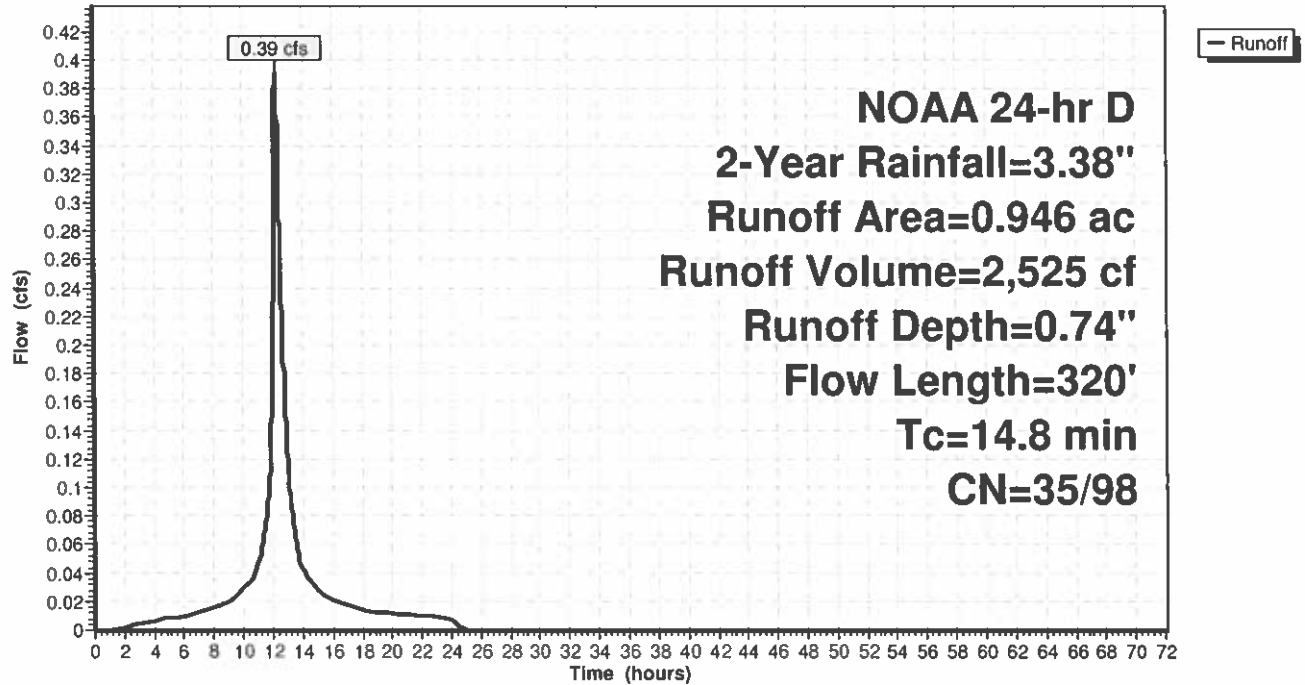
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.375	39	>75% Grass cover, Good, HSG A
0.350	30	Woods, Good, HSG A
* 0.113	98	Pavement, Conc.
* 0.108	98	Rooftop
0.946	49	Weighted Average
0.725	35	76.64% Pervious Area
0.221	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0260	0.08		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.38"
1.2	35	0.0090	0.47		Shallow Concentrated Flow, Shallow Conc. Flow Woodland Kv= 5.0 fps
1.8	105	0.0200	0.99		Shallow Concentrated Flow, Shallow Conc. Flow - Paved Short Grass Pasture Kv= 7.0 fps
1.0	130	0.0120	2.22		Shallow Concentrated Flow, Shallow concent. Paved Kv= 20.3 fps
14.8	320	Total			

Subcatchment E-1A: Pre - DA #1A - Project Site

Hydrograph



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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment E-1A: Pre - DA #1A - Project Site

Runoff = 0.61 cfs @ 12.24 hrs, Volume= 4,306 cf, Depth= 1.25"

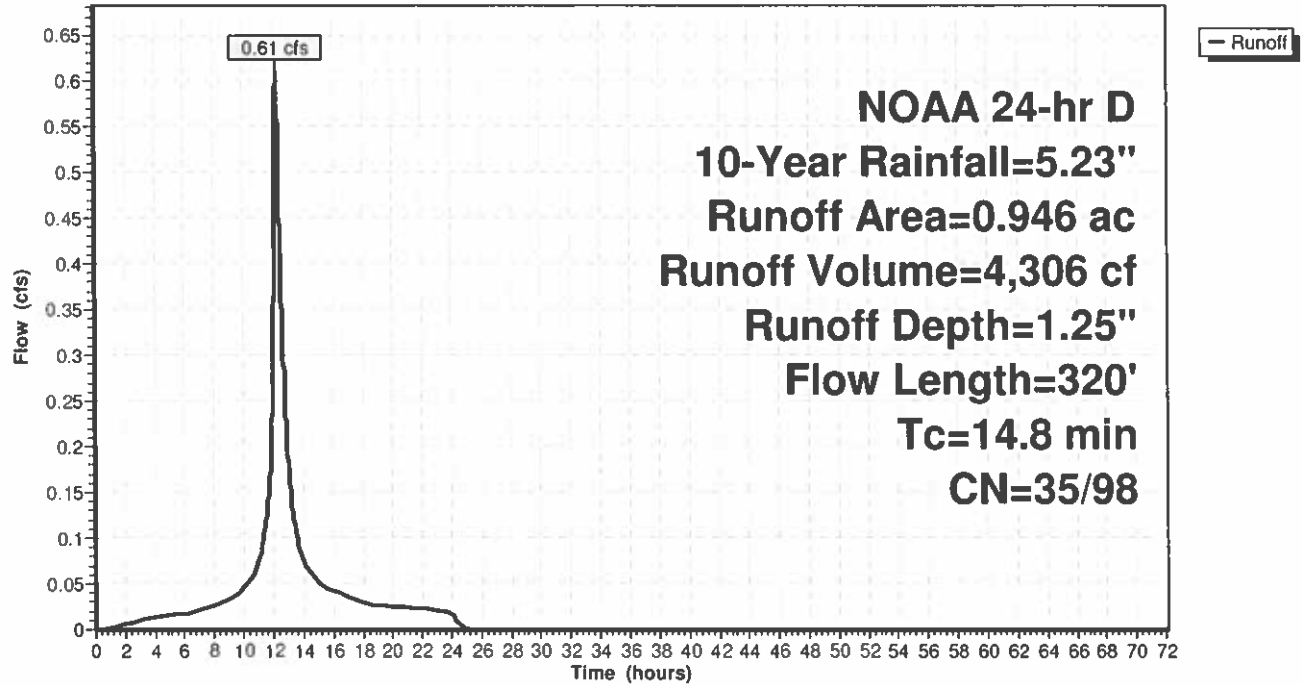
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.375	39	>75% Grass cover, Good, HSG A
0.350	30	Woods, Good, HSG A
* 0.113	98	Pavement, Conc.
* 0.108	98	Rooftop
0.946	49	Weighted Average
0.725	35	76.64% Pervious Area
0.221	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0260	0.08		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.38"
1.2	35	0.0090	0.47		Shallow Concentrated Flow, Shallow Conc. Flow Woodland Kv= 5.0 fps
1.8	105	0.0200	0.99		Shallow Concentrated Flow, Shallow Conc. Flow - Paved Short Grass Pasture Kv= 7.0 fps
1.0	130	0.0120	2.22		Shallow Concentrated Flow, Shallow concent. Paved Kv= 20.3 fps
14.8	320	Total			

Subcatchment E-1A: Pre - DA #1A - Project Site

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment E-1A: Pre - DA #1A - Project Site

Runoff = 0.77 cfs @ 12.24 hrs, Volume= 6,023 cf, Depth= 1.75"

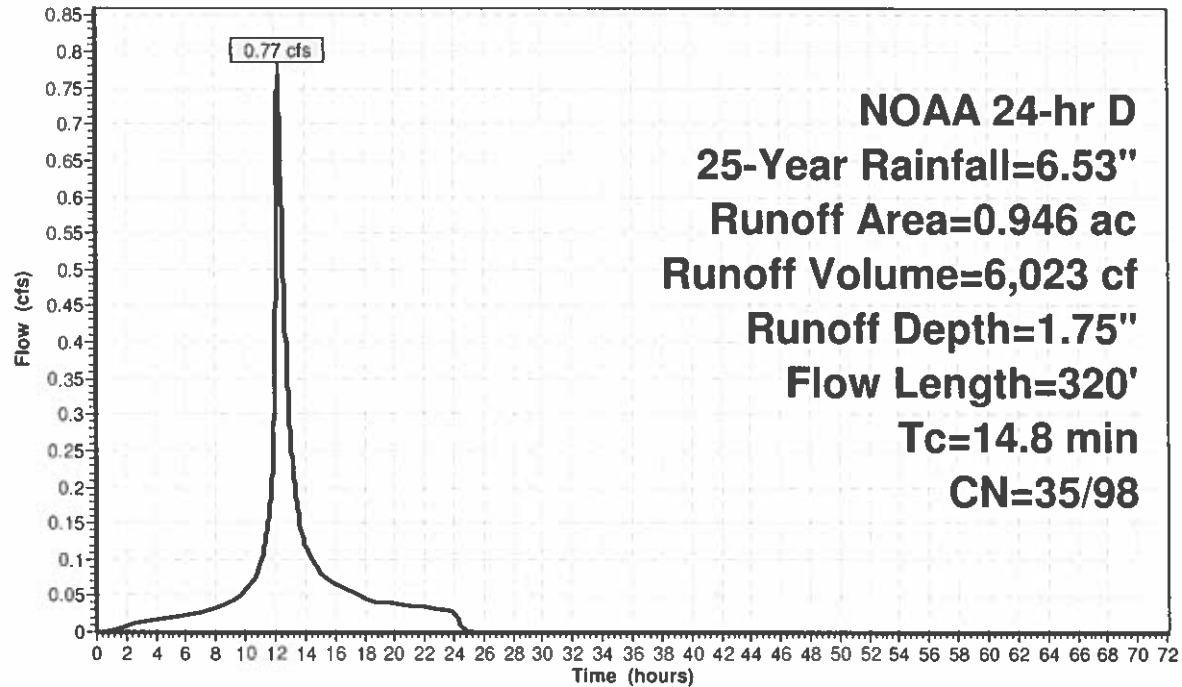
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.375	39	>75% Grass cover, Good, HSG A
0.350	30	Woods, Good, HSG A
* 0.113	98	Pavement, Conc.
* 0.108	98	Rooftop
0.946	49	Weighted Average
0.725	35	76.64% Pervious Area
0.221	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0260	0.08		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.38"
1.2	35	0.0090	0.47		Shallow Concentrated Flow, Shallow Conc. Flow Woodland Kv= 5.0 fps
1.8	105	0.0200	0.99		Shallow Concentrated Flow, Shallow Conc. Flow - Paved Short Grass Pasture Kv= 7.0 fps
1.0	130	0.0120	2.22		Shallow Concentrated Flow, Shallow concent. Paved Kv= 20.3 fps
14.8	320	Total			

Subcatchment E-1A: Pre - DA #1A - Project Site

Hydrograph



174 Church Street

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NOAA 24-hr D 100-Year Rainfall=8.94"

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Summary for Subcatchment E-1A: Pre - DA #1A - Project Site

Runoff = 1.30 cfs @ 12.27 hrs, Volume= 9,999 cf, Depth= 2.91"

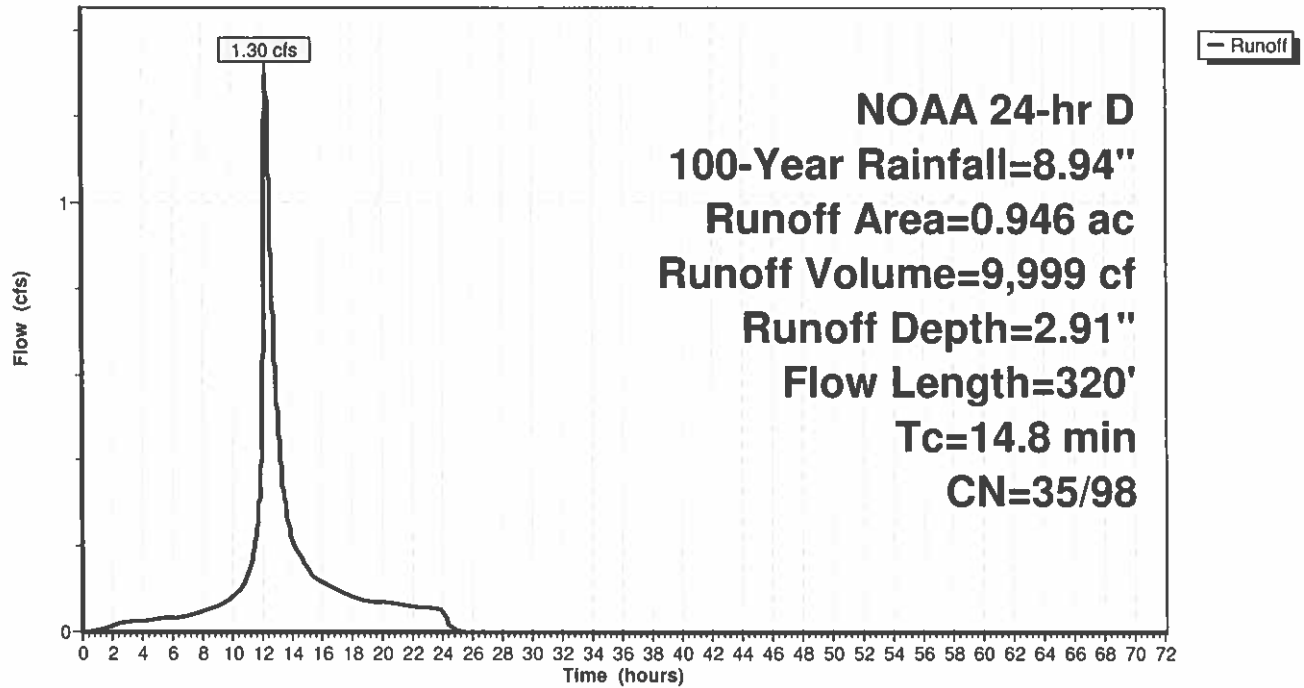
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.375	39	>75% Grass cover, Good, HSG A
0.350	30	Woods, Good, HSG A
* 0.113	98	Pavement, Conc.
* 0.108	98	Rooftop
0.946	49	Weighted Average
0.725	35	76.64% Pervious Area
0.221	98	23.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0260	0.08		Sheet Flow, Sheet Flow
					Woods: Light underbrush n= 0.400 P2= 3.38"
1.2	35	0.0090	0.47		Shallow Concentrated Flow, Shallow Conc. Flow
					Woodland Kv= 5.0 fps
1.8	105	0.0200	0.99		Shallow Concentrated Flow, Shallow Conc. Flow - Paved
					Short Grass Pasture Kv= 7.0 fps
1.0	130	0.0120	2.22		Shallow Concentrated Flow, Shallow concent.
					Paved Kv= 20.3 fps
14.8	320	Total			

Subcatchment E-1A: Pre - DA #1A - Project Site

Hydrograph



A-3 – POST-DEVELOPED DRAINAGE CONDITIONS

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 0.40 cfs @ 12.24 hrs, Volume= 2,537 cf, Depth= 2.64"
Routed to Link PT-1 : Post - Total

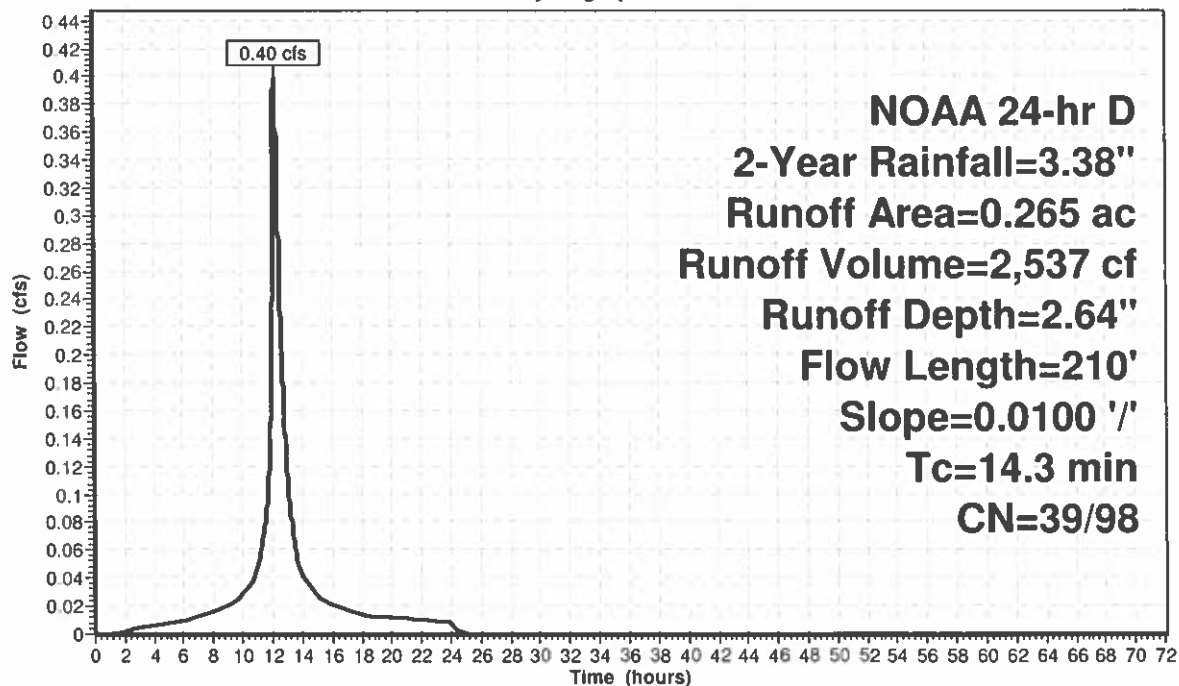
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concent. grass Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 0.62 cfs @ 12.24 hrs, Volume= 4,062 cf, Depth= 4.22"
 Routed to Link PT-1 : Post - Total

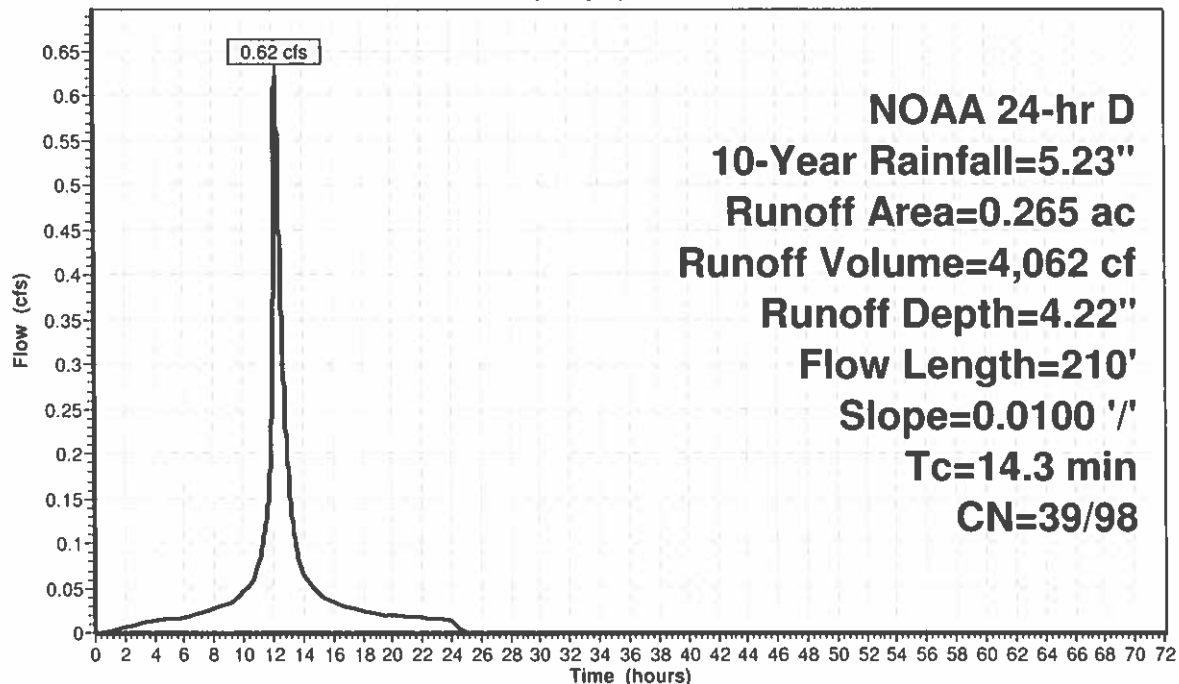
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concent. grass Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 0.78 cfs @ 12.24 hrs, Volume= 5,165 cf, Depth= 5.37"
 Routed to Link PT-1 : Post - Total

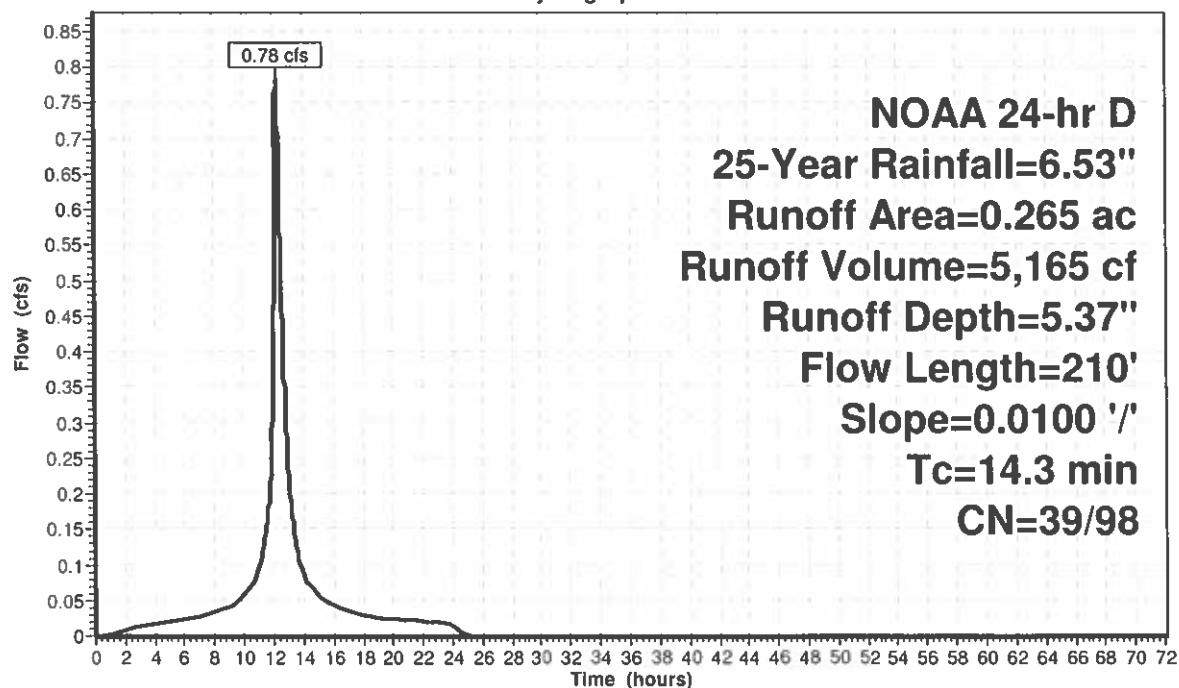
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concent. grass Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



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NOAA 24-hr D 100-Year Rainfall=8.94"

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Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 1.10 cfs @ 12.24 hrs, Volume= 7,256 cf, Depth= 7.54"

Routed to Link PT-1 : Post - Total

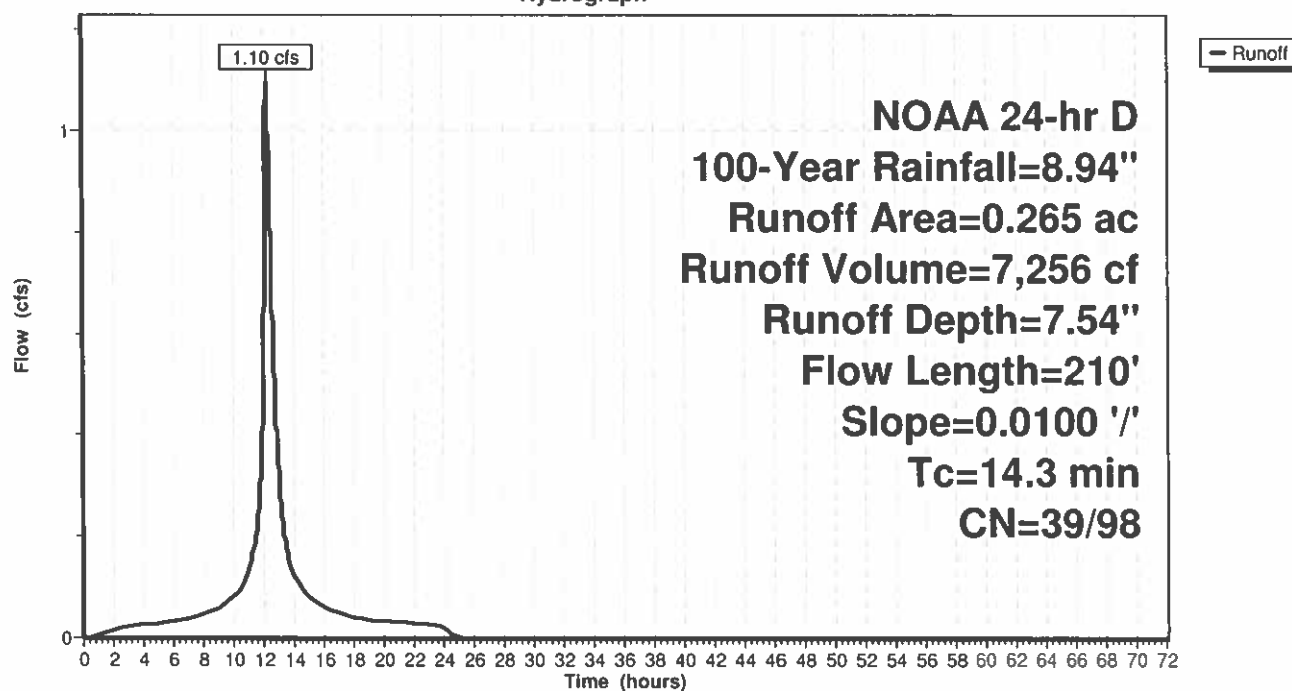
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass
					Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concent. grass
					Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.25 cfs @ 12.14 hrs, Volume= 1,099 cf, Depth= 1.18"
 Routed to Pond PB-A : Inf/Detention Basin A

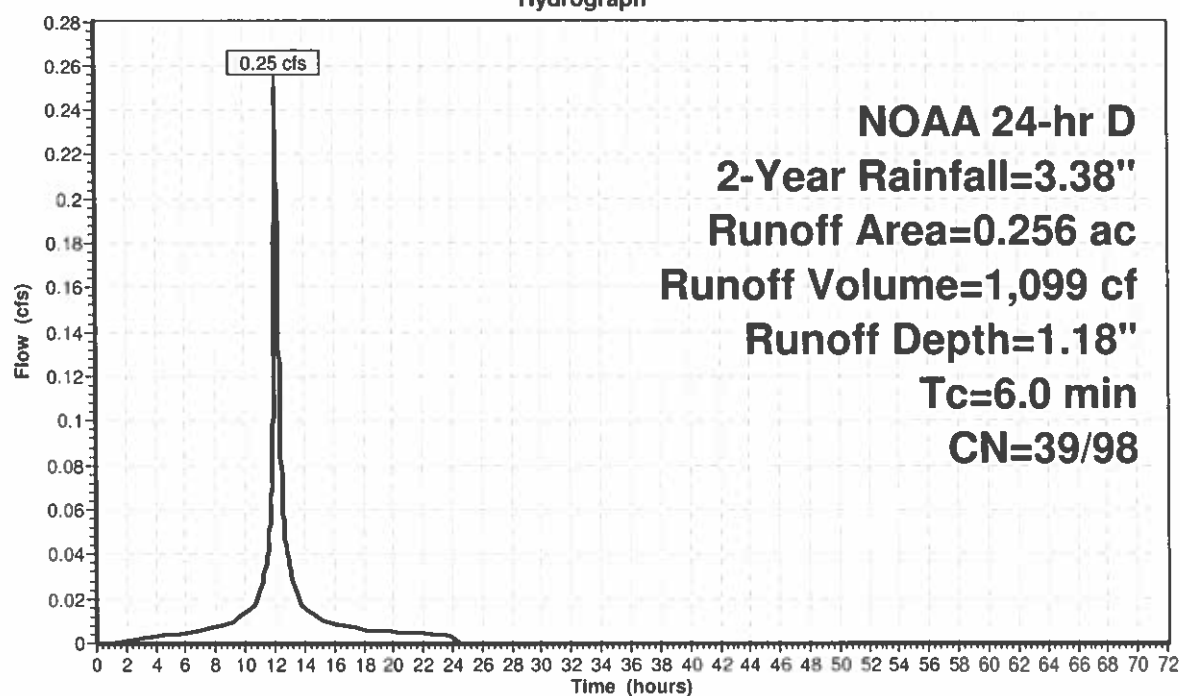
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A

Hydrograph



Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 1,885 cf, Depth= 2.03"
 Routed to Pond PB-A : Inf/Detention Basin A

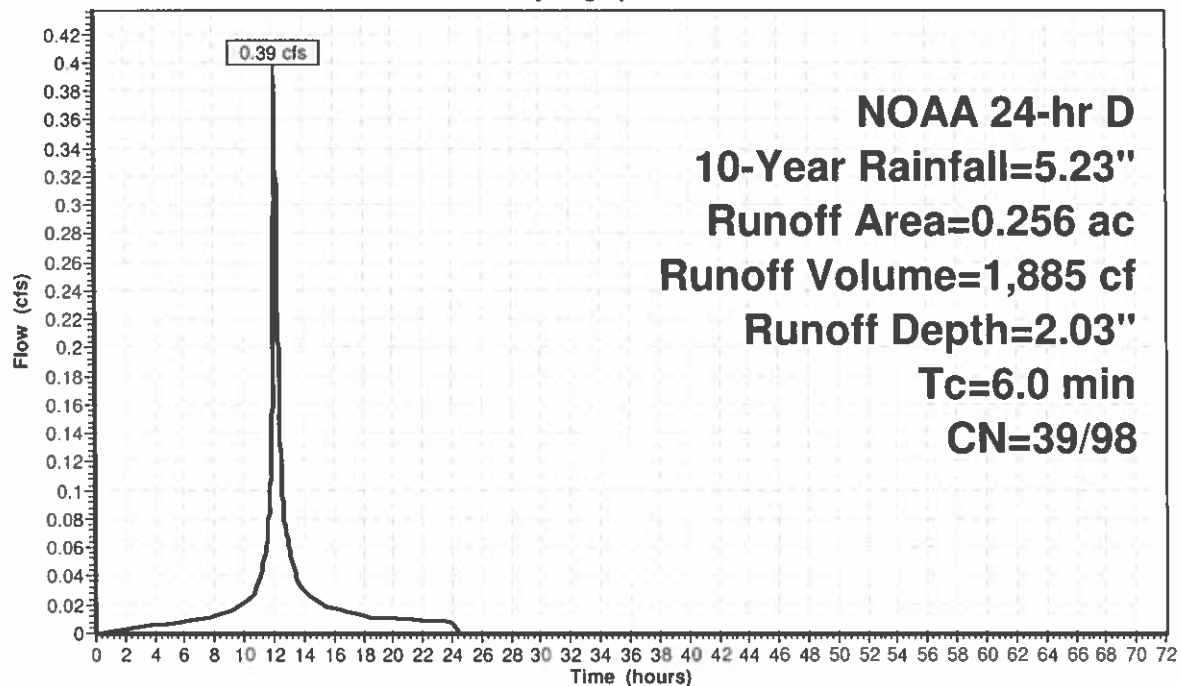
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.51 cfs @ 12.14 hrs, Volume= 2,545 cf, Depth= 2.74"
Routed to Pond PB-A : Inf/Detention Basin A

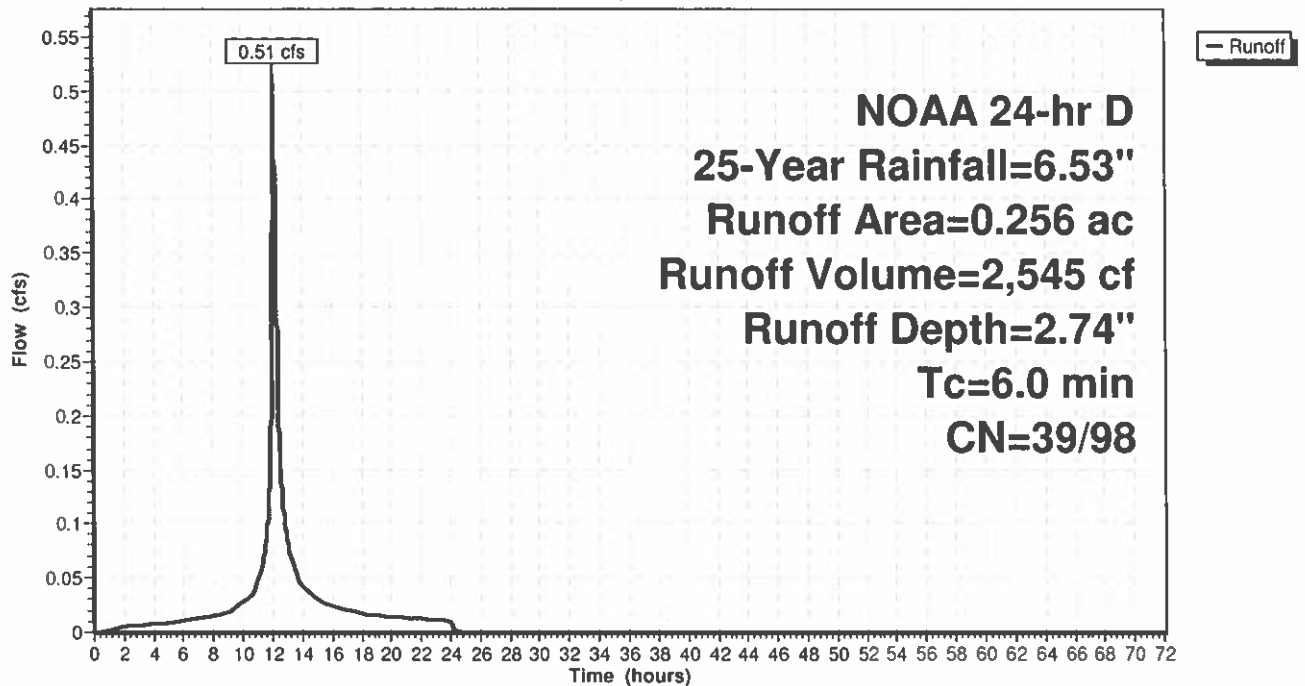
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A

Hydrograph



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NOAA 24-hr D 100-Year Rainfall=8.94"

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Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.84 cfs @ 12.14 hrs, Volume= 3,946 cf, Depth= 4.25"
Routed to Pond PB-A : Inf/Detention Basin A

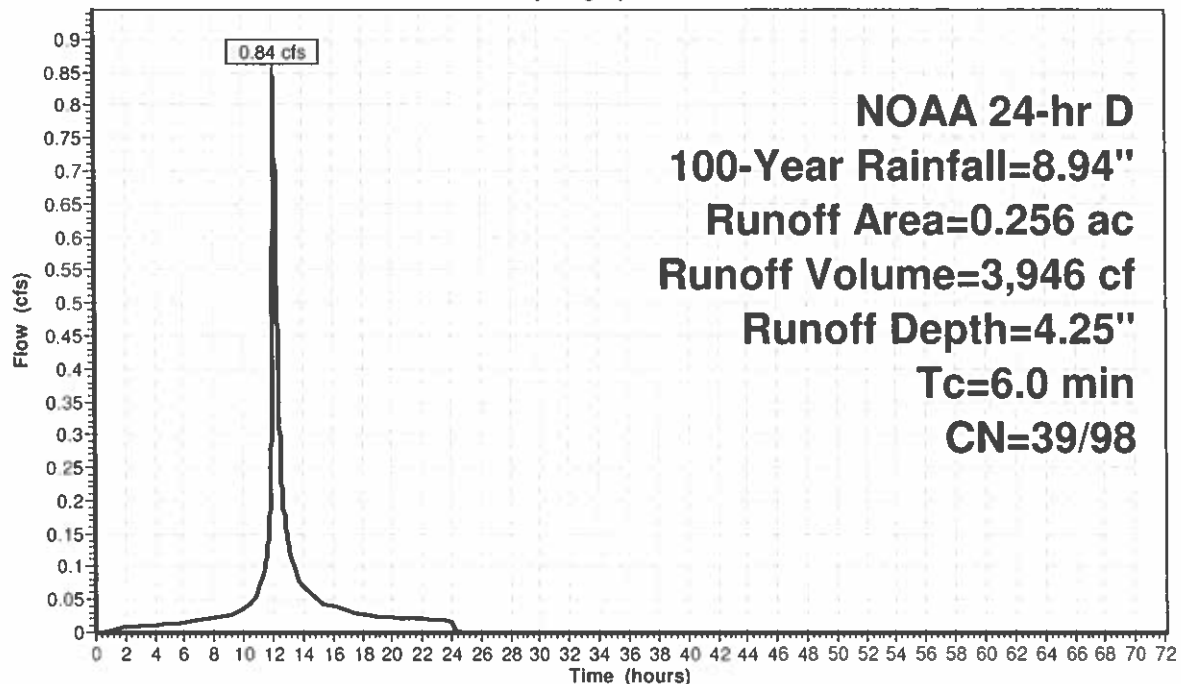
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A

Hydrograph



Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 400 cf, Depth= 1.70"
 Routed to Pond PB-B : Inf./Detention Basin B

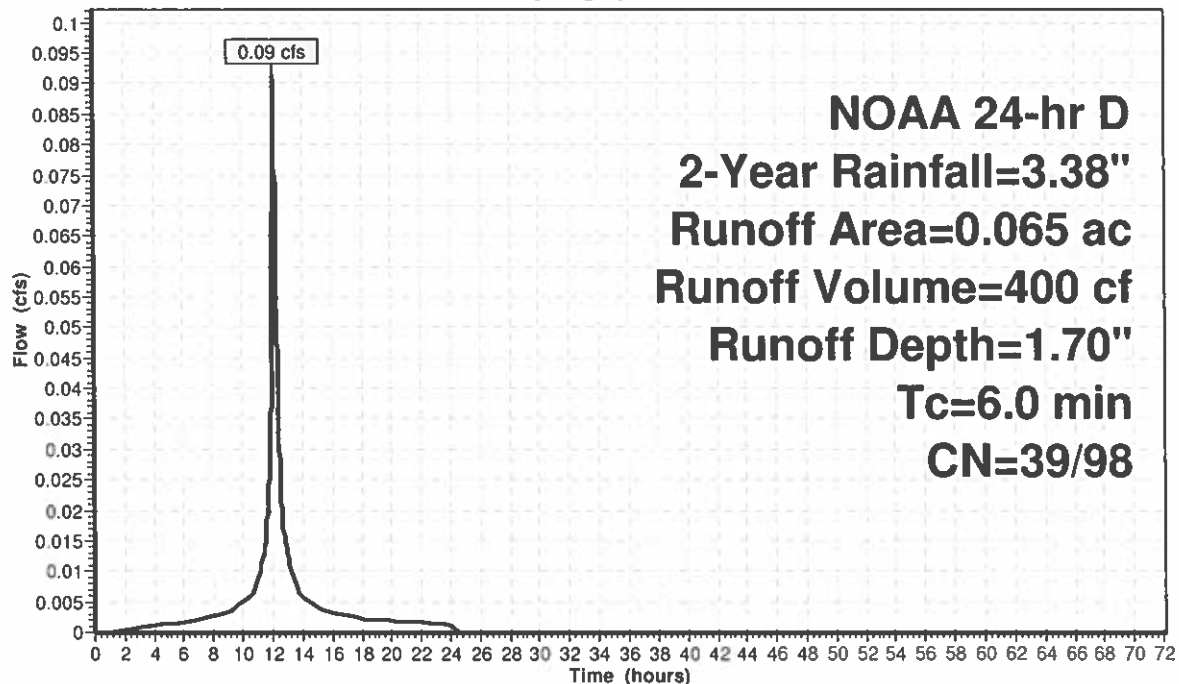
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 661 cf, Depth= 2.80"
Routed to Pond PB-B : Inf./Detention Basin B

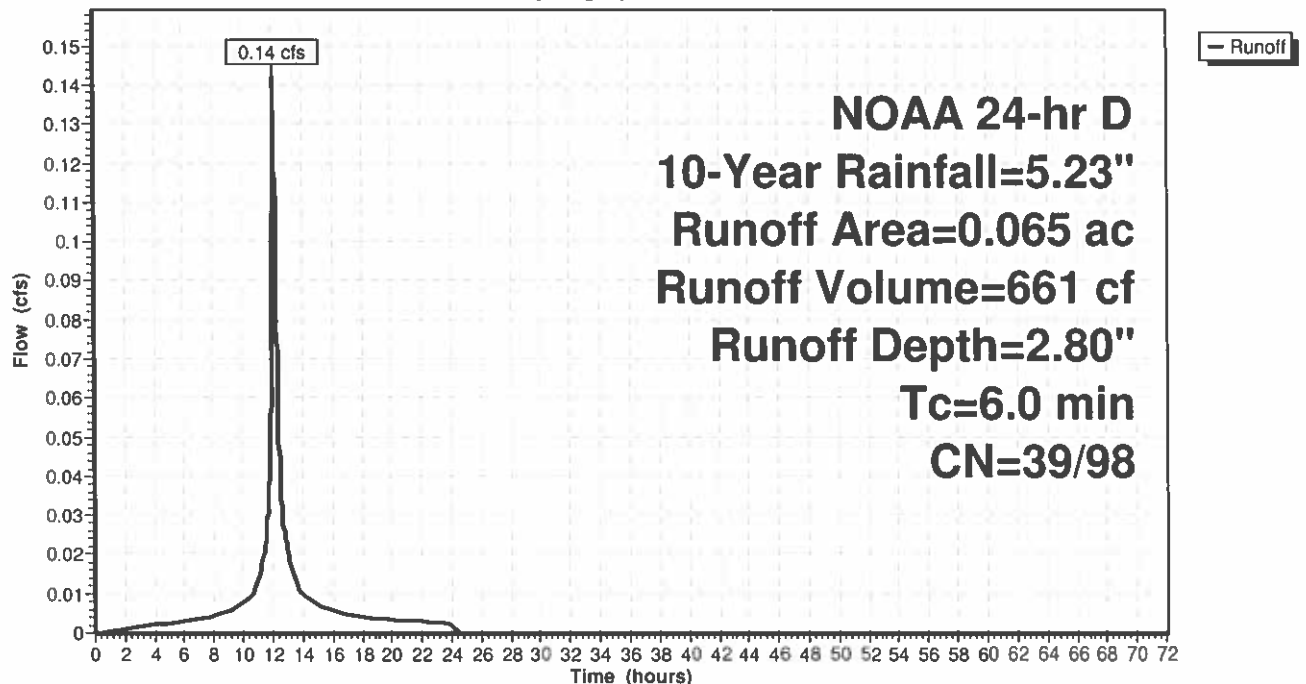
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 865 cf, Depth= 3.67"
Routed to Pond PB-B : Inf./Detention Basin B

