

# General Project Description and Stormwater Management Calculations



Project: McDonald's Restaurant No. 29-0019 Rebuild  
4295 US Route 130  
Edgewater Park Township  
Burlington County, NJ

Project  
Number: PY170090

Client: McDonald's USA, LLC  
6903 Rockledge Drive, Suite 1100  
Bethesda, MD 20817  
C/O Jonathan Baske

Date: 5/29/2020

Professional  
Engineer: Michael E. Jeitner  
PA License #PE055733

A handwritten signature in black ink that reads "Michael E. Jeitner". The signature is written in a cursive style and is positioned above a thin horizontal line.



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# **General Project Description/Stormwater Management**

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## **GENERAL PROJECT DESCRIPTION**

McDonald's USA, LLC is proposing to consolidate two lots and rebuild the existing McDonald's on the corner of Cooper Street and US Route 130 in Edgewater Park Township, Burlington County, New Jersey. These lots contain an existing 4,975 SF. McDonald's and barren lot that historically contained a gas station. The project includes the closure of the existing accesses to US Route 130, the installation of a right-in, right-out access onto US Route 130, associated parking, utilities, lighting, landscaping and stormwater management controls necessary to support the development. Pertinent data characterizing the existing and future site conditions are shown on the accompanying Preliminary/Final Major Site Plans. The intent of the stormwater management system is to decrease the volume of stormwater runoff from the site to US Route 130 by storing and infiltrating the on-site stormwater runoff with 36" perforated pipes within a stone envelope in areas where stormwater management investigations have determined infiltration rates of 0.75 in/hr.

## **STORMWATER MANAGEMENT**

### **Points of Interest**

#### Pre-Development

The site is presently developed with a large majority of the land being impervious cover (asphalt parking lots, buildings, gravel, etc.). A portion of the site had been previously developed with a 4,975 McDonald's and associated parking. Another portion of the site is a barren lot that historically contained a gas station, which has since been abandoned and demolished. In the pre-development condition, the site drains to three points of interest, all of which ultimately drain to an Unnamed Tributary to Mill Creek which is classified as FW2-NT.

The first point of interest, POI #1, is the US Route 130 right of way. Rainfall sheet flows off the site and proceeds to gutter flow southwest along the curb line of US Route 130. Eventually the runoff is conveyed to the unnamed tributary to Mill creek.

The second point of interest, POI #2, is an existing swale located northwest of the subject property. Rainfall sheet flows off the site through rip rap aprons into the existing swale. The swale conveys flow to an existing stormwater basin for the development on Block 502, Lot 13.05. Eventually the runoff is conveyed to the unnamed tributary to Mill creek.

The third and final point of interest, POI #3, is an existing inlet located within the right-of-way of Cooper street, north of US Route 130 at the stop bar along the westernmost curb line. Rainfall sheet flows off the site and proceeds to gutter flow south along the westernmost curb line of Cooper Street. The stormwater enters the NJDOT storm system and eventually is conveyed and discharged to the unnamed tributary to Mill Creek.

The on- and off-site areas tributary to these points of interest have been delineated and hydrographs have been generated for the 2, 5, 10, 25, 50, and 100-year design storms. The pre-development conditions were analyzed based on existing conditions for all areas tributary to the points of interest.

#### Post-Development

The post-development condition of the site maintains the same points of interest and relative drainage patterns. The overall site has a reduction in impervious cover which results in a decrease of stormwater volume. In the post-development condition, the total drainage area to POI#1 increases slightly from .78 Ac. To 0.83 Ac. (0.05 Ac. increase) and the impervious cover increases slightly from 0.65 Ac. to 0.70 Ac.

(0.05 Ac. increase). The slight increase of total area and impervious to POI#1 will cause a slight increase of rate and volume that will be mitigated and reduced by storing and infiltrating the on-site stormwater runoff with 36" perforated pipes within a stone envelope in areas where stormwater management investigations have determined infiltration rates of 0.75 in/hr.

In the post development, the tributary drainage area to POI #2 has been reduced from 1.04 Ac. to 1.02 Ac. (0.02 Ac. decrease) and the impervious cover decreases from 0.97 Ac. to 0.90 Ac. (0.07 Ac. decrease). As a result, runoff rate and volume to POI #2 have been reduced in the post-development condition. No stormwater BMP's or controls are proposed in the area tributary to POI#2.

In the post development, the tributary drainage area to POI #3 has been reduced from 0.12 Ac. to 0.09 Ac. (0.03 Ac. decrease) and the impervious cover decreases from 0.07 Ac. to 0.03 Ac. (0.04 Ac. decrease). As a result, runoff rate and volume to POI #3 have been reduced in the post-development condition. No stormwater BMP's or controls are proposed in the area tributary to POI#3.

The proposed infiltrating pipe system in POI#1 will utilize 314 LF of oversized 36" perforated HDPE to store and infiltrate the slight increase in volume. The areas tributary to the basins have been delineated and hydrographs have been generated for the 2, 10, 25, 50, and 100-year design storms.

### **Calculation Methodology**

The SCS Method was utilized for calculating the peak runoff rates and generating hydrographs for the pre- and post-development conditions using the HydroCAD 10.0 software. The hydrographs were generated based on the precipitation amounts dictated by the NOAA Atlas 14, Volume 2, Version 3 for Edgewater Park Township, NJ for each storm event. Runoff curve numbers were obtained from the USDA NRCS TR-55. The runoff volume is calculated using a weighted Q approach rather than a weighted CN approach. The weighted Q approach calculates separate runoff for each CN value in each sub catchment and then combines the volumes. Due to the developed nature of the site and the location of the POI's, a time of concentration (TOC) of 6 minutes was utilized for all pre- and post- development conditions.

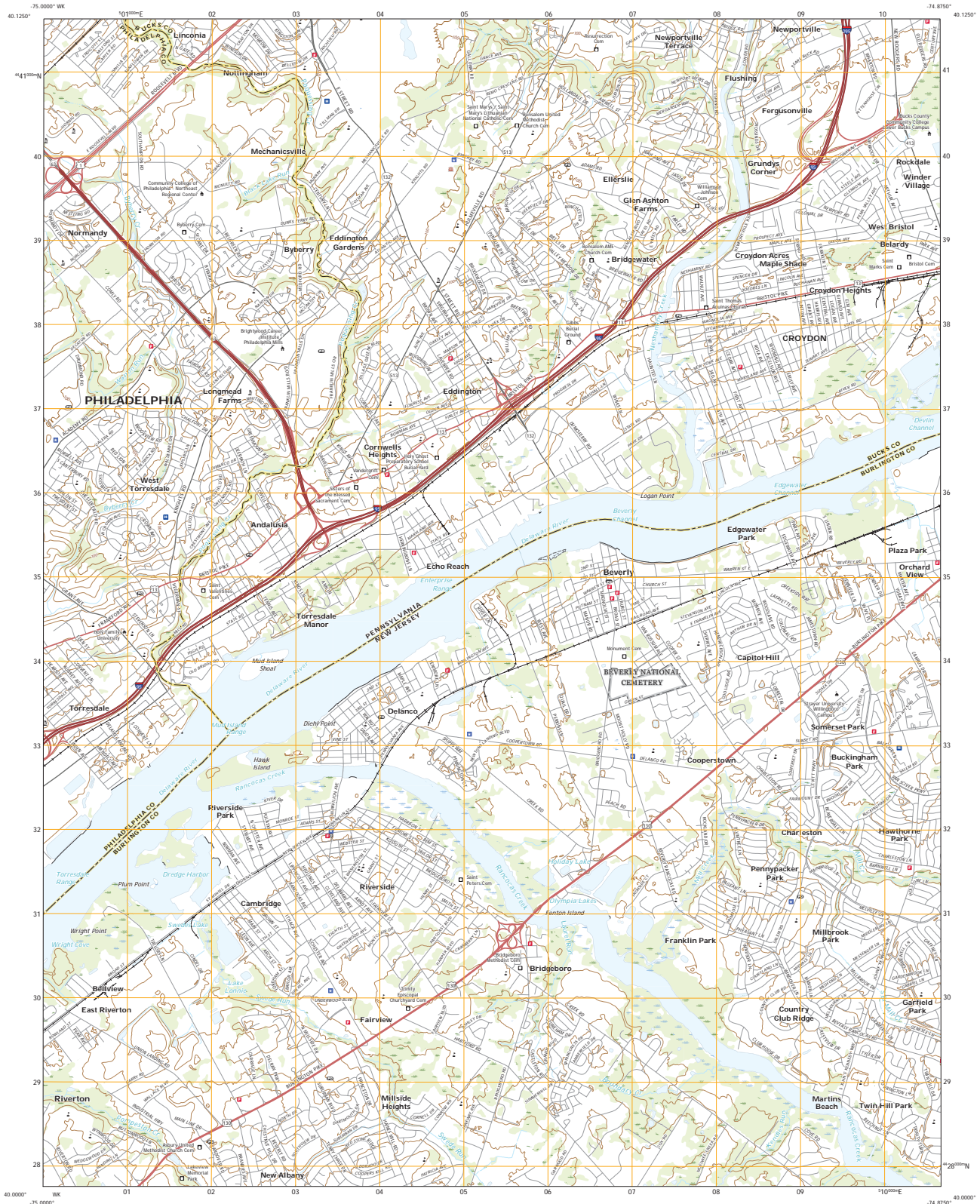
The proposed development will introduce structural stormwater best management practices in order to control the rate of stormwater runoff. The infiltrating pipe system utilized in POI#1 is designed to have oversized perforated pipe embedded in a 6.0' W by 5.0' H stone envelope at a very low slope (0.1%). The water will be stored within the pipes and stone and will be infiltrated over the wetted perimeter. The system is designed to discharge from structure A0 via weir flow through the inlet grate into the US Route 130 ROW during times of high flows (50- and 100-yr storms). Existing, all flow in POI#1 sheet flows into the US Route 130 ROW and then proceeds to gutter flow along Route 130 until it is captured by a downstream inlet. This proposed outlet will only discharge during times of high flow as mentioned above and will help reduce the volume and rate of water leaving the site, ultimately reducing flows to below pre-development conditions. The proposed stormwater management program described above has been designed to comply with the Edgewater Park Township Stormwater Management Requirements and NJDEP Stormwater regulations.

### **Water Quality**

The uses on the site will not change and the post-development condition reduces the impervious coverage to below the pre-development conditions. The reduction of impervious will reduce the pollutant load, and therefore no additional water quality BMP's are proposed. The proposed oversized, low-slope pipes are designed to capture, store, and infiltrate a majority of the stormwater runoff produced by the site which will also contribute to the reduction of the pollutant load.

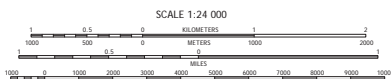
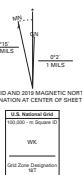
### **Conclusion**

The proposed stormwater management program described above has been designed to comply with the Edgewater Park Township Stormwater Management Requirements and NJDEP Stormwater regulations.



Produced by the United States Geological Survey  
North American Datum of 1983 (NAD83)  
World Geodetic System of 1984 (WGS84) Projection and  
1 000-meter grid Universal Transverse Mercator, Zone 18T1885  
This map is not a legal document. Boundaries may be  
generalized for this map scale. Private lands within government  
reservations may not be shown. Obtain permission before  
entering private lands.

Imagery: NIPAP, July 2015 - December 2017  
Roads: U.S. Census Bureau, 2016  
Names: U.S. Census Bureau, 1975 - 2018  
Hydrography: National Hydrography Dataset, 1999 - 2019  
Contours: National Elevation Dataset, 2013 - 2017  
Boundaries: Multiple sources; see metadata file 2017 - 2018  
Wetlands: FWS National Wetlands Inventory 1983 - 2013

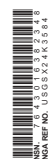


1	2	3
4	5	6
7	8	9

ABSOLUTE QUADRANGLES



1	Harboro
2	Langhorne
3	Truitts Beach
4	Frankford
5	Bristol
6	Camden
7	Moorestown
8	Mount Holly



# **Stormwater Management Calculations**

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PROJECT: Edgewater Park - McDonald's Rebuild  
4295 US Route 130  
Edgewater Park Township, Burlington County, NJ

DATE: 3/31/2020  
 BY: JDK  
 CHECKED BY: MEJ  
 SHEET NO.: Summary  
 REVISION: 0

**Stormwater Peak Rate Summary - POI #1**

	Storm Event (years)					
Hydrograph	2	5	10	25	50	100
Pre-Development (cfs)	3.10	3.98	4.72	5.86	6.89	8.05
Allowable Total Post Development Flow (cfs)	<b>3.10</b>	<b>3.98</b>	<b>4.72</b>	<b>5.86</b>	<b>6.89</b>	<b>8.05</b>
	2Yr Pre	5Yr Pre	10Yr Pre	25Yr Pre	50Yr Pre	100Yr Pre
Post Development Total (cfs)	<b>1.36</b>	<b>1.75</b>	<b>2.07</b>	<b>2.59</b>	<b>3.08</b>	<b>8.01</b>
Net Change:	-1.74	-2.23	-2.65	-3.27	-3.81	-0.04

**Stormwater Peak Rate Summary - POI #2**

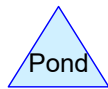
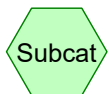
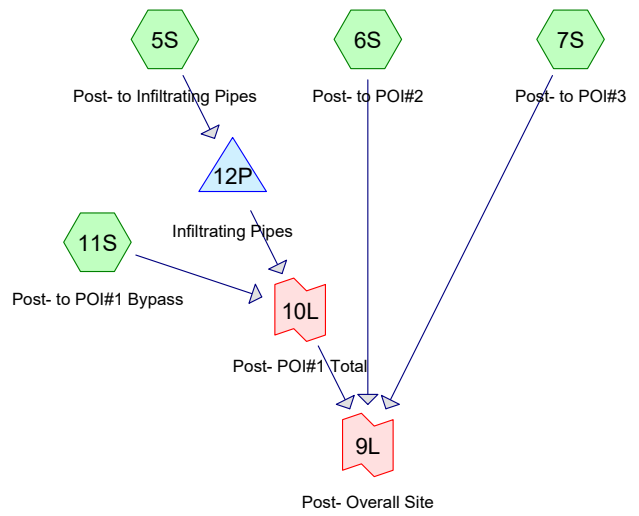
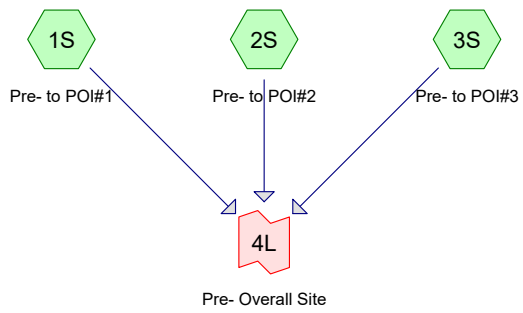
	Storm Event (years)					
Hydrograph	2	5	10	25	50	100
Pre-Development (cfs)	4.56	5.84	6.93	8.58	10.03	11.64
Allowable Total Post Development Flow (cfs)	<b>4.56</b>	<b>5.84</b>	<b>6.93</b>	<b>8.58</b>	<b>10.03</b>	<b>11.64</b>
	2Yr Pre	5Yr Pre	10Yr Pre	25Yr Pre	50Yr Pre	100Yr Pre
Post Development Total (cfs)	<b>4.23</b>	<b>5.42</b>	<b>6.43</b>	<b>7.98</b>	<b>9.36</b>	<b>10.89</b>
Net Change:	-0.33	-0.42	-0.50	-0.60	-0.67	-0.75

**Stormwater Peak Rate Summary - POI #3**

	Storm Event (years)					
Hydrograph	2	5	10	25	50	100
Pre-Development (cfs)	0.33	0.42	0.50	0.64	0.77	0.94
Allowable Total Post Development Flow (cfs)	<b>0.33</b>	<b>0.42</b>	<b>0.50</b>	<b>0.64</b>	<b>0.77</b>	<b>0.94</b>
	2Yr Pre	5Yr Pre	10Yr Pre	25Yr Pre	50Yr Pre	100Yr Pre
Post Development Total (cfs)	<b>0.14</b>	<b>0.18</b>	<b>0.21</b>	<b>0.28</b>	<b>0.36</b>	<b>0.47</b>
Net Change:	-0.19	-0.24	-0.29	-0.36	-0.41	-0.47

**Stormwater Peak Rate Summary - Overall Site**

	Storm Event (years)					
Hydrograph	2	5	10	25	50	100
Pre-Development (cfs)	7.98	10.24	12.15	15.07	17.69	20.62
Allowable Total Post Development Flow (cfs)	<b>7.98</b>	<b>10.24</b>	<b>12.15</b>	<b>15.07</b>	<b>17.69</b>	<b>20.62</b>
	2Yr Pre	5Yr Pre	10Yr Pre	25Yr Pre	50Yr Pre	100Yr Pre
Post Development Total (cfs)	<b>5.73</b>	<b>7.35</b>	<b>8.72</b>	<b>10.85</b>	<b>12.80</b>	<b>18.22</b>
Net Change:	-2.25	-2.89	-3.43	-4.22	-4.89	-2.40



**Routing Diagram for PY170090 Hydro-0**  
 Prepared by {enter your company name here}, Printed 4/14/2020  
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**PY170090 Hydro-0**

Type II 24-hr 2-yr Rainfall=3.32"

Prepared by {enter your company name here}

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Page 1

Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Pre- to POI#1</b>	Runoff Area=0.780 ac 84.62% Impervious Runoff Depth=2.61" Tc=6.0 min CN=WQ Runoff=3.10 cfs 0.170 af
<b>Subcatchment 2S: Pre- to POI#2</b>	Runoff Area=1.040 ac 93.27% Impervious Runoff Depth=2.88" Tc=6.0 min CN=WQ Runoff=4.56 cfs 0.250 af
<b>Subcatchment 3S: Pre- to POI#3</b>	Runoff Area=0.130 ac 53.85% Impervious Runoff Depth=1.66" Tc=6.0 min CN=WQ Runoff=0.33 cfs 0.018 af
<b>Subcatchment 5S: Post- to Infiltrating Pipes</b>	Runoff Area=0.430 ac 95.35% Impervious Runoff Depth=2.94" Tc=6.0 min CN=WQ Runoff=1.93 cfs 0.105 af
<b>Subcatchment 6S: Post- to POI#2</b>	Runoff Area=1.020 ac 88.24% Impervious Runoff Depth=2.72" Tc=6.0 min CN=WQ Runoff=4.23 cfs 0.232 af
<b>Subcatchment 7S: Post- to POI#3</b>	Runoff Area=0.090 ac 33.33% Impervious Runoff Depth=1.03" Tc=6.0 min CN=WQ Runoff=0.14 cfs 0.008 af
<b>Subcatchment 11S: Post- to POI#1 Bypass</b>	Runoff Area=0.400 ac 72.50% Impervious Runoff Depth=2.24" Tc=6.0 min CN=WQ Runoff=1.36 cfs 0.075 af
<b>Pond 12P: Infiltrating Pipes</b>	Peak Elev=23.23' Storage=2,497 cf Inflow=1.93 cfs 0.105 af Discarded=0.06 cfs 0.105 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.105 af
<b>Link 4L: Pre- Overall Site</b>	Inflow=7.98 cfs 0.437 af Primary=7.98 cfs 0.437 af
<b>Link 9L: Post- Overall Site</b>	Inflow=5.73 cfs 0.314 af Primary=5.73 cfs 0.314 af
<b>Link 10L: Post- POI#1 Total</b>	Inflow=1.36 cfs 0.075 af Primary=1.36 cfs 0.075 af

**PY170090 Hydro-0**

Type II 24-hr 5-yr Rainfall=4.24"

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Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Pre- to POI#1** Runoff Area=0.780 ac 84.62% Impervious Runoff Depth=3.40"  
Tc=6.0 min CN=WQ Runoff=3.98 cfs 0.221 af

**Subcatchment 2S: Pre- to POI#2** Runoff Area=1.040 ac 93.27% Impervious Runoff Depth=3.74"  
Tc=6.0 min CN=WQ Runoff=5.84 cfs 0.324 af

**Subcatchment 3S: Pre- to POI#3** Runoff Area=0.130 ac 53.85% Impervious Runoff Depth=2.19"  
Tc=6.0 min CN=WQ Runoff=0.42 cfs 0.024 af

**Subcatchment 5S: Post- to Infiltrating Pipes** Runoff Area=0.430 ac 95.35% Impervious Runoff Depth=3.82"  
Tc=6.0 min CN=WQ Runoff=2.47 cfs 0.137 af

**Subcatchment 6S: Post- to POI#2** Runoff Area=1.020 ac 88.24% Impervious Runoff Depth=3.54"  
Tc=6.0 min CN=WQ Runoff=5.42 cfs 0.301 af

**Subcatchment 7S: Post- to POI#3** Runoff Area=0.090 ac 33.33% Impervious Runoff Depth=1.38"  
Tc=6.0 min CN=WQ Runoff=0.18 cfs 0.010 af

**Subcatchment 11S: Post- to POI#1 Bypass** Runoff Area=0.400 ac 72.50% Impervious Runoff Depth=2.92"  
Tc=6.0 min CN=WQ Runoff=1.75 cfs 0.097 af

**Pond 12P: Infiltrating Pipes** Peak Elev=23.91' Storage=3,387 cf Inflow=2.47 cfs 0.137 af  
Discarded=0.07 cfs 0.137 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.137 af

**Link 4L: Pre- Overall Site** Inflow=10.24 cfs 0.569 af  
Primary=10.24 cfs 0.569 af

**Link 9L: Post- Overall Site** Inflow=7.35 cfs 0.409 af  
Primary=7.35 cfs 0.409 af

**Link 10L: Post- POI#1 Total** Inflow=1.75 cfs 0.097 af  
Primary=1.75 cfs 0.097 af



**PY170090 Hydro-0**

Type II 24-hr 10-yr Rainfall=5.02"

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Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Pre- to POI#1** Runoff Area=0.780 ac 84.62% Impervious Runoff Depth=4.08"  
Tc=6.0 min CN=WQ Runoff=4.72 cfs 0.265 af

**Subcatchment 2S: Pre- to POI#2** Runoff Area=1.040 ac 93.27% Impervious Runoff Depth=4.47"  
Tc=6.0 min CN=WQ Runoff=6.93 cfs 0.388 af

**Subcatchment 3S: Pre- to POI#3** Runoff Area=0.130 ac 53.85% Impervious Runoff Depth=2.67"  
Tc=6.0 min CN=WQ Runoff=0.50 cfs 0.029 af

**Subcatchment 5S: Post- to Infiltrating Pipes** Runoff Area=0.430 ac 95.35% Impervious Runoff Depth=4.57"  
Tc=6.0 min CN=WQ Runoff=2.93 cfs 0.164 af

**Subcatchment 6S: Post- to POI#2** Runoff Area=1.020 ac 88.24% Impervious Runoff Depth=4.24"  
Tc=6.0 min CN=WQ Runoff=6.43 cfs 0.361 af

**Subcatchment 7S: Post- to POI#3** Runoff Area=0.090 ac 33.33% Impervious Runoff Depth=1.73"  
Tc=6.0 min CN=WQ Runoff=0.21 cfs 0.013 af

**Subcatchment 11S: Post- to POI#1 Bypass** Runoff Area=0.400 ac 72.50% Impervious Runoff Depth=3.52"  
Tc=6.0 min CN=WQ Runoff=2.07 cfs 0.117 af

**Pond 12P: Infiltrating Pipes** Peak Elev=24.62' Storage=4,164 cf Inflow=2.93 cfs 0.164 af  
Discarded=0.08 cfs 0.164 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.164 af

**Link 4L: Pre- Overall Site** Inflow=12.15 cfs 0.682 af  
Primary=12.15 cfs 0.682 af

**Link 9L: Post- Overall Site** Inflow=8.72 cfs 0.491 af  
Primary=8.72 cfs 0.491 af

**Link 10L: Post- POI#1 Total** Inflow=2.07 cfs 0.117 af  
Primary=2.07 cfs 0.117 af

**PY170090 Hydro-0**

Type II 24-hr 25-yr Rainfall=6.19"

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Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Pre- to POI#1** Runoff Area=0.780 ac 84.62% Impervious Runoff Depth=5.11"  
Tc=6.0 min CN=WQ Runoff=5.86 cfs 0.332 af

**Subcatchment 2S: Pre- to POI#2** Runoff Area=1.040 ac 93.27% Impervious Runoff Depth=5.58"  
Tc=6.0 min CN=WQ Runoff=8.58 cfs 0.484 af

**Subcatchment 3S: Pre- to POI#3** Runoff Area=0.130 ac 53.85% Impervious Runoff Depth=3.44"  
Tc=6.0 min CN=WQ Runoff=0.64 cfs 0.037 af

**Subcatchment 5S: Post- to Infiltrating Pipes** Runoff Area=0.430 ac 95.35% Impervious Runoff Depth=5.70"  
Tc=6.0 min CN=WQ Runoff=3.62 cfs 0.204 af

**Subcatchment 6S: Post- to POI#2** Runoff Area=1.020 ac 88.24% Impervious Runoff Depth=5.31"  
Tc=6.0 min CN=WQ Runoff=7.98 cfs 0.451 af

**Subcatchment 7S: Post- to POI#3** Runoff Area=0.090 ac 33.33% Impervious Runoff Depth=2.32"  
Tc=6.0 min CN=WQ Runoff=0.28 cfs 0.017 af

**Subcatchment 11S: Post- to POI#1 Bypass** Runoff Area=0.400 ac 72.50% Impervious Runoff Depth=4.45"  
Tc=6.0 min CN=WQ Runoff=2.59 cfs 0.148 af

**Pond 12P: Infiltrating Pipes** Peak Elev=27.06' Storage=5,173 cf Inflow=3.62 cfs 0.204 af  
Discarded=0.09 cfs 0.200 af Primary=0.09 cfs 0.004 af Outflow=0.17 cfs 0.204 af

**Link 4L: Pre- Overall Site** Inflow=15.07 cfs 0.854 af  
Primary=15.07 cfs 0.854 af

**Link 9L: Post- Overall Site** Inflow=10.85 cfs 0.621 af  
Primary=10.85 cfs 0.621 af

**Link 10L: Post- POI#1 Total** Inflow=2.59 cfs 0.153 af  
Primary=2.59 cfs 0.153 af

**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Pre- to POI#1</b>	Runoff Area=0.780 ac 84.62% Impervious Runoff Depth=6.02" Tc=6.0 min CN=WQ Runoff=6.89 cfs 0.391 af
<b>Subcatchment 2S: Pre- to POI#2</b>	Runoff Area=1.040 ac 93.27% Impervious Runoff Depth=6.55" Tc=6.0 min CN=WQ Runoff=10.03 cfs 0.568 af
<b>Subcatchment 3S: Pre- to POI#3</b>	Runoff Area=0.130 ac 53.85% Impervious Runoff Depth=4.14" Tc=6.0 min CN=WQ Runoff=0.77 cfs 0.045 af
<b>Subcatchment 5S: Post- to Infiltrating Pipes</b>	Runoff Area=0.430 ac 95.35% Impervious Runoff Depth=6.68" Tc=6.0 min CN=WQ Runoff=4.23 cfs 0.239 af
<b>Subcatchment 6S: Post- to POI#2</b>	Runoff Area=1.020 ac 88.24% Impervious Runoff Depth=6.24" Tc=6.0 min CN=WQ Runoff=9.36 cfs 0.530 af
<b>Subcatchment 7S: Post- to POI#3</b>	Runoff Area=0.090 ac 33.33% Impervious Runoff Depth=2.88" Tc=6.0 min CN=WQ Runoff=0.36 cfs 0.022 af
<b>Subcatchment 11S: Post- to POI#1 Bypass</b>	Runoff Area=0.400 ac 72.50% Impervious Runoff Depth=5.28" Tc=6.0 min CN=WQ Runoff=3.08 cfs 0.176 af
<b>Pond 12P: Infiltrating Pipes</b>	Peak Elev=27.40' Storage=5,195 cf Inflow=4.23 cfs 0.239 af Discarded=0.09 cfs 0.208 af Primary=1.51 cfs 0.031 af Outflow=1.59 cfs 0.239 af
<b>Link 4L: Pre- Overall Site</b>	Inflow=17.69 cfs 1.004 af Primary=17.69 cfs 1.004 af
<b>Link 9L: Post- Overall Site</b>	Inflow=12.80 cfs 0.759 af Primary=12.80 cfs 0.759 af
<b>Link 10L: Post- POI#1 Total</b>	Inflow=3.08 cfs 0.207 af Primary=3.08 cfs 0.207 af

**PY170090 Hydro-0**

Type II 24-hr 100-yr Rainfall=8.31"

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Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Pre- to POI#1</b>	Runoff Area=0.780 ac 84.62% Impervious Runoff Depth=7.03" Tc=6.0 min CN=WQ Runoff=8.05 cfs 0.457 af
<b>Subcatchment 2S: Pre- to POI#2</b>	Runoff Area=1.040 ac 93.27% Impervious Runoff Depth=7.61" Tc=6.0 min CN=WQ Runoff=11.64 cfs 0.660 af
<b>Subcatchment 3S: Pre- to POI#3</b>	Runoff Area=0.130 ac 53.85% Impervious Runoff Depth=4.94" Tc=6.0 min CN=WQ Runoff=0.94 cfs 0.054 af
<b>Subcatchment 5S: Post- to Infiltrating Pipes</b>	Runoff Area=0.430 ac 95.35% Impervious Runoff Depth=7.75" Tc=6.0 min CN=WQ Runoff=4.90 cfs 0.278 af
<b>Subcatchment 6S: Post- to POI#2</b>	Runoff Area=1.020 ac 88.24% Impervious Runoff Depth=7.27" Tc=6.0 min CN=WQ Runoff=10.89 cfs 0.618 af
<b>Subcatchment 7S: Post- to POI#3</b>	Runoff Area=0.090 ac 33.33% Impervious Runoff Depth=3.55" Tc=6.0 min CN=WQ Runoff=0.47 cfs 0.027 af
<b>Subcatchment 11S: Post- to POI#1 Bypass</b>	Runoff Area=0.400 ac 72.50% Impervious Runoff Depth=6.21" Tc=6.0 min CN=WQ Runoff=3.64 cfs 0.207 af
<b>Pond 12P: Infiltrating Pipes</b>	Peak Elev=27.77' Storage=5,218 cf Inflow=4.90 cfs 0.278 af Discarded=0.09 cfs 0.216 af Primary=4.75 cfs 0.061 af Outflow=4.84 cfs 0.277 af
<b>Link 4L: Pre- Overall Site</b>	Inflow=20.62 cfs 1.170 af Primary=20.62 cfs 1.170 af
<b>Link 9L: Post- Overall Site</b>	Inflow=18.22 cfs 0.913 af Primary=18.22 cfs 0.913 af
<b>Link 10L: Post- POI#1 Total</b>	Inflow=8.01 cfs 0.268 af Primary=8.01 cfs 0.268 af

**PY170090 Hydro-0**

Type II 24-hr 100-yr Rainfall=8.31"

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**Stage-Area-Storage for Pond 12P: Infiltrating Pipes**

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
20.75	1,884	0	26.05	5,084	5,093
20.85	1,948	75	26.15	5,084	5,101
20.95	2,012	151	26.25	5,084	5,109
21.05	2,076	226	26.35	5,084	5,117
21.15	2,140	301	26.45	5,084	5,125
21.25	2,204	377	26.55	5,084	5,133
21.35	2,268	451	26.65	5,084	5,141
21.45	2,332	520	26.75	5,084	5,149
21.55	2,396	584	26.85	5,084	5,157
21.65	2,460	648	26.95	5,084	5,165
21.75	2,524	719	27.05	5,084	5,172
21.85	2,588	804	27.15	5,084	5,179
21.95	2,652	899	27.25	5,084	5,185
22.05	2,716	1,002	27.35	5,084	5,192
22.15	2,780	1,111	27.45	5,084	5,198
22.25	2,844	1,228	27.55	5,084	5,204
22.35	2,908	1,351	27.65	5,084	5,211
22.45	2,972	1,475	27.75	5,084	5,217
22.55	3,036	1,602	27.85	5,084	5,224
22.65	3,100	1,731	27.95	5,084	5,230
22.75	3,164	1,862	28.05	5,084	5,236
22.85	3,228	1,994	28.15	5,084	5,240
22.95	3,292	2,126	28.25	5,084	5,245
23.05	3,356	2,259	28.35	5,084	5,250
23.15	3,420	2,393	28.45	5,084	5,255
23.25	3,484	2,526	28.55	5,084	5,260
23.35	3,548	2,659	28.65	5,084	5,264
23.45	3,612	2,792	28.75	5,084	5,269
23.55	3,676	2,924	28.85	5,084	5,274
23.65	3,740	3,055	28.95	5,084	5,279
23.75	3,804	3,184	29.05	5,084	5,284
23.85	3,868	3,311	29.15	5,084	5,288
23.95	3,932	3,436	29.25	5,084	5,293
24.05	3,996	3,559	29.35	5,084	5,298
24.15	4,060	3,678	29.45	5,084	5,301
24.25	4,124	3,794	29.55	5,084	5,302
24.35	4,188	3,904	29.65	5,084	5,304
24.45	4,252	4,008	29.75	5,084	5,306
24.55	4,316	4,103	29.85	5,084	<b>5,307</b>
24.65	4,380	4,184			
24.75	4,444	4,256			
24.85	4,508	4,327			
24.95	4,572	4,404			
25.05	4,636	4,486			
25.15	4,700	4,569			
25.25	4,764	4,652			
25.35	4,828	4,736			
25.45	4,892	4,819			
25.55	4,956	4,902			
25.65	5,020	4,986			
25.75	<b>5,084</b>	5,069			
25.85	5,084	5,077			
25.95	5,084	5,085			

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Type II 24-hr 2-yr Rainfall=3.32"

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**Summary for Subcatchment 1S: Pre- to POI#1**

Runoff = 3.10 cfs @ 11.97 hrs, Volume= 0.170 af, Depth= 2.61"

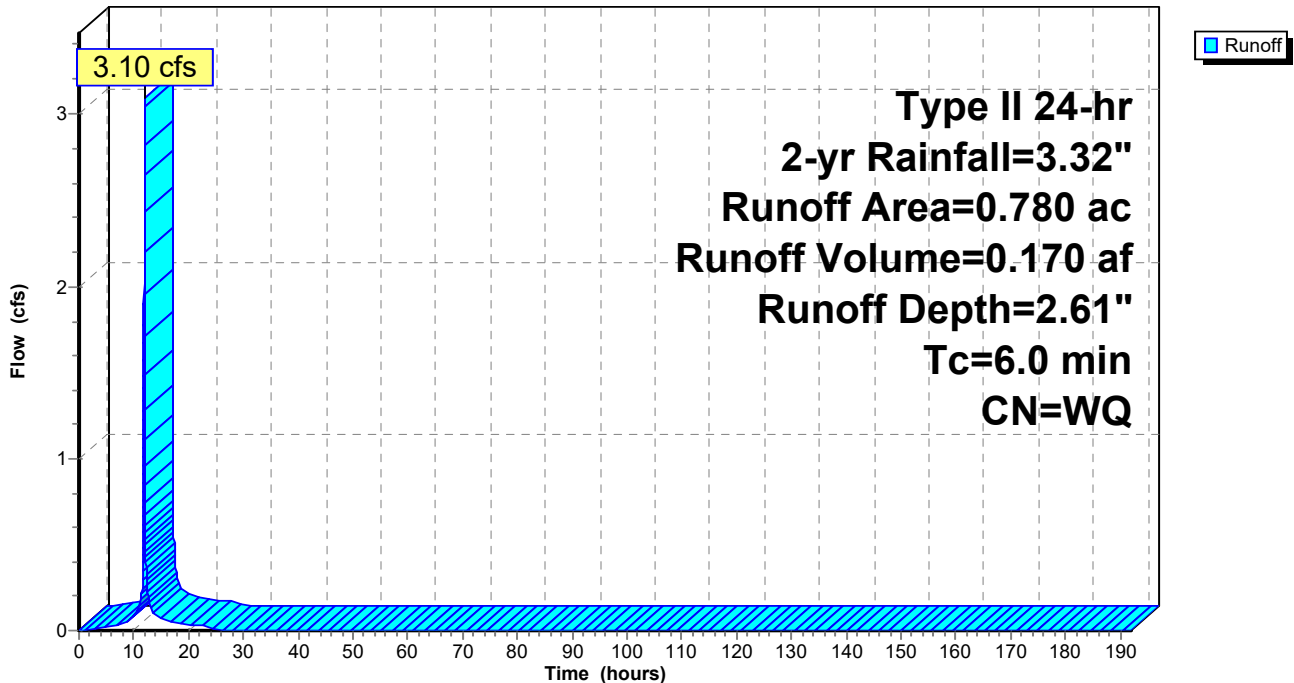
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.660	98	Paved parking, HSG A
0.780		Weighted Average
0.120		15.38% Pervious Area
0.660		84.62% Impervious Area

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

**Subcatchment 1S: Pre- to POI#1**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 2-yr Rainfall=3.32"

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**Summary for Subcatchment 2S: Pre- to POI#2**

Runoff = 4.56 cfs @ 11.97 hrs, Volume= 0.250 af, Depth= 2.88"

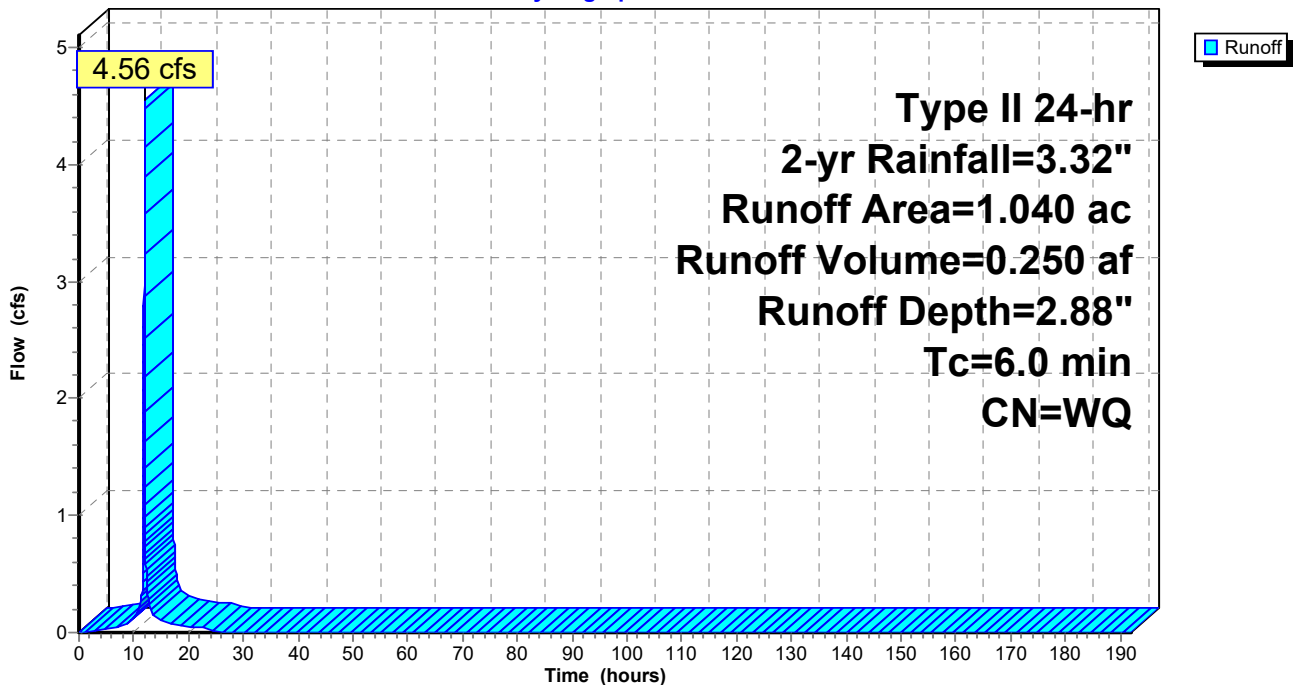
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.970	98	Paved parking, HSG A
1.040		Weighted Average
0.070		6.73% Pervious Area
0.970		93.27% Impervious Area

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

**Subcatchment 2S: Pre- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 2-yr Rainfall=3.32"

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**Summary for Subcatchment 3S: Pre- to POI#3**

Runoff = 0.33 cfs @ 11.97 hrs, Volume= 0.018 af, Depth= 1.66"

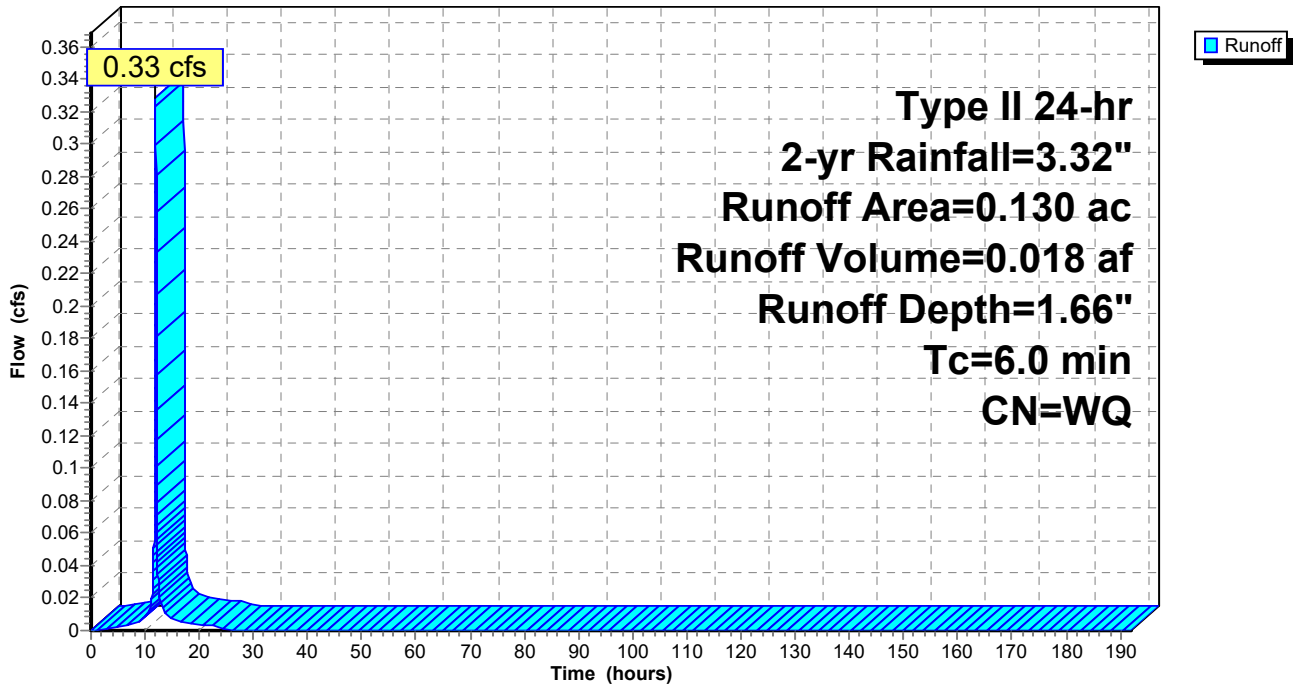
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.070	98	Paved parking, HSG A
Weighted Average		
0.060		46.15% Pervious Area
0.070		53.85% Impervious Area

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

**Subcatchment 3S: Pre- to POI#3**

Hydrograph





**Summary for Subcatchment 5S: Post- to Infiltrating Pipes**

Runoff = 1.93 cfs @ 11.97 hrs, Volume= 0.105 af, Depth= 2.94"

