STORM WATER DRAINAGE CALCULATIONS

for

PROPOSED
DEVELOPMENT
522 PARK AVENUE
BLOCK 705, LOT 8
CITY OF PLAINFIELD
UNION COUNTY, NEW JERSEY

March 11, 2020

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Description of Site

The subject property is a 0.12 acre parcel located along on the corner of Park Avenue and West 6th Street in Plainfield, New Jersey.

Presently located on the site is a parking lot with a total impervious area of approximately 5,109 square feet. The entire lot is considered 100% impervious.

Description of Proposed Improvements

Proposed improvements of the site consist of a 5-story residential building with retail on the first floor, 14 apartment units above and a rooftop terrace.

Between the building and the sidewalk, the proposed total impervious area is 4,870 square feet, equivalent to 95.3% of the site.

Purpose

The objective of the Stormwater Drainage Calculations is to provide supporting computations for the planned development in compliance with New Jersey's Stormwater Management Regulations—NJAC 7:8.

Drainage - Existing

Existing drainage on site sheet flows off of the site and onto Park Avenue where there is an existing catch basin located at the intersection.

Drainage - Proposed

The proposed construction will not affect the impervious coverage on site. Therefore, the existing drainage will not be impacted by construction. The drainage will continue to drain as it currently does to the county drainage system on Park Avenue. Storm water will be collected from the roof via roof leaders which will then be piped to the catch basin on Park Avenue. Areas around the building will be landscaped.

Water Quality

New water quality standards are triggered when a project proposes ¼ acre of new impervious surface.

As this project proposes less than ¼ acre of new impervious surface, no specific water quality measures are proposed. Furthermore, the project will slightly reduce the existing impervious coverage and the project will have no impact on the downstream drainage system.

Methodology

The pre-developed runoff analysis was determined using the rational method equation, Q=CiA. Where Q is the peak discharge in cfs, C is the runoff coefficient, i is the rainfall intensity in in/hr, and A is the area of the site in acres.

The post-developed runoff analysis was determined using the Rational Method, utilizing HydroCAD version 10.00-22. Runoff computations and modeling are based on the NJ-DEP IDF file.

Results

Based on our analysis, the proposed construction and drainage system reduces the stormwater flow.

The existing drainage shows a peak discharge rate of 0.93 cfs occurring during the 100-Year storm, while the proposed peak discharge rate is 0.90 cfs. As shown, the proposed development will nominally reduce the existing discharge rates.

Table 1: Existing and Proposed Stormwater Runoff

EVENT	EXISTING (cfs)	PROPOSED (cfs)
2-YEAR	0.49	0.47
10-YEAR	0.67	0.65
25-YEAR	0.78	0.76
100-YEAR	0.93	0.90

Existing

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Runoff Area=5,109 sf 100.00% Impervious Runoff Depth=1.04"
Tc=10.0 min C=0.99 Runoff=0.49 cfs 0.010 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.010 af Average Runoff Depth = 1.04"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.117 ac