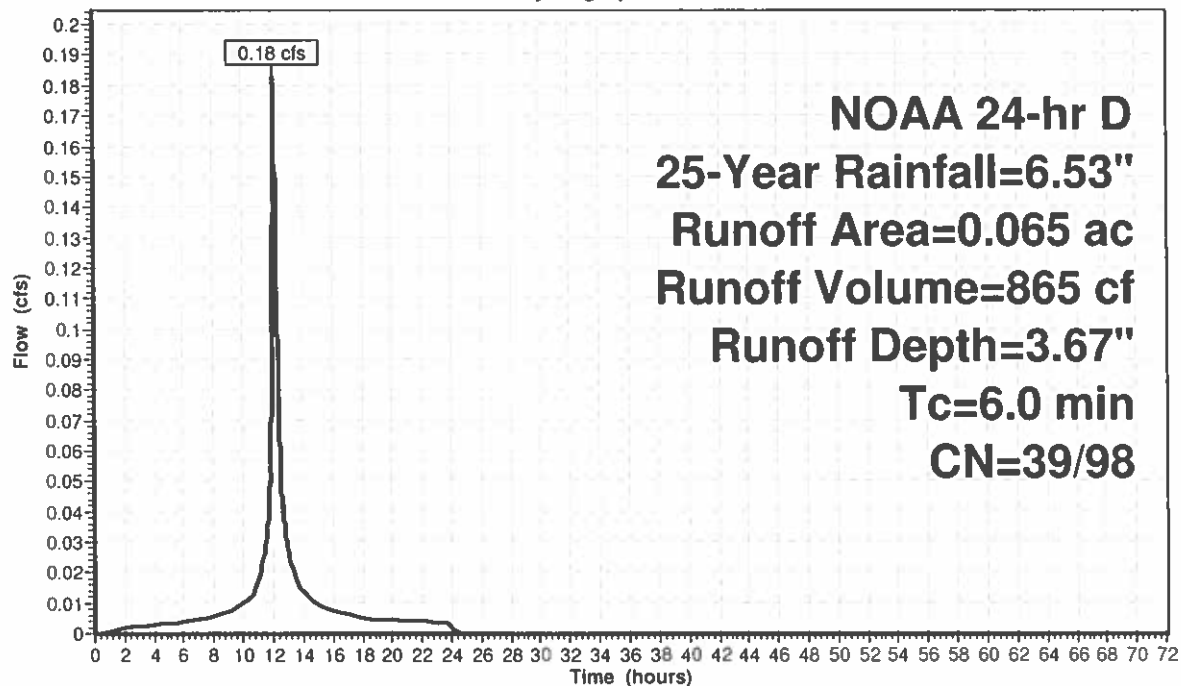
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



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NOAA 24-hr D 100-Year Rainfall=8.94"

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Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 1,277 cf, Depth= 5.41"
Routed to Pond PB-B : Inf./Detention Basin B

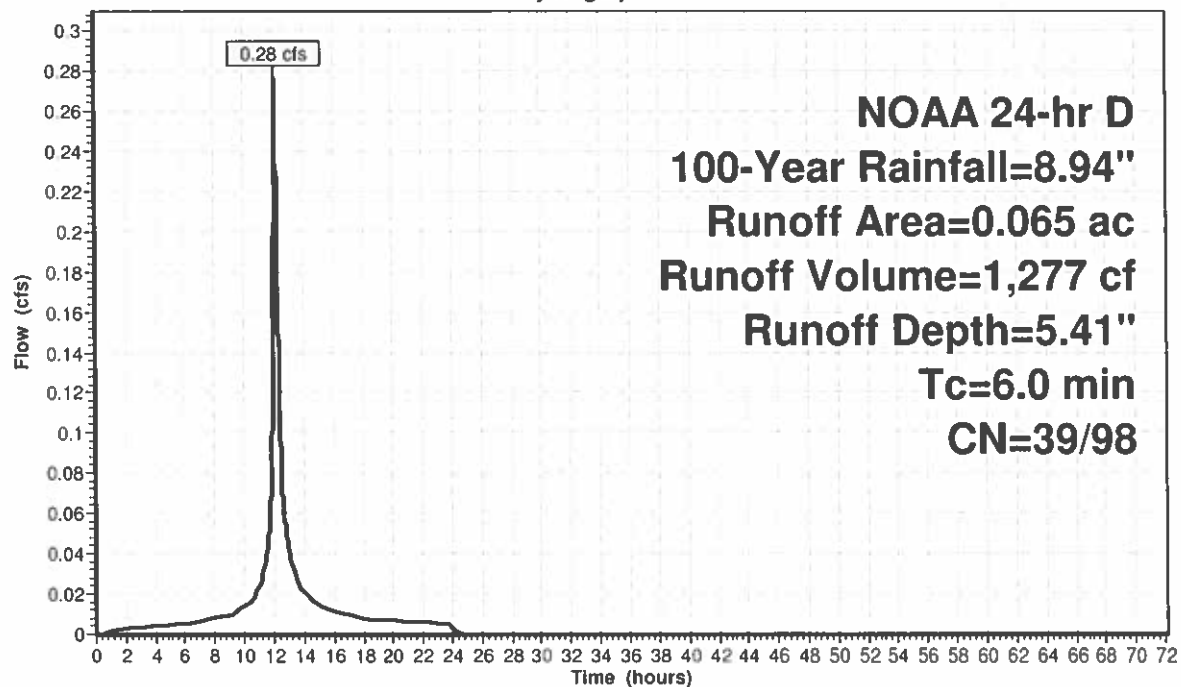
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 400 cf, Depth= 1.75"
Routed to Pond PB-C : Inf./Detention Basin C

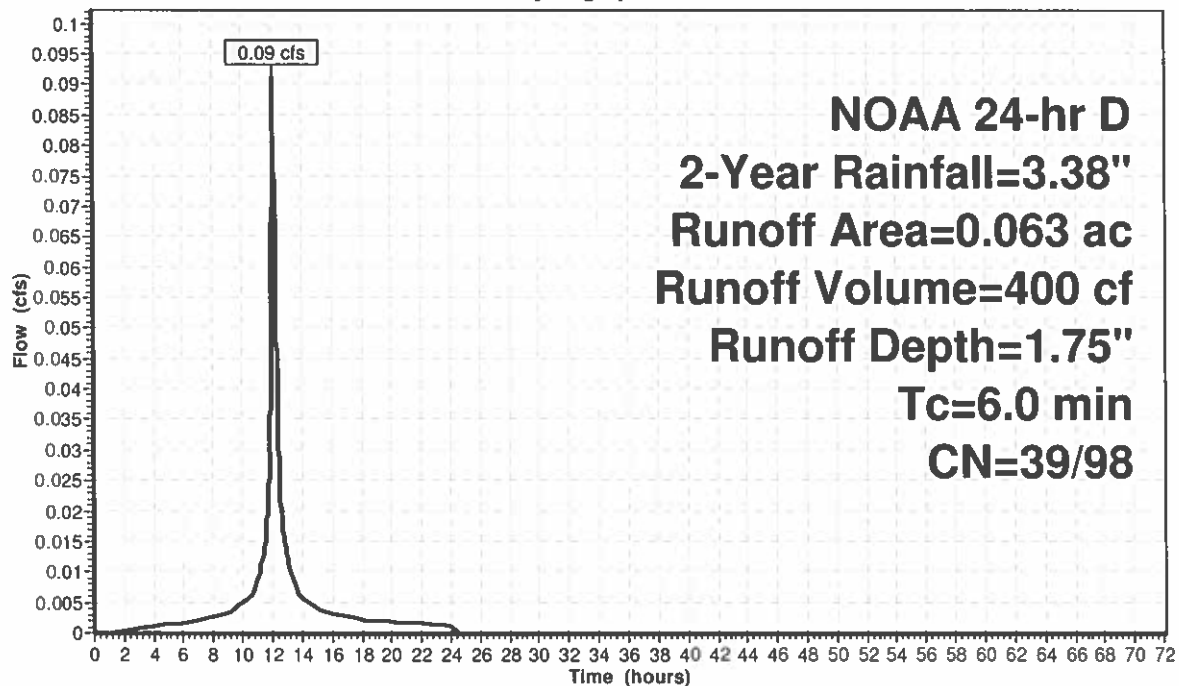
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 660 cf, Depth= 2.88"
 Routed to Pond PB-C : Inf./Detention Basin C

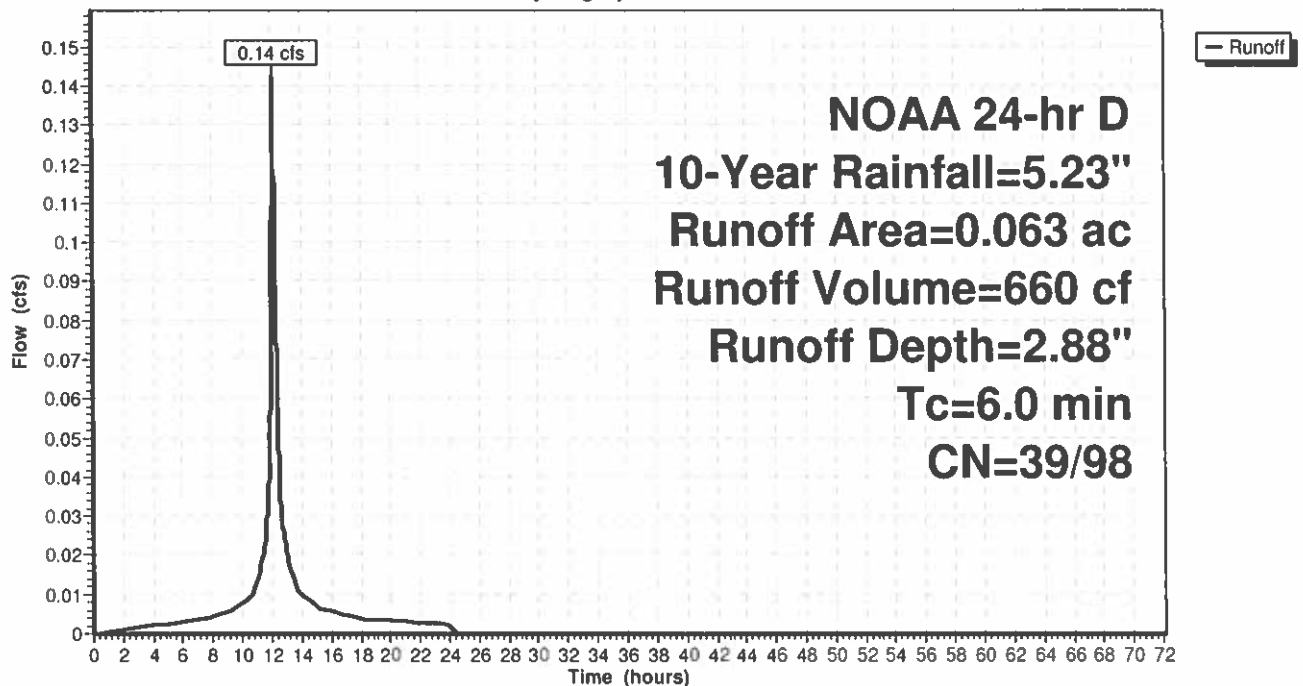
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 861 cf, Depth= 3.77"
 Routed to Pond PB-C : Inf./Detention Basin C

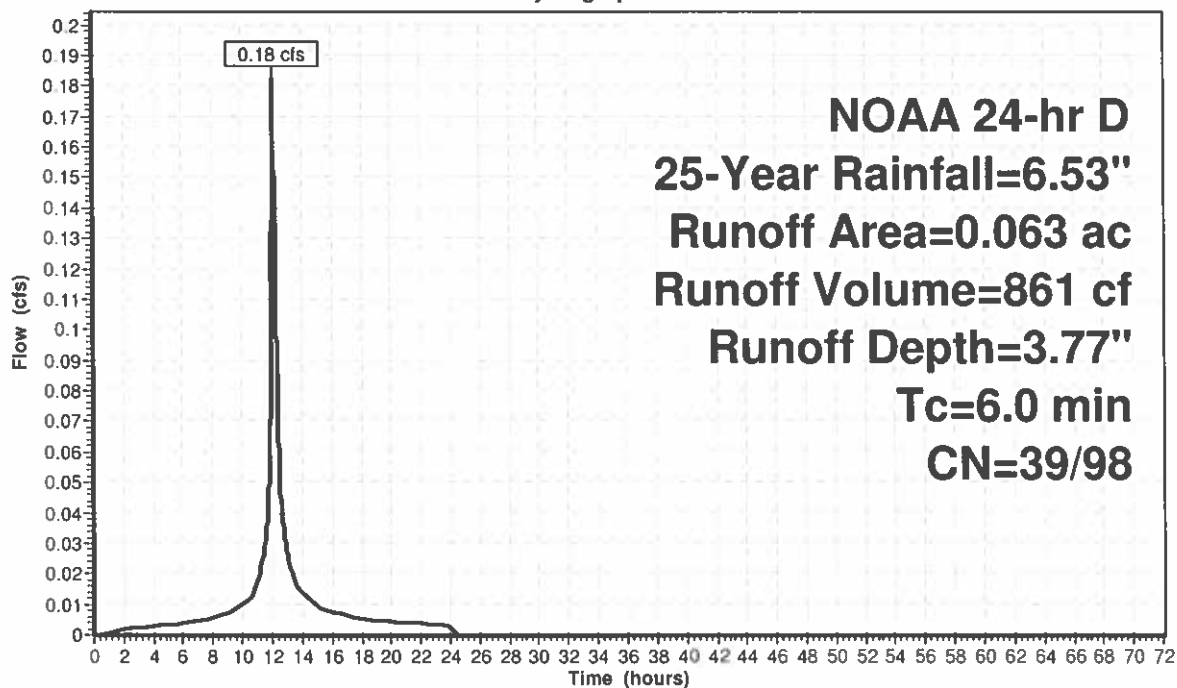
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 1,265 cf, Depth= 5.53"
 Routed to Pond PB-C : Inf./Detention Basin C

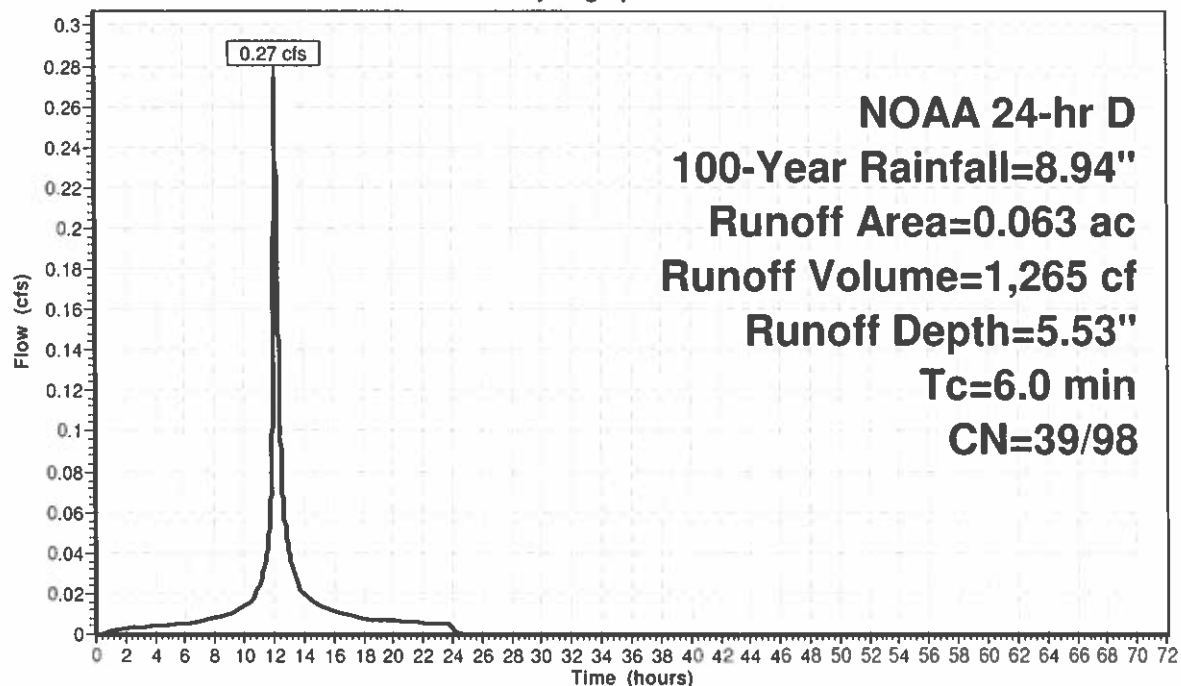
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



Summary for Subcatchment P-1D: Post - DA #1D

Runoff = 0.22 cfs @ 12.14 hrs, Volume= 949 cf, Depth= 2.06"
 Routed to Pond PB-D : Inf./Detention Basins 'D'

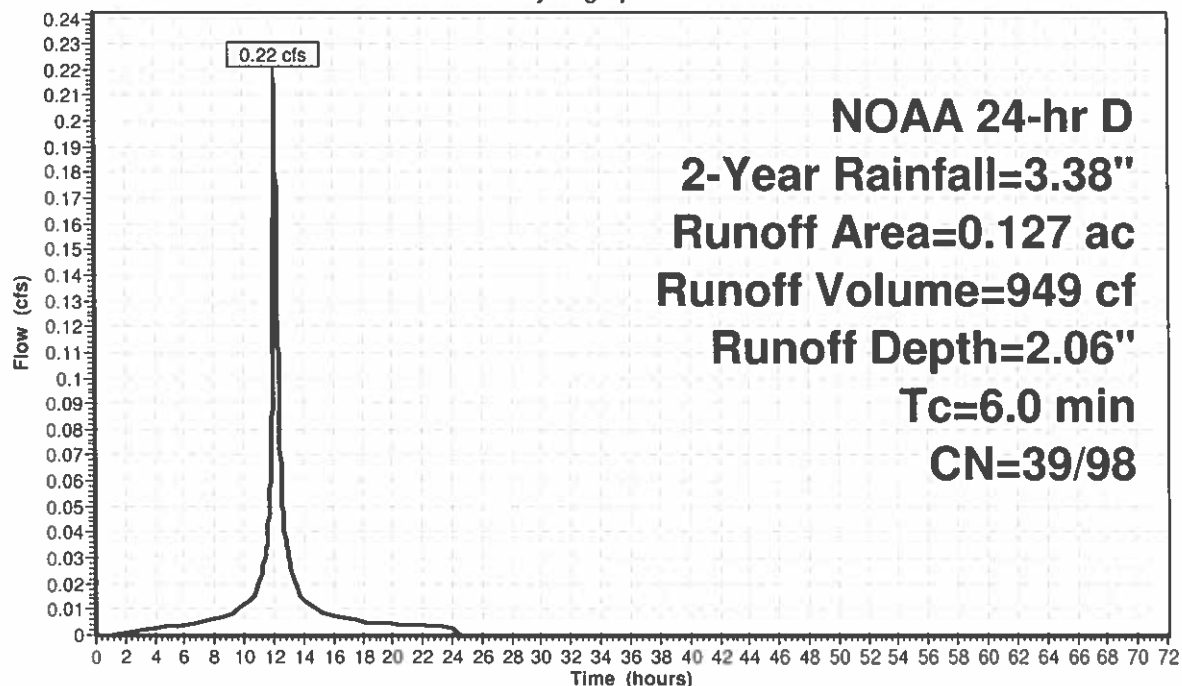
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D

Hydrograph



174 Church Street

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1D: Post - DA #1D

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 1,544 cf, Depth= 3.35"
Routed to Pond PB-D : Inf./Detention Basins 'D'

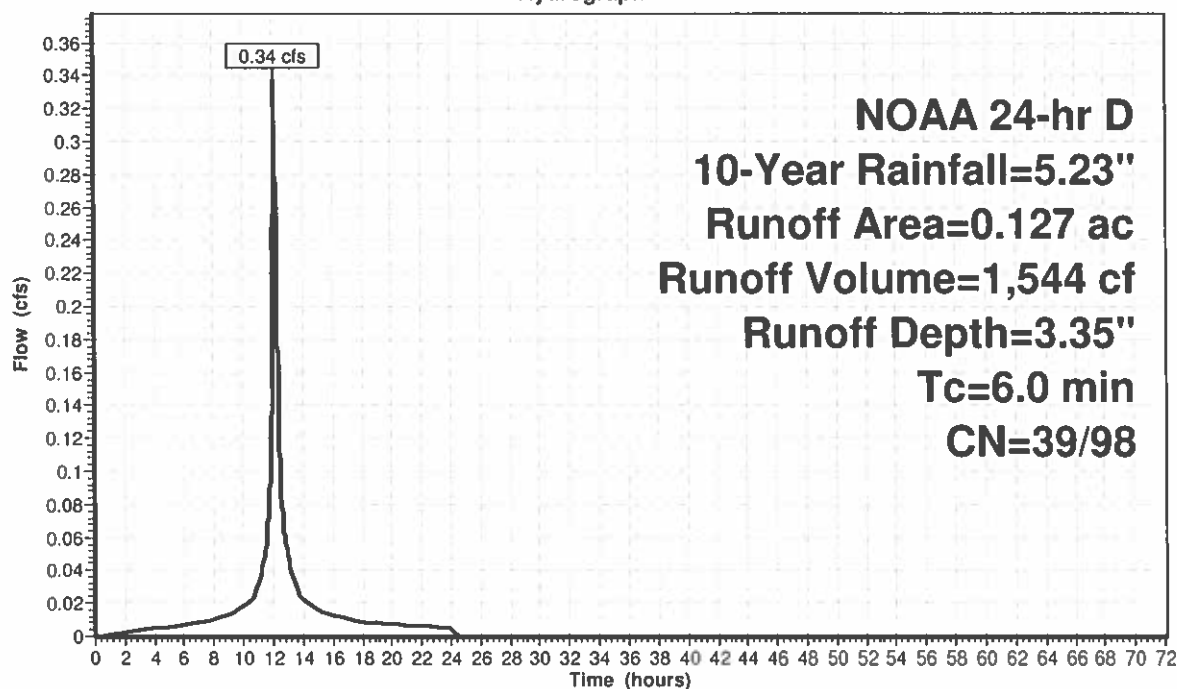
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D

Hydrograph



174 Church Street

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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1D: Post - DA #1D

Runoff = 0.43 cfs @ 12.14 hrs, Volume= 1,993 cf, Depth= 4.32"
Routed to Pond PB-D : Inf./Detention Basins 'D'

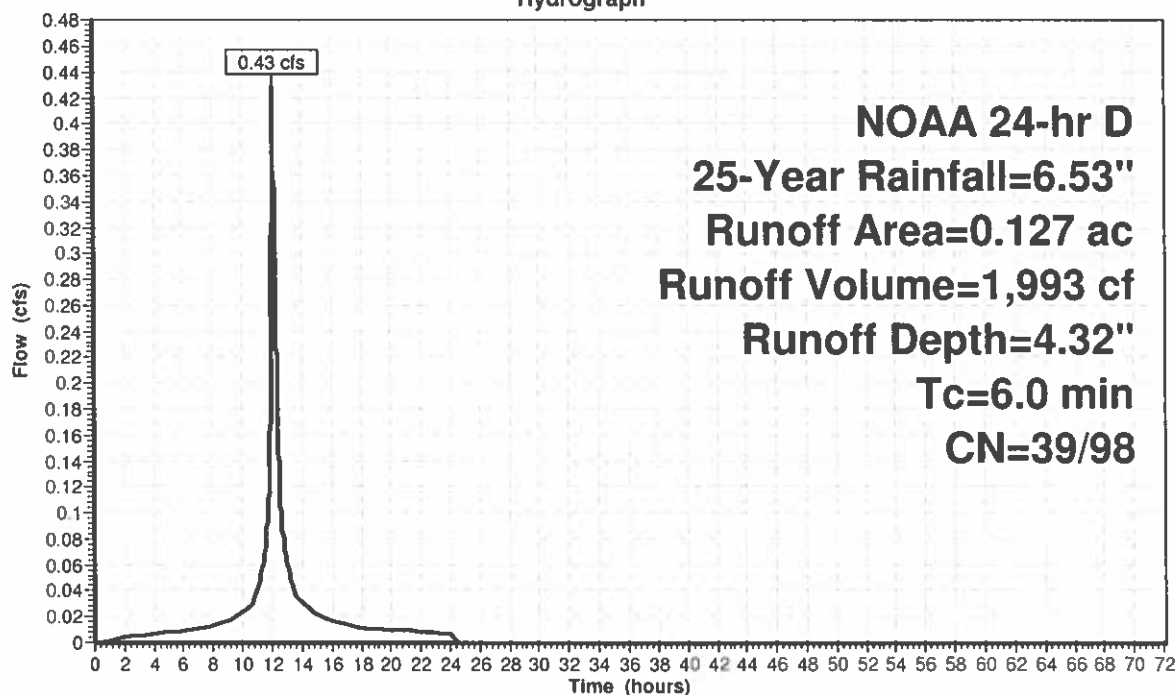
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D

Hydrograph



174 Church Street

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NOAA 24-hr D 100-Year Rainfall=8.94"

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Summary for Subcatchment P-1D: Post - DA #1D

Runoff = 0.63 cfs @ 12.14 hrs, Volume= 2,873 cf, Depth= 6.23"
Routed to Pond PB-D : Inf./Detention Basins 'D'

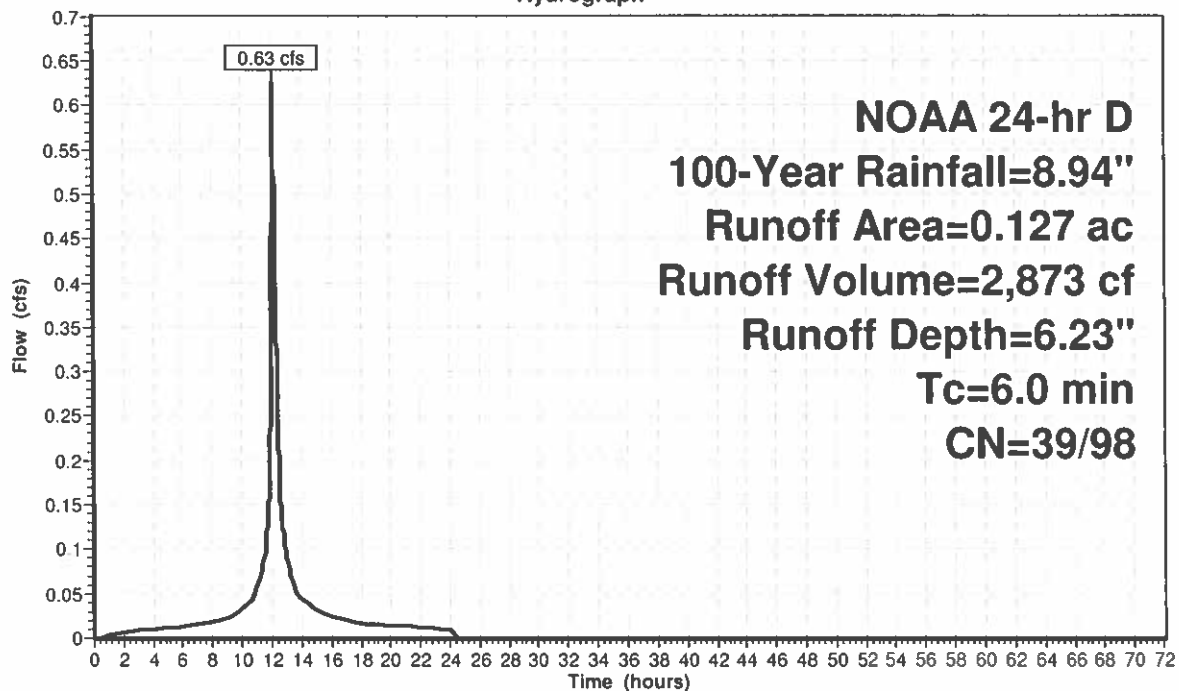
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D

Hydrograph



Summary for Subcatchment P-1E: Post - DA #1E

Runoff = 0.43 cfs @ 12.14 hrs, Volume= 1,886 cf, Depth= 1.93"
 Routed to Pond PB-E : Inf./Detention Basins 'E'

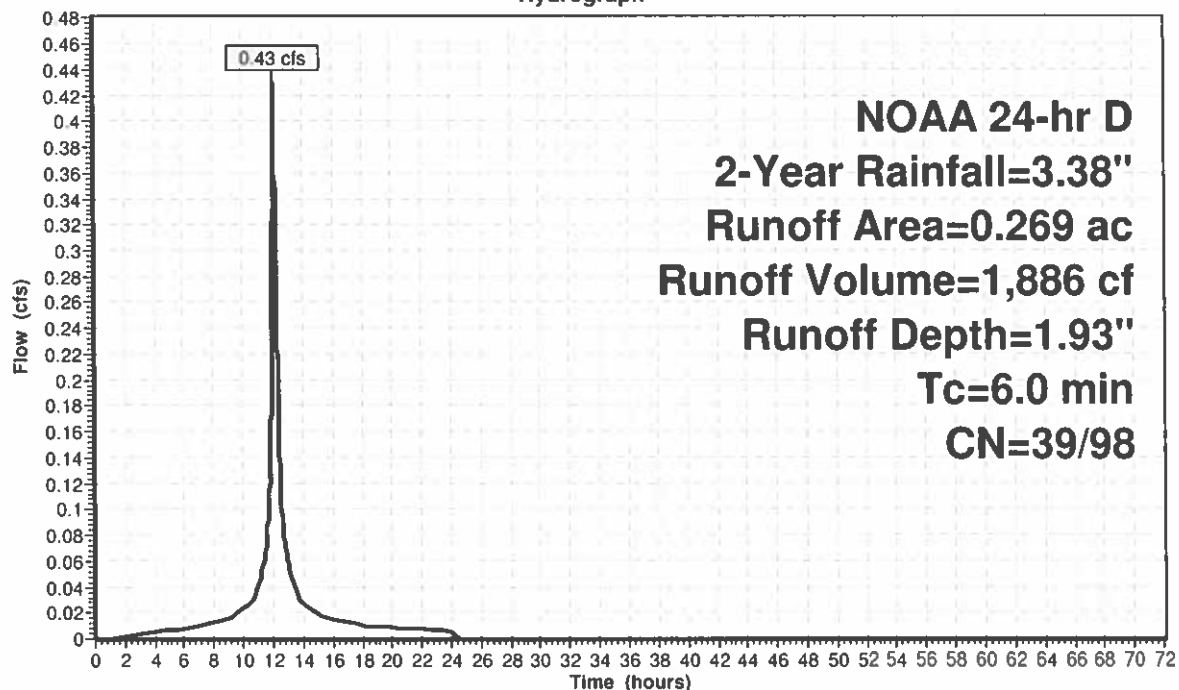
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E

Hydrograph



Summary for Subcatchment P-1E: Post - DA #1E

Runoff = 0.67 cfs @ 12.14 hrs, Volume= 3,084 cf, Depth= 3.16"
 Routed to Pond PB-E : Inf./Detention Basins 'E'

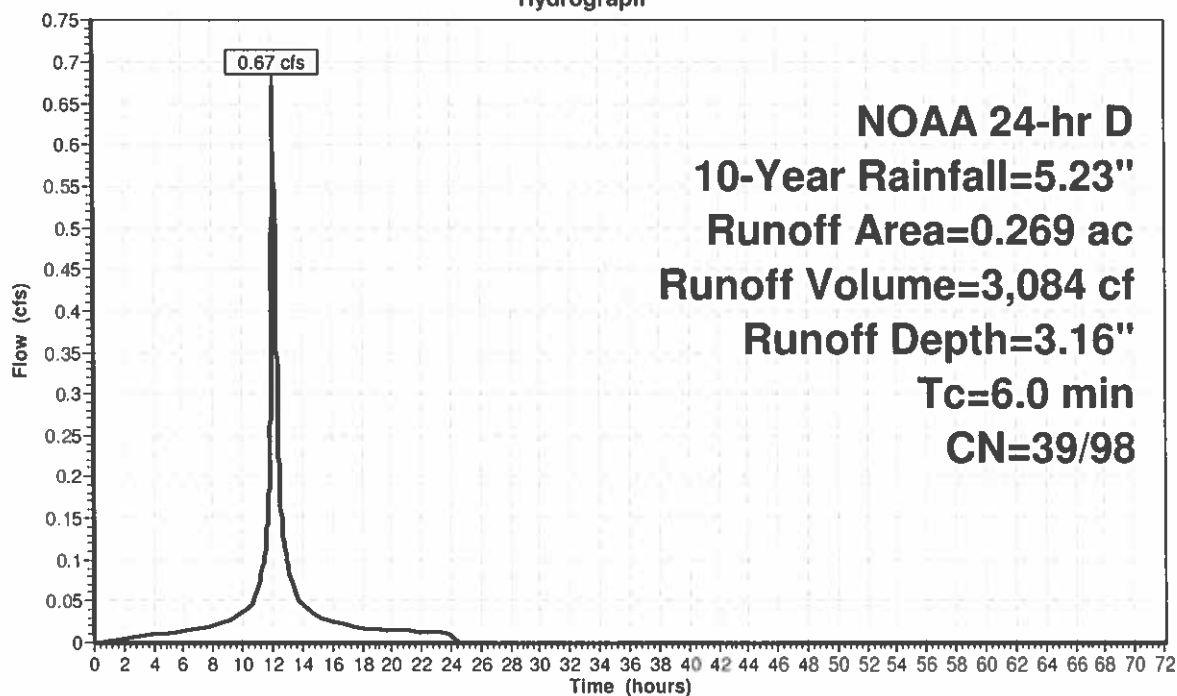
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1E: Post - DA #1E

Runoff = 0.86 cfs @ 12.14 hrs, Volume= 3,998 cf, Depth= 4.09"
Routed to Pond PB-E : Inf./Detention Basins 'E'

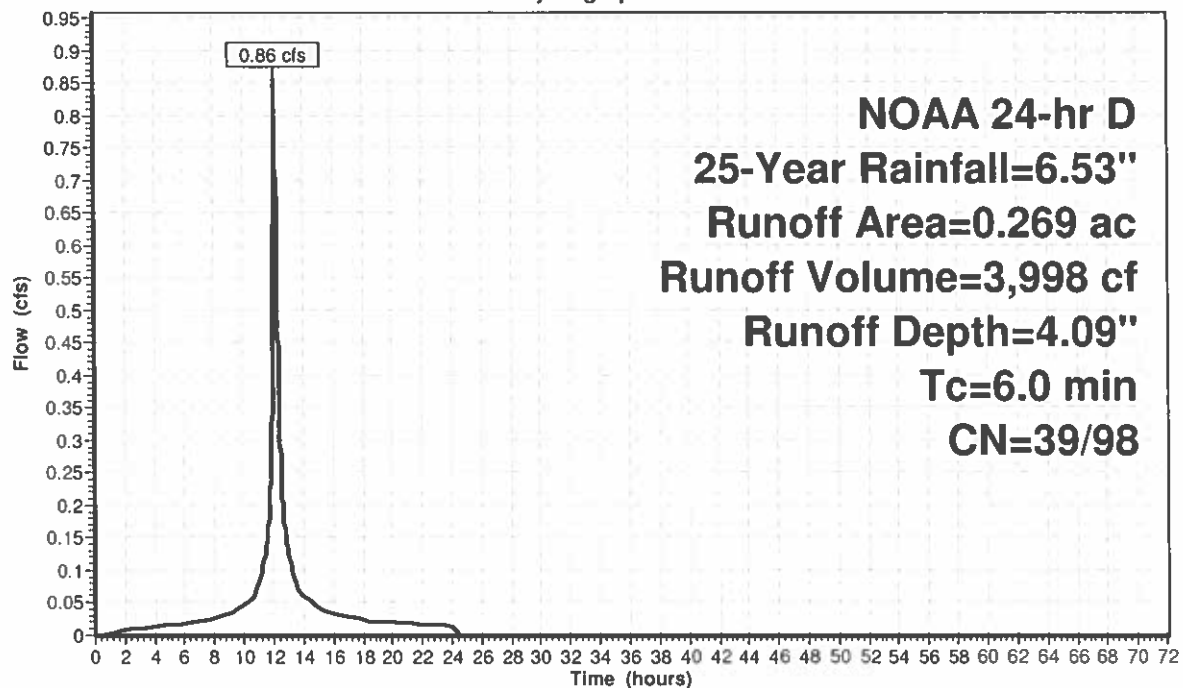
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E

Hydrograph



Summary for Subcatchment P-1E: Post - DA #1E

Runoff = 1.26 cfs @ 12.14 hrs, Volume= 5,805 cf, Depth= 5.94"
 Routed to Pond PB-E : Inf./Detention Basins 'E'

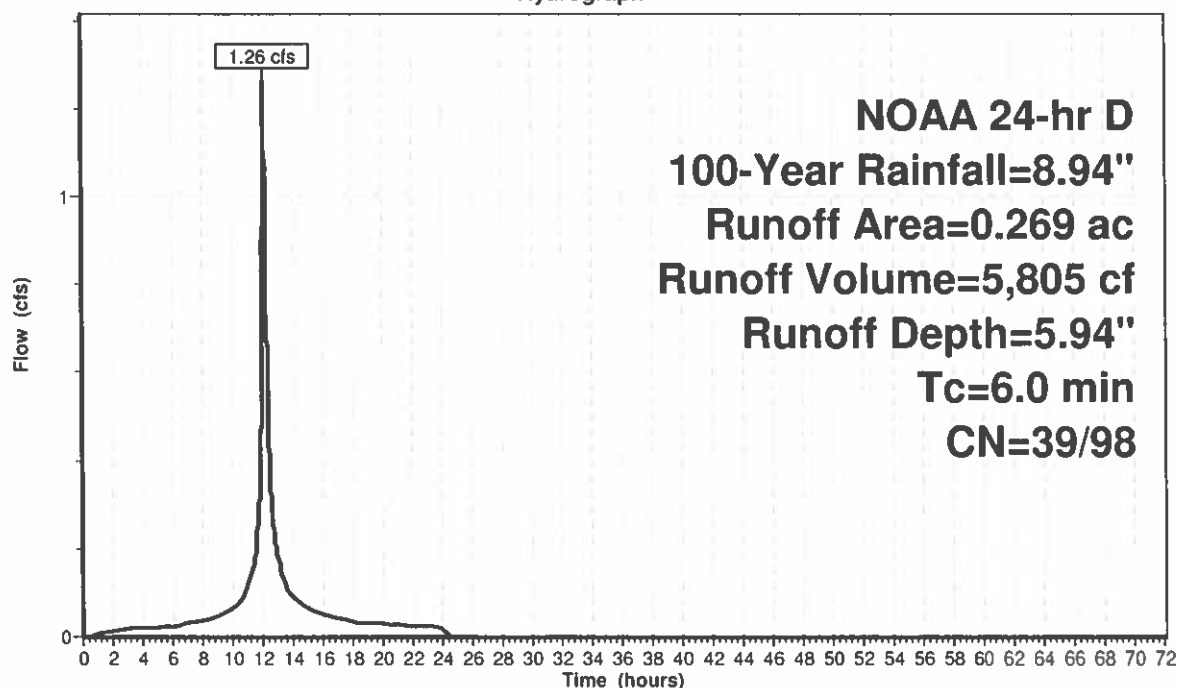
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E

Hydrograph



174 Church Street

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 402 cf, Depth= 0.66"
Routed to Link PT-1 : Post - Total

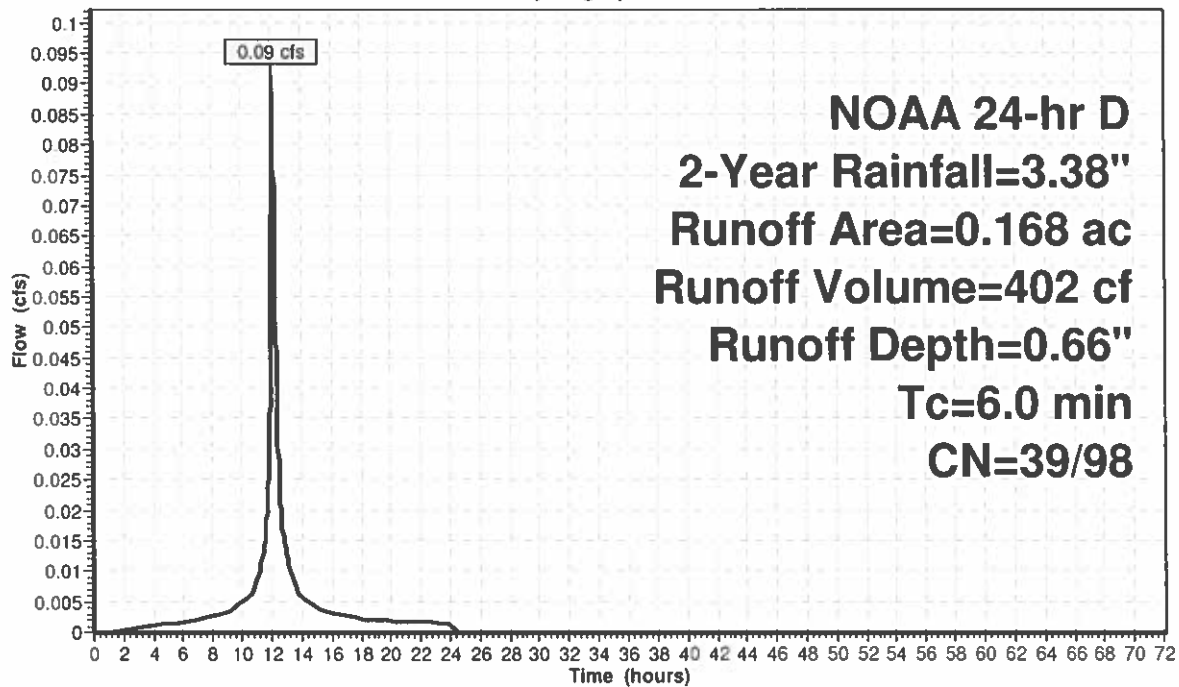
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



174 Church Street

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 755 cf, Depth= 1.24"
Routed to Link PT-1 : Post - Total

