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Project Memo

Date: 5/4/16 **Job No. 1948**

To: New Bedford Conservation Commission

Cc:

From: Rich Riccio

Re: 200 Theodore Rice Boulevard – Amended OOC Request - Updated Drainage Calculations

COMMONWEALTH OF MASSACHUSETTS
RICHARD R. RICCIO III
CIVIL
No. 43898
REGISTERED PROFESSIONAL ENGINEER
5/4/16

The purpose of this memorandum is to summarize the results of the updated Post Development Hydrologic Calculations that have been performed to support a Request for an Amended Order of Conditions for the above referenced project. The previously approved Pre Development Hydrologic Analysis remains unchanged from the Stormwater Management System Report Addendum 2 prepared for NSTAR and dated 11/9/13. The results of those calculations are presented below for comparison.

Previously Approved Pre Development Hydrologic Summary

Storm Event	Analysis Point AP-1 Rate of Flow (c.f.s.)	Analysis Point AP-2 Rate of Flow (c.f.s.)	Analysis Point AP-3 Rate of Flow (c.f.s.)	Analysis Point AP-4 Rate of Flow (c.f.s.)
2-year storm	11.89	15.35	0.77	4.32
10-year storm	20.82	27.81	2.34	8.11
25-year storm	26.61	36.12	3.52	10.77
100-year storm	37.01	51.15	5.84	15.73

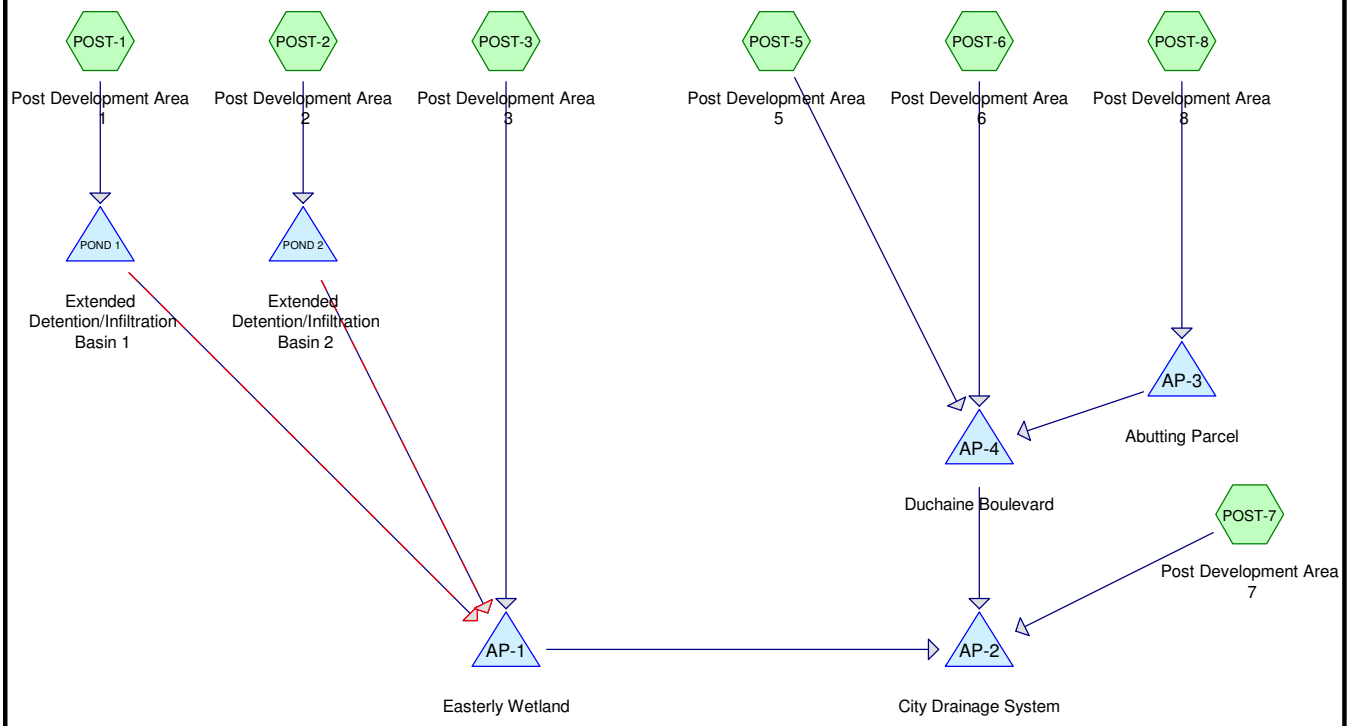
As described in the Request for an Amended Order of Conditions, the applicant is proposing to construct a smaller project than previously approved and the Post Development Hydrologic Analysis has been re-visited to address the design changes shown on the plans. A summary of the results of the updated Post Development Hydrologic Analysis is presented below.

Updated Post Development Hydrologic Summary

Storm Event	Analysis Point AP-1 Rate of Flow (c.f.s.)	Analysis Point AP-2 Rate of Flow (c.f.s.)	Analysis Point AP-3 Rate of Flow (c.f.s.)	Analysis Point AP-4 Rate of Flow (c.f.s.)
2-year storm	4.50	11.05	0.67	5.89
10-year storm	13.71	26.86	2.09	10.26
25-year storm	17.43	35.26	3.14	13.14
100-year storm	23.06	48.13	5.20	18.47

The revised hydrologic analysis indicates that the stormwater management system design for the site still meets or reduces peak runoff rates for the 2, 10, 25, and 100 year, 24 hour, Type III storm events from the pre developed levels at the subject analysis points. It should be noted that in the Analysis, we ultimately combined the runoff from the easterly wetlands (Analysis Point 1) and the abutting properties (Analysis Point 3) with the areas contributing runoff the Duchaine Boulevard drainage system (Analysis Point 2), as all of this water ultimately discharges to the substantial culvert and drainage ditch running along Duchaine Boulevard. As the above tables and the analysis show, the proposed re-development of this property will not result in an increase in the rates of runoff to the Duchaine Boulevard drainage system south of Barnet Boulevard. The proposed redevelopment of this property will actually result in approximately 28% reduction in the contributing rates of runoff in the 2 year storm event and a 6% reduction in the 100 year storm event.

We had also added Analysis Point 4 to this study, which is the portion of the Duchaine Boulevard drainage system to the immediate west of the project site. We have added this Analysis Point at the request of Nitsch during their second review. As the tables above show, there is an increase in the rates of runoff to this portion of the Duchaine Boulevard Drainage system; however, the increase is less than was previously approved. We will work with the New Bedford Department of Public Infrastructure to ensure the continued functionality of this portion of the Duchaine Boulevard drainage system as a result of this project.