Summary for Subcatchment 1S: Existing

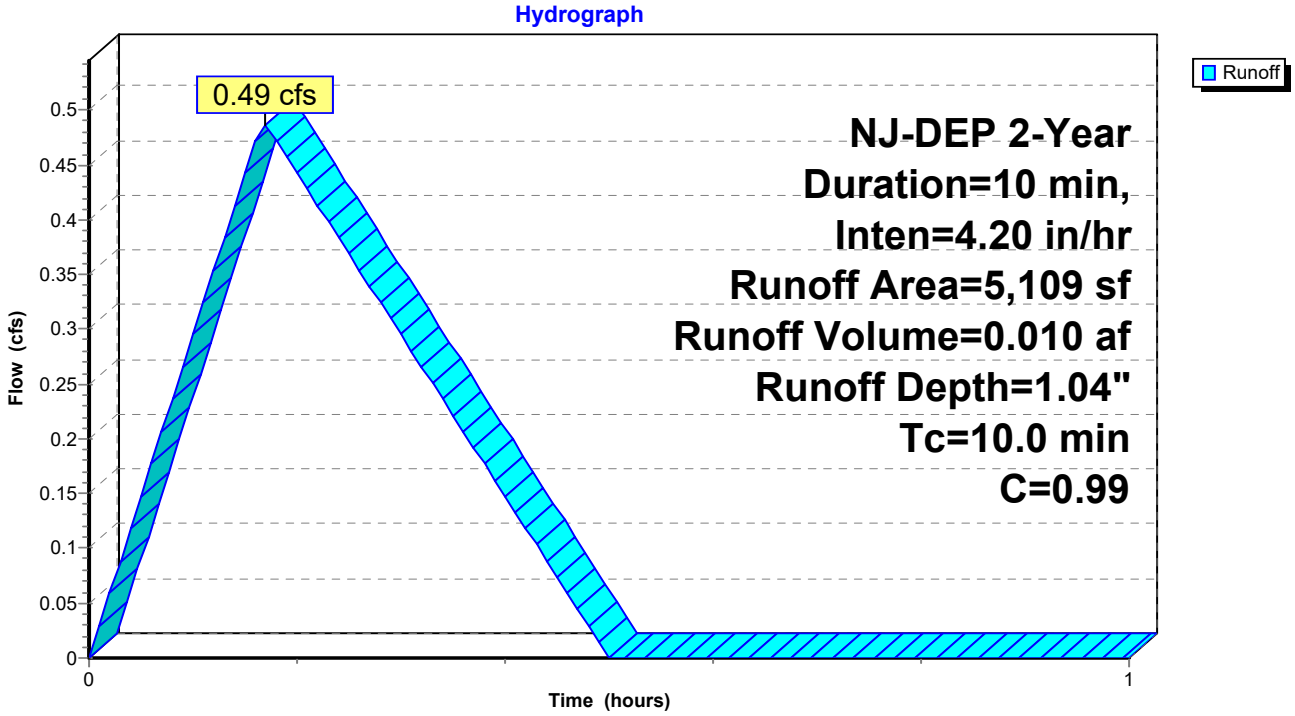
Runoff = 0.49 cfs @ 0.17 hrs, Volume= 0.010 af, Depth= 1.04"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 2-Year Duration=10 min, Inten=4.20 in/hr

Area (sf)	C	Description
5,109	0.99	
5,109		100.00% Impervious Area

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

Subcatchment 1S: Existing



Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Runoff Area=5,109 sf 100.00% Impervious Runoff Depth=1.43"
Tc=10.0 min C=0.99 Runoff=0.67 cfs 0.014 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.014 af Average Runoff Depth = 1.43"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.117 ac

Summary for Subcatchment 1S: Existing

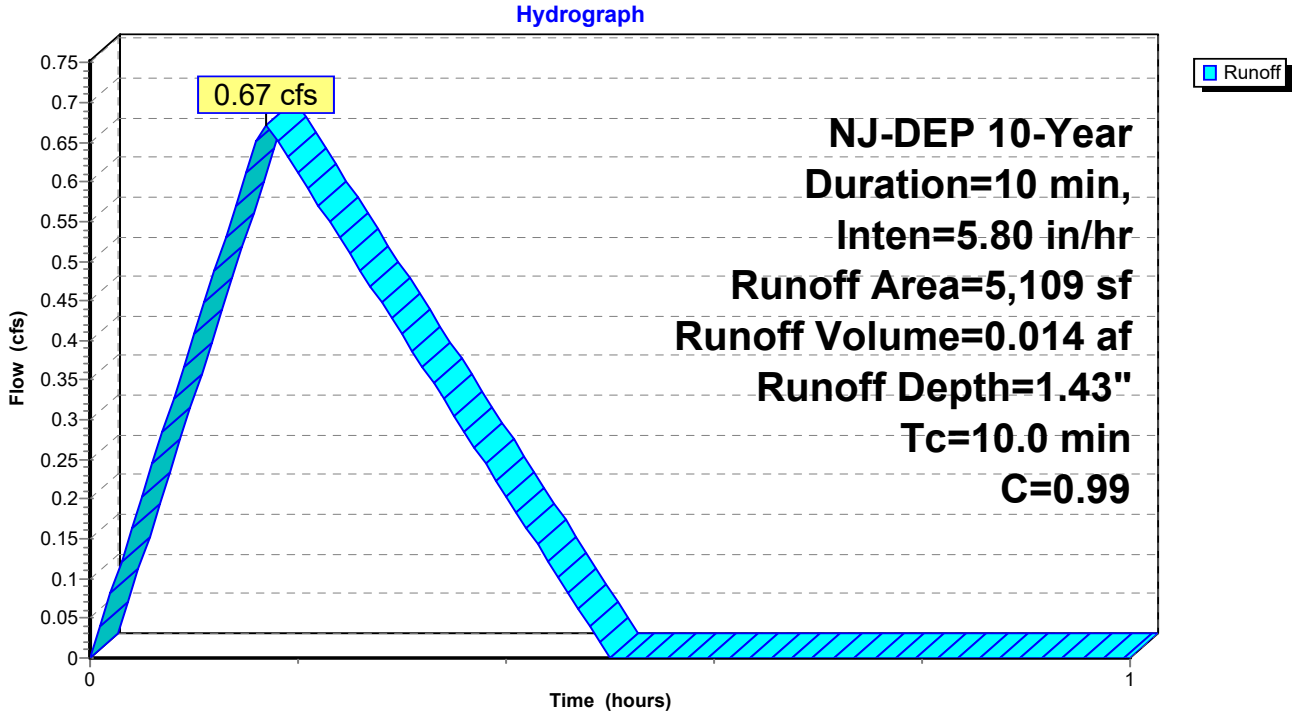
Runoff = 0.67 cfs @ 0.17 hrs, Volume= 0.014 af, Depth= 1.43"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 10-Year Duration=10 min, Inten=5.80 in/hr