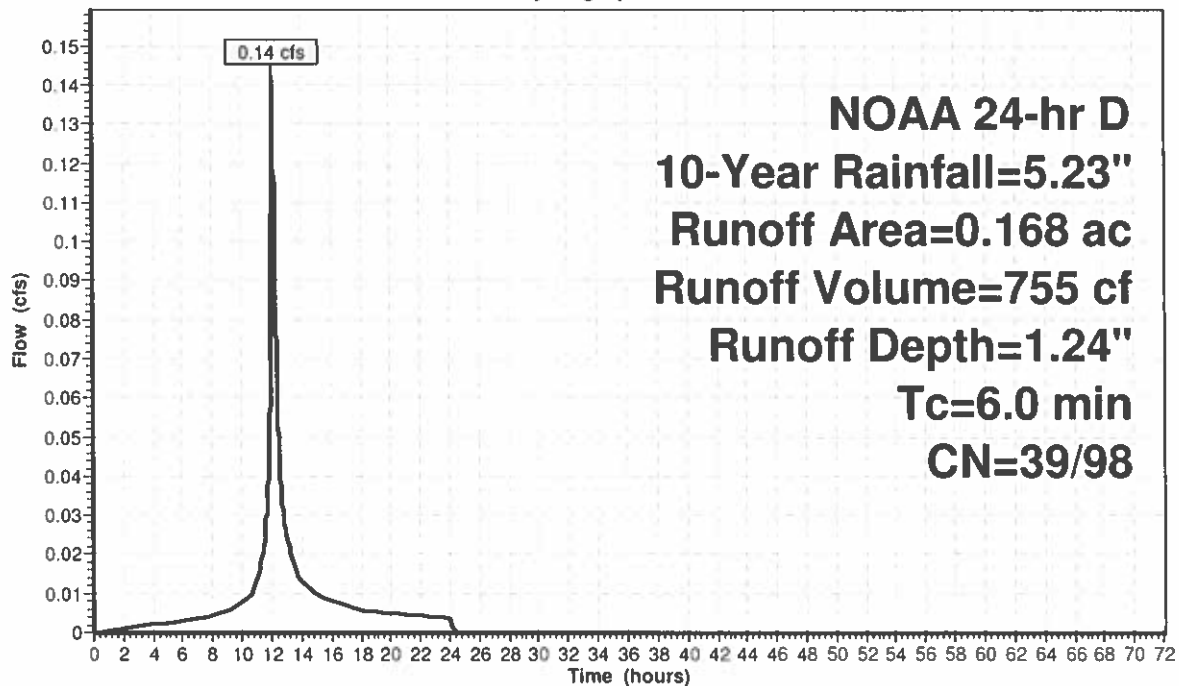
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.20 cfs @ 12.15 hrs, Volume= 1,093 cf, Depth= 1.79"
 Routed to Link PT-1 : Post - Total

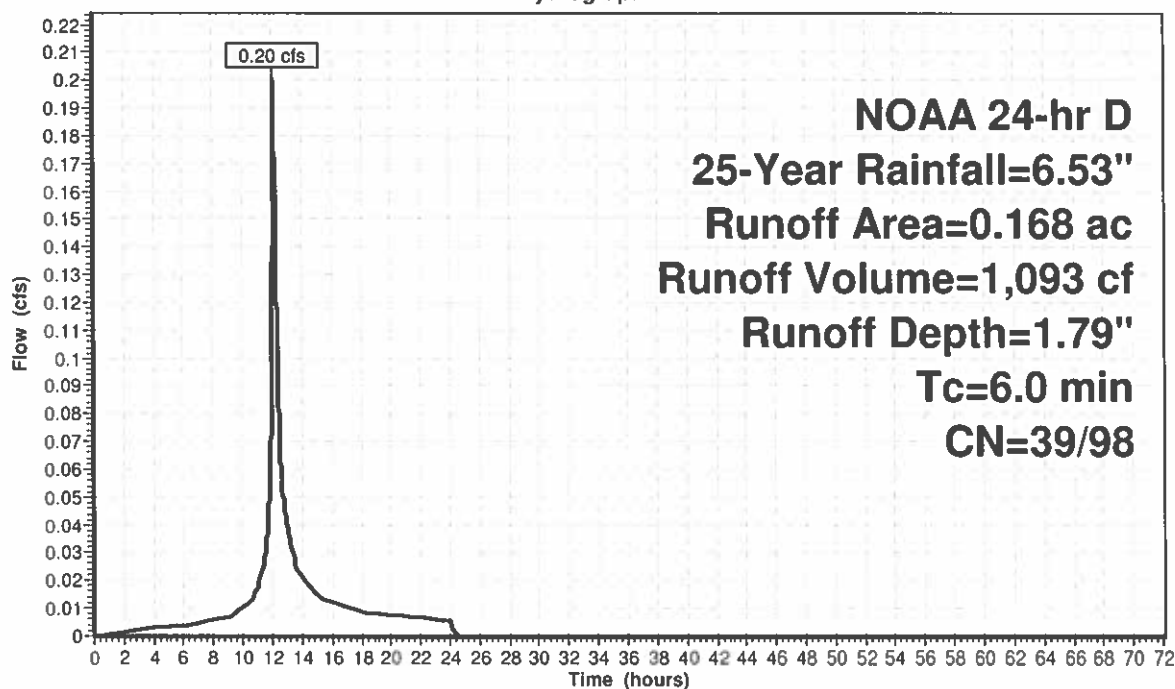
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.39 cfs @ 12.15 hrs, Volume= 1,865 cf, Depth= 3.06"
 Routed to Link PT-1 : Post - Total

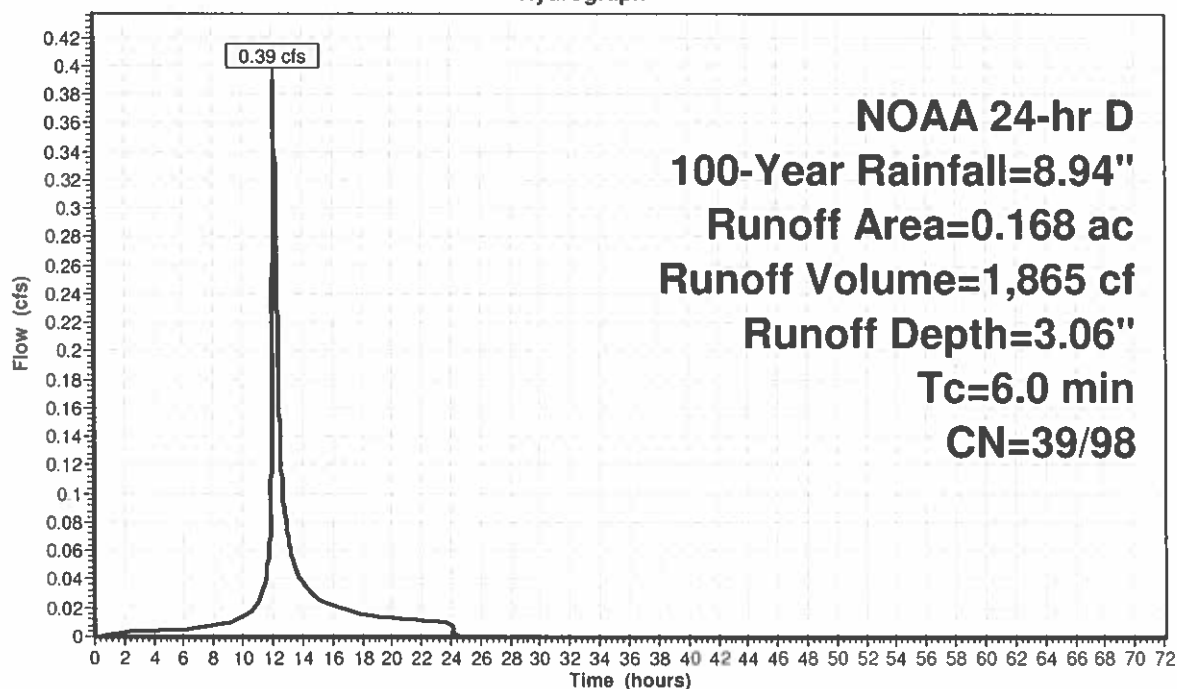
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



A-4 – POST-DEVELOPED – INFILTRATION/DETENTION BASINS CALCULATIONS

Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 1.18" for 2-Year event
 Inflow = 0.25 cfs @ 12.14 hrs, Volume= 1,099 cf
 Outflow = 0.02 cfs @ 13.53 hrs, Volume= 1,099 cf, Atten= 92%, Lag= 83.7 min
 Discarded = 0.01 cfs @ 13.53 hrs, Volume= 1,064 cf
 Primary = 0.01 cfs @ 13.53 hrs, Volume= 35 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 28.05' @ 13.53 hrs Surf.Area= 740 sf Storage= 528 cf

Plug-Flow detention time= 343.4 min calculated for 1,099 cf (100% of inflow)
 Center-of-Mass det. time= 343.4 min (1,105.3 - 762.0)

Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
		1,054 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	26.80'	0.500 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 24.78' Phase-In= 0.01'
#2	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 13.53 hrs HW=28.05' (Free Discharge)

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

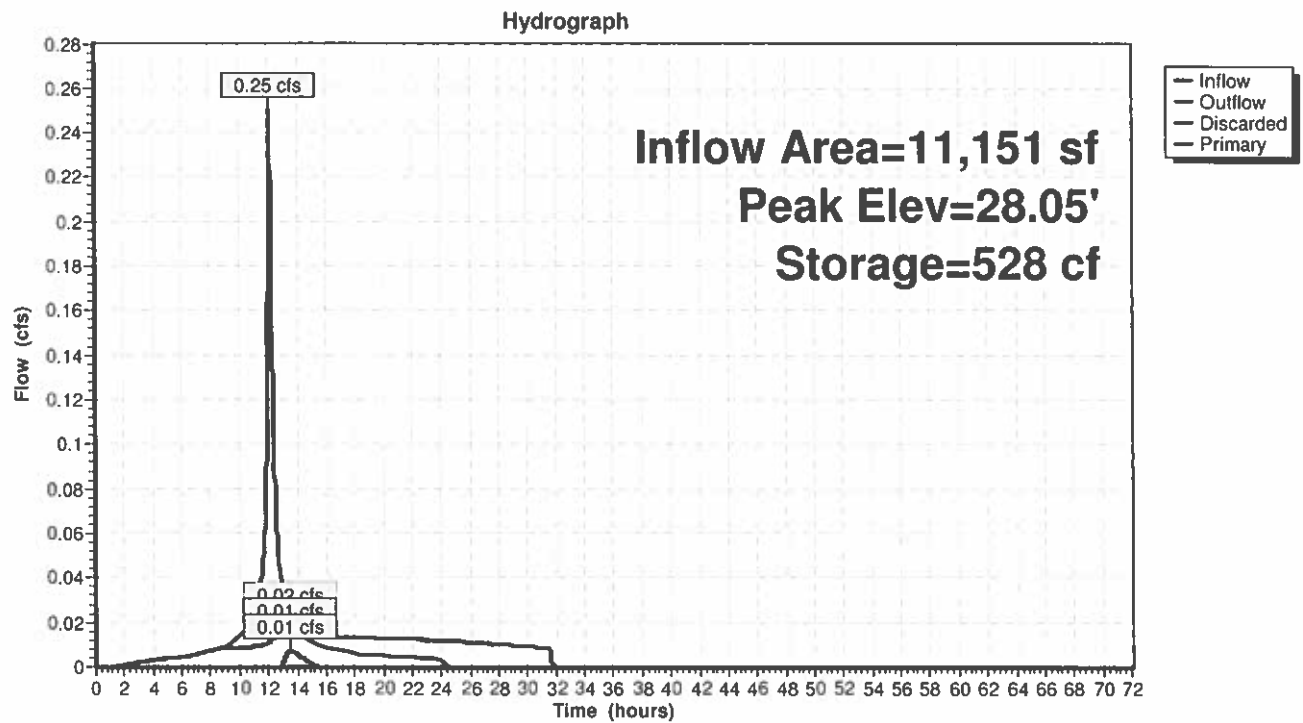
Primary OutFlow Max=0.01 cfs @ 13.53 hrs HW=28.05' TW=0.00' (Dynamic Tailwater)

↳ **2=Culvert** (Passes 0.01 cfs of 10.94 cfs potential flow)

↳ **3=Orifice** (Orifice Controls 0.01 cfs @ 0.77 fps)

↳ **4=Grate El. 31.0** (Controls 0.00 cfs)

Pond PB-A: Inf/Detention Basin A



Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 2.03" for 10-Year event
 Inflow = 0.39 cfs @ 12.14 hrs, Volume= 1,885 cf
 Outflow = 0.17 cfs @ 12.39 hrs, Volume= 1,885 cf, Atten= 57%, Lag= 15.0 min
 Discarded = 0.01 cfs @ 12.39 hrs, Volume= 1,315 cf
 Primary = 0.15 cfs @ 12.39 hrs, Volume= 570 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 28.27' @ 12.39 hrs Surf.Area= 740 sf Storage= 652 cf

Plug-Flow detention time= 276.5 min calculated for 1,885 cf (100% of inflow)
 Center-of-Mass det. time= 276.5 min (1,049.5 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
		1,054 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	26.80'	0.500 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 24.78' Phase-In= 0.01'
#2	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.39 hrs HW=28.27' (Free Discharge)

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

Primary OutFlow Max=0.15 cfs @ 12.39 hrs HW=28.27' TW=0.00' (Dynamic Tailwater)

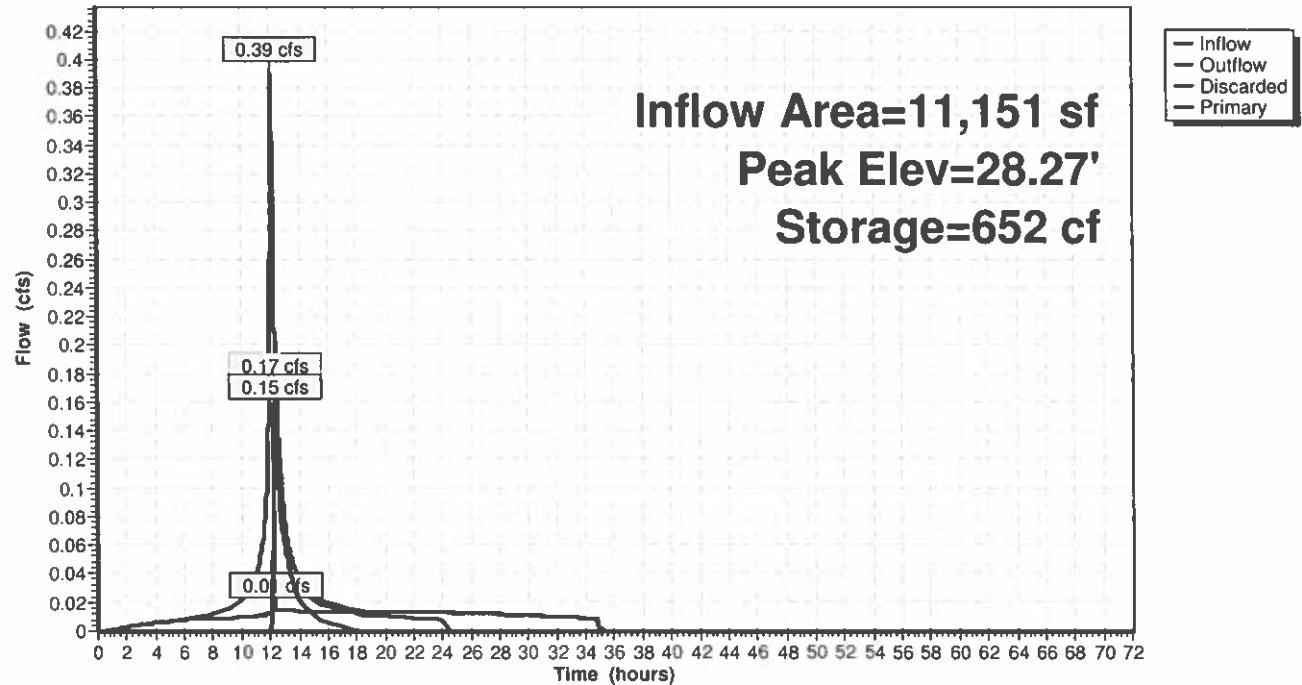
↑ **2=Culvert** (Passes 0.15 cfs of 11.29 cfs potential flow)

↑ **3=Orifice** (Orifice Controls 0.15 cfs @ 1.78 fps)

↑ **4=Grate El. 31.0** (Controls 0.00 cfs)

Pond PB-A: Inf/Detention Basin A

Hydrograph



Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 2.74" for 25-Year event
 Inflow = 0.51 cfs @ 12.14 hrs, Volume= 2,545 cf
 Outflow = 0.30 cfs @ 12.32 hrs, Volume= 2,545 cf, Atten= 43%, Lag= 10.7 min
 Discarded = 0.02 cfs @ 12.32 hrs, Volume= 1,432 cf
 Primary = 0.28 cfs @ 12.32 hrs, Volume= 1,114 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 28.46' @ 12.32 hrs Surf.Area= 740 sf Storage= 754 cf

Plug-Flow detention time= 234.1 min calculated for 2,545 cf (100% of inflow)
 Center-of-Mass det. time= 234.2 min (1,012.9 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
			1,054 cf Total Available Storage

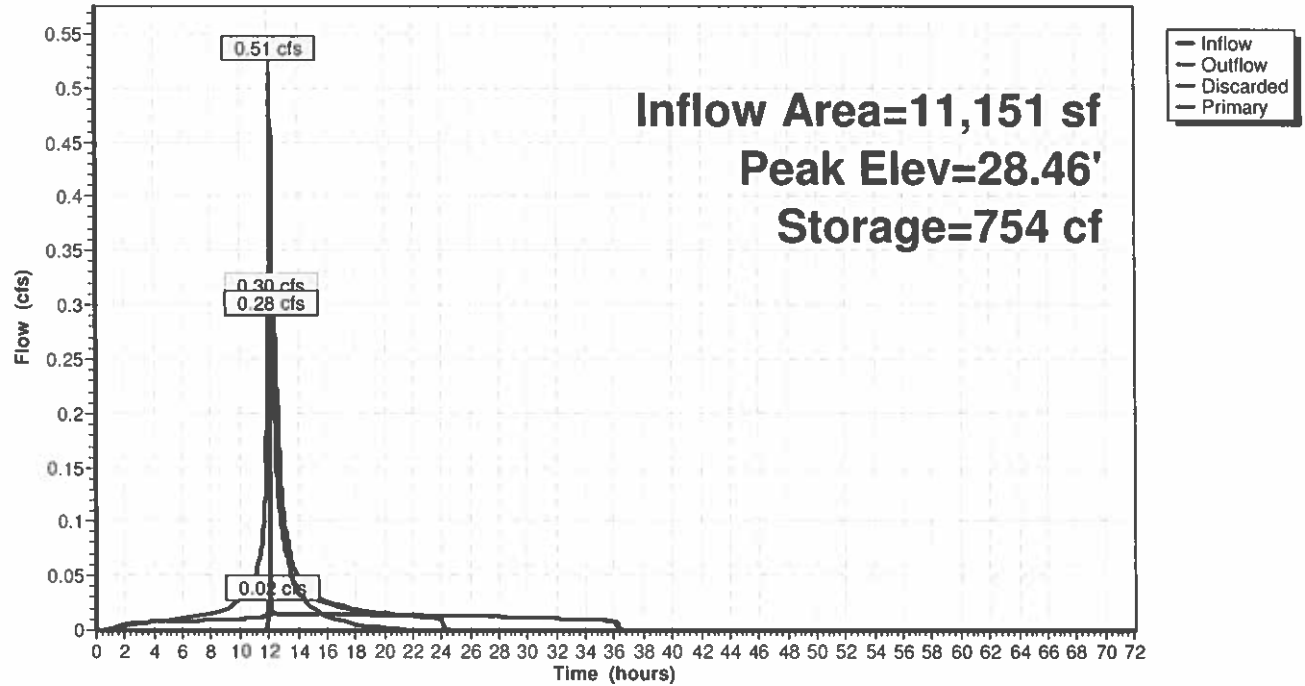
Device	Routing	Invert	Outlet Devices
#1	Discarded	26.80'	0.500 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 24.78' Phase-In= 0.01'
#2	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.32 hrs HW=28.46' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.28 cfs @ 12.32 hrs HW=28.46' TW=0.00' (Dynamic Tailwater)
 ↳ **2=Culvert** (Passes 0.28 cfs of 11.58 cfs potential flow)
 ↳ ↳ **3=Orifice** (Orifice Controls 0.28 cfs @ 2.53 fps)
 ↳ ↳ ↳ **4=Grate El. 31.0** (Controls 0.00 cfs)

Pond PB-A: Inf/Detention Basin A

Hydrograph



Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 4.25" for 100-Year event
 Inflow = 0.84 cfs @ 12.14 hrs, Volume= 3,946 cf
 Outflow = 0.51 cfs @ 12.31 hrs, Volume= 3,946 cf, Atten= 40%, Lag= 9.8 min
 Discarded = 0.02 cfs @ 12.31 hrs, Volume= 1,527 cf
 Primary = 0.49 cfs @ 12.31 hrs, Volume= 2,420 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 29.04' @ 12.31 hrs Surf.Area= 740 sf Storage= 977 cf

Plug-Flow detention time= 171.7 min calculated for 3,946 cf (100% of inflow)
 Center-of-Mass det. time= 171.8 min (956.6 - 784.9)

Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
			1,054 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	26.80'	0.500 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 24.78' Phase-In= 0.01'
#2	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.31 hrs HW=29.04' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.49 cfs @ 12.31 hrs HW=29.04' TW=0.00' (Dynamic Tailwater)

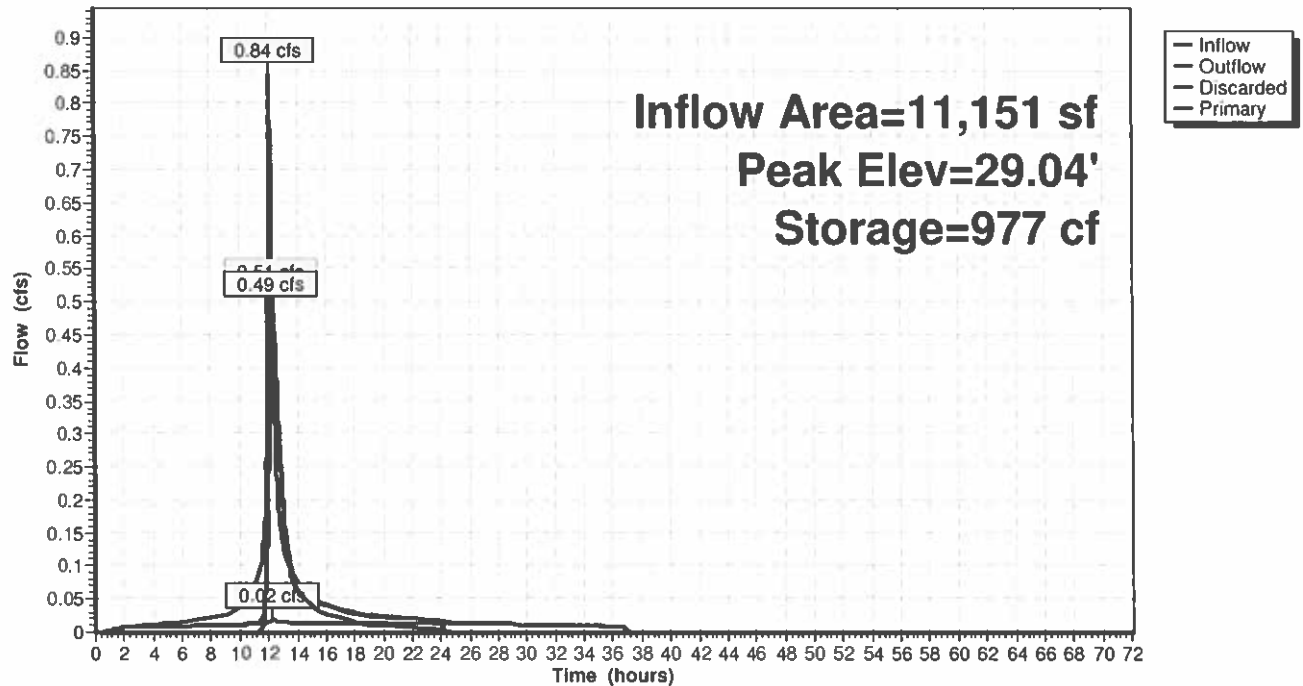
↑ **2=Culvert** (Passes 0.49 cfs of 12.42 cfs potential flow)

↑ **3=Orifice** (Orifice Controls 0.49 cfs @ 4.45 fps)

↑ **4=Grate El. 31.0** (Controls 0.00 cfs)

Pond PB-A: Inf/Detention Basin A

Hydrograph



Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 1.70" for 2-Year event
 Inflow = 0.09 cfs @ 12.14 hrs, Volume= 400 cf
 Outflow = 0.01 cfs @ 12.91 hrs, Volume= 400 cf, Atten= 85%, Lag= 46.4 min
 Discarded = 0.01 cfs @ 12.91 hrs, Volume= 400 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.55' @ 12.91 hrs Surf.Area= 380 sf Storage= 132 cf

Plug-Flow detention time= 76.3 min calculated for 400 cf (100% of inflow)
 Center-of-Mass det. time= 76.3 min (837.7 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

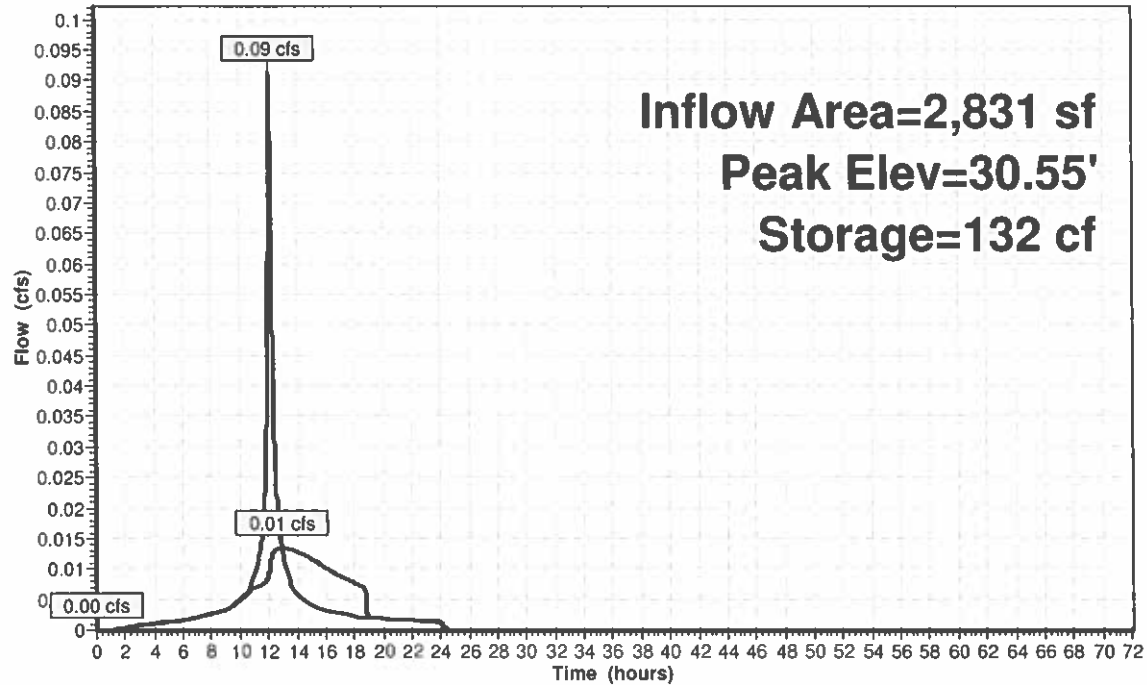
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.03' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.91 hrs HW=30.55' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Grate El. 32.8** (Controls 0.00 cfs)

Pond PB-B: Inf./Detention Basin B

Hydrograph



Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 2.80" for 10-Year event
 Inflow = 0.14 cfs @ 12.14 hrs, Volume= 661 cf
 Outflow = 0.02 cfs @ 13.16 hrs, Volume= 661 cf, Atten= 88%, Lag= 61.3 min
 Discarded = 0.02 cfs @ 13.16 hrs, Volume= 661 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.95' @ 13.16 hrs Surf.Area= 380 sf Storage= 242 cf

Plug-Flow detention time= 124.0 min calculated for 661 cf (100% of inflow)
 Center-of-Mass det. time= 124.0 min (887.2 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

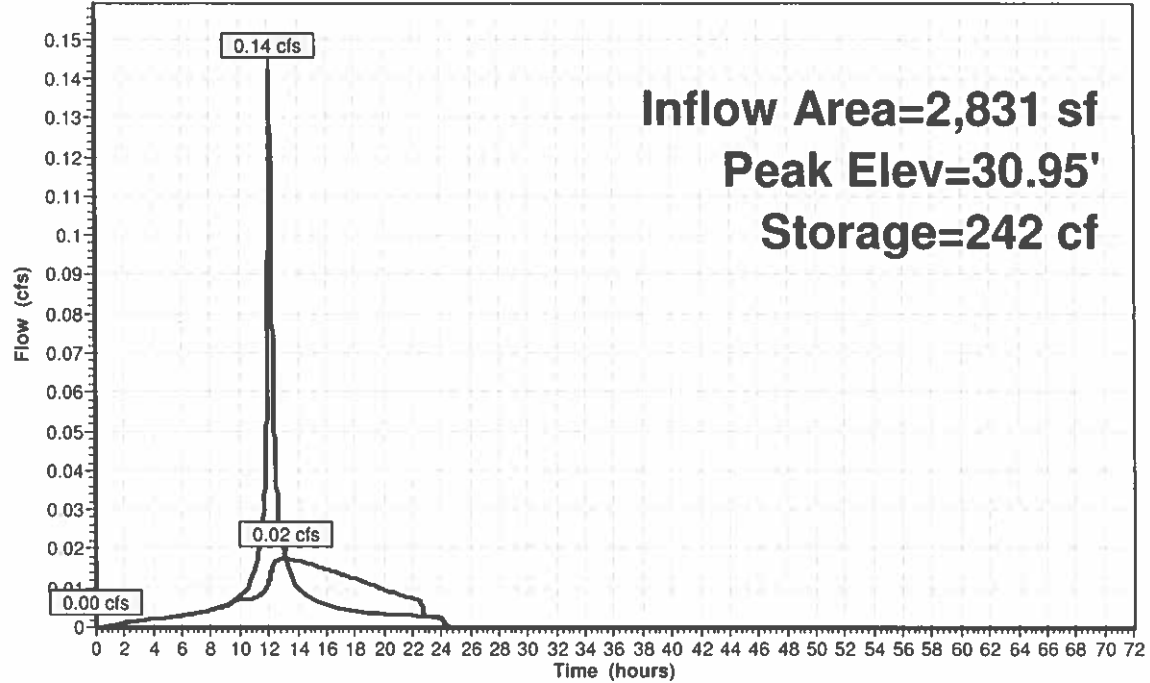
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.03' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 13.16 hrs HW=30.95' (Free Discharge)
 ↑1=Exfiltration (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑2=Grate El. 32.8 (Controls 0.00 cfs)

Pond PB-B: Inf./Detention Basin B

Hydrograph



Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 3.67" for 25-Year event
 Inflow = 0.18 cfs @ 12.14 hrs, Volume= 865 cf
 Outflow = 0.02 cfs @ 13.31 hrs, Volume= 865 cf, Atten= 89%, Lag= 69.9 min
 Discarded = 0.02 cfs @ 13.31 hrs, Volume= 865 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.28' @ 13.31 hrs Surf.Area= 380 sf Storage= 336 cf

Plug-Flow detention time= 157.6 min calculated for 865 cf (100% of inflow)
 Center-of-Mass det. time= 157.6 min (922.8 - 765.2)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

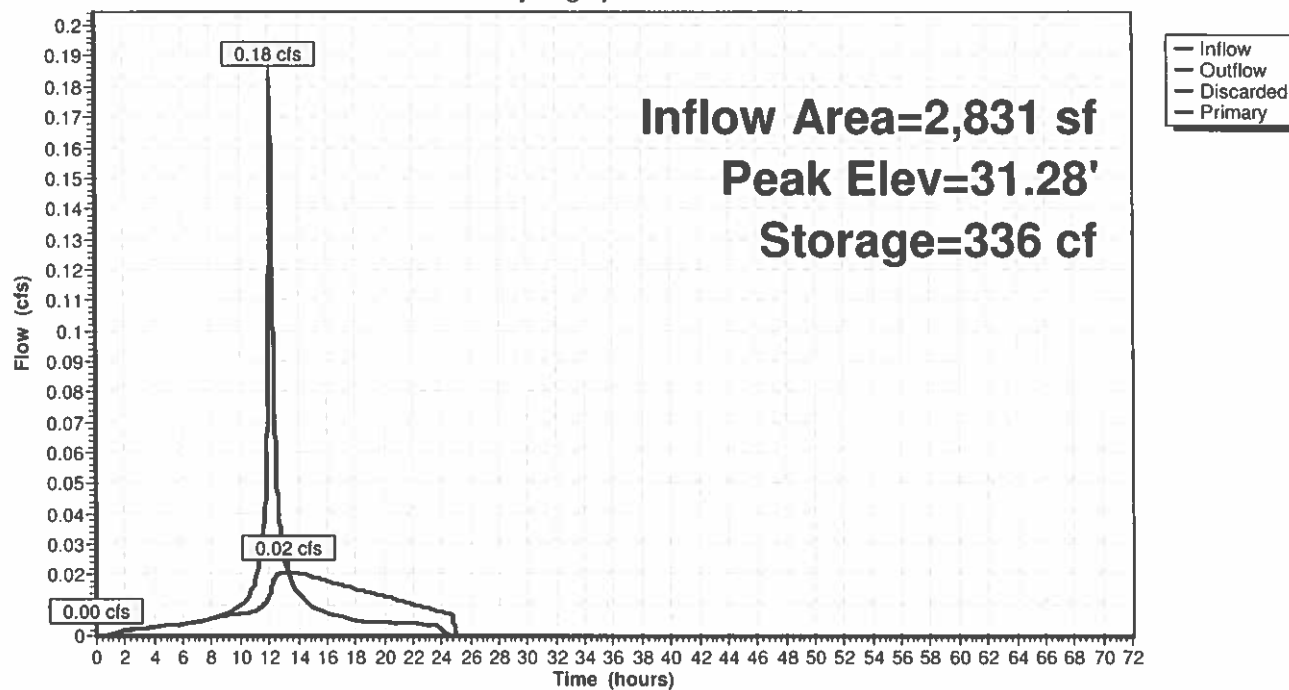
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.03' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 13.31 hrs HW=31.28' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Grate El. 32.8** (Controls 0.00 cfs)

Pond PB-B: Inf./Detention Basin B

Hydrograph



Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 5.41" for 100-Year event
 Inflow = 0.28 cfs @ 12.14 hrs, Volume= 1,277 cf
 Outflow = 0.03 cfs @ 13.32 hrs, Volume= 1,277 cf, Atten= 89%, Lag= 70.4 min
 Discarded = 0.03 cfs @ 13.32 hrs, Volume= 1,277 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.21' @ 13.32 hrs Surf.Area= 380 sf Storage= 528 cf

Plug-Flow detention time= 199.9 min calculated for 1,277 cf (100% of inflow)
 Center-of-Mass det. time= 199.9 min (967.7 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

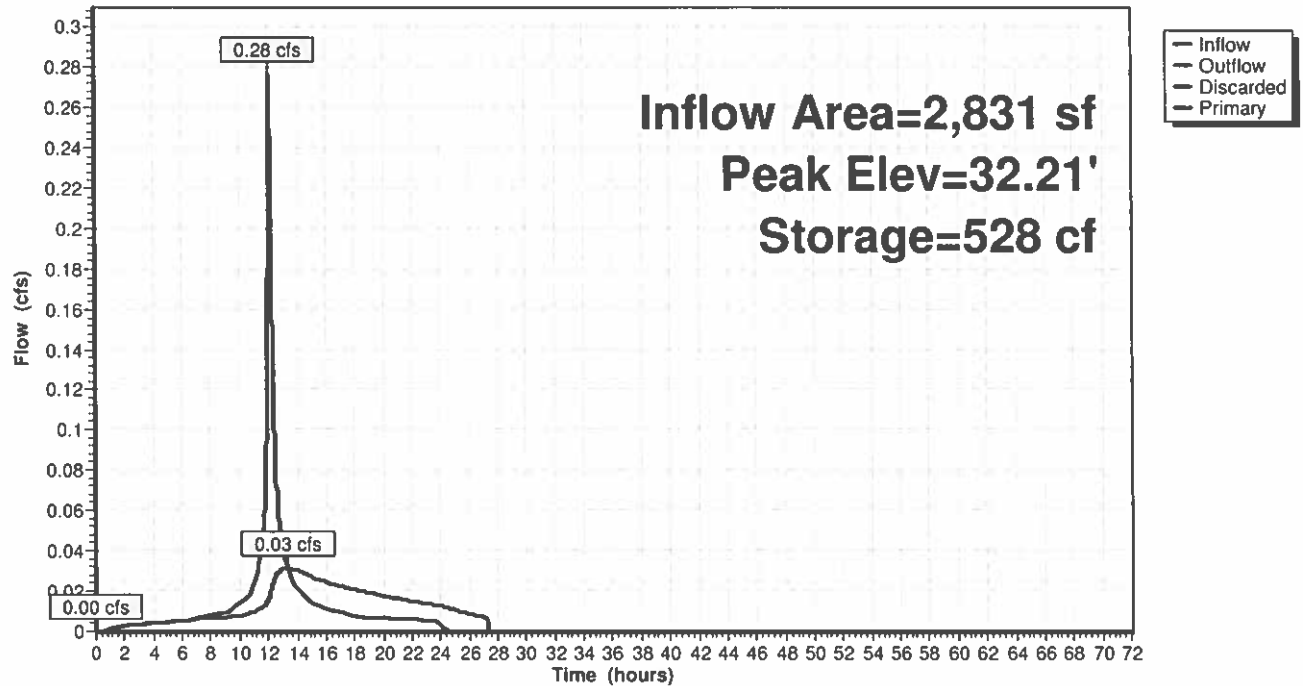
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.03' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.32 hrs HW=32.21' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Grate El. 32.8** (Controls 0.00 cfs)

Pond PB-B: Inf./Detention Basin B

Hydrograph



Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 1.75" for 2-Year event
 Inflow = 0.09 cfs @ 12.14 hrs, Volume= 400 cf
 Outflow = 0.01 cfs @ 12.86 hrs, Volume= 400 cf, Atten= 84%, Lag= 43.4 min
 Discarded = 0.01 cfs @ 12.86 hrs, Volume= 400 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.54' @ 12.86 hrs Surf.Area= 380 sf Storage= 129 cf

Plug-Flow detention time= 71.3 min calculated for 400 cf (100% of inflow)
 Center-of-Mass det. time= 71.3 min (832.7 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

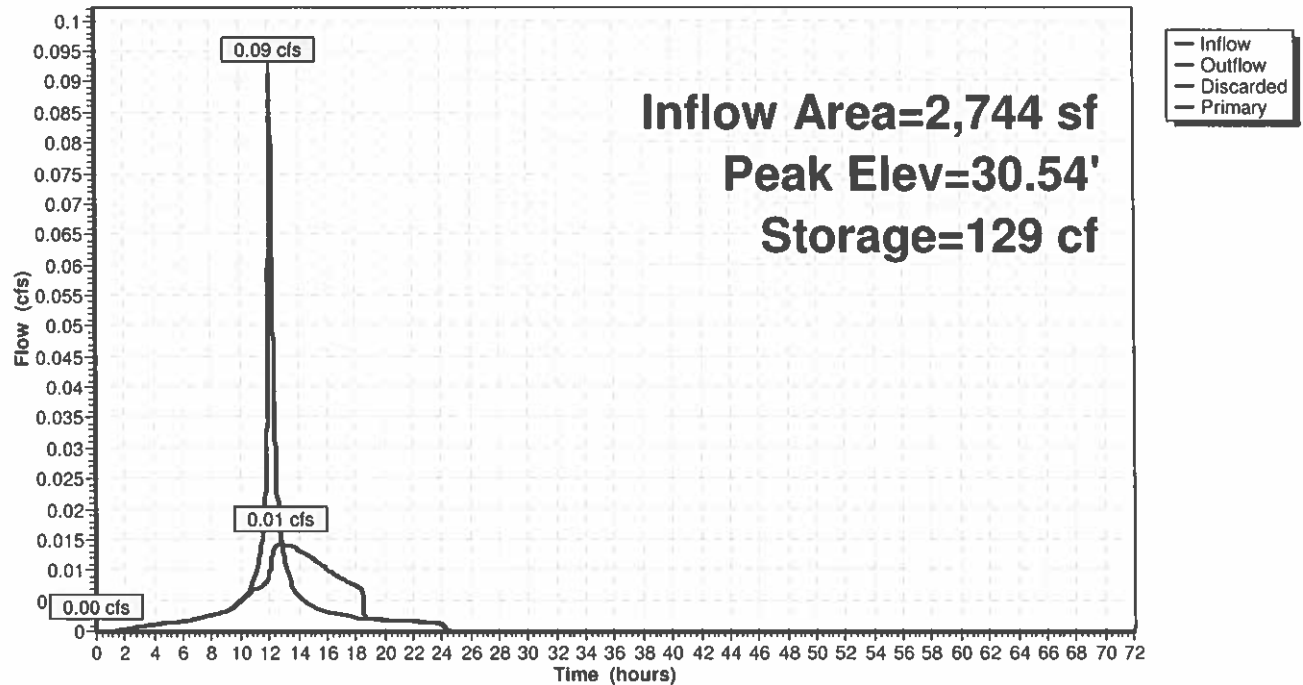
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.77' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.86 hrs HW=30.54' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Grate El. 32.80** (Controls 0.00 cfs)

Pond PB-C: Inf./Detention Basin C

Hydrograph



Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 2.88" for 10-Year event
 Inflow = 0.14 cfs @ 12.14 hrs, Volume= 660 cf
 Outflow = 0.02 cfs @ 13.09 hrs, Volume= 660 cf, Atten= 87%, Lag= 56.9 min
 Discarded = 0.02 cfs @ 13.09 hrs, Volume= 660 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.93' @ 13.09 hrs Surf.Area= 380 sf Storage= 237 cf

Plug-Flow detention time= 113.2 min calculated for 660 cf (100% of inflow)
 Center-of-Mass det. time= 113.2 min (875.8 - 762.6)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