Subcat Reach Pond Link

Routing Diagram for 1948_Post-Development Final-2016Update
Prepared by Field Engineering Co. Inc.

Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment POST-1: Post Runoff Area=210,010 sf 81.60% Impervious Runoff Depth=2.54"
Tc=6.0 min CN=91 Runoff=13.98 cfs 1.021 af

Subcatchment POST-2: Post Development Runoff Area=29,717 sf 51.34% Impervious Runoff Depth=1.78"
Tc=6.0 min CN=82 Runoff=1.42 cfs 0.101 af

Subcatchment POST-3: Post Development Runoff Area=150,851 sf 2.08% Impervious Runoff Depth=0.71"
Flow Length=390' Slope=0.0100 '/' Tc=13.8 min CN=64 Runoff=1.78 cfs 0.203 af

Subcatchment POST-5: Post Development Runoff Area=66,789 sf 54.70% Impervious Runoff Depth=1.71"
Flow Length=300' Slope=0.0100 '/' Tc=9.9 min CN=81 Runoff=2.67 cfs 0.218 af

Subcatchment POST-6: Post Development Runoff Area=43,316 sf 78.89% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=90 Runoff=2.80 cfs 0.203 af

Subcatchment POST-7: Post Runoff Area=109,739 sf 43.74% Impervious Runoff Depth=1.37"
Flow Length=487' Tc=13.6 min CN=76 Runoff=3.07 cfs 0.287 af

Subcatchment POST-8: Post Development Runoff Area=80,316 sf 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=59 Runoff=0.67 cfs 0.076 af

Pond AP-1: Easterly Wetland Inflow=4.50 cfs 0.812 af
Primary=4.50 cfs 0.812 af

Pond AP-2: City Drainage System Inflow=11.05 cfs 1.595 af
Primary=11.05 cfs 1.595 af

Pond AP-3: Abutting Parcel Inflow=0.67 cfs 0.076 af
Primary=0.67 cfs 0.076 af

Pond AP-4: Duchaine Boulevard Inflow=5.89 cfs 0.497 af
Primary=5.89 cfs 0.497 af

Pond POND 1: Extended Peak Elev=86.57' Storage=18,524 cf Inflow=13.98 cfs 1.021 af
Discarded=0.32 cfs 0.412 af Primary=3.20 cfs 0.609 af Secondary=0.00 cfs 0.000 af Outflow=3.52 cfs 1.021 af

Pond POND 2: Extended Detention/Infiltration Peak Elev=85.74' Storage=1,604 cf Inflow=1.42 cfs 0.101 af
Discarded=0.17 cfs 0.101 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.101 af

Total Runoff Area = 15.857 ac Runoff Volume = 2.109 af Average Runoff Depth = 1.60"
55.34% Pervious = 8.776 ac 44.66% Impervious = 7.081 ac

Summary for Subcatchment POST-1: Post Development Area 1

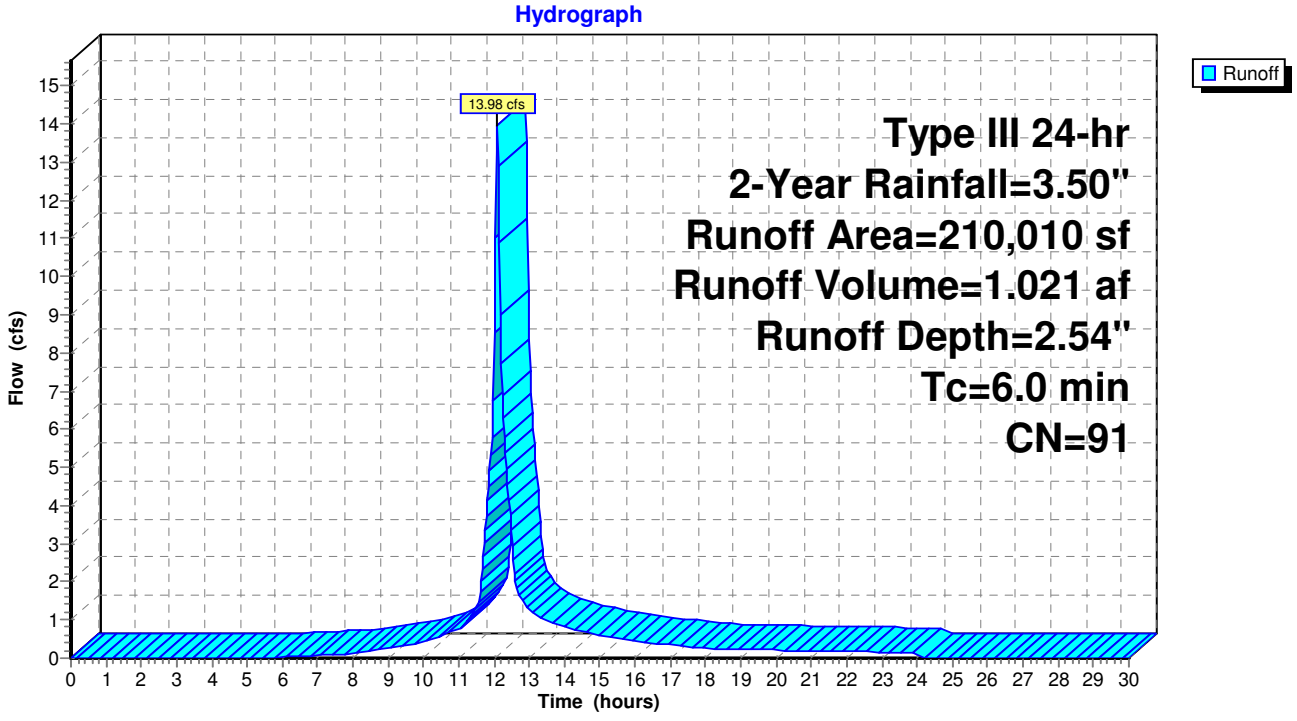
Runoff = 13.98 cfs @ 12.09 hrs, Volume= 1.021 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
117,140	98	Roofs, HSG B
54,222	98	Paved parking, HSG B
38,648	61	>75% Grass cover, Good, HSG B
210,010	91	Weighted Average
38,648		18.40% Pervious Area
171,362		81.60% Impervious Area