Area (sf)	C	Description
5,109	0.99	
5,109		100.00% Impervious Area

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

Subcatchment 1S: Existing



Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Runoff Area=5,109 sf 100.00% Impervious Runoff Depth=1.66"
Tc=10.0 min C=0.99 Runoff=0.78 cfs 0.016 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.016 af Average Runoff Depth = 1.66"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.117 ac

Summary for Subcatchment 1S: Existing

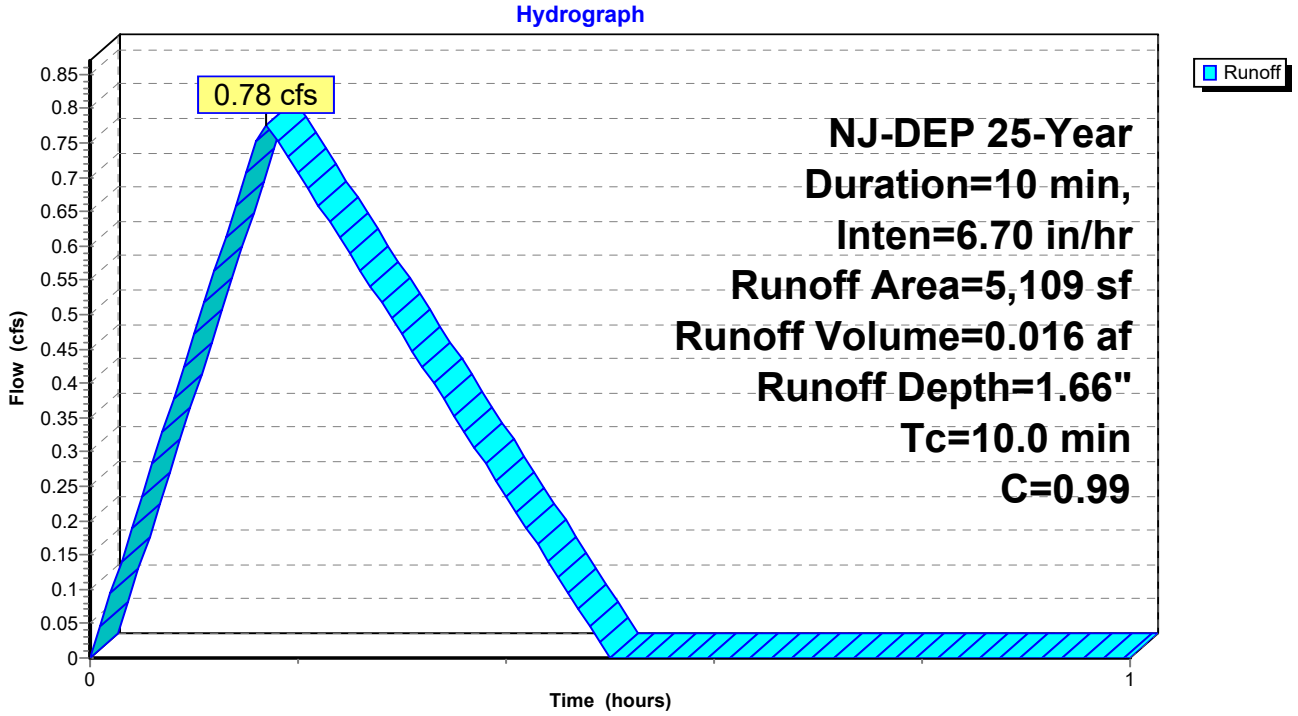
Runoff = 0.78 cfs @ 0.17 hrs, Volume= 0.016 af, Depth= 1.66"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 25-Year Duration=10 min, Inten=6.70 in/hr