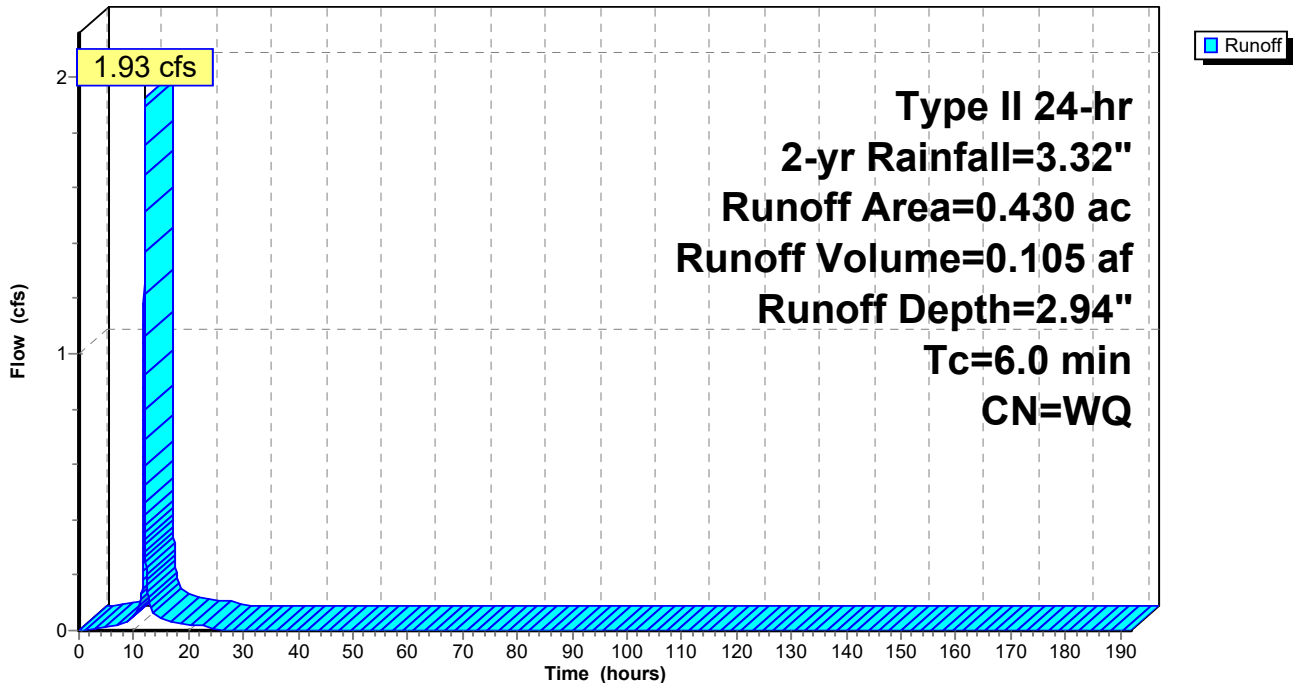
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.020	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.430		Weighted Average
0.020		4.65% Pervious Area
0.410		95.35% Impervious Area

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

**Subcatchment 5S: Post- to Infiltrating Pipes**

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.32"

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**Summary for Subcatchment 6S: Post- to POI#2**

Runoff = 4.23 cfs @ 11.97 hrs, Volume= 0.232 af, Depth= 2.72"

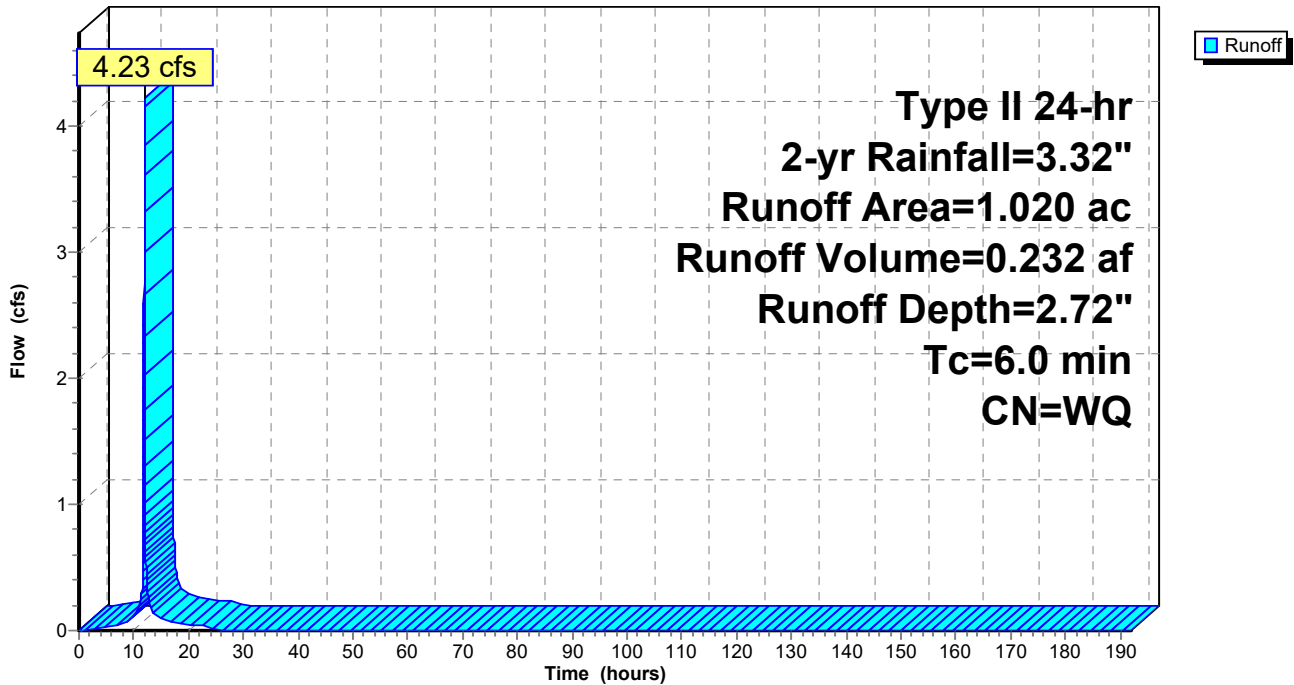
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.900	98	Paved parking, HSG A
1.020		Weighted Average
0.120		11.76% Pervious Area
0.900		88.24% Impervious Area

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

**Subcatchment 6S: Post- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 2-yr Rainfall=3.32"

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**Summary for Subcatchment 7S: Post- to POI#3**

Runoff = 0.14 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 1.03"

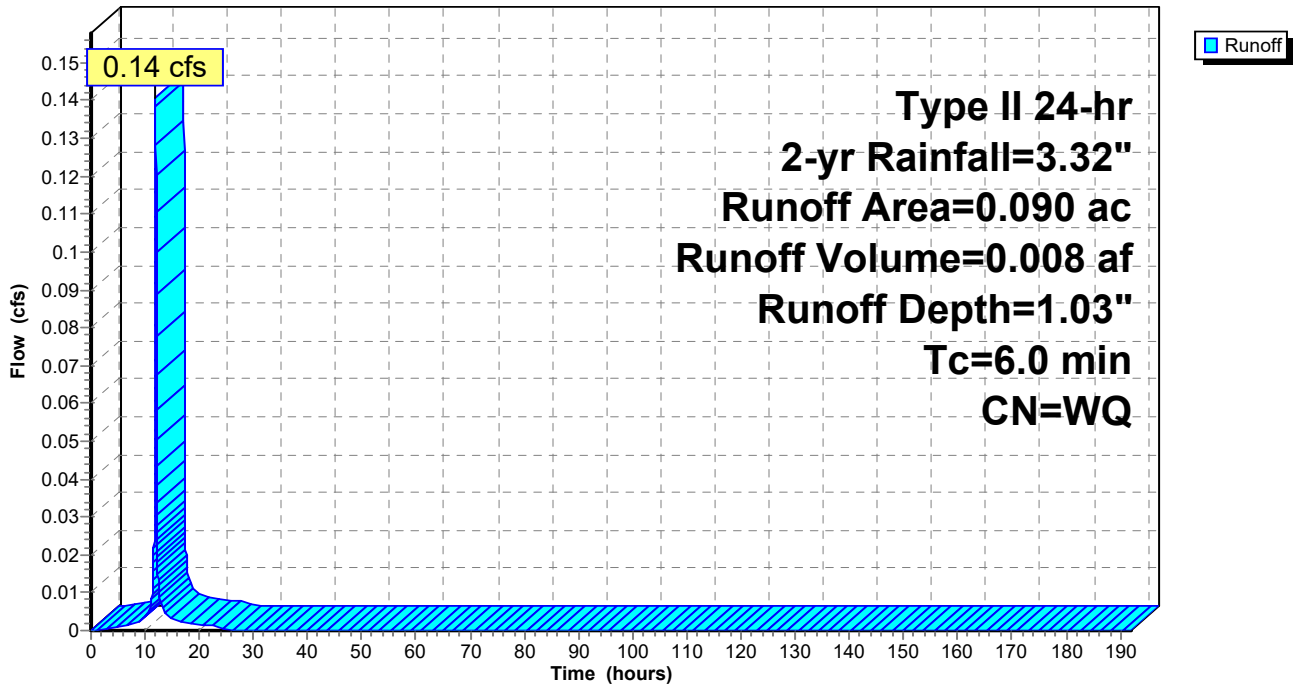
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.030	98	Paved parking, HSG A
Weighted Average		
0.060		66.67% Pervious Area
0.030		33.33% Impervious Area

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

**Subcatchment 7S: Post- to POI#3**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 2-yr Rainfall=3.32"

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**Summary for Subcatchment 11S: Post- to POI#1 Bypass**

Runoff = 1.36 cfs @ 11.97 hrs, Volume= 0.075 af, Depth= 2.24"

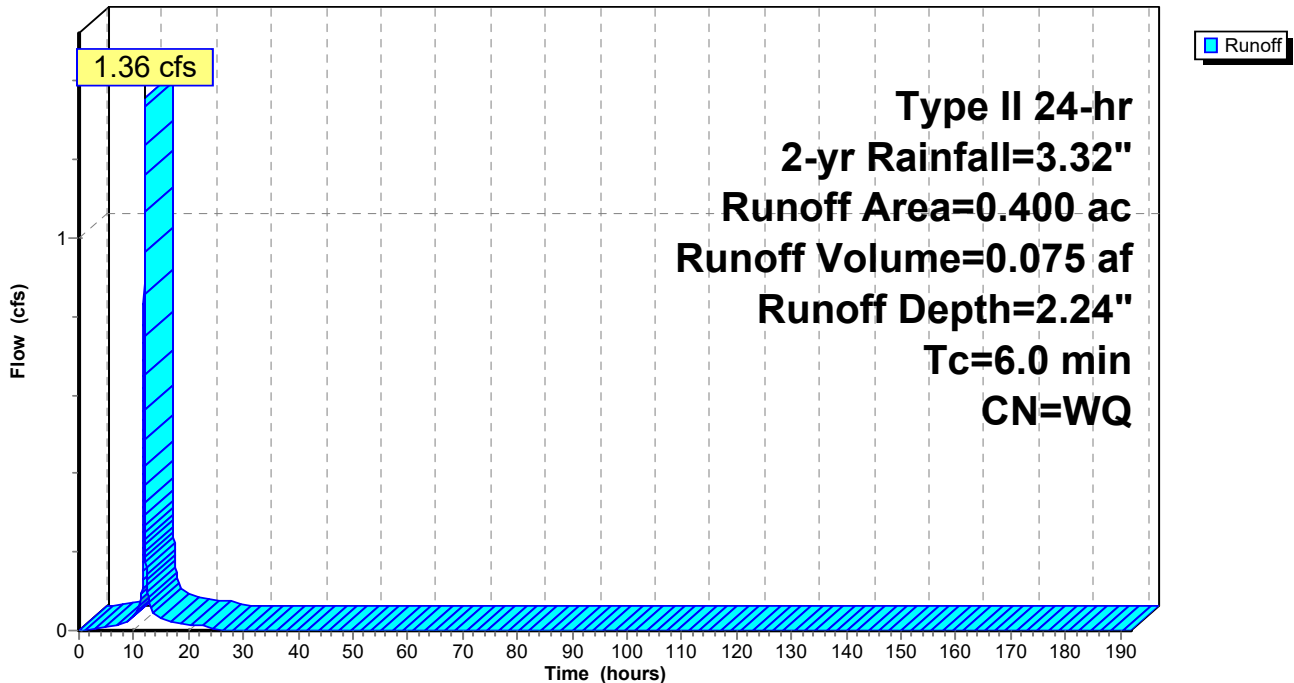
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-yr Rainfall=3.32"

Area (ac)	CN	Description
0.110	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG A
0.400		Weighted Average
0.110		27.50% Pervious Area
0.290		72.50% Impervious Area

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

**Subcatchment 11S: Post- to POI#1 Bypass**

Hydrograph



**Summary for Pond 12P: Infiltrating Pipes**

Inflow Area = 0.430 ac, 95.35% Impervious, Inflow Depth = 2.94" for 2-yr event  
 Inflow = 1.93 cfs @ 11.97 hrs, Volume= 0.105 af  
 Outflow = 0.06 cfs @ 13.74 hrs, Volume= 0.105 af, Atten= 97%, Lag= 106.2 min  
 Discarded = 0.06 cfs @ 13.74 hrs, Volume= 0.105 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 23.23' @ 13.74 hrs Surf.Area= 1,884 sf Storage= 2,497 cf

Plug-Flow detention time= 412.5 min calculated for 0.105 af (100% of inflow)  
 Center-of-Mass det. time= 412.5 min ( 1,164.2 - 751.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	20.75'	2,560 cf	<b>6.00'W x 314.00'L x 5.00'H Stone Storage</b> 9,420 cf Overall - 3,021 cf Embedded = 6,399 cf x 40.0% Voids
#2	21.50'	2,220 cf	<b>36.0" Round Pipe Storage</b> Inside #1 L= 314.0' S= 0.0010 '/' 3,021 cf Overall - 3.0" Wall Thickness = 2,220 cf
#3	22.00'	80 cf	<b>4.00'W x 4.00'L x 5.00'H Inlet A0</b> -Impervious
#4	22.08'	95 cf	<b>4.00'W x 4.00'L x 5.92'H Inlet A1</b> -Impervious
#5	22.15'	116 cf	<b>4.00'W x 4.00'L x 7.22'H Inlet A2</b> -Impervious
#6	22.25'	122 cf	<b>4.00'W x 4.00'L x 7.65'H Inlet A3</b> -Impervious
#7	22.14'	116 cf	<b>4.00'W x 4.00'L x 7.26'H Inlet A1.1</b> -Impervious
		5,308 cf	Total Available Storage

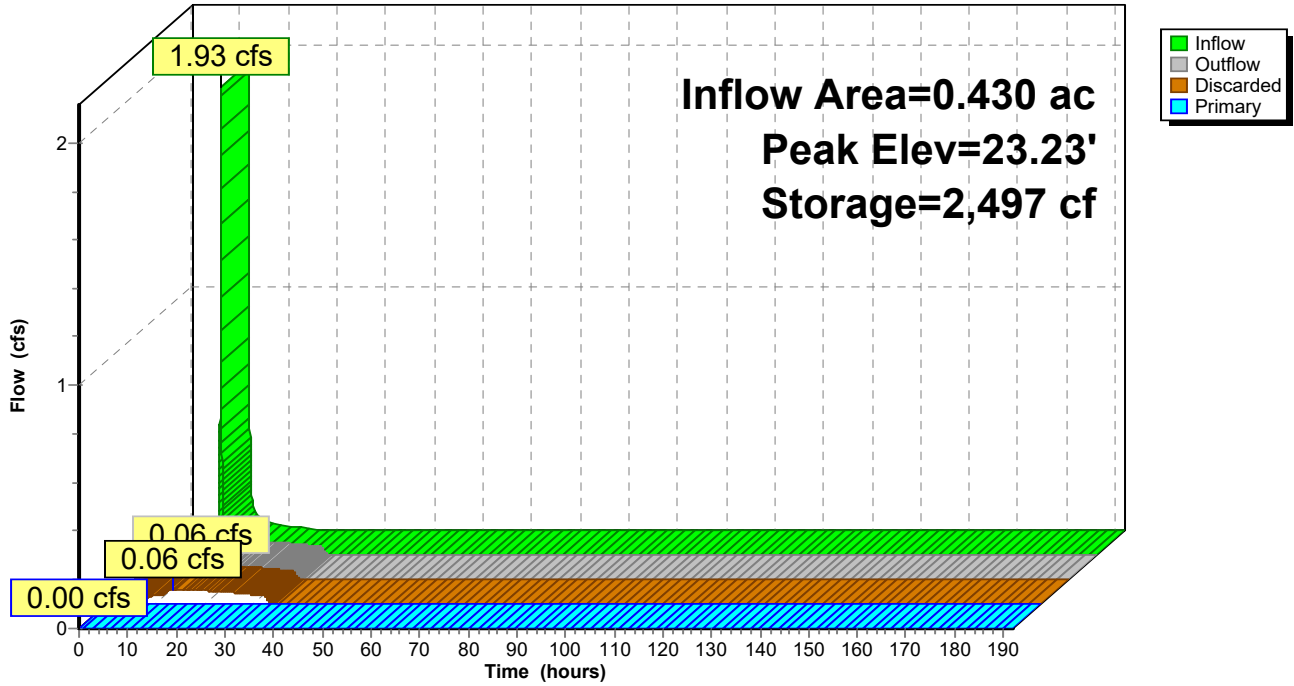
Device	Routing	Invert	Outlet Devices
#1	Discarded	20.75'	<b>0.750 in/hr Exfiltration over Wetted area</b>
#2	Primary	27.00'	<b>2.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Discarded OutFlow** Max=0.06 cfs @ 13.74 hrs HW=23.23' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=20.75' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 12P: Infiltrating Pipes

Hydrograph



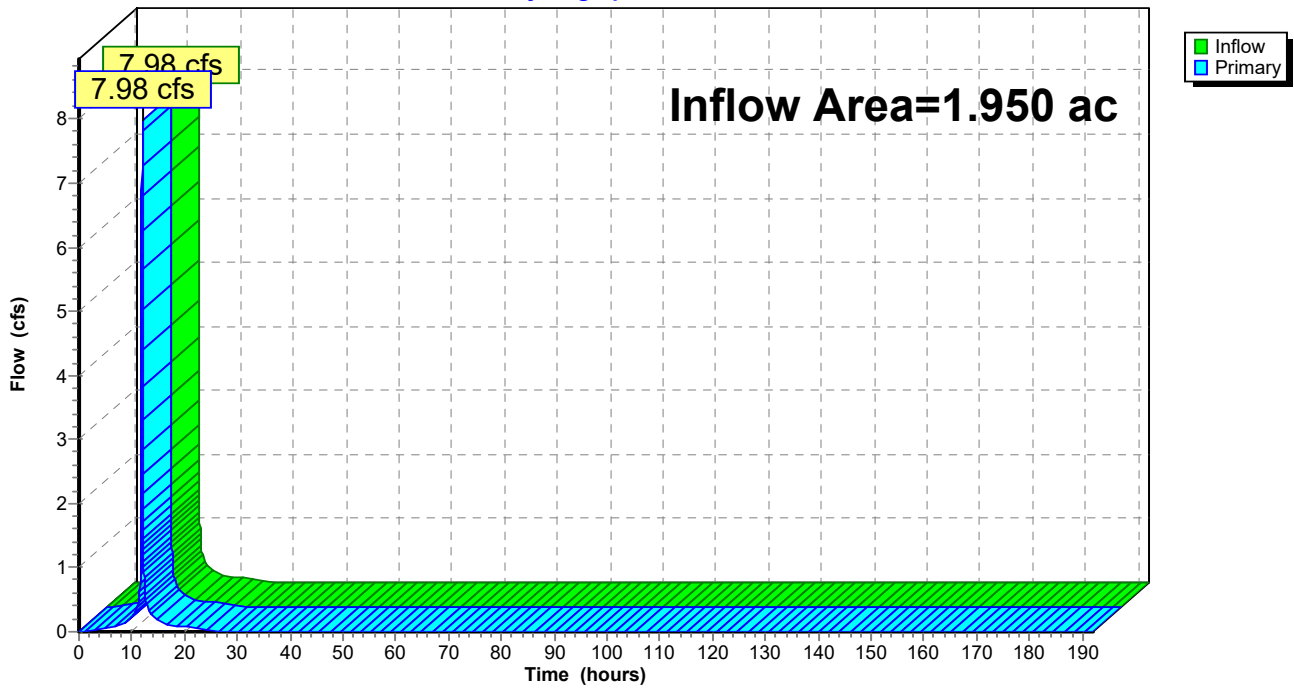
### Summary for Link 4L: Pre- Overall Site

Inflow Area = 1.950 ac, 87.18% Impervious, Inflow Depth = 2.69" for 2-yr event  
Inflow = 7.98 cfs @ 11.97 hrs, Volume= 0.437 af  
Primary = 7.98 cfs @ 11.97 hrs, Volume= 0.437 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 4L: Pre- Overall Site

Hydrograph



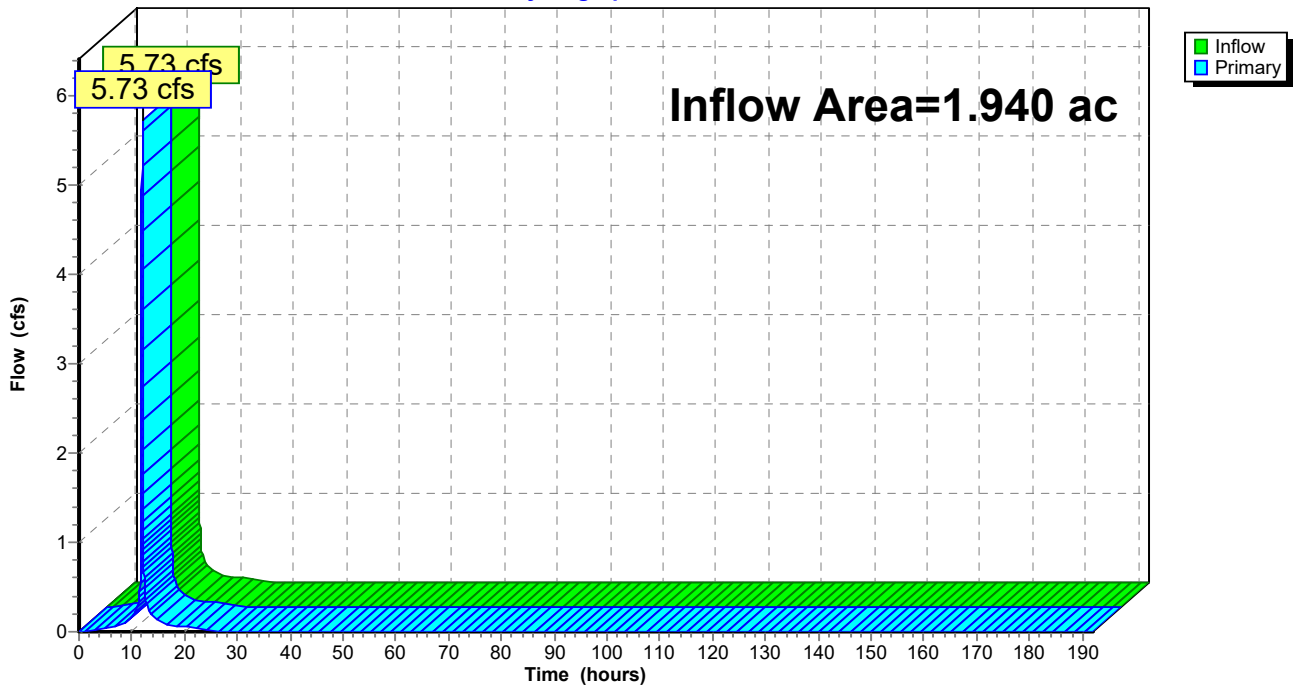
### Summary for Link 9L: Post- Overall Site

Inflow Area = 1.940 ac, 84.02% Impervious, Inflow Depth = 1.94" for 2-yr event  
Inflow = 5.73 cfs @ 11.97 hrs, Volume= 0.314 af  
Primary = 5.73 cfs @ 11.97 hrs, Volume= 0.314 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 9L: Post- Overall Site

Hydrograph





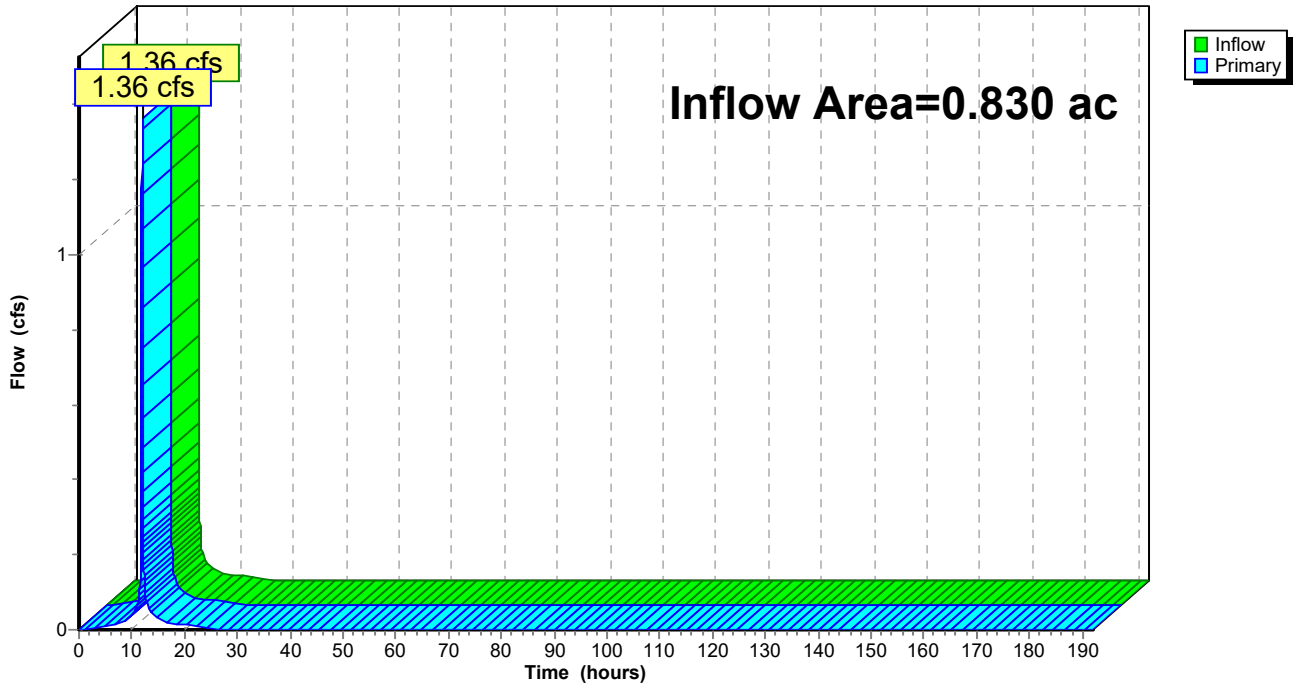
**Summary for Link 10L: Post- POI#1 Total**

Inflow Area = 0.830 ac, 84.34% Impervious, Inflow Depth = 1.08" for 2-yr event  
Inflow = 1.36 cfs @ 11.97 hrs, Volume= 0.075 af  
Primary = 1.36 cfs @ 11.97 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

**Link 10L: Post- POI#1 Total**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 5-yr Rainfall=4.24"

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**Summary for Subcatchment 1S: Pre- to POI#1**

Runoff = 3.98 cfs @ 11.97 hrs, Volume= 0.221 af, Depth= 3.40"

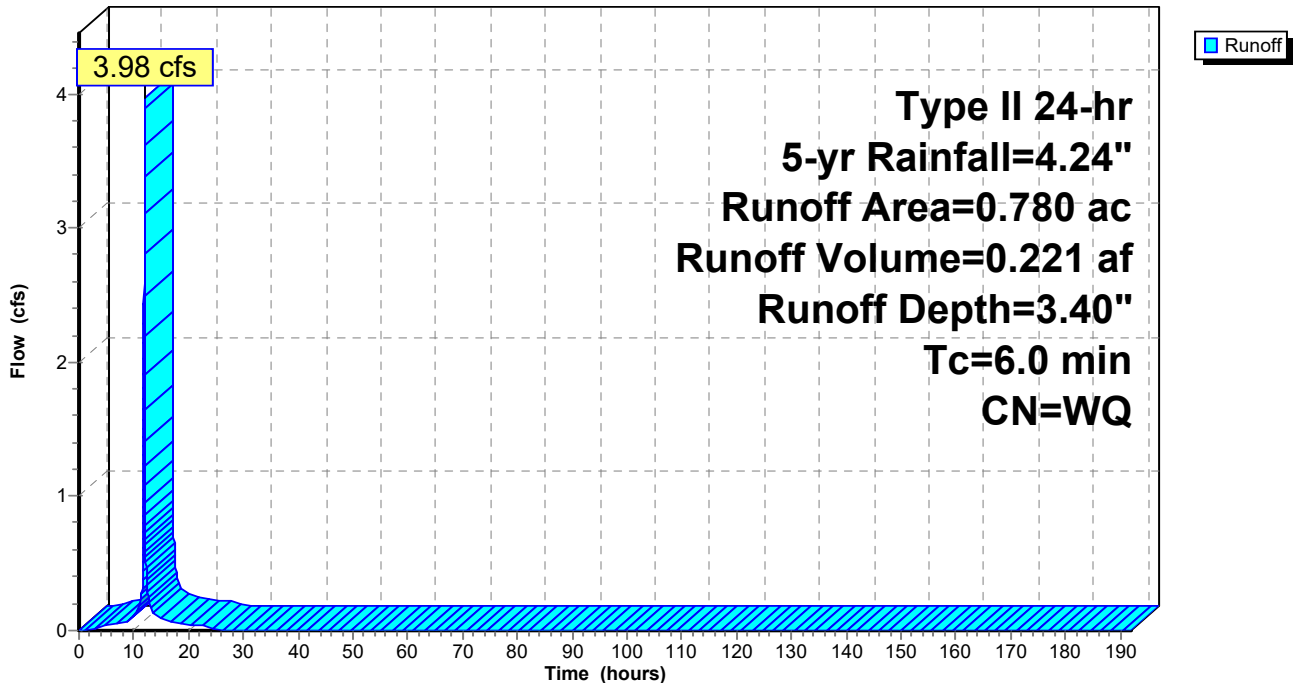
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.660	98	Paved parking, HSG A
0.780		Weighted Average
0.120		15.38% Pervious Area
0.660		84.62% Impervious Area

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

**Subcatchment 1S: Pre- to POI#1**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 5-yr Rainfall=4.24"

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**Summary for Subcatchment 2S: Pre- to POI#2**

Runoff = 5.84 cfs @ 11.97 hrs, Volume= 0.324 af, Depth= 3.74"

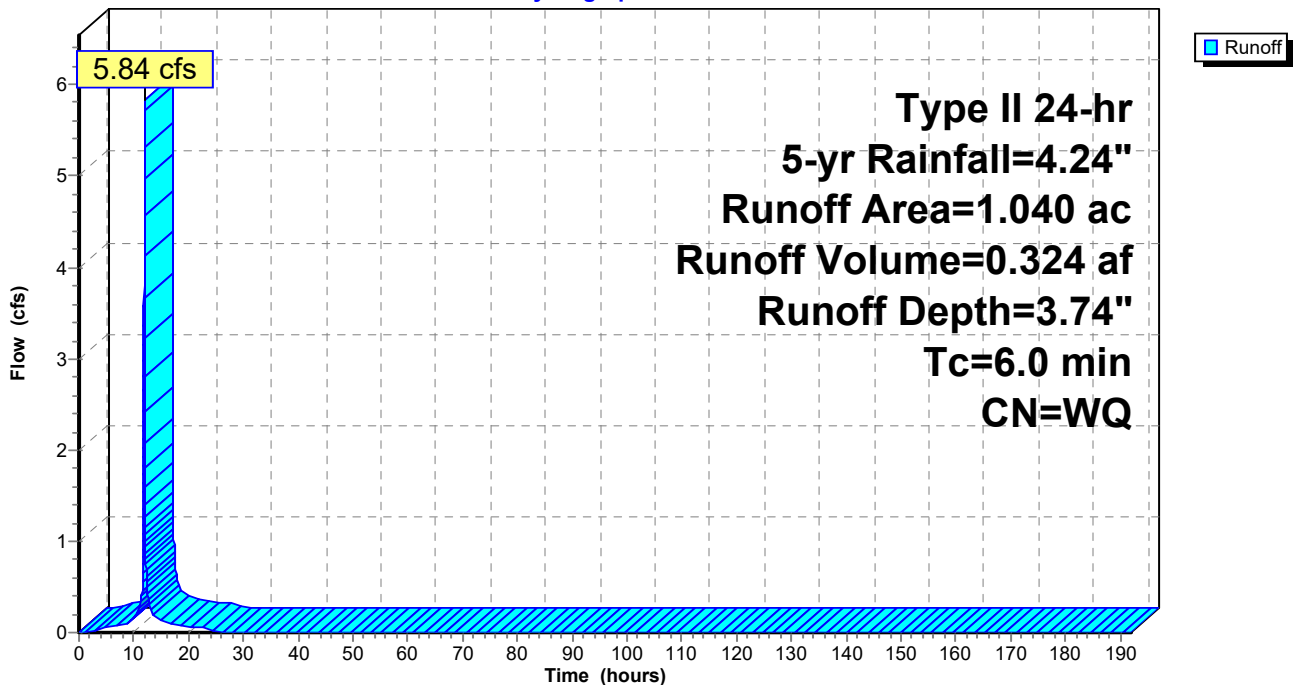
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.970	98	Paved parking, HSG A
1.040		Weighted Average
0.070		6.73% Pervious Area
0.970		93.27% Impervious Area

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

**Subcatchment 2S: Pre- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 5-yr Rainfall=4.24"

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**Summary for Subcatchment 3S: Pre- to POI#3**

Runoff = 0.42 cfs @ 11.97 hrs, Volume= 0.024 af, Depth= 2.19"

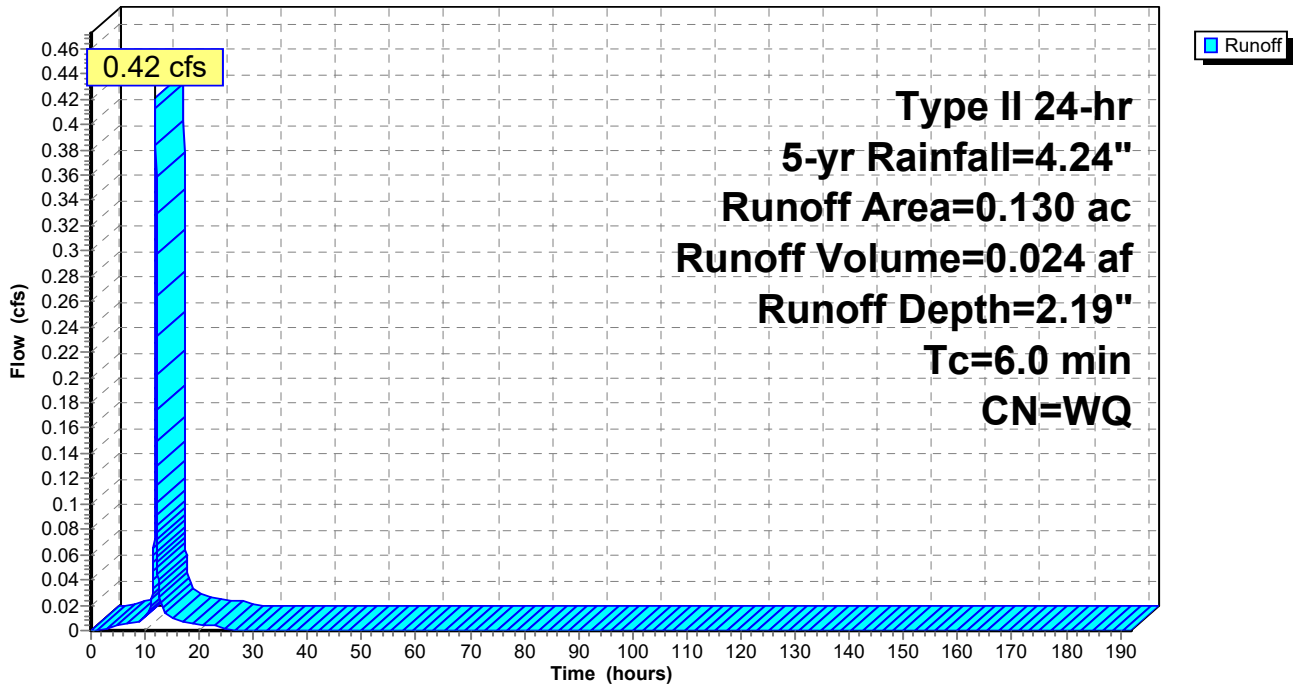
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.070	98	Paved parking, HSG A
Weighted Average		
0.060		46.15% Pervious Area
0.070		53.85% Impervious Area

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

**Subcatchment 3S: Pre- to POI#3**

Hydrograph



**Summary for Subcatchment 5S: Post- to Infiltrating Pipes**

Runoff = 2.47 cfs @ 11.97 hrs, Volume= 0.137 af, Depth= 3.82"

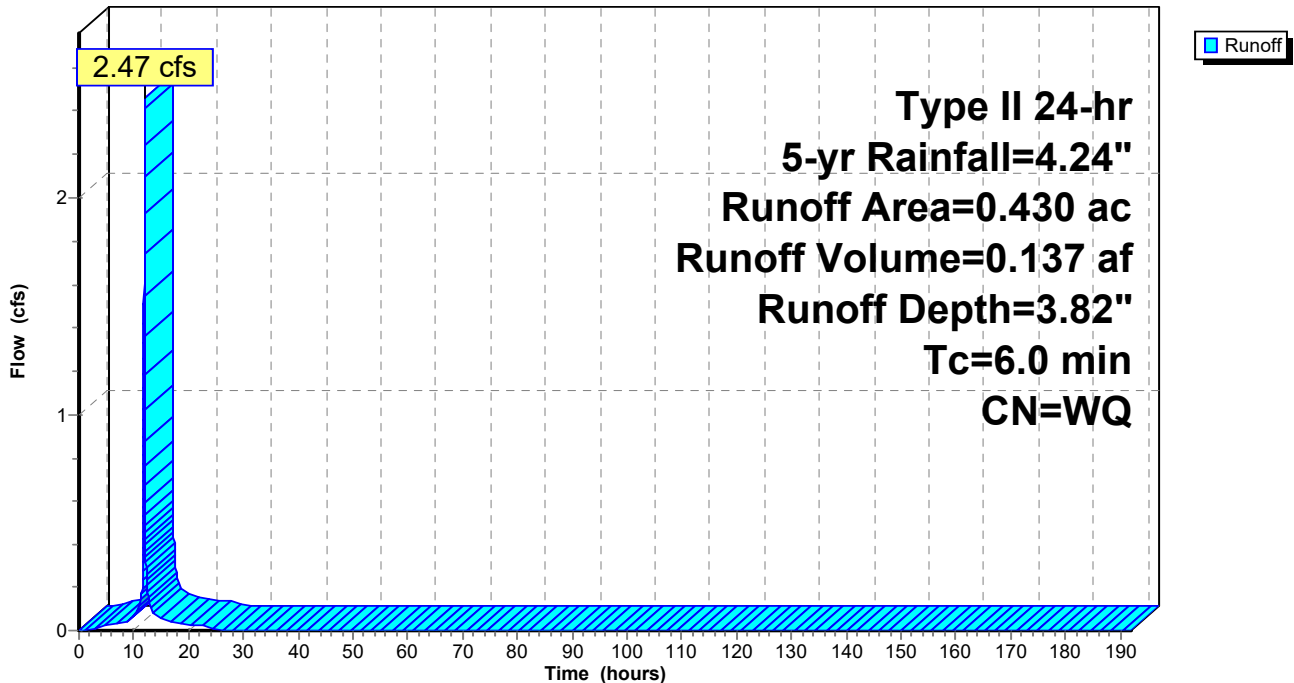
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.020	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.430		Weighted Average
0.020		4.65% Pervious Area
0.410		95.35% Impervious Area

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

**Subcatchment 5S: Post- to Infiltrating Pipes**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 5-yr Rainfall=4.24"

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**Summary for Subcatchment 6S: Post- to POI#2**

Runoff = 5.42 cfs @ 11.97 hrs, Volume= 0.301 af, Depth= 3.54"

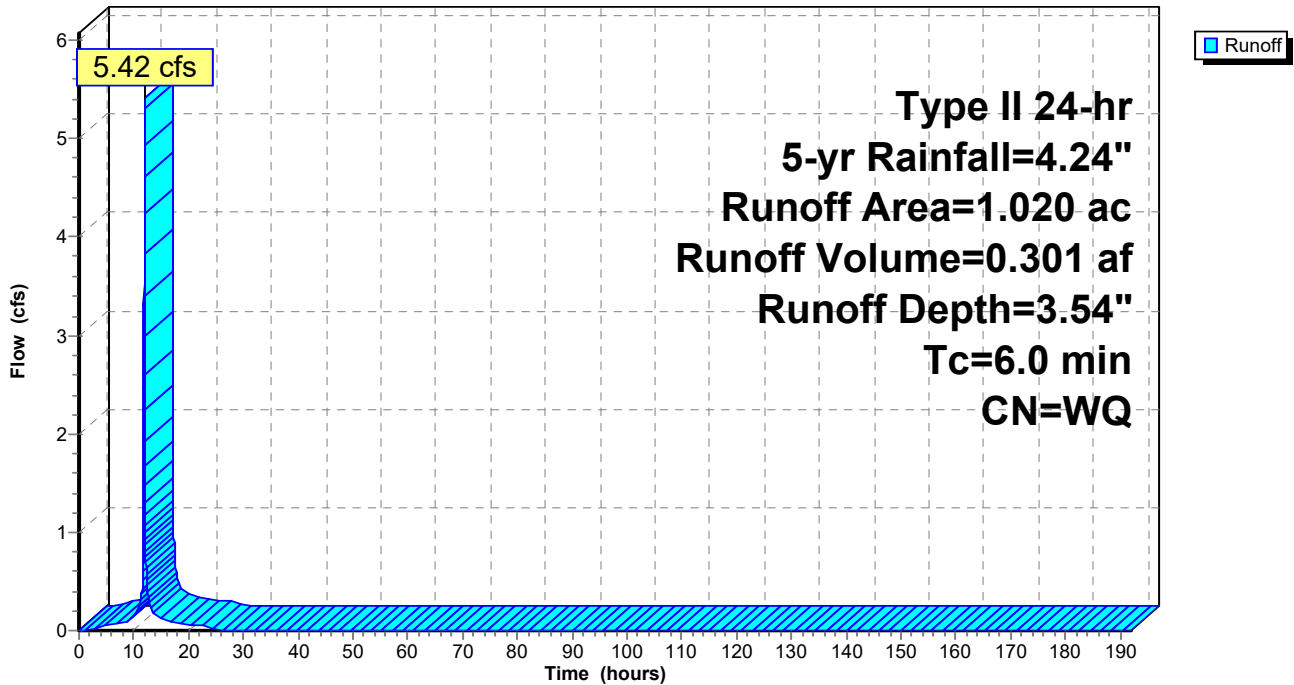
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.900	98	Paved parking, HSG A
1.020		Weighted Average
0.120		11.76% Pervious Area
0.900		88.24% Impervious Area

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

**Subcatchment 6S: Post- to POI#2**

Hydrograph



**Summary for Subcatchment 7S: Post- to POI#3**

Runoff = 0.18 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 1.38"

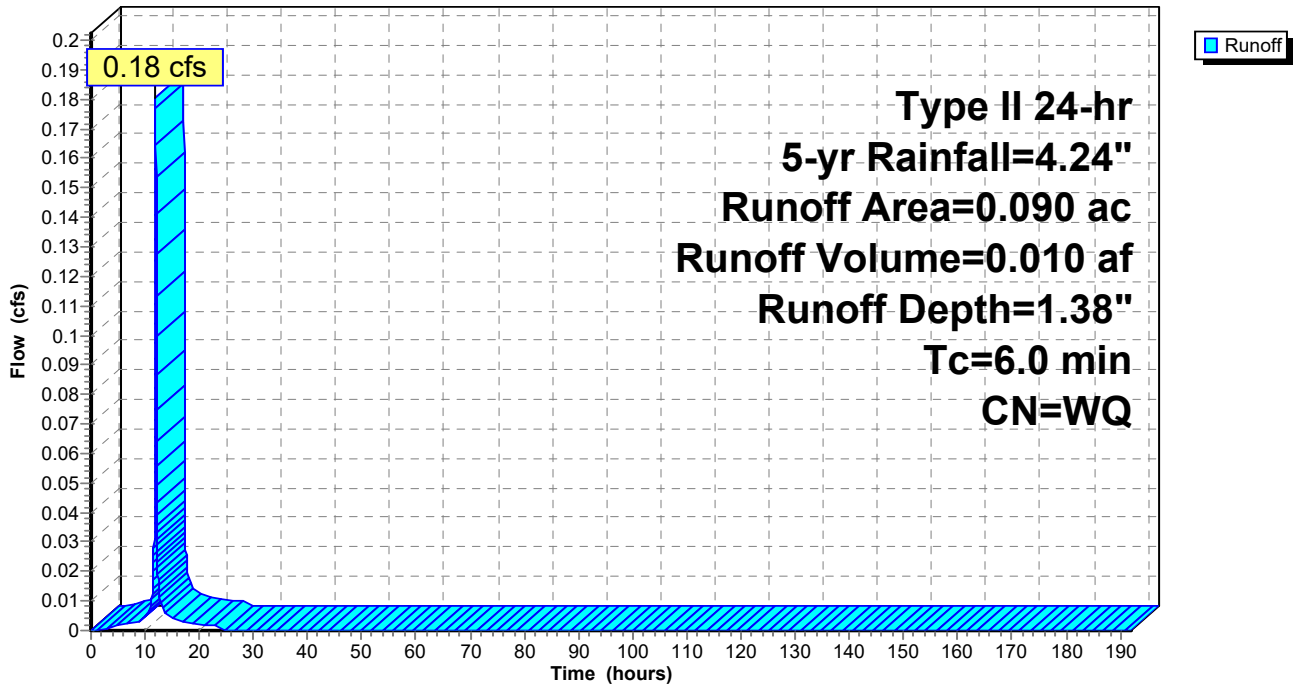
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.030	98	Paved parking, HSG A
Weighted Average		
0.060		66.67% Pervious Area
0.030		33.33% Impervious Area