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

Subcatchment POST-1: Post Development Area 1



Summary for Subcatchment POST-2: Post Development Area 2

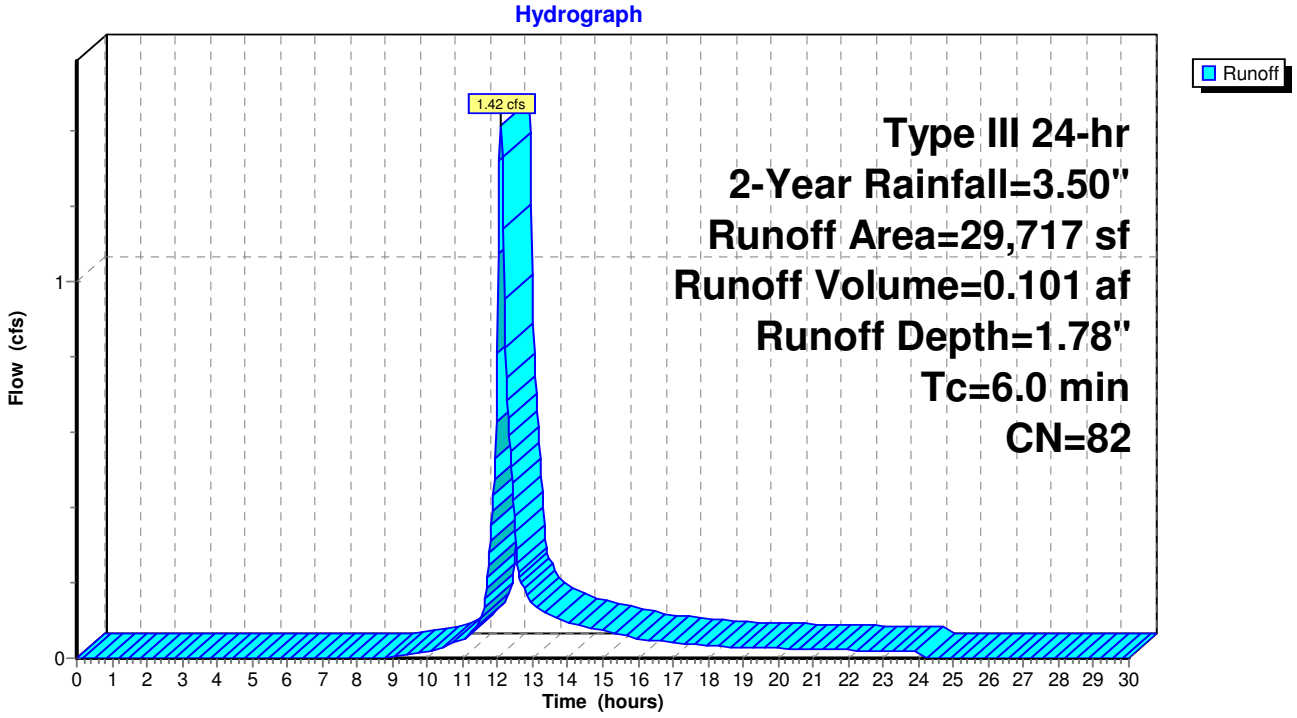
Runoff = 1.42 cfs @ 12.09 hrs, Volume= 0.101 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
15,256	98	Paved parking, HSG B
10,651	61	>75% Grass cover, Good, HSG B
3,810	80	>75% Grass cover, Good, HSG D
29,717	82	Weighted Average
14,461		48.66% Pervious Area
15,256		51.34% Impervious Area

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

Subcatchment POST-2: Post Development Area 2



Summary for Subcatchment POST-3: Post Development Area 3

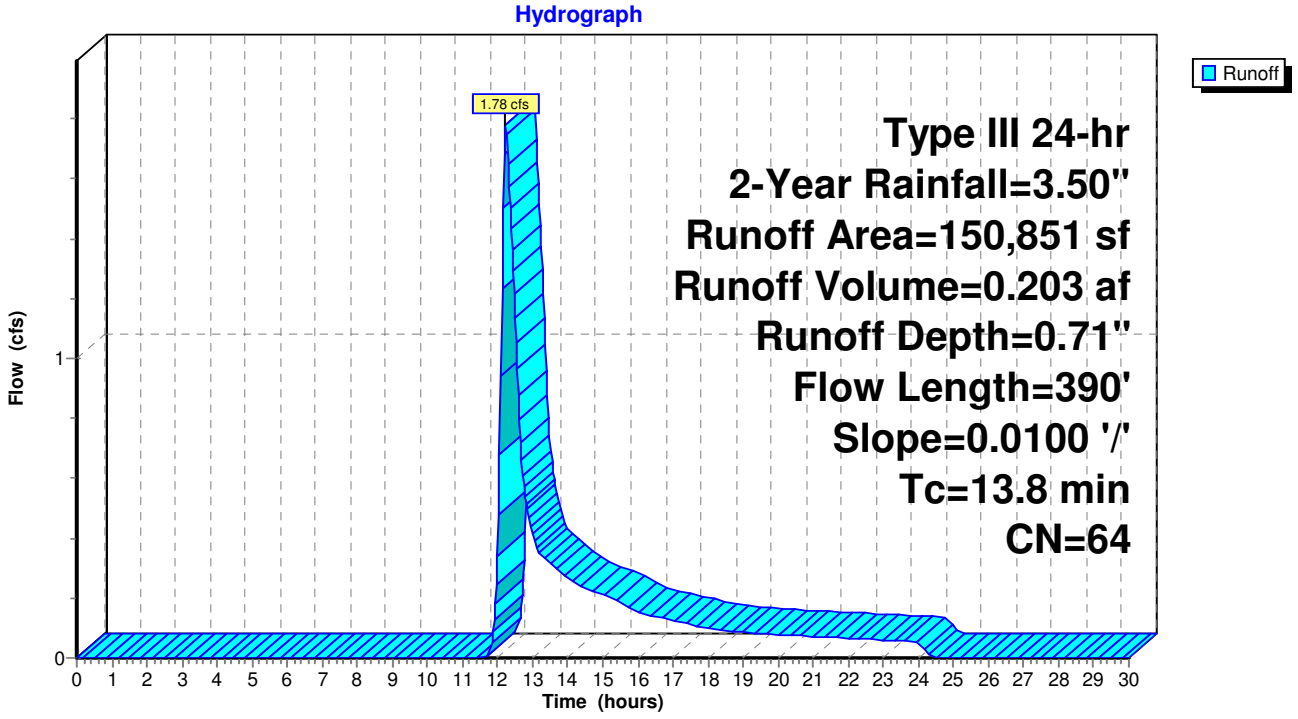
Runoff = 1.78 cfs @ 12.23 hrs, Volume= 0.203 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
3,139	98	Paved parking, HSG B
15,504	61	>75% Grass cover, Good, HSG B
11,430	80	>75% Grass cover, Good, HSG D
81,786	55	Woods, Good, HSG B
38,992	77	Woods, Good, HSG D
150,851	64	Weighted Average
147,712		97.92% Pervious Area
3,139		2.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.50"
3.5	340	0.0100	1.61		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	390	Total			