Area (sf)	C	Description
5,109	0.99	
5,109		100.00% Impervious Area

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

Subcatchment 1S: Existing



Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Runoff Area=5,109 sf 100.00% Impervious Runoff Depth=1.98"
Tc=10.0 min C=0.99 Runoff=0.93 cfs 0.019 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.019 af Average Runoff Depth = 1.98"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.117 ac

Summary for Subcatchment 1S: Existing

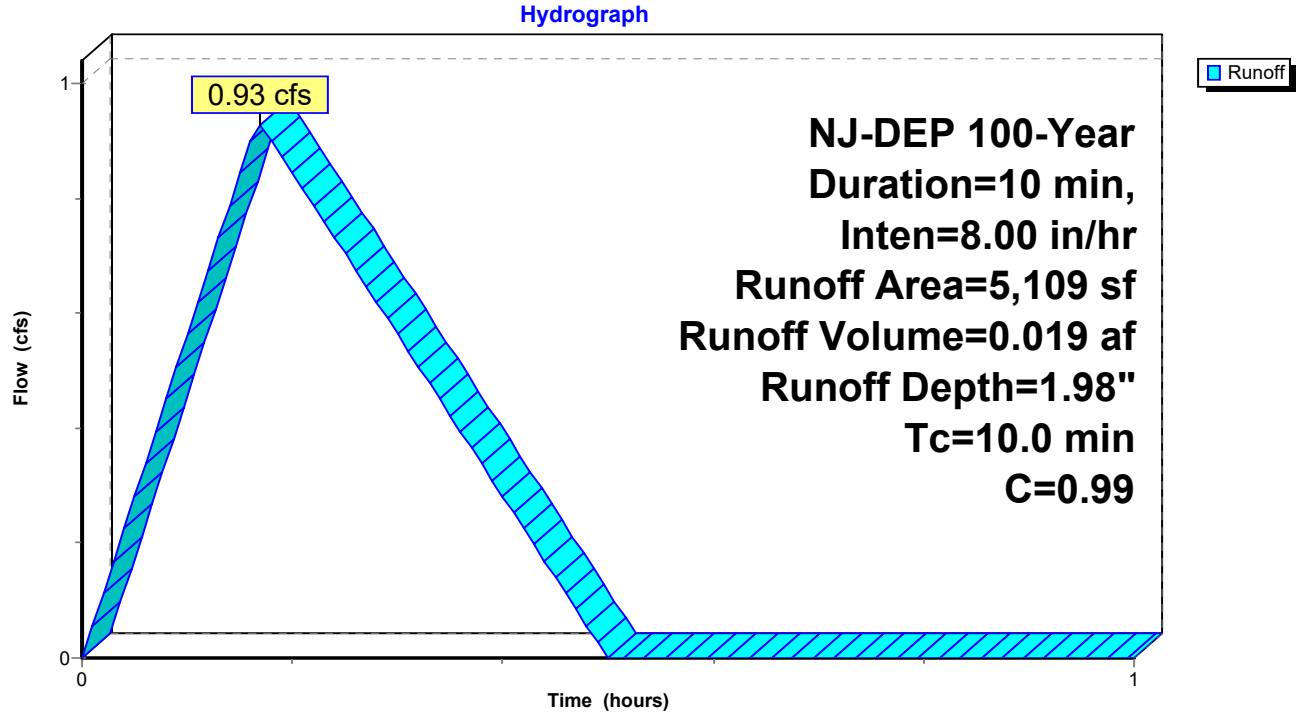
Runoff = 0.93 cfs @ 0.17 hrs, Volume= 0.019 af, Depth= 1.98"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 100-Year Duration=10 min, Inten=8.00 in/hr