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

**Subcatchment 7S: Post- to POI#3**

Hydrograph



**Summary for Subcatchment 11S: Post- to POI#1 Bypass**

Runoff = 1.75 cfs @ 11.97 hrs, Volume= 0.097 af, Depth= 2.92"

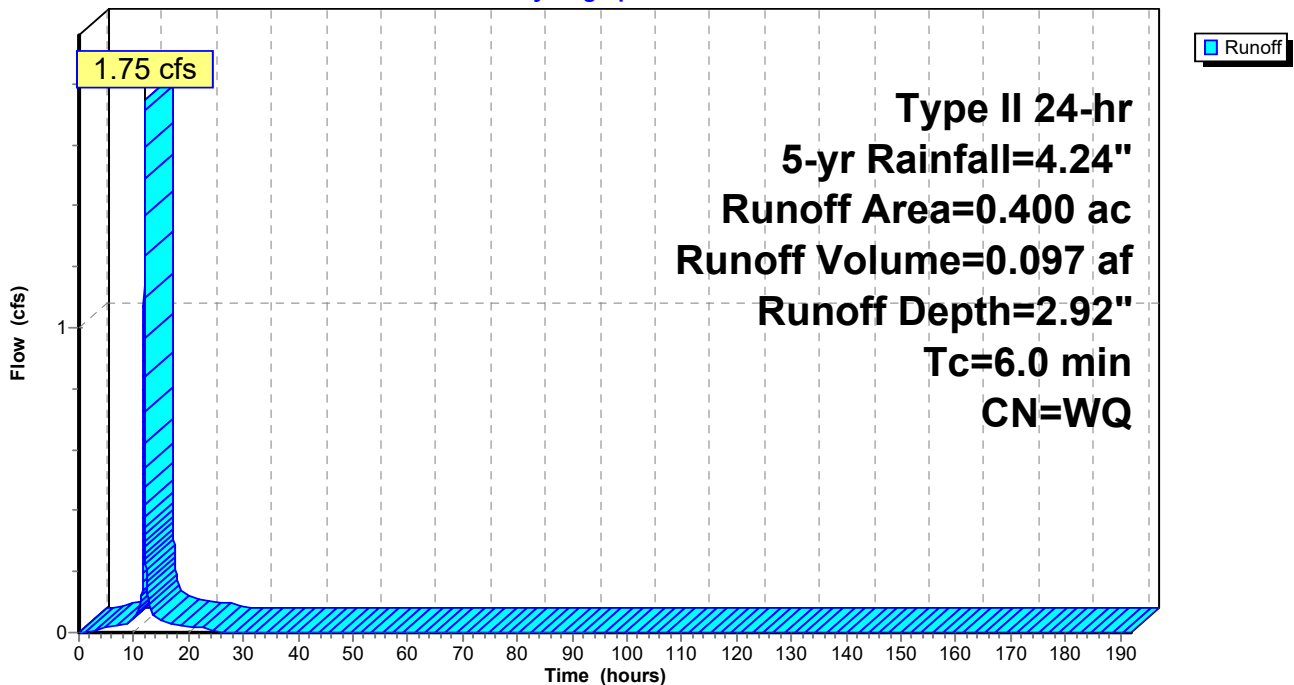
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-yr Rainfall=4.24"

Area (ac)	CN	Description
0.110	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG A
Weighted Average		
0.110		27.50% Pervious Area
0.290		72.50% Impervious Area

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

**Subcatchment 11S: Post- to POI#1 Bypass**

Hydrograph





**Summary for Pond 12P: Infiltrating Pipes**

Inflow Area = 0.430 ac, 95.35% Impervious, Inflow Depth = 3.82" for 5-yr event  
 Inflow = 2.47 cfs @ 11.97 hrs, Volume= 0.137 af  
 Outflow = 0.07 cfs @ 14.01 hrs, Volume= 0.137 af, Atten= 97%, Lag= 122.3 min  
 Discarded = 0.07 cfs @ 14.01 hrs, Volume= 0.137 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 23.91' @ 14.01 hrs Surf.Area= 1,884 sf Storage= 3,387 cf

Plug-Flow detention time= 512.0 min calculated for 0.137 af (100% of inflow)  
 Center-of-Mass det. time= 511.9 min ( 1,259.1 - 747.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	20.75'	2,560 cf	<b>6.00'W x 314.00'L x 5.00'H Stone Storage</b> 9,420 cf Overall - 3,021 cf Embedded = 6,399 cf x 40.0% Voids
#2	21.50'	2,220 cf	<b>36.0" Round Pipe Storage</b> Inside #1 L= 314.0' S= 0.0010 '/' 3,021 cf Overall - 3.0" Wall Thickness = 2,220 cf
#3	22.00'	80 cf	<b>4.00'W x 4.00'L x 5.00'H Inlet A0</b> -Impervious
#4	22.08'	95 cf	<b>4.00'W x 4.00'L x 5.92'H Inlet A1</b> -Impervious
#5	22.15'	116 cf	<b>4.00'W x 4.00'L x 7.22'H Inlet A2</b> -Impervious
#6	22.25'	122 cf	<b>4.00'W x 4.00'L x 7.65'H Inlet A3</b> -Impervious
#7	22.14'	116 cf	<b>4.00'W x 4.00'L x 7.26'H Inlet A1.1</b> -Impervious
		5,308 cf	Total Available Storage

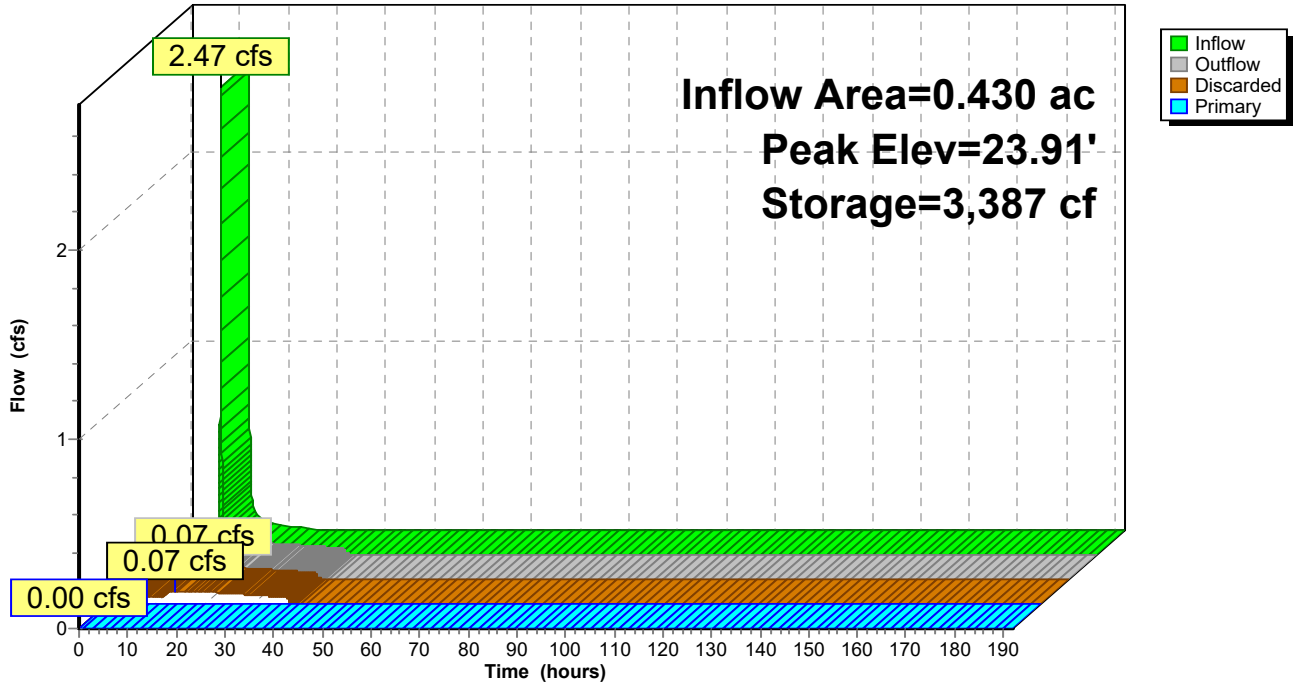
Device	Routing	Invert	Outlet Devices
#1	Discarded	20.75'	<b>0.750 in/hr Exfiltration over Wetted area</b>
#2	Primary	27.00'	<b>2.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Discarded OutFlow** Max=0.07 cfs @ 14.01 hrs HW=23.91' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=20.75' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 12P: Infiltrating Pipes

Hydrograph



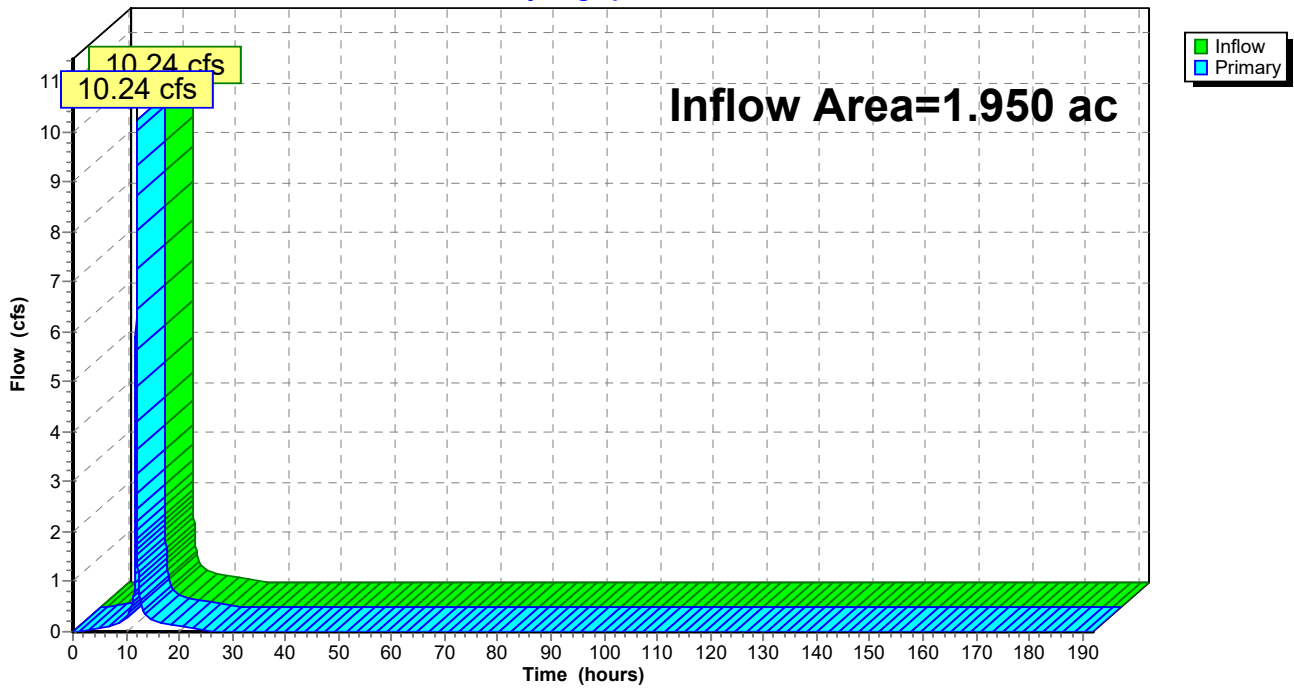
### Summary for Link 4L: Pre- Overall Site

Inflow Area = 1.950 ac, 87.18% Impervious, Inflow Depth = 3.50" for 5-yr event  
Inflow = 10.24 cfs @ 11.97 hrs, Volume= 0.569 af  
Primary = 10.24 cfs @ 11.97 hrs, Volume= 0.569 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 4L: Pre- Overall Site

Hydrograph



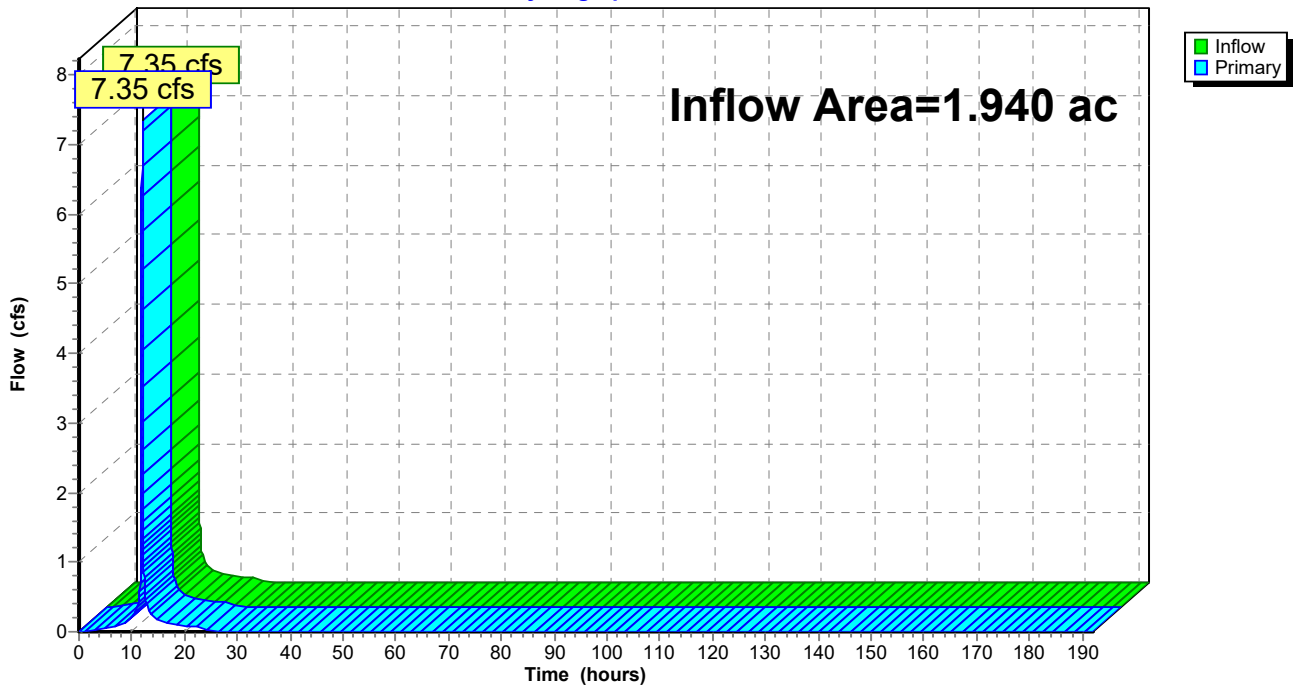
### Summary for Link 9L: Post- Overall Site

Inflow Area = 1.940 ac, 84.02% Impervious, Inflow Depth = 2.53" for 5-yr event  
Inflow = 7.35 cfs @ 11.97 hrs, Volume= 0.409 af  
Primary = 7.35 cfs @ 11.97 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 9L: Post- Overall Site

Hydrograph



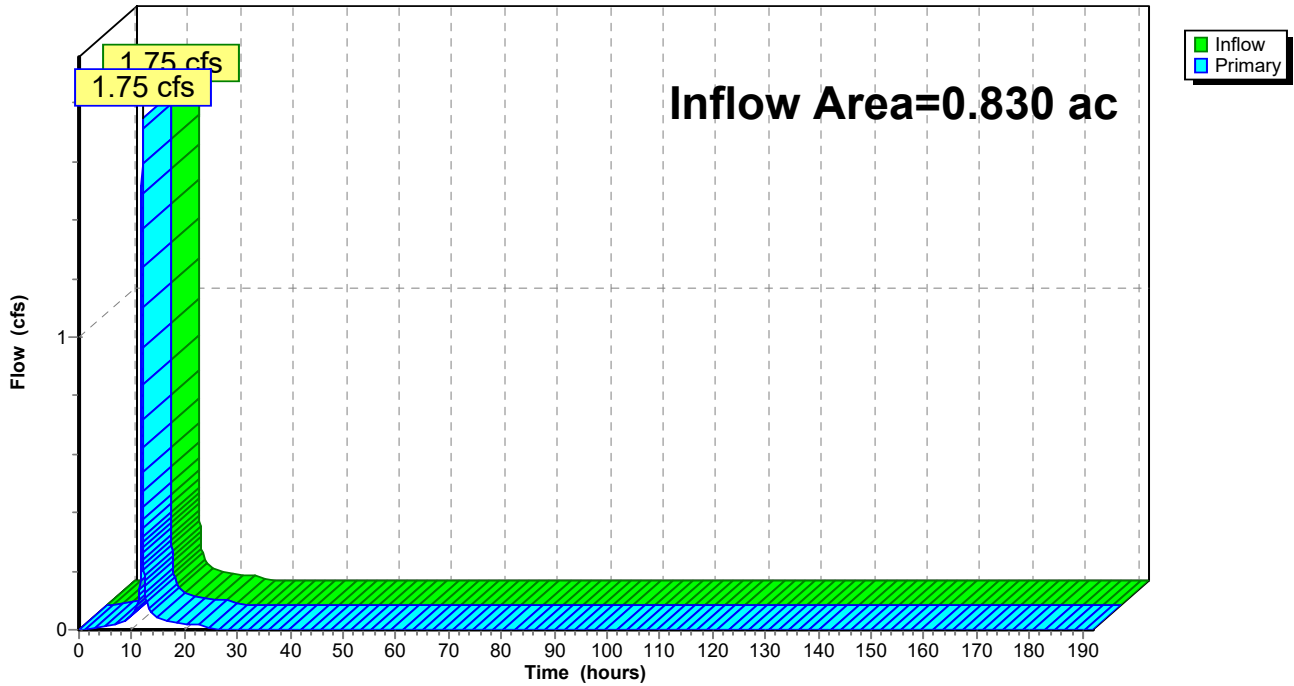
**Summary for Link 10L: Post- POI#1 Total**

Inflow Area = 0.830 ac, 84.34% Impervious, Inflow Depth = 1.41" for 5-yr event  
Inflow = 1.75 cfs @ 11.97 hrs, Volume= 0.097 af  
Primary = 1.75 cfs @ 11.97 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

**Link 10L: Post- POI#1 Total**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 10-yr Rainfall=5.02"

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**Summary for Subcatchment 1S: Pre- to POI#1**

Runoff = 4.72 cfs @ 11.97 hrs, Volume= 0.265 af, Depth= 4.08"

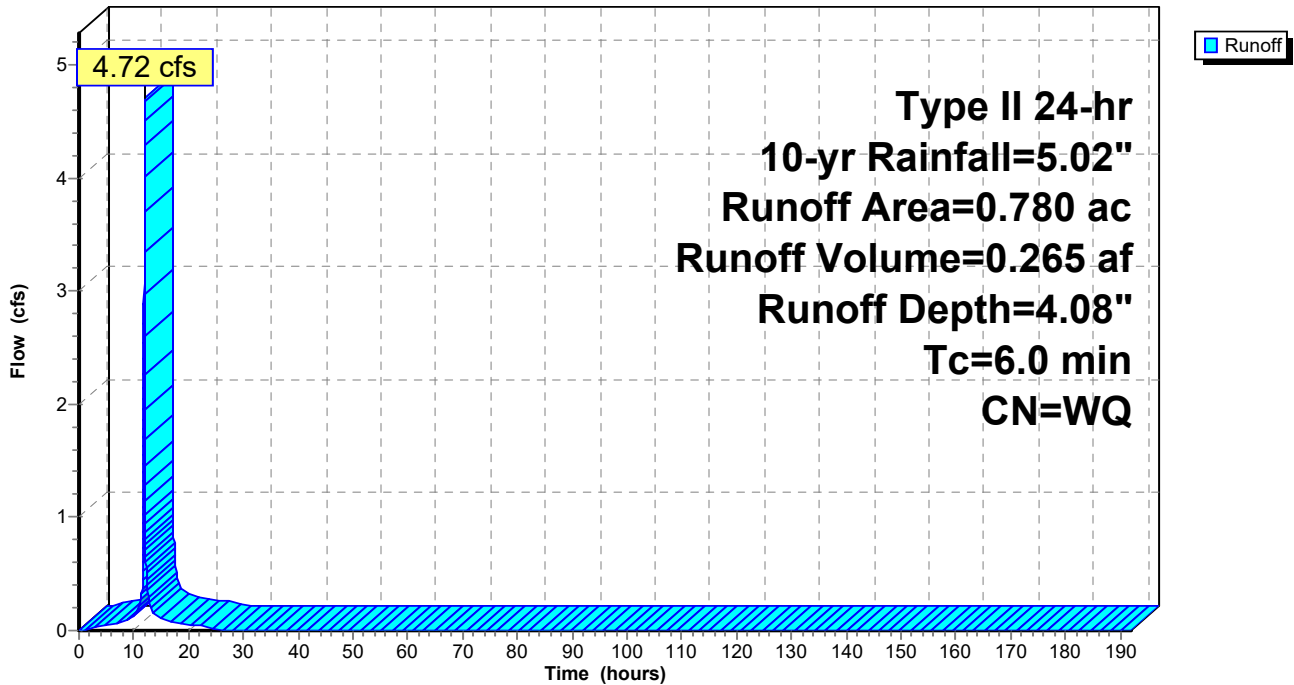
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.660	98	Paved parking, HSG A
0.780		Weighted Average
0.120		15.38% Pervious Area
0.660		84.62% Impervious Area

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

**Subcatchment 1S: Pre- to POI#1**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 10-yr Rainfall=5.02"

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**Summary for Subcatchment 2S: Pre- to POI#2**

Runoff = 6.93 cfs @ 11.97 hrs, Volume= 0.388 af, Depth= 4.47"

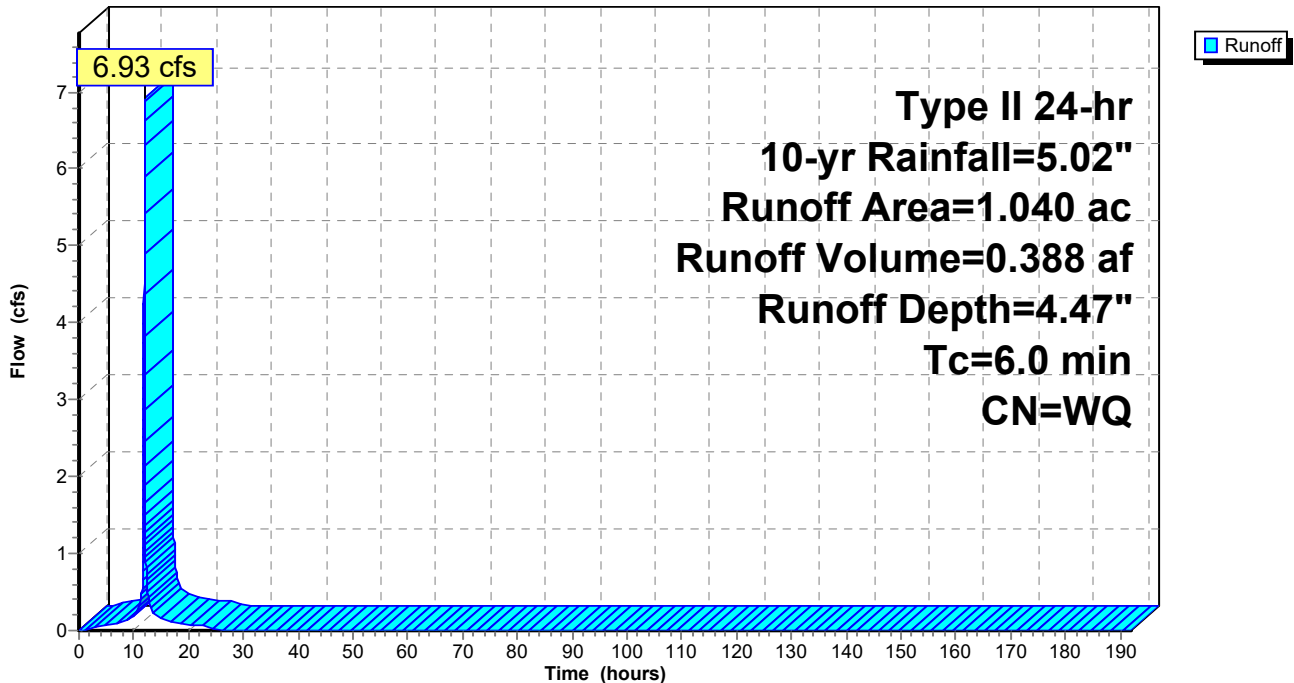
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.970	98	Paved parking, HSG A
1.040		Weighted Average
0.070		6.73% Pervious Area
0.970		93.27% Impervious Area

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

**Subcatchment 2S: Pre- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 10-yr Rainfall=5.02"

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**Summary for Subcatchment 3S: Pre- to POI#3**

Runoff = 0.50 cfs @ 11.97 hrs, Volume= 0.029 af, Depth= 2.67"

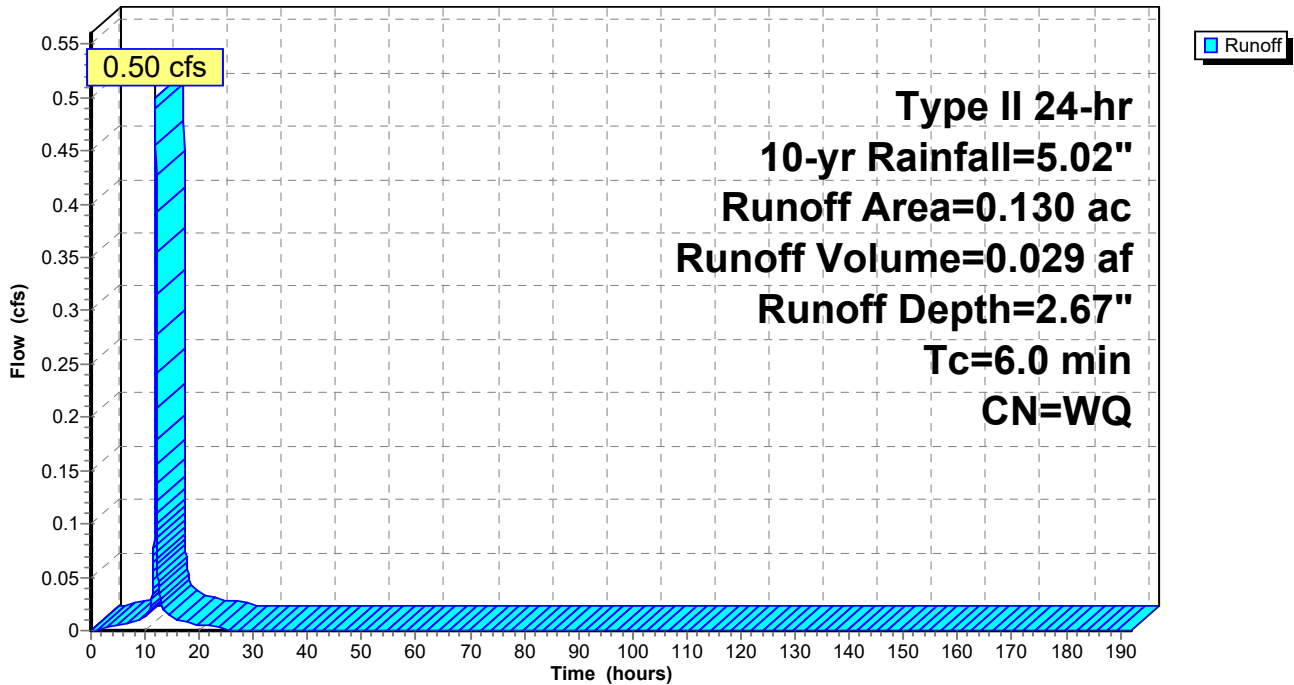
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.070	98	Paved parking, HSG A
Weighted Average		
0.060		46.15% Pervious Area
0.070		53.85% Impervious Area

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

**Subcatchment 3S: Pre- to POI#3**

Hydrograph





**Summary for Subcatchment 5S: Post- to Infiltrating Pipes**

Runoff = 2.93 cfs @ 11.97 hrs, Volume= 0.164 af, Depth= 4.57"

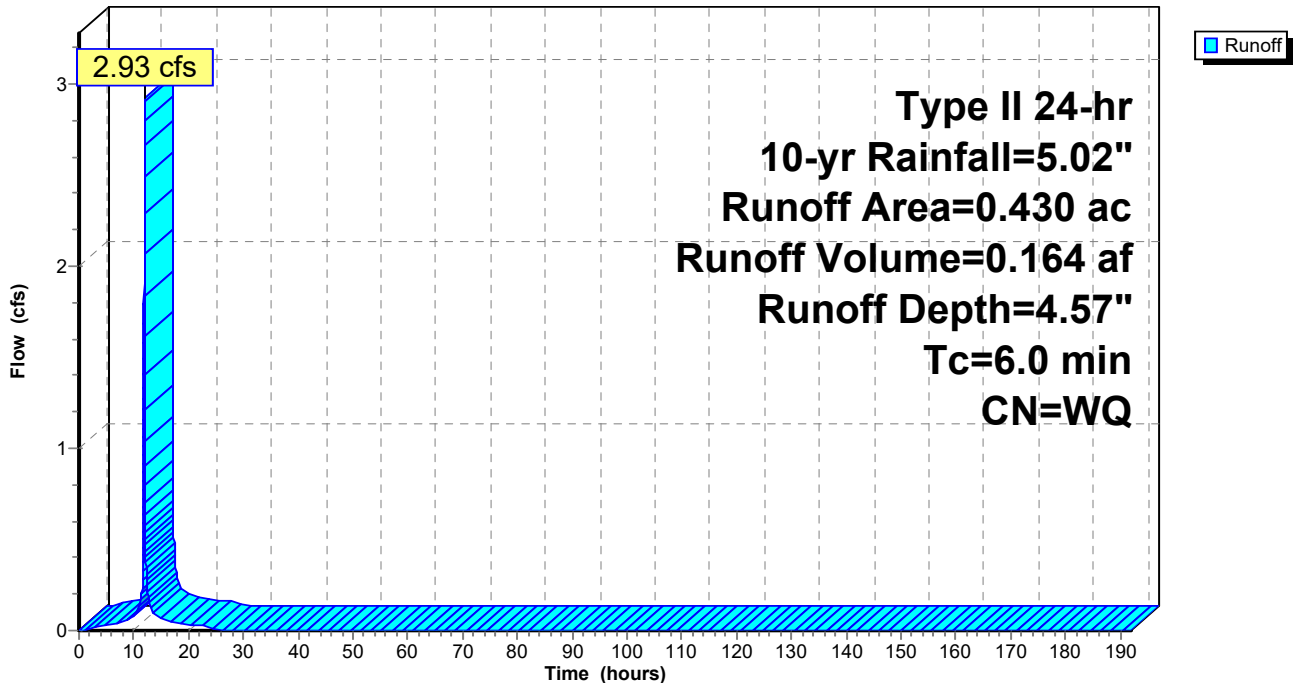
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.020	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.430		Weighted Average
0.020		4.65% Pervious Area
0.410		95.35% Impervious Area

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

**Subcatchment 5S: Post- to Infiltrating Pipes**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 10-yr Rainfall=5.02"

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**Summary for Subcatchment 6S: Post- to POI#2**

Runoff = 6.43 cfs @ 11.97 hrs, Volume= 0.361 af, Depth= 4.24"

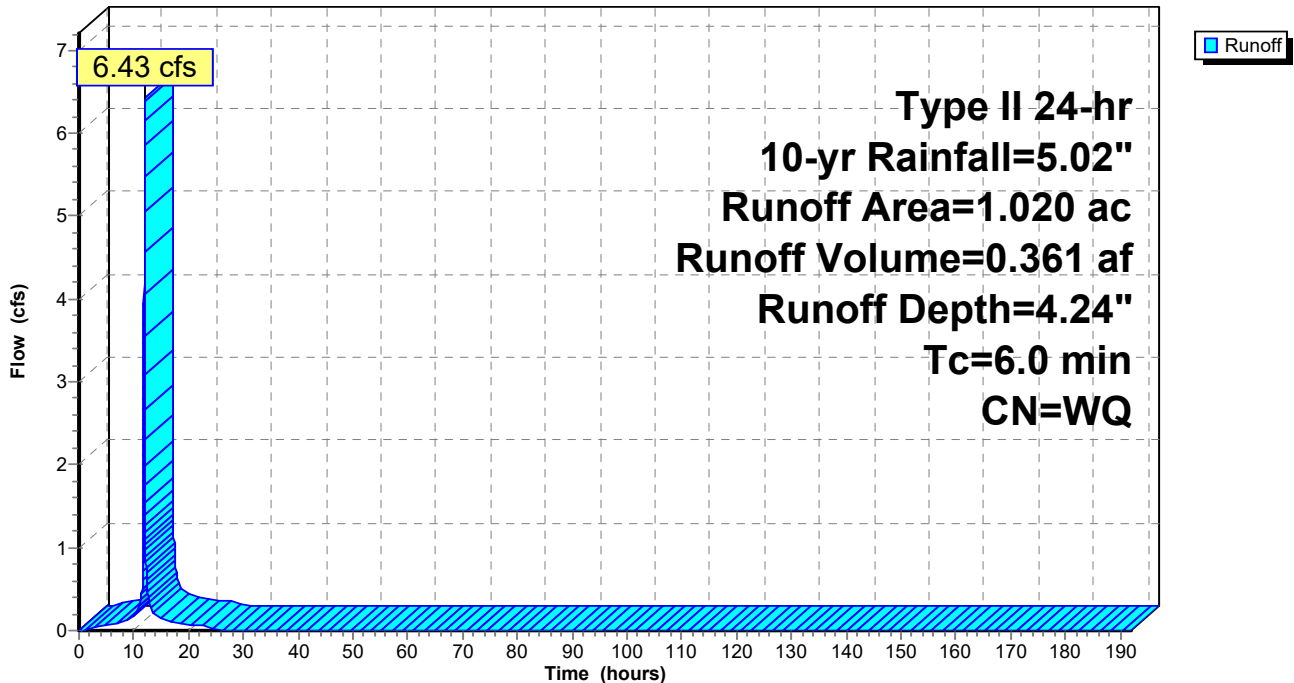
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.900	98	Paved parking, HSG A
1.020		Weighted Average
0.120		11.76% Pervious Area
0.900		88.24% Impervious Area

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

**Subcatchment 6S: Post- to POI#2**

Hydrograph



**Summary for Subcatchment 7S: Post- to POI#3**

Runoff = 0.21 cfs @ 11.97 hrs, Volume= 0.013 af, Depth= 1.73"

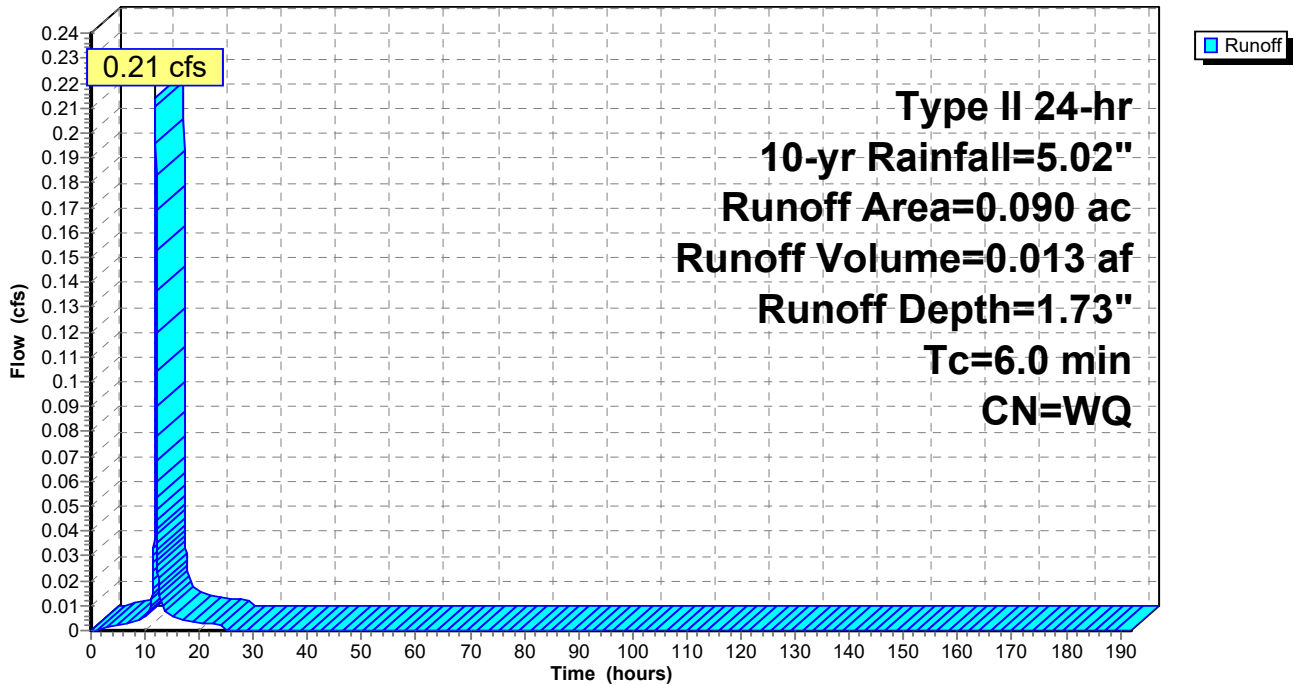
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.030	98	Paved parking, HSG A
Weighted Average		
0.060		66.67% Pervious Area
0.030		33.33% Impervious Area

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

**Subcatchment 7S: Post- to POI#3**

Hydrograph



**Summary for Subcatchment 11S: Post- to POI#1 Bypass**

Runoff = 2.07 cfs @ 11.97 hrs, Volume= 0.117 af, Depth= 3.52"

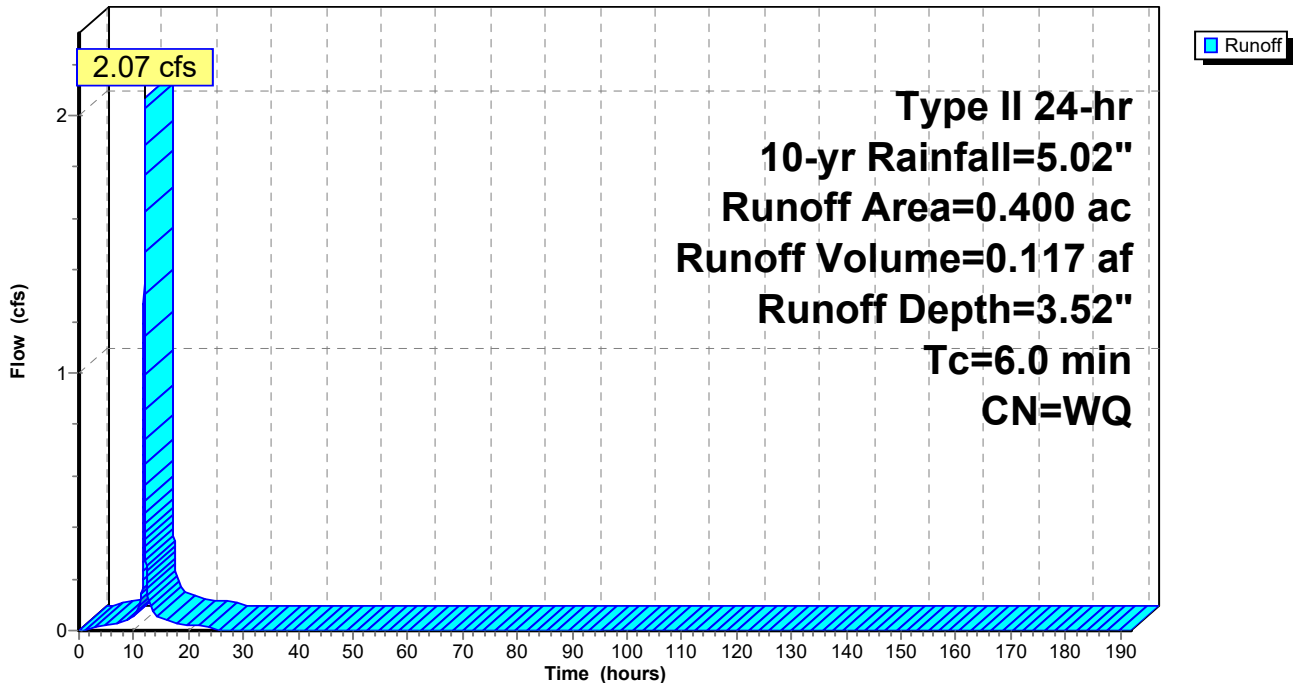
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-yr Rainfall=5.02"

Area (ac)	CN	Description
0.110	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG A
0.400		Weighted Average
0.110		27.50% Pervious Area
0.290		72.50% Impervious Area

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

**Subcatchment 11S: Post- to POI#1 Bypass**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 10-yr Rainfall=5.02"

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**Summary for Pond 12P: Infiltrating Pipes**

Inflow Area = 0.430 ac, 95.35% Impervious, Inflow Depth = 4.57" for 10-yr event  
 Inflow = 2.93 cfs @ 11.97 hrs, Volume= 0.164 af  
 Outflow = 0.08 cfs @ 14.19 hrs, Volume= 0.164 af, Atten= 97%, Lag= 133.1 min  
 Discarded = 0.08 cfs @ 14.19 hrs, Volume= 0.164 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 24.62' @ 14.19 hrs Surf.Area= 1,884 sf Storage= 4,164 cf

Plug-Flow detention time= 583.7 min calculated for 0.164 af (100% of inflow)  
 Center-of-Mass det. time= 583.7 min ( 1,328.2 - 744.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	20.75'	2,560 cf	<b>6.00'W x 314.00'L x 5.00'H Stone Storage</b> 9,420 cf Overall - 3,021 cf Embedded = 6,399 cf x 40.0% Voids
#2	21.50'	2,220 cf	<b>36.0" Round Pipe Storage</b> Inside #1 L= 314.0' S= 0.0010 '/' 3,021 cf Overall - 3.0" Wall Thickness = 2,220 cf
#3	22.00'	80 cf	<b>4.00'W x 4.00'L x 5.00'H Inlet A0</b> -Impervious
#4	22.08'	95 cf	<b>4.00'W x 4.00'L x 5.92'H Inlet A1</b> -Impervious
#5	22.15'	116 cf	<b>4.00'W x 4.00'L x 7.22'H Inlet A2</b> -Impervious
#6	22.25'	122 cf	<b>4.00'W x 4.00'L x 7.65'H Inlet A3</b> -Impervious
#7	22.14'	116 cf	<b>4.00'W x 4.00'L x 7.26'H Inlet A1.1</b> -Impervious
		5,308 cf	Total Available Storage

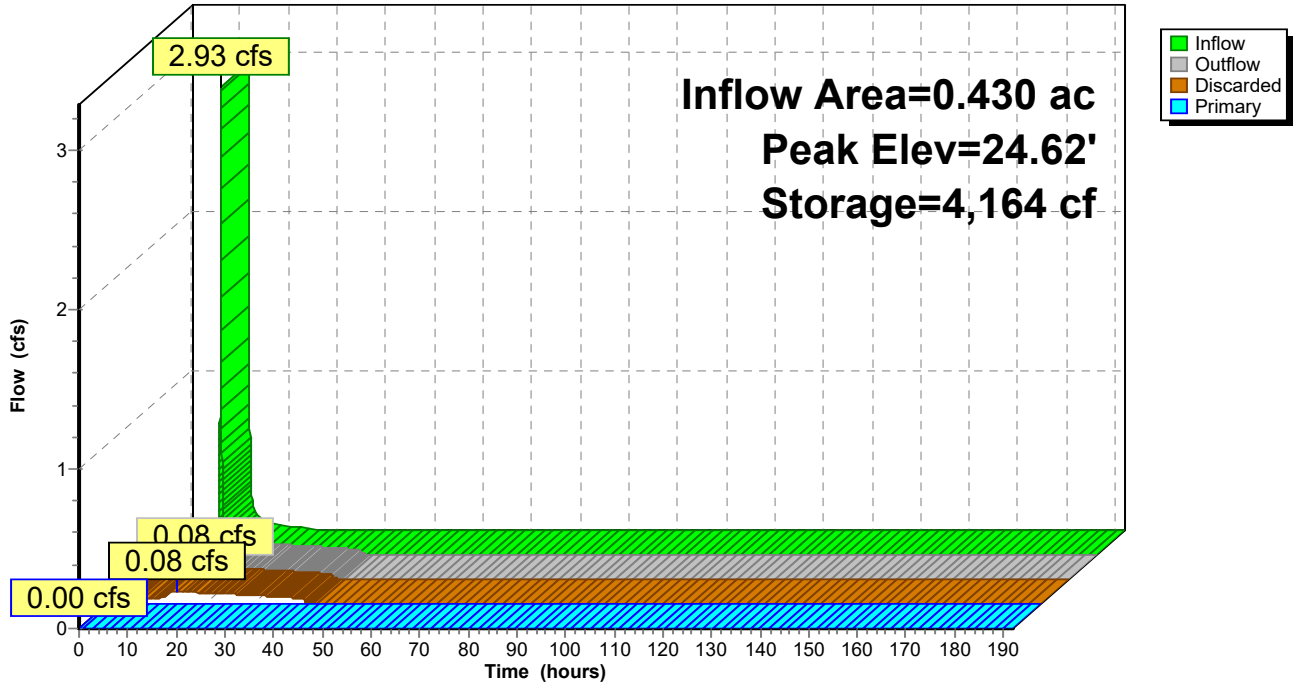
Device	Routing	Invert	Outlet Devices
#1	Discarded	20.75'	<b>0.750 in/hr Exfiltration over Wetted area</b>
#2	Primary	27.00'	<b>2.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Discarded OutFlow** Max=0.08 cfs @ 14.19 hrs HW=24.62' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=20.75' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 12P: Infiltrating Pipes