Subcatchment POST-3: Post Development Area 3



Summary for Subcatchment POST-5: Post Development Area 5

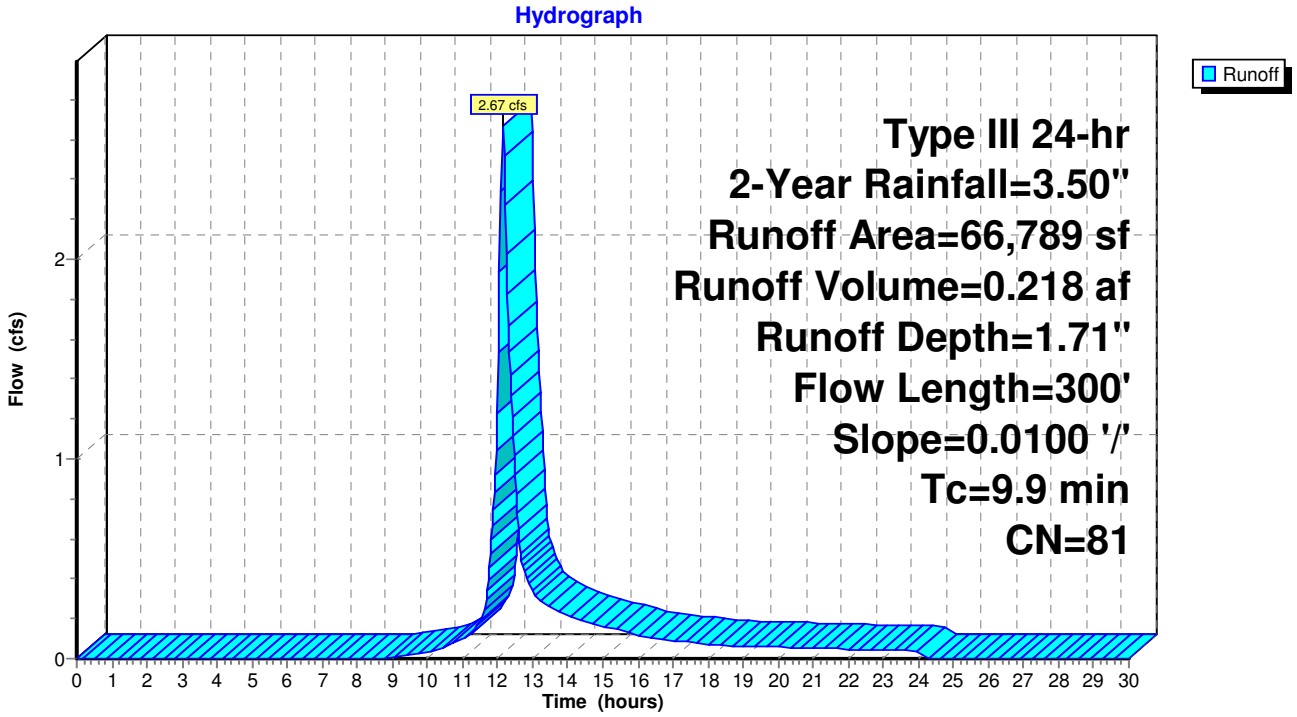
Runoff = 2.67 cfs @ 12.14 hrs, Volume= 0.218 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
36,536	98	Paved parking, HSG B
30,253	61	>75% Grass cover, Good, HSG B
66,789	81	Weighted Average
30,253		45.30% Pervious Area
36,536		54.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
2.8	250	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
9.9	300	Total			

Subcatchment POST-5: Post Development Area 5



Summary for Subcatchment POST-6: Post Development Area 6

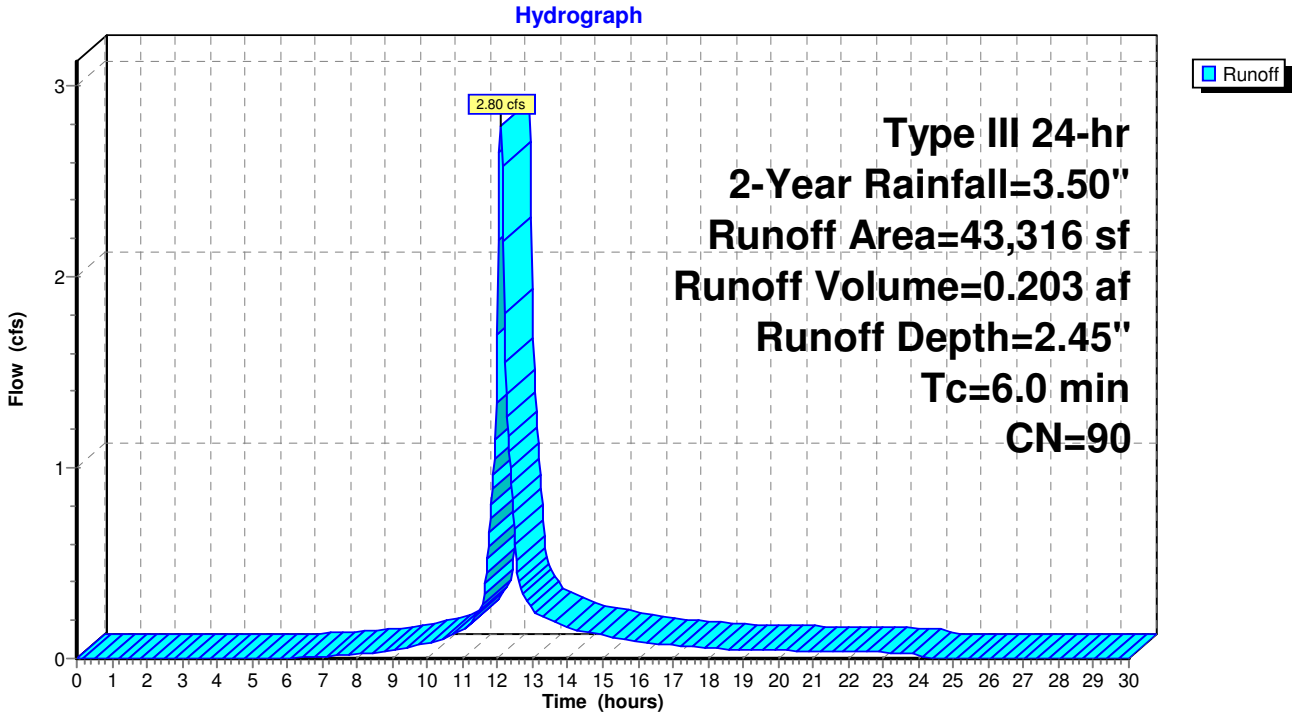
Runoff = 2.80 cfs @ 12.09 hrs, Volume= 0.203 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
34,171	98	Paved parking, HSG B
9,145	61	>75% Grass cover, Good, HSG B
43,316	90	Weighted Average
9,145		21.11% Pervious Area
34,171		78.89% Impervious Area