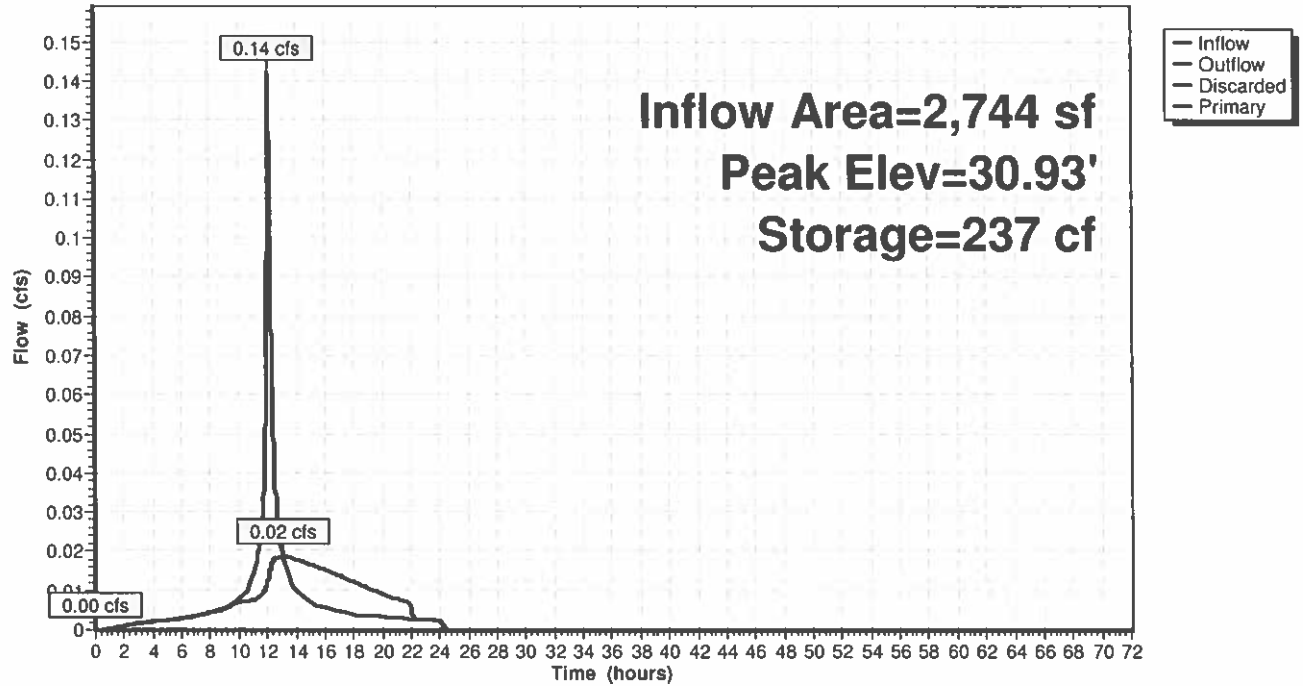
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.77' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 13.09 hrs HW=30.93' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Grate El. 32.80** (Controls 0.00 cfs)

Pond PB-C: Inf./Detention Basin C

Hydrograph



Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 3.77" for 25-Year event
 Inflow = 0.18 cfs @ 12.14 hrs, Volume= 861 cf
 Outflow = 0.02 cfs @ 13.21 hrs, Volume= 861 cf, Atten= 88%, Lag= 64.1 min
 Discarded = 0.02 cfs @ 13.21 hrs, Volume= 861 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.24' @ 13.21 hrs Surf.Area= 380 sf Storage= 326 cf

Plug-Flow detention time= 142.4 min calculated for 861 cf (100% of inflow)
 Center-of-Mass det. time= 142.3 min (906.5 - 764.2)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

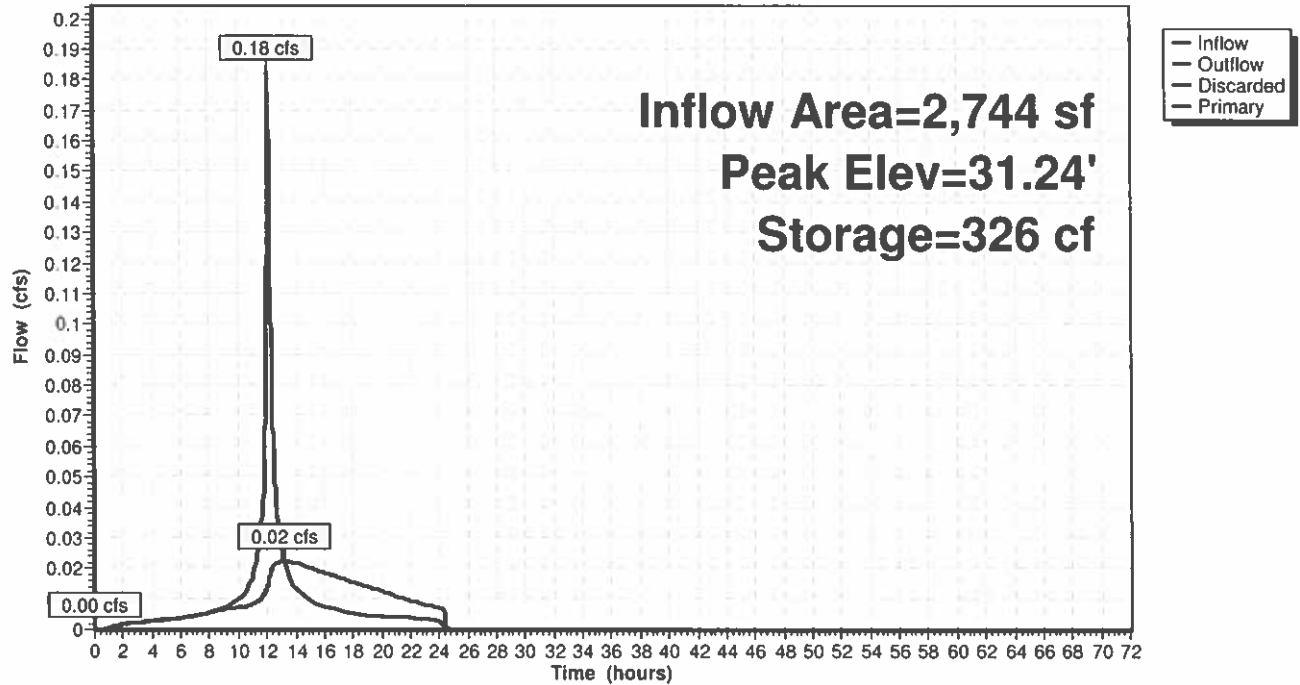
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.77' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 13.21 hrs HW=31.24' (Free Discharge)
 ↗ **1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↗ **2=Grate El. 32.80** (Controls 0.00 cfs)

Pond PB-C: Inf./Detention Basin C

Hydrograph



Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 5.53" for 100-Year event
 Inflow = 0.27 cfs @ 12.14 hrs, Volume= 1,265 cf
 Outflow = 0.03 cfs @ 13.22 hrs, Volume= 1,265 cf, Atten= 88%, Lag= 64.8 min
 Discarded = 0.03 cfs @ 13.22 hrs, Volume= 1,265 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.10' @ 13.22 hrs Surf.Area= 380 sf Storage= 511 cf

Plug-Flow detention time= 180.3 min calculated for 1,265 cf (100% of inflow)
 Center-of-Mass det. time= 180.3 min (946.8 - 766.4)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

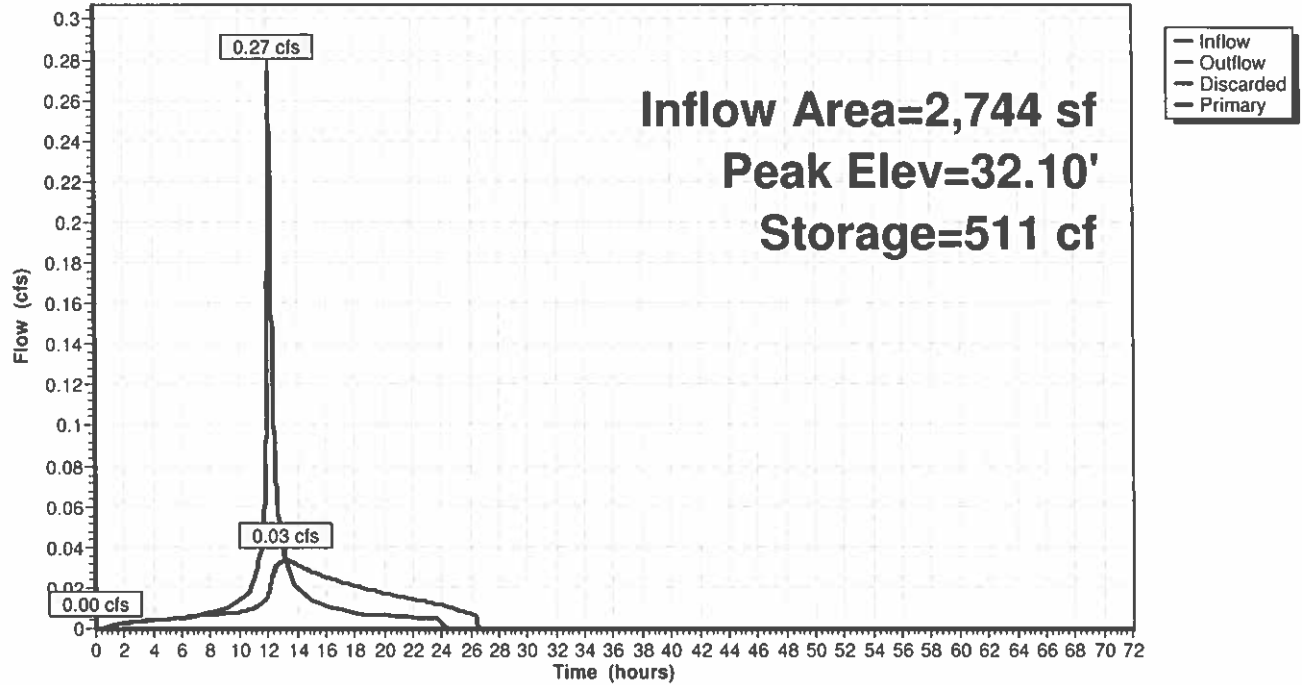
Device	Routing	Invert	Outlet Devices
#1	Discarded	29.80'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.77' Phase-In= 0.01'
#2	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.22 hrs HW=32.10' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Grate El. 32.80** (Controls 0.00 cfs)

Pond PB-C: Inf./Detention Basin C

Hydrograph



Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 2.06" for 2-Year event
 Inflow = 0.22 cfs @ 12.14 hrs, Volume= 949 cf
 Outflow = 0.03 cfs @ 13.03 hrs, Volume= 949 cf, Atten= 87%, Lag= 53.7 min
 Discarded = 0.03 cfs @ 13.03 hrs, Volume= 949 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.90' @ 13.03 hrs Surf.Area= 702 sf Storage= 341 cf

Plug-Flow detention time= 100.8 min calculated for 949 cf (100% of inflow)
 Center-of-Mass det. time= 100.8 min (862.0 - 761.2)

Volume	Invert	Avail.Storage	Storage Description
#1	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.95'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.95' Phase-In= 0.01'
#2	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.03 hrs HW=30.90' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.95' TW=28.18' (Dynamic Tailwater)

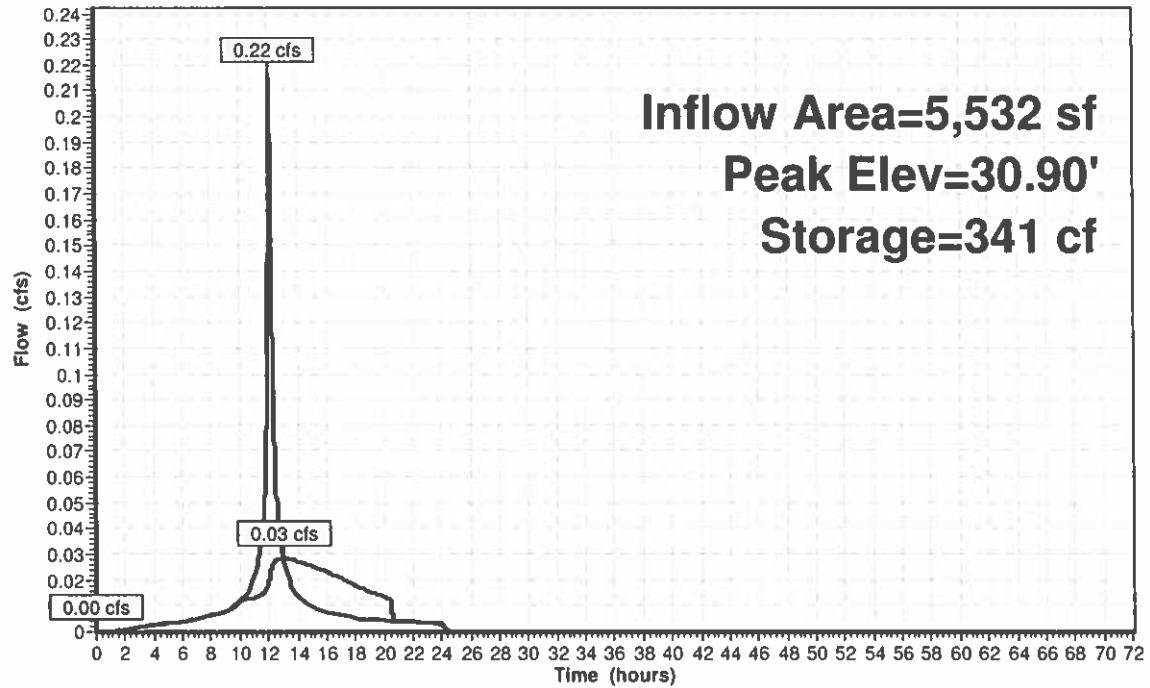
↑ **2=Culvert** (Controls 0.00 cfs)

↑ **3=Orifice** (Controls 0.00 cfs)

↑ **4=Grate eL 33.2** (Controls 0.00 cfs)

Pond PB-D: Inf./Detention Basins 'D'

Hydrograph



Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 3.35" for 10-Year event
 Inflow = 0.34 cfs @ 12.14 hrs, Volume= 1,544 cf
 Outflow = 0.04 cfs @ 13.24 hrs, Volume= 1,544 cf, Atten= 89%, Lag= 65.9 min
 Discarded = 0.04 cfs @ 13.24 hrs, Volume= 1,544 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.40' @ 13.24 hrs Surf.Area= 702 sf Storage= 613 cf

Plug-Flow detention time= 156.0 min calculated for 1,544 cf (100% of inflow)
 Center-of-Mass det. time= 156.0 min (915.1 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.95'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.95' Phase-In= 0.01'
#2	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 13.24 hrs HW=31.40' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.95' TW=28.18' (Dynamic Tailwater)

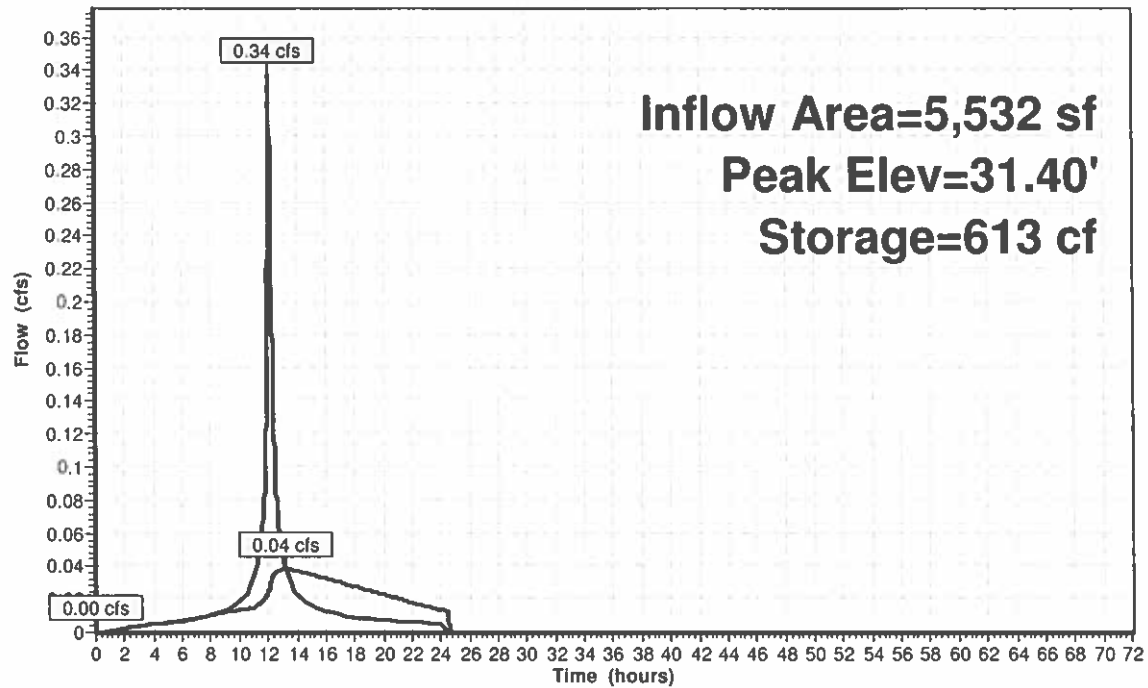
↑ **2=Culvert** (Controls 0.00 cfs)

↑ **3=Orifice** (Controls 0.00 cfs)

↑ **4=Grate eL 33.2** (Controls 0.00 cfs)

Pond PB-D: Inf./Detention Basins 'D'

Hydrograph



Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 4.32" for 25-Year event
 Inflow = 0.43 cfs @ 12.14 hrs, Volume= 1,993 cf
 Outflow = 0.05 cfs @ 13.34 hrs, Volume= 1,993 cf, Atten= 89%, Lag= 72.0 min
 Discarded = 0.05 cfs @ 13.34 hrs, Volume= 1,993 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.79' @ 13.34 hrs Surf.Area= 702 sf Storage= 830 cf

Plug-Flow detention time= 189.0 min calculated for 1,992 cf (100% of inflow)
 Center-of-Mass det. time= 189.0 min (948.2 - 759.2)

Volume	Invert	Avail.Storage	Storage Description
#1	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.95'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.95' Phase-In= 0.01'
#2	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 13.34 hrs HW=31.79' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.95' TW=28.18' (Dynamic Tailwater)

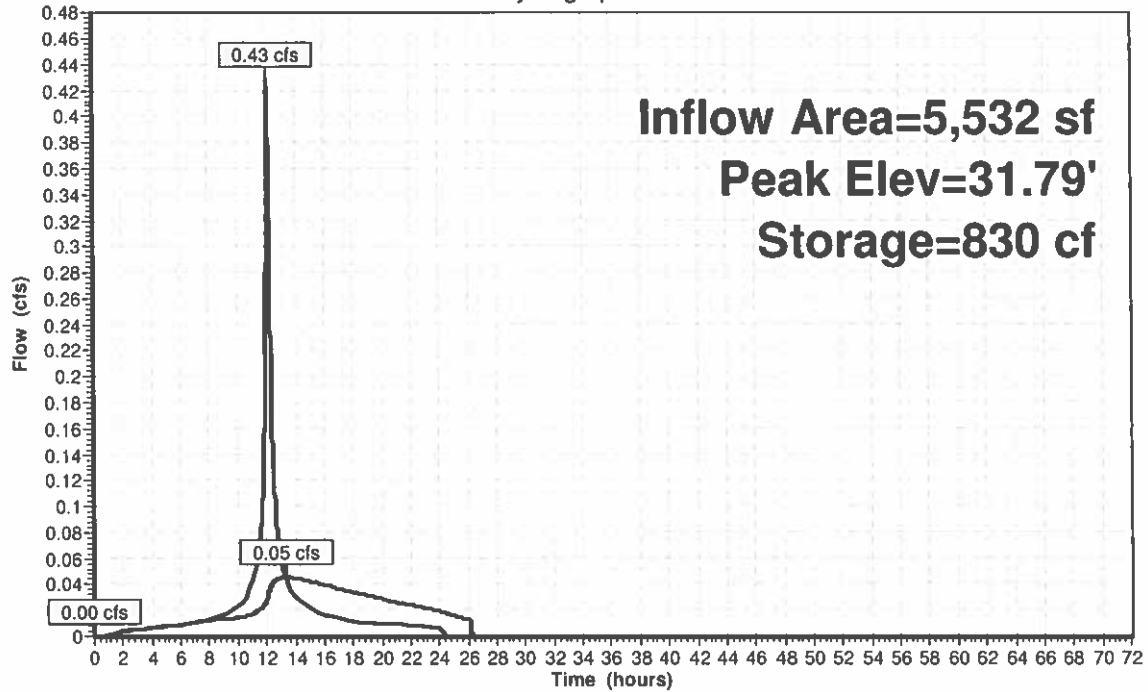
↑ **2=Culvert** (Controls 0.00 cfs)

↑ **3=Orifice** (Controls 0.00 cfs)

↑ **4=Grate eL 33.2** (Controls 0.00 cfs)

Pond PB-D: Inf./Detention Basins 'D'

Hydrograph



Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 6.23" for 100-Year event
 Inflow = 0.63 cfs @ 12.14 hrs, Volume= 2,873 cf
 Outflow = 0.12 cfs @ 12.74 hrs, Volume= 2,873 cf, Atten= 81%, Lag= 36.0 min
 Discarded = 0.06 cfs @ 12.74 hrs, Volume= 2,757 cf
 Primary = 0.06 cfs @ 12.74 hrs, Volume= 116 cf
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.59' @ 12.74 hrs Surf.Area= 702 sf Storage= 1,182 cf

Plug-Flow detention time= 215.4 min calculated for 2,873 cf (100% of inflow)
 Center-of-Mass det. time= 215.3 min (975.0 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.95'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 27.95' Phase-In= 0.01'
#2	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.74 hrs HW=32.59' (Free Discharge)

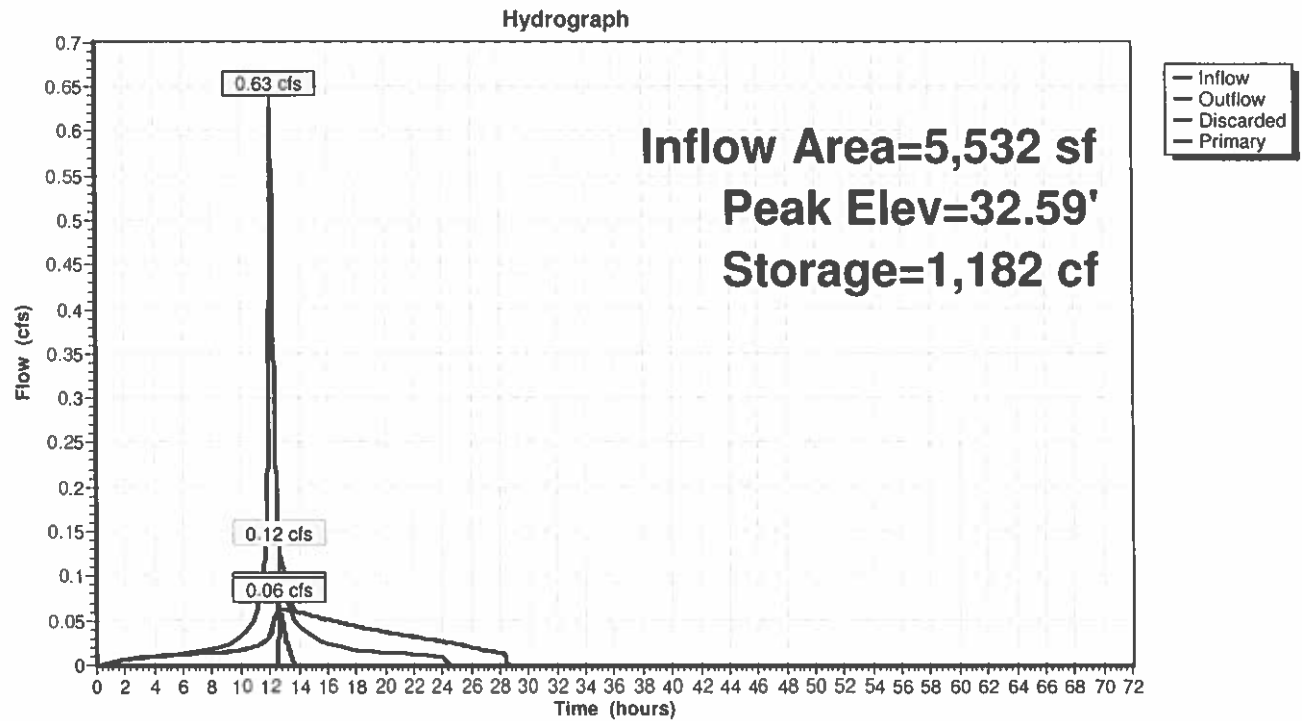
↑ **1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.06 cfs @ 12.74 hrs HW=32.59' TW=30.57' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.06 cfs of 11.44 cfs potential flow)

↑ **3=Orifice** (Orifice Controls 0.06 cfs @ 1.28 fps)

↑ **4=Grate eL 33.2** (Controls 0.00 cfs)

Pond PB-D: Inf./Detention Basins 'D'

Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 1.31" for 2-Year event
 Inflow = 0.43 cfs @ 12.14 hrs, Volume= 1,886 cf
 Outflow = 0.06 cfs @ 12.99 hrs, Volume= 1,886 cf, Atten= 86%, Lag= 51.0 min
 Discarded = 0.06 cfs @ 12.99 hrs, Volume= 1,886 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 29.04' @ 12.99 hrs Surf.Area= 1,548 sf Storage= 655 cf

Plug-Flow detention time= 90.9 min calculated for 1,886 cf (100% of inflow)
 Center-of-Mass det. time= 90.9 min (852.1 - 761.2)

Volume	Invert	Avail.Storage	Storage Description
#1	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	28.18'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 26.18' Phase-In= 0.01'
#2	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.99 hrs HW=29.04' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.06 cfs)

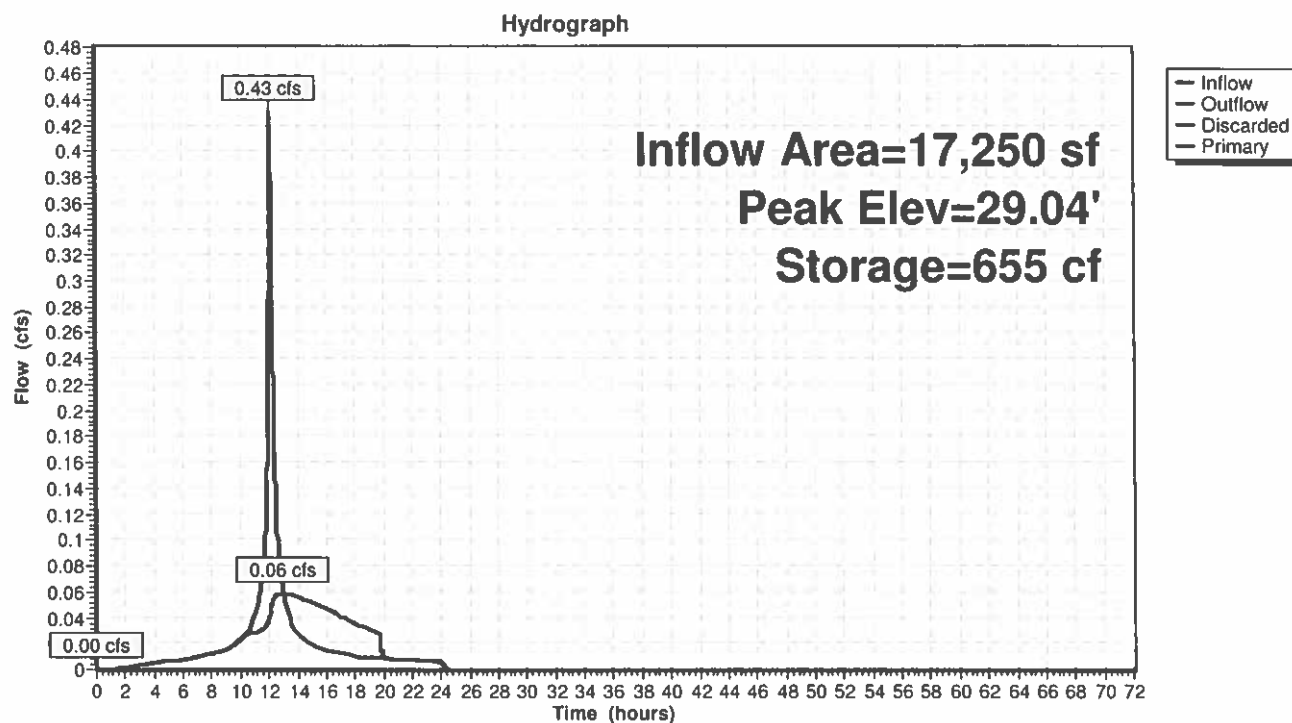
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=28.18' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.00 cfs of 0.21 cfs potential flow)

↑ **3=Orifice** (Controls 0.00 cfs)

↑ **4=Grate El. 32.10** (Controls 0.00 cfs)

Pond PB-E: Inf./Detention Basins 'E'



Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 2.15" for 10-Year event
 Inflow = 0.67 cfs @ 12.14 hrs, Volume= 3,084 cf
 Outflow = 0.08 cfs @ 13.21 hrs, Volume= 3,084 cf, Atten= 88%, Lag= 64.5 min
 Discarded = 0.08 cfs @ 13.21 hrs, Volume= 3,084 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 29.50' @ 13.21 hrs Surf.Area= 1,548 sf Storage= 1,191 cf

Plug-Flow detention time= 144.0 min calculated for 3,084 cf (100% of inflow)
 Center-of-Mass det. time= 144.0 min (904.4 - 760.4)

Volume	Invert	Avail.Storage	Storage Description
#1	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	28.18'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 26.18' Phase-In= 0.01'
#2	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 13.21 hrs HW=29.50' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.08 cfs)

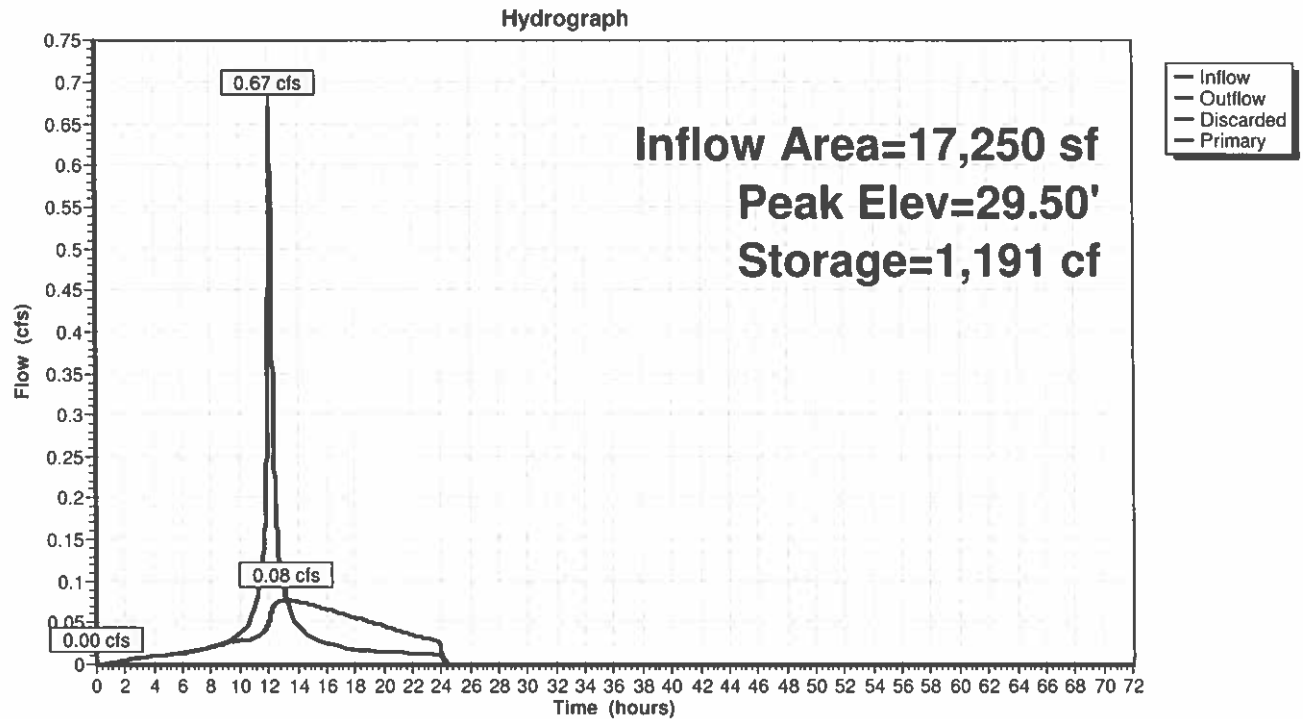
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=28.18' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.00 cfs of 0.21 cfs potential flow)

↑ **3=Orifice** (Controls 0.00 cfs)

↑ **4=Grate El. 32.10** (Controls 0.00 cfs)

Pond PB-E: Inf./Detention Basins 'E'



Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 2.78" for 25-Year event
 Inflow = 0.86 cfs @ 12.14 hrs, Volume= 3,998 cf
 Outflow = 0.09 cfs @ 13.34 hrs, Volume= 3,998 cf, Atten= 89%, Lag= 72.1 min
 Discarded = 0.09 cfs @ 13.34 hrs, Volume= 3,998 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 29.85' @ 13.34 hrs Surf.Area= 1,548 sf Storage= 1,626 cf

Plug-Flow detention time= 178.0 min calculated for 3,997 cf (100% of inflow)
 Center-of-Mass det. time= 178.0 min (939.0 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	28.18'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 26.18' Phase-In= 0.01'
#2	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 13.34 hrs HW=29.85' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=28.18' TW=0.00' (Dynamic Tailwater)

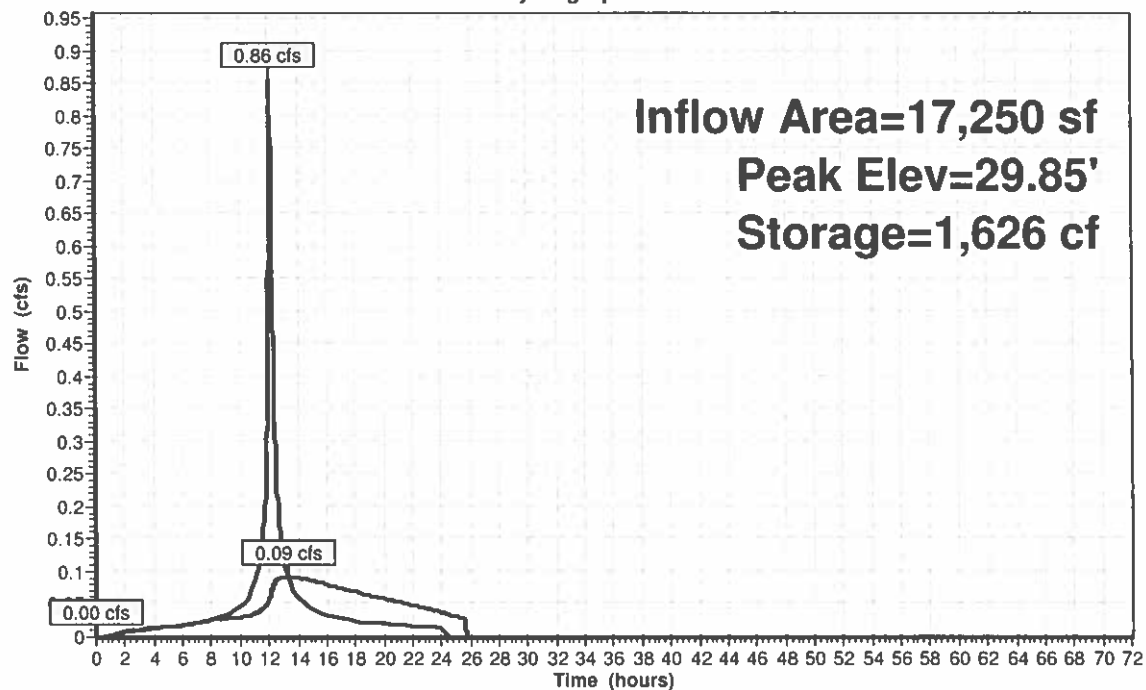
↑ **2=Culvert** (Passes 0.00 cfs of 0.21 cfs potential flow)

↑ **3=Orifice** (Controls 0.00 cfs)

↑ **4=Grate El. 32.10** (Controls 0.00 cfs)

Pond PB-E: Inf./Detention Basins 'E'

Hydrograph



Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 4.12" for 100-Year event
 Inflow = 1.26 cfs @ 12.14 hrs, Volume= 5,921 cf
 Outflow = 0.14 cfs @ 13.42 hrs, Volume= 5,921 cf, Atten= 89%, Lag= 76.6 min
 Discarded = 0.14 cfs @ 13.42 hrs, Volume= 5,919 cf
 Primary = 0.00 cfs @ 13.42 hrs, Volume= 2 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.83' @ 13.42 hrs Surf.Area= 1,548 sf Storage= 2,615 cf

Plug-Flow detention time= 226.0 min calculated for 5,920 cf (100% of inflow)
 Center-of-Mass det. time= 226.0 min (988.5 - 762.5)

Volume	Invert	Avail.Storage	Storage Description
#1	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	28.18'	0.775 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 26.18' Phase-In= 0.01'
#2	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#3	Device 2	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 13.42 hrs HW=30.83' (Free Discharge)

↳ **1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 13.42 hrs HW=30.83' TW=0.00' (Dynamic Tailwater)

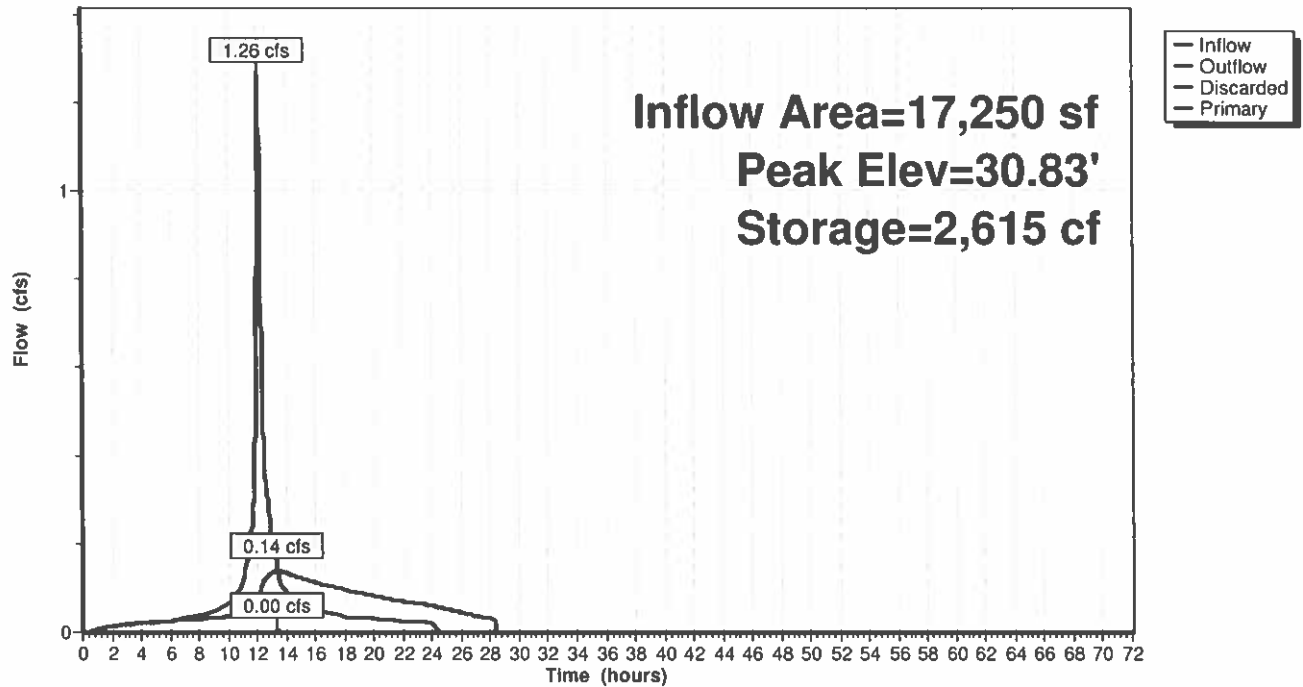
↳ **2=Culvert** (Passes 0.00 cfs of 11.97 cfs potential flow)

↳ **3=Orifice** (Orifice Controls 0.00 cfs @ 0.62 fps)

↳ **4=Grate El. 32.10** (Controls 0.00 cfs)

Pond PB-E: Inf./Detention Basins 'E'

Hydrograph

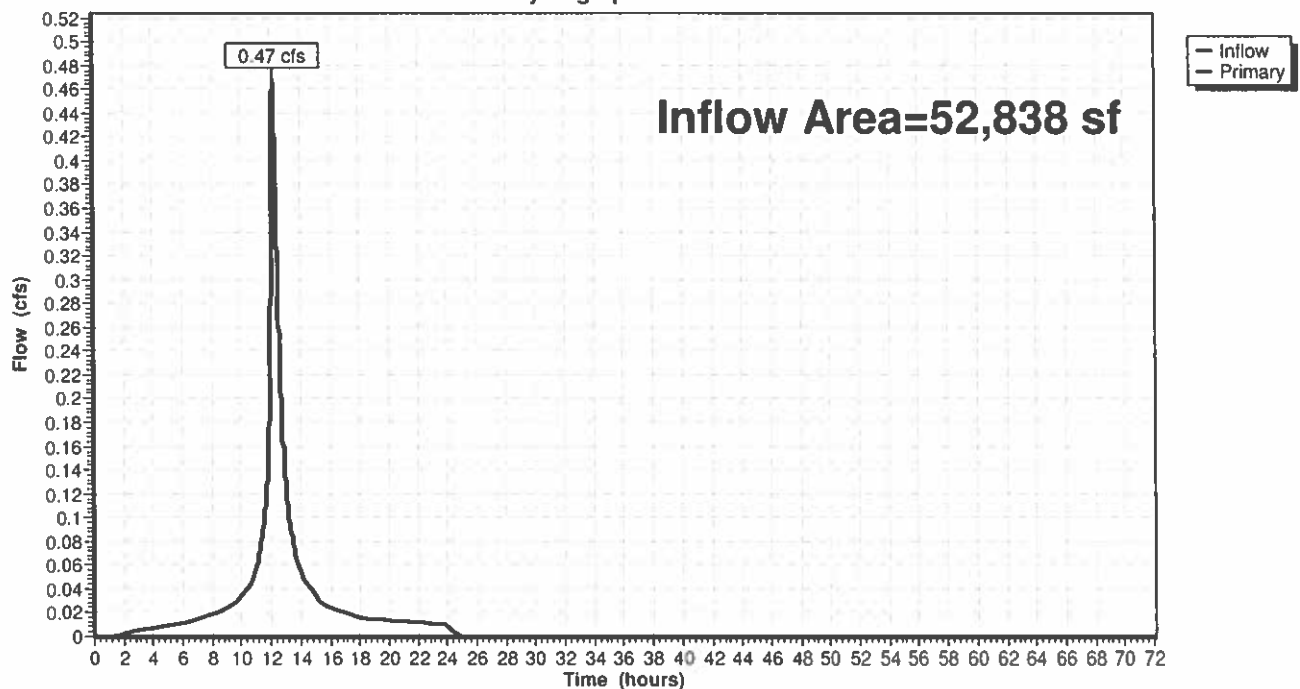


A-5 – POST-DEVELOPED – TOTAL

Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 0.68" for 2-Year event
Inflow = 0.47 cfs @ 12.23 hrs, Volume= 2,973 cf
Primary = 0.47 cfs @ 12.23 hrs, Volume= 2,973 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total**Hydrograph**