Area (sf)	C	Description
5,109	0.99	
5,109		100.00% Impervious Area

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

Subcatchment 1S: Existing



Proposed

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Proposed Runoff Area=5,075 sf 95.29% Impervious Runoff Depth=1.02"
Tc=10.0 min C=0.97 Runoff=0.47 cfs 0.010 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.010 af Average Runoff Depth = 1.02"
4.71% Pervious = 0.005 ac 95.29% Impervious = 0.111 ac

Summary for Subcatchment 1S: Proposed

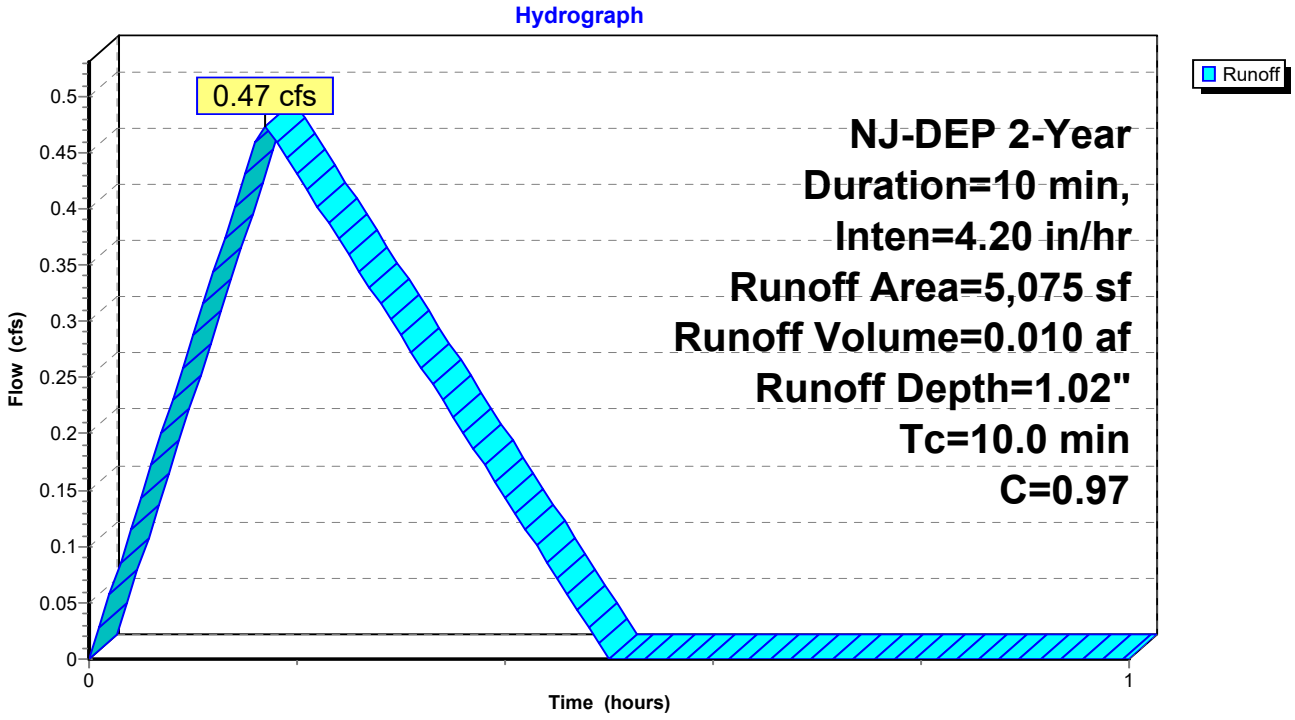
Runoff = 0.47 cfs @ 0.17 hrs, Volume= 0.010 af, Depth= 1.02"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 2-Year Duration=10 min, Inten=4.20 in/hr

Area (sf)	C	Description
326	0.99	
4,510	0.99	
239	0.51	
5,075	0.97	Weighted Average
239		4.71% Pervious Area
4,836		95.29% Impervious Area