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

Subcatchment POST-6: Post Development Area 6



Summary for Subcatchment POST-7: Post Development Area 7

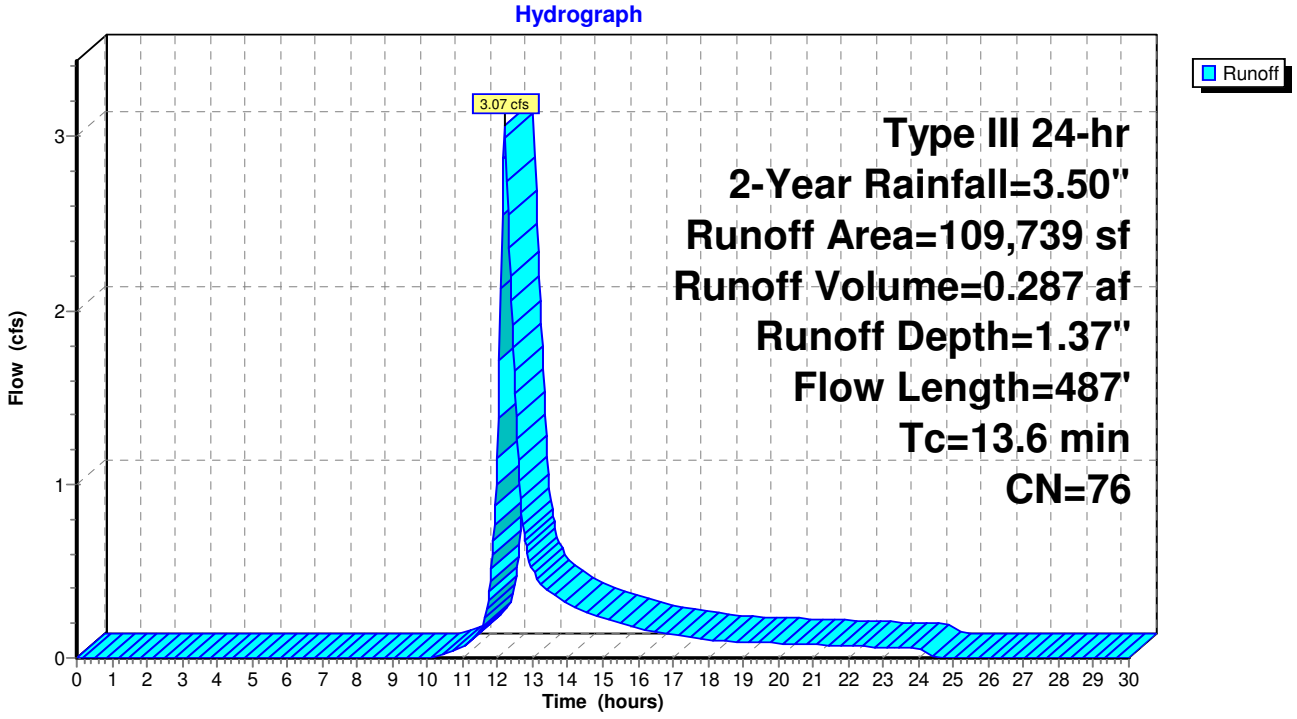
Runoff = 3.07 cfs @ 12.20 hrs, Volume= 0.287 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
47,999	98	Paved parking, HSG B
7,096	39	>75% Grass cover, Good, HSG A
54,644	61	>75% Grass cover, Good, HSG B
109,739	76	Weighted Average
61,740		56.26% Pervious Area
47,999		43.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
0.2	37	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
6.3	400	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
13.6	487	Total			

Subcatchment POST-7: Post Development Area 7



Summary for Subcatchment POST-8: Post Development Area 8

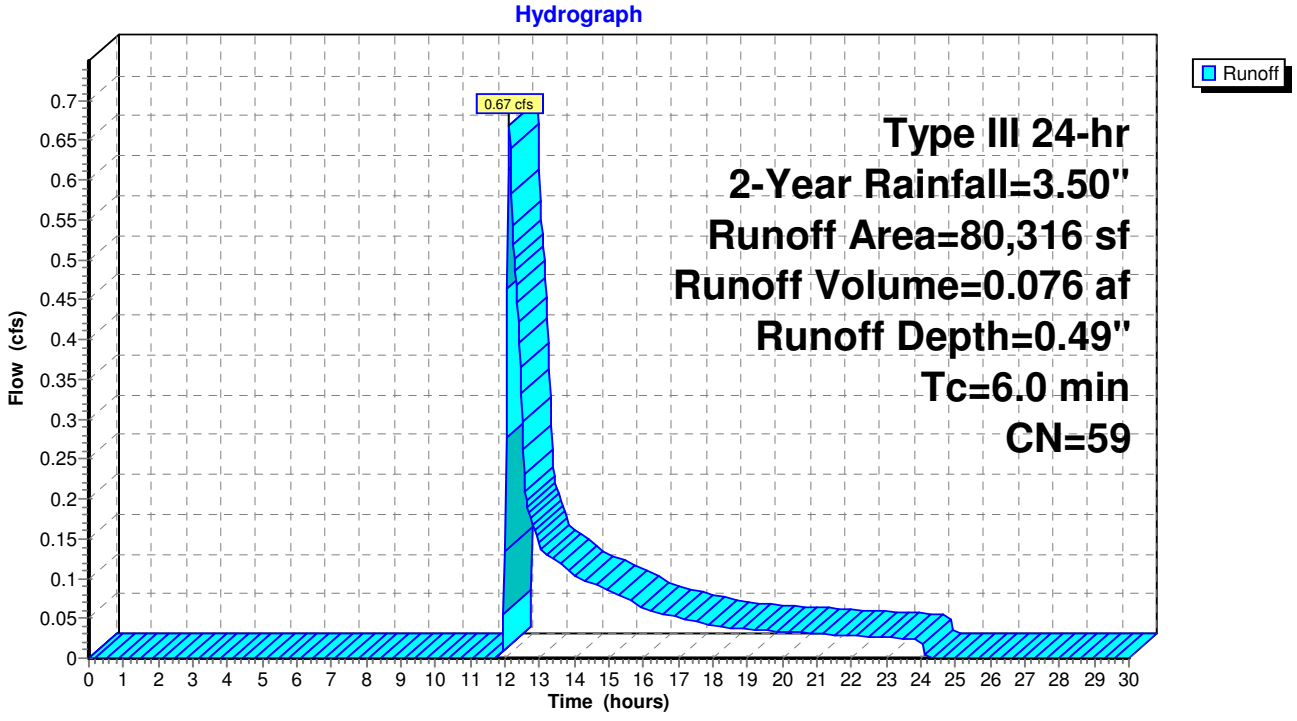
Runoff = 0.67 cfs @ 12.12 hrs, Volume= 0.076 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.50"