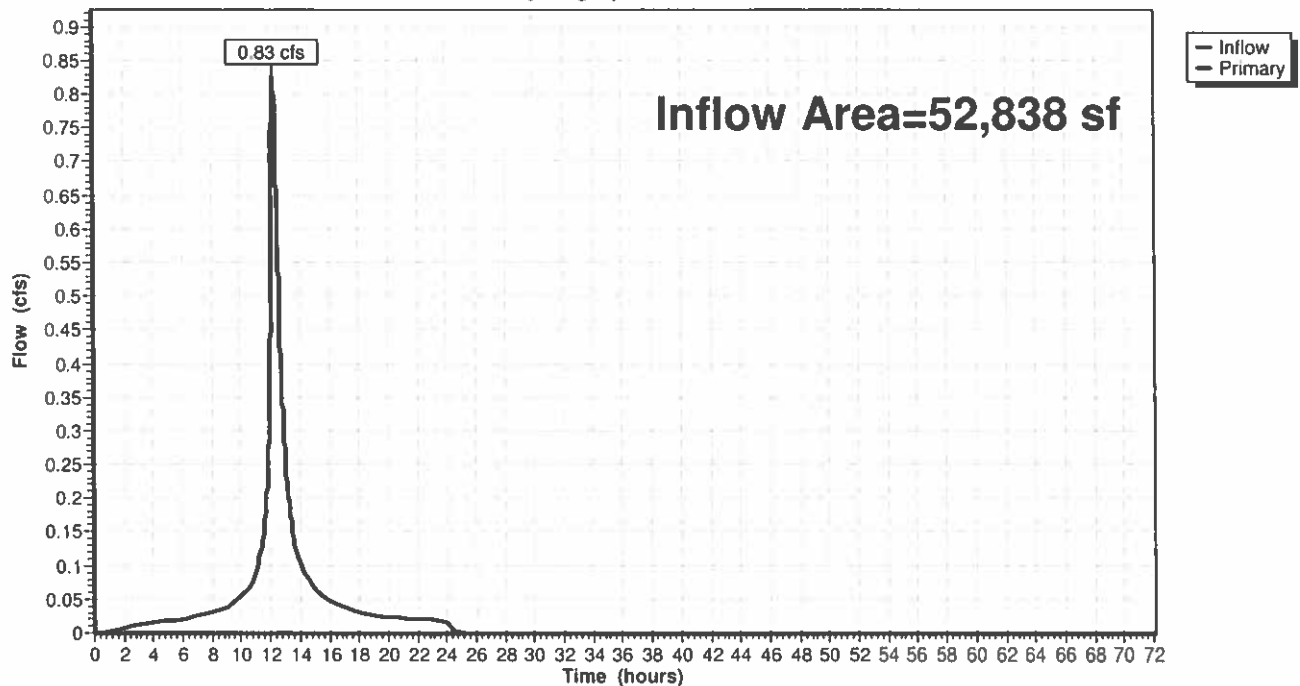
Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 1.22" for 10-Year event
Inflow = 0.83 cfs @ 12.26 hrs, Volume= 5,387 cf
Primary = 0.83 cfs @ 12.26 hrs, Volume= 5,387 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total

Hydrograph



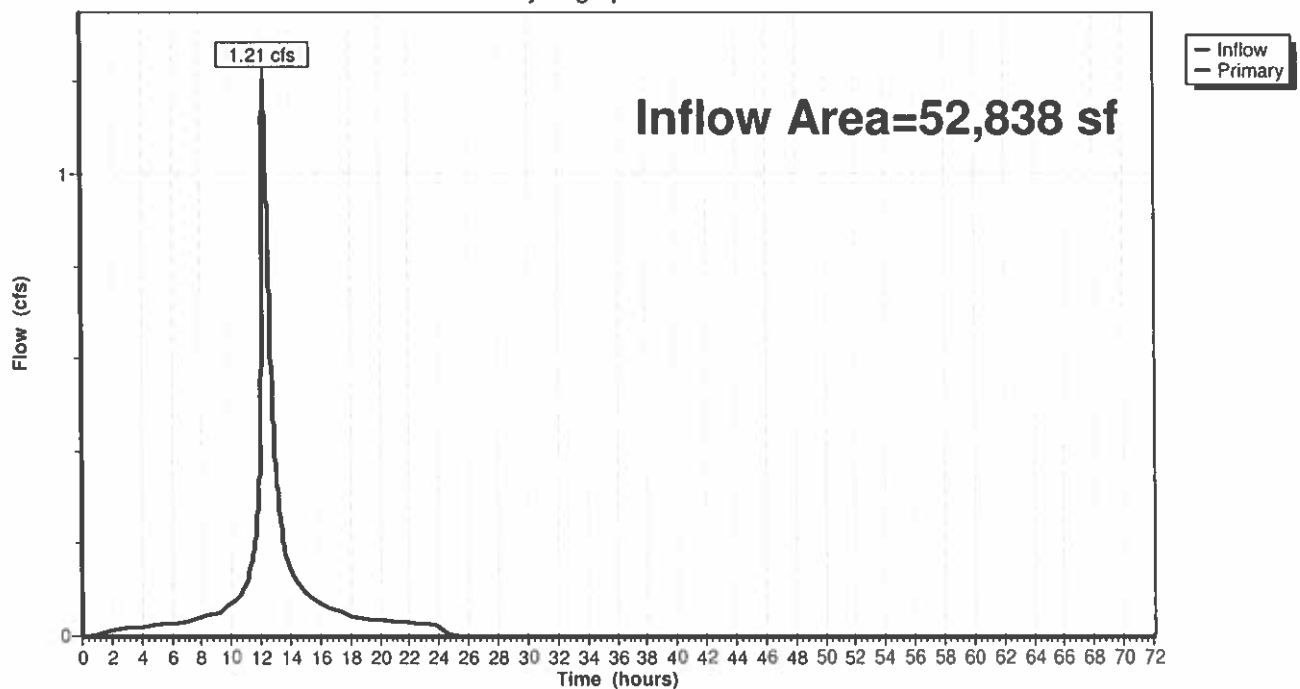
Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 1.67" for 25-Year event
Inflow = 1.21 cfs @ 12.24 hrs, Volume= 7,371 cf
Primary = 1.21 cfs @ 12.24 hrs, Volume= 7,371 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total

Hydrograph



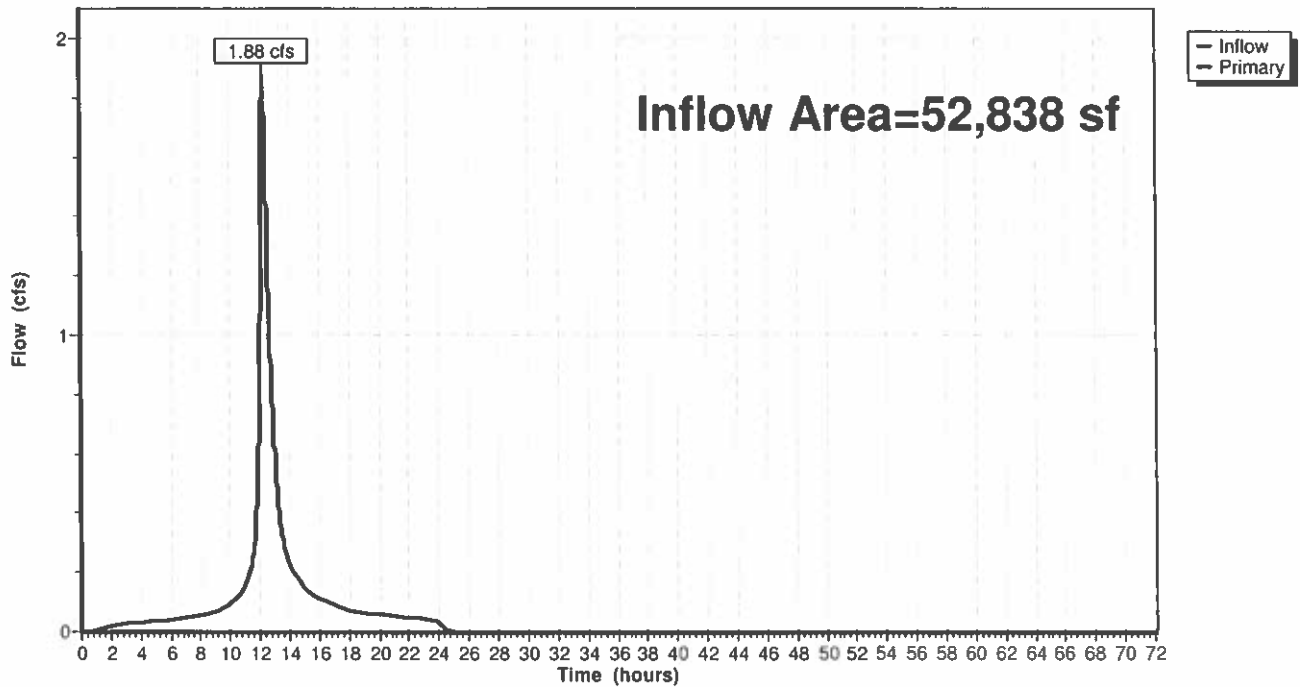
Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 2.62" for 100-Year event
Inflow = 1.88 cfs @ 12.23 hrs, Volume= 11,544 cf
Primary = 1.88 cfs @ 12.23 hrs, Volume= 11,544 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total

Hydrograph



A-6 – HYDROGRAPH SUMMARY - FAILURE ANALYSIS

174 Church Street no Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Page 1

Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 0.40 cfs @ 12.24 hrs, Volume= 2,537 cf, Depth= 2.64"
Routed to Link PT-1 : Post - Total

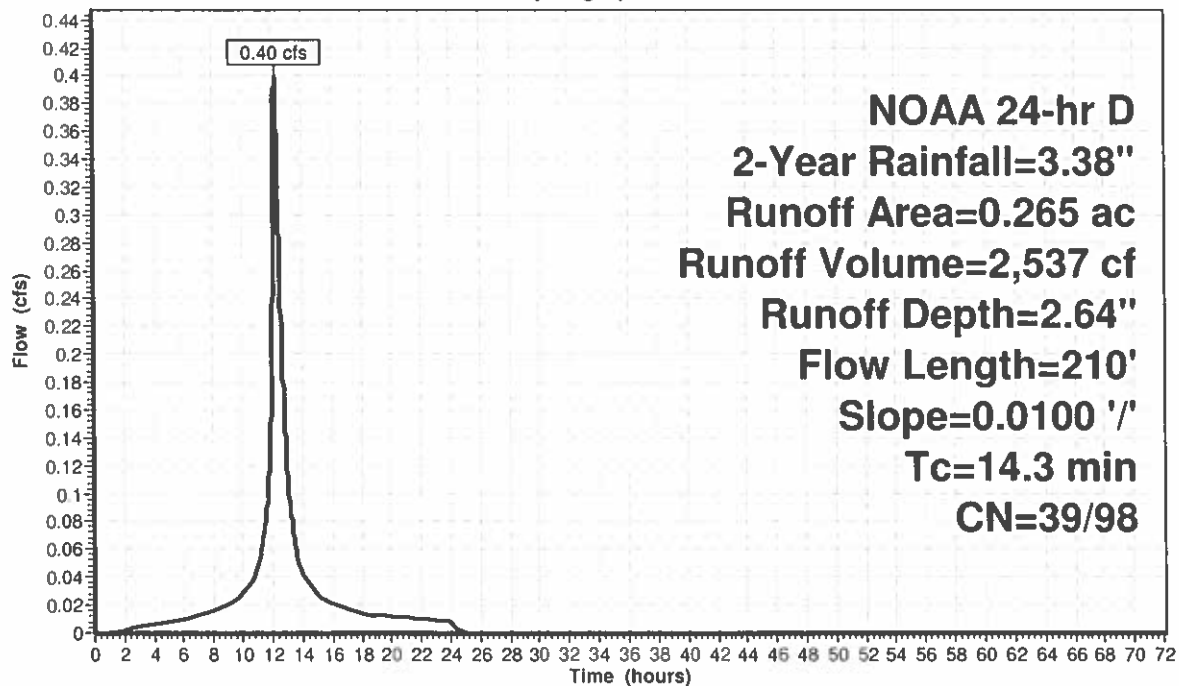
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concent. grass Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 0.62 cfs @ 12.24 hrs, Volume= 4,062 cf, Depth= 4.22"
Routed to Link PT-1 : Post - Total

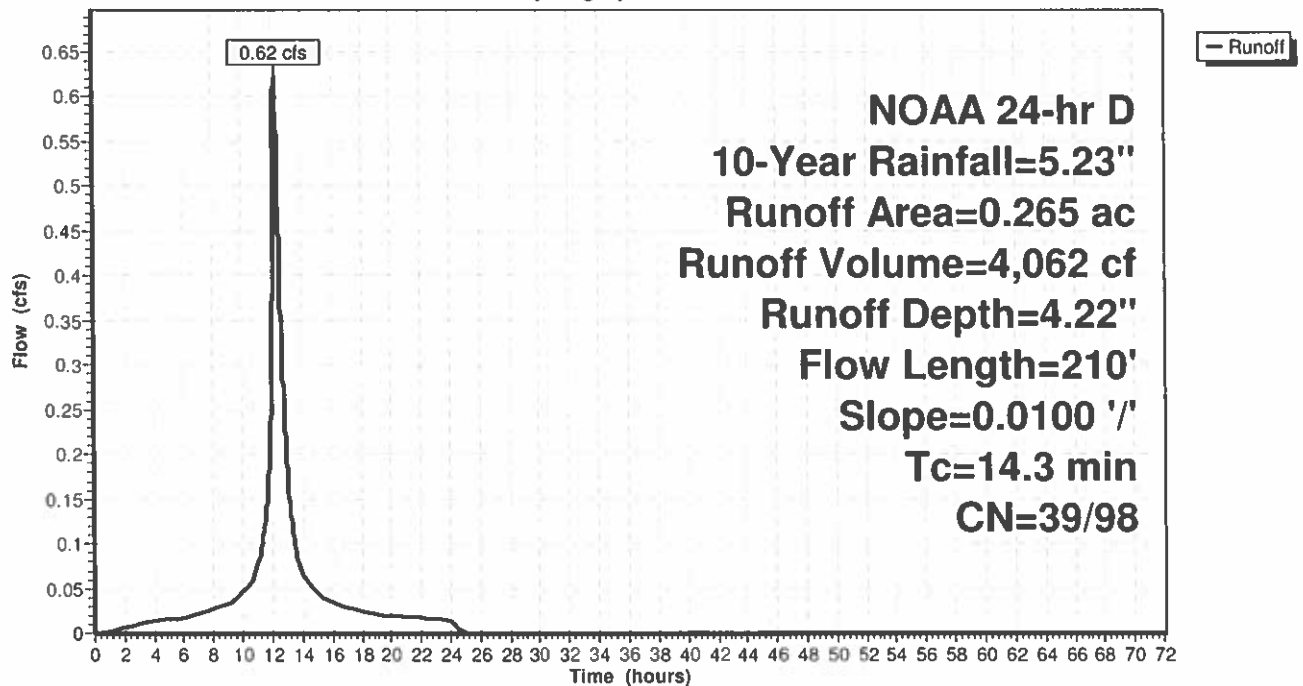
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concentr. grass Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1: Post - DA#1 (Osborn St)

Runoff = 0.78 cfs @ 12.24 hrs, Volume= 5,165 cf, Depth= 5.37"
Routed to Link PT-1 : Post - Total

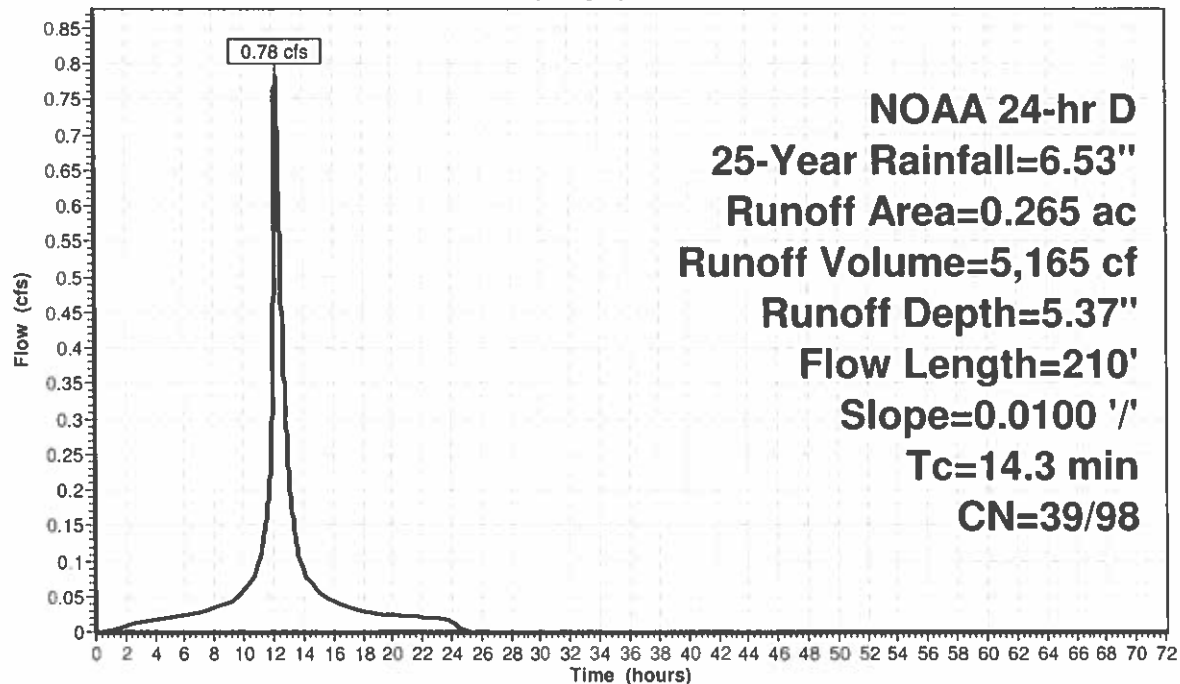
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
* 0.195	98	Road
0.043	39	>75% Grass cover, Good, HSG A
* 0.027	98	Sidewalks & Driveway Aprons
0.265	88	Weighted Average
0.043	39	16.23% Pervious Area
0.222	98	83.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0100	0.08		Sheet Flow, sheet flow grass Grass: Dense n= 0.240 P2= 3.38"
3.8	160	0.0100	0.70		Shallow Concentrated Flow, shallow concent. grass Short Grass Pasture Kv= 7.0 fps
14.3	210	Total			

Subcatchment P-1: Post - DA#1 (Osborn St)

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1A: Post DA #1A

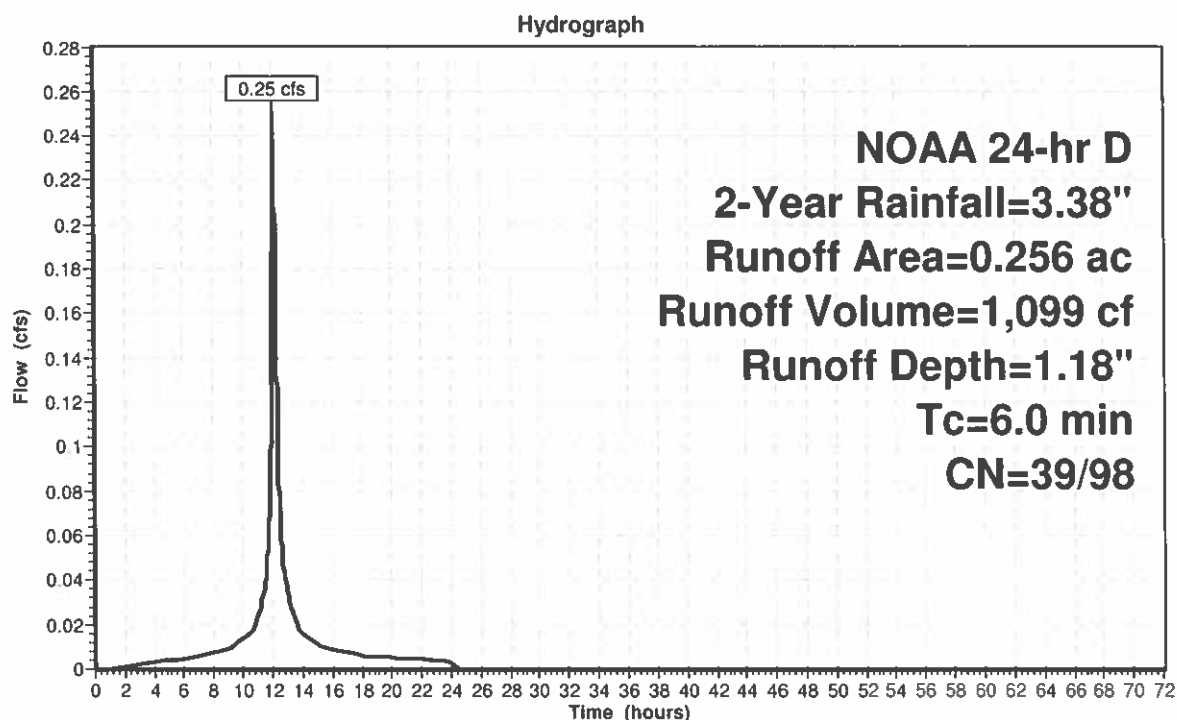
Runoff = 0.25 cfs @ 12.14 hrs, Volume= 1,099 cf, Depth= 1.18"
Routed to Pond PB-A : Inf/Detention Basin A

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A



174 Church Street no Infiltration

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 1,885 cf, Depth= 2.03"
Routed to Pond PB-A : Inf/Detention Basin A

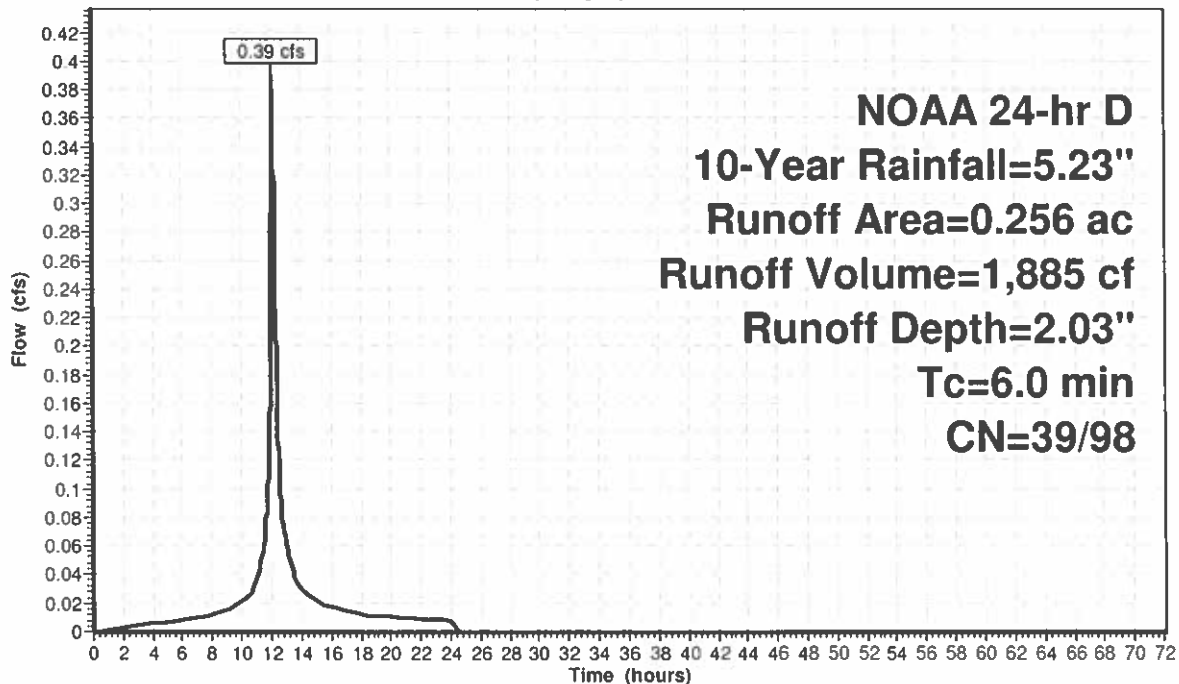
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.51 cfs @ 12.14 hrs, Volume= 2,545 cf, Depth= 2.74"
Routed to Pond PB-A : Inf/Detention Basin A

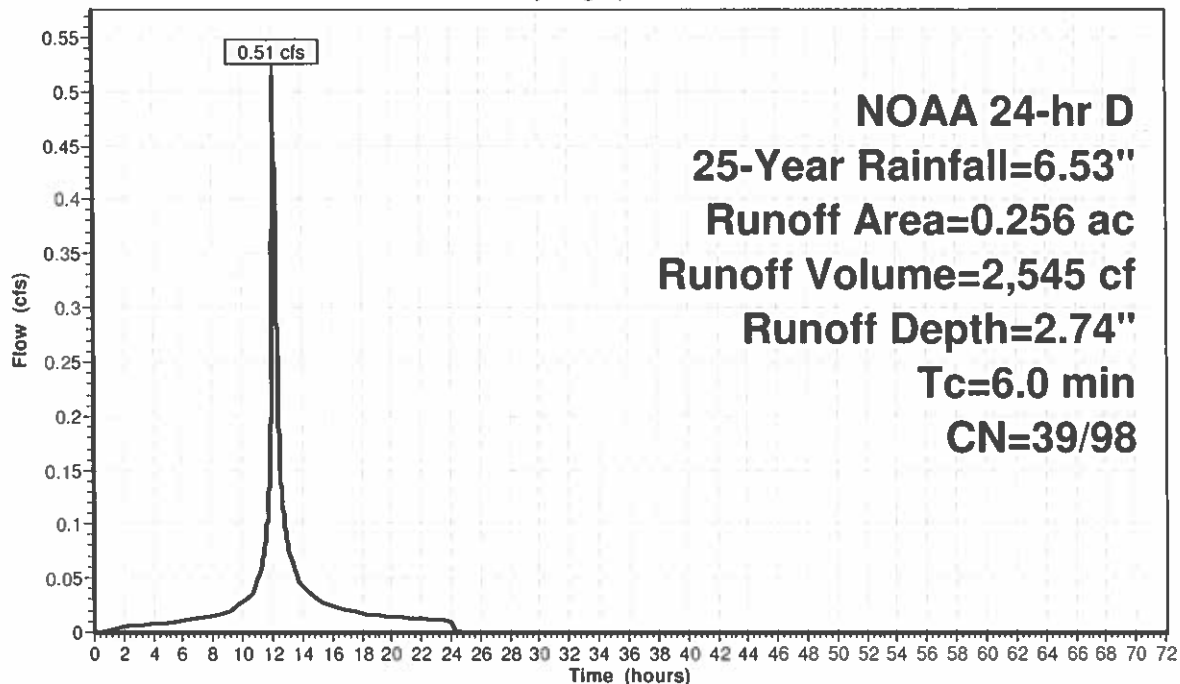
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
* 0.096	98	Porches, Walkways, & Driveways
0.160	39	>75% Grass cover, Good, HSG A
0.256	61	Weighted Average
0.160	39	62.50% Pervious Area
0.096	98	37.50% Impervious Area

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

Subcatchment P-1A: Post DA #1A

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 1.18" for 2-Year event
 Inflow = 0.25 cfs @ 12.14 hrs, Volume= 1,099 cf
 Outflow = 0.18 cfs @ 12.25 hrs, Volume= 1,098 cf, Atten= 30%, Lag= 6.7 min
 Primary = 0.18 cfs @ 12.25 hrs, Volume= 1,098 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Automatic Starting Elev= 28.00' Surf.Area= 740 sf Storage= 499 cf
 Peak Elev= 28.30' @ 12.25 hrs Surf.Area= 740 sf Storage= 665 cf (166 cf above start)

Plug-Flow detention time= 308.4 min calculated for 599 cf (55% of inflow)
 Center-of-Mass det. time= 45.0 min (807.0 - 762.0)

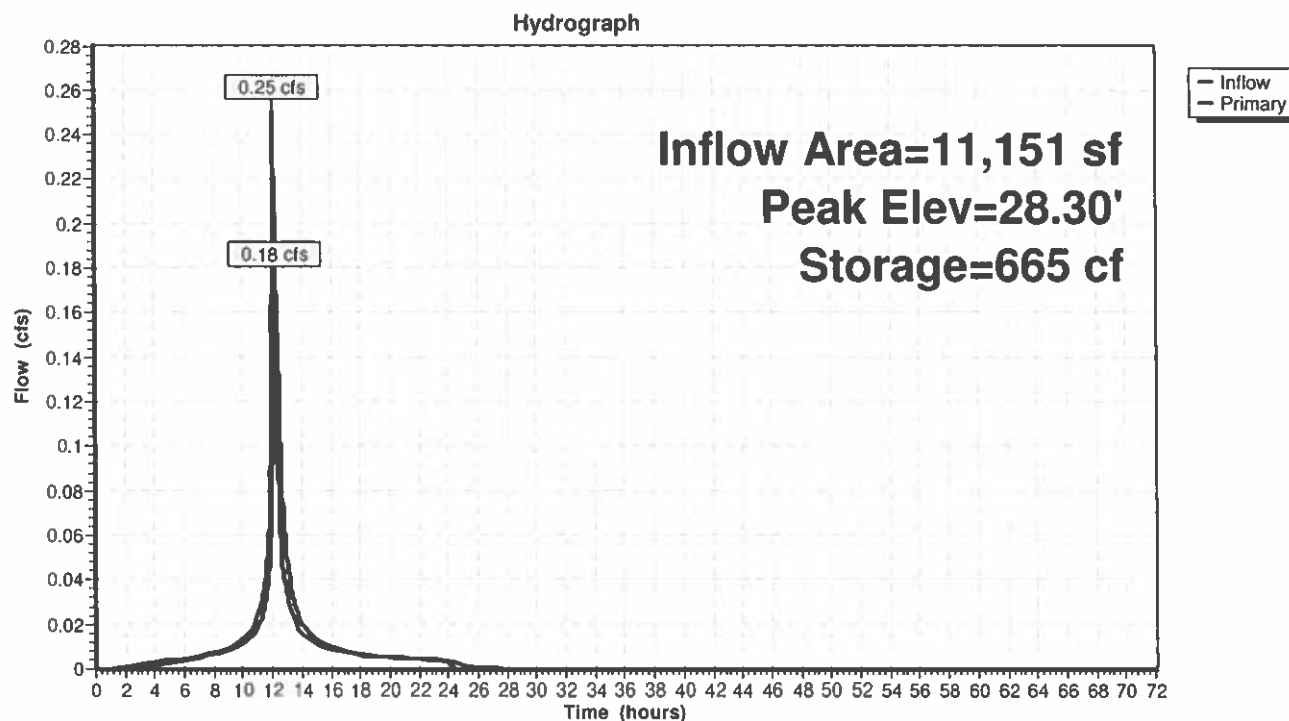
Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
		1,054 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 12.25 hrs HW=28.30' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.18 cfs of 11.32 cfs potential flow)
- 2=Orifice (Orifice Controls 0.18 cfs @ 1.86 fps)
- 3=Grate El. 31.0 (Controls 0.00 cfs)

Pond PB-A: Inf/Detention Basin A



174 Church Street no Infiltration

NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 2.03" for 10-Year event
 Inflow = 0.39 cfs @ 12.14 hrs, Volume= 1,885 cf
 Outflow = 0.26 cfs @ 12.26 hrs, Volume= 1,884 cf, Atten= 33%, Lag= 7.4 min
 Primary = 0.26 cfs @ 12.26 hrs, Volume= 1,884 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Automatic Starting Elev= 28.00' Surf.Area= 740 sf Storage= 499 cf
 Peak Elev= 28.43' @ 12.26 hrs Surf.Area= 740 sf Storage= 736 cf (237 cf above start)

Plug-Flow detention time= 230.6 min calculated for 1,385 cf (73% of inflow)
 Center-of-Mass det. time= 35.8 min (808.8 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
1,054 cf			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.26 cfs @ 12.26 hrs HW=28.43' TW=0.00' (Dynamic Tailwater)

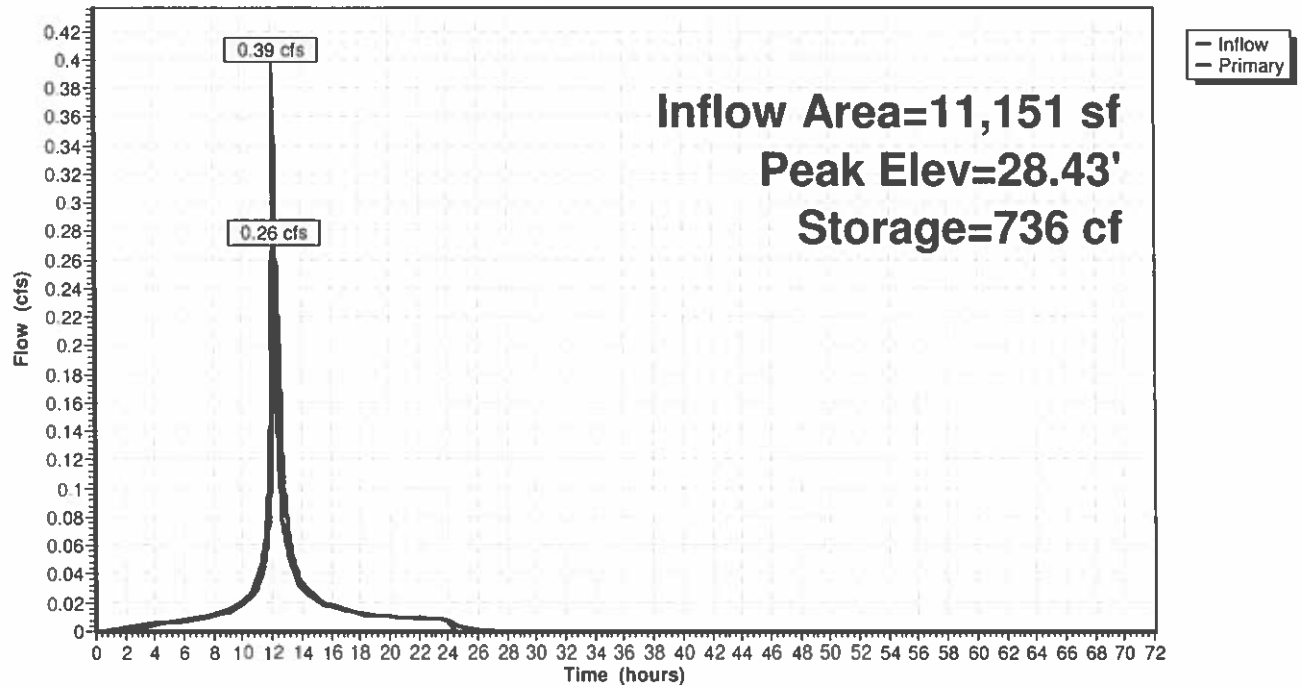
1=Culvert (Passes 0.26 cfs of 11.53 cfs potential flow)

2=Orifice (Orifice Controls 0.26 cfs @ 2.37 fps)

3=Grate El. 31.0 (Controls 0.00 cfs)

Pond PB-A: Inf/Detention Basin A

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Pond PB-A: Inf/Detention Basin A

Inflow Area = 11,151 sf, 37.50% Impervious, Inflow Depth = 2.74" for 25-Year event
 Inflow = 0.51 cfs @ 12.14 hrs, Volume= 2,545 cf
 Outflow = 0.33 cfs @ 12.29 hrs, Volume= 2,545 cf, Atten= 36%, Lag= 8.7 min
 Primary = 0.33 cfs @ 12.29 hrs, Volume= 2,545 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Automatic Starting Elev= 28.00' Surf.Area= 740 sf Storage= 499 cf
 Peak Elev= 28.57' @ 12.29 hrs Surf.Area= 740 sf Storage= 806 cf (308 cf above start)

Plug-Flow detention time= 194.1 min calculated for 2,046 cf (80% of inflow)
 Center-of-Mass det. time= 31.6 min (810.3 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	26.80'	531 cf	2.50'W x 74.00'L x 2.50'H Stone Trench x 4 1,850 cf Overall - 523 cf Embedded = 1,327 cf x 40.0% Voids
#2	27.30'	523 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 74.0'
		1,054 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	24.00'	15.0" Round Culvert L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 24.00' / 23.90' S= 0.0050 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	28.00'	4.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	29.28'	24.0" x 48.0" Horiz. Grate El. 31.0 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 12.29 hrs HW=28.57' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.33 cfs of 11.73 cfs potential flow)

2=Orifice (Orifice Controls 0.33 cfs @ 2.97 fps)

3=Grate El. 31.0 (Controls 0.00 cfs)

174 Church Street no Infiltration

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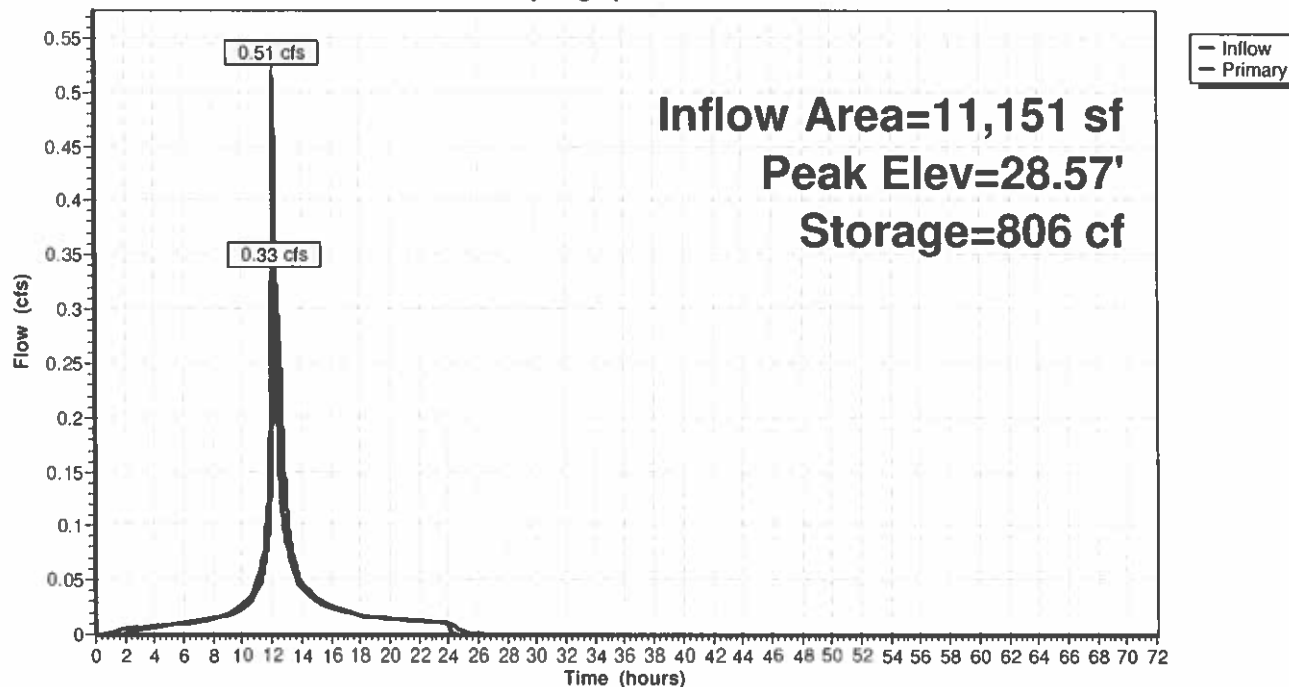
NOAA 24-hr D 25-Year Rainfall=6.53"

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Pond PB-A: Inf/Detention Basin A

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Page 4

Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 400 cf, Depth= 1.70"
Routed to Pond PB-B : Inf./Detention Basin B

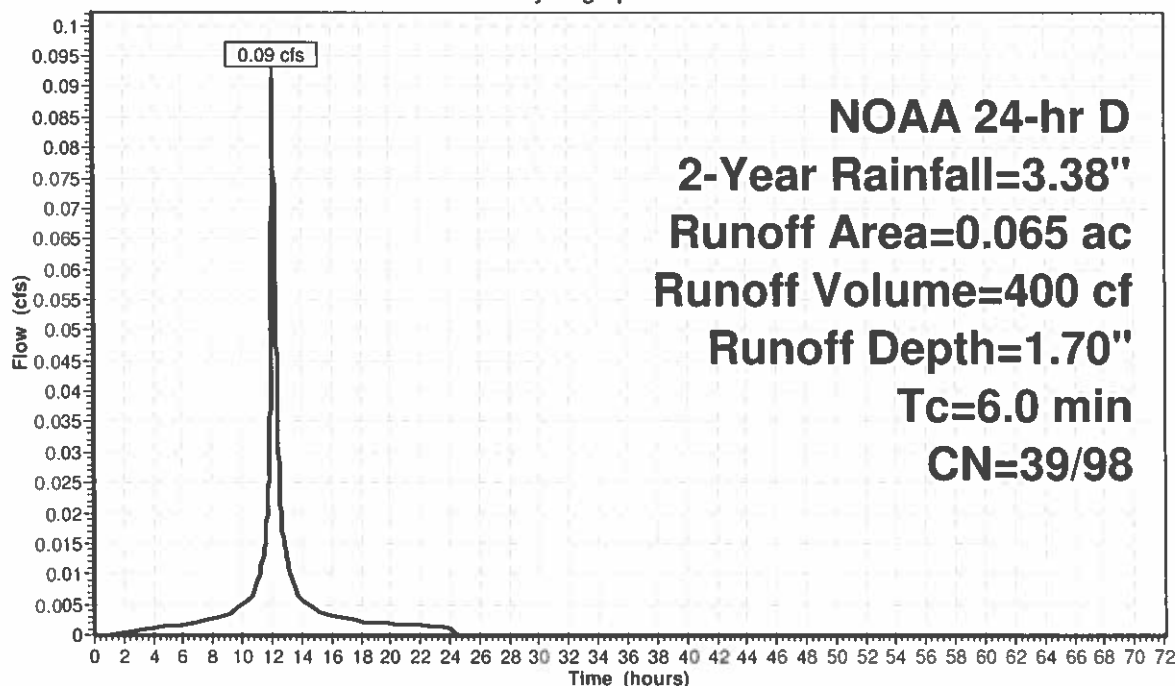
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 661 cf, Depth= 2.80"
Routed to Pond PB-B : Inf./Detention Basin B

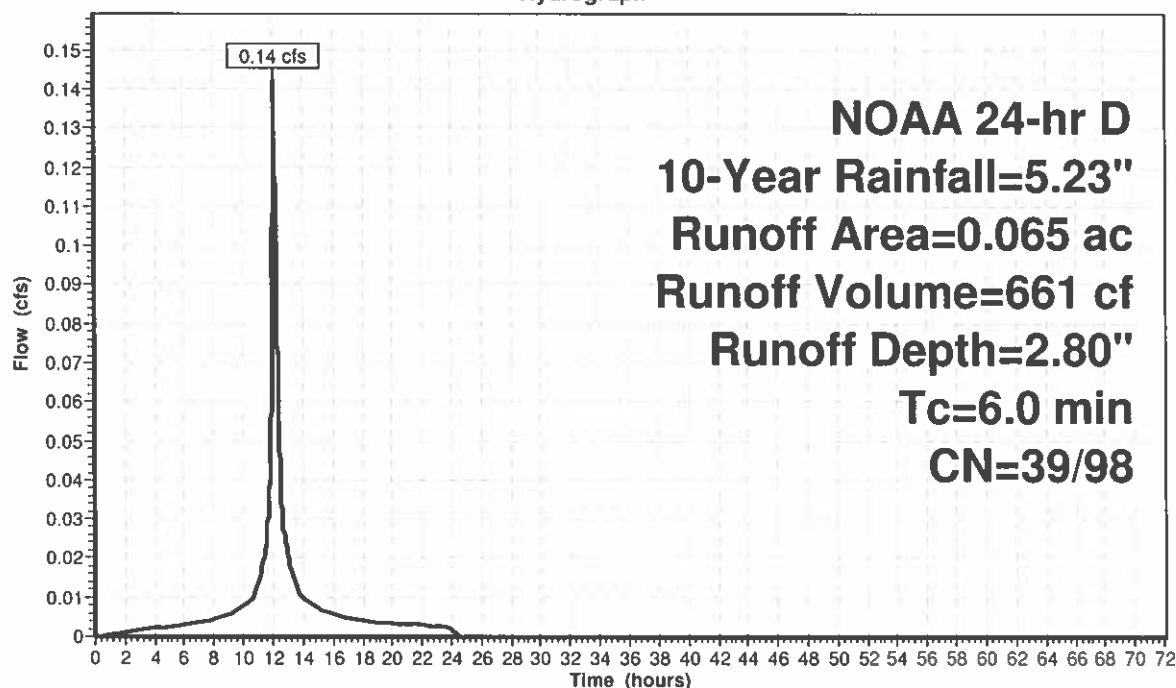
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1B: Post - DA #1B