Hydrograph



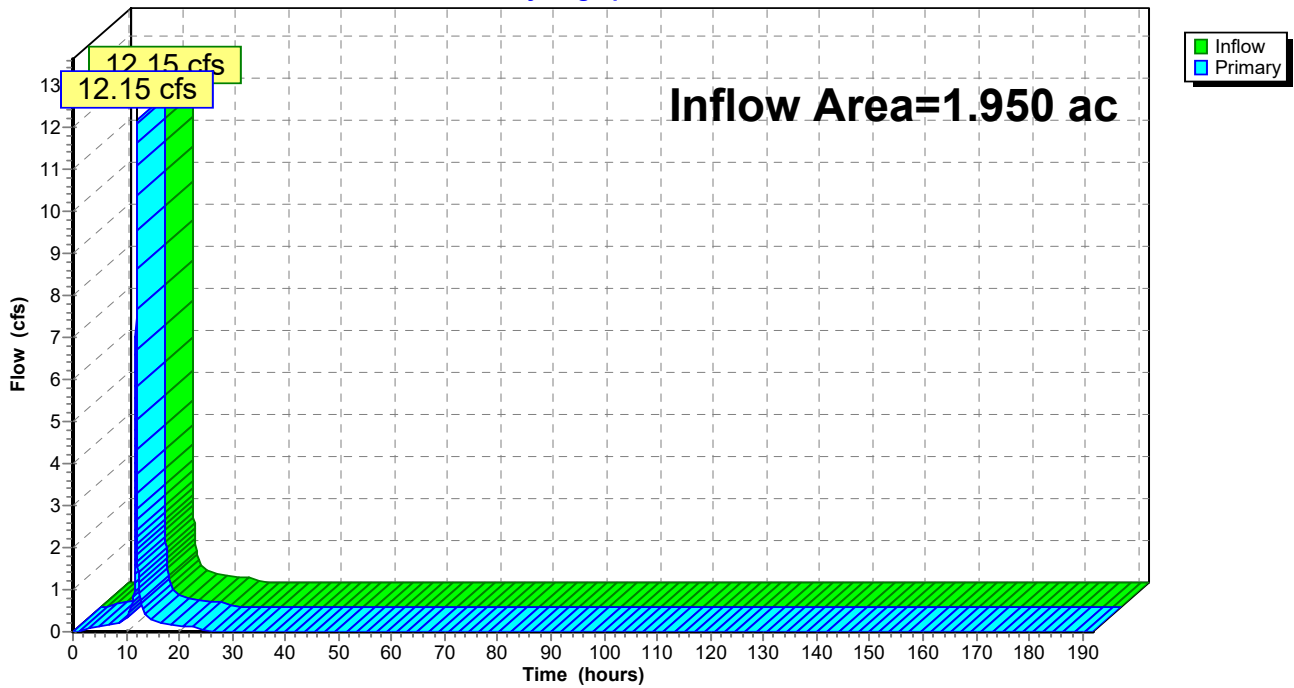
### Summary for Link 4L: Pre- Overall Site

Inflow Area = 1.950 ac, 87.18% Impervious, Inflow Depth = 4.20" for 10-yr event  
Inflow = 12.15 cfs @ 11.97 hrs, Volume= 0.682 af  
Primary = 12.15 cfs @ 11.97 hrs, Volume= 0.682 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 4L: Pre- Overall Site

Hydrograph



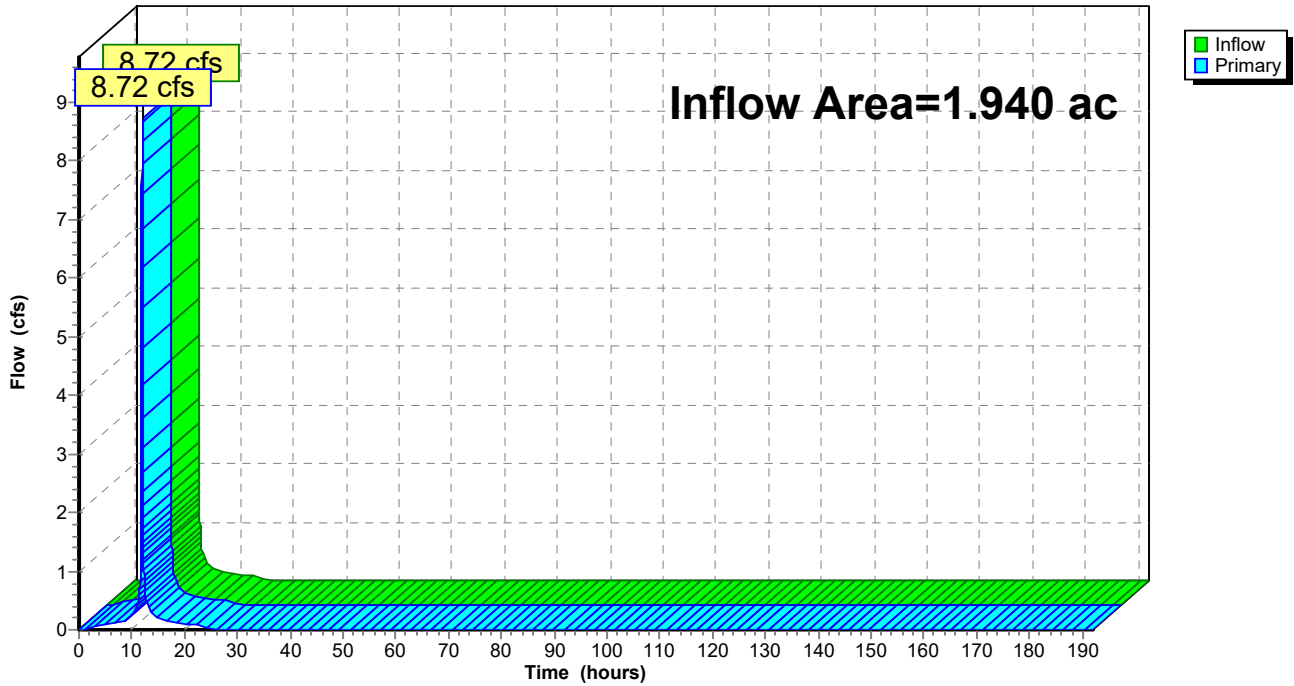
### Summary for Link 9L: Post- Overall Site

Inflow Area = 1.940 ac, 84.02% Impervious, Inflow Depth = 3.04" for 10-yr event  
Inflow = 8.72 cfs @ 11.97 hrs, Volume= 0.491 af  
Primary = 8.72 cfs @ 11.97 hrs, Volume= 0.491 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 9L: Post- Overall Site

Hydrograph





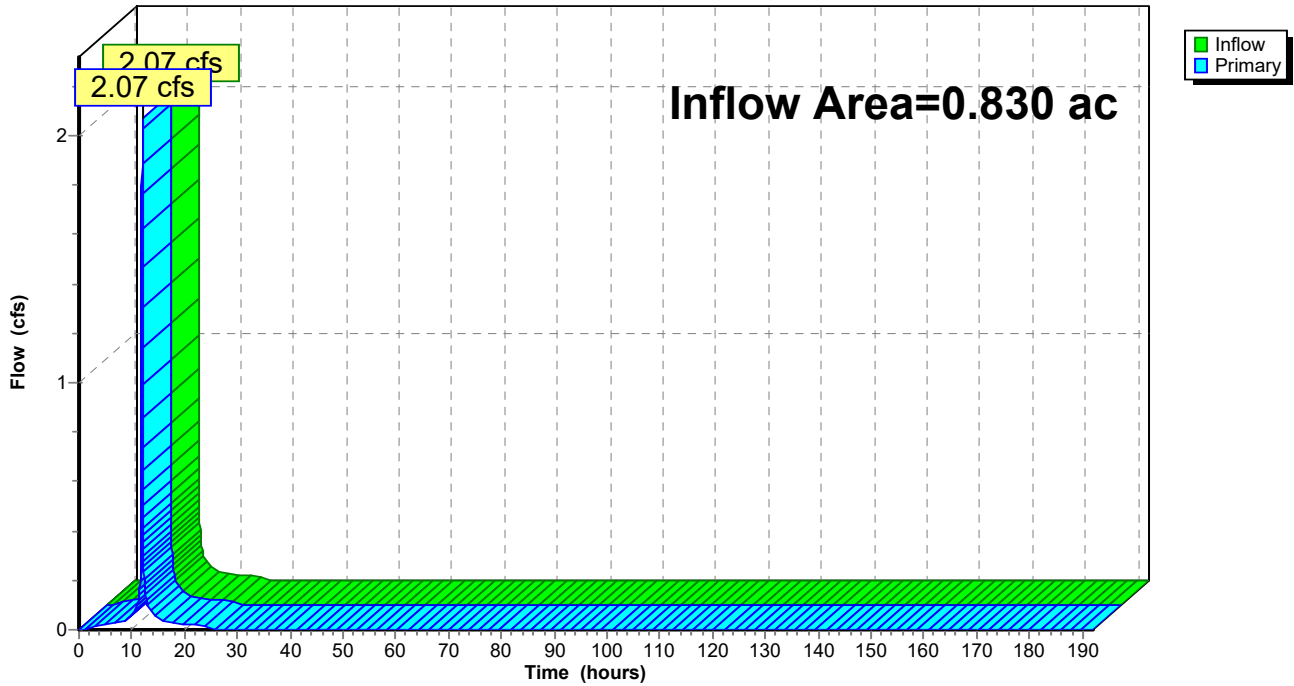
### Summary for Link 10L: Post- POI#1 Total

Inflow Area = 0.830 ac, 84.34% Impervious, Inflow Depth = 1.70" for 10-yr event  
Inflow = 2.07 cfs @ 11.97 hrs, Volume= 0.117 af  
Primary = 2.07 cfs @ 11.97 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 10L: Post- POI#1 Total

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 25-yr Rainfall=6.19"

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**Summary for Subcatchment 1S: Pre- to POI#1**

Runoff = 5.86 cfs @ 11.97 hrs, Volume= 0.332 af, Depth= 5.11"

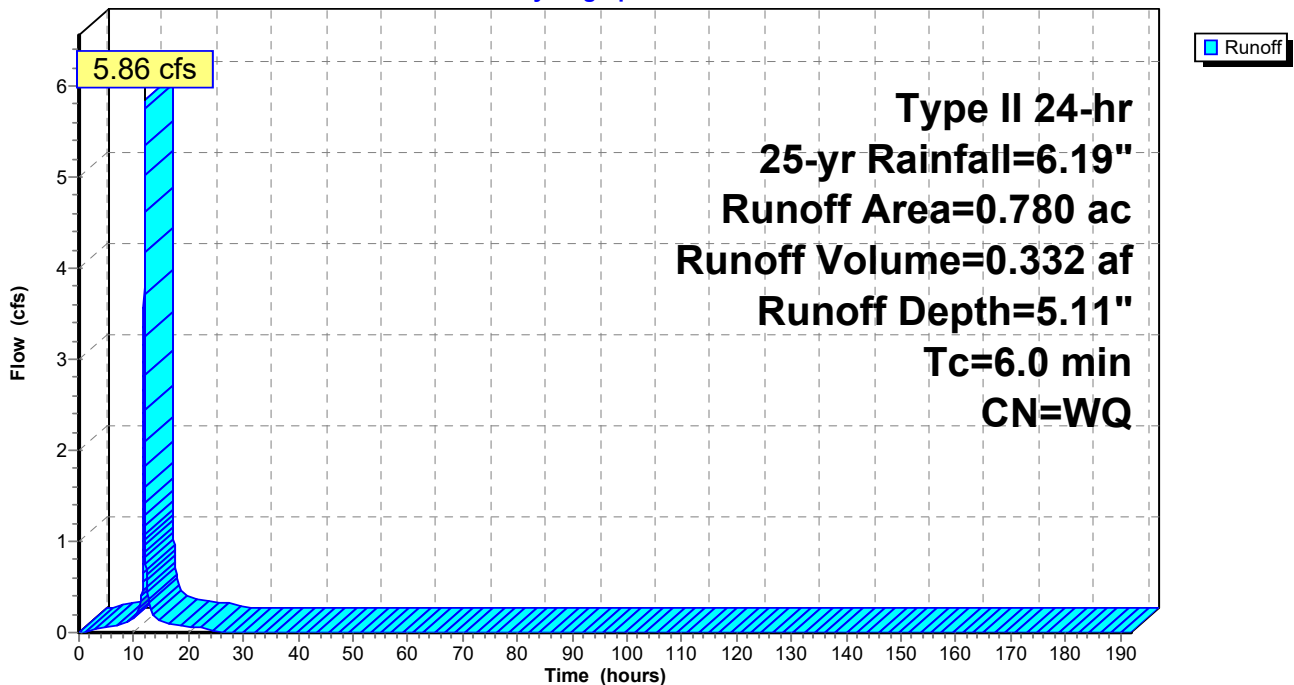
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.660	98	Paved parking, HSG A
0.780		Weighted Average
0.120		15.38% Pervious Area
0.660		84.62% Impervious Area

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

**Subcatchment 1S: Pre- to POI#1**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 25-yr Rainfall=6.19"

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**Summary for Subcatchment 2S: Pre- to POI#2**

Runoff = 8.58 cfs @ 11.97 hrs, Volume= 0.484 af, Depth= 5.58"

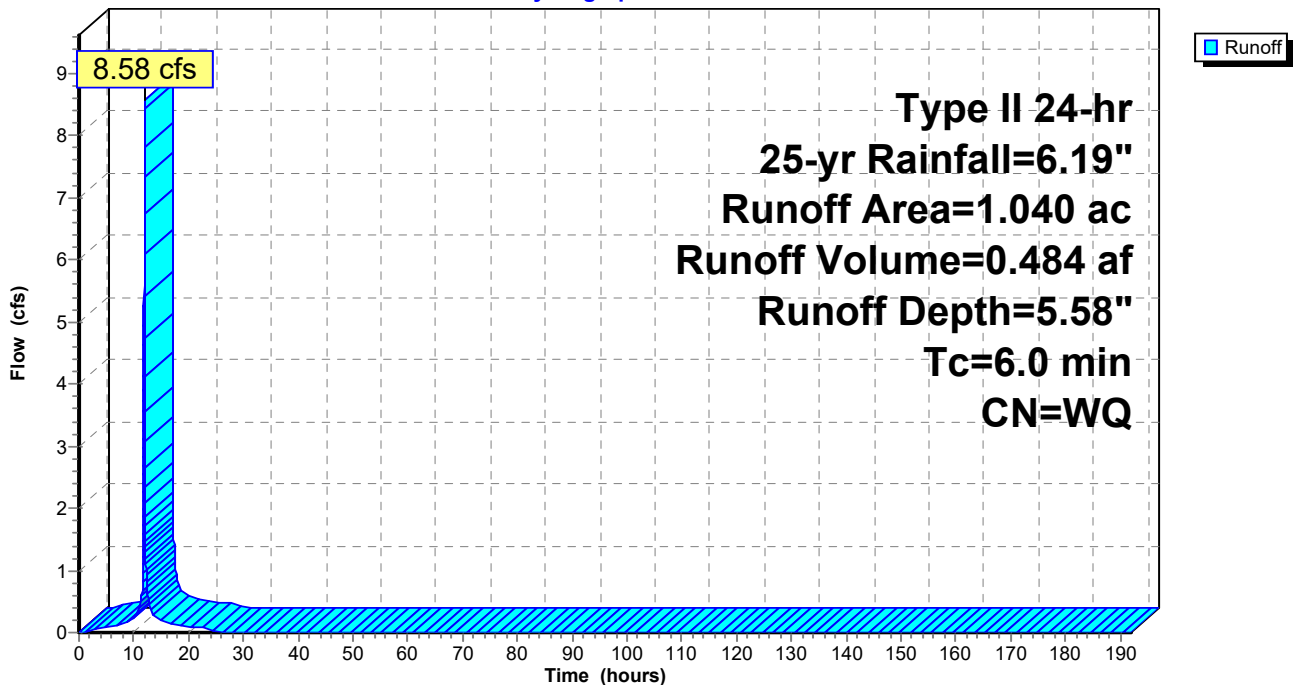
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.970	98	Paved parking, HSG A
1.040		Weighted Average
0.070		6.73% Pervious Area
0.970		93.27% Impervious Area

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

**Subcatchment 2S: Pre- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 25-yr Rainfall=6.19"

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**Summary for Subcatchment 3S: Pre- to POI#3**

Runoff = 0.64 cfs @ 11.97 hrs, Volume= 0.037 af, Depth= 3.44"

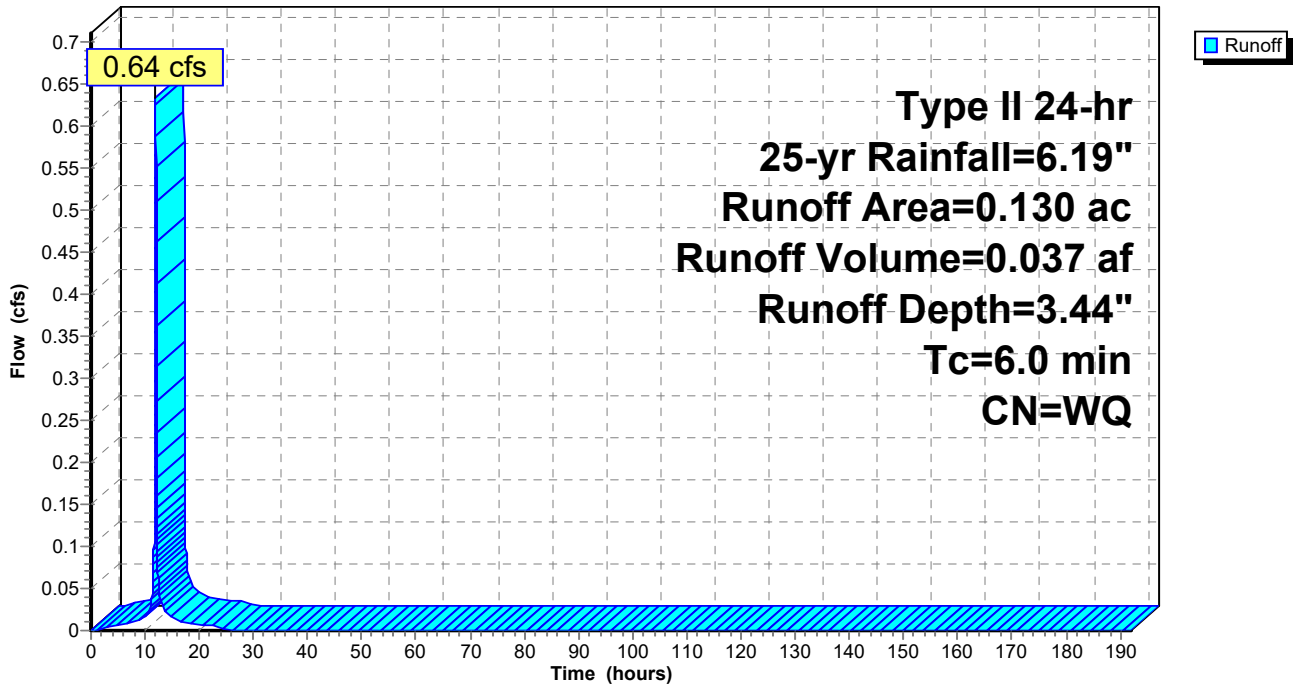
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.070	98	Paved parking, HSG A
0.130		Weighted Average
0.060		46.15% Pervious Area
0.070		53.85% Impervious Area

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

**Subcatchment 3S: Pre- to POI#3**

Hydrograph



**Summary for Subcatchment 5S: Post- to Infiltrating Pipes**

Runoff = 3.62 cfs @ 11.97 hrs, Volume= 0.204 af, Depth= 5.70"

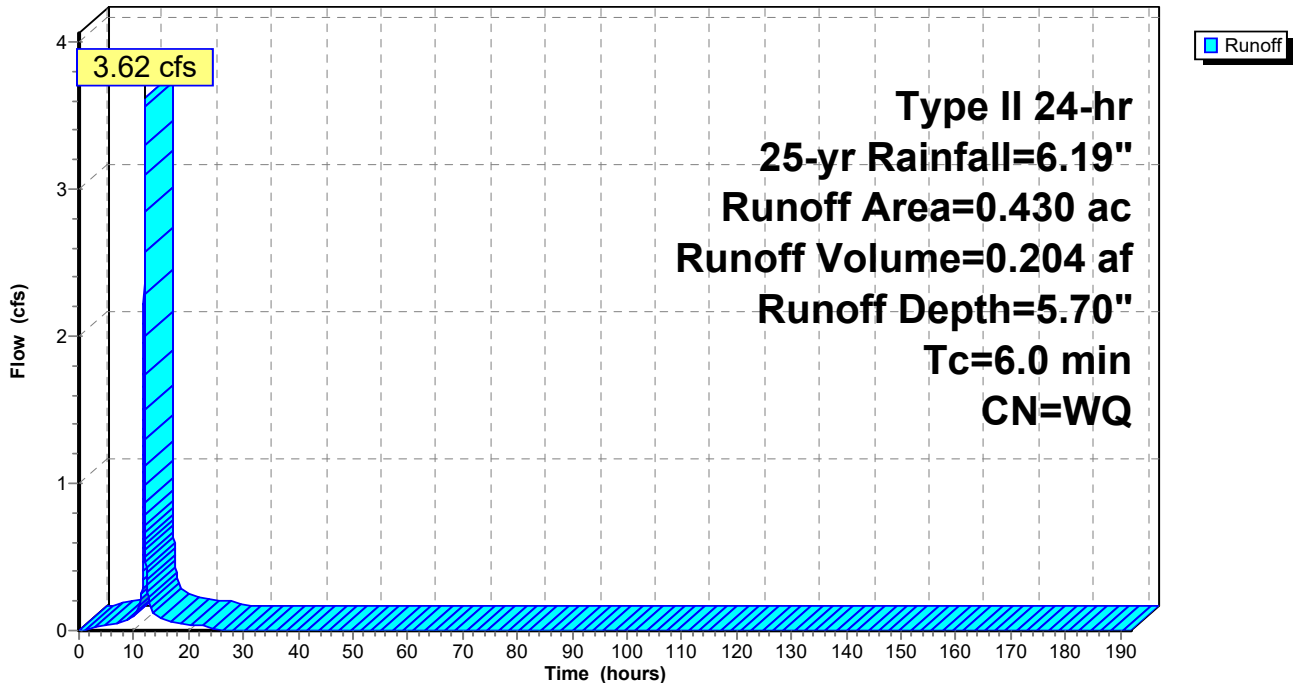
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.020	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.430		Weighted Average
0.020		4.65% Pervious Area
0.410		95.35% Impervious Area

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

**Subcatchment 5S: Post- to Infiltrating Pipes**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 25-yr Rainfall=6.19"

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**Summary for Subcatchment 6S: Post- to POI#2**

Runoff = 7.98 cfs @ 11.97 hrs, Volume= 0.451 af, Depth= 5.31"

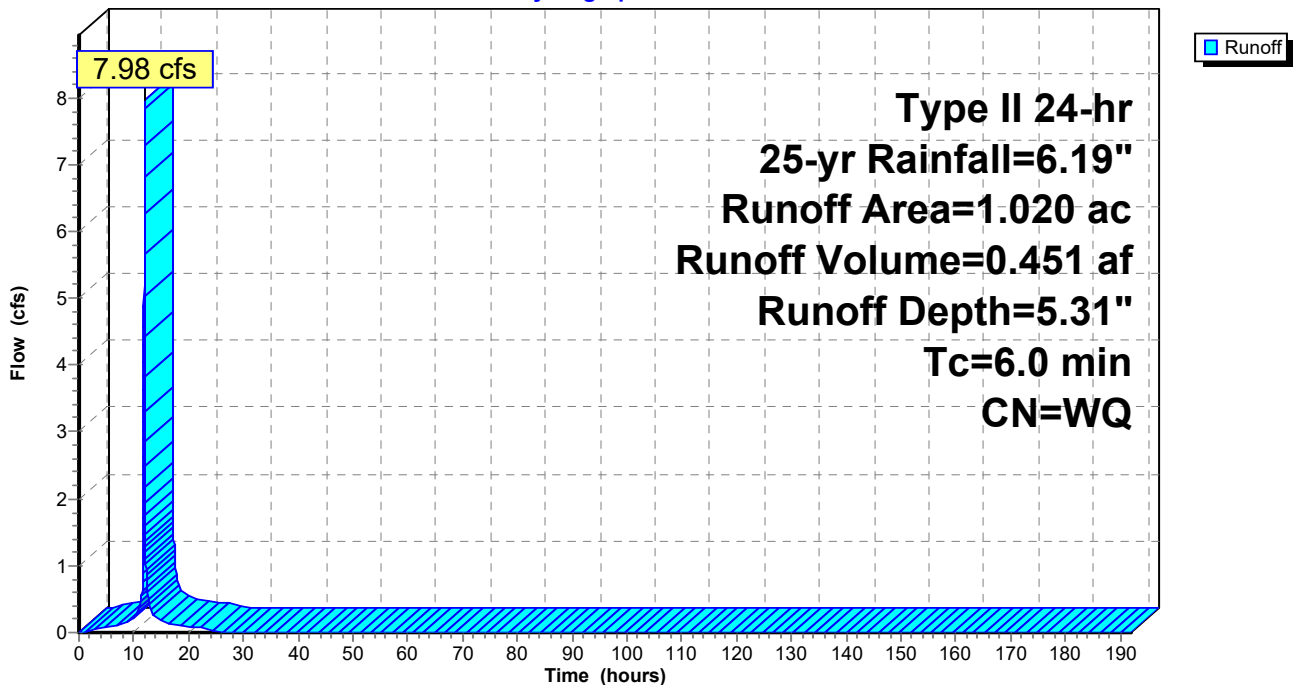
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.900	98	Paved parking, HSG A
1.020		Weighted Average
0.120		11.76% Pervious Area
0.900		88.24% Impervious Area

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

**Subcatchment 6S: Post- to POI#2**

Hydrograph



**Summary for Subcatchment 7S: Post- to POI#3**

Runoff = 0.28 cfs @ 11.97 hrs, Volume= 0.017 af, Depth= 2.32"

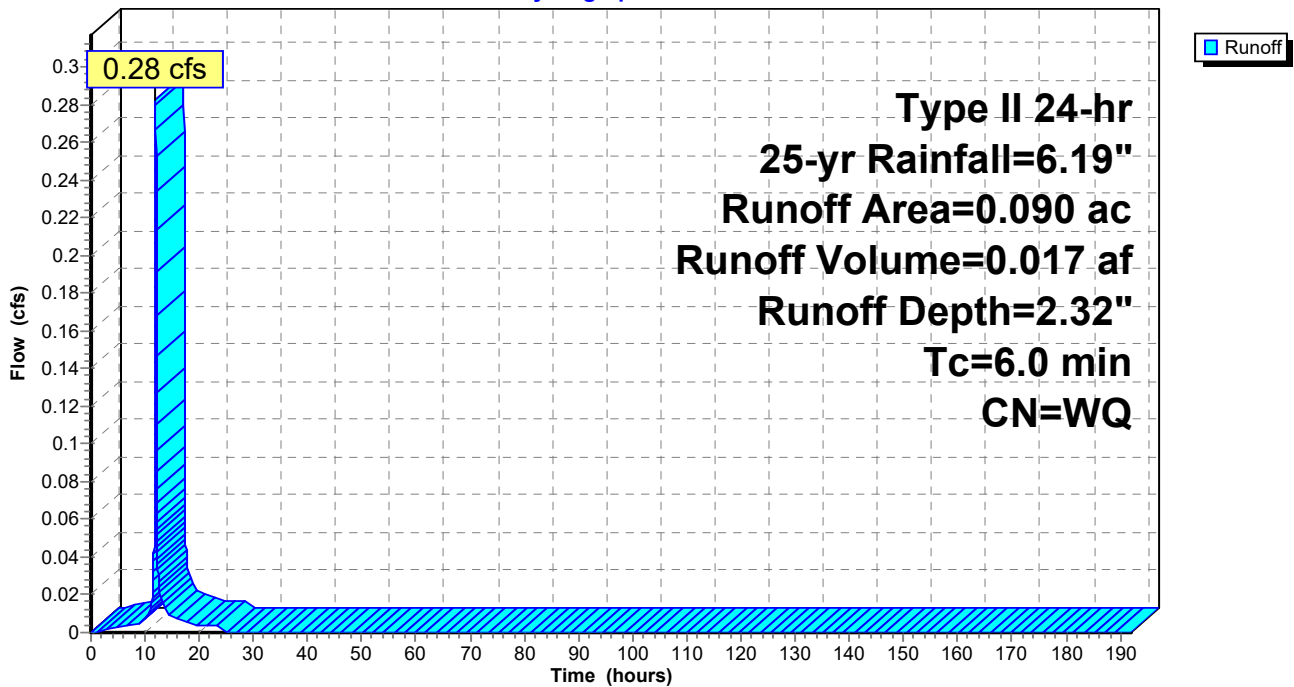
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.030	98	Paved parking, HSG A
Weighted Average		
0.060		66.67% Pervious Area
0.030		33.33% Impervious Area

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

**Subcatchment 7S: Post- to POI#3**

Hydrograph



**Summary for Subcatchment 11S: Post- to POI#1 Bypass**

Runoff = 2.59 cfs @ 11.97 hrs, Volume= 0.148 af, Depth= 4.45"

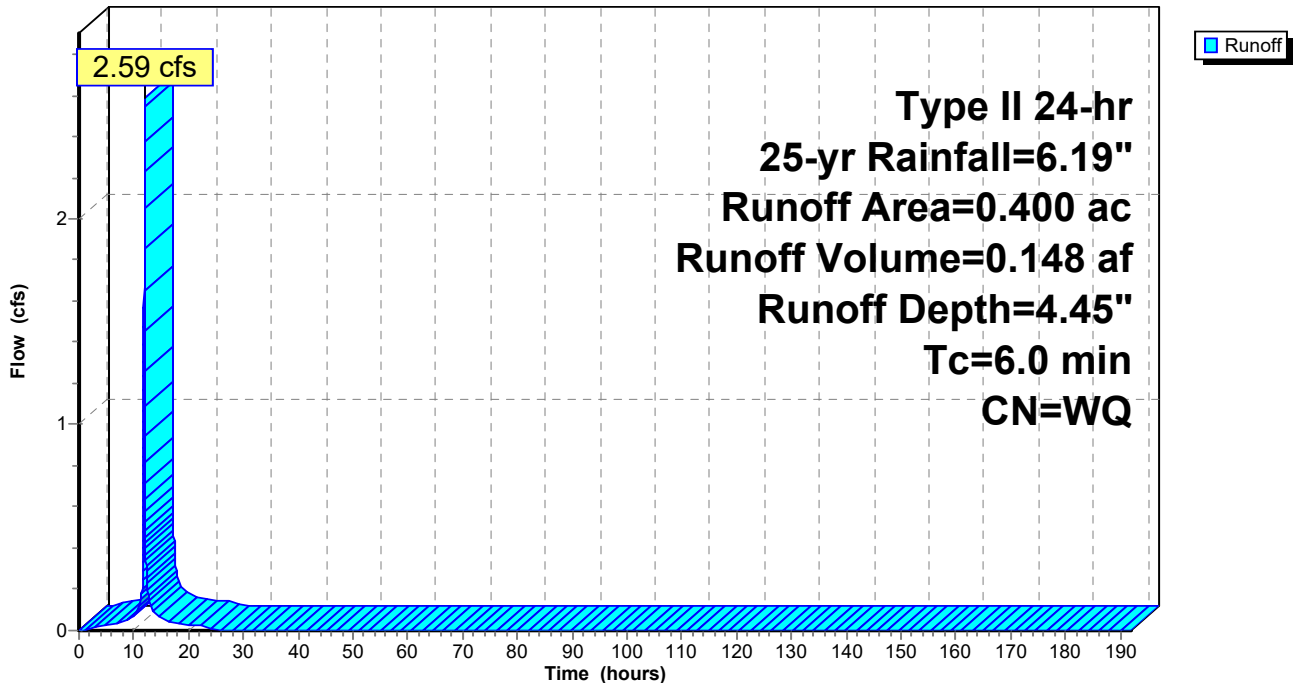
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-yr Rainfall=6.19"

Area (ac)	CN	Description
0.110	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG A
0.400		Weighted Average
0.110		27.50% Pervious Area
0.290		72.50% Impervious Area

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

**Subcatchment 11S: Post- to POI#1 Bypass**

Hydrograph





**PY170090 Hydro-0**

Type II 24-hr 25-yr Rainfall=6.19"

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**Summary for Pond 12P: Infiltrating Pipes**

Inflow Area = 0.430 ac, 95.35% Impervious, Inflow Depth = 5.70" for 25-yr event  
 Inflow = 3.62 cfs @ 11.97 hrs, Volume= 0.204 af  
 Outflow = 0.17 cfs @ 12.97 hrs, Volume= 0.204 af, Atten= 95%, Lag= 60.4 min  
 Discarded = 0.09 cfs @ 12.67 hrs, Volume= 0.200 af  
 Primary = 0.09 cfs @ 12.97 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 27.06' @ 12.97 hrs Surf.Area= 1,884 sf Storage= 5,173 cf

Plug-Flow detention time= 640.5 min calculated for 0.204 af (100% of inflow)  
 Center-of-Mass det. time= 640.5 min ( 1,381.9 - 741.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	20.75'	2,560 cf	<b>6.00'W x 314.00'L x 5.00'H Stone Storage</b> 9,420 cf Overall - 3,021 cf Embedded = 6,399 cf x 40.0% Voids
#2	21.50'	2,220 cf	<b>36.0" Round Pipe Storage</b> Inside #1 L= 314.0' S= 0.0010 '/' 3,021 cf Overall - 3.0" Wall Thickness = 2,220 cf
#3	22.00'	80 cf	<b>4.00'W x 4.00'L x 5.00'H Inlet A0</b> -Impervious
#4	22.08'	95 cf	<b>4.00'W x 4.00'L x 5.92'H Inlet A1</b> -Impervious
#5	22.15'	116 cf	<b>4.00'W x 4.00'L x 7.22'H Inlet A2</b> -Impervious
#6	22.25'	122 cf	<b>4.00'W x 4.00'L x 7.65'H Inlet A3</b> -Impervious
#7	22.14'	116 cf	<b>4.00'W x 4.00'L x 7.26'H Inlet A1.1</b> -Impervious
		5,308 cf	Total Available Storage

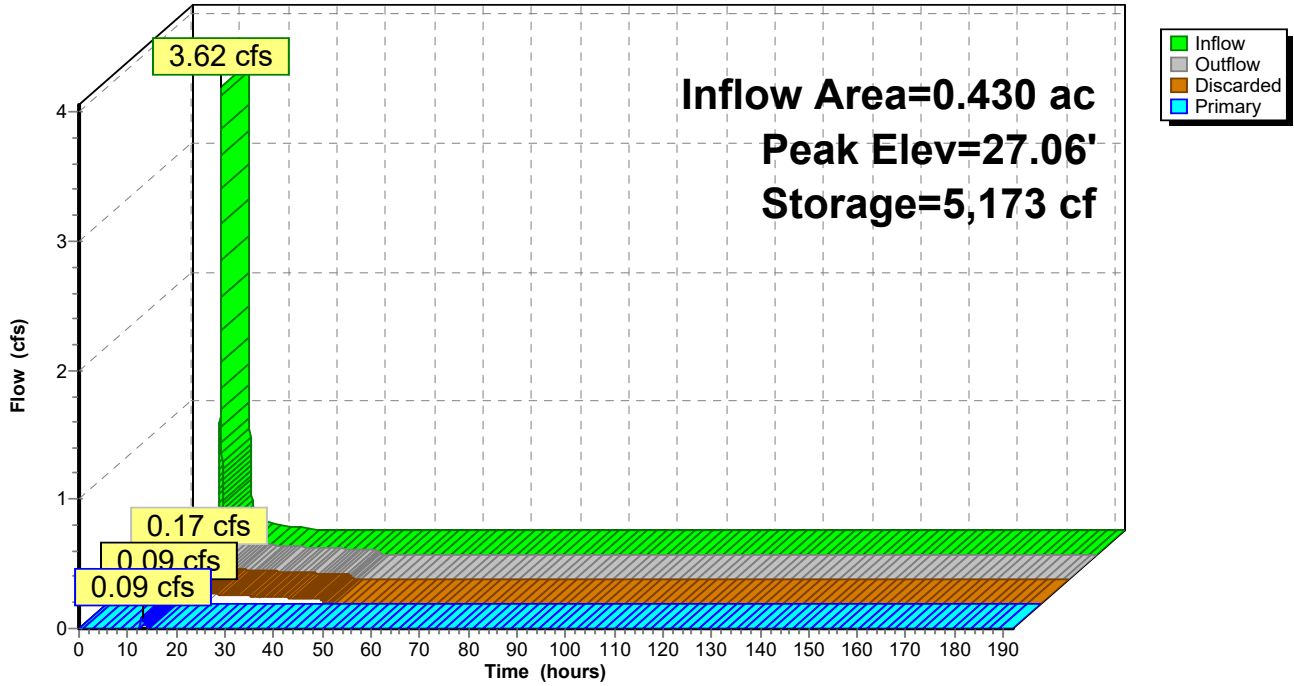
Device	Routing	Invert	Outlet Devices
#1	Discarded	20.75'	<b>0.750 in/hr Exfiltration over Wetted area</b>
#2	Primary	27.00'	<b>2.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Discarded OutFlow** Max=0.09 cfs @ 12.67 hrs HW=25.77' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

**Primary OutFlow** Max=0.08 cfs @ 12.97 hrs HW=27.06' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.08 cfs @ 0.69 fps)

### Pond 12P: Infiltrating Pipes

Hydrograph



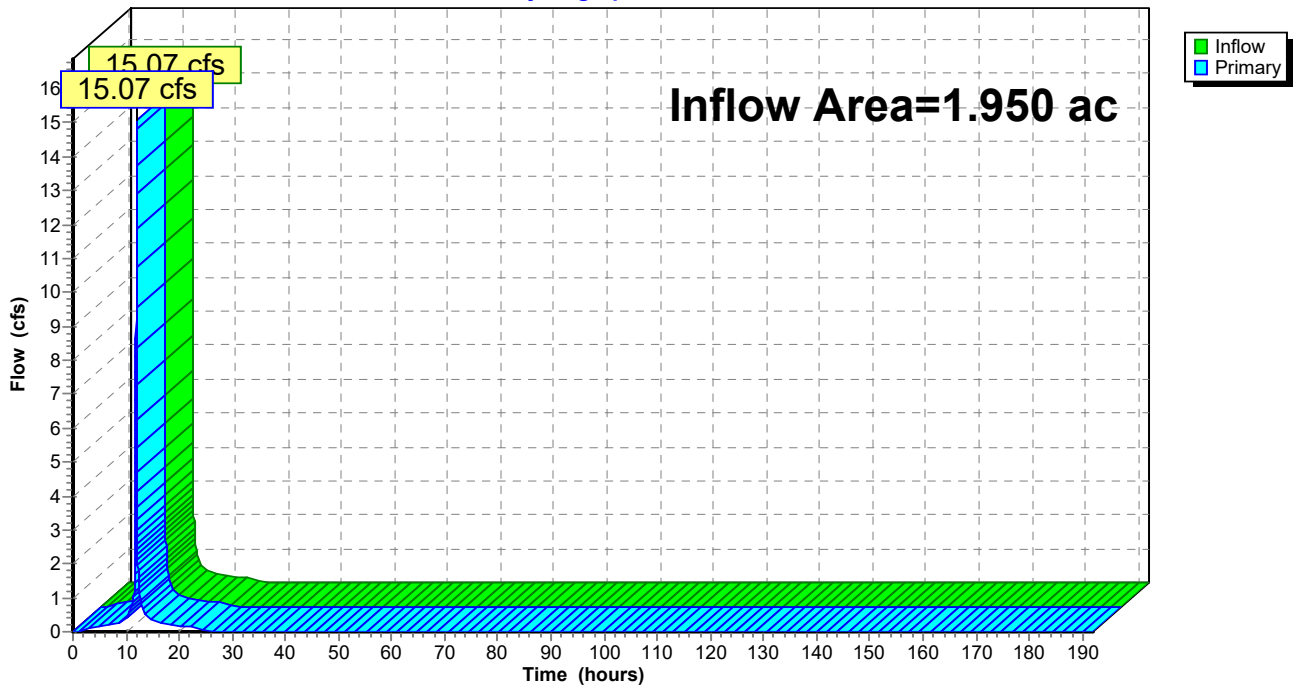
### Summary for Link 4L: Pre- Overall Site

Inflow Area = 1.950 ac, 87.18% Impervious, Inflow Depth = 5.25" for 25-yr event  
Inflow = 15.07 cfs @ 11.97 hrs, Volume= 0.854 af  
Primary = 15.07 cfs @ 11.97 hrs, Volume= 0.854 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 4L: Pre- Overall Site

Hydrograph



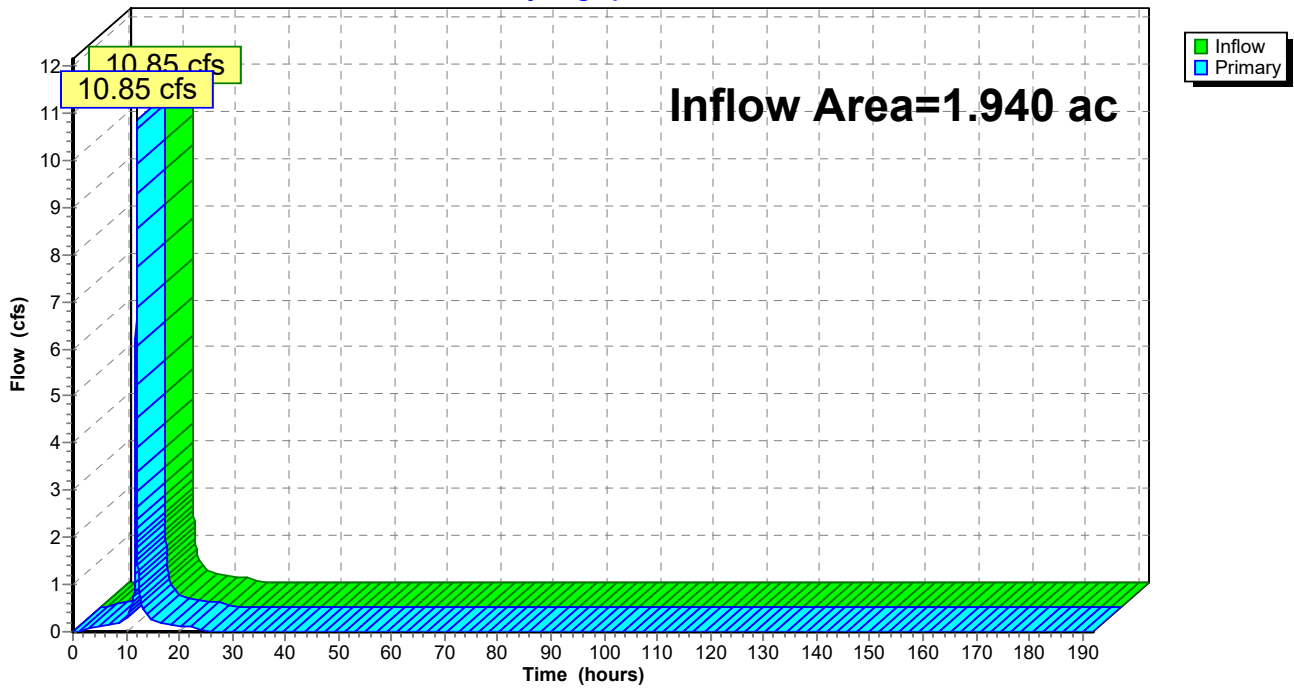
**Summary for Link 9L: Post- Overall Site**

Inflow Area = 1.940 ac, 84.02% Impervious, Inflow Depth = 3.84" for 25-yr event  
Inflow = 10.85 cfs @ 11.97 hrs, Volume= 0.621 af  
Primary = 10.85 cfs @ 11.97 hrs, Volume= 0.621 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