Area (sf)	CN	Description
43,702	55	Woods, Good, HSG B
28,772	61	>75% Grass cover, Good, HSG B
1,347	80	>75% Grass cover, Good, HSG D
6,495	77	Woods, Good, HSG D
80,316	59	Weighted Average
80,316		100.00% Pervious Area

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

Subcatchment POST-8: Post Development Area 8



Summary for Pond AP-1: Easterly Wetland

Analysis Point 1 is taken at the Boundary of the Easterly Wetland System

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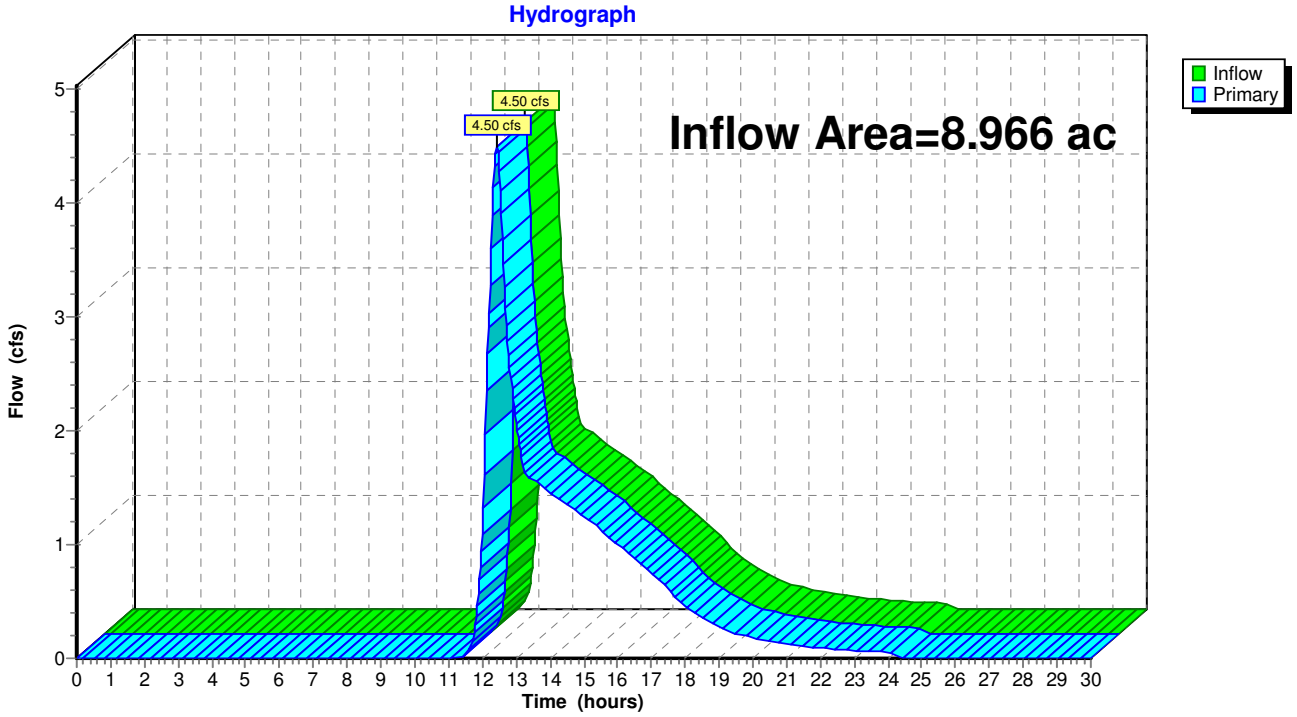
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.966 ac, 48.58% Impervious, Inflow Depth = 1.09" for 2-Year event
Inflow = 4.50 cfs @ 12.43 hrs, Volume= 0.812 af
Primary = 4.50 cfs @ 12.43 hrs, Volume= 0.812 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-1: Easterly Wetland



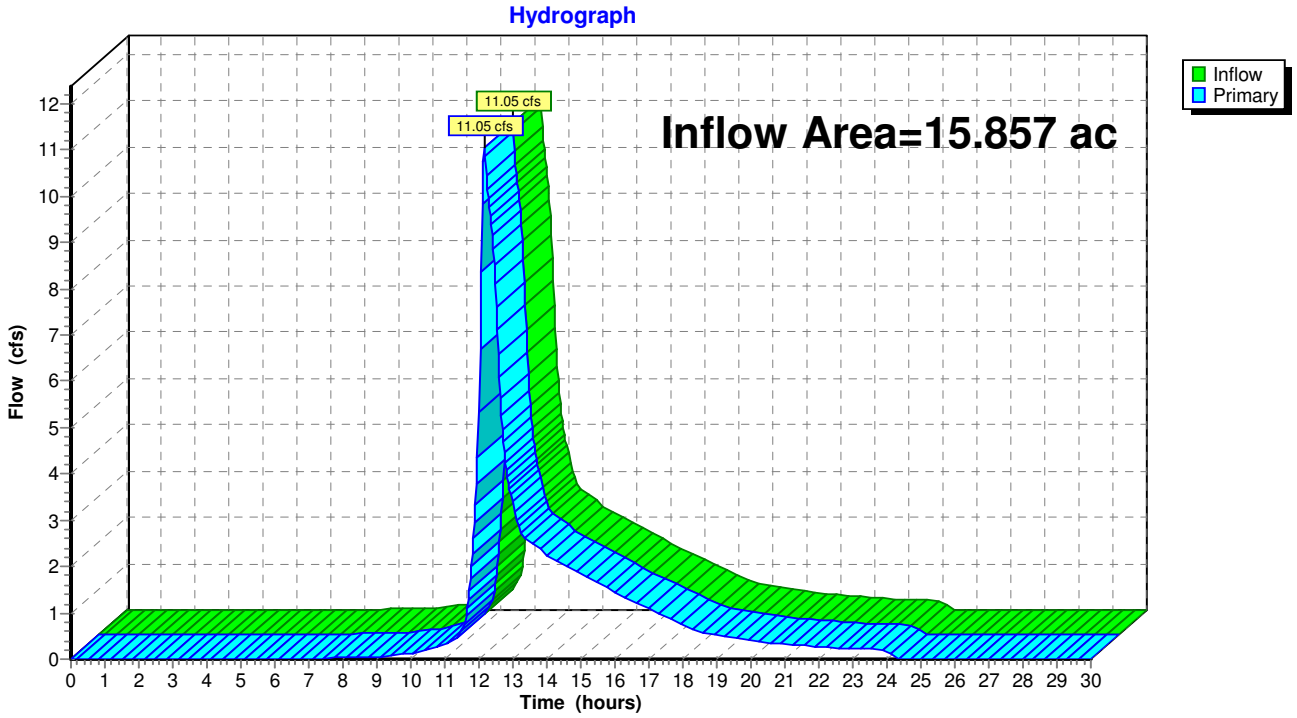
Summary for Pond AP-2: City Drainage System