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

Subcatchment 1S: Proposed



Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Proposed Runoff Area=5,075 sf 95.29% Impervious Runoff Depth=1.41"
Tc=10.0 min C=0.97 Runoff=0.65 cfs 0.014 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.014 af Average Runoff Depth = 1.41"
4.71% Pervious = 0.005 ac 95.29% Impervious = 0.111 ac

Summary for Subcatchment 1S: Proposed

Runoff = 0.65 cfs @ 0.17 hrs, Volume= 0.014 af, Depth= 1.41"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 10-Year Duration=10 min, Inten=5.80 in/hr

Area (sf)	C	Description
326	0.99	
4,510	0.99	
239	0.51	
5,075	0.97	Weighted Average
239		4.71% Pervious Area
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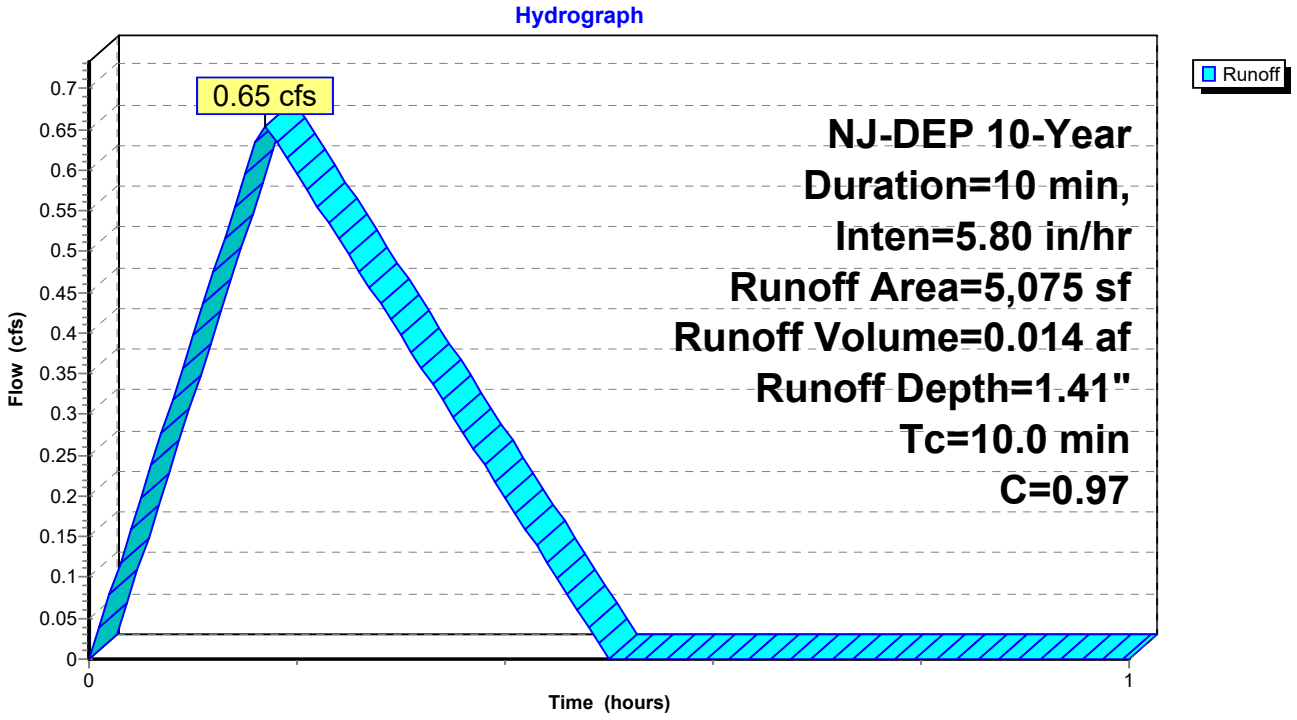
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1S: Proposed



Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=5,075 sf 95.29% Impervious Runoff Depth=1.62"
Tc=10.0 min C=0.97 Runoff=0.76 cfs 0.016 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.016 af Average Runoff Depth = 1.62"
4.71% Pervious = 0.005 ac 95.29% Impervious = 0.111 ac