**Link 9L: Post- Overall Site**

Hydrograph



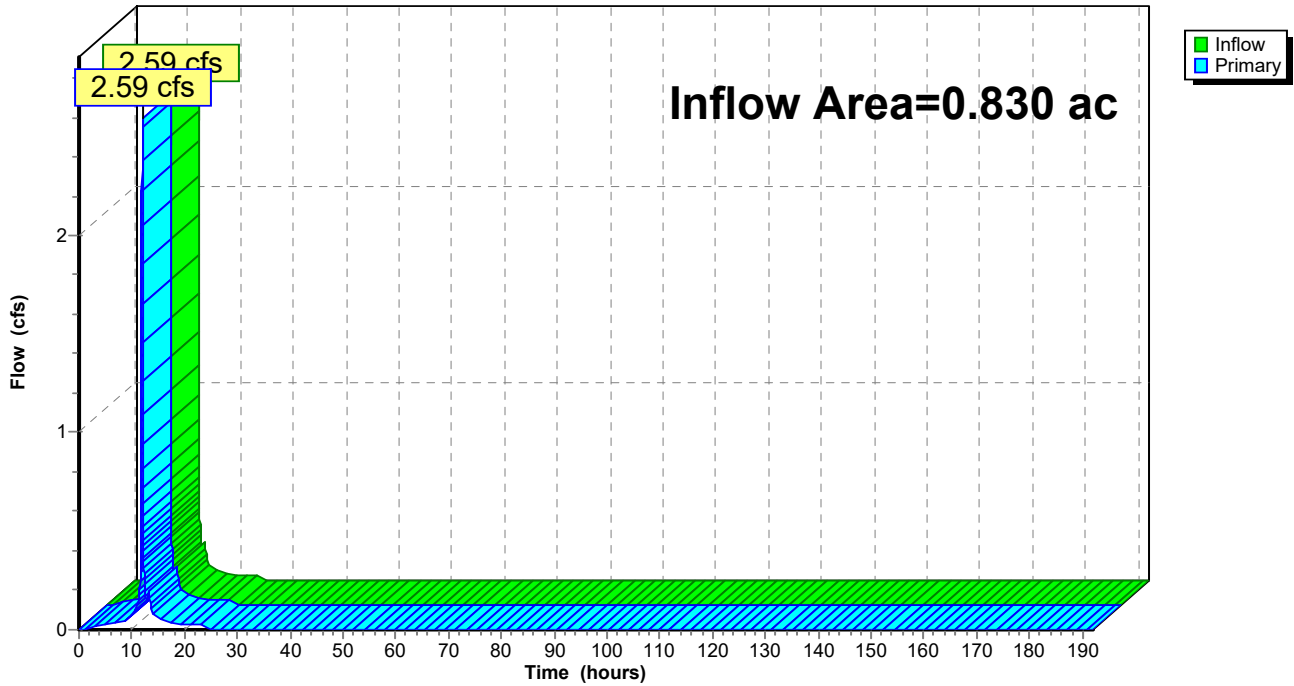
**Summary for Link 10L: Post- POI#1 Total**

Inflow Area = 0.830 ac, 84.34% Impervious, Inflow Depth = 2.21" for 25-yr event  
Inflow = 2.59 cfs @ 11.97 hrs, Volume= 0.153 af  
Primary = 2.59 cfs @ 11.97 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

**Link 10L: Post- POI#1 Total**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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**Summary for Subcatchment 1S: Pre- to POI#1**

Runoff = 6.89 cfs @ 11.97 hrs, Volume= 0.391 af, Depth= 6.02"

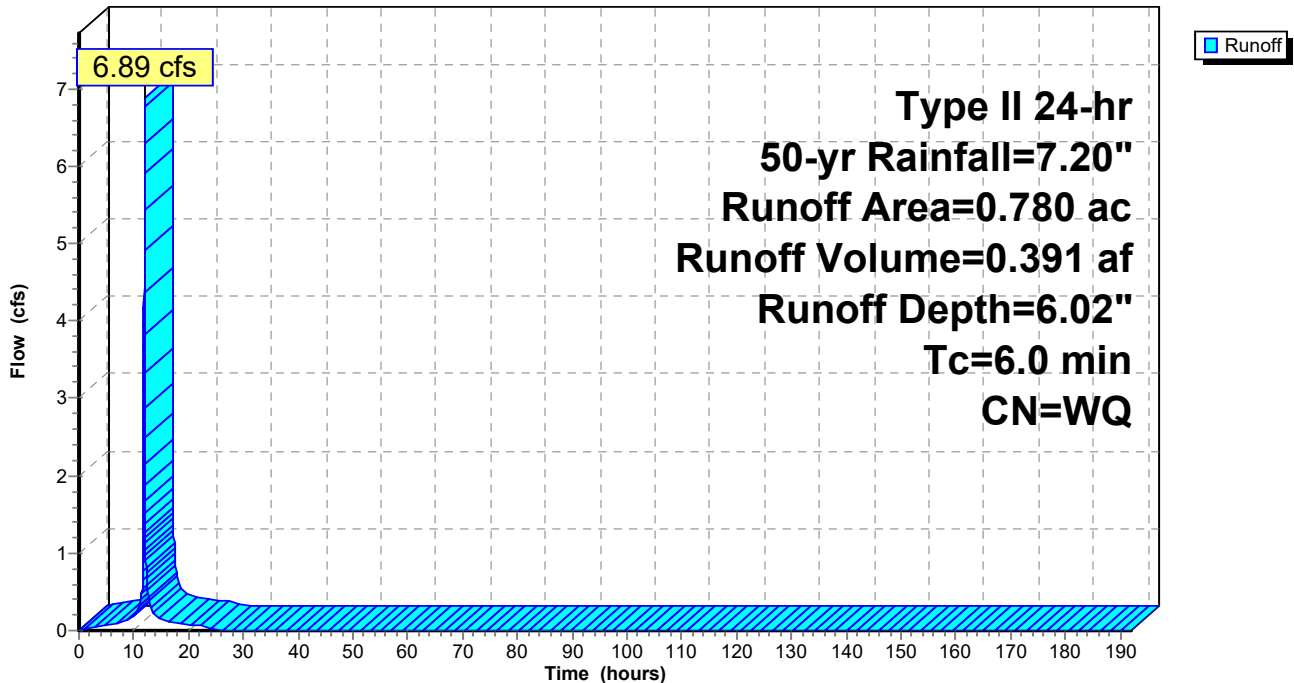
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.660	98	Paved parking, HSG A
0.780		Weighted Average
0.120		15.38% Pervious Area
0.660		84.62% Impervious Area

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

**Subcatchment 1S: Pre- to POI#1**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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**Summary for Subcatchment 2S: Pre- to POI#2**

Runoff = 10.03 cfs @ 11.97 hrs, Volume= 0.568 af, Depth= 6.55"

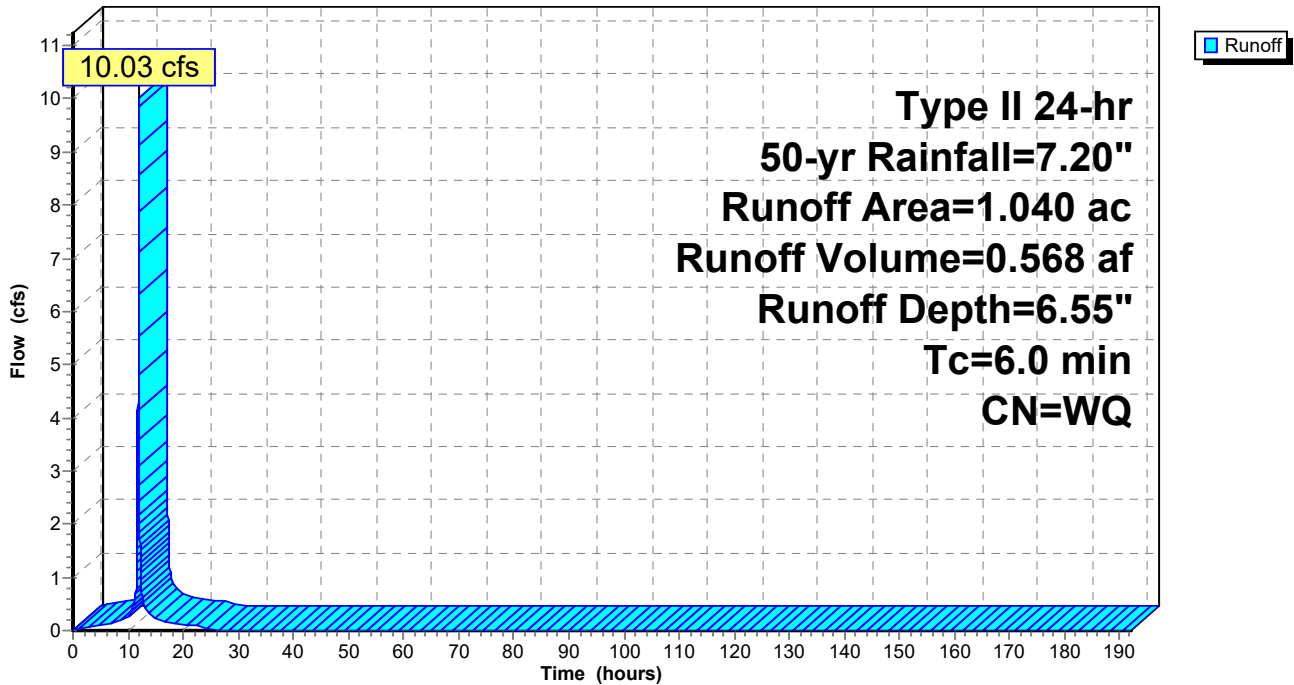
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.970	98	Paved parking, HSG A
1.040		Weighted Average
0.070		6.73% Pervious Area
0.970		93.27% Impervious Area

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

**Subcatchment 2S: Pre- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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**Summary for Subcatchment 3S: Pre- to POI#3**

Runoff = 0.77 cfs @ 11.97 hrs, Volume= 0.045 af, Depth= 4.14"

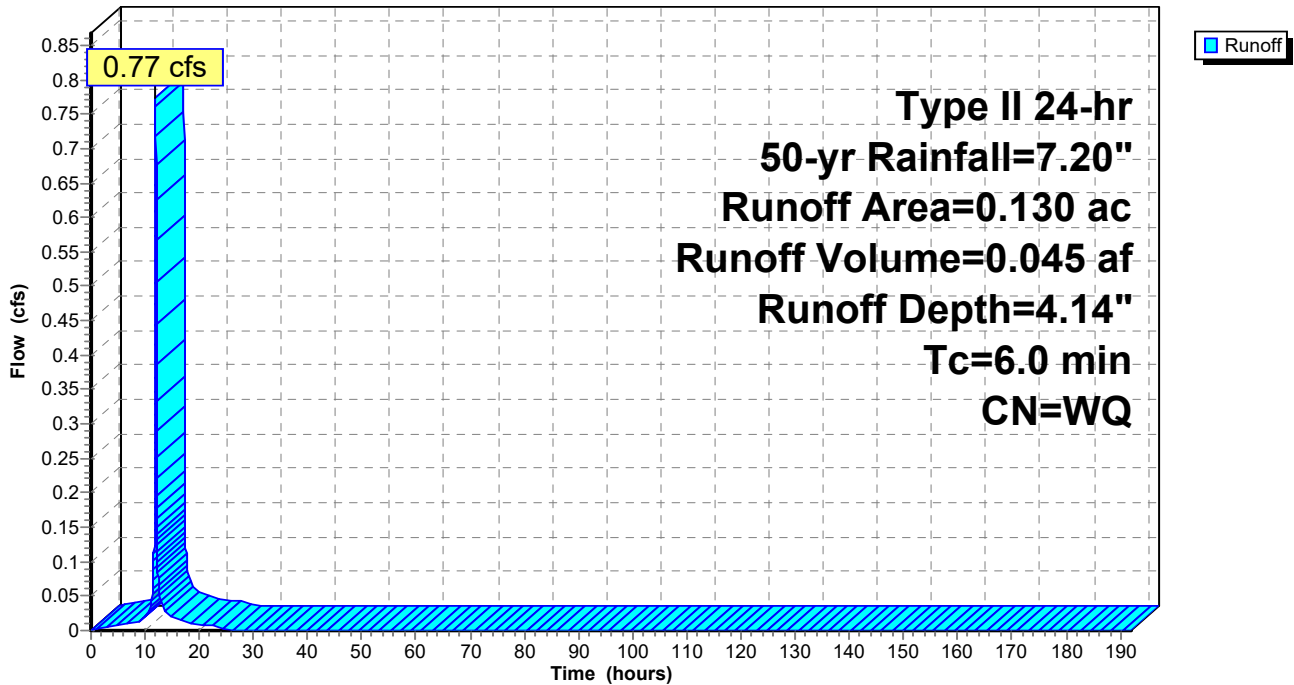
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.070	98	Paved parking, HSG A
0.130		Weighted Average
0.060		46.15% Pervious Area
0.070		53.85% Impervious Area

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

**Subcatchment 3S: Pre- to POI#3**

Hydrograph





**Summary for Subcatchment 5S: Post- to Infiltrating Pipes**

Runoff = 4.23 cfs @ 11.97 hrs, Volume= 0.239 af, Depth= 6.68"

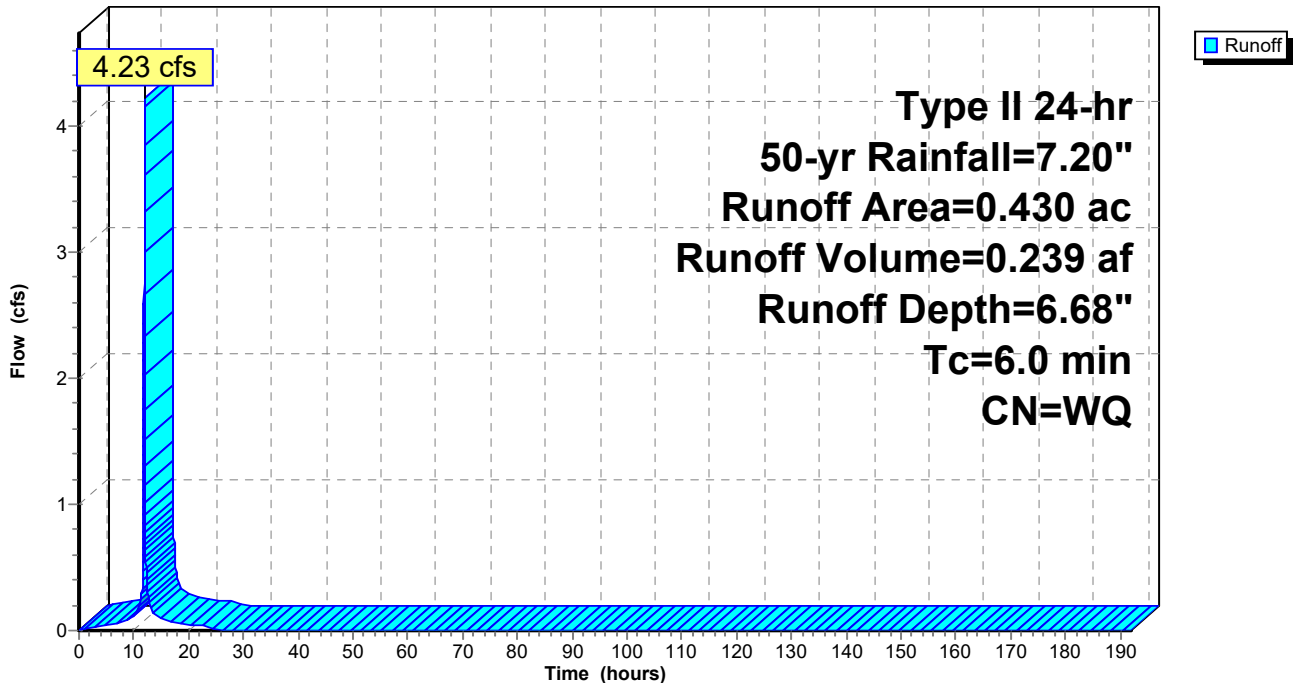
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.020	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.430		Weighted Average
0.020		4.65% Pervious Area
0.410		95.35% Impervious Area

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

**Subcatchment 5S: Post- to Infiltrating Pipes**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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**Summary for Subcatchment 6S: Post- to POI#2**

Runoff = 9.36 cfs @ 11.97 hrs, Volume= 0.530 af, Depth= 6.24"

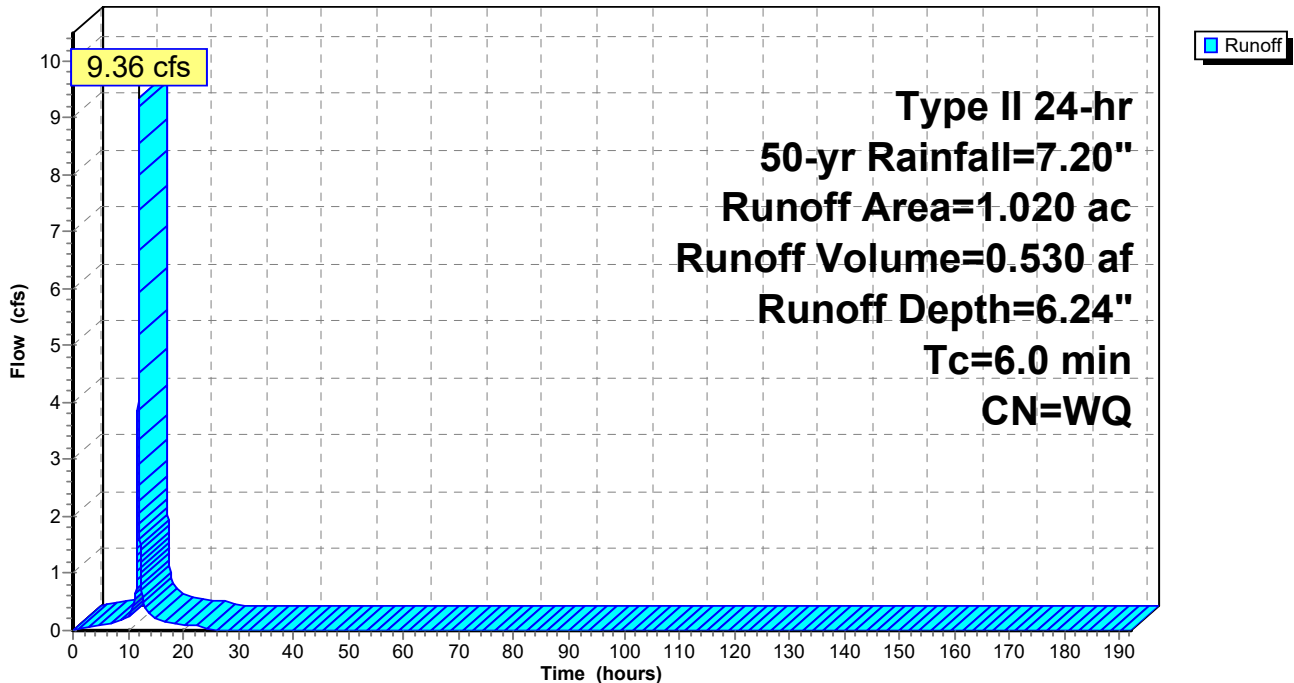
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.900	98	Paved parking, HSG A
1.020		Weighted Average
0.120		11.76% Pervious Area
0.900		88.24% Impervious Area

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

**Subcatchment 6S: Post- to POI#2**

Hydrograph



**Summary for Subcatchment 7S: Post- to POI#3**

Runoff = 0.36 cfs @ 11.98 hrs, Volume= 0.022 af, Depth= 2.88"

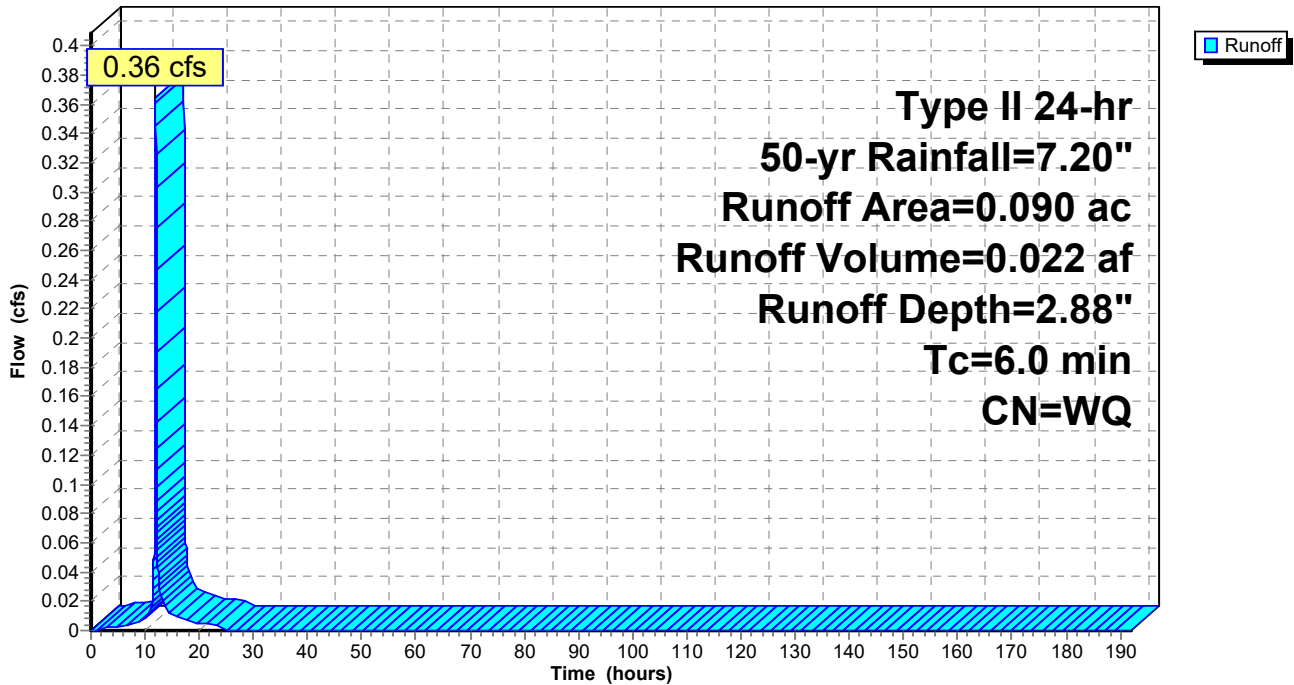
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.030	98	Paved parking, HSG A
0.090		Weighted Average
0.060		66.67% Pervious Area
0.030		33.33% Impervious Area

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

**Subcatchment 7S: Post- to POI#3**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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**Summary for Subcatchment 11S: Post- to POI#1 Bypass**

Runoff = 3.08 cfs @ 11.97 hrs, Volume= 0.176 af, Depth= 5.28"

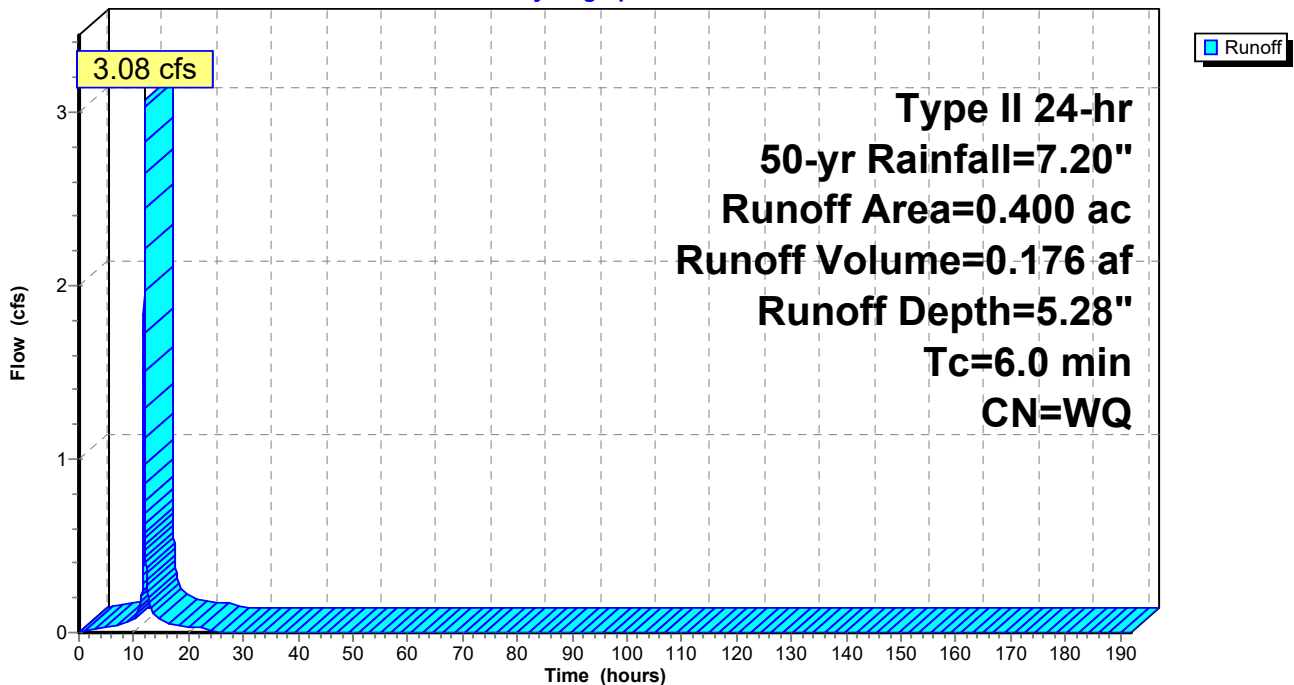
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-yr Rainfall=7.20"

Area (ac)	CN	Description
0.110	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG A
0.400		Weighted Average
0.110		27.50% Pervious Area
0.290		72.50% Impervious Area

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

**Subcatchment 11S: Post- to POI#1 Bypass**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 50-yr Rainfall=7.20"

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**Summary for Pond 12P: Infiltrating Pipes**

Inflow Area = 0.430 ac, 95.35% Impervious, Inflow Depth = 6.68" for 50-yr event  
 Inflow = 4.23 cfs @ 11.97 hrs, Volume= 0.239 af  
 Outflow = 1.59 cfs @ 12.08 hrs, Volume= 0.239 af, Atten= 62%, Lag= 6.9 min  
 Discarded = 0.09 cfs @ 12.06 hrs, Volume= 0.208 af  
 Primary = 1.51 cfs @ 12.08 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 27.40' @ 12.08 hrs Surf.Area= 1,884 sf Storage= 5,195 cf

Plug-Flow detention time= 576.3 min calculated for 0.239 af (100% of inflow)  
 Center-of-Mass det. time= 576.8 min ( 1,316.2 - 739.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	20.75'	2,560 cf	<b>6.00'W x 314.00'L x 5.00'H Stone Storage</b> 9,420 cf Overall - 3,021 cf Embedded = 6,399 cf x 40.0% Voids
#2	21.50'	2,220 cf	<b>36.0" Round Pipe Storage</b> Inside #1 L= 314.0' S= 0.0010 '/' 3,021 cf Overall - 3.0" Wall Thickness = 2,220 cf
#3	22.00'	80 cf	<b>4.00'W x 4.00'L x 5.00'H Inlet A0</b> -Impervious
#4	22.08'	95 cf	<b>4.00'W x 4.00'L x 5.92'H Inlet A1</b> -Impervious
#5	22.15'	116 cf	<b>4.00'W x 4.00'L x 7.22'H Inlet A2</b> -Impervious
#6	22.25'	122 cf	<b>4.00'W x 4.00'L x 7.65'H Inlet A3</b> -Impervious
#7	22.14'	116 cf	<b>4.00'W x 4.00'L x 7.26'H Inlet A1.1</b> -Impervious
		5,308 cf	Total Available Storage

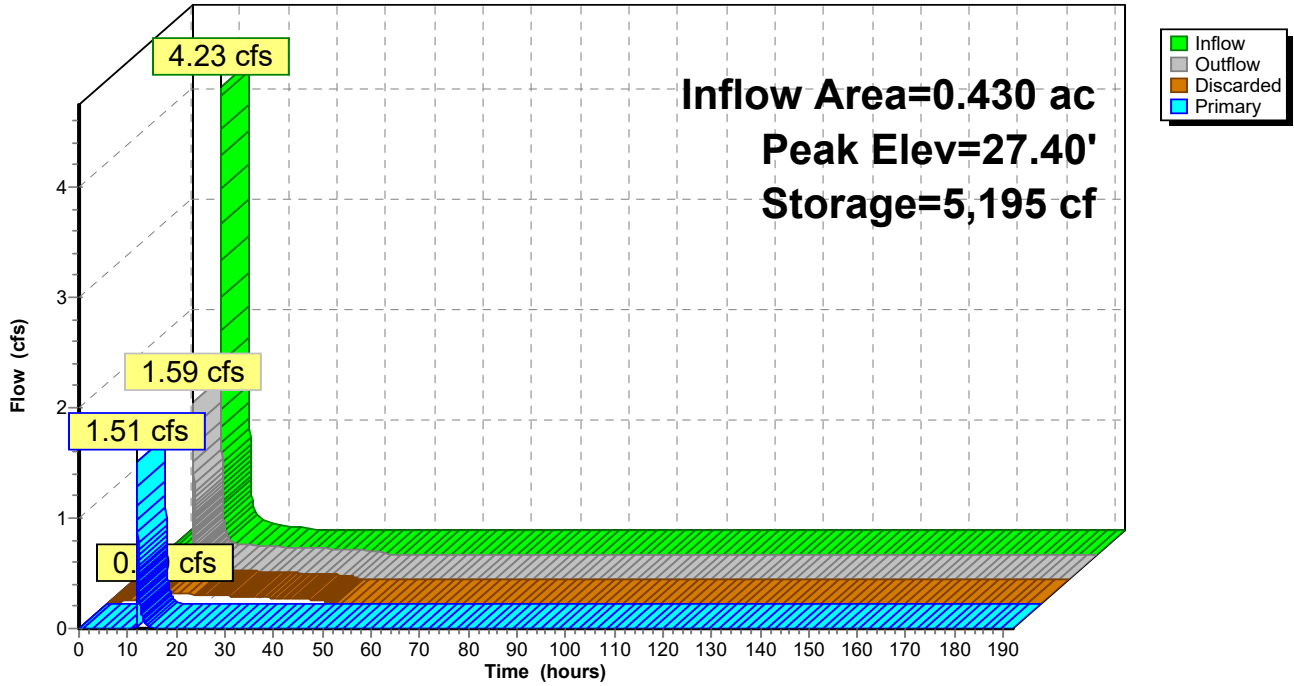
Device	Routing	Invert	Outlet Devices
#1	Discarded	20.75'	<b>0.750 in/hr Exfiltration over Wetted area</b>
#2	Primary	27.00'	<b>2.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Discarded OutFlow** Max=0.09 cfs @ 12.06 hrs HW=26.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

**Primary OutFlow** Max=1.42 cfs @ 12.08 hrs HW=27.39' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 1.42 cfs @ 1.82 fps)

### Pond 12P: Infiltrating Pipes

Hydrograph



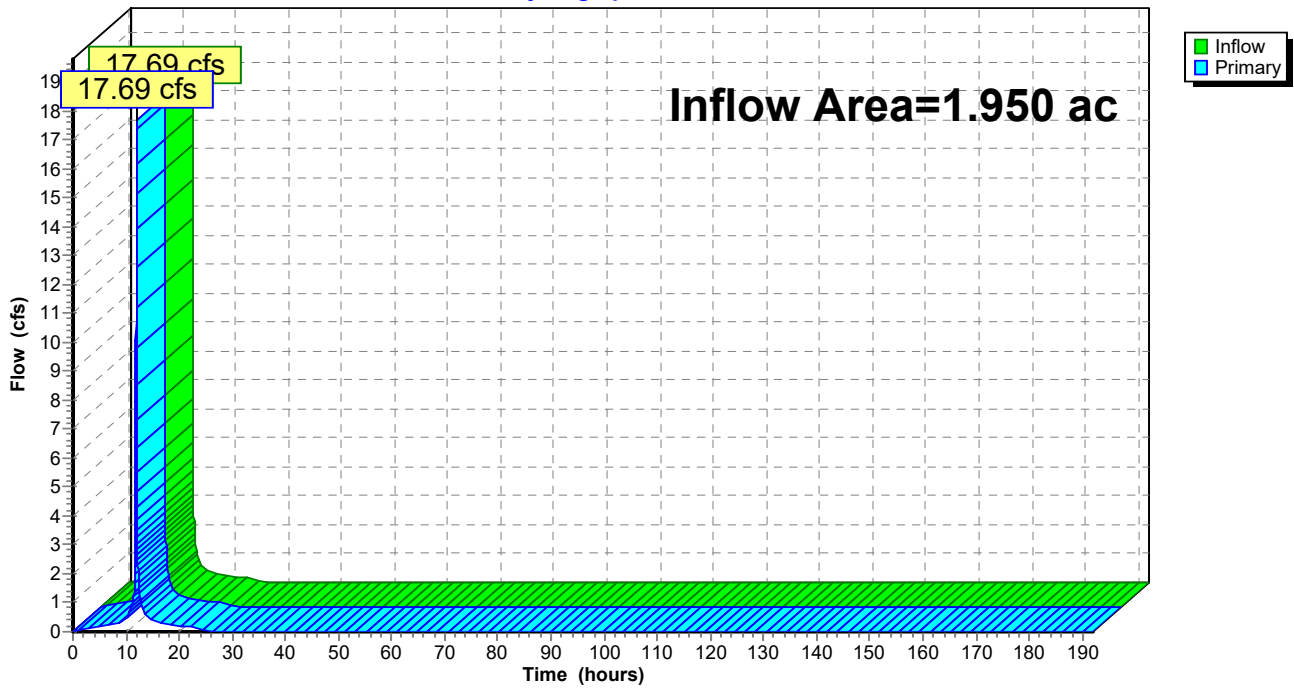
### Summary for Link 4L: Pre- Overall Site

Inflow Area = 1.950 ac, 87.18% Impervious, Inflow Depth = 6.18" for 50-yr event  
Inflow = 17.69 cfs @ 11.97 hrs, Volume= 1.004 af  
Primary = 17.69 cfs @ 11.97 hrs, Volume= 1.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 4L: Pre- Overall Site

Hydrograph



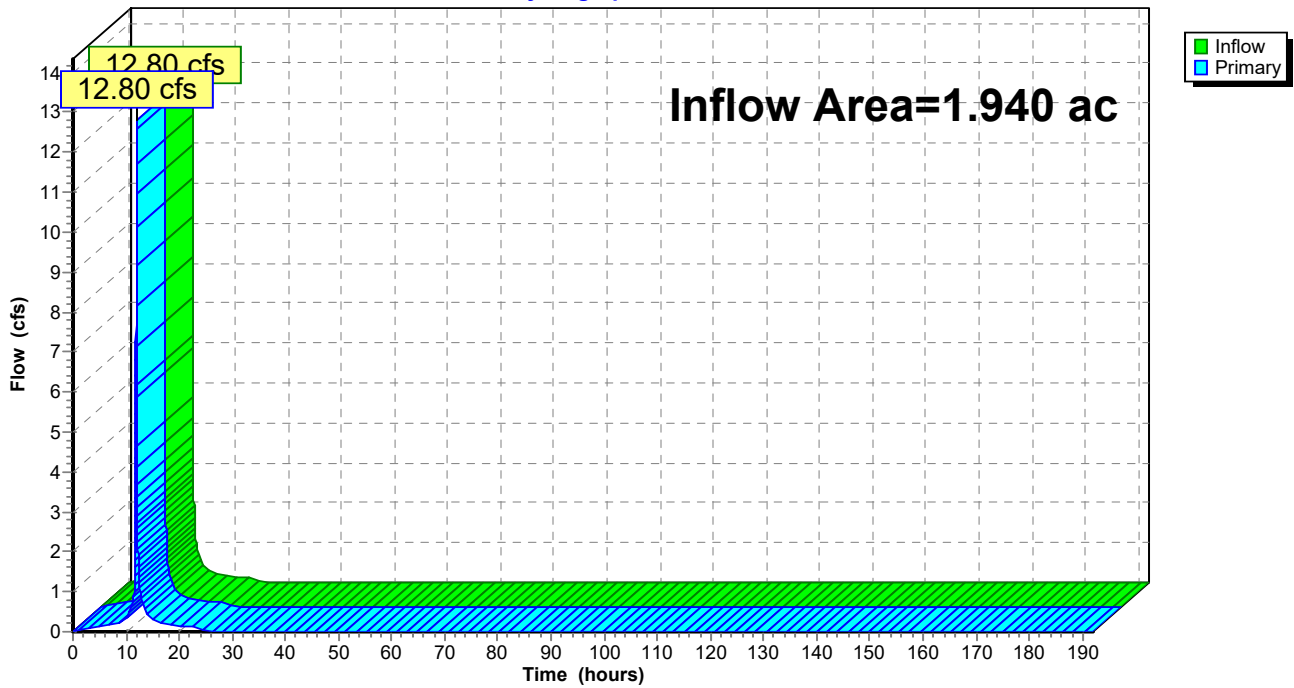
### Summary for Link 9L: Post- Overall Site

Inflow Area = 1.940 ac, 84.02% Impervious, Inflow Depth = 4.70" for 50-yr event  
Inflow = 12.80 cfs @ 11.97 hrs, Volume= 0.759 af  
Primary = 12.80 cfs @ 11.97 hrs, Volume= 0.759 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 9L: Post- Overall Site

Hydrograph





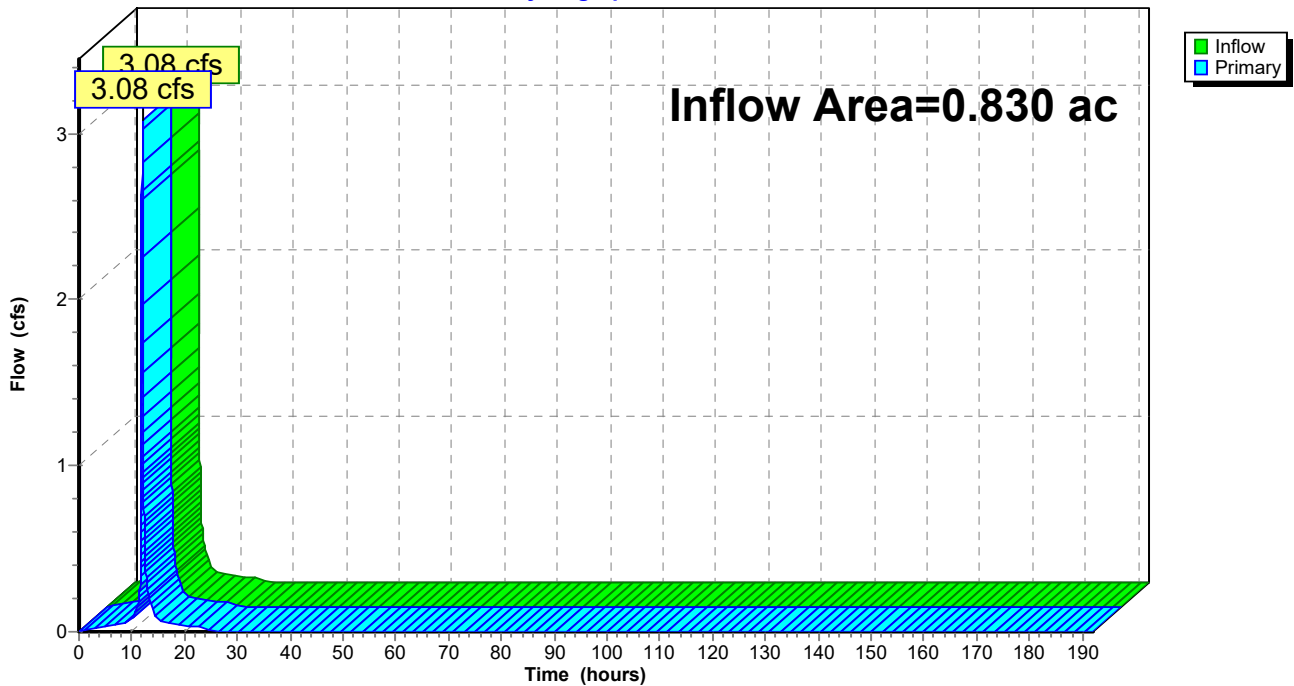
**Summary for Link 10L: Post- POI#1 Total**

Inflow Area = 0.830 ac, 84.34% Impervious, Inflow Depth = 2.99" for 50-yr event  
Inflow = 3.08 cfs @ 11.97 hrs, Volume= 0.207 af  
Primary = 3.08 cfs @ 11.97 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

**Link 10L: Post- POI#1 Total**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 100-yr Rainfall=8.31"

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**Summary for Subcatchment 1S: Pre- to POI#1**

Runoff = 8.05 cfs @ 11.97 hrs, Volume= 0.457 af, Depth= 7.03"

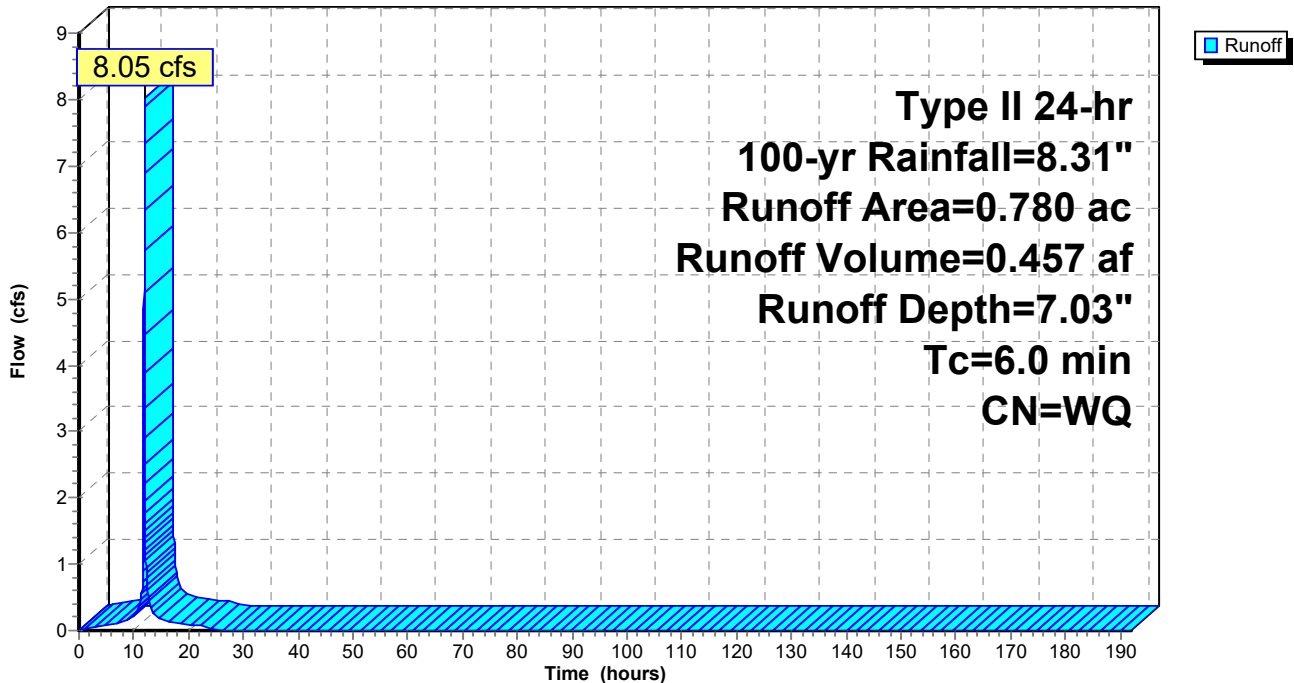
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.660	98	Paved parking, HSG A
0.780		Weighted Average
0.120		15.38% Pervious Area
0.660		84.62% Impervious Area

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

**Subcatchment 1S: Pre- to POI#1**

Hydrograph



**Summary for Subcatchment 2S: Pre- to POI#2**

Runoff = 11.64 cfs @ 11.97 hrs, Volume= 0.660 af, Depth= 7.61"