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

Inflow Area = 15.857 ac, 44.66% Impervious, Inflow Depth = 1.21" for 2-Year event
Inflow = 11.05 cfs @ 12.15 hrs, Volume= 1.595 af
Primary = 11.05 cfs @ 12.15 hrs, Volume= 1.595 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-2: City Drainage System



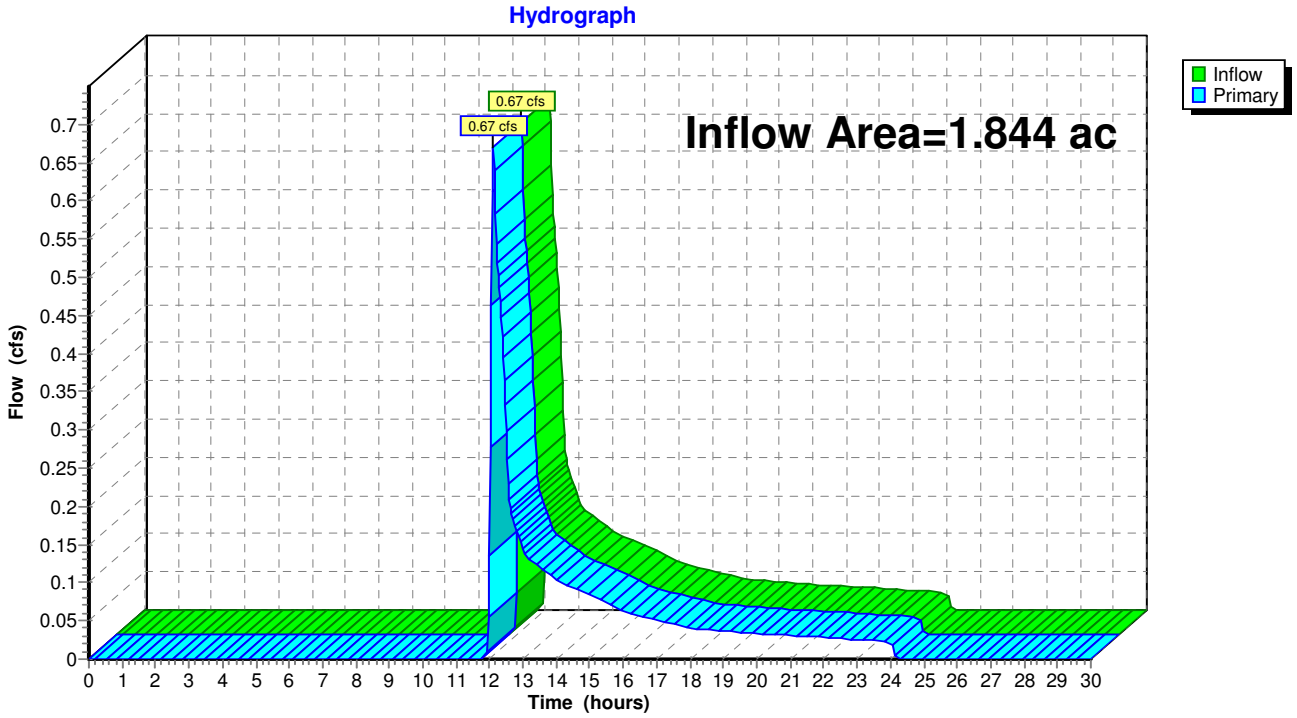
Summary for Pond AP-3: Abutting Parcel

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

Inflow Area = 1.844 ac, 0.00% Impervious, Inflow Depth = 0.49" for 2-Year event
Inflow = 0.67 cfs @ 12.12 hrs, Volume= 0.076 af
Primary = 0.67 cfs @ 12.12 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-3: Abutting Parcel



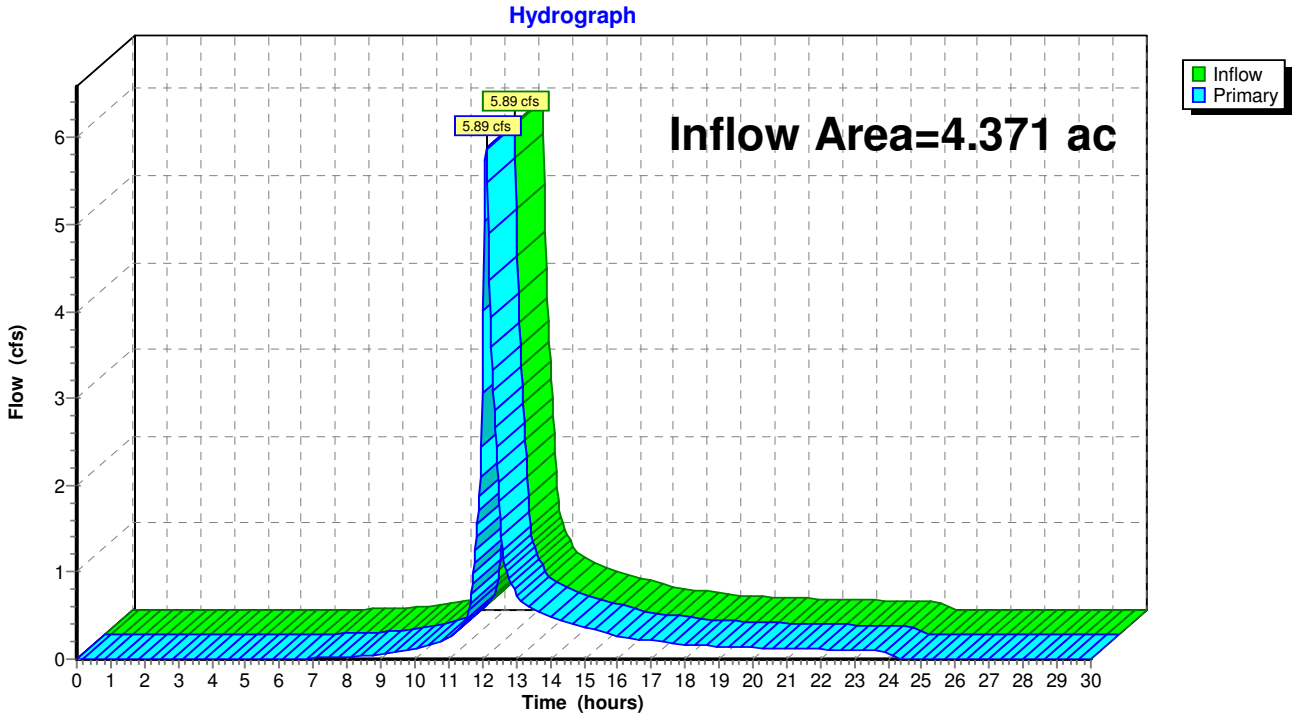
Summary for Pond AP-4: Duchaine Boulevard