Summary for Subcatchment 1S: Proposed

Runoff = 0.76 cfs @ 0.17 hrs, Volume= 0.016 af, Depth= 1.62"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 25-Year Duration=10 min, Inten=6.70 in/hr

Area (sf)	C	Description
326	0.99	
4,510	0.99	
239	0.51	
5,075	0.97	Weighted Average
239		4.71% Pervious Area
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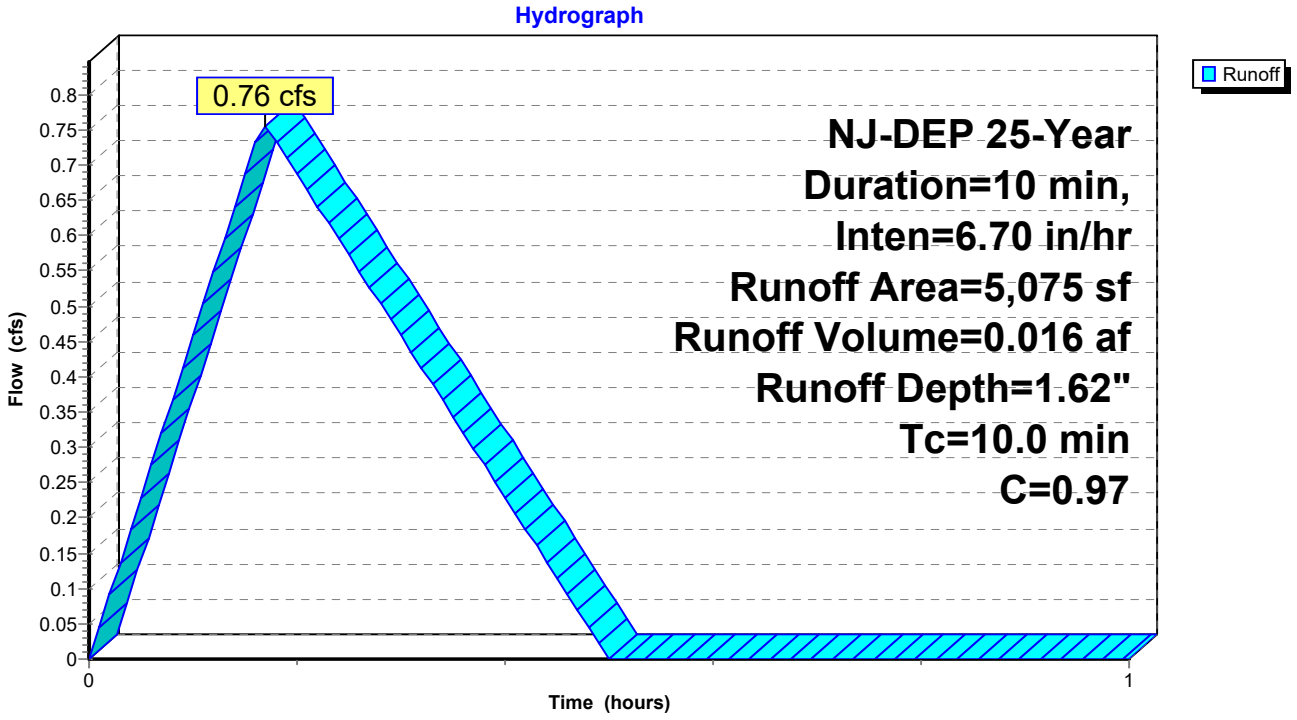
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1S: Proposed



Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=5,075 sf 95.29% Impervious Runoff Depth=1.94"
Tc=10.0 min C=0.97 Runoff=0.90 cfs 0.019 af

Total Runoff Area = 0.117 ac Runoff Volume = 0.019 af Average Runoff Depth = 1.94"
4.71% Pervious = 0.005 ac 95.29% Impervious = 0.111 ac

Summary for Subcatchment 1S: Proposed

Runoff = 0.90 cfs @ 0.17 hrs, Volume= 0.019 af, Depth= 1.94"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
NJ-DEP 100-Year Duration=10 min, Inten=8.00 in/hr

Area (sf)	C	Description
326	0.99	
4,510	0.99	
239	0.51	
5,075	0.97	Weighted Average
239		4.71% Pervious Area
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1S: Proposed