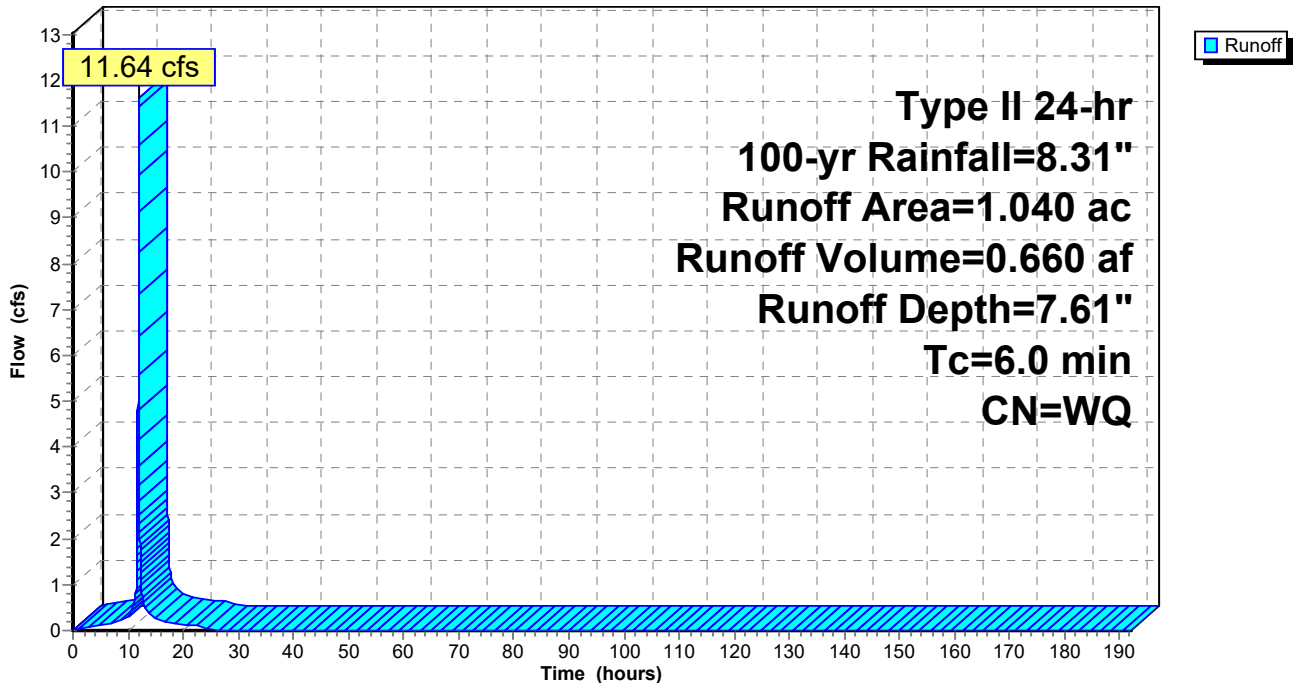
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.970	98	Paved parking, HSG A
1.040		Weighted Average
0.070		6.73% Pervious Area
0.970		93.27% Impervious Area

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

**Subcatchment 2S: Pre- to POI#2**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 100-yr Rainfall=8.31"

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**Summary for Subcatchment 3S: Pre- to POI#3**

Runoff = 0.94 cfs @ 11.97 hrs, Volume= 0.054 af, Depth= 4.94"

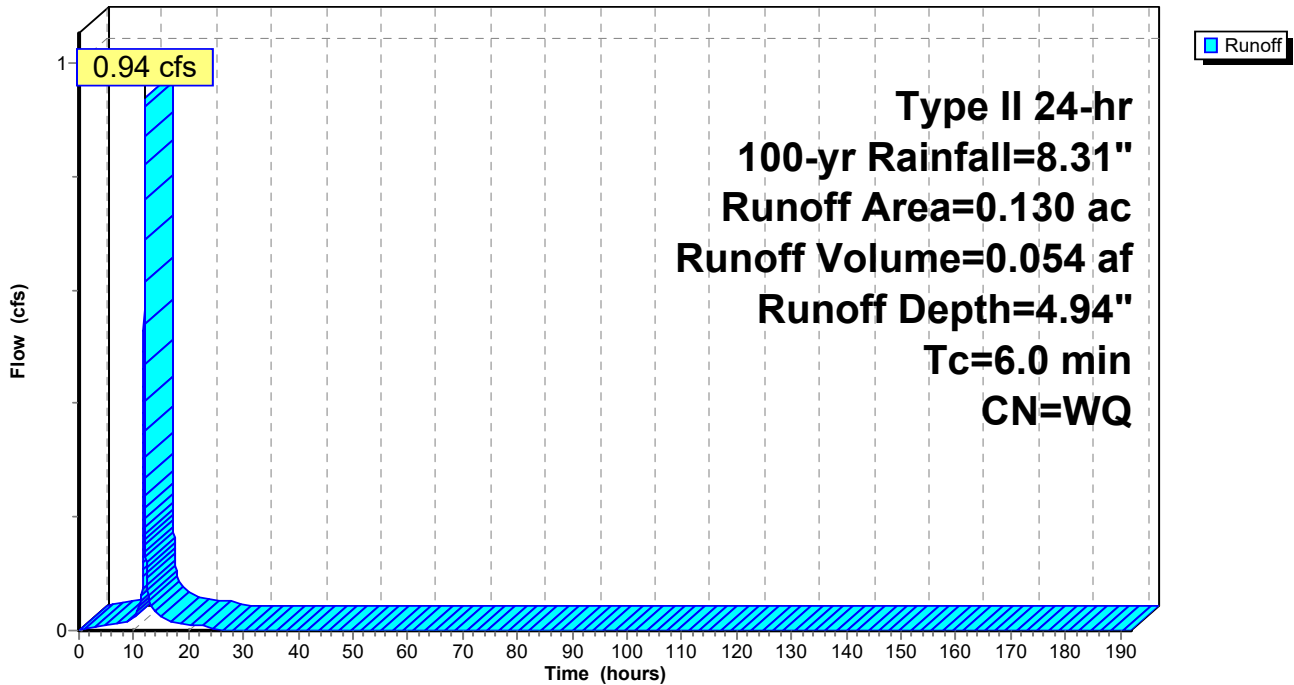
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.070	98	Paved parking, HSG A
0.130		Weighted Average
0.060		46.15% Pervious Area
0.070		53.85% Impervious Area

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

**Subcatchment 3S: Pre- to POI#3**

Hydrograph



**Summary for Subcatchment 5S: Post- to Infiltrating Pipes**

Runoff = 4.90 cfs @ 11.97 hrs, Volume= 0.278 af, Depth= 7.75"

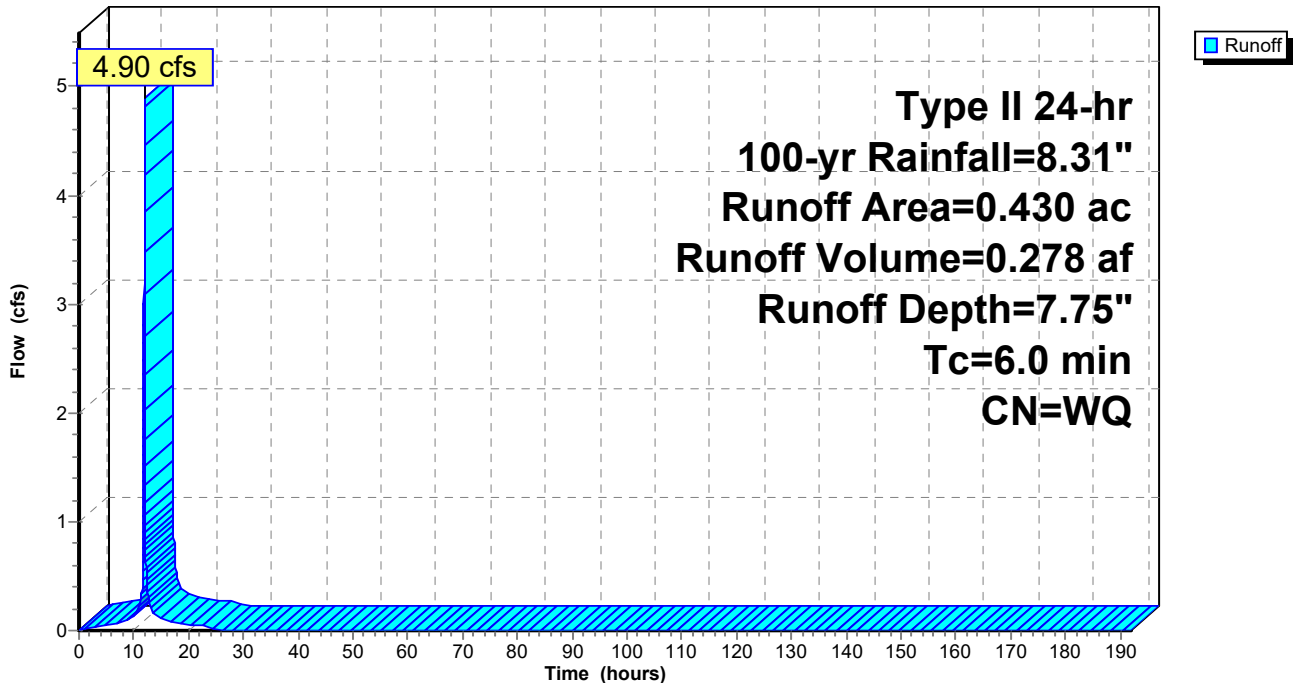
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.020	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.430		Weighted Average
0.020		4.65% Pervious Area
0.410		95.35% Impervious Area

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

**Subcatchment 5S: Post- to Infiltrating Pipes**

Hydrograph



**Summary for Subcatchment 6S: Post- to POI#2**

Runoff = 10.89 cfs @ 11.97 hrs, Volume= 0.618 af, Depth= 7.27"

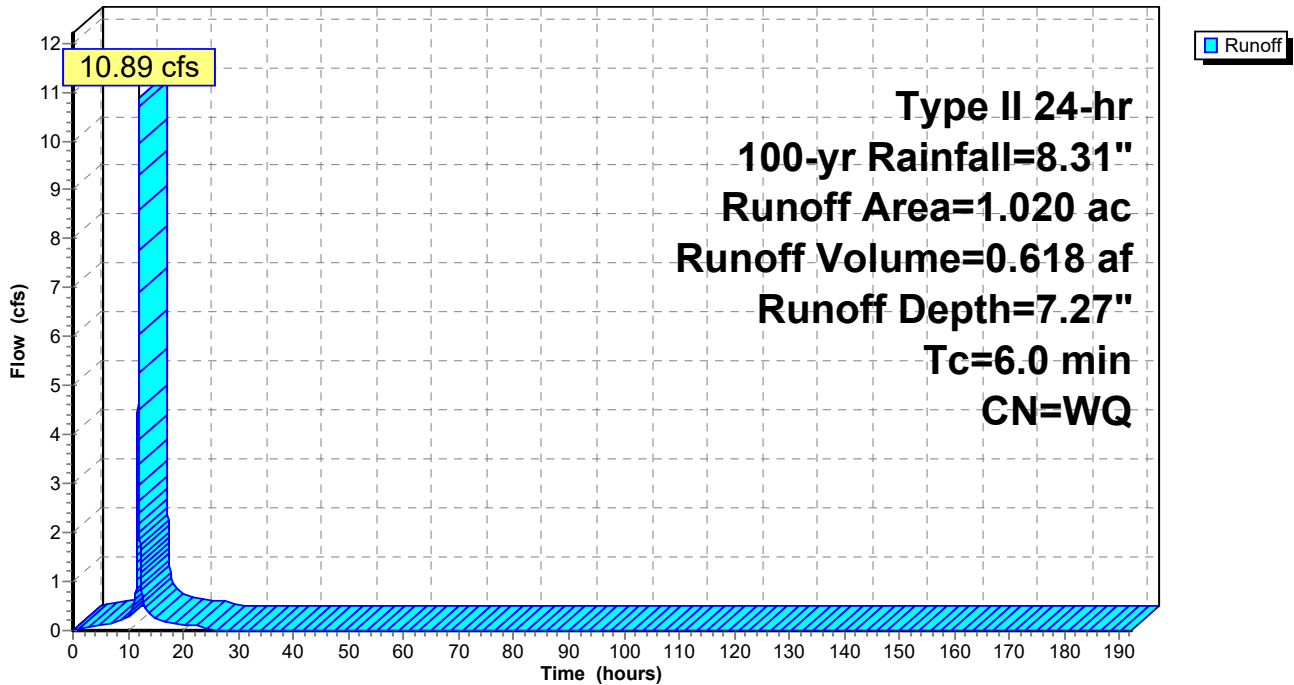
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.120	39	>75% Grass cover, Good, HSG A
0.900	98	Paved parking, HSG A
Weighted Average		
0.120		11.76% Pervious Area
0.900		88.24% Impervious Area

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

**Subcatchment 6S: Post- to POI#2**

Hydrograph



**Summary for Subcatchment 7S: Post- to POI#3**

Runoff = 0.47 cfs @ 11.98 hrs, Volume= 0.027 af, Depth= 3.55"

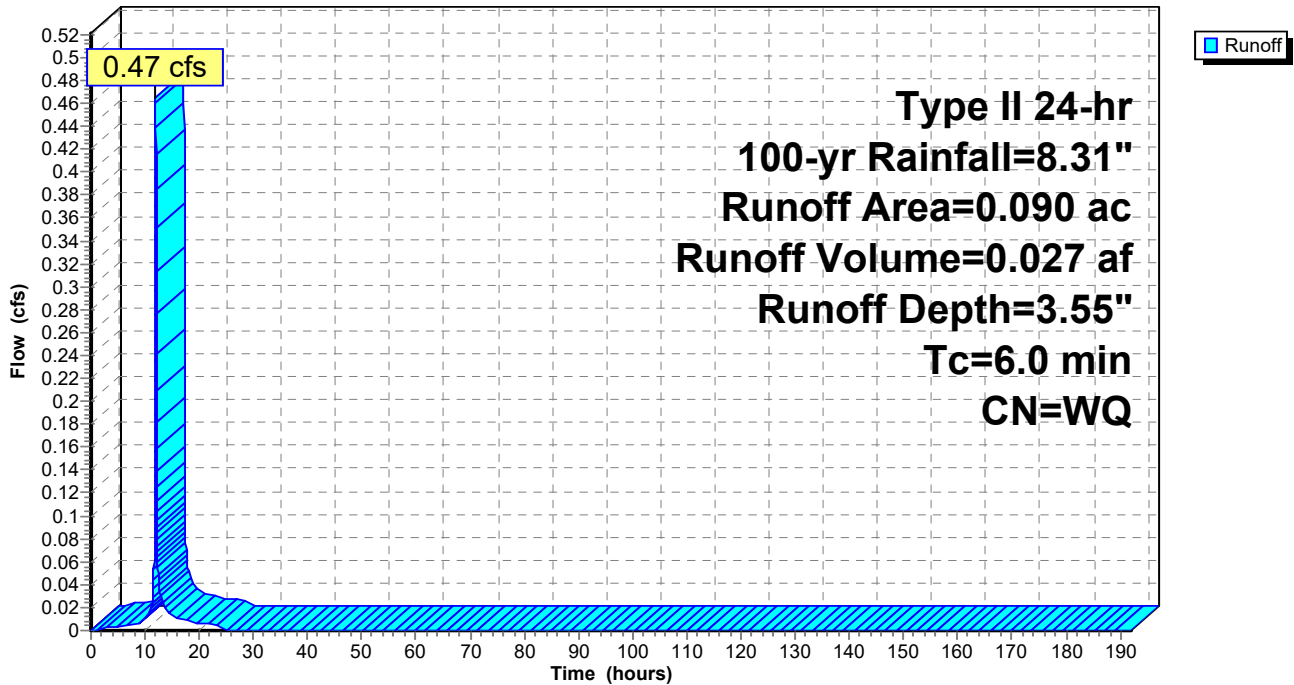
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.060	39	>75% Grass cover, Good, HSG A
0.030	98	Paved parking, HSG A
0.090		Weighted Average
0.060		66.67% Pervious Area
0.030		33.33% Impervious Area

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

**Subcatchment 7S: Post- to POI#3**

Hydrograph



**PY170090 Hydro-0**

Type II 24-hr 100-yr Rainfall=8.31"

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**Summary for Subcatchment 11S: Post- to POI#1 Bypass**

Runoff = 3.64 cfs @ 11.97 hrs, Volume= 0.207 af, Depth= 6.21"

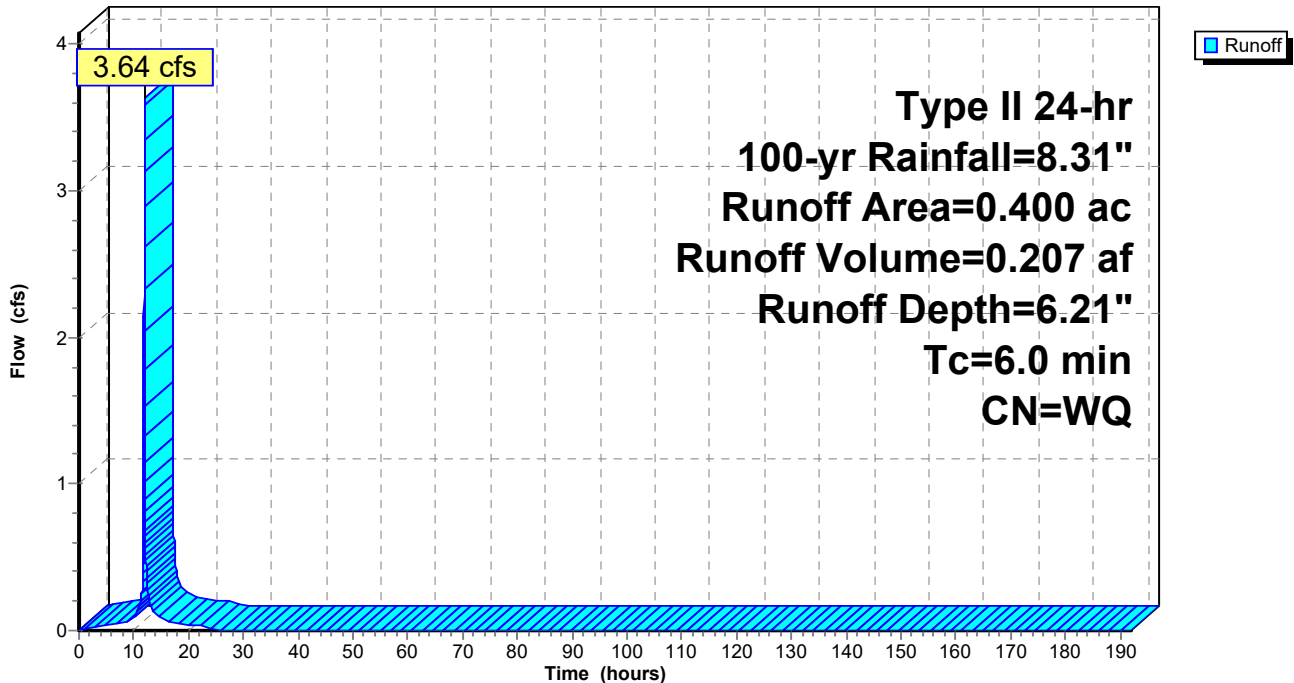
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs  
Type II 24-hr 100-yr Rainfall=8.31"

Area (ac)	CN	Description
0.110	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG A
0.400		Weighted Average
0.110		27.50% Pervious Area
0.290		72.50% Impervious Area

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

**Subcatchment 11S: Post- to POI#1 Bypass**

Hydrograph





**Summary for Pond 12P: Infiltrating Pipes**

Inflow Area = 0.430 ac, 95.35% Impervious, Inflow Depth = 7.75" for 100-yr event  
 Inflow = 4.90 cfs @ 11.97 hrs, Volume= 0.278 af  
 Outflow = 4.84 cfs @ 12.00 hrs, Volume= 0.277 af, Atten= 1%, Lag= 2.2 min  
 Discarded = 0.09 cfs @ 11.99 hrs, Volume= 0.216 af  
 Primary = 4.75 cfs @ 12.00 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 27.77' @ 12.00 hrs Surf.Area= 1,884 sf Storage= 5,218 cf

Plug-Flow detention time= 524.9 min calculated for 0.277 af (100% of inflow)  
 Center-of-Mass det. time= 523.3 min ( 1,261.1 - 737.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	20.75'	2,560 cf	<b>6.00'W x 314.00'L x 5.00'H Stone Storage</b> 9,420 cf Overall - 3,021 cf Embedded = 6,399 cf x 40.0% Voids
#2	21.50'	2,220 cf	<b>36.0" Round Pipe Storage</b> Inside #1 L= 314.0' S= 0.0010 '/' 3,021 cf Overall - 3.0" Wall Thickness = 2,220 cf
#3	22.00'	80 cf	<b>4.00'W x 4.00'L x 5.00'H Inlet A0</b> -Impervious
#4	22.08'	95 cf	<b>4.00'W x 4.00'L x 5.92'H Inlet A1</b> -Impervious
#5	22.15'	116 cf	<b>4.00'W x 4.00'L x 7.22'H Inlet A2</b> -Impervious
#6	22.25'	122 cf	<b>4.00'W x 4.00'L x 7.65'H Inlet A3</b> -Impervious
#7	22.14'	116 cf	<b>4.00'W x 4.00'L x 7.26'H Inlet A1.1</b> -Impervious
		5,308 cf	Total Available Storage

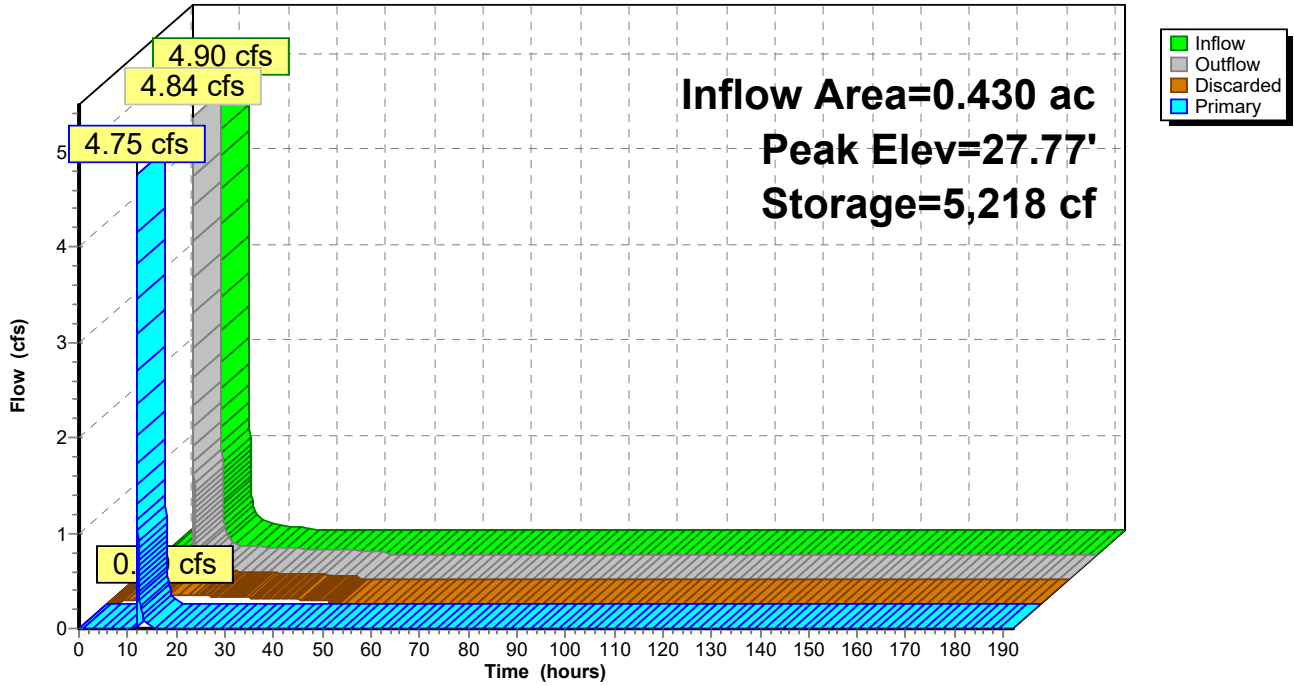
Device	Routing	Invert	Outlet Devices
#1	Discarded	20.75'	<b>0.750 in/hr Exfiltration over Wetted area</b>
#2	Primary	27.00'	<b>2.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Discarded OutFlow** Max=0.09 cfs @ 11.99 hrs HW=27.29' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

**Primary OutFlow** Max=4.28 cfs @ 12.00 hrs HW=27.76' (Free Discharge)  
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 4.28 cfs @ 2.83 fps)

### Pond 12P: Infiltrating Pipes

Hydrograph



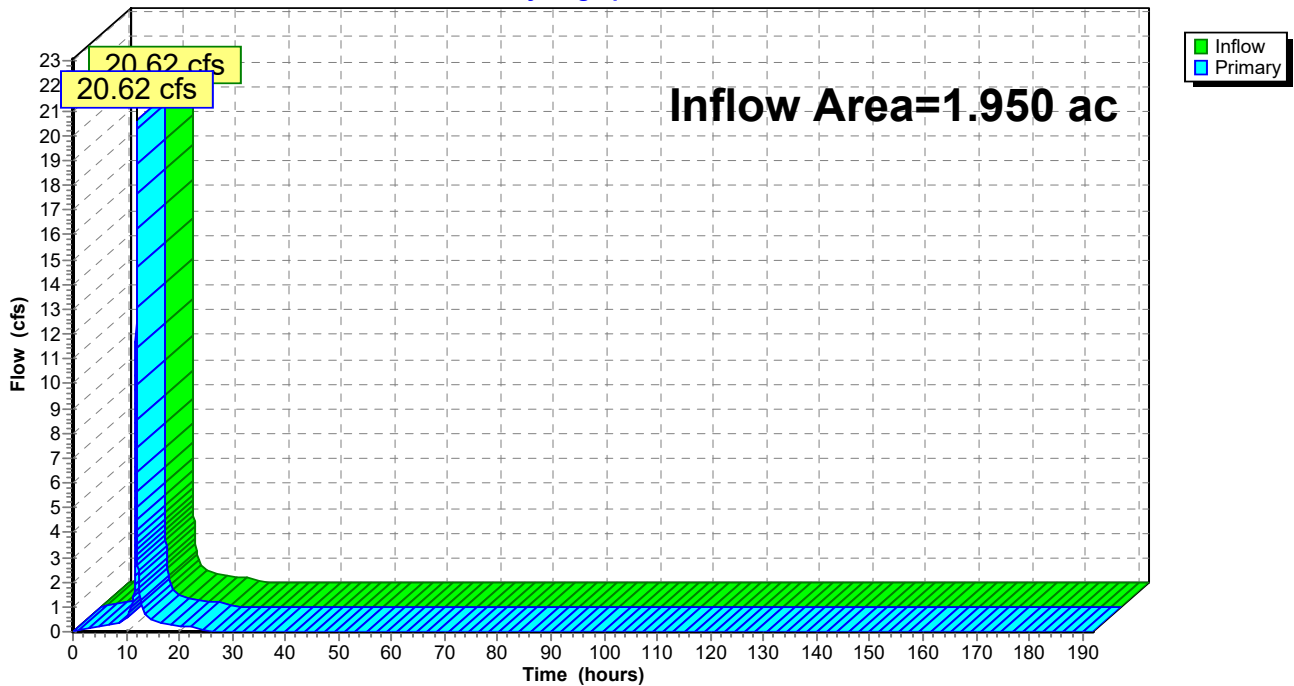
### Summary for Link 4L: Pre- Overall Site

Inflow Area = 1.950 ac, 87.18% Impervious, Inflow Depth = 7.20" for 100-yr event  
Inflow = 20.62 cfs @ 11.97 hrs, Volume= 1.170 af  
Primary = 20.62 cfs @ 11.97 hrs, Volume= 1.170 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 4L: Pre- Overall Site

Hydrograph



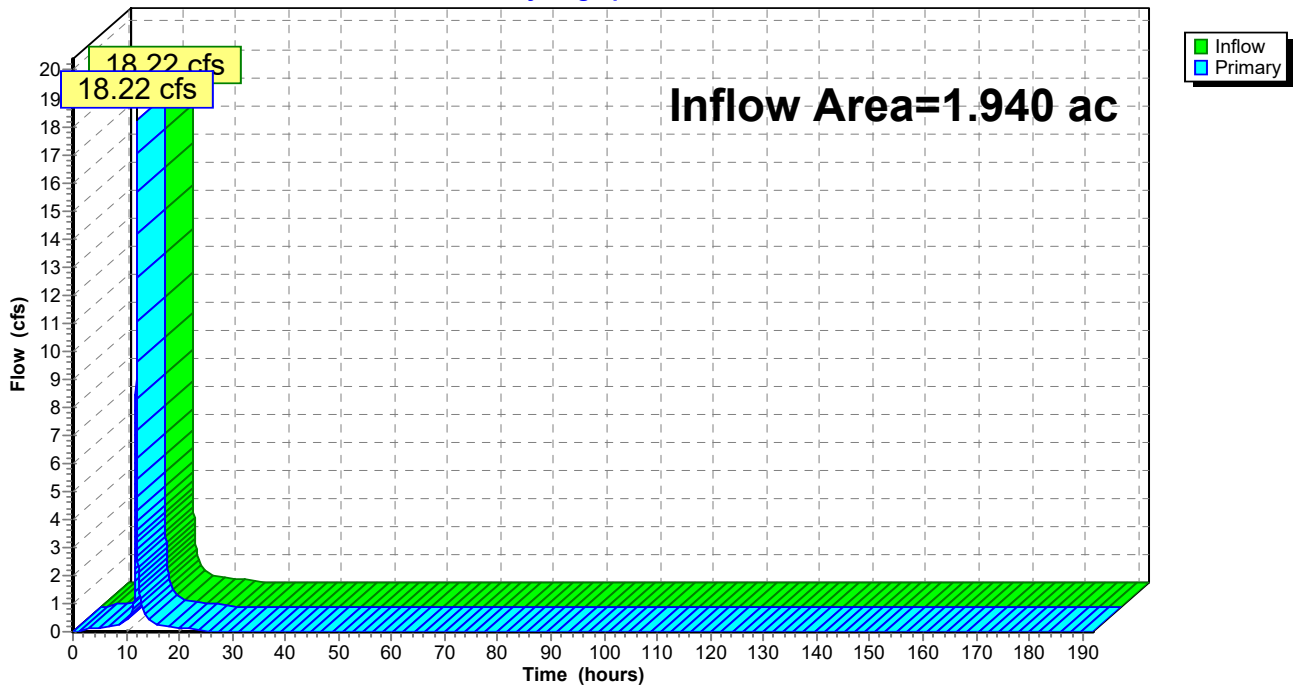
### Summary for Link 9L: Post- Overall Site

Inflow Area = 1.940 ac, 84.02% Impervious, Inflow Depth = 5.65" for 100-yr event  
Inflow = 18.22 cfs @ 12.00 hrs, Volume= 0.913 af  
Primary = 18.22 cfs @ 12.00 hrs, Volume= 0.913 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 9L: Post- Overall Site

Hydrograph



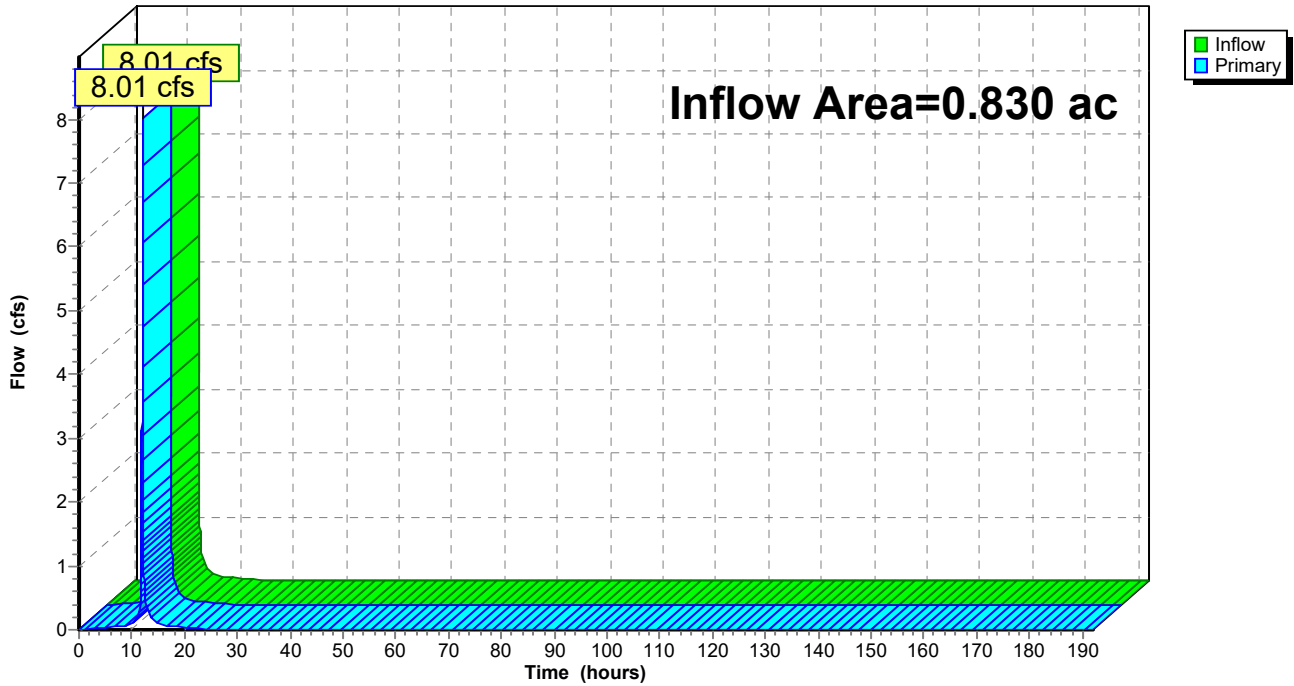
### Summary for Link 10L: Post- POI#1 Total

Inflow Area = 0.830 ac, 84.34% Impervious, Inflow Depth = 3.88" for 100-yr event  
Inflow = 8.01 cfs @ 12.00 hrs, Volume= 0.268 af  
Primary = 8.01 cfs @ 12.00 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

### Link 10L: Post- POI#1 Total

Hydrograph



**COMPUTATION SHEET : DESIGN INFILTRATION RATE**

PROJECT: McDonald's Restaurant No. 29-0019 Rebuild  
4295 US Route 130  
Edgewater Park Twp, Burlington County, NJ

DATE: 4/10/2020  
 BY: JDK  
 CHECKED BY: MEJ  
 REVISION: 0

BMP	Test Pit Number	Surface Elevation (ft.)	Infiltration Test Depth (ft.)	Infiltration Test Elevation	Infiltration Rate (in/hr)	Limiting ZoneType	Limiting Zone Depth (ft)
Infiltrating Pipes	I-3 @ B-14	29	7.5	21.5	1.20	-	NE
Infiltrating Pipes	I-4 @ B-15	29	4	25	1.80	-	NE

*Average Infiltration Rate (Geometric Mean):* 1.50 in/hr  
*Recommended Design Infiltration Rate:* 0.75 in/hr (Factor of Safety=3)

<b>Utilized Infiltration Rate:</b>	<b>0.75 in/hr</b>
<b>Utilized Factor of Safety</b>	<b>2.0</b>

## **Supporting Documentation**

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**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Edgewater Park Twp, New Jersey,**  
**USA\***



**Latitude: 40.0469°, Longitude: -74.9052°**  
**Elevation: 22.48 ft\*\***



\* source: ESRI Maps  
 \*\* source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps\\_&\\_aerials](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
<b>Duration</b>	<b>Average recurrence interval (years)</b>									
	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>
<b>5-min</b>	<b>0.348</b> (0.317-0.382)	<b>0.415</b> (0.379-0.455)	<b>0.493</b> (0.448-0.540)	<b>0.549</b> (0.498-0.602)	<b>0.619</b> (0.558-0.678)	<b>0.669</b> (0.601-0.734)	<b>0.720</b> (0.643-0.791)	<b>0.766</b> (0.680-0.845)	<b>0.825</b> (0.725-0.916)	<b>0.870</b> (0.758-0.972)
<b>10-min</b>	<b>0.556</b> (0.507-0.610)	<b>0.664</b> (0.605-0.728)	<b>0.789</b> (0.717-0.865)	<b>0.878</b> (0.797-0.962)	<b>0.986</b> (0.890-1.08)	<b>1.07</b> (0.957-1.17)	<b>1.14</b> (1.02-1.26)	<b>1.22</b> (1.08-1.34)	<b>1.30</b> (1.15-1.45)	<b>1.37</b> (1.19-1.53)
<b>15-min</b>	<b>0.695</b> (0.634-0.762)	<b>0.835</b> (0.761-0.916)	<b>0.999</b> (0.907-1.09)	<b>1.11</b> (1.01-1.22)	<b>1.25</b> (1.13-1.37)	<b>1.35</b> (1.21-1.48)	<b>1.45</b> (1.29-1.59)	<b>1.53</b> (1.36-1.69)	<b>1.64</b> (1.44-1.82)	<b>1.72</b> (1.50-1.92)
<b>30-min</b>	<b>0.953</b> (0.869-1.05)	<b>1.15</b> (1.05-1.26)	<b>1.42</b> (1.29-1.56)	<b>1.61</b> (1.46-1.76)	<b>1.85</b> (1.67-2.03)	<b>2.03</b> (1.83-2.23)	<b>2.21</b> (1.98-2.43)	<b>2.39</b> (2.12-2.63)	<b>2.61</b> (2.30-2.90)	<b>2.79</b> (2.43-3.11)
<b>60-min</b>	<b>1.19</b> (1.08-1.30)	<b>1.45</b> (1.32-1.59)	<b>1.82</b> (1.65-1.99)	<b>2.10</b> (1.90-2.30)	<b>2.47</b> (2.23-2.70)	<b>2.75</b> (2.47-3.02)	<b>3.05</b> (2.73-3.35)	<b>3.35</b> (2.97-3.69)	<b>3.75</b> (3.30-4.16)	<b>4.07</b> (3.54-4.54)
<b>2-hr</b>	<b>1.43</b> (1.30-1.58)	<b>1.74</b> (1.58-1.92)	<b>2.20</b> (1.99-2.42)	<b>2.55</b> (2.31-2.80)	<b>3.03</b> (2.72-3.32)	<b>3.42</b> (3.05-3.75)	<b>3.81</b> (3.38-4.19)	<b>4.21</b> (3.71-4.64)	<b>4.77</b> (4.15-5.30)	<b>5.21</b> (4.49-5.83)
<b>3-hr</b>	<b>1.57</b> (1.42-1.73)	<b>1.91</b> (1.73-2.11)	<b>2.41</b> (2.19-2.66)	<b>2.81</b> (2.53-3.10)	<b>3.35</b> (3.01-3.70)	<b>3.80</b> (3.39-4.18)	<b>4.26</b> (3.77-4.71)	<b>4.74</b> (4.15-5.25)	<b>5.41</b> (4.67-6.03)	<b>5.95</b> (5.08-6.67)
<b>6-hr</b>	<b>1.97</b> (1.79-2.18)	<b>2.39</b> (2.17-2.65)	<b>3.01</b> (2.73-3.33)	<b>3.52</b> (3.17-3.88)	<b>4.25</b> (3.80-4.68)	<b>4.85</b> (4.31-5.35)	<b>5.51</b> (4.84-6.08)	<b>6.20</b> (5.39-6.87)	<b>7.21</b> (6.15-8.05)	<b>8.05</b> (6.76-9.05)
<b>12-hr</b>	<b>2.40</b> (2.19-2.67)	<b>2.91</b> (2.65-3.23)	<b>3.69</b> (3.35-4.09)	<b>4.35</b> (3.94-4.82)	<b>5.34</b> (4.78-5.90)	<b>6.19</b> (5.49-6.84)	<b>7.13</b> (6.23-7.89)	<b>8.16</b> (7.02-9.09)	<b>9.71</b> (8.16-10.9)	<b>11.0</b> (9.11-12.5)
<b>24-hr</b>	<b>2.75</b> (2.55-2.97)	<b>3.32</b> (3.08-3.59)	<b>4.24</b> (3.93-4.58)	<b>5.02</b> (4.64-5.42)	<b>6.19</b> (5.68-6.65)	<b>7.20</b> (6.55-7.72)	<b>8.31</b> (7.50-8.91)	<b>9.55</b> (8.52-10.2)	<b>11.4</b> (10.0-12.3)	<b>13.0</b> (11.3-14.0)
<b>2-day</b>	<b>3.17</b> (2.93-3.44)	<b>3.84</b> (3.55-4.18)	<b>4.91</b> (4.54-5.33)	<b>5.81</b> (5.35-6.30)	<b>7.12</b> (6.52-7.70)	<b>8.25</b> (7.49-8.92)	<b>9.48</b> (8.54-10.2)	<b>10.8</b> (9.66-11.7)	<b>12.8</b> (11.3-13.9)	<b>14.5</b> (12.6-15.8)
<b>3-day</b>	<b>3.36</b> (3.12-3.63)	<b>4.06</b> (3.77-4.39)	<b>5.16</b> (4.79-5.58)	<b>6.08</b> (5.63-6.57)	<b>7.42</b> (6.82-7.99)	<b>8.55</b> (7.82-9.21)	<b>9.78</b> (8.88-10.5)	<b>11.1</b> (10.0-12.0)	<b>13.1</b> (11.6-14.2)	<b>14.8</b> (13.0-16.0)
<b>4-day</b>	<b>3.54</b> (3.31-3.82)	<b>4.28</b> (4.00-4.61)	<b>5.41</b> (5.04-5.83)	<b>6.35</b> (5.91-6.83)	<b>7.71</b> (7.13-8.28)	<b>8.85</b> (8.14-9.50)	<b>10.1</b> (9.22-10.8)	<b>11.4</b> (10.4-12.3)	<b>13.4</b> (12.0-14.4)	<b>15.0</b> (13.3-16.2)
<b>7-day</b>	<b>4.15</b> (3.88-4.45)	<b>4.99</b> (4.66-5.35)	<b>6.22</b> (5.81-6.68)	<b>7.25</b> (6.75-7.77)	<b>8.74</b> (8.10-9.35)	<b>9.99</b> (9.21-10.7)	<b>11.3</b> (10.4-12.1)	<b>12.8</b> (11.6-13.7)	<b>14.9</b> (13.4-15.9)	<b>16.6</b> (14.8-17.9)
<b>10-day</b>	<b>4.73</b> (4.45-5.05)	<b>5.67</b> (5.32-6.05)	<b>6.96</b> (6.53-7.42)	<b>8.02</b> (7.51-8.54)	<b>9.52</b> (8.88-10.1)	<b>10.7</b> (9.98-11.4)	<b>12.0</b> (11.1-12.8)	<b>13.4</b> (12.3-14.3)	<b>15.3</b> (14.0-16.3)	<b>17.0</b> (15.3-18.1)
<b>20-day</b>	<b>6.41</b> (6.08-6.77)	<b>7.62</b> (7.23-8.05)	<b>9.14</b> (8.66-9.65)	<b>10.3</b> (9.79-10.9)	<b>12.0</b> (11.3-12.7)	<b>13.3</b> (12.5-14.0)	<b>14.6</b> (13.7-15.4)	<b>16.0</b> (14.9-16.9)	<b>17.9</b> (16.6-18.9)	<b>19.3</b> (17.8-20.5)
<b>30-day</b>	<b>7.97</b> (7.58-8.37)	<b>9.40</b> (8.95-9.88)	<b>11.1</b> (10.5-11.6)	<b>12.3</b> (11.7-13.0)	<b>14.1</b> (13.3-14.8)	<b>15.4</b> (14.6-16.2)	<b>16.7</b> (15.8-17.6)	<b>18.1</b> (17.0-19.0)	<b>19.8</b> (18.5-20.9)	<b>21.2</b> (19.7-22.3)
<b>45-day</b>	<b>10.2</b> (9.72-10.7)	<b>12.0</b> (11.4-12.5)	<b>13.9</b> (13.2-14.5)	<b>15.3</b> (14.6-16.0)	<b>17.1</b> (16.3-17.9)	<b>18.5</b> (17.6-19.4)	<b>19.8</b> (18.8-20.8)	<b>21.1</b> (20.0-22.1)	<b>22.7</b> (21.4-23.8)	<b>23.9</b> (22.4-25.1)
<b>60-day</b>	<b>12.2</b> (11.7-12.7)	<b>14.3</b> (13.7-14.9)	<b>16.4</b> (15.7-17.1)	<b>18.0</b> (17.2-18.8)	<b>19.9</b> (19.0-20.8)	<b>21.4</b> (20.4-22.3)	<b>22.7</b> (21.6-23.8)	<b>24.0</b> (22.8-25.1)	<b>25.6</b> (24.2-26.8)	<b>26.7</b> (25.3-28.0)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**



**Table 2-2a** Runoff curve numbers for urban areas <sup>1/</sup>

Cover description	Average percent impervious area <sup>2/</sup>	Curve numbers for hydrologic soil group			
		A	B	C	D
<b>Fully developed urban areas (vegetation established)</b>					
Open space (lawns, parks, golf courses, cemeteries, etc.) <sup>3/</sup> :					
Poor condition (grass cover < 50%) .....		68	79	86	89
Fair condition (grass cover 50% to 75%) .....		49	69	79	84
Good condition (grass cover > 75%) .....		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way) .....		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way) .....		98	98	98	98
Paved; open ditches (including right-of-way) .....		83	89	92	93
Gravel (including right-of-way) .....		76	85	89	91
Dirt (including right-of-way) .....		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) <sup>4/</sup> .....		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders) .....		96	96	96	96
Urban districts:					
Commercial and business .....	85	89	92	94	95
Industrial .....	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses) .....	65	77	85	90	92
1/4 acre .....	38	61	75	83	87
1/3 acre .....	30	57	72	81	86
1/2 acre .....	25	54	70	80	85
1 acre .....	20	51	68	79	84
2 acres .....	12	46	65	77	82

**Developing urban areas**

Newly graded areas  
(pervious areas only, no vegetation) <sup>5/</sup> .....