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 865 cf, Depth= 3.67"
Routed to Pond PB-B : Inf./Detention Basin B

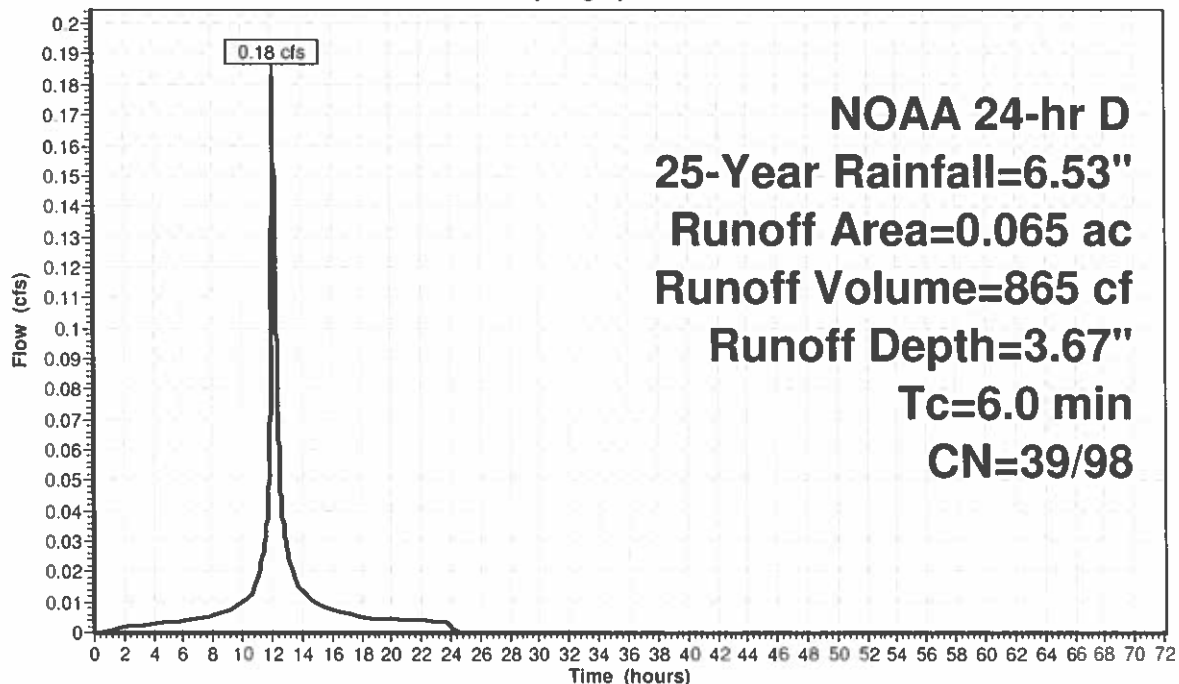
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.030	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.065	71	Weighted Average
0.030	39	46.15% Pervious Area
0.035	98	53.85% Impervious Area

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

Subcatchment P-1B: Post - DA #1B

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 1.70" for 2-Year event
 Inflow = 0.09 cfs @ 12.14 hrs, Volume= 400 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
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.51' @ 24.66 hrs Surf.Area= 380 sf Storage= 400 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	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑1=Grate El. 32.8 (Controls 0.00 cfs)

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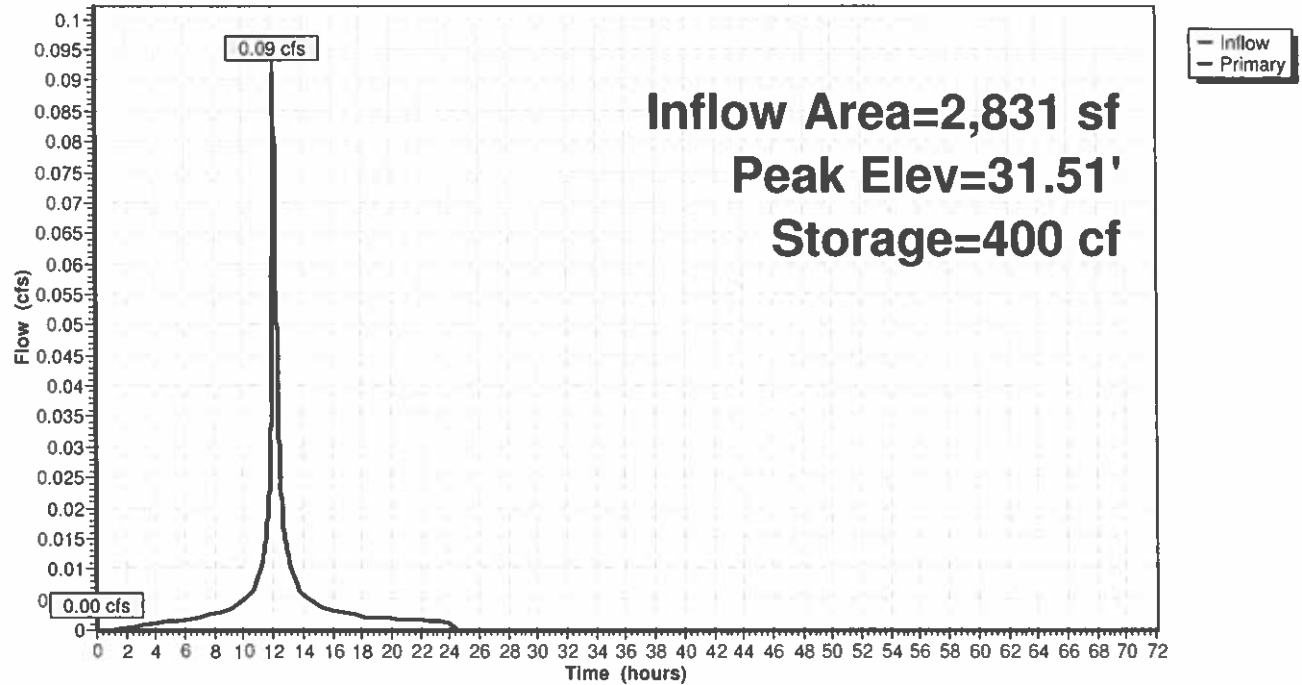
NOAA 24-hr D 2-Year Rainfall=3.38"

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Pond PB-B: Inf./Detention Basin B

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 2.80" for 10-Year event
 Inflow = 0.14 cfs @ 12.14 hrs, Volume= 661 cf
 Outflow = 0.01 cfs @ 15.16 hrs, Volume= 123 cf, Atten= 95%, Lag= 181.5 min
 Primary = 0.01 cfs @ 15.16 hrs, Volume= 123 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.28' @ 15.16 hrs Surf.Area= 380 sf Storage= 539 cf

Plug-Flow detention time= 680.3 min calculated for 123 cf (19% of inflow)
 Center-of-Mass det. time= 371.1 min (1,134.4 - 763.3)

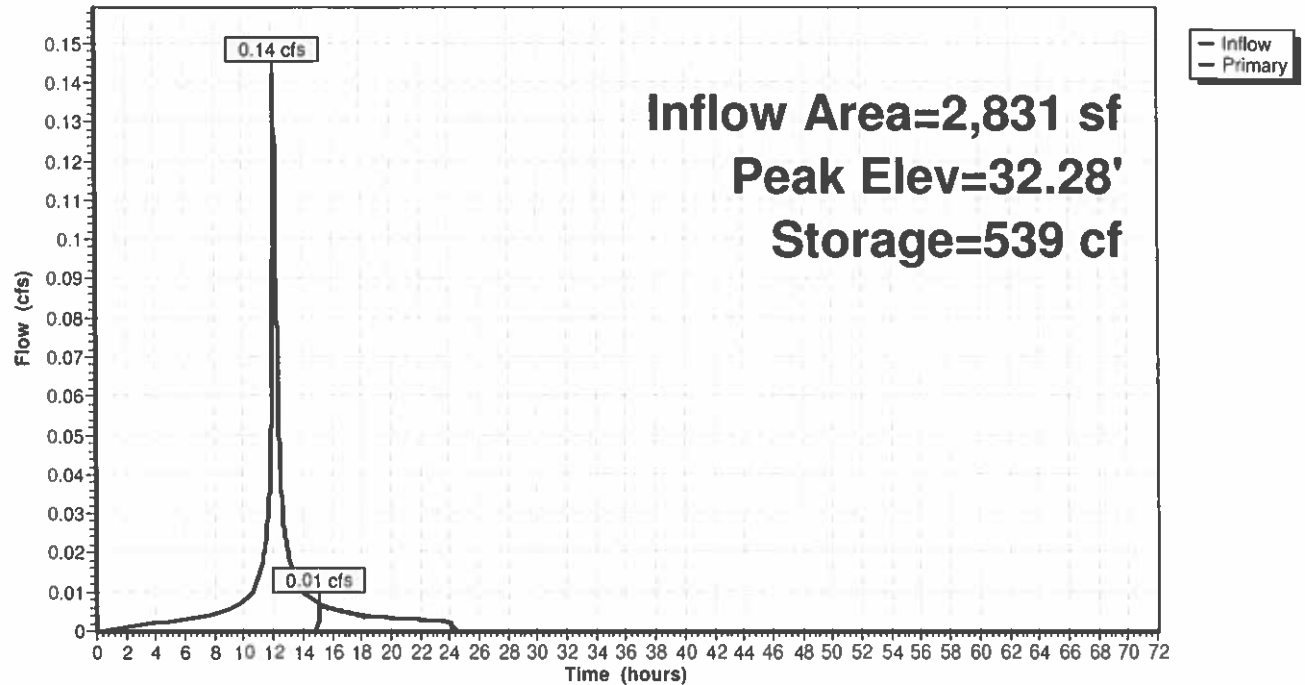
Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 15.16 hrs HW=32.28' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Grate El. 32.8** (Weir Controls 0.01 cfs @ 0.16 fps)

Pond PB-B: Inf./Detention Basin B

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Pond PB-B: Inf./Detention Basin B

Inflow Area = 2,831 sf, 53.85% Impervious, Inflow Depth = 3.67" for 25-Year event
 Inflow = 0.18 cfs @ 12.14 hrs, Volume= 865 cf
 Outflow = 0.04 cfs @ 12.63 hrs, Volume= 327 cf, Atten= 76%, Lag= 29.3 min
 Primary = 0.04 cfs @ 12.63 hrs, Volume= 327 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.29' @ 12.63 hrs Surf.Area= 380 sf Storage= 539 cf

Plug-Flow detention time= 400.9 min calculated for 327 cf (38% of inflow)
 Center-of-Mass det. time= 210.3 min (975.5 - 765.2)

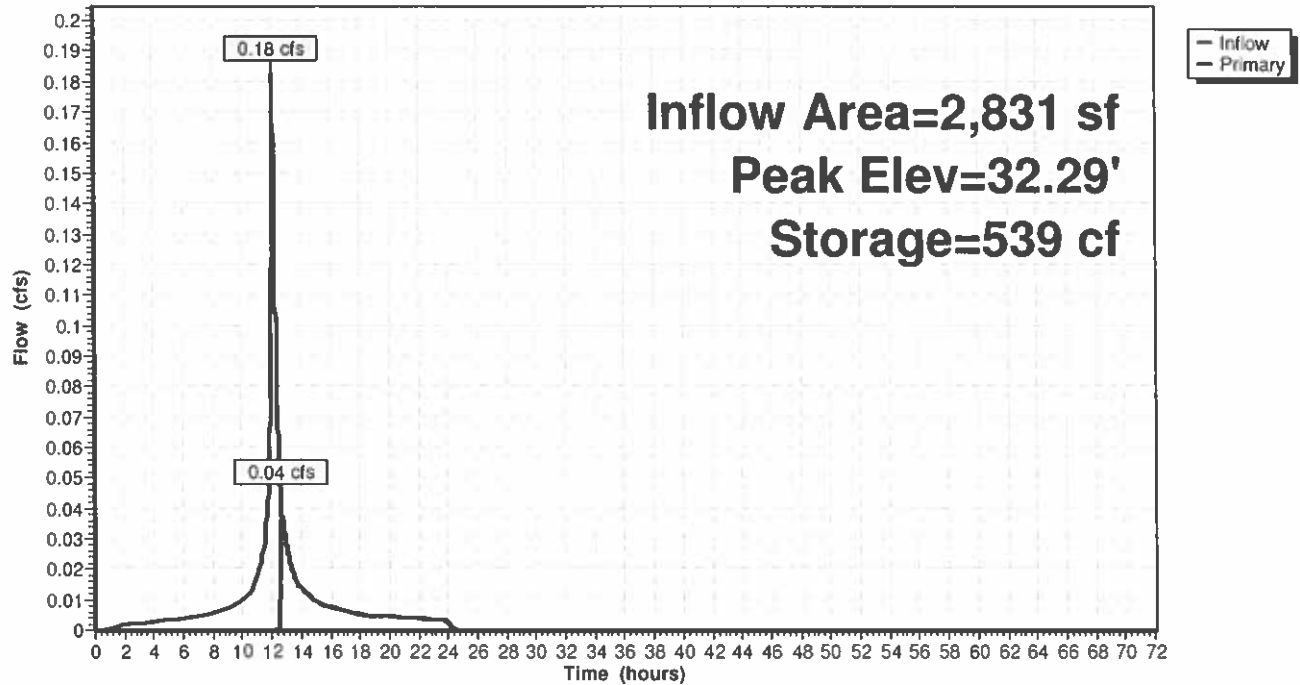
Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.8 X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.04 cfs @ 12.63 hrs HW=32.29' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Grate El. 32.8** (Weir Controls 0.04 cfs @ 0.31 fps)

Pond PB-B: Inf./Detention Basin B

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 400 cf, Depth= 1.75"
Routed to Pond PB-C : Inf./Detention Basin C

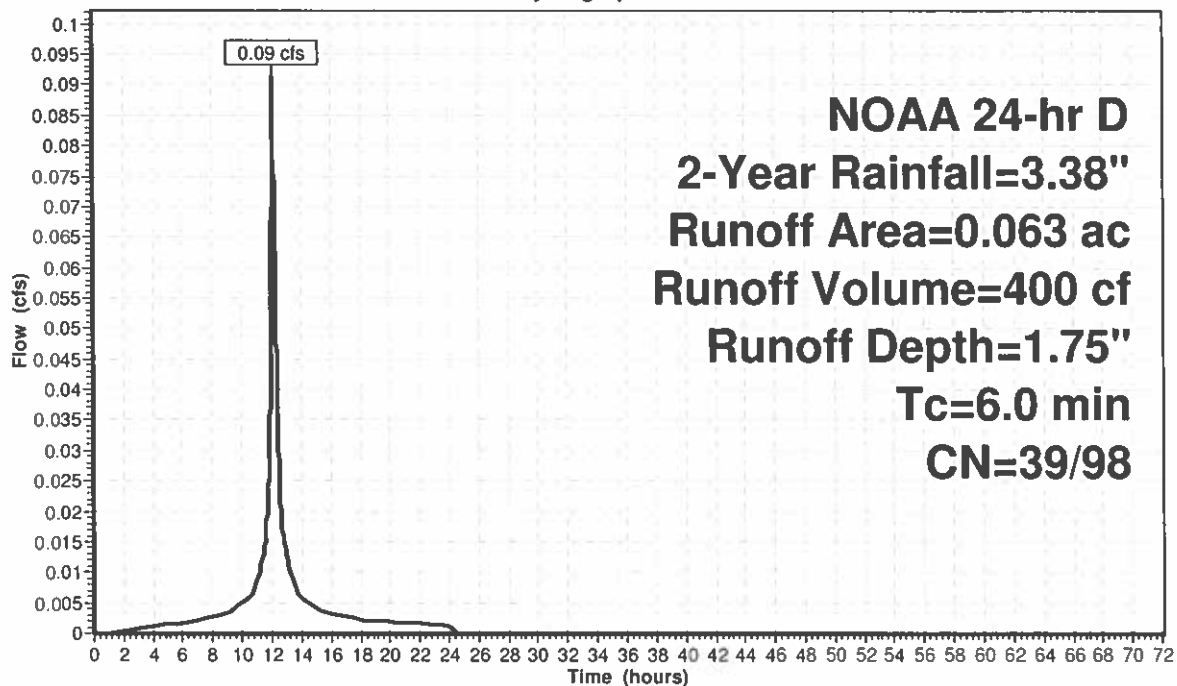
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 660 cf, Depth= 2.88"
Routed to Pond PB-C : Inf./Detention Basin C

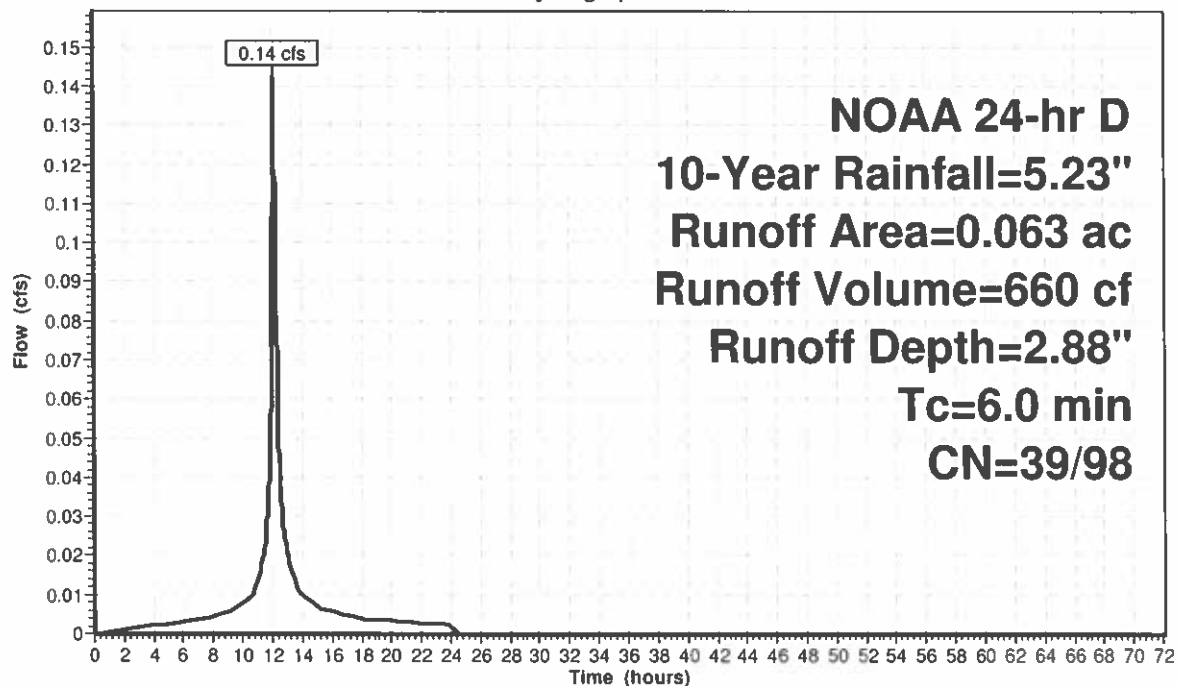
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1C: Post - DA #1C

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 861 cf, Depth= 3.77"
Routed to Pond PB-C : Inf./Detention Basin C

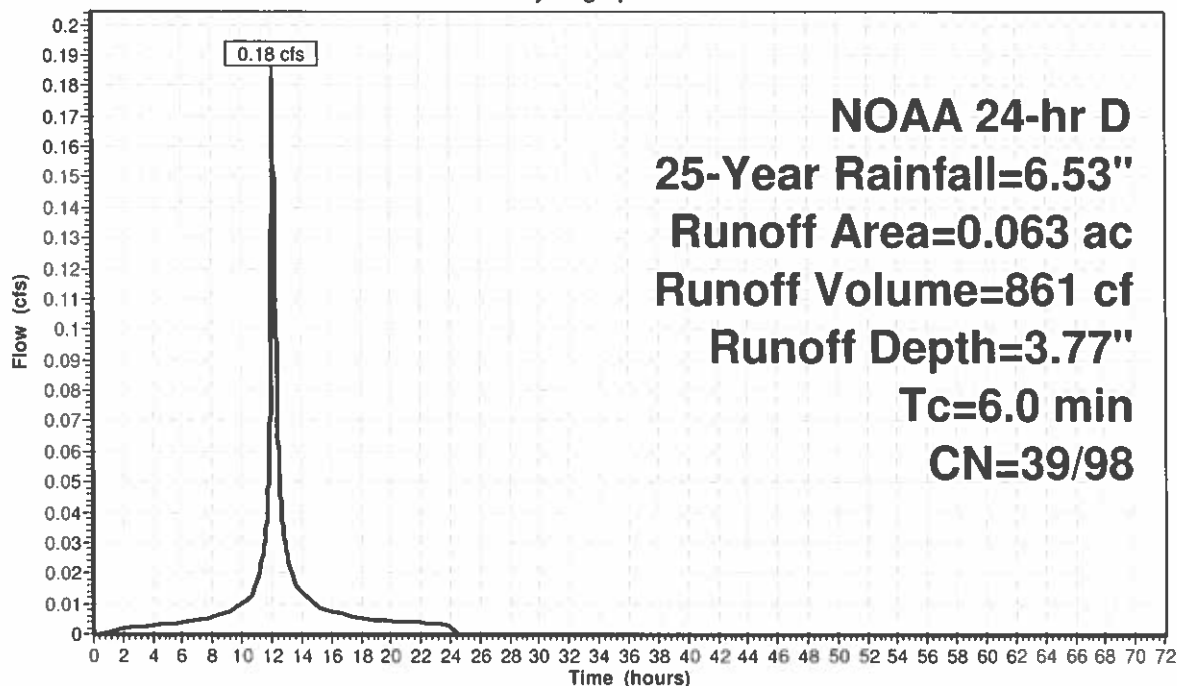
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.028	39	>75% Grass cover, Good, HSG A
* 0.035	98	Rooftop
0.063	72	Weighted Average
0.028	39	44.44% Pervious Area
0.035	98	55.56% Impervious Area

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

Subcatchment P-1C: Post - DA #1C

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 1.75" for 2-Year event
 Inflow = 0.09 cfs @ 12.14 hrs, Volume= 400 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
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.51' @ 24.66 hrs Surf.Area= 380 sf Storage= 400 cf

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

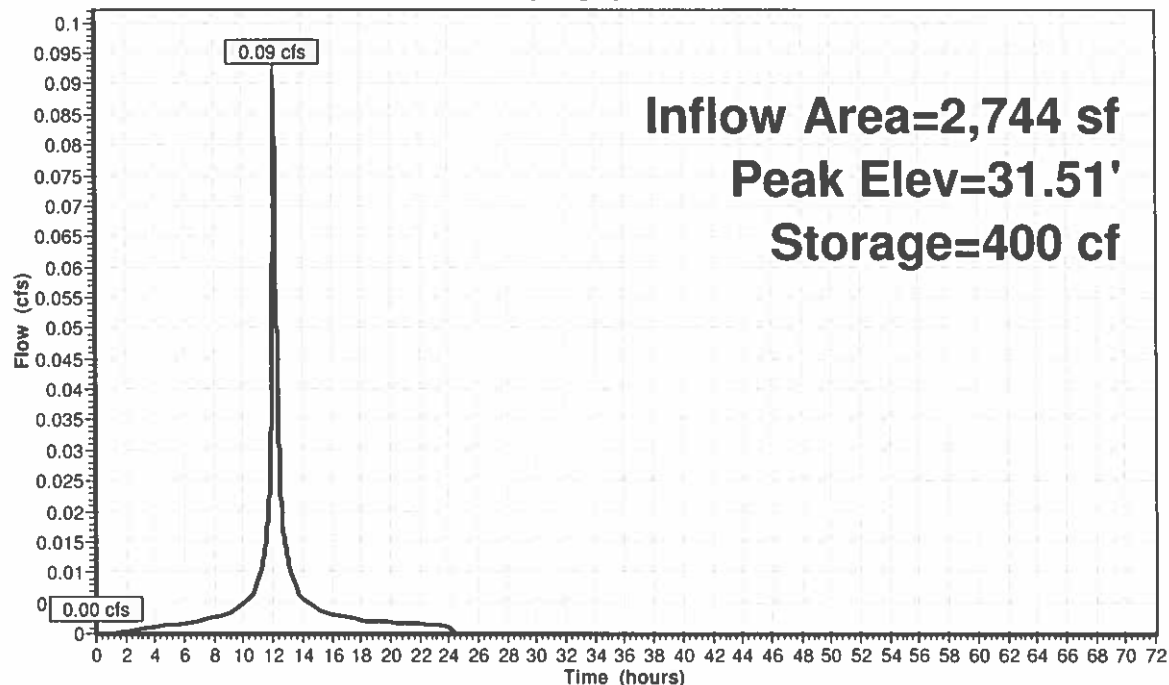
Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.80' TW=0.00' (Dynamic Tailwater)
 ↑1=Grate El. 32.80 (Controls 0.00 cfs)

Pond PB-C: Inf./Detention Basin C

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 2.88" for 10-Year event
 Inflow = 0.14 cfs @ 12.14 hrs, Volume= 660 cf
 Outflow = 0.01 cfs @ 15.19 hrs, Volume= 122 cf, Atten= 95%, Lag= 183.3 min
 Primary = 0.01 cfs @ 15.19 hrs, Volume= 122 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.28' @ 15.19 hrs Surf.Area= 380 sf Storage= 539 cf

Plug-Flow detention time= 684.2 min calculated for 122 cf (18% of inflow)
 Center-of-Mass det. time= 373.0 min (1,135.5 - 762.6)

Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 15.19 hrs HW=32.28' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Grate El. 32.80** (Weir Controls 0.01 cfs @ 0.16 fps)

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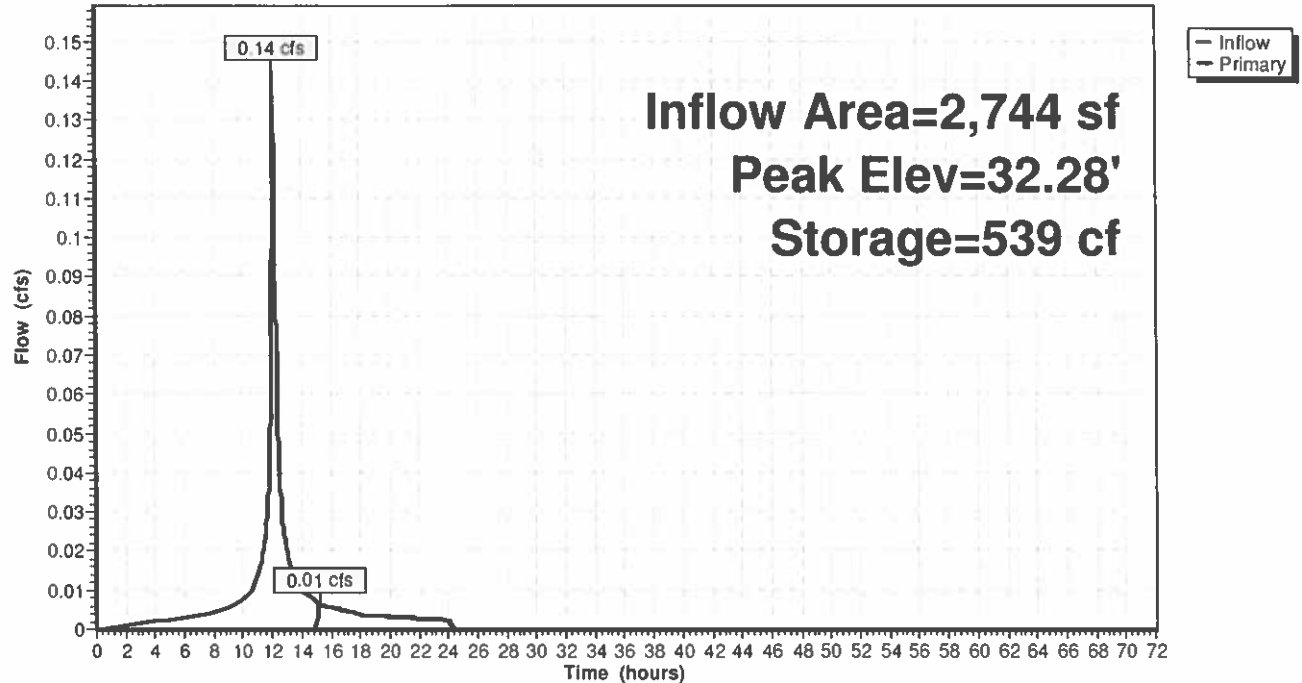
NOAA 24-hr D 10-Year Rainfall=5.23"

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Pond PB-C: Inf./Detention Basin C

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Pond PB-C: Inf./Detention Basin C

Inflow Area = 2,744 sf, 55.56% Impervious, Inflow Depth = 3.77" for 25-Year event
 Inflow = 0.18 cfs @ 12.14 hrs, Volume= 861 cf
 Outflow = 0.04 cfs @ 12.64 hrs, Volume= 323 cf, Atten= 76%, Lag= 29.8 min
 Primary = 0.04 cfs @ 12.64 hrs, Volume= 323 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.29' @ 12.64 hrs Surf.Area= 380 sf Storage= 539 cf

Plug-Flow detention time= 403.0 min calculated for 323 cf (38% of inflow)
 Center-of-Mass det. time= 211.4 min (975.6 - 764.2)

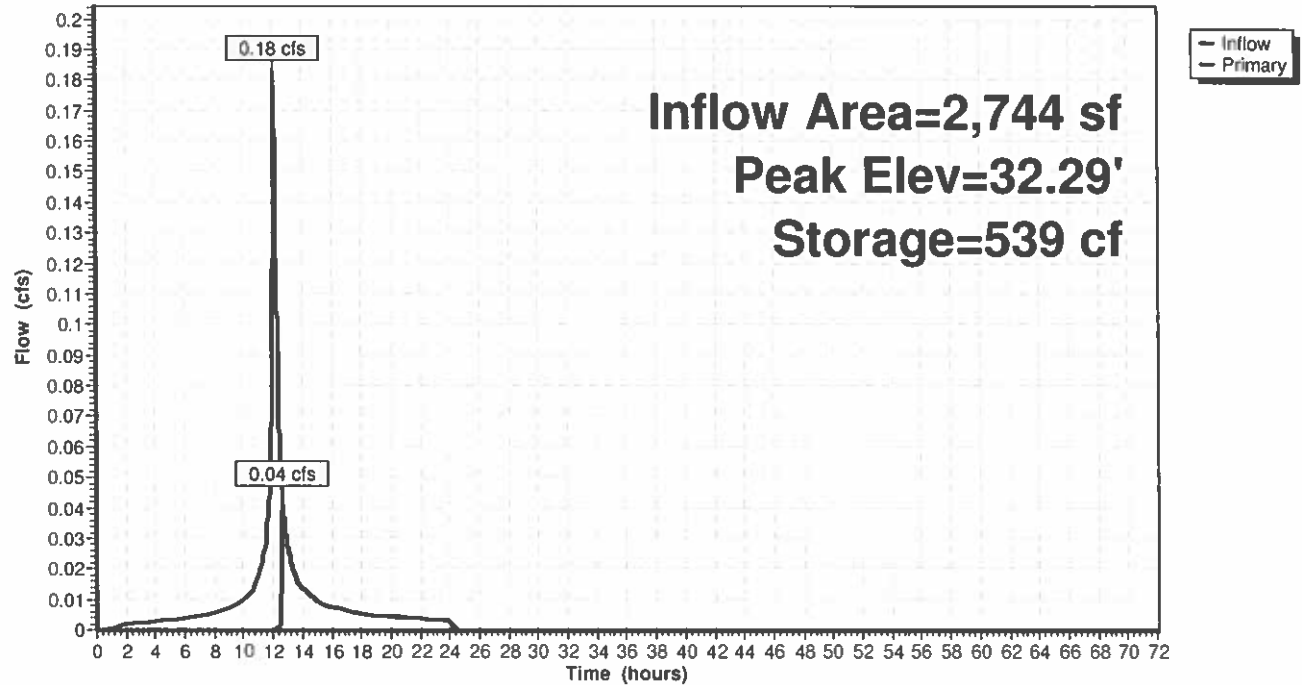
Volume	Invert	Avail.Storage	Storage Description
#1	29.80'	273 cf	2.50'W x 38.00'L x 2.50'H Stone Trench x 4 950 cf Overall - 269 cf Embedded = 681 cf x 40.0% Voids
#2	30.30'	269 cf	18.0" Round 18" Pipe x 4 Inside #1 L= 38.0'
		541 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	32.28'	24.0" x 24.0" Horiz. Grate El. 32.80 X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.04 cfs @ 12.64 hrs HW=32.29' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Grate El. 32.80** (Weir Controls 0.04 cfs @ 0.31 fps)

Pond PB-C: Inf./Detention Basin C

Hydrograph



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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1D: Post - DA #1D

Runoff = 0.22 cfs @ 12.14 hrs, Volume= 949 cf, Depth= 2.06"
Routed to Pond PB-D : Inf./Detention Basins 'D'

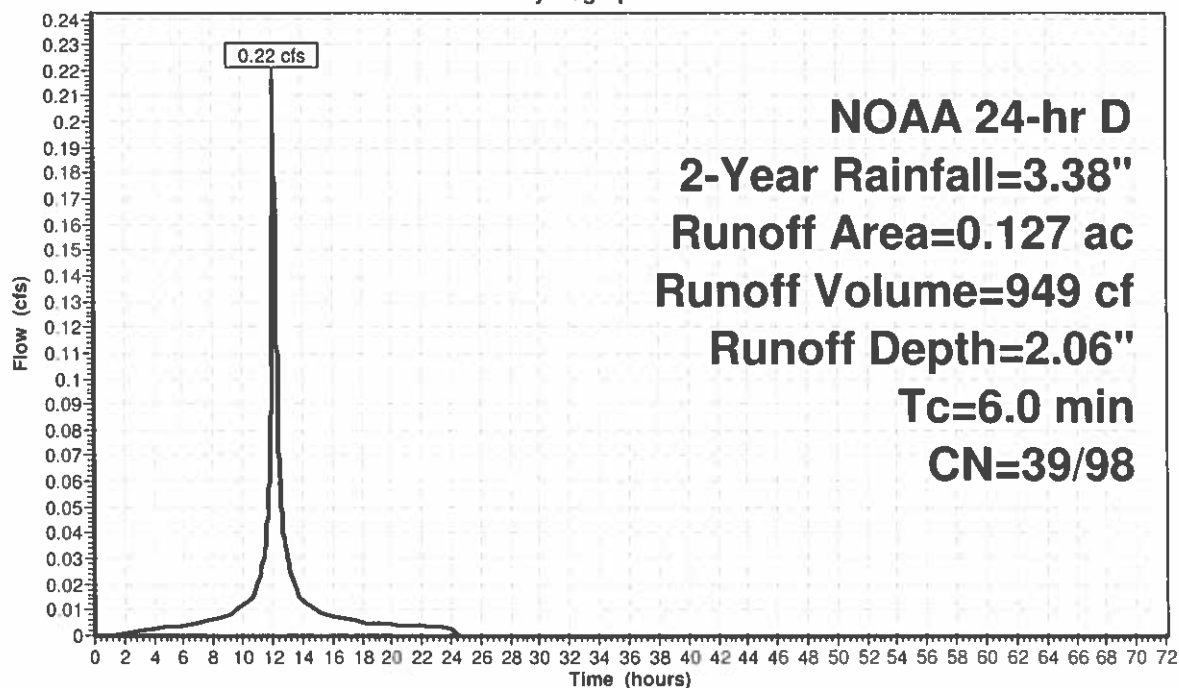
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D

Hydrograph



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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1D: Post - DA #1D

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 1,544 cf, Depth= 3.35"
Routed to Pond PB-D : Inf./Detention Basins 'D'

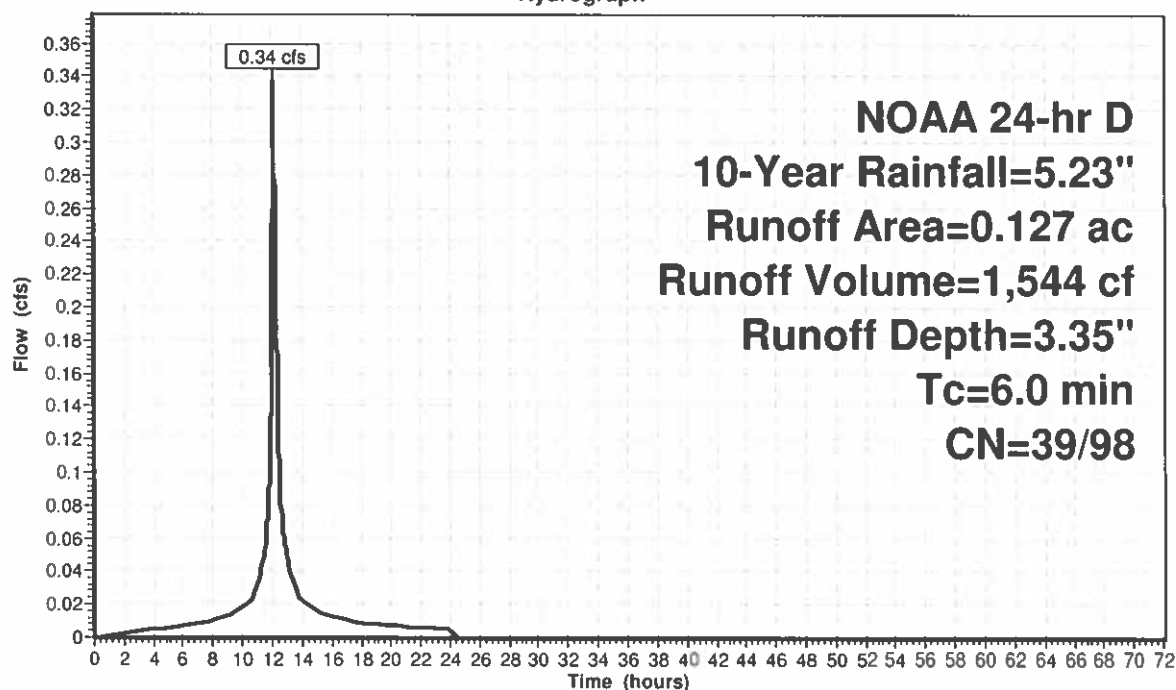
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1D: Post - DA #1D

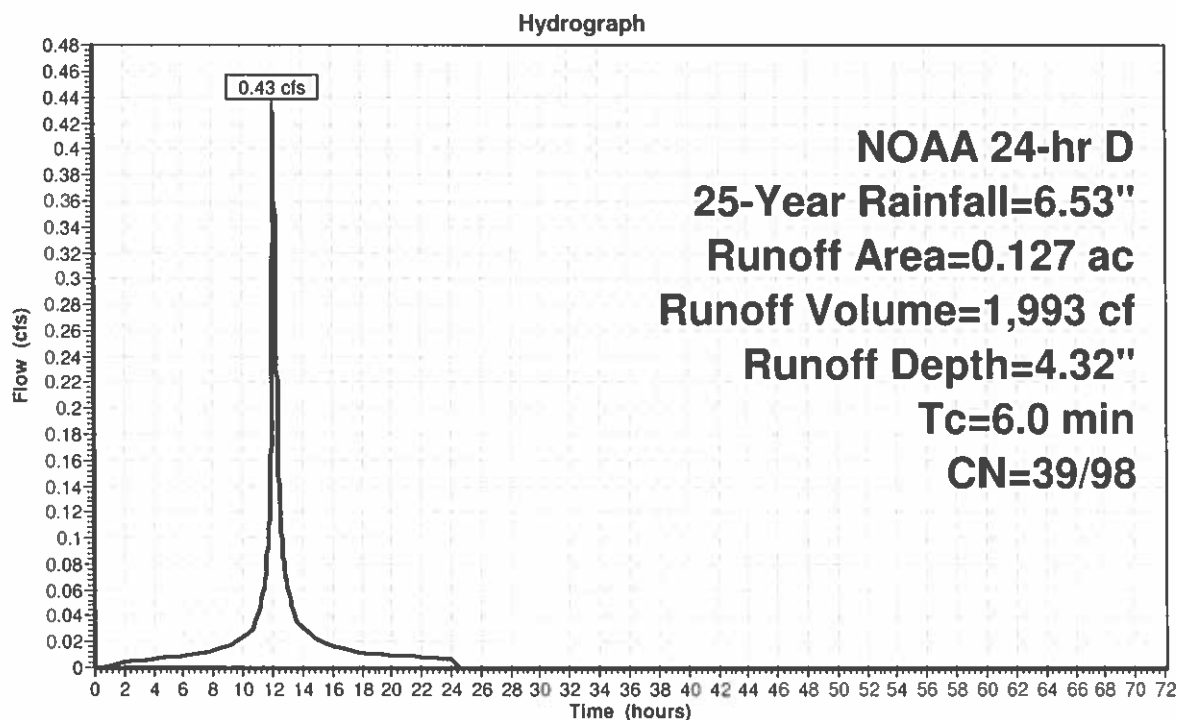
Runoff = 0.43 cfs @ 12.14 hrs, Volume= 1,993 cf, Depth= 4.32"
Routed to Pond PB-D : Inf./Detention Basins 'D'

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.044	39	>75% Grass cover, Good, HSG A
* 0.083	98	Duplexes Rooftop (2)
0.127	78	Weighted Average
0.044	39	34.65% Pervious Area
0.083	98	65.35% Impervious Area

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

Subcatchment P-1D: Post - DA #1D



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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 2.06" for 2-Year event
 Inflow = 0.22 cfs @ 12.14 hrs, Volume= 949 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
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.01' @ 24.66 hrs Surf.Area= 702 sf Storage= 949 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	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 ' ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.95' TW=28.18' (Dynamic Tailwater)

1=Culvert (Controls 0.00 cfs)
 2=Orifice (Controls 0.00 cfs)
 3=Grate eL 33.2 (Controls 0.00 cfs)

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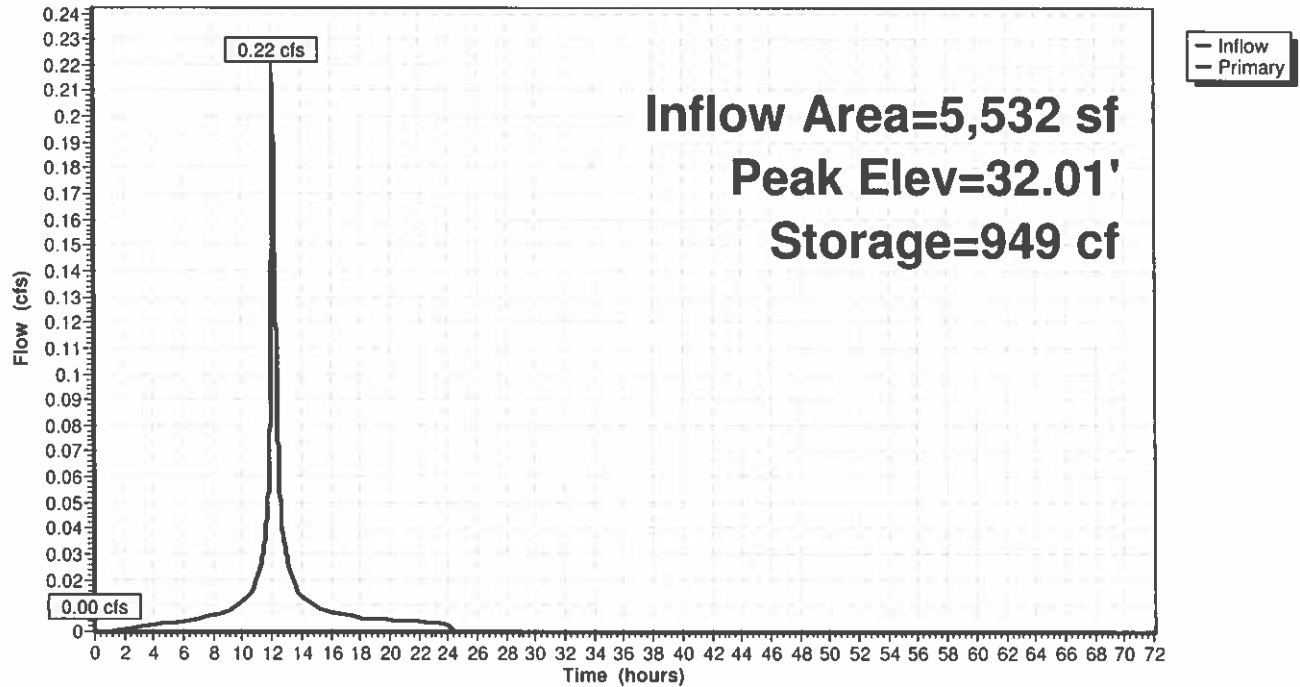
NOAA 24-hr D 2-Year Rainfall=3.38"

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Pond PB-D: Inf./Detention Basins 'D'

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 3.35" for 10-Year event
 Inflow = 0.34 cfs @ 12.14 hrs, Volume= 1,544 cf
 Outflow = 0.02 cfs @ 14.11 hrs, Volume= 401 cf, Atten= 93%, Lag= 118.5 min
 Primary = 0.02 cfs @ 14.11 hrs, Volume= 401 cf
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.54' @ 14.11 hrs Surf.Area= 702 sf Storage= 1,167 cf

Plug-Flow detention time= 562.5 min calculated for 401 cf (26% of inflow)
 Center-of-Mass det. time= 315.4 min (1,074.5 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 14.11 hrs HW=32.54' TW=30.56' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 0.02 cfs of 11.28 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 0.02 cfs @ 1.00 fps)
- ↑ **3=Grate eL 33.2** (Controls 0.00 cfs)

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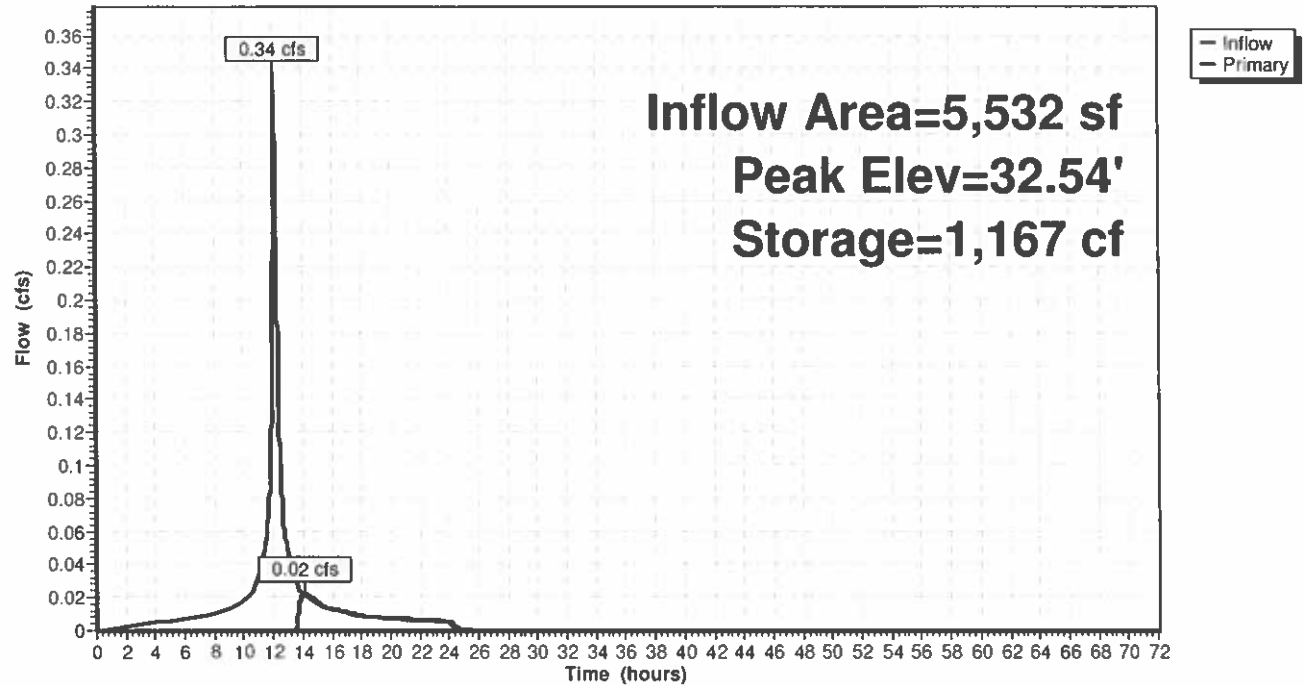
NOAA 24-hr D 10-Year Rainfall=5.23"

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Pond PB-D: Inf./Detention Basins 'D'

Hydrograph



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Pond PB-D: Inf./Detention Basins 'D'

Inflow Area = 5,532 sf, 65.35% Impervious, Inflow Depth = 4.32" for 25-Year event
 Inflow = 0.43 cfs @ 12.14 hrs, Volume= 1,993 cf
 Outflow = 0.12 cfs @ 12.57 hrs, Volume= 849 cf, Atten= 73%, Lag= 25.8 min
 Primary = 0.12 cfs @ 12.57 hrs, Volume= 849 cf
 Routed to Pond PB-E : Inf./Detention Basins 'E'

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.65' @ 12.57 hrs Surf.Area= 702 sf Storage= 1,200 cf

Plug-Flow detention time= 371.0 min calculated for 849 cf (43% of inflow)
 Center-of-Mass det. time= 199.7 min (958.8 - 759.2)

Volume	Invert	Avail.Storage	Storage Description
#1	29.95'	548 cf	3.00'W x 78.00'L x 3.00'H Basin 'D' - Stone Trench x 3 2,106 cf Overall - 735 cf Embedded = 1,371 cf x 40.0% Voids
#2	30.45'	735 cf	24.0" Round Basin 'D' - 24" Pipe X 3 Rows x 3 Inside #1 L= 78.0'
		1,283 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	29.95'	15.0" Round Culvert L= 5.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 29.95' / 29.70' S= 0.0500 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	32.45'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	32.93'	24.0" x 24.0" Horiz. Grate eL 33.2 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 12.57 hrs HW=32.65' TW=30.72' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 0.12 cfs of 11.19 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 0.12 cfs @ 1.54 fps)
- ↑ **3=Grate eL 33.2** (Controls 0.00 cfs)

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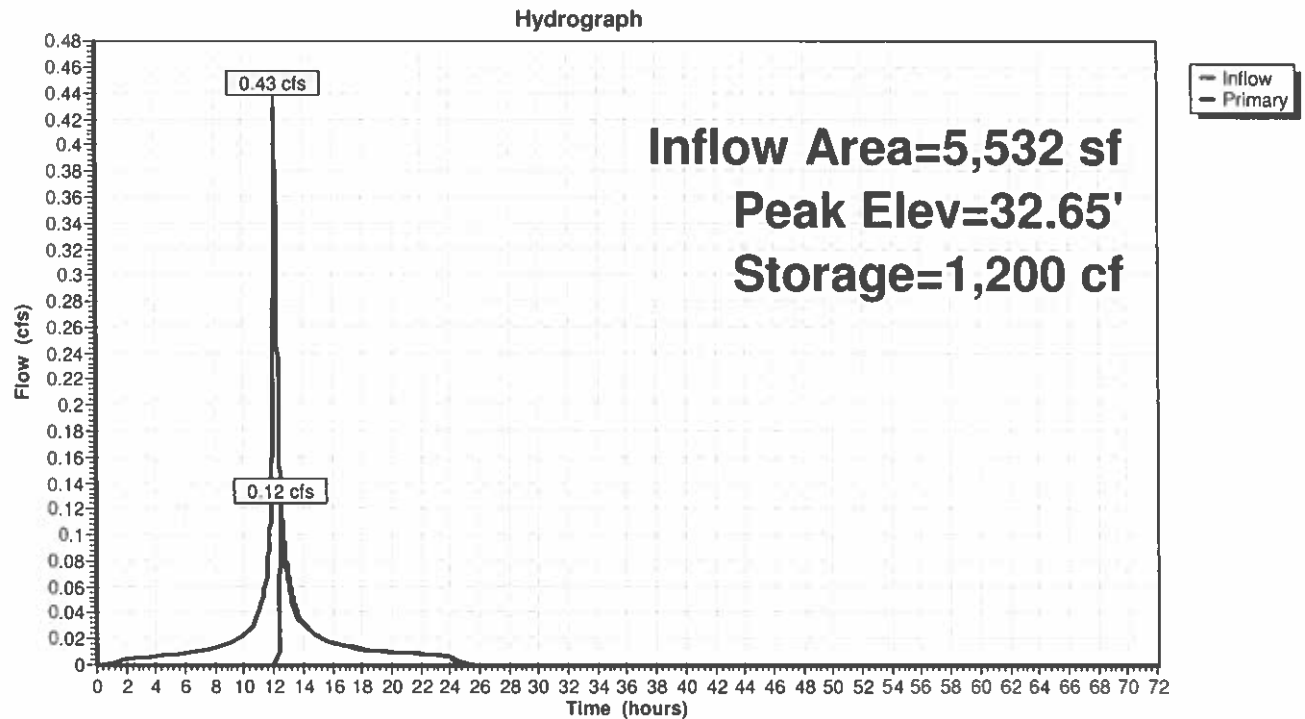
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Pond PB-D: Inf./Detention Basins 'D'



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NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Subcatchment P-1E: Post - DA #1E

Runoff = 0.43 cfs @ 12.14 hrs, Volume= 1,886 cf, Depth= 1.93"
Routed to Pond PB-E : Inf./Detention Basins 'E'

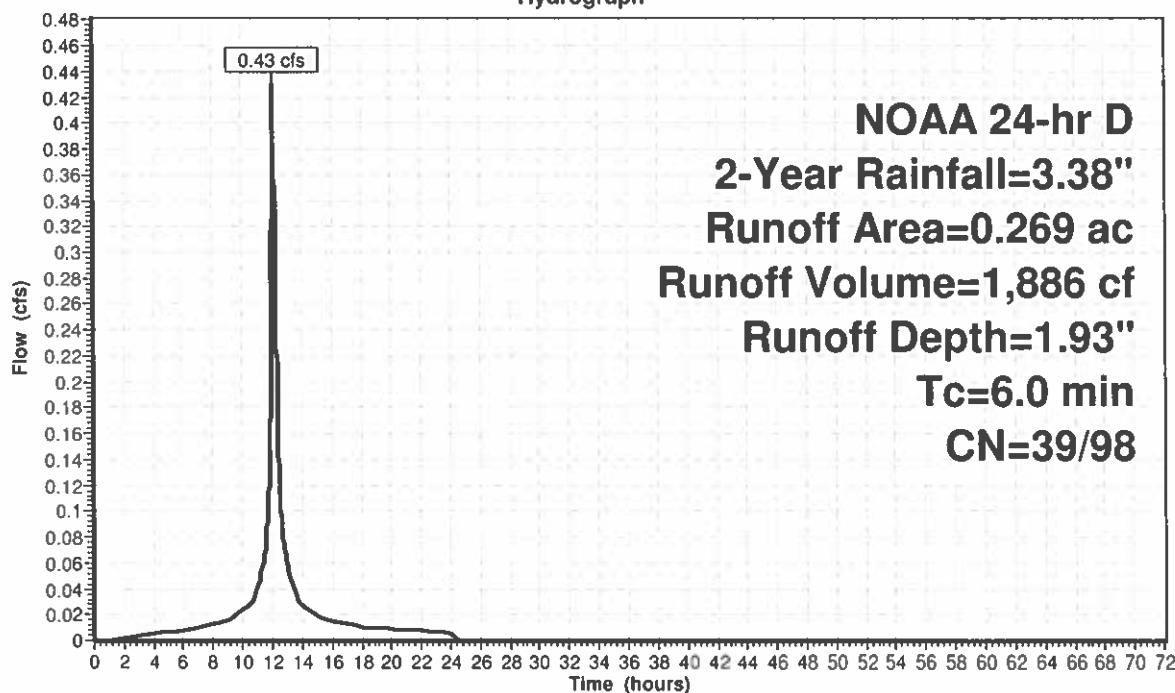
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1E: Post - DA #1E

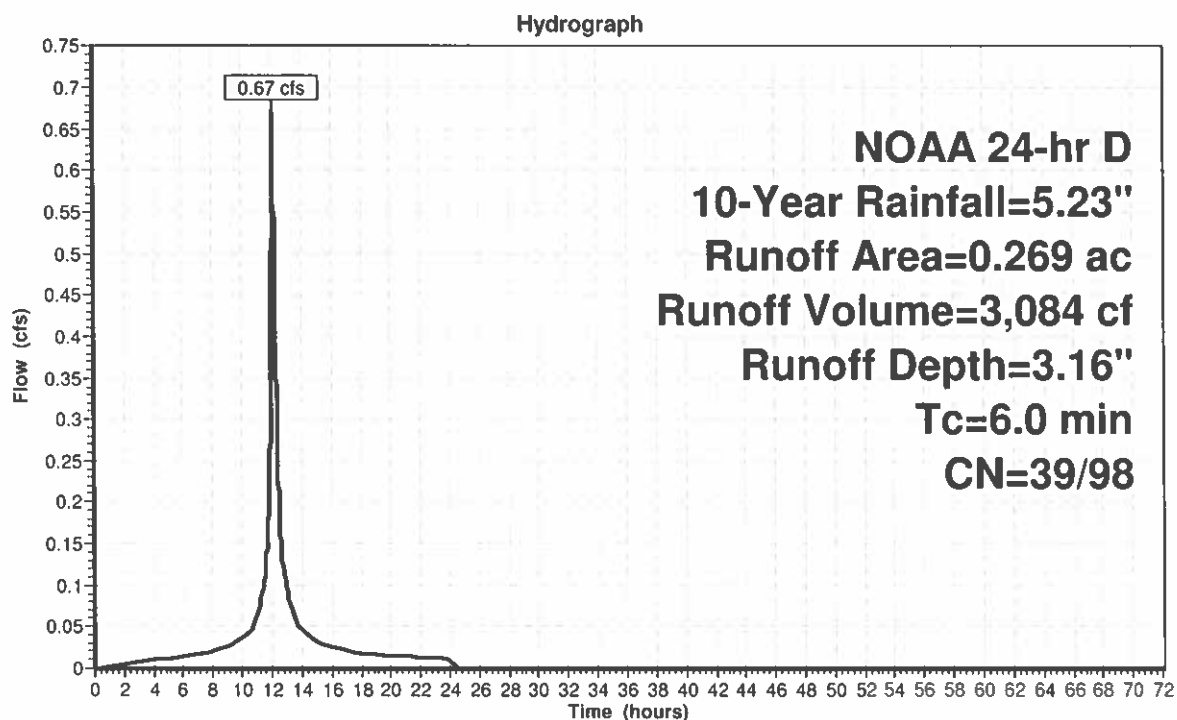
Runoff = 0.67 cfs @ 12.14 hrs, Volume= 3,084 cf, Depth= 3.16"
Routed to Pond PB-E : Inf./Detention Basins 'E'

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E



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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1E: Post - DA #1E

Runoff = 0.86 cfs @ 12.14 hrs, Volume= 3,998 cf, Depth= 4.09"
Routed to Pond PB-E : Inf./Detention Basins 'E'

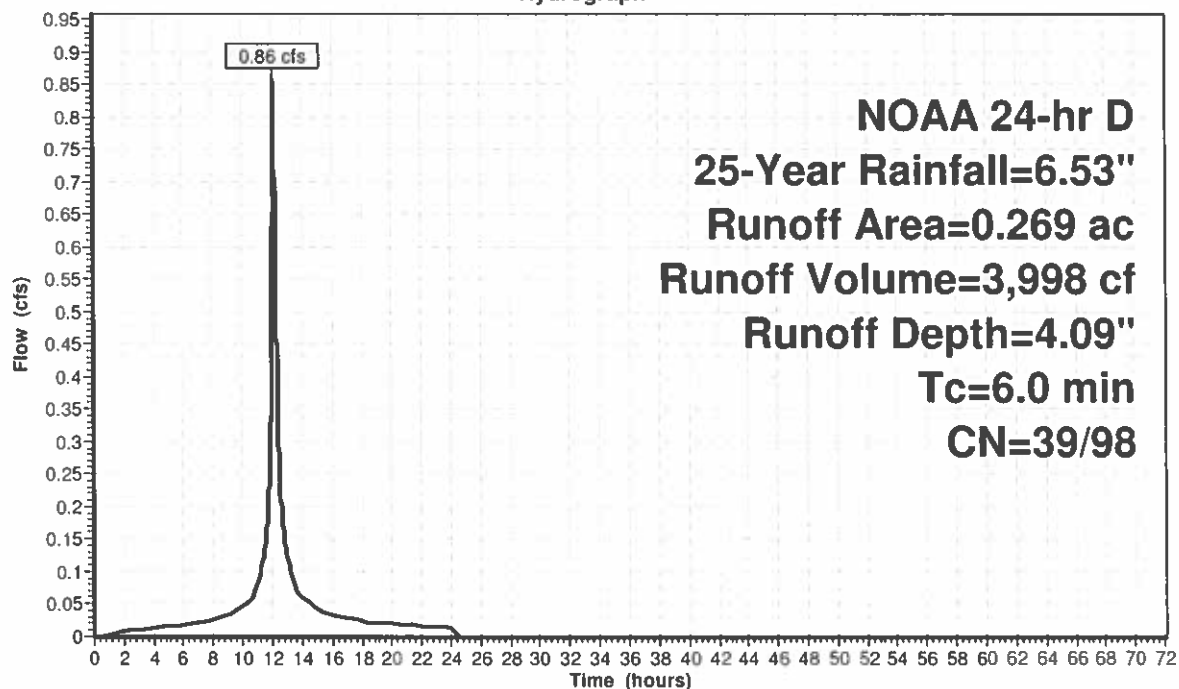
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.104	39	>75% Grass cover, Good, HSG A
* 0.165	98	Duplexes Rooftop (4)
0.269	75	Weighted Average
0.104	39	38.66% Pervious Area
0.165	98	61.34% Impervious Area

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

Subcatchment P-1E: Post - DA #1E

Hydrograph



174 Church Street no Infiltration

NOAA 24-hr D 2-Year Rainfall=3.38"

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Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 1.31" for 2-Year event
 Inflow = 0.43 cfs @ 12.14 hrs, Volume= 1,886 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
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.07' @ 24.66 hrs Surf.Area= 1,548 sf Storage= 1,886 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	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=28.18' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 0.00 cfs of 0.21 cfs potential flow)
- ↑ **2=Orifice** (Controls 0.00 cfs)
- ↑ **3=Grate El. 32.10** (Controls 0.00 cfs)

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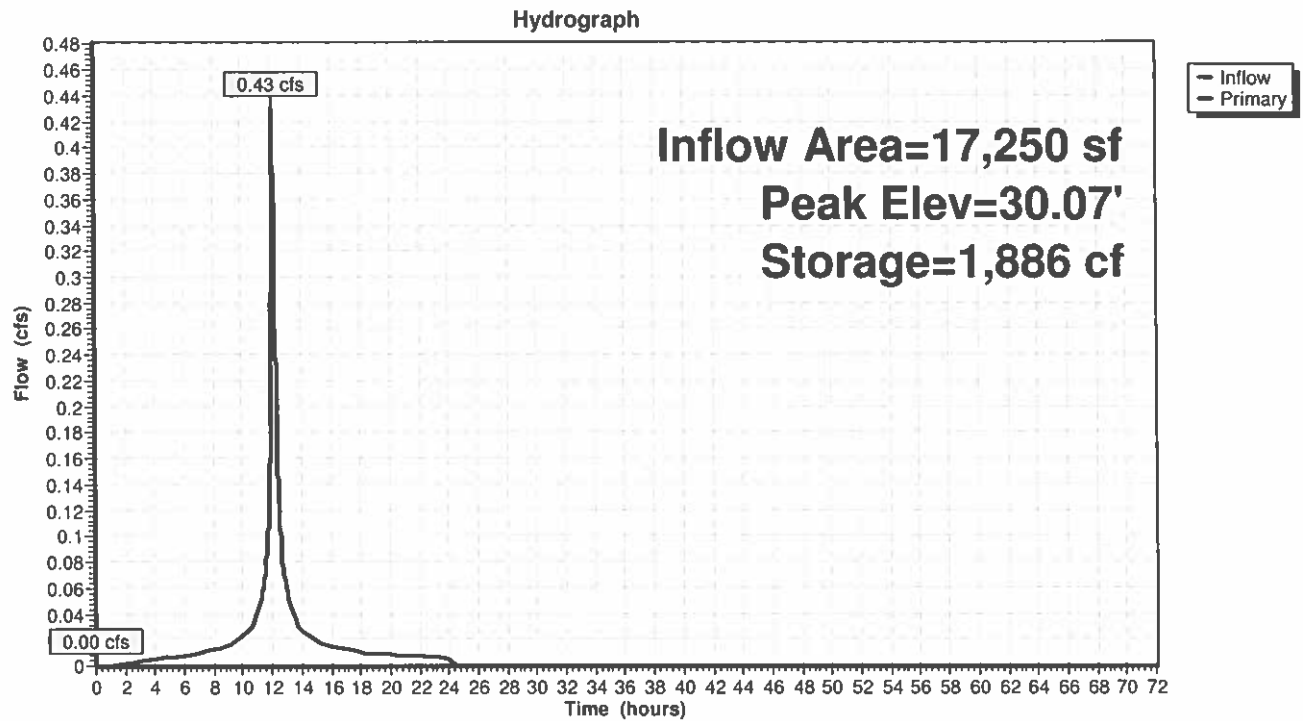
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Pond PB-E: Inf./Detention Basins 'E'



174 Church Street no Infiltration

NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 2.42" for 10-Year event
 Inflow = 0.67 cfs @ 12.14 hrs, Volume= 3,485 cf
 Outflow = 0.04 cfs @ 16.46 hrs, Volume= 889 cf, Atten= 95%, Lag= 259.1 min
 Primary = 0.04 cfs @ 16.46 hrs, Volume= 889 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 30.96' @ 16.46 hrs Surf.Area= 1,548 sf Storage= 2,691 cf

Plug-Flow detention time= 656.8 min calculated for 889 cf (26% of inflow)
 Center-of-Mass det. time= 391.4 min (1,188.0 - 796.5)

Volume	Invert	Avail.Storage	Storage Description
#1	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.04 cfs @ 16.46 hrs HW=30.96' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.04 cfs of 12.30 cfs potential flow)
- 2=Orifice (Orifice Controls 0.04 cfs @ 1.34 fps)
- 3=Grate El. 32.10 (Controls 0.00 cfs)

174 Church Street no Infiltration

Prepared by WJH Engineering

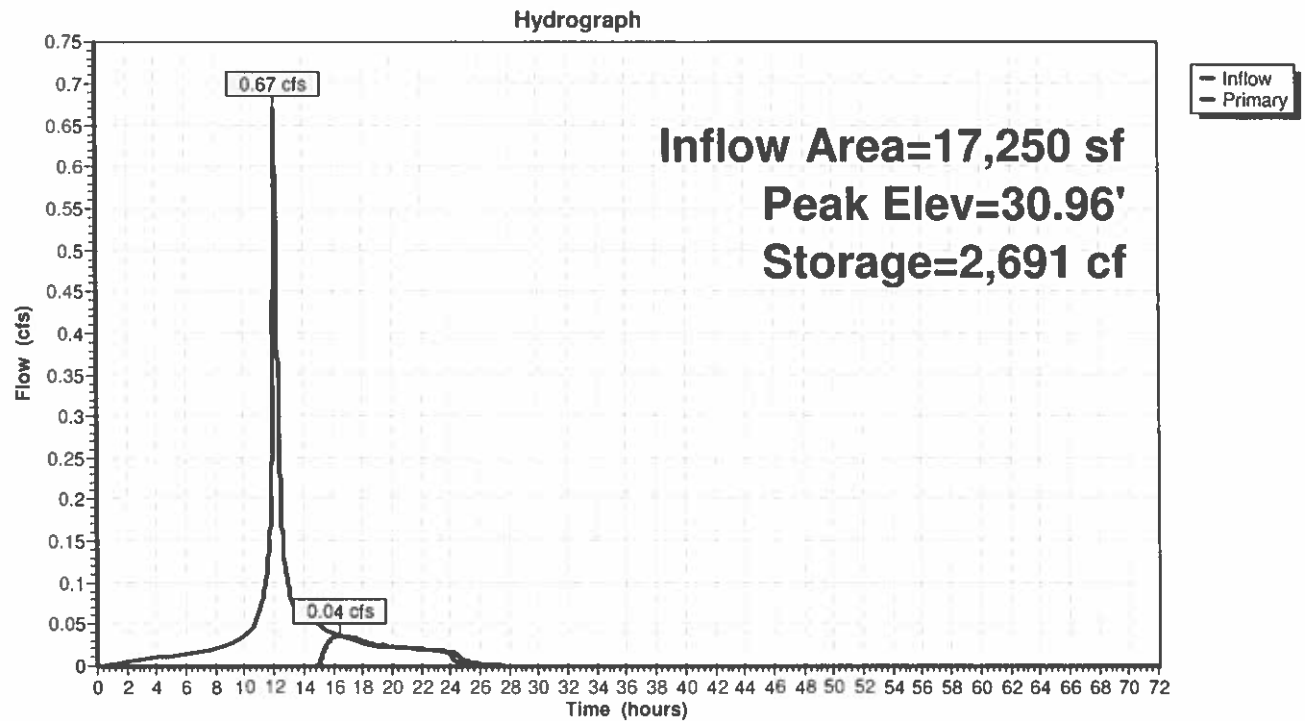
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NOAA 24-hr D 10-Year Rainfall=5.23"

Printed 8/17/2022

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Pond PB-E: Inf./Detention Basins 'E'



174 Church Street no Infiltration

NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Pond PB-E: Inf./Detention Basins 'E'

Inflow Area = 17,250 sf, 62.63% Impervious, Inflow Depth = 3.37" for 25-Year event
 Inflow = 0.86 cfs @ 12.14 hrs, Volume= 4,847 cf
 Outflow = 0.21 cfs @ 12.98 hrs, Volume= 2,251 cf, Atten= 75%, Lag= 50.4 min
 Primary = 0.21 cfs @ 12.98 hrs, Volume= 2,251 cf
 Routed to Link PT-1 : Post - Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 31.18' @ 12.98 hrs Surf.Area= 1,548 sf Storage= 2,830 cf

Plug-Flow detention time= 393.9 min calculated for 2,251 cf (46% of inflow)
 Center-of-Mass det. time= 222.5 min (1,018.2 - 795.7)

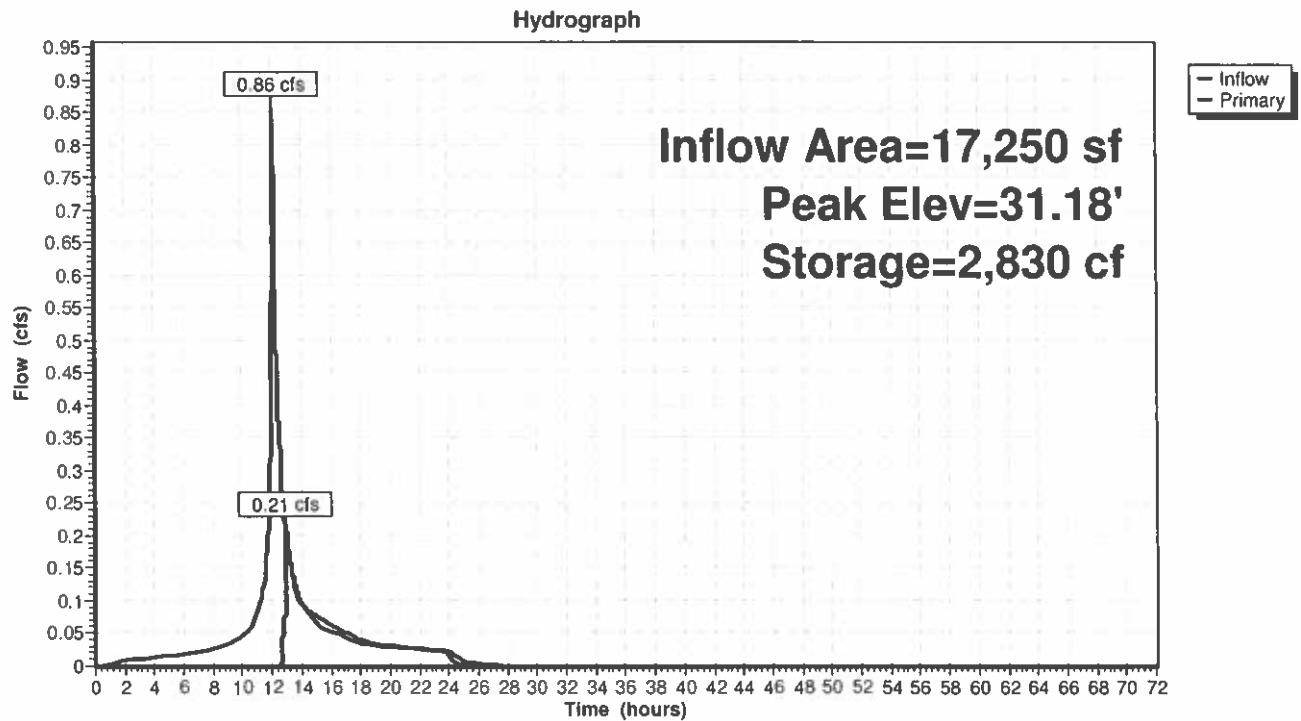
Volume	Invert	Avail.Storage	Storage Description
#1	28.18'	1,209 cf	3.00'W x 172.00'L x 3.00'H Basin 'E' - Stone Trench x 3 4,644 cf Overall - 1,621 cf Embedded = 3,023 cf x 40.0% Voids
#2	28.68'	1,621 cf	24.0" Round Basin 'E' - 24" Pipe X 3 Rows x 3 Inside #1 L= 172.0'
		2,830 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	28.00'	15.0" Round Culvert L= 10.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 28.00' / 27.50' S= 0.0500 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	30.80'	2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	31.15'	24.0" W x 24.0" H Vert. Grate El. 32.10 X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 12.98 hrs HW=31.18' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.21 cfs of 12.89 cfs potential flow)
- 2=Orifice (Orifice Controls 0.09 cfs @ 2.55 fps)
- 3=Grate El. 32.10 (Orifice Controls 0.12 cfs @ 0.59 fps)

Pond PB-E: Inf./Detention Basins 'E'



174 Church Street no Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.38"

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Page 2

Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 402 cf, Depth= 0.66"
Routed to Link PT-1 : Post - Total

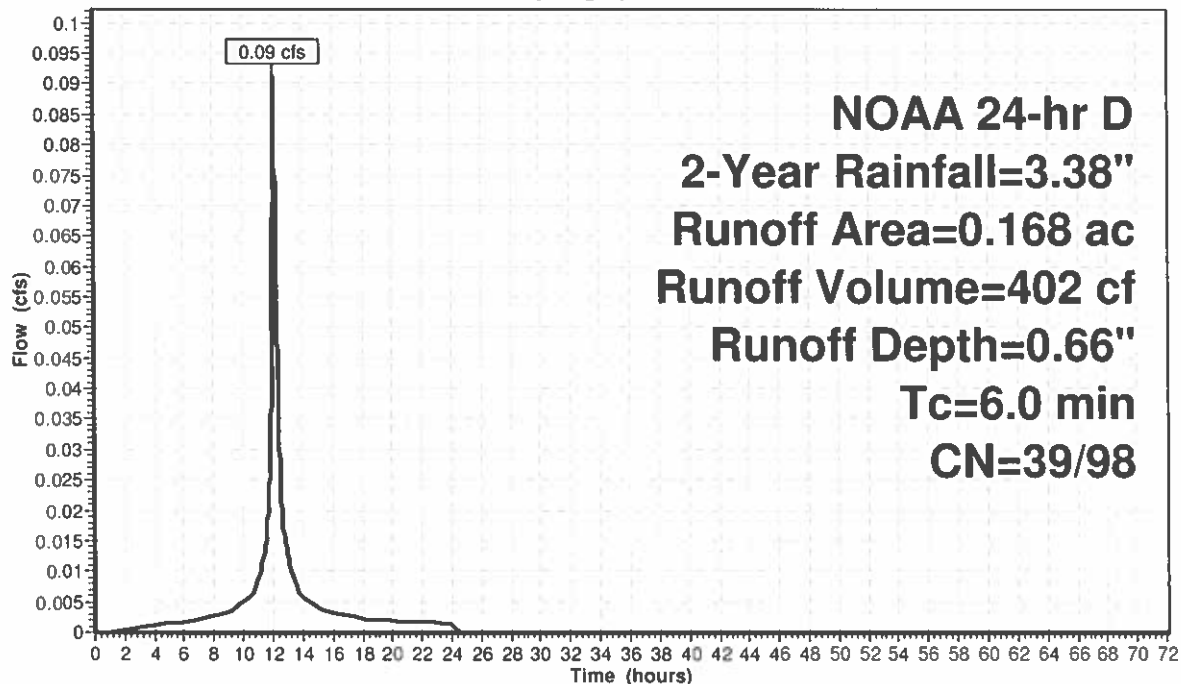
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 10-Year Rainfall=5.23"

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Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 755 cf, Depth= 1.24"
Routed to Link PT-1 : Post - Total

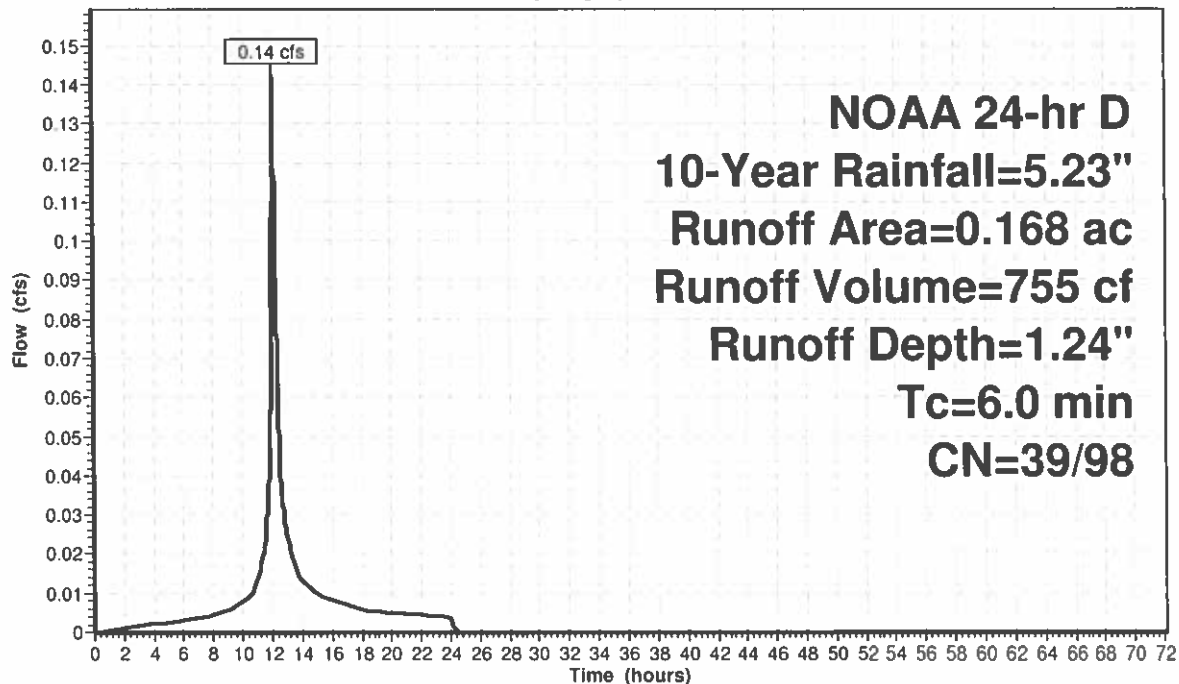
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 25-Year Rainfall=6.53"

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Summary for Subcatchment P-1(U): Post DA #1(Undetained)

Runoff = 0.20 cfs @ 12.15 hrs, Volume= 1,093 cf, Depth= 1.79"
Routed to Link PT-1 : Post - Total

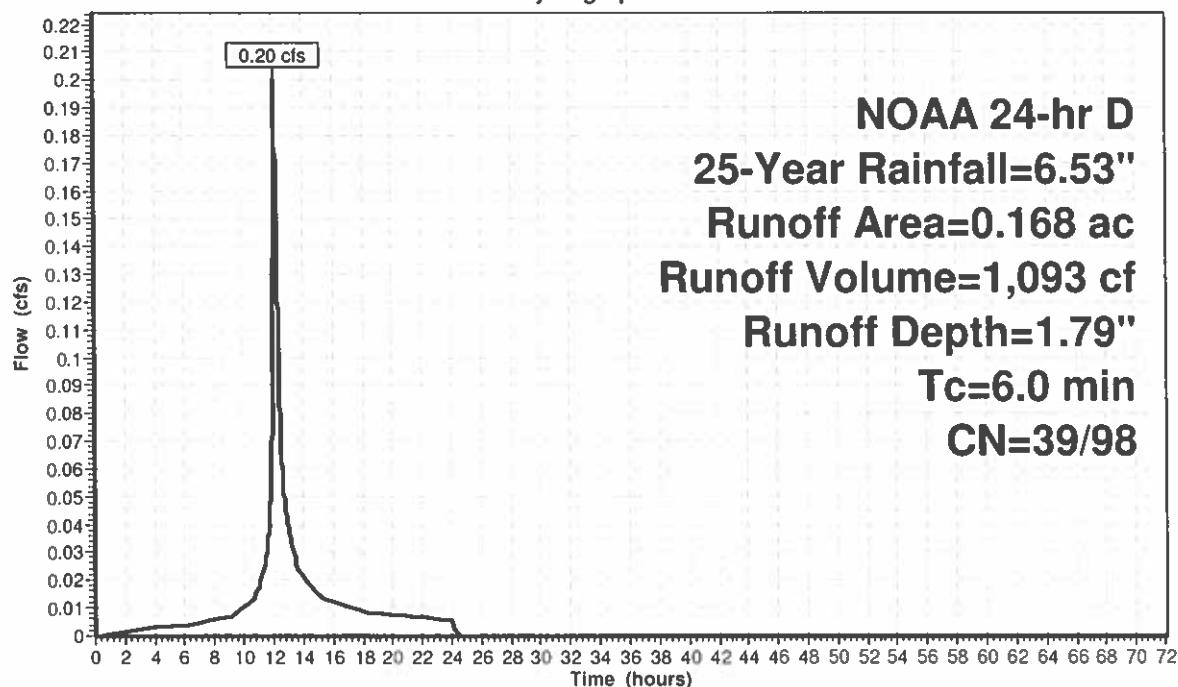
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.53"

Area (ac)	CN	Description
0.133	39	>75% Grass cover, Good, HSG A
* 0.035	98	Driveways, concr, porches
0.168	51	Weighted Average
0.133	39	79.17% Pervious Area
0.035	98	20.83% Impervious Area

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

Subcatchment P-1(U): Post DA #1(Undetained)

Hydrograph



174 Church Street no Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.38"

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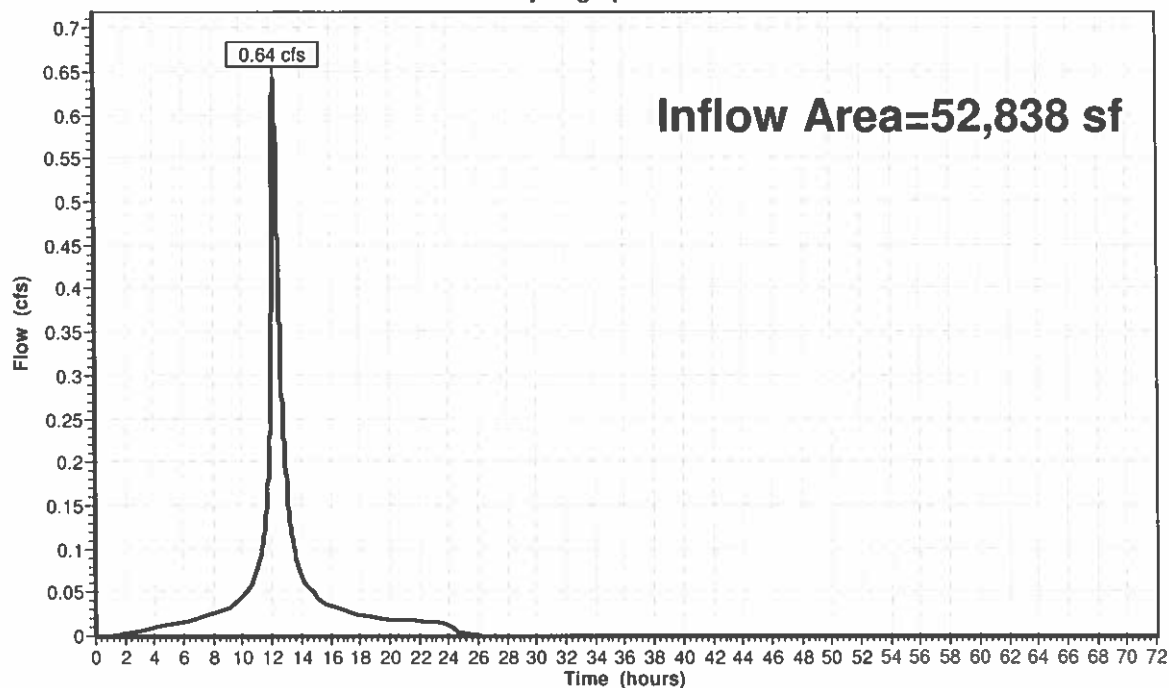
Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 0.92" for 2-Year event
Inflow = 0.64 cfs @ 12.23 hrs, Volume= 4,037 cf
Primary = 0.64 cfs @ 12.23 hrs, Volume= 4,037 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total