	77	86	91	94
--	----	----	----	----

Idle lands (CN's are determined using cover types  
similar to those in table 2-2c).

<sup>1</sup> Average runoff condition, and  $I_a = 0.2S$ .

<sup>2</sup> The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

<sup>3</sup> CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

<sup>4</sup> Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

<sup>5</sup> Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

**Table 2-2b** Runoff curve numbers for cultivated agricultural lands <sup>1/</sup>

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment <sup>2/</sup>	Hydrologic condition <sup>3/</sup>	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

<sup>1</sup> Average runoff condition, and  $I_a=0.2S$

<sup>2</sup> Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

<sup>3</sup> Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good  $\geq 20\%$ ), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

**Table 2-2c** Runoff curve numbers for other agricultural lands <sup>1/</sup>

Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
		A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. <sup>2/</sup>	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. <sup>3/</sup>	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 <sup>4/</sup>	48	65	73
Woods—grass combination (orchard or tree farm). <sup>5/</sup>	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. <sup>6/</sup>	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 <sup>4/</sup>	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

<sup>1</sup> Average runoff condition, and  $I_a = 0.2S$ .

<sup>2</sup> **Poor:** <50% ground cover or heavily grazed with no mulch.

**Fair:** 50 to 75% ground cover and not heavily grazed.

**Good:** > 75% ground cover and lightly or only occasionally grazed.

<sup>3</sup> **Poor:** <50% ground cover.

**Fair:** 50 to 75% ground cover.

**Good:** >75% ground cover.

<sup>4</sup> Actual curve number is less than 30; use CN = 30 for runoff computations.

<sup>5</sup> CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

<sup>6</sup> **Poor:** Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

**Fair:** Woods are grazed but not burned, and some forest litter covers the soil.

**Good:** Woods are protected from grazing, and litter and brush adequately cover the soil.

## **Appendix A – Infiltration Report**

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# REPORT OF GEOTECHNICAL INVESTIGATION

**PROPOSED McDONALD'S RESTAURANT REBUILD #29-0019  
4295 & 4299 U.S. ROUTE 130  
EDGEWATER PARK, BURLINGTON COUNTY, NEW JERSEY**

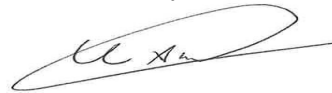


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***Prepared by:***

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**Chase A. Weinhold  
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**Laurence W. Keller, P.E.  
Principal, Geotechnical Services**

**Whitestone Project No.: GP1111577.001  
February 14, 2020**

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February 14, 2020

*via Internet Upload*

**McDONALD'S USA, LLC**  
64 Harbor Drive  
Hammonton, New Jersey 08037

Attention: Jonathan M. Baske, P.E., PMP  
Area Construction Manager

**Regarding: REPORT OF GEOTECHNICAL INVESTIGATION &  
PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION  
PROPOSED McDONALD'S RESTAURANT REBUILD #29-0019  
4295 & 4299 U.S. ROUTE 130  
EDGEWATER PARK, BURLINGTON COUNTY, NEW JERSEY  
WHITESTONE PROJECT NO.: GP1111577.001**

Dear Mr. Baske:

Whitestone Associates, Inc. is pleased to submit the attached *Report of Geotechnical Investigation* for the above-referenced project. The attached report presents the results of Whitestone's soils exploration efforts and presents recommendations for design of proposed foundations, floor slab, stormwater management facilities, pavements, and associated earthwork.

Whitestone's geotechnical division appreciates the opportunity to be of continued service to McDonald's USA, LLC. Please note that Whitestone has the capability to perform the additional geotechnical engineering services recommended herein. Please contact us at (215) 712-2700 with any questions regarding the enclosed report.

Sincerely,

**WHITESTONE ASSOCIATES, INC.**

Chase A. Weinhold  
Associate Project Manager

Laurence W. Keller, P.E.  
Principal, Geotechnical Services

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Enclosures  
Copy: Michael E. Jeitner, P.E., Bohler Engineering PA, LLC  
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# REPORT OF GEOTECHNICAL INVESTIGATION

Proposed McDonald's Restaurant Rebuild #29-0019

4295 & 4299 U.S. Route 130

Edgewater Park, Burlington County New Jersey

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**REPORT OF GEOTECHNICAL INVESTIGATION**  
**Proposed McDonald's Restaurant Rebuild #29-0019**  
**4295 & 4299 U.S. Route 130**  
**Edgewater Park, Burlington County New Jersey**

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APPENDIX D Infiltration Test Results



## **SECTION 1.0**

### **Summary of Findings and Recommendations**

Whitestone Associates, Inc. (Whitestone) has performed an exploration and evaluation of the subsurface conditions on the site of the proposed McDonald's restaurant #29-0019 located at 4295 & 4299 U.S. Route 130 in the Township of Edgewater Park, Burlington County, New Jersey. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1.

At the time of the investigation, the northeastern portion of the property was undeveloped with vegetative cover and the southwestern portion of the subject property was developed with an operating McDonald's restaurant, associated paved parking/driveway areas, and a small brick/masonry dumpster corral located south of the proposed new restaurant. Based on a review of available historic aerial imagery, the northeastern portion of the property (and area of proposed redevelopment) was previously developed with residential dwellings, automotive repair facility, and gasoline station.

Based on the aforementioned April 12, 2018 (last revised June 6, 2019) *ALTA/NSPS Land Title Survey* prepared by Blue Marsh Associates, Inc. (BMA), the site generally is gently sloping with ground surface elevations ranging from approximately 31 feet adjacent in the northern portions of the site to 28 feet within southern/southwestern portions of the site. All elevations are referenced from the North American Vertical Datum (NAVD88).

Based on information shown on the October 19, 2017 (last revised December 2, 2019) *Concept Plan* prepared by Bohler Engineering PA, LLC (Bohler), the proposed site redevelopment includes demolition of the existing restaurant in the southwestern portion of the site and construction of an approximately 4,540-square feet McDonald's restaurant with associated new pavements, drive-thru facilities, and utilities including stormwater management (SWM) facilities in the northeastern portion of the site. The locations, types, and bottom elevations of the SWM facilities have not been determined as of the time of this report. Final grading was not determined as of the time of this report; however, Whitestone anticipates that the proposed building and pavements will be constructed at or near existing site elevations and will require minimal cuts and fills, excluding the proposed SWM facilities.

The subsurface exploration included performing a reconnaissance of the project site, drilling a total of 15 soil borings (identified as B-1 through B-15), performing four infiltration tests, and collecting soil samples for laboratory analysis. The soil borings are shown on the *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A. The data from the exploration and analysis were analyzed by Whitestone in light of the project information provided by McDonald's USA, LLC (McDonald's) and Bohler.

A summary of Whitestone’s findings is presented in the following table and detailed descriptions of the subsurface conditions encountered are presented in Section 4.0.

<b>Subsurface Profile</b>	<b>Description</b>	<b>Bottom of Stratum</b>
<i>Surface Cover Materials</i>	Topsoil: 2.0 inches to 8.0 inches Pavement: 3.0 inches to 5.0 inches of asphalt with up to one inch of underlying granular subbase	0.33 to 0.67
<i>Existing Fill Materials</i>	Consisting of sand and silt mixtures with lesser amounts of gravel-size rock fragments. Mostly apparent re-worked site soils with some trace gravel-size brick, concrete, and fragments encountered in isolated areas.	2.0 to 9.0
<i>Coastal Plain Deposits</i>	Consisting of sand with varying amounts of silt (USCS: SP, SP-SM, and SM) with lesser amounts of gravel. Encountered in loose to medium dense relative density.	+20.0
<i>Groundwater</i>	Not encountered to the maximum exploration depth of 20 fbgs, corresponding to an approximate elevation of 9.5 feet.	+20.0

fbgs: feet below ground surface.

Recommendations developed upon consideration of these findings are summarized in the table below and presented in greater detail in the indicated sections of the report.

<b>Geotechnical Consideration</b>	<b>Recommendation</b>	<b>Report Section</b>
<i>Foundation System &amp; Floor Slabs</i>	Shallow spread and continuous footings bearing on approved and recompacted existing fill materials, natural soils, and imported structural fill.	5.5
<i>Supplemental Evaluation of Existing Fill Materials</i>	The existing fill materials encountered within the soil borings preliminarily appear to be suitable for foundation and slab support. However, there is a potential risk of variability in the existing fill that may not be disclosed solely by soil borings. Therefore, the composition of the existing fill should be verified by visual observation and additional test pit excavations prior to, or during construction, to enable further assessment of the depth, possible presence or absence of voids, uncontrolled conditions, or possible additional deleterious materials.	5.11
<i>On-Site Soil Reuse</i>	The existing fill materials and natural materials will be suitable for selective reuse as structural fill/backfill material, provided that soil moisture contents are controlled within two percent of optimum moisture level. Immediate soil reuse should not be expected due to the material’s moisture sensitivity, especially if construction occurs during winter or early spring months.	5.3
<i>Demolition of Existing Building</i>	Demolition of the existing McDonald’s restaurant building should include complete removal of the floor slab, foundation walls, footings, and associated utilities. The resulting excavations (as well as basement levels) should be backfilled in a controlled manner using approved structural backfill materials.	5.2

<b>Geotechnical Consideration</b>	<b>Recommendation</b>	<b>Report Section</b>
<i>Groundwater Control</i>	Dewatering for construction primarily is anticipated to consist of removing surface water runoff, infiltrating water, or trapped water at this site with sump pits and pumps.	5.4
<i>Pavements</i>	The on-site soils will be suitable for support of the proposed pavements following compaction and proofroll inspections.	5.7
<i>Preliminary Stormwater Management</i>	The underlying granular site soils encountered throughout the site are suitable for infiltration. Final layout, locations, elevations, and size of SWM basins should be submitted to Whitestone to confirm recommendations presented herein. Additional testing may be required to satisfy local requirements.	5.12

## **SECTION 2.0**

### **Introduction**

#### **2.1 AUTHORIZATION**

Jonathan Baske, P.E., PMP of McDonald's issued authorization to Whitestone to perform a subsurface investigation on this site relevant to the construction of the proposed McDonald's Restaurant #29-0019 rebuild located at 4295 and 4299 U.S. Route 130 in Edgewater Park, Burlington County, New Jersey. The subsurface investigation was performed in general accordance with Whitestone's December 20, 2019 proposal to McDonald's.

#### **2.2 PURPOSE**

The purpose of this subsurface exploration and analysis was to:

- ▶ ascertain the various soil profile components at test locations;
- ▶ estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- ▶ provide geotechnical criteria for use by the design engineers in preparing the foundation, slab, pavement, as well as SWM design;
- ▶ provide recommendations for required earthwork and subgrade preparation;
- ▶ record groundwater levels (if encountered) at the time of the investigation and discuss the potential impact on the proposed construction; and
- ▶ recommend additional investigation and/or analysis (if warranted).

#### **2.3 SCOPE**

The scope of the exploration and analysis included the subsurface exploration, field testing and sampling, laboratory analysis, and an engineering analysis and evaluation of the foundation materials. This *Report of Geotechnical Investigation* is limited to addressing the site conditions related to the physical support of the proposed construction. Any references to suspicious odors, materials, or conditions are provided strictly for the client's information.

In addition, a *Phase I Environmental Site Assessment* (Phase I ESA); *Survey for Asbestos Containing Materials* (ACM); and a *Limited Phase II Site Investigation* (Phase II SI) reports were prepared by Whitestone's environmental division and submitted under separate cover.

### 2.3.1 Field Exploration

Field exploration of the project site was conducted by means of 15 soil borings, identified as B-1 through B-15. The soil borings were advanced with a truck-mounted CME-55 drill rig equipped with hollow-stem augers. The explorations are shown on the *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A. The test locations were based on the project information available at the time of the investigation including the October 19, 2017 (last revised December 2, 2019) *Concept Plan* prepared by Bohler. A summary of test locations with corresponding termination depths is presented in the following table:

SOIL BORING LOCATION SUMMARY		
Proposed Construction	Boring Location(s)	Termination Depth (fbgs)
McDonald's Restaurant Building	B-1 through B-4	20.0
Pavement Areas/Drive-Thru	B-5, B-7 through B-11	6.0 to 9.0
Proposed Trash Enclosure	B-6	11.0
Proposed Subsurface SWM Areas	B-12 through B-15	14.0

fbgs: feet below ground surface

The soil borings were conducted in the presence of a Whitestone engineer who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The test areas were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D 1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, where encountered, were recorded during and immediately after the completion of field operations prior to backfilling the borings. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

### 2.3.2 Laboratory Program

In addition to the field investigation, a laboratory program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory program was performed in general accordance with applicable ASTM standard test methods and included physical testing of proposed building foundation bearing and pavement subgrade stratum.

**Physical/Textural Analyses:** Representative samples of selected strata encountered were subjected to a laboratory program that included Atterberg limits determinations (ASTM D-4318), moisture content determinations (ASTM D-2216) and washed gradation analyses (ASTM D-422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D-2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table. Quantitative test results are provided in Appendix B.

<b>PHYSICAL/TEXTURAL ANALYSES SUMMARY</b>							
<b>Boring No.</b>	<b>Sample</b>	<b>Depth (fbgs)</b>	<b>% Passing No. 200 Sieve</b>	<b>Moisture Content (%)</b>	<b>Liquid Limit</b>	<b>Plastic Index</b>	<b>USCS Classification</b>
B-2	S-5	8.0 to 10.0	21.3	18.9	Non-Plastic		SM
B-4	S-2	3.0 to 5.0	13.5	5.6	Non-Plastic		SM (Fill)
B-12	S-3	6.0 to 8.0	1.8	1.5	Non-Plastic		SP

fbgs: feet below ground surface

The engineering classifications are useful when considered in conjunction with the additional site data to estimate properties of the soil types encountered and to predict the soil's behavior under construction and service loads.

## SECTION 3.0 Site Description

### 3.1 LOCATION AND DESCRIPTION

The subject site is a rectangular-shaped parcel located in the eastern quadrant of the intersection of U.S. Route 130 and Cooper Street in Edgewater Park, Burlington County, New Jersey. Specifically, the site is located at 4295 and 4299 U.S. Route 130. The site is bound by Cooper Street, followed by retail and restaurant development to the north; by U.S. Route 130, followed by retail development to the east; by an automotive wash facility and U.S. Route 130, followed by retail development to the south; and warehouse development to the west.

### 3.2 EXISTING CONDITIONS

**Surface Cover/Development:** At the time of the investigation, the subject property was undeveloped in the northeastern portion of the site (areas of the proposed new building) and the southwestern portion of the property was developed with an active McDonald's restaurant and associated paved parking/driveway areas and a detached masonry dumpster corral. In addition, the existing McDonald's building has a partial basement level.

**Previous Site Development:** Based on a review of available historical aerial imagery dating back to 1931, the site was mostly undeveloped and likely utilized for agricultural purposes with an apparent residential property located in the northeastern portion of the site. The site remained relatively unchanged until sometime between 1953 and 1964, when the residential building was no longer apparent and the existing McDonald's restaurant building in the southwestern portion of the site and an automotive repair facility in the eastern/central portion of the site were apparent. Sometime in between 1989 and 1991, the automotive repair facility was no longer apparent, and a gasoline station was constructed in the northeastern portion of the site. The site remained relatively unchanged from 1991 to 2016 until the underground storage tank (UST) field was removed. The remnant canopy structure was removed sometime in between 2016 and 2019.

**Topography:** Based on the aforementioned April 12, 2018 (last revised June 6, 2019) *ALTA/NSPS Land Title Survey* prepared by Blue Marsh Associates, Inc. (BMA), the site generally is gently sloping with ground surface elevations ranging from approximately 31 feet adjacent in the northern portions of the site to 28 feet within southern/southwestern portions of the site. All elevations are referenced from NAVD88.

**Utilities:** The existing McDonald's restaurant reportedly is serviced by natural gas, water, sanitary sewer, communications, and electric. In addition, aboveground and underground utilities traverse the perimeter

of the site along U.S. Route 130 and Cooper Street. The utility information contained in this report is presented for general discussion only and is not intended for construction purposes.

**Site Drainage:** Surface runoff consists of sheet flow across the existing ground surface and generally appears to flow from the north to the south.

### **3.3 SITE BEDROCK GEOLOGY**

The *Bedrock Geology Map of New Jersey*, prepared by the New Jersey Department of Environmental Protection, Bureau of Topographic and Geologic Survey, indicates that the subject property is located within the Atlantic Coastal Plain Physiographic Province of New Jersey. Specifically, the area is underlain by southeastward dipping, marine and fluvial clay, silt, sand, and gravel of late Cretaceous and Tertiary age identified as the Magothy Formation, which typically is comprised of fine to coarse grained sands interbedded with thin-bedded clay or clayey silt.

The subsurface conditions encountered at the site were generally consistent with the mapped geology. Overburden materials include existing fill materials likely associated with previous and current site development.

### **3.4 PROPOSED CONSTRUCTION**

Based on the aforementioned October 19, 2017 (last revised December 2, 2019) *Concept Plan* prepared by Bohler, the proposed site redevelopment includes demolition of the existing McDonald's restaurant (located southwest of the proposed building) and construction of an approximately 4,540-square foot McDonald's restaurant building including tandem drive-thru facilities, detached trash enclosure, new pavements, and subsurface SWM facilities. Proposed grading was not determined at the time of this report; however, Whitestone assumes a maximum of two feet of earth cuts and fill required to attain final subgrade. No new earth retaining walls are identified on the *Concept Plan*.

Maximum design loads for the proposed restaurant building are expected to be less than 70 kips for columns, 4.0 kips per linear foot for walls, and 125 pounds per square foot for slabs.

The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Any revisions or additions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.



## SECTION 4.0 Subsurface Conditions

Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A of this report. The subsurface soil conditions encountered in the test locations consisted of the following generalized strata in order of increasing depth.

### 4.1 SUBSURFACE CONDITIONS

**Surface Cover Materials:** The majority of the test locations were performed within existing vegetated areas and disclosed approximately two inches to eight inches of topsoil with an average thickness of four inches. Borings performed within existing paved areas encountered approximately three inches to five inches of asphalt with up to one inch of underlying gravel subbase material.

**Existing Fill Materials:** Underlying the surficial cover materials, a majority of the test borings encountered existing fill materials extending to depths ranging from approximately two fbgs to nine fbgs that consisted predominantly of sand and silt mixtures (USCS: SM, SP-SM) with lesser amounts of gravel. Locations B-9, B-14, and B-15 encountered up to 10 percent gravel-size concrete and brick fragments, otherwise, the compositions of the majority of the existing fill materials generally were consistent with on-site natural soils. The existing fill materials were encountered in a loose to medium dense relative density.

**Coastal Plain Deposits:** Underlying the existing fill materials, the test borings encountered natural coast plain deposit soils consisting of sand with varying amounts of silt and gravel (USCS: SM, SP-SM, and SP). The coastal plain deposit soils extended through the maximum termination depths ranging between approximately six fbgs and 20.0 fbgs. SPT N-values recorded in the coastal plain deposit soils ranged from four blows per foot (bpf) to 34 bpf, generally indicating a loose to dense relative density.

**Groundwater:** Static groundwater was not encountered to the maximum exploration depth of 20 fbgs, corresponding to an approximate elevation of 9.5 feet NAVD88. Perched water was encountered at various locations and depths throughout the site at the confluence of existing fill materials and natural soils, as well as above dense soil strata. Static and perched/trapped water conditions are expected to fluctuate seasonally and following periods of precipitation.

## SECTION 5.0

### Conclusions and Recommendations

#### 5.1 GENERAL

Based on the conditions disclosed by the test borings performed as part of this investigation, Whitestone anticipates that proposed foundations, floor slab, and pavements may be supported on properly prepared, inspected, and approved existing fill materials, natural soils, and/or properly placed structural fill and backfill used to raise grades provided these materials are properly evaluated compacted and proof rolled as recommended herein. Areas requiring overexcavation and replacement may be required due to moisture sensitivity and inherent variability of existing fill materials.

Whitestone anticipates that a majority of the existing fill materials and natural site soils will be suitable for selective reuse as structural fill/backfill during warm, dry conditions provided that soil moisture contents are controlled within two percent of optimum moisture level and the existing fill is further evaluated during construction as recommended herein.

Based on the aforementioned *Concept Plan*, the new McDonald's restaurant building will be completely outside of the existing McDonald's footprint, however this report includes recommendations for proper demolition and earthwork associated with the existing restaurant pad.

#### 5.2 SITE PREPARATION AND EARTHWORK

**Surface Cover Stripping and Demolition:** Prior to stripping operations, all utilities should be identified and secured. The existing pavements to be removed should be stripped at least five feet beyond the limits of the proposed development. Existing structural elements such as foundation walls, footings, or slabs should be removed entirely from below proposed foundations and their zones of influence (as determined by lines extending at least one foot laterally beyond footing edges for each vertical foot of depth) and excavated to at least two feet below proposed construction subgrade levels elsewhere. Foundations may remain in place below these depths beneath proposed pavements and landscaped areas, provided they do not interfere with future construction. The resulting excavations and former basement areas should be backfilled in accordance with the recommendations of Section 5.3. Any surficial vegetation should be completely stripped and removed within and at least five feet beyond the limits of the proposed construction. The demolition contractor should be required to perform all site work in accordance with the recommendations in this report including backfilling any resulting excavations with structural fill.

**Surface Preparation/Proofrolling:** Prior to placing any backfill or subbase materials to raise or restore grades to the desired slab or pavement subgrade elevations, the exposed soils should be compacted to a firm

and unyielding surface with a minimum of two passes in two perpendicular directions of a minimum 10-ton, smooth drum roller operated in static mode. The surface should be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify soft or loose pockets that may require removal and replacement or further investigation. Because the upper site soils contain an appreciable amount of moisture-sensitive fines, proofrolling should be conducted after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade. Any fill or backfill should be placed and compacted in accordance with Section 5.3.

**Weather Performance Criteria:** Every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of saturated soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

**On-Site Soil Protection and Maintenance:** The site soils are moisture sensitive and will degrade when exposed to inclement weather, freeze-thaw cycles, or repeated construction traffic. However, if properly protected and maintained as recommended herein, the site soils will provide adequate support for the proposed construction. The site contractors should employ appropriate means and methods to protect the subgrade including, but not limited to the following:

- ▶ leaving existing pavements in-place as long as practical to help minimize subgrade exposure to inclement weather;
- ▶ sealing exposed subgrade soils on a daily basis with a vibratory smooth drum roller;
- ▶ regrading the site as needed to maintain positive drainage away from open earthwork construction areas and to prevent standing water;
- ▶ removing wet surficial soils immediately; and
- ▶ limiting exposure to construction traffic and precipitation especially following inclement weather and subgrade thawing.

**Pavement Subgrade Stabilization and Inspection:** The moisture sensitive site soils will degrade when exposed to inclement weather and/or heavy construction traffic and will require either extensive drying time or overexcavation and replacement in order to provide a suitable subgrade for pavements. Overexcavation of unstable soils (existing fill materials or natural site soils) within pavement areas typically should be limited to approximately 1.5 feet below planned subgrade unless directed otherwise by the owner's geotechnical engineer, provided that a reinforcing geogrid approved by the owner's geotechnical engineer is used. Alternatively, unstable materials may be completely overexcavated and either aerated and recompacted or replaced with imported structural fill per Section 5.3. However, this option is likely least economical.

Geogrids typically are economical when proposed undercut depths exceed approximately 16 inches. The geogrid (Tensar TriAx TX130S, or similar) should be placed directly on the exposed subgrade and backfill should consist of a well-graded gravel and sand blend. The services of the geotechnical engineer should be retained to inspect soil conditions during construction and to provide specific recommendations for stabilizing subgrades. Additionally, a geotechnical engineer should be retained to verify the suitability of prepared foundation, floor slab and pavement subgrades for support of design loads.

### 5.3 STRUCTURAL FILL AND BACKFILL

**Imported Fill Material:** Any imported material placed as structural fill or backfill to raise elevations or restore design grades should consist of clean, relatively well-graded sand or gravel with a maximum particle size of two inches and five percent to 15 percent of material finer than a #200 sieve. Silts, clays, and silty or clayey sands and gravels with higher percentage of fines and with a liquid limit less than 40 and a plasticity index less than 20 may be considered subject to the owner's approval, provided that the required moisture content and compaction controls are met during favorable weather conditions. The material should be free of clay lumps, organics, and deleterious material. Imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

**On-Site Materials:** Whitestone anticipates that majority of the existing fill materials and natural soils will be suitable for selective reuse as structural fill/backfill material provided that soil moisture contents are controlled within two percent of optimum moisture level and free of clay lumps, organics, and deleterious material. Immediate soil reuse of the upper soils should not be anticipated due to moisture sensitivity, especially if construction occurs during wet periods such as winter or early spring months. Where existing fill materials are not suitable for immediate reuse as structural fill or backfill, these materials may require off-site disposal at a regulated environmental facility. Reuse of any existing fill materials will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation performed during construction in accordance with Section 5.11 of this report.

The on-site materials will become increasingly difficult to re-use and compact when wetted beyond the optimum moisture content. On-site materials placed as fill should be sealed on a daily basis using a smooth drum roller to promote drainage and prevent ponding of stormwater. Materials that are or become exceedingly wet will likely require discing and aerating. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations during wet weather periods. The contractor should cover stockpiled soils, seal subgrades, and provide proper surface drainage prior to forecasted wet weather.

**Demolition Material:** Demolition material, free of environmental restrictions, may be used as fill material provided the material is properly processed as recommended herein. Concrete and masonry materials should be crushed to a well graded blend with a maximum size of 1.5 inches in diameter. Stripped asphaltic materials and deleterious building materials such as wood, insulation, metal, roofing shingles etc. should

not be used as structural fill material. Milled or recycled asphalt pavement (RAP) may be re-used as granular base for proposed pavements provided that the RAP particle size meets the New Jersey Department of Transportation (NJDOT) standard specifications for granular base and no more than 50 percent of the pavement granular base contains RAP.

**Compaction and Placement Requirements:** On-site soils and imported materials used as fill or backfill should be placed in maximum nine-inch loose lifts and compacted using a 10-ton smooth drum vibratory drum roller for granular soils. The smooth drum roller can be operated in static mode for more fine-grained soils during mass grading activities. A small walk-behind roller or hand-held vibratory compactor within excavations. All structural fill and backfill should be compacted to at least 95 percent of the maximum dry density within two percent of the optimum moisture content as determined by ASTM D 1557 (Modified Proctor). Fill and backfill placed within non-structural areas may be compacted to at least 92 percent of the maximum dry density within three percent of optimum moisture content as determined by ASTM D 1557 (Modified Proctor).

**Structural Fill Testing:** A sample of the imported fill material or any on-site material proposed for reuse as structural fill or backfill should be submitted to the geotechnical engineer for analysis and approval at least one week prior to its use. The placement of all fill and backfill should be monitored by a qualified engineering technician to ensure that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be performed to ensure that the specified compaction is achieved throughout the height of the fill or backfill.

#### **5.4 GROUNDWATER CONTROL**

Static groundwater was not encountered to the maximum exploration depth of 20 fbs and thus is expected to be deeper than anticipated excavation depths and overexcavation depths for foundations as well as for typical utilities. However, perched/trapped water may be encountered within fill strata and natural soils. As such, Whitestone anticipates that construction phase dewatering will consist of removing surface water runoff, trapped, or perched water at this site. Minor dewatering of surface runoff, infiltrating water or trapped water typically may be controlled by providing a sufficient number of sump pumps at the base of the excavations. Since excessive amounts of perched groundwater may accumulate during periods of wet weather, Whitestone recommends that foundation construction occur during periods of relatively dry weather.

Because the site soils will degrade when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations to precipitation.

## 5.5 FOUNDATIONS

**Shallow Foundation Design Criteria:** Whitestone recommends supporting the proposed building and appurtenances on conventional shallow spread and continuous footings designed to bear within approved existing/recompacted fill materials, natural soils, and/or structural fill materials provided these materials are properly evaluated, placed, and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. Foundations bearing within these materials may be designed using a maximum allowable net bearing pressure of 3,000 pounds per square foot.

All footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings. Due to the variability of the on-site soils, localized areas of existing unsuitable fill material or natural soils may require overexcavation and replacement in controlled lifts. The overexcavations should be backfilled in accordance with Sections 5.2 and 5.3.

Footings should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings so that lateral resistance should be provided by friction resistance at the base of the footings. An allowable coefficient of friction against sliding of 0.30 is recommended for use in the design of the foundations bearing within the on-site soils or imported structural backfill.

**Inspection Criteria:** Whitestone recommends that the suitability of the bearing soils along exposed overexcavation bottoms be verified by the geotechnical engineer prior to reinforcing steel placement. In the event that isolated areas of unsuitable materials are encountered in excavations, overexcavation and replacement of such materials will be necessary to provide a suitable footing subgrade.

**Settlement:** Whitestone estimates post construction settlements of new building foundations will be on the order of less than one inch if the recommendations outlined in this report are properly implemented. Differential settlement between individual footings should be less than one-half inch.

**Frost Coverage Depths:** Footings subject to frost action should be placed at least 30 inches below adjacent grades or as required by local building codes to provide protection from frost penetration. Interior footing not subject to frost action may be placed at a minimum depth of 18 inches below the slab subgrade.

## 5.6 FLOOR SLAB

Whitestone anticipates that properly evaluated and approved site soils or imported materials will provide suitable support for the floor slab. The exposed subgrade should be inspected and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic or contain objectionable materials should be removed and replaced with compacted structural fill. The properly prepared site soils and structural fill/backfill materials are expected to yield a minimum subgrade modulus (k) of 150 psi/in.

A minimum four inch layer of three-quarter inch crushed stone (AASHTO No. 57 stone or similar) should be installed below the floor slab to provide a uniform subgrade and capillary break. A moisture vapor barrier should be placed beneath the floor slab where recommended by the flooring manufacturer.

## 5.7 PAVEMENT DESIGN CRITERIA

**General:** Whitestone anticipates that the majority of the site soils and/or compacted structural fill/backfill placed to raise or restore design elevations will be suitable for support of the proposed pavements provided these materials are properly evaluated, compacted, and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report during favorable weather conditions. Subgrade stabilization with a triaxial geogrid, approved by the owner's geotechnical engineer, may be used to minimize depths of overexcavation as discussed further in Section 5.2. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural fill.

**Design Criteria:** A California Bearing Ratio value of 5.0 has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible and rigid pavement designs per the AASHTO *Guide for the Design of Pavement Structures*.

Design traffic loads were estimated based on Whitestone's past experience with similar projects and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. An estimated maximum pavement load of 35,000 ESALs was used for the proposed standard duty pavement areas. This value assumes the pavements primarily will accommodate automobile traffic with limited heavier truck traffic. Actual loading is anticipated to be less than this value.

**Pavement Section:** The recommended flexible pavement section is presented below in tabular format:

FLEXIBLE PAVEMENT SECTION DESIGN		
Layer	Material	Thickness (Inches)
Asphalt Surface	NJDOT Superpave 9.5 mm (PG 64-22)	1.5

FLEXIBLE PAVEMENT SECTION DESIGN		
Layer	Material	Thickness (Inches)
Asphalt Base	NJDOT Superpave 19.0 mm (PG 64-22)	3.0
Granular Subbase	NJDOT Dense-Graded Aggregate	6.0

A rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns (such as loading areas, driveway aprons, and garbage dumpster aprons). The recommended rigid pavement is presented below in tabular format:

RIGID PAVEMENT SECTION DESIGN		
Layer	Material	Thickness (Inches)
Surface	4,000 psi Air-Entrained Concrete	6.0
Base	NJDOT 2A Stone	8.0

**Additional Design Considerations:** The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thickness may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, all subgrade soil and supporting fill or backfill must be properly evaluated, placed, and prepared as detailed in Sections 5.2, 5.3, and 5.11 of this report. Proper drainage must be provided for the pavement structure including appropriate grading and surface water control, as well as measures to drain water from the subgrade.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that NJDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. All rigid concrete pavements should be suitably air-entrained, jointed, and reinforced.

## 5.8 LATERAL EARTH PRESSURES

No retaining walls were identified on the aforementioned *Concept Plan*. However, Whitestone anticipates that lateral earth pressure parameters may be required for design of new identification signs and menu boards. The following soil parameters apply to the site soils encountered and imported materials placed in a well-drained, level backfill condition and may be used for design:



<b>LATERAL EARTH PRESSURE PARAMETERS</b>		
<b>Parameters</b>	<b>Site Soils</b>	<b>Imported Granular Fill Materials</b>
Moist Density ( $\gamma_{\text{moist}}$ )	135 pcf	140 pcf
Internal Friction Angle ( $\phi$ )	26°	30°
Active Earth Pressure Coefficient ( $K_a$ )	0.39	0.33
Passive Earth Pressure Coefficient ( $K_p$ )	2.56	3.00
At-Rest Earth Pressure Coefficient ( $K_o$ )	0.56	0.50

Lateral earth pressure will depend on the slope angle of construction phase grades and subgrades. The effect of other surcharges also will need to be included in earth pressure calculations, possibly including the loads imposed by adjacent traffic. Whitestone would be pleased to assist with the calculation of lateral earth pressures based on the soil parameters presented herein, if necessary. The effects of sloped backfill, surface grades, and proposed slopes beyond the toe of the retaining structures, if applicable, must be considered when calculating resultant forces to be resisted by the retaining structures. Below-grade wall footings should be designed so that the combined effect of vertical and horizontal resultants and overturning moment does not exceed the maximum soil bearing capacity provided in Section 5.5.

Acceptable backfill should be approved by the owner's geotechnical engineer and should be placed in maximum nine-inch loose lifts and compacted to 95 percent of the maximum dry density within two percent of the optimum moisture content, as determined by ASTM D 1557 (Modified Proctor). The maximum densities outlined in the table above should not be exceeded in order to avoid creating excessive lateral pressure on the walls during compaction operations.

Whitestone recommends that backfill directly behind the walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Resistance to sliding should be provided by friction resistance at the base of the wall foundation. For mass concrete on existing site soils or imported structural fill materials, an allowable coefficient of friction against sliding of 0.30 should be used in the design of the below-grade walls. Passive earth pressures at the toe of any proposed below-grade walls should be neglected in the design.

Whitestone should be notified if any other retaining structures or design considerations requiring lateral earth pressure estimations are proposed. Specific recommendations for temporary retaining structures are beyond Whitestone's scope of work.

## 5.9 SEISMIC AND LIQUEFACTION CONSIDERATIONS

The subsurface conditions are most consistent with a Site Class D as defined by the *2018 International Building Code – New Jersey Edition*. Based on the seismic zone and soil profile, liquefaction considerations are not expected to have a substantial impact on design. Based on the seismic zone and soil profile, liquefaction considerations are considered unlikely and not expected to have a substantial impact on design. The following spectral accelerations are recommended:

SEISMIC SITE PARAMETERS			
S <sub>s</sub>	S <sub>1</sub>	F <sub>a</sub>	F <sub>v</sub>
0.206g	0.061g	1.600	2.400

## 5.10 EXCAVATIONS

**Open Excavations:** The existing fill materials and natural soils encountered during this investigation typically are, at a minimum, consistent with Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA) which require a maximum unbraced excavation angle of 1.5:1 (horizontal:vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA) to ensure that safe excavation methods and/or shoring and bracing requirements are implemented.

## 5.11 SUPPLEMENTAL POST INVESTIGATION SERVICES

**Final Grading Plan Review:** The final site grading has not been completed at the time of this report. Whitestone should be provided a final grading plan to confirm the design recommendations provided herein.

**Supplemental Existing Fill Evaluation:** The existing fill materials encountered within the soil borings preliminarily appear to be suitable for foundation and slab support. However, there is a potential risk of variability in the existing fill that may not be disclosed solely by soil borings. Therefore, the composition of the existing fill should be verified by visual observation and additional test pit excavations prior to, or during construction, to enable further assessment of the depth, possible presence or absence of voids, uncontrolled conditions, or possible additional deleterious materials. These observations will need to be made by a qualified geotechnical engineer in order to identify the extent of overexcavation required versus areas which may remain. If unfavorable fill conditions are encountered during the test pit evaluation, Whitestone recommendations overexcavation of the unsuitable materials in their entirety (where present) below foundation, floor slab and pavement areas and replacement with appropriate structural fill as defined in Section 5.3. The recommended supplemental and construction phase evaluation should include performing test pits and proofroll testing throughout the proposed building footprint in order to confirm or revise the recommendations herein prior to construction.

**Demolition and Construction Inspection and Monitoring:** The owner’s geotechnical engineer with specific knowledge of the subsurface conditions and design intent should perform inspection, testing, and consultation during construction as described in previous sections of this report. Monitoring and testing should also be performed to verify that the building is properly demolished, any encountered underground structures are properly removed and backfilled, the existing surface cover materials are properly removed, and suitable materials used for controlled fill are properly placed and compacted over suitable subgrade soils. In addition, inspection of structural backfill within the exiting basement should be witnessed and documented by the owner’s geotechnical engineer.

**5.12 PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION**

**General:** Four soil borings, identified as B-12 through B-15, were performed in the location of the anticipated SWM facilities provided by Bohler. The soil borings were terminated at an approximate depth of 14.0 fbs. The soils encountered at or below the approximate test elevations ranging between of 25 feet and 21.5 feet consisted of USDA soil types Sand and Loamy Sand. *Records of Subsurface Exploration* are included in Appendix A.

**Estimated Seasonal High Groundwater Levels:** The methods used in determining the seasonal high groundwater level include evaluating the soil morphology within a test excavation and identifying irregular spots or blotches of different colors or minerals unlike that of the surrounding soil (mottles). Indications of a seasonal high groundwater table within the area of the SWM basin were not encountered to the depths explored, corresponding to elevations ranging between approximately 14 feet and 15 feet, as referenced from NAVD88.

**In-Situ Infiltration Rates:** In-situ infiltration testing was performed in general accordance with the *New Jersey Stormwater Best Practices Manual* (NJBMP) utilizing cased borehole testing methodology. A summary of the individual infiltration test results are provided in the following table and detailed test results are included in Appendix D.

INFILTRATION TESTING SUMMARY			
Test Location No.	Approximate Test Elevation (feet NAVD88)	In-Situ Infiltration Test Results	
		USDA Classification at Test Elevation	Rate (in/hour)*
I-1 at B-13	22.5	Loamy Sand	1.8
I-2 at B-12	21.5	Loamy Sand	1.2
I-3 at B-15	21.5	Loamy Sand	1.2
I-4 at B-16	25.0	Loamy Sand	1.8

\* Does Not Include Safety Factor

**Preliminary Conclusions and Recommendations:** The results of the infiltration testing indicated that the soils granular soils tested are conducive for SWM infiltration. Whitestone recommends a design rate of 0.6 inches per hour that includes an applicable safety factor of at least 2.0.

**Design Considerations:** Infiltration rates decrease over time and on-going maintenance, such as preventing the accumulation of sediment, should be performed to extend the capacity of the infiltration system. To satisfy the criterion presented in the NJBMP, additional testing may be necessary depending on the final layout and design of the infiltration facilities.

**Construction Considerations:** Construction of the SWM facilities should be witnessed by a geotechnical engineer that is familiar with the subsurface investigation and SWM design to ensure that any materials not suitable for infiltration have been properly removed from the bottom of the proposed SWM facility and that any imported backfill materials will not impede drainage. Due to variability in the field infiltration rates and at the discretion of the geotechnical engineer, the above recommended design infiltration rates may require verification by conducting in-situ infiltration testing at the bottom of the SWM facilities during construction.

During basin construction, compaction/densification of undisturbed soils underlying the proposed basin should be avoided. Contractors should use track-mounted equipment and excavators with toothed-buckets for basin construction. Conversely, rubber-tired equipment and excavators with smooth buckets should not be used. Additionally, contractors should avoid unnecessarily traversing the basin footprint with large/heavy equipment during basin construction to the extent possible.

## **SECTION 6.0**

### **General Comments**

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Soil bearing conditions should be checked at the appropriate time for consistency with those conditions encountered during Whitestone's geotechnical investigation.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards which may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the sole use of McDonald's USA, LLC and Bohler Engineering PA, LLC for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

The possibility exists that conditions between borings may differ from those at specific boring locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may alter soil and rock conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

Whitestone assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure all excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability.

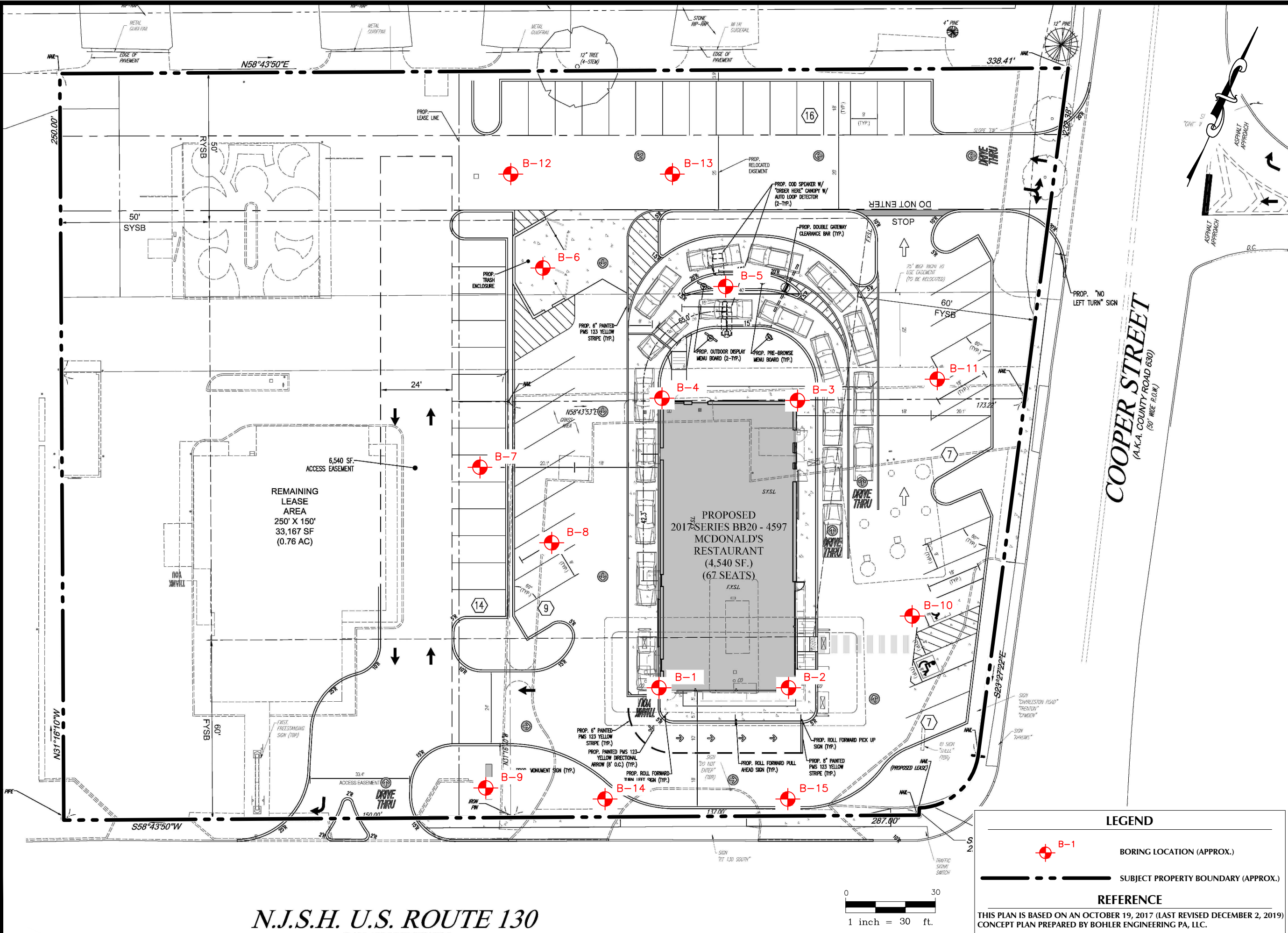
Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing capacities. Monitoring and testing also should be performed to verify that suitable materials are used for controlled fills and that they are properly placed and compacted over suitable subgrade soils.

The exploration and analysis of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the design details furnished by Bohler Engineering PA, LLC. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

*The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.*

**FIGURE 1**  
**Test Location Plan**

M:\Job Folders\2011\1115770P Drawings and Plans\GP1111577.001 BLP.dwg



**WHITESTONE ASSOCIATES, INC.**  
*Environmental & Geotechnical Engineers & Consultants*  
 1600 MANOR DRIVE, SUITE 220, CHALFONT, PA 18914  
 215.712.2700 WHITESTONEASSOC.COM

**TEST LOCATION PLAN**

CLIENT: MCDONALD'S USA, LLC

PROJECT: PROPOSED MCDONALD'S RESTAURANT REBUILD #29-0019  
 4295 & 4299 U.S. ROUTE 130  
 EDGEWATER PARK, BURLINGTON COUNTY, NJ

PROJECT #: GP1111577.001

DESIGNED BY: GR	PROJ. MGR.: JMM
DATE: 2/13/20	FIGURE: 1
SCALE: 1" = 30'	

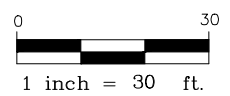
**LEGEND**

B-1 BORING LOCATION (APPROX.)