Hydrograph



174 Church Street no Infiltration

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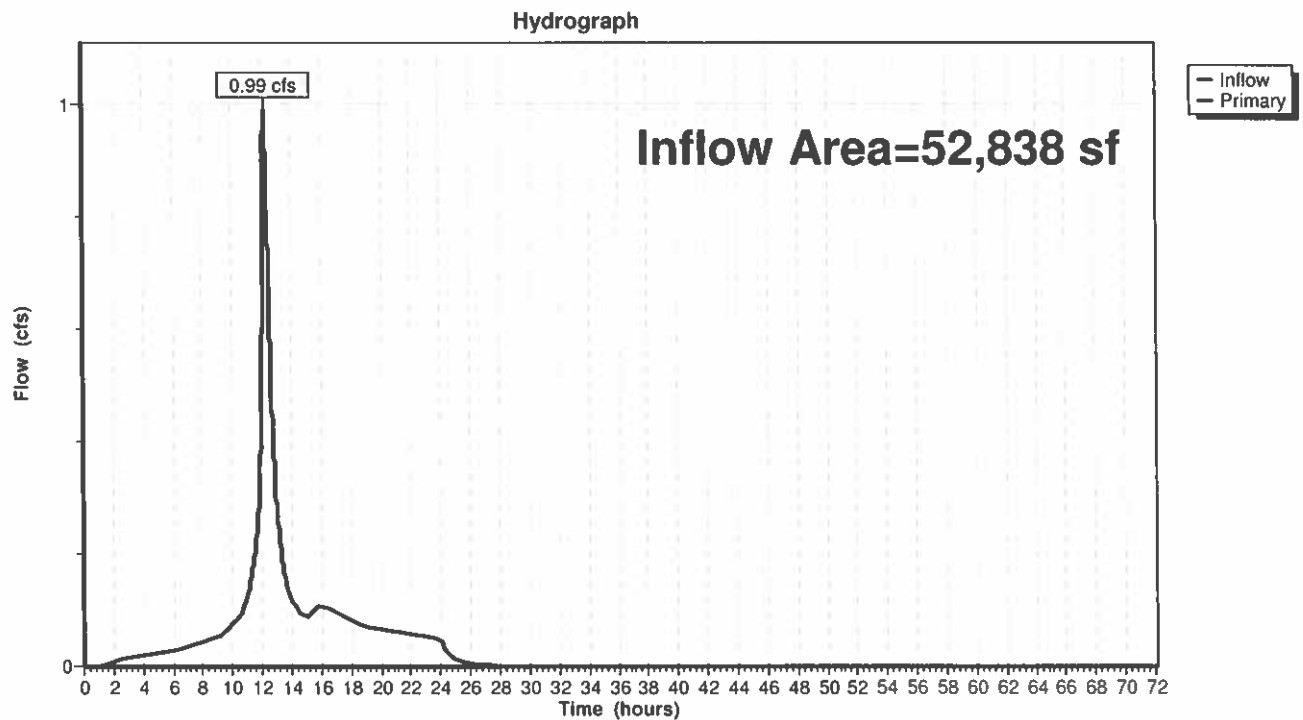
Page 36

Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 1.78" for 10-Year event
Inflow = 0.99 cfs @ 12.23 hrs, Volume= 7,835 cf
Primary = 0.99 cfs @ 12.23 hrs, Volume= 7,835 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total



174 Church Street no Infiltration

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NOAA 24-hr D 25-Year Rainfall=6.53"

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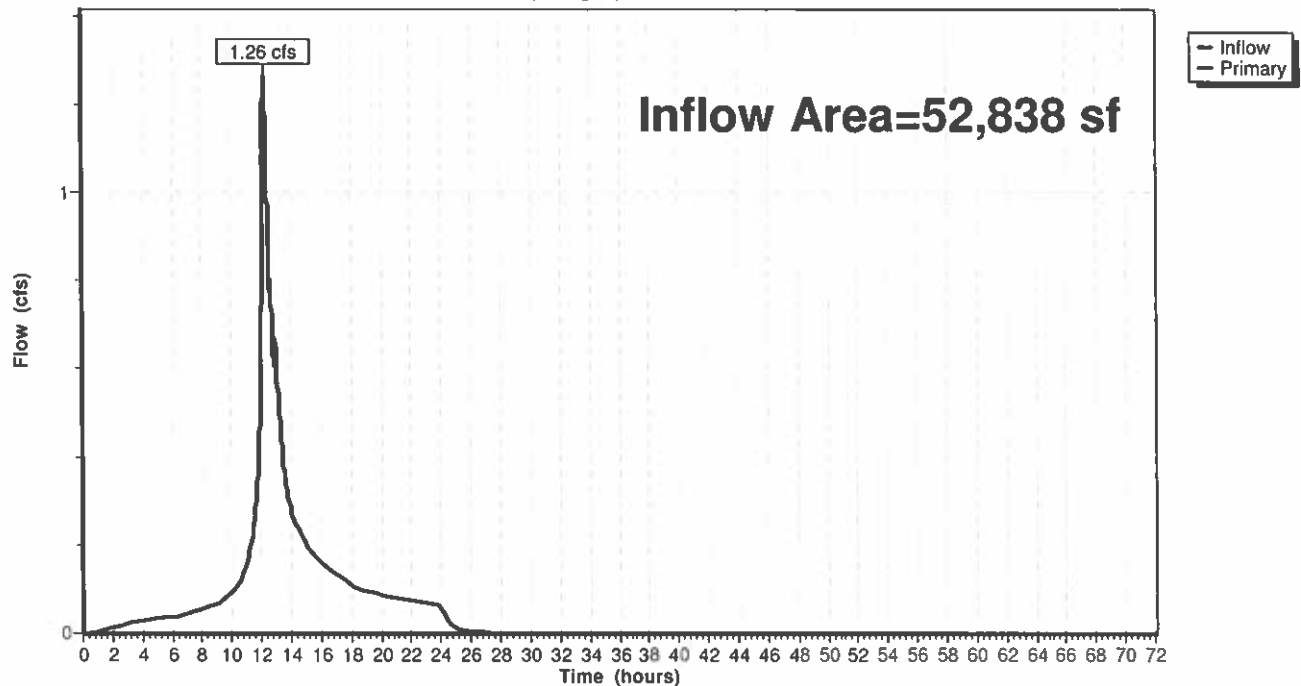
Summary for Link PT-1: Post - Total

Inflow Area = 52,838 sf, 55.32% Impervious, Inflow Depth = 2.66" for 25-Year event
Inflow = 1.26 cfs @ 12.23 hrs, Volume= 11,703 cf
Primary = 1.26 cfs @ 12.23 hrs, Volume= 11,703 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PT-1: Post - Total

Hydrograph



A-7 – PIPE CALCULATIONS & PIPE PROFILES

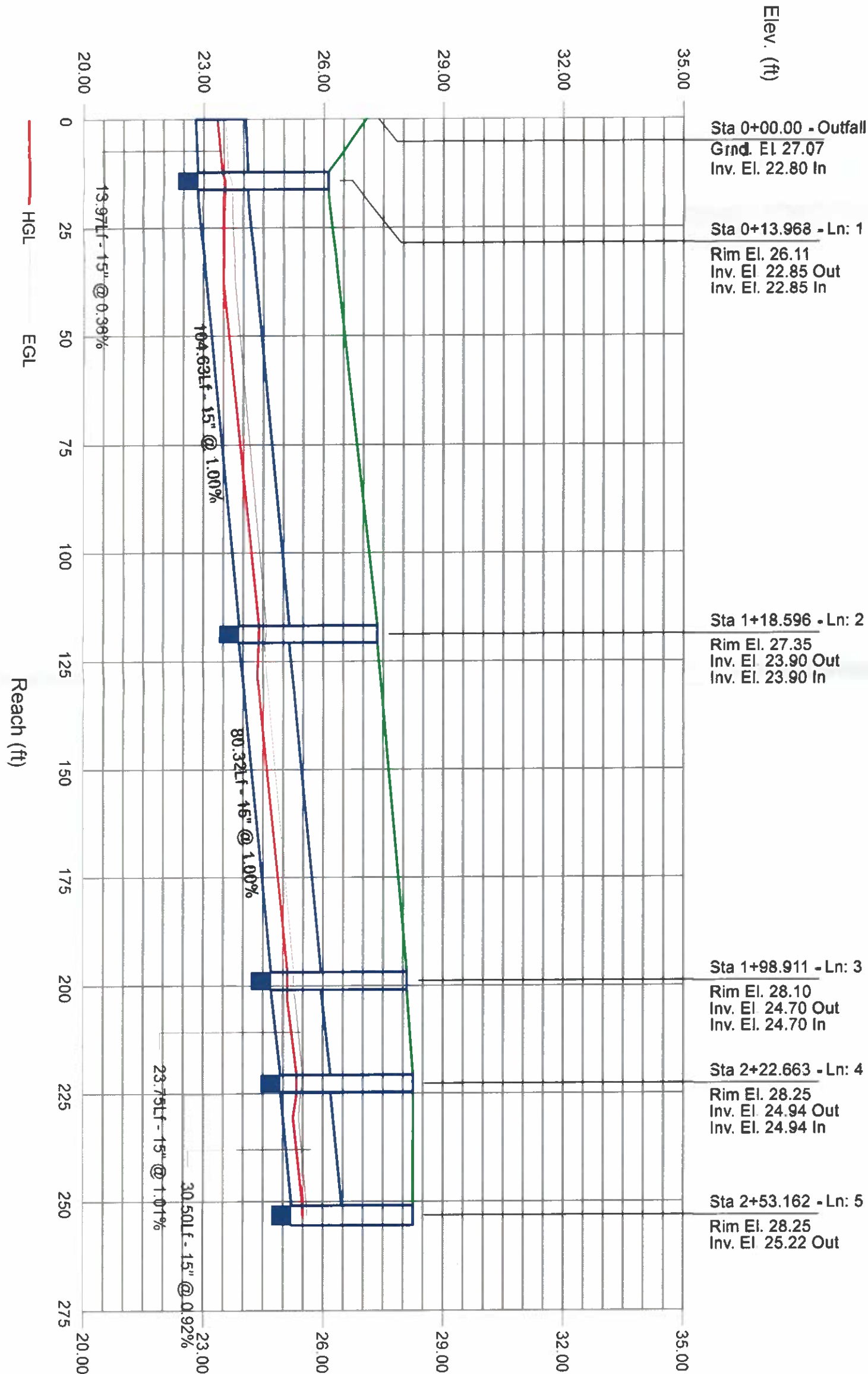
Line No.	Inlet ID	DnStm Ln No	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	Inlet Time (min)	Incr Q (cfs)	Known Q (cfs)	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)
1	INLET B, S-2	Outfall	0.13	0.57	0.07	0.32	10.0	0.42	0.00	2.01	3.86	3.47	15	Cir	0.013	13.97	0.36	22.80	22.85	27.07	26.11
2	INLET B, S-3	1	0.07	0.55	0.04	0.25	10.0	0.22	0.00	1.64	6.47	2.88	15	Cir	0.013	104.63	1.00	22.85	23.90	26.11	27.35
3	INLET B, S-4	2	0.02	0.44	0.01	0.21	10.0	0.05	0.00	1.16	6.44	2.83	15	Cir	0.013	80.32	1.00	23.90	24.70	27.35	28.10
4	INLET B, S-5	3	0.12	0.90	0.11	0.20	10.0	0.62	0.00	1.12	6.49	3.09	15	Cir	0.013	23.75	1.01	24.70	24.94	28.10	28.25
5	INLET E, S-6	4	0.13	0.69	0.09	0.09	10.0	0.51	0.00	0.51	6.19	1.97	15	Cir	0.013	30.50	0.92	24.94	25.22	28.25	28.25
6	DMH OCS-3A	2	0.00	0.00	0.00	0.00	10.0	0.28	0.28	0.28	20.28	1.37	15	Cir	0.012	19.00	8.40	23.90	25.50	27.35	30.00
7	YARD INLET, Y-7	Outfall	0.02	0.44	0.01	0.12	10.0	0.05	0.00	0.62	0.82	2.87	8	Cir	0.012	10.18	0.39	27.30	27.34	29.80	29.20
8	YARD INLET, Y-6	7	0.04	0.46	0.02	0.11	10.0	0.11	0.00	0.58	0.79	2.18	8	Cir	0.012	47.11	0.36	27.34	27.51	29.20	29.25
9	YARD INLET, Y-5	8	0.04	0.49	0.02	0.09	10.0	0.11	0.00	0.49	0.78	1.99	8	Cir	0.012	47.50	0.36	27.51	27.68	29.25	29.50
10	YARD INLET, Y-4	9	0.04	0.46	0.02	0.07	10.0	0.11	0.00	0.39	0.82	1.90	8	Cir	0.012	48.43	0.39	27.68	27.87	29.50	29.70
11	YARD INLET, Y-3	10	0.05	0.45	0.02	0.05	10.0	0.13	0.00	0.30	0.51	2.69	6	Cir	0.012	46.57	0.71	28.04	28.37	29.70	30.54
12	YARD INLET, Y-2	11	0.05	0.45	0.02	0.03	10.0	0.13	0.00	0.17	0.51	1.91	6	Cir	0.012	47.50	0.72	28.37	28.71	30.54	30.85
13	YARD INLET Y-1	12	0.02	0.43	0.01	0.01	10.0	0.05	0.00	0.05	0.62	1.10	6	Cir	0.012	40.29	1.04	28.71	29.13	30.85	31.50
25-YEAR STORM EVENT																		Number of lines: 13		Date: 8/15/2022	
NOTES: ** Critical depth																					

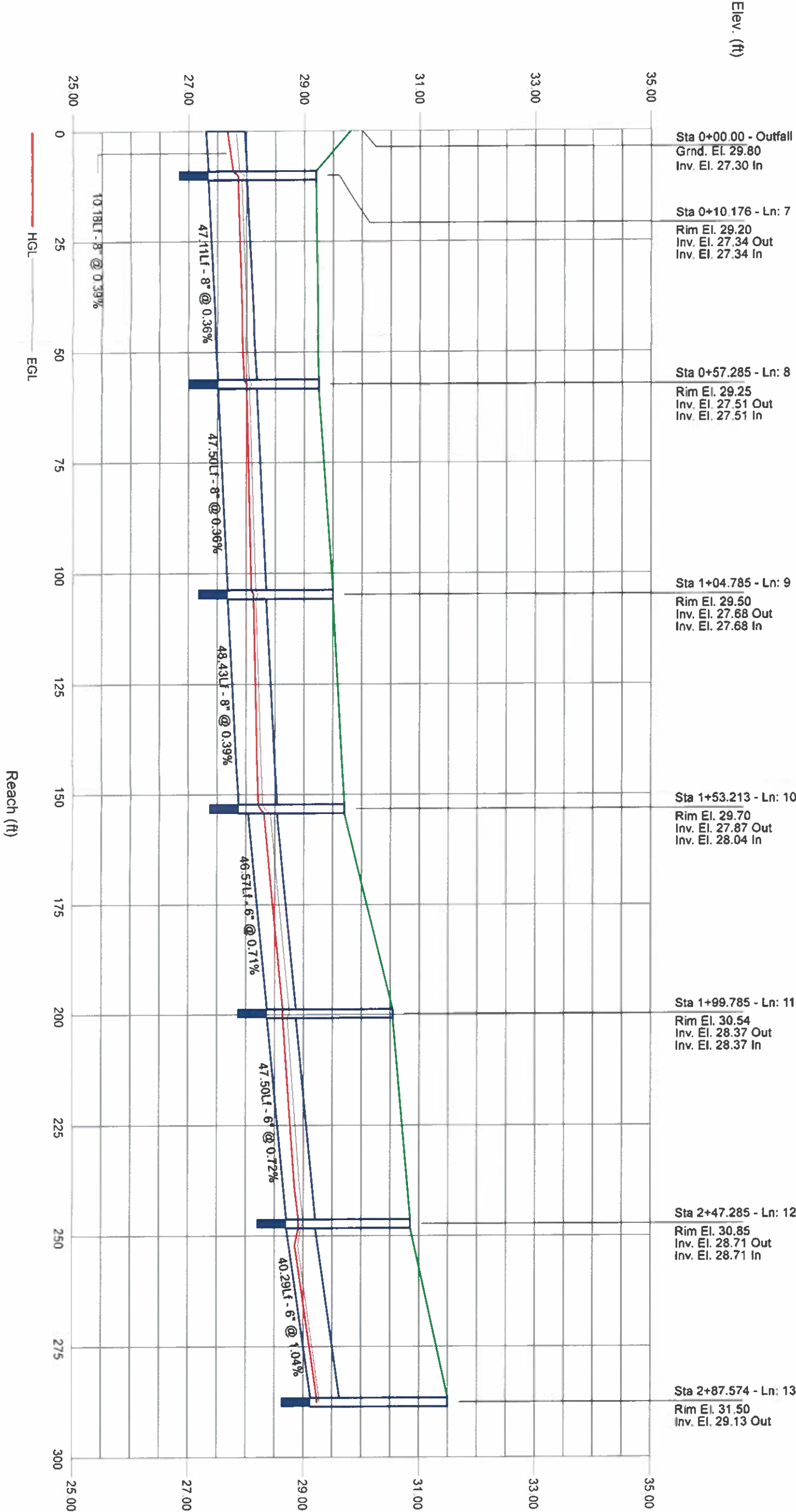
Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Energy loss (ft)		
1	15	2.01	22.80	23.36	0.56	0.54	3.74	0.22	23.58	0.552	22.85	23.49	0.64	0.63	3.20	0.16	23.65	0.365	0.459	0.064	0.50	0.08	
2	15	1.64	22.85	23.57	0.72	0.47	2.25	0.19	23.76	0.000	23.90	24.41 j	0.51**	0.47	3.51	0.19	24.60	0.000	0.000	n/a	0.60	n/a	
3	15	1.16	23.90	24.41	0.51	0.37	2.49	0.16	24.56	0.000	24.70	25.12 j	0.42**	0.37	3.17	0.16	25.28	0.000	0.000	n/a	0.60	0.09	
4	15	1.12	24.70	25.12	0.42	0.36	3.04	0.15	25.28	0.000	24.94	25.36 j	0.42**	0.36	3.13	0.15	25.51	0.000	0.000	n/a	0.60	0.09	
5	15	0.51	24.94	25.36	0.42	0.20	1.43	0.10	25.45	0.000	25.22	25.50 j	0.28**	0.20	2.52	0.10	25.60	0.000	0.000	n/a	0.50	0.05	
6	15	0.28	23.90	24.41	0.51	0.13	0.60	0.07	24.48	0.000	25.50	25.70 j	0.20**	0.13	2.14	0.07	25.77	0.000	0.000	n/a	0.50	0.04	
7	8	0.62	27.30	27.67	0.37*	0.20	3.12	0.15	27.82	0.635	27.34	27.77	0.43	0.24	2.63	0.11	27.88	0.410	0.523	0.053	0.80	0.09	
8	8	0.58	27.34	27.85	0.51	0.29	2.02	0.06	27.92	0.225	27.51	27.96	0.45	0.25	2.33	0.08	28.04	0.314	0.269	0.127	0.50	0.04	
9	8	0.49	27.51	28.00	0.49	0.28	1.78	0.05	28.05	0.177	27.68	28.09	0.41	0.22	2.19	0.07	28.16	0.293	0.235	0.112	0.50	0.04	
10	8	0.39	27.68	28.13	0.45	0.25	1.58	0.04	28.17	0.145	27.87	28.21	0.34	0.18	2.21	0.08	28.28	0.344	0.244	0.118	0.50	0.04	
11	6	0.30	28.04	28.31	0.27*	0.11	2.70	0.11	28.42	0.000	28.37	28.64	0.27**	0.11	2.68	0.11	28.75	0.000	0.000	n/a	0.50	0.06	
12	6	0.17	28.37	28.64	0.27	0.08	1.58	0.08	28.72	0.000	28.71	28.91 j	0.21**	0.08	2.25	0.08	28.99	0.000	0.000	n/a	0.50	n/a	
13	6	0.05	28.71	28.91	0.21	0.03	0.64	0.04	28.95	0.000	29.13	29.24 j	0.11**	0.03	1.57	0.04	29.27	0.000	0.000	n/a	0.50	0.02	
25-YEAR STORM EVENT										Number of lines: 13								Run Date: 8/15/2022					
Notes: * Normal depth assumed; ** Critical depth; j-Line contains hyd. jump ; c = cir e = ellip b = box																							

Storm Sewer Profile

Proj. file: SW.stm





A-8 – WEB SOIL SURVEY HYDROLOGIC SOILS GROUP MAP



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for **Monmouth County, New Jersey**



November 12, 2021

Preface

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

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

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

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

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

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

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Legend.....	7
Map Unit Legend.....	8
Map Unit Descriptions.....	8
Monmouth County, New Jersey.....	10
USKLEA—Urban land-Klej complex, 0 to 2 percent slopes.....	10

Soil Map

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

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Soils		Stony Spot
	Soil Map Unit Polygons		Very Stony Spot
	Soil Map Unit Lines		Wet Spot
	Soil Map Unit Points		Other
	Special Point Features		Special Line Features
	Blowout		Streams and Canals
	Borrow Pit		Transportation
	Clay Spot		Rails
	Closed Depression		Interstate Highways
	Gravel Pit		US Routes
	Gravelly Spot		Major Roads
	Landfill		Local Roads
	Lava Flow		Background
	Marsh or swamp		Aerial Photography
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Monmouth County, New Jersey
Survey Area Data: Version 15, Aug 31, 2021

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

Date(s) aerial images were photographed: May 9, 2021—Sep 15, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
USKLEA	Urban land-Klej complex, 0 to 2 percent slopes	1.2	100.0%
Totals for Area of Interest		1.2	100.0%

Map Unit Descriptions

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

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

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

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

Custom Soil Resource Report

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

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

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

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

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

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

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

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

Monmouth County, New Jersey

USKLEA—Urban land-Klej complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2ywgr
Elevation: 0 to 70 feet
Mean annual precipitation: 42 to 49 inches
Mean annual air temperature: 52 to 59 degrees F
Frost-free period: 190 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Klej and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Klej

Setting

Landform: Broad interstream divides
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy fluviomarine deposits

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
Oe - 3 to 4 inches: moderately decomposed plant material
A - 4 to 14 inches: loamy sand
Bw1 - 14 to 24 inches: loamy sand
Bw2 - 24 to 40 inches: loamy sand
C - 40 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Custom Soil Resource Report

Depth to water table: About 8 to 16 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: A/D

Hydric soil rating: No

Minor Components

Berryland, occasionally flooded

Percent of map unit: 5 percent

Landform: Depressions on flats, drainageways on flats, deflation flats on flats

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Hydric soil rating: Yes

Atsion

Percent of map unit: 5 percent

Landform: Depressions on flats, drainageways on flats, deflation flats on flats

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Hydric soil rating: Yes

Hammonton

Percent of map unit: 5 percent

Landform: Flats, broad interstream divides

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

A-9 – SOIL LOGS & PERMEABILITY TESTS

31

KEYPORT BL 85 LOTS 4-10 & 13

TP - 201

0"-18"=TOP SOIL & ROOTS

18"-28"=GREYISH BRN, SAND, GRANULAR, LOOSE, ROOTS

28"-41"=DK BRN , LOAM, SUBANGULAR, BLOCKY, MODERATE, FRIABLE, ROOTS

41"-57"=STG BRN, SANDY LOAM, SUBANGULAR, BLOCKY, WEAK, FRIABLE, MOTTLED DK GREY, MANY, CRS, PROMENINET, AND SEEPAGE

57"-72"=DK GREY, SAND, GRANULAR, LOOSE, HEAVY SEEPAGE & MOTTLES STG BRN , MANY, CRS, PROMINENT

72"-84"=DK GREENISH GREY, SAND, GRANULAR, LOOSE, HEVAY SEEPAGE, MOTTLED STG BRN & OLIVE, MANY, CRS, PROMINENT

CAVE IN

SAMPLE TAKEN AT 41"-57"

SEEPAGE & MOTTLES @ 41 INCHES

SHWT = 41 INCHES

TP - 202

0"-8"=TOP SOIL. ROOTS

8"-35"=BRN, LOAMY SAND, SUBANGULAR, BLOCKY, MODERATE, FRIABLE

35"-72"=STG BRN, LOAMY SAND, GRANULAR, LOOSE, HEAVY SEEPAGE, MOTTLED OLIVE & LT GREY, MANY, CRS, PROMNENT

72"-85"=DK GREENISH GREY, SAND, GRANULAR, LOOSE, HEAVY SEEPAGE, MOLTTED OLIVE, MANY, CRS, PROMINENT

CAVE IN

SAMPLE TAKEN = 8"-35"

SEEPAGE & MOTTLES @ 35 INCHES

SHWT =35 INCHES



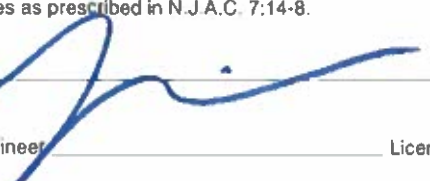
257 MONMOUTH ROAD
BUILDING A, SUITE 7
OAKHURST, NJ 08736 732-
223-1313

Tube Permeameter Test

		Job #		20152	
Test Number	TP - 201		Date Collected	9/9/2021	
Material Tested-	Fill	Native Soil	X	Depth	41"-57"
Type of Sample	Disturbed	X	Undisturbed		
Sample Dims.	Inside Radius of Tube, R, (in.)	0.73	Length of Tube (in.)	5.95	
			Dist. From Tube to Sample (in.)	2.00	
			Length of Sample, L, (in.)	3.95	
Bulk Density (Disturbed Samples Only)	Sample Weight (grams)	172.93	Wt. Tube Containing Sample (oz.)	9.70	Wt. Empty Tube (oz.) 3.6
	Sample Volume $L \times 3.14R^2$	108.31			
	Bulk Density grams/cm ³	1.60	Must be > 1.2		
Height of Water Above Basin (in.)	H ₁	3.00			
	H ₂	2.00			
Replicate		A	B	C	
Rate of Water	t ₁	0.00	0.00	0.00	t ₁
Level Drop (min.)	t ₂	58.00	62.00	61.00	t ₂
	T	58.00	62.00	61.00	T
Permeability		1.66 in/hr	1.55 in/hr	1.58 in/hr	
Defects in the Sample	☒ None ☐ Cracks ☐ Worm Channels				
	☐ Root Channels ☐ Soil/Tube Contact				
	☐ Large Gravel ☐ Large Roots				
	☐ Dry Soil ☐ Smearing ☐ Compaction				
	☐ Other				

I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator  Date: 9/13/2021

Signature of Professional Engineer  License # 40673



257 MONMOUTH ROAD
BUILDING A, SUITE 7
OAKHURST, NJ 08736 732-
223-1313

Tube Permeameter Test

		Job #		20152	
Test Number	TP - 202		Date Collected	9/9/2021	
Material Tested-	Fill		Native Soil	X	Depth 8'-35"
Type of Sample	Disturbed	X	Undisturbed		
Sample Dims.	Inside Radius of Tube, R, (in.)	0.73	Length of Tube (in.)	5.95	
			Dist. From Tube to Sample (in.)	2.00	
			Length of Sample, L, (in.)	3.95	
Bulk Density (Disturbed Samples Only)	Sample Weight (grams)	184.27	Wt. Tube Containing Sample (oz.)	10.10	Wt. Empty Tube (oz.) 3.6
	Sample Volume $L \times 3.14R^2$	108.31			
	Bulk Density grams/cm ³	1.70	Must be > 1.2		
Height of Water Above Basin (in.)	H ₁	3.00			
	H ₂	2.50			
Replicate		A	B	C	
Rate of Water	t ₁	0.00	0.00	0.00	t ₁
Level Drop (min.)	t ₂	7.67	7.45	8.10	t ₂
	T	7.67	7.45	8.10	T
Permeability		5.64 in/hr	5.80 in/hr	5.33 in/hr	
Defects in the Sample	☒ None ☐ Cracks ☐ Worm Channels				
	☐ Root Channels ☐ Soil/Tube Contact				
	☐ Large Gravel ☐ Large Roots				
	☐ Dry Soil ☐ Smearing ☐ Compaction				
	☐ Other				

I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator  Date: 9/13/2021

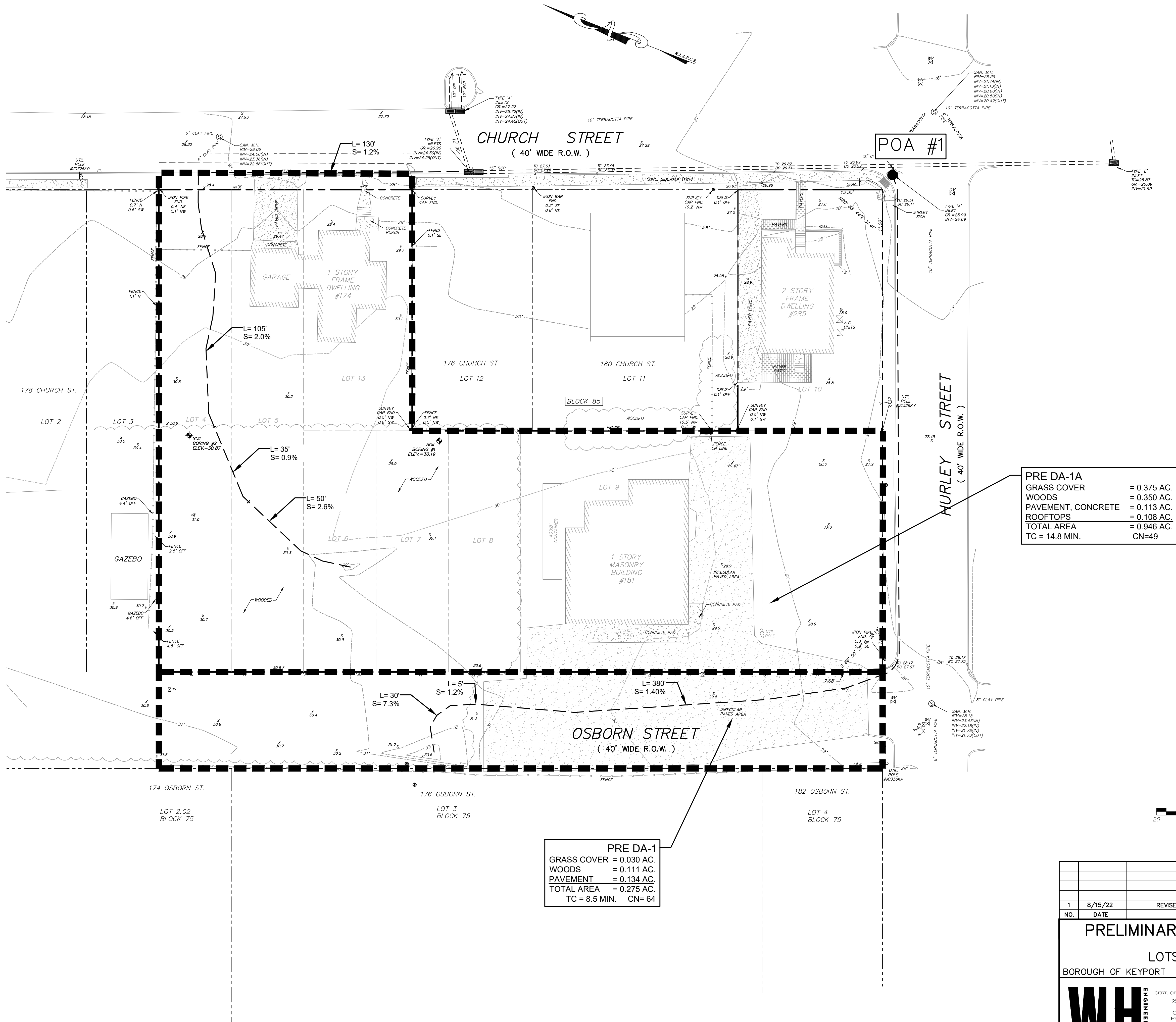
Signature of Professional Engineer  License # 40673

A-10 – DRAINAGE AREA MAPS

W:\Projects\2015\0152 - John Fitey - 174 Church St., Keyport\DWG's\Design Drawings\Drainage Map_06-2022.dwg 8/12/2022 5:23:09 PM

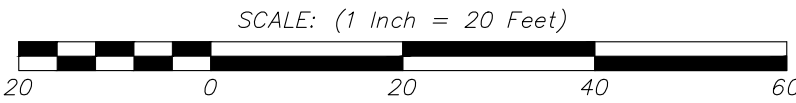
LEGEND

- GV GAS VALVE
- WV WATER VALVE
- WM WATER METER
- UM UTILITY MANHOLE
- DM DRAINAGE MANHOLE
- EM ELECTRICAL MANHOLE
- SM SANITARY MANHOLE
- TM TELEPHONE MANHOLE
- TS TRAFFIC SIGN
- TS (2 POST) TRAFFIC SIGN (2 POST)
- SS STREET SIGN
- LP LIGHT POST
- UP UTILITY POLE
- FH FIRE HYDRANT
- DI DRAINAGE INLET (TYPE "A")
- DI DRAINAGE INLET (TYPE "B")
- DI DRAINAGE INLET (TYPE "C")
- DL DRAINAGE LINE
- EL ELECTRIC LINE
- GL GAS LINE
- SSL SANITARY SEWER LINE
- TL TELEPHONE LINE
- WL WATER LINE
- OWH OVERHEAD WIRES
- MW MONITORING WELL
- IPF IRON PIPE FOUND
- CRF CAPPED REBAR FOUND
- CMF CONCRETE MONUMENT FOUND
- S SURVEY
- FM FILE MAP
- GM GAS METER
- DC DEPRESSION CURB
- FC FLUSH CURB
- SB SOIL BORING LOCATION
- PG PHOTOGRAPH LOCATION



PRE DA-1A	
GRASS COVER	= 0.375 AC.
WOODS	= 0.350 AC.
PAVEMENT, CONCRETE	= 0.113 AC.
ROOFTOPS	= 0.108 AC.
TOTAL AREA	= 0.946 AC.
TC = 14.8 MIN.	CN=49

PRE DA-1	
GRASS COVER	= 0.030 AC.
WOODS	= 0.111 AC.
PAVEMENT	= 0.134 AC.
TOTAL AREA	= 0.275 AC.
TC = 8.5 MIN.	CN= 64



1	8/15/22	REVISED PURSUANT TO RESOLUTION COMPLIANCE	CM
NO.	DATE	DESCRIPTION	DRAWN BY
PRELIMINARY & FINAL MAJOR SITE PLAN			
OF			
LOTS 4-10 & 13 BLOCK 85			
BOROUGH OF KEYPORT MONMOUTH COUNTY NEW JERSEY			
WH ENGINEERING		CERT. OF AUTH. NO. 24GA28117300 257 MONMOUTH ROAD, BLDG. A, STE. 7 CAMDEN, NJ 07755 PHONE: 732-223-1313 WWW.WJENGINEERING.COM	
SCALE: 1" = 20'		DRAINAGE AREA MAP PRE-DEVELOPED CONDITIONS	
DRAWN BY: KB/CM		WALTER JOSEPH HOPKIN N.J. PROFESSIONAL ENGINEER, LIC. No. 40673	
DATE: 11/30/21		JOB No.: 20152	
SHEET No.: 1 of 3			

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LEGEND

- CV GAS VALVE
- WV WATER VALVE
- WM WATER METER
- UM UTILITY MANHOLE
- DM DRAINAGE MANHOLE
- EM ELECTRICAL MANHOLE
- SM SANITARY MANHOLE
- TM TELEPHONE MANHOLE
- TS TRAFFIC SIGN
- TS-2 TRAFFIC SIGN (2 POST)
- SS STREET SIGN
- LP LIGHT POST
- UP UTILITY POLE
- FR FIRE HYDRANT
- DI DRAINAGE INLET (TYPE "A")
- DI DRAINAGE INLET (TYPE "B")
- DI DRAINAGE INLET (TYPE "C")
- DL DRAINAGE LINE
- EL ELECTRIC LINE
- GL GAS LINE
- SL SANITARY SEWER LINE
- TL TELEPHONE LINE
- WL WATER LINE
- OW OVERHEAD WIRES
- MW MONITORING WELL
- IF IRON PIPE FOUND
- CF CAPPED REBAR FOUND
- CM CONCRETE MONUMENT FOUND
- S SURVEY
- FM FILE MAP
- G GAS METER
- DC DEPRESSION CURB
- FC FLUSH CURB
- SB SOIL BORING LOCATION
- PG PHOTOGRAPH LOCATION

POST DA-1C
GRASS COVER = 0.021 AC.
ROOFTOP = 0.035 AC.
WALLS = 0.000 AC.
TOTAL AREA = 0.056 AC.
TC = 6 MIN. CN=76

POST DA-1B
GRASS COVER = 0.013 AC.
ROOFTOP = 0.041 AC.
WALLS = 0.000 AC.
TOTAL AREA = 0.054 AC.
TC = 6 MIN. CN=77

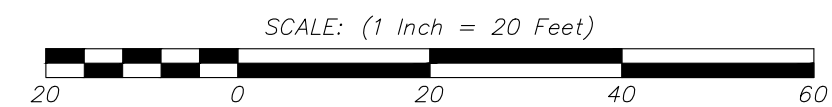
POST DA-1(UNDETAINED)
GRASS COVER = 0.148 AC.
PORCHES/WALKWAYS/DRIVEWAYS = 0.038 AC.
TOTAL AREA = 0.186 AC.
TC = 6 MIN. CN=51

POST DA-1E
GRASS COVER = 0.104 AC.
ROOFTOPS = 0.165 AC.
TOTAL AREA = 0.269 AC.
TC = 6 MIN. CN=75

POST DA-1D
GRASS COVER = 0.044 AC.
ROOFTOPS = 0.083 AC.
TOTAL AREA = 0.127 AC.
TC = 6 MIN. CN=78

POST DA-1 (OSBORN ST)
GRASS COVER = 0.040 AC.
SIDEWALK/DRIVEWAYS = 0.027 AC.
OSBORN STREET/PAVMT. = 0.198 AC.
TOTAL AREA = 0.265 AC.
TC = 6 MIN. CN=88

POST DA-1A
GRASS COVER = 0.096 AC.
PORCHES/WALKWAYS/DRIVEWAYS = 0.160 AC.
TOTAL AREA = 0.256 AC.
TC = 6 MIN. CN=61



1	8/15/22	REVISED PURSUANT TO RESOLUTION COMPLIANCE	CM
NO.	DATE	DESCRIPTION	DRAWN BY
PRELIMINARY & FINAL MAJOR SITE PLAN			
OF			
LOTS 4-10 & 13 BLOCK 85			
BOROUGH OF KEYPORT MONMOUTH COUNTY NEW JERSEY			
WH ENGINEERING		CERT. OF AUTH. NO. 24GA28117300 257 MORMOUTH ROAD, BLDG. A, STE. 7 OAKHURST, NJ 07755 PHONE: 732-223-1313 WWW.WJENGINEERING.COM	
SCALE: 1" = 20'		DRAWN BY: KB/CM DATE: 11/30/21 JOB No.: 20152 SHEET No.: 2 of 3	
		DRAINAGE AREA MAP POST-DEVELOPED CONDITIONS WALTER JOSEPH HOPKIN N.J. PROFESSIONAL ENGINEER, LIC. No. 40673	

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- LEGEND**
- GV GAS VALVE
 - WV WATER VALVE
 - WM WATER METER
 - UM UTILITY MANHOLE
 - DM DRAINAGE MANHOLE
 - EM ELECTRICAL MANHOLE
 - SM SANITARY MANHOLE
 - TM TELEPHONE MANHOLE
 - TS TRAFFIC SIGN
 - TS2 TRAFFIC SIGN (2 POST)
 - SS STREET SIGN
 - LP LIGHT POST
 - UP UTILITY POLE
 - FR FIRE HYDRANT
 - DI(A) DRAINAGE INLET (TYPE "A")
 - DI(B) DRAINAGE INLET (TYPE "B")
 - DI(C) DRAINAGE INLET (TYPE "C")
 - DL DRAINAGE LINE
 - EL ELECTRIC LINE
 - GL GAS LINE
 - SSL SANITARY SEWER LINE
 - TL TELEPHONE LINE
 - WL WATER LINE
 - OW OVERHEAD WIRES
 - MW MONITORING WELL
 - IPF IRON PIPE FOUND
 - CRP CAPPED REBAR FOUND
 - CMF CONCRETE MONUMENT FOUND
 - S SURVEY
 - FM FILE MAP
 - G GAS METER
 - DC DEPRESSION CURB
 - FC FLUSH CURB
 - SB SOIL BORING LOCATION
 - PH PHOTOGRAPH LOCATION

DA DI Y-1
AREA=0.024 AC.
PERV. 0.016 AC.
IMPERV. 0.008 AC

DA DI Y-2
AREA=0.045 AC.
PERV. =0.029 AC.
IMPERV.=0.016AC.

DA DI Y-3
AREA=0.045 AC.
PERV. =0.029 AC.
IMPERV.=0.016AC.

DA DI S-6
AREA=0.134 AC.
PERV.=0.041 AC.
IMPERV. =0.093 AC.

DA DI Y-4
AREA=0.043 AC.
PERV. =0.027 AC.
IMPERV.=0.016AC.

DA DI Y-5
AREA=0.038 AC.
PERV. =0.022 AC.
IMPERV.=0.016AC.

DA DI Y-6
AREA=0.043 AC.
PERV. =0.027 AC.
IMPERV.=0.016AC.

DA DI S-5
AREA=0.120 AC.
IMPERV.=0.120 AC.

DA DI Y-7
AREA=0.023 AC.
PERV. =0.015 AC.
IMPERV.=0.008 AC.

DA DI S-3
AREA=0.070 AC.
PERV. =0.035 AC.
IMPERV.=0.035 AC.

DA DI S-4
AREA=0.020 AC.
IMPERV.=0.020 AC.

DA DI S-2
AREA=0.126 AC.
PERV. =0.060 AC.
IMPERV.=0.066 AC.

SCALE: (1 Inch = 20 Feet)

NO.	DATE	DESCRIPTION	DRAWN BY
PRELIMINARY & FINAL MAJOR SITE PLAN			
OF			
LOTS 4-10 & 13 BLOCK 85			
BOROUGH OF KEYPORT MONMOUTH COUNTY NEW JERSEY			
WH ENGINEERING		CERT. OF AUTH. NO. 24GA28117300 257 MORMOUTH ROAD, BLDG. A, STE. 7, OAKHURST, NJ 07755 PHONE: 732-223-1313 WWW.WJENGINEERING.COM	
DRAINAGE INLET MAP		WALTER JOSEPH HOPKIN N.J. PROFESSIONAL ENGINEER, LIC. No. 40673	
SCALE:	DRAWN BY:	DATE:	JOB No.:
SCALE	CM	DATE	20152
SHEET No.:		3 of 2	