SUBJECT PROPERTY BOUNDARY (APPROX.)

**REFERENCE**

THIS PLAN IS BASED ON AN OCTOBER 19, 2017 (LAST REVISED DECEMBER 2, 2019) CONCEPT PLAN PREPARED BY BOHLER ENGINEERING PA, LLC.



**APPENDIX A**  
**Records of Subsurface Exploration**



# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 20.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> 6.5(P)   23.0	<b>At Completion:</b> 14.5   15.0
<b>Proposed Location:</b> Building Pad	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   ---	<b>24 Hours:</b> ---   ---
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	4" Topsoil	
0 - 2	S-1	X	2 - 3 - 5 - 6	13	8	0.3	FILL	Dark Brown Sand with Gravel, Moist (FILL)	
2 - 4	S-2	X	5 - 4 - 3 - 2	16	7			As Above, Moist (FILL)	
4 - 6	S-3	X	3 - 3 - 4 - 5	20	7	4.0	COASTAL PLAIN DEPOSITS	Brown/Orange Silty Sand, Moist, Loose (SM)	
6 - 8	S-4	X	4 - 4 - 5 - 6	18	9			As Above, Moist to Wet, Loose (SM)	Perched Water 6.5 fbgs
8 - 10	S-5	X	5 - 5 - 6 - 6	23	11			As Above, Moist, Medium Dense (SM)	
13 - 15	S-6	X	5 - 6 - 8 - 8	22	14	10.0		Brown Poorly-Graded Sand with Silt, Moist, Medium Dense (SP-SM)	
18 - 20	S-7	X	8 - 12 - 14 - 18	23	26	15.0		As Above, with 10% Gravel, Moist, Medium Dense (SP-SM)	
						20.0		Boring Log B-1 Terminated at a Depth of 20.0 Feet Below Ground Surface	
						25.0			

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 20.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> 5.5(P)   24.0	<b>At Completion:</b> 14.0   15.5
<b>Proposed Location:</b> Building Pad	<b>Logged By:</b> TJ	<b>At Completion:</b> NE   ---	<b>At Completion:</b> 14.0   15.5
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>24 Hours:</b> ---   ---	<b>24 Hours:</b> ---   ---
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	3" Topsoil	
0 - 2	S-1	X	2 - 4 - 5 - 5	17	9	0.3	FILL	Brown Sand with Gravel, Moist (FILL)	
2 - 4	S-2	X	4 - 5 - 6 - 6	22	11	2.0	COASTAL PLAIN DEPOSITS	Brown/Orange Silty Sand, Moist, Medium Dense (SM)	
4 - 6	S-3	X	5 - 5 - 5 - 5	21	10	5.0		As Above, Moist to Wet, Medium Dense (SM)	Perched Water 5.5 fbgs to 6.0 fbgs
6 - 8	S-4	X	5 - 5 - 5 - 6	22	10	8.0		As Above, Moist, Medium Dense (SM)	
8 - 10	S-5	X	4 - 5 - 5 - 5	24	10	10.0		As Above, Moist to Wet, Medium Dense (SM)	Perched Water 9.0 fbgs to 10.0 fbgs
13 - 15	S-6	X	6 - 7 - 7 - 9	22	14	15.0		Brown/Orange Poorly-Graded Sand with Silt, Moist, Medium Dense (SP-SM)	
18 - 20	S-7	X	8 - 11 - 16 - 24	20	27	20.0	Brown Silty Sand, Moist, Medium Dense (SM)		
								Boring Log B-2 Terminated at a Depth of 20.0 Feet Below Ground Surface	

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 31.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	
<b>Termination Depth:</b> 20.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)	
<b>Proposed Location:</b> Building Pad	<b>Logged By:</b> TJ	<b>During:</b> NE   --- ▾	<b>At Completion:</b> 12.5   19.0 <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>At Completion:</b> NE   --- ▾	
	<b>Equipment:</b> CME-55	<b>24 Hours:</b> ---   --- ▾	<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	8" Topsoil	
0 - 2	S-1		2 - 6 - 11 - 12	24	17	0.7	FILL	Dark Brown Silty Sand with Gravel, Moist (FILL)	
2 - 4	S-2		7 - 8 - 8 - 7	24	16	2.0	COASTAL PLAIN DEPOSITS	Brown Poorly-Graded Sand with Silt and Gravel, Moist, Medium Dense (SP-SM)	
4 - 6	S-3		4 - 3 - 3 - 2	24	6	5.0		As Above, Moist, Loose (SP-SM)	
6 - 8	S-4		2 - 2 - 3 - 4	18	5	8.0		As Above, Moist, Loose (SP-SM)	
8 - 10	S-5		2 - 3 - 3 - 3	23	6	10.0		Dark Brown Silty Sand, Moist, Loose (SM)	
10 - 12	S-6		3 - 3 - 2 - 2	24	5	12.0		Brown/Orange Poorly-Graded Sand with Silt, Moist, loose (SP-SM)	
12 - 14	S-7		3 - 2 - 3 - 4	19	5	14.0		As Above, Moist, Loose (SP-SM)	
14 - 16	S-8		4 - 4 - 6 - 6	14	10	15.0		As Above, Moist, Medium Dense (SP-SM)	
16 - 18	S-9		5 - 5 - 6 - 6	16	11	17.0		As Above, with 15 % Gravel, Moist, Medium Dense (SP-SM)	
18 - 20	S-10		7 - 8 - 11 - 11	20	19	19.0		As Above, Moist to Wet, Medium Dense (SP-SM)	
						20.0		Boring Log B-3 Terminated at a Depth of 20.0 Feet Below Ground Surface	
						25.0			

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 30.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 20.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   ---   ▾	<b>At Completion:</b> NE   ---   ▾
<b>Proposed Location:</b> Building Pad	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   ---   ▾	<b>At Completion:</b> 15.0   15.5   <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		<b>24 Hours:</b> ---   ---   <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
0 - 2	A	B	Environmental Sample	---	---	0.0	TOPSOIL	6" Asphalt, 1" Subbase	
1 - 3	S-1	<del>X</del>	8 - 9 - 12 - 14	18	21	0.7	FILL	Brown Silty Sand with Gravel, Moist (FILL)	
3 - 5	S-2	<del>X</del>	3 - 4 - 3 - 3	20	7	5.0		As Above, with Gravel, Moist (FILL)	
5 - 7	S-3	<del>X</del>	3 - 4 - 4 - 4	21	8	7.0		As Above, with Gravel, Moist (FILL)	
7 - 9	S-4	<del>X</del>	3 - 3 - 3 - 3	17	6	9.0		Brown Silty Sand, Moist (FILL)	
9 - 11	S-5	<del>X</del>	3 - 4 - 4 - 5	16	8	10.0	COASTAL PLAIN DEPOSITS	Orange/Brown Poorly-Graded Sand, Moist, Loose (SP)	
13 - 15	S-6	<del>X</del>	4 - 4 - 5 - 5	24	9	15.0		As Above, Moist, Loose (SP)	
18 - 20	S-7	<del>X</del>	16 - 7 - 11 - 14	24	18	20.0		As Above, Moist, Medium Dense (SP)	
						25.0		Boring Log B-4 Terminated at a Depth of 20.0 Feet Below Ground Surface	

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 7.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> 6.5   23.0 <input checked="" type="checkbox"/>
<b>Proposed Location:</b> Drive-Thru	<b>Logged By:</b> TJ	<b>At Completion:</b> NE   --- ▾	<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>24 Hours:</b> ---   --- ▾	
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
						0.5	PAVEMENT	5" Asphalt, 1" Gravel Subbase	
							FILL		
1 - 3	S-1	<del>X</del>	3 - 4 - 4 - 5	16	8			Brown Sand with Gravel, Moist (FILL)	
3 - 5	S-2	<del>X</del>	5 - 6 - 7 - 6	24	13	4.0		As Above, Moist (FILL)	
						5.0	COASTAL PLAIN DEPOSITS	Brown Sand, Moist, Medium Dense (SP)	
5 - 7	S-3	<del>X</del>	5 - 4 - 4 - 4	21	8	7.0		As Above, Moist, Loose (SP)	
									Boring Log B-5 Terminated at a Depth of 7.0 Feet Below Ground Surface
						10.0			
						15.0			
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 28.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 11.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> 7.0   21.5 <input checked="" type="checkbox"/>
<b>Proposed Location:</b> Trash Enclosure	<b>Logged By:</b> TJ	<b>At Completion:</b> NE   --- ▾	<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>24 Hours:</b> ---   --- ▾	
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	PAVEMENT	3" Asphalt, 1" Gravel Subbase	
						0.4	FILL		
1 - 3	S-1		3 - 3 - 4 - 4	24	7			Brown Sand, Moist (FILL)	
3 - 5	S-2		3 - 4 - 4 - 5	12	8			As Above, Moist (FILL)	
5 - 7	S-3		6 - 5 - 5 - 5	24	10	5.0	COASTAL PLAIN DEPOSITS	Brown/Orange Poorly-Graded Sand with Silt and Gravel, Moist, Medium Dense (SP-SM)	
7 - 9	S-4		4 - 4 - 5 - 6	24	9			As Above, Moist, Loose (SP-SM)	
9 - 11	S-5		6 - 7 - 9 - 12	22	16	10.0		As Above, Moist, Medium Dense (SP-SM)	
						11.0			Boring Log B-6 Terminated at a Depth of 11.0 Feet Below Ground Surface
						15.0			
						20.0			
						25.0			

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 30.0 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 6.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> 4.0   26.0 <input checked="" type="checkbox"/>
<b>Proposed Location:</b> Pavement	<b>Logged By:</b> TJ	<b>At Completion:</b> NE   --- ▾	<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>24 Hours:</b> ---   --- ▾	
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	4" Topsoil	
0 - 2	S-1	<del>X</del>	2 - 3 - 4 - 6	16	7	0.3	FILL	Dark Brown Silty Sand with Gravel, Moist (FILL)	
2 - 4	S-2	<del>X</del>	5 - 5 - 6 - 6	20	11	4.0		As Above, Brown, Moist (FILL)	
4 - 6	S-3	<del>X</del>	5 - 5 - 4 - 4	24	9	5.0	COASTAL PLAIN DEPOSITS	Brown Silty Sand with 15% Rounded Gravel, Moist, Loose (SM)	
						6.0		Boring Log B-7 Terminated at a Depth of 6.0 Feet Below Ground Surface	
						10.0			
						15.0			
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 30.0 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 6.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> NE   --- ▾
<b>Proposed Location:</b> Pavement	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   --- ▾	<b>At Completion:</b> DNC   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	4" Topsoil	
0 - 2	S-1	<del>X</del>	3 - 5 - 6 - 7	11	11	0.3	FILL	Brown Sand with Gravel, Moist (FILL)	
2 - 4	S-2	<del>X</del>	4 - 4 - 3 - 3	20	7	2.0	COASTAL PLAIN DEPOSITS	Brown/Orange Poorly-Graded Sand with Silt and 10% Gravel, Moist, Loose (SP-SM)	
4 - 6	S-3	<del>X</del>	3 - 2 - 5 - 5	24	4	5.0		As Above, with 10% Rounded Gravel, Moist, Loose to Medium Dense (SP-SM)	
						6.0		Boring Log B-8 Terminated at a Depth of 6.0 Feet Below Ground Surface	
						10.0			
						15.0			
						20.0			
						25.0			

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



# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.0 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 6.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> NE   --- ▾
<b>Proposed Location:</b> Pavement	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   --- ▾	<b>At Completion:</b> DNC   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	3" Topsoil	
0 - 2	S-1	<del>X</del>	3 - 4 - 5 - 7	12	9	0.3	FILL	Brown Silty Sand, with Gravel, Moist (FILL)	
2 - 4	S-2	<del>X</del>	6 - 6 - 6 - 7	20	12	4.0		As Above with 10% Gravel and Brick Fragments, Moist (FILL)	
4 - 6	S-3	<del>X</del>	9 - 11 - 10 - 10	24	21	5.0	COASTAL PLAIN DEPOSITS	Brown/Light Orange Silty Sand with 10% Gravel, Moist, Medium Dense (SM)	
						6.0		Boring Log B-9 Terminated at a Depth of 6.0 Feet Below Ground Surface	
						10.0			
						15.0			
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 30.0 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 6.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> NE   --- ▾
<b>Proposed Location:</b> Pavement	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   --- ▾	<b>At Completion:</b> DNC   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	3" Topsoil	
0 - 2	S-1	<del>X</del>	3 - 4 - 5 - 5	12	9	0.3	FILL	Brown Sand with Gravel, Moist (FILL)	
2 - 4	S-2	<del>X</del>	6 - 5 - 4 - 4	24	9	2.0	COASTAL PLAIN DEPOSITS	Brown/Orange Poorly-Graded Sand with Silt and 10% Gravel, Moist, Loose (SP-SM)	
4 - 6	S-3	<del>X</del>	4 - 3 - 4 - 4	24	7	5.0		As Above, Gray/Orange, Very Moist, Loose (SP-SM)	
						6.0		Boring Log B-10 Terminated at a Depth of 6.0 Feet Below Ground Surface	
						10.0			
						15.0			
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 30.5 feet	<b>Date Started:</b> 1/24/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 9.0 feet bgs	<b>Date Completed:</b> 1/24/2020	<b>During:</b> NE   --- ▾	<b>At Completion:</b> 6.0   24.5 <input checked="" type="checkbox"/>
<b>Proposed Location:</b> Pavement	<b>Logged By:</b> TJ	<b>At Completion:</b> NE   --- ▾	<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>24 Hours:</b> ---   --- ▾	<b>24 Hours:</b> ---   --- <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.5	PAVEMENT	4" Asphalt, 1" Gravel Subbase	
							FILL		
1 - 3	S-1	<del>X</del>	2 - 3 - 4 - 4	14	7			Brown Silty Sand with Gravel, Moist (FILL)	
3 - 5	S-2	<del>X</del>	4 - 3 - 4 - 4	17	7			As Above, with Gravel, Moist (FILL)	
5 - 7	S-3	<del>X</del>	5 - 4 - 4 - 4	21	8			As Above, with Gravel, Moist (FILL)	
7 - 9	S-4	<del>X</del>	4 - 4 - 4 - 4	24	8		COASTAL PLAIN DEPOSITS	Brown/Orange Poorly-Graded Sand with Silt and 10% Gravel, Moist, Loose (SP-SM)	
						9.0			
						10.0			Boring Log B-11 Terminated at a Depth of 9.0 Feet Below Ground Surface
						15.0			
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 28.0 feet	<b>Date Started:</b> 1/27/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 14.0 feet bgs	<b>Date Completed:</b> 1/27/2020	<b>During:</b> NE   ---   ▾	<b>At Completion:</b> NE   ---   ▾
<b>Proposed Location:</b> SWM	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   ---   ▾	<b>At Completion:</b> 10.0   18.0   <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		<b>24 Hours:</b> ---   ---   <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	4" Asphalt, 1" Gravel	
0 - 2	A	B	Environmental Sample	---	---	0.3	FILL	Dark Yellowish Brown (7.5YR 4/4), LOAMY SAND, Single-Grain, No Roots, No Mottling, Moist (FILL)	
2 - 4	S-1	<del>X</del>	4 - 4 - 5 - 4	20	6			As Above, Moist (FILL)	
4 - 6	S-2	<del>X</del>	4 - 2 - 2 - 2	24	4	5.0		As Above, Moist (FILL)	
							COASTAL PLAIN DEPOSITS	Strong Brown (7.5YR 5/8) LOAMY SAND, Single-Grain, Moist, Loose (SP)	
6 - 8	A	B	Environmental Sample	---	---			As Above, with Gravel, Moist, Medium Dense (SP)	
	S-3	<del>X</del>	14 - 21 - 7 - 7	21	28			As Above, Moist, Medium Dense (SP)	
8 - 10	S-4	<del>X</del>	6 - 9 - 10 - 13	21	19			As Above, Moist, Dense (SP)	
10 - 12	S-5	<del>X</del>	11 - 19 - 15 - 17	23	34	10.0		As Above, Moist, Dense (SP)	
12 - 14	S-6	<del>X</del>	13 - 15 - 15 - 15	21	30	14.0		As Above, Moist, Dense (SP)	
						15.0		Boring Log B-12 Terminated at a Depth of 14.0 Feet Below Ground Surface	
						20.0			
						25.0			

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.0 feet	<b>Date Started:</b> 1/27/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 14.0 feet bgs	<b>Date Completed:</b> 1/27/2020	<b>During:</b> NE   ---   ▾	<b>At Completion:</b> 6.0   23.0   <input checked="" type="checkbox"/>
<b>Proposed Location:</b> SWM	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   ---   ▾	<b>24 Hours:</b> ---   ---   <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	4" Asphalt	
0 - 2	A	B	Environmental Sample	---	---	0.3	FILL	Brown (7.5YR 3/2) SANDY LOAM, Single-Grain, No Roots, No Mottling, Moist (FILL)	
2 - 4	S-1	<del>X</del>	4 - 4 - 5 - 5	9	9			As Above, with Gravel, Moist (FILL)	
4 - 6	S-2	<del>X</del>	6 - 9 - 6 - 8	20	17	5.0		As Above, with Gravel, Moist (FILL)	
6 - 8	A	B	Environmental Sample	---	---	6.0	COASTAL PLAIN DEPOSITS	Strong Brown (7.5YR 5/8) LOAMY SAND, Single-Grain, No Roots, No Mottling, Moist, Medium Dense (SP-SM)	
	S-3	<del>X</del>	9 - 10 - 10 - 11	24	20				
8 - 10	S-4	<del>X</del>	10 - 11 - 13 - 15	23	24	10.0		As Above, Moist, Medium Dense (SP-SM)	
10 - 12	S-5	<del>X</del>	11 - 19 - 15 - 19	22	34			As Above, Moist, Dense (SP-SM)	
12 - 14	S-6	<del>X</del>	15 - 15 - 17 - 21	21	32	14.0		As Above, Moist, Dense (SP-SM)	
						15.0		Boring Log B-13 Terminated at a Depth of 14.0 Feet Below Ground Surface	
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.0 feet	<b>Date Started:</b> 1/27/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 14.0 feet bgs	<b>Date Completed:</b> 1/27/2020	<b>During:</b> NE   ---   ▾	<b>At Completion:</b> NE   ---   ▾
<b>Proposed Location:</b> SWM	<b>Logged By:</b> TJ	<b>24 Hours:</b> ---   ---   ▾	<b>At Completion:</b> 8.0   21.0   <input checked="" type="checkbox"/>
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW		<b>24 Hours:</b> ---   ---   <input checked="" type="checkbox"/>
	<b>Equipment:</b> CME-55		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	4" Topsoil	Poor Recovery Due to Gravel in Spoon Tip
0 - 2	A	B	Environmental Sample	---	---	0.3	FILL	Brown (7.5YR 4/2) SANDY LOAM with 10% Gravel-Sized Concrete Fragments, Moist (FILL)	
	S-1	<del>X</del>	14 - 21 - 7 - 7	21	28				
2 - 4	S-2	<del>X</del>	19 - 20 - 7 - 4	5	27			As Above, with Gravel, Moist (FILL)	
4 - 6	S-3	<del>X</del>	3 - 3 - 3 - 3	12	6	5.0		As Above, with Trace Roots, Moist (FILL)	
6 - 8	S-4	<del>X</del>	2 - 2 - 3 - 4	24	5	6.0	COASTAL PLAIN DEPOSITS	Strong Brown (7.5YR 5/8) LOAMY SAND, Single-Grain, No Roots, No Mottling, Moist, Very Loose to Loose (SP-SM)	
8 - 10	S-5	<del>X</del>	4 - 4 - 9 - 5	24	8			As Above, Moist, Loose (SP-SM)	
10 - 12	S-6	<del>X</del>	4 - 4 - 4 - 4	20	8	10.0		As Above, Moist, Loose (SP-SM)	
12 - 14	S-7	<del>X</del>	5 - 5 - 5 - 6	23	10	14.0		As Above, Trace Silt, Moist, Medium Dense (SP-SM)	
						15.0		Boring Log B-14 Terminated at a Depth of 14.0 Feet Below Ground Surface	
						20.0			
						25.0			

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

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed McDonald's Restaurant No. 29-0019 Rebuild		<b>WAI Project No.:</b> GP1111577.001	
<b>Location:</b> 4295 & 4299 U.S. Route 130; Edgewater Park, Burlington County, NJ		<b>Client:</b> McDonald's USA, LLC	
<b>Surface Elevation:</b> ± 29.0 feet	<b>Date Started:</b> 1/27/2020	<b>Water Depth   Elevation</b> (feet bgs)   (feet)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet)
<b>Termination Depth:</b> 14.0 feet bgs	<b>Date Completed:</b> 1/27/2020	<b>During:</b> 7.0(P)   22.0	<b>At Completion:</b> 12.0   17.0
<b>Proposed Location:</b> SWM	<b>Logged By:</b> TJ	<b>At Completion:</b> NE   ---	<b>At Completion:</b> 12.0   17.0
<b>Drill / Test Method:</b> HSA / SPT	<b>Contractor:</b> BW	<b>24 Hours:</b> ---   ---	<b>24 Hours:</b> ---   ---
	<b>Equipment:</b> CME-55		

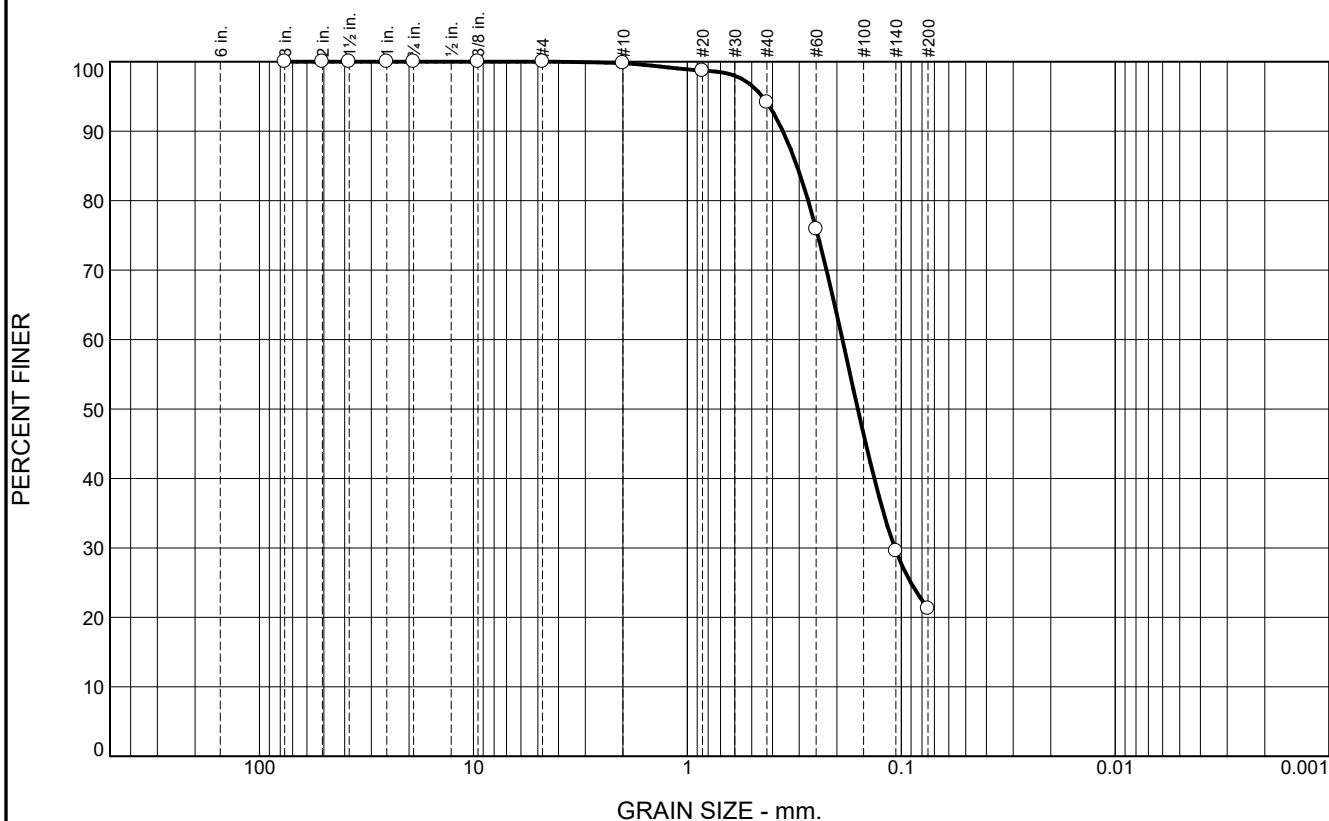
SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	2" Topsoil	
0 - 2	A	B	Environmental Sample	---	---	0.2	FILL	Brown (7.5YR 4/2) SANDY LOAM, with 10% Gravel-Size Concrete Fragments, Single-Grain, No Roots, No Mottling, Moist (FILL)	
	S-1	<del>X</del>	3 - 4 - 4 - 6	15	8				
2 - 4	S-2	<del>X</del>	5 - 17 - 9 - 3	23	21			As Above, with 10% Gravel and Concrete Fragments, Moist (FILL)	
4 - 6	S-3	<del>X</del>	5 - 4 - 4 - 3	24	8	5.0		As Above, with 10% Gravel, Moist (FILL)	
6 - 8	S-4	<del>X</del>	3 - 3 - 4 - 4	21	7	6.0	COASTAL PLAIN DEPOSITS	Strong Brown (7.5YR 5/8) LOAMY SAND, Single-Grain, No Mottling, No Roots, Moist to Wet, Loose (SP-SM)	Perched Water 7.0 fbg to 7.5 fbg
8 - 10	S-5	<del>X</del>	4 - 5 - 6 - 6	24	11			As Above, Moist, Medium Dense (SP-SM)	
10 - 12	S-6	<del>X</del>	6 - 7 - 8 - 8	24	15			As Above, Moist, Medium Dense (SP-SM)	
12 - 14	S-7	<del>X</del>	10 - 11 - 12 - 12	24	23	14.0		As Above, Moist, Medium Dense (SP-SM)	
						15.0		Boring Log B-15 Terminated at a Depth of 14.0 Feet Below Ground Surface	
						20.0			
						25.0			

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

**APPENDIX B**  
**Laboratory Test Results**



# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	5.7	72.8	21.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.8		
#20	98.7		
#40	94.1		
#60	75.9		
#140	29.6		
#200	21.3		

**Material Description**

Silty Sand

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>90</sub>= 0.3577      D<sub>85</sub>= 0.3076      D<sub>60</sub>= 0.1886  
 D<sub>50</sub>= 0.1597      D<sub>30</sub>= 0.1072      D<sub>15</sub>=  
 D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**  
 USCS= SM                      AASHTO= A-2-4(0)

**Remarks**  
 W<sub>n</sub> = 18.9 %

\* (no specification provided)

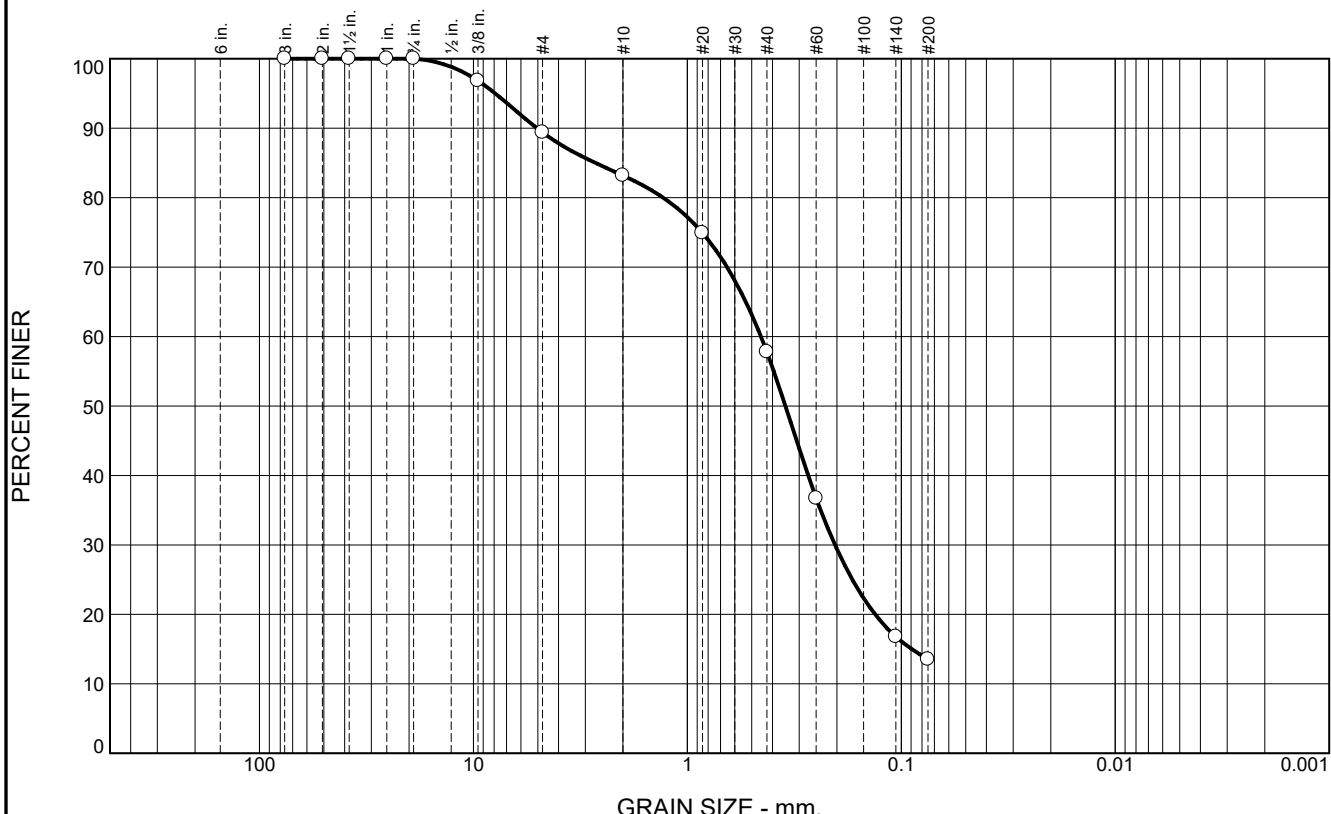
Source of Sample: B-2      Depth: 8.0' - 10.0'  
 Sample Number: S-5

Date: 02/07/2020

**WHITESTONE  
 ASSOCIATES, INC.  
 Warren, New Jersey**

**Client:** McDonald's USA, LLC  
**Project:** Proposed McDonald's Restaurant Rebuild  
 4296 Route 130, Edgewater Park Twp, Burlington Co, NJ  
**Project No:** GP1111577.001      **Figure**

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.6	6.2	25.4	44.3	13.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	96.8		
#4	89.4		
#10	83.2		
#20	74.9		
#40	57.8		
#60	36.7		
#140	16.8		
#200	13.5		

**Material Description**

Silty Sand

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>90</sub>= 5.0540      D<sub>85</sub>= 2.6894      D<sub>60</sub>= 0.4530  
 D<sub>50</sub>= 0.3481      D<sub>30</sub>= 0.2041      D<sub>15</sub>= 0.0894  
 D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**  
 USCS= SM      AASHTO= A-2-4(0)

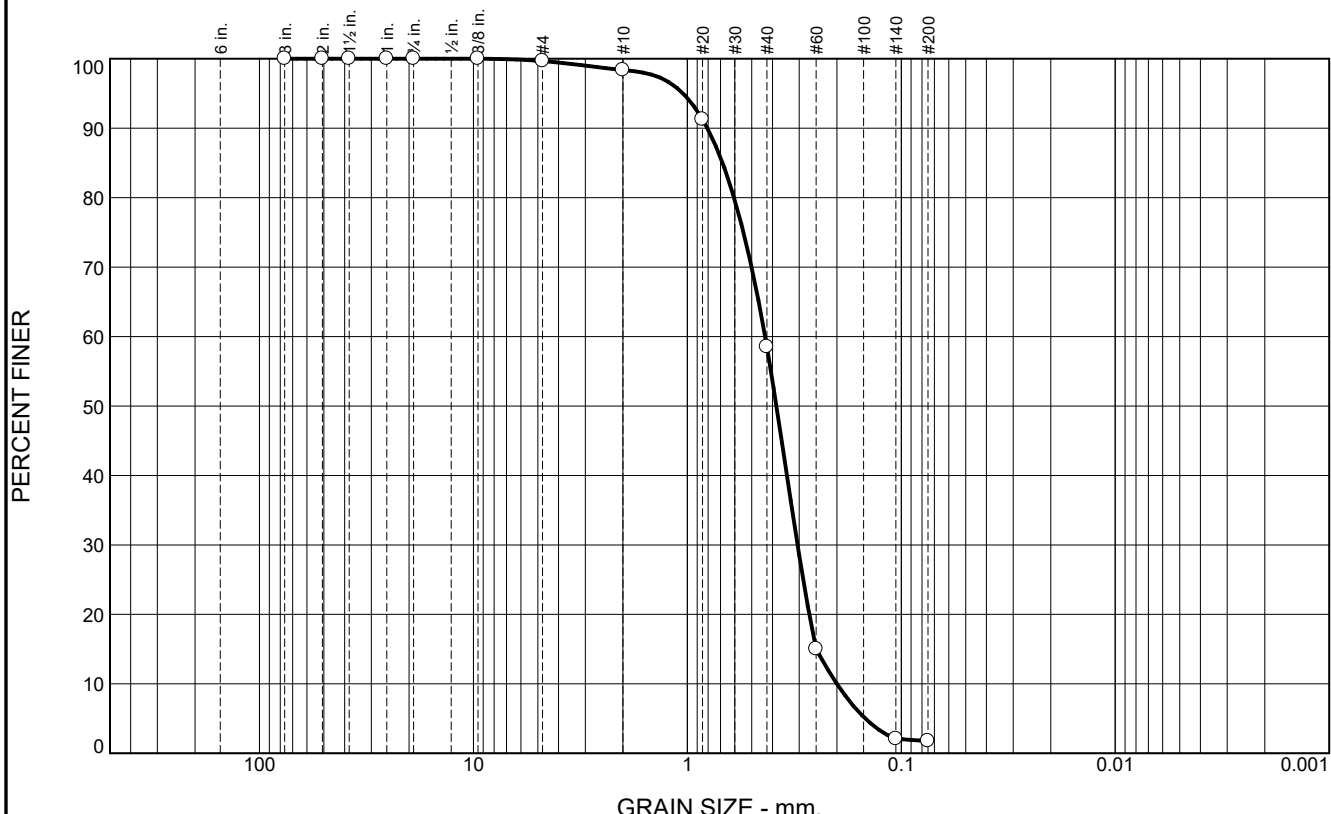
**Remarks**  
 W<sub>n</sub> = 5.6 %

\* (no specification provided)

Source of Sample: B-4      Depth: 3.0' - 5.0'      Date: 02/07/2020  
 Sample Number: S-2

<b>WHITESTONE ASSOCIATES, INC.</b> Warren, New Jersey	Client: McDonald's USA, LLC Project: Proposed McDonald's Restaurant Rebuild 4296 Route 130, Edgewater Park Twp, Burlington Co, NJ Project No: GP1111577.001      Figure
--	--

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	1.3	39.9	56.7	1.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.7		
#10	98.4		
#20	91.3		
#40	58.5		
#60	15.0		
#140	2.1		
#200	1.8		

**Material Description**

Poorly Graded Sand

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>90</sub>= 0.8067      D<sub>85</sub>= 0.6849      D<sub>60</sub>= 0.4332  
 D<sub>50</sub>= 0.3834      D<sub>30</sub>= 0.3055      D<sub>15</sub>= 0.2499  
 D<sub>10</sub>= 0.2001      C<sub>u</sub>= 2.16      C<sub>c</sub>= 1.08

**Classification**  
 USCS= SP      AASHTO= A-3

**Remarks**  
 W<sub>n</sub> = 1.5 %

\* (no specification provided)

Source of Sample: B-12      Depth: 6.0' - 8.0'  
 Sample Number: S-3

Date: 02/07/2020

**WHITESTONE  
 ASSOCIATES, INC.  
 Warren, New Jersey**

Client: McDonald's USA, LLC  
 Project: Proposed McDonald's Restaurant Rebuild  
 4296 Route 130, Edgewater Park Twp, Burlington Co, NJ  
 Project No: GP1111577.001      Figure

**APPENDIX C**  
**Supplemental Information**  
**(USCS, Terms and Symbols)**

# UNIFIED SOIL CLASSIFICATION SYSTEM

## SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
	MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	SM	SILTY SANDS, SAND-SILT MIXTURES	
		LIQUID LIMITS <u>GREATER</u> THAN 50	SC	CLAYEY SANDS, SAND-CLAY MIXTURES	
MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		LIQUID LIMITS <u>GREATER</u> THAN 50	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		LIQUID LIMITS <u>GREATER</u> THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
		LIQUID LIMITS <u>GREATER</u> THAN 50	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
		LIQUID LIMITS <u>GREATER</u> THAN 50	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

**GRADATION\***

% FINER BY WEIGHT

TRACE..... 1% TO 10%  
LITTLE..... 10% TO 20%  
SOME..... 20% TO 35%  
AND..... 35% TO 50%

**COMPACTNESS\***  
Sand and/or Gravel

RELATIVE DENSITY

LOOSE..... 0% TO 40%  
MEDIUM DENSE.... 40% TO 70%  
DENSE..... 70% TO 90%  
VERY DENSE..... 90% TO 100%

**CONSISTENCY\***  
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250  
SOFT..... 250 TO 500  
MEDIUM..... 500 TO 1000  
STIFF..... 1000 TO 2000  
VERY STIFF..... 2000 TO 4000  
HARD..... GREATER THAN 4000

\* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

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*Other Office Locations:*

WARREN, NJ  
908.668.7777

SOUTHBOROUGH, MA  
508.485.0755

ROCKY HILL, CT  
860.726.7889

WALL, NJ  
732.592.2101

STERLING, VA  
703.464.5858

EVERGREEN, CO  
303.670.6905

## GEOTECHNICAL TERMS AND SYMBOLS

### SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

### SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.  
 Qu: Unconfined compressive strength, TSF.  
 Qp: Penetrometer value, unconfined compressive strength, TSF.  
 Mc: Moisture content, %.  
 LL: Liquid limit, %.  
 PI: Plasticity index, %.  
 δd: Natural dry density, PCF.  
 ▽: Apparent groundwater level at time noted after completion of boring.

### DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered).  
 SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.  
 ST: Shelby Tube - 3" O.D., except where noted.  
 AU: Auger Sample.  
 OB: Diamond Bit.  
 CB: Carbide Bit  
 WS: Washed Sample.

### RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>Term (Non-Cohesive Soils)</u>	<u>Standard Penetration Resistance</u>
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

<u>Term (Cohesive Soils)</u>	<u>Qu (TSF)</u>
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

### PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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**APPENDIX D**  
**Infiltration Test Results**



# INFILTRATION TEST

**Client:** McDonald's USA, LLC

**Project:** Proposed McDonald's Restaurant No. 29-0019 Rebuild

**Location:** 4295 & 4299 U.S. Route 130, Edgewater Park, Burlington Co., NJ

**File No.** GP1111577.001

**Surf. Elev.** ±29.0

**Test Hole No.:** I-1 at B-13

**Date:** 1/27/2020

**Weather:** Cloudy/Clear (30-40°F)

**Field Engineer:** TJ

**Test Depth Ft. | Elev.:** ±6.5 | 22.5

Reading No.	Time		Water Level Reading (inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
	Start	Finish	Start	Finish			
PS	9:45AM	10:15 AM	24.0	21.5	2.5	0.5	5.0
PS	10:45 AM	11:15 AM	24.0	24.5	2.5	0.5	5.0
1	11:15 AM	11:25 AM	24.0	23.5	0.5	0.16	3.0
2	11:25 AM	11:35 AM	24.0	23.7	0.3	0.16	1.8
3	11:35 AM	11:45 AM	24.0	23.7	0.3	0.16	1.8
4	11:45 AM	11:55 AM	24.0	23.7	0.3	0.16	1.8
5	11:55 AM	12:05 PM	24.0	23.7	0.3	0.16	1.8
6	12:05 PM	12:15 PM	24.0	23.7	0.3	0.16	1.8

Field *i* = 1.8 in/hr

NOTES: PS = Pre Soak; NS = Not Surveyed





# INFILTRATION TEST

**Client:** McDonald's USA, LLC

**Project:** Proposed McDonald's Restaurant No. 29-0019 Rebuild

**Location:** 4295 & 4299 U.S. Route 130, Edgewater Park, Burlington Co., NJ

**File No.** GP1111577.001

**Surf. Elev.** ±28.0

**Test Hole No.:** I-2 at B-12

**Date:** 1/27/2020

**Weather:** Cloudy/Clear (30-40°F)

**Field Engineer:** TJ

**Test Depth Ft. | Elev.:** ±6.5 | 21.5

Reading No.	Time		Water Level Reading (inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
	Start	Finish	Start	Finish			
PS	10:29 AM	10:59 AM	24.0	19.0	5.0	0.5	10.0
PS	10:59 AM	11:39 AM	24.0	23.0	1.0	0.5	6.0
1	11:39 AM	11:49 AM	24.0	23.5	0.5	0.16	3.0
2	11:49 AM	11:59 AM	24.0	23.8	0.2	0.16	1.2
3	11:59 AM	12:09 PM	24.0	23.8	0.2	0.16	1.2
4	12:09 PM	12:19 PM	24.0	23.8	0.2	0.16	1.2
5	12:19 PM	12:29 PM	24.0	23.8	0.2	0.16	1.2
6	12:29 PM	12:39 PM	24.0	23.8	0.2	0.16	1.2

Field *i* = 1.2 in/hr

NOTES: PS = Pre Soak; NS = Not Surveyed



# INFILTRATION TEST

**Client:** McDonald's USA, LLC

**Project:** Proposed McDonald's Restaurant No. 29-0019 Rebuild

**Location:** 4295 & 4299 U.S. Route 130, Edgewater Park, Burlington Co., NJ

**File No.** GP1111577.001

**Surf. Elev.** ±29.0

**Test Hole No.:** I-3 at B-15

**Date:** 1/27/2020

**Weather:** Cloudy/Clear (30-40°F)

**Field Engineer:** TJ

**Test Depth Ft. | Elev.:** ±7.5 | 21.5

Reading No.	Time		Water Level Reading (inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
	Start	Finish	Start	Finish			
PS	1:00 PM	1:30 PM	24.0	21.0	3.0	0.5	6.0
PS	1:30 PM	2:00 PM	24.0	21.0	3.0	0.5	6.0
1	2:00 PM	2:10 PM	24.0	23.2	0.8	0.16	4.8
2	2:10 PM	2:20 PM	24.0	23.5	0.5	0.16	3.0
3	2:20 PM	2:30 PM	24.0	23.8	0.2	0.16	1.2
4	2:30 PM	2:40 PM	24.0	23.8	0.2	0.16	1.2
5	2:40 PM	2:50 PM	24.0	23.8	0.2	0.16	1.2
6	2:50 PM	3:00 PM	24.0	23.8	0.2	0.16	1.2
7	3:00 PM	3:10 PM	24.0	23.8	0.2	0.16	1.2

Field *i* = 1.2 in/hr

NOTES: PS = Pre Soak; NS = Not Surveyed



# INFILTRATION TEST

**Client:** McDonald's USA, LLC

**Project:** Proposed McDonald's Restaurant No. 29-0019 Rebuild

**Location:** 4295 & 4299 U.S. Route 130, Edgewater Park, Burlington Co., NJ

**File No.** GP1111577.001

**Surf. Elev.** ±29.0

**Test Hole No.:** I-4 at B-14

**Date:** 1/27/2020

**Weather:** Cloudy/Clear (30-40°F)

**Field Engineer:** TJ

**Test Depth Ft. | Elev.:** ±4.0 | 25.0

Reading No.	Time		Water Level Reading (inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/Hour)
	Start	Finish	Start	Finish			
PS	1:05 PM	1:35 PM	24.0	18.50	5.50	0.5	11.0
PS	1:35 PM	2:05 PM	24.0	21.5	2.5	0.5	5.0
1	2:05 PM	2:15 PM	24.0	23.7	0.3	0.16	1.8
2	2:15 PM	2:25 PM	24.0	23.7	0.3	0.16	1.8
3	2:25 PM	2:35 PM	24.0	23.7	0.3	0.16	1.8
4	2:35 PM	2:45 PM	24.0	23.7	0.3	0.16	1.8
5	2:45 PM	2:55 PM	24.0	23.70	0.30	0.16	1.8
6	2:55 PM	3:05 PM	24.0	23.70	0.30	0.16	1.8

Field *i* = 1.8 in/hr

NOTES: PS = Pre Soak; NS = Not Surveyed



## **Appendix B – Drainage Area Plans**

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