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

Inflow Area = 4.371 ac, 37.13% Impervious, Inflow Depth = 1.36" for 2-Year event
Inflow = 5.89 cfs @ 12.11 hrs, Volume= 0.497 af
Primary = 5.89 cfs @ 12.11 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-4: Duchaine Boulevard



Summary for Pond POND 1: Extended Detention/Infiltration Basin 1

Inflow Area = 4.821 ac, 81.60% Impervious, Inflow Depth = 2.54" for 2-Year event
Inflow = 13.98 cfs @ 12.09 hrs, Volume= 1.021 af
Outflow = 3.52 cfs @ 12.47 hrs, Volume= 1.021 af, Atten= 75%, Lag= 22.9 min
Discarded = 0.32 cfs @ 12.47 hrs, Volume= 0.412 af
Primary = 3.20 cfs @ 12.47 hrs, Volume= 0.609 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 86.57' @ 12.47 hrs Surf.Area= 13,694 sf Storage= 18,524 cf

Plug-Flow detention time= 139.4 min calculated for 1.021 af (100% of inflow)
Center-of-Mass det. time= 139.4 min (938.6 - 799.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	42,129 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	9,930	0	0
86.00	12,307	11,119	11,119
87.00	14,741	13,524	24,643
88.00	20,231	17,486	42,129

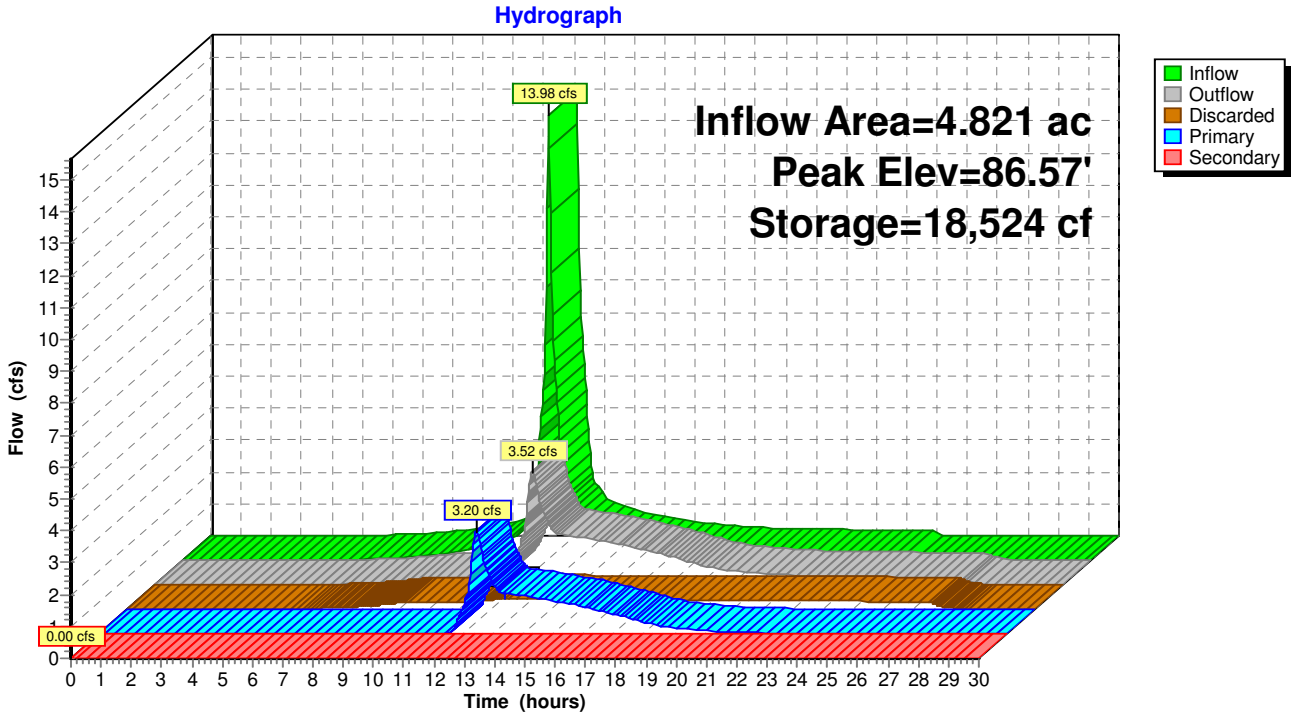
Device	Routing	Invert	Outlet Devices
#1	Primary	85.25'	**15.0" Round Culvert X 2.00** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 85.25' / 85.00' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	85.25'	**5.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	86.40'	**4.0' long Sharp-Crested Rectangular Weir X 2.00** 2 End Contraction(s)
#4	Secondary	87.50'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.32 cfs @ 12.47 hrs HW=86.57' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=3.19 cfs @ 12.47 hrs HW=86.57' (Free Discharge)
└**1=Culvert** (Passes 3.19 cfs of 8.55 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.38 cfs @ 5.08 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.81 cfs @ 1.35 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 1: Extended Detention/Infiltration Basin 1



Summary for Pond POND 2: Extended Detention/Infiltration Basin 2

Inflow Area = 0.682 ac, 51.34% Impervious, Inflow Depth = 1.78" for 2-Year event
Inflow = 1.42 cfs @ 12.09 hrs, Volume= 0.101 af
Outflow = 0.17 cfs @ 12.86 hrs, Volume= 0.101 af, Atten= 88%, Lag= 45.9 min
Discarded = 0.17 cfs @ 12.86 hrs, Volume= 0.101 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs / 4
Peak Elev= 85.74' @ 12.86 hrs Surf.Area= 7,155 sf Storage= 1,604 cf

Plug-Flow detention time= 82.6 min calculated for 0.101 af (100% of inflow)
Center-of-Mass det. time= 82.5 min (914.5 - 832.0)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	15,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.50	6,257	0	0
86.00	8,134	3,598	3,598
87.00	10,100	9,117	12,715
87.25	10,585	2,586	15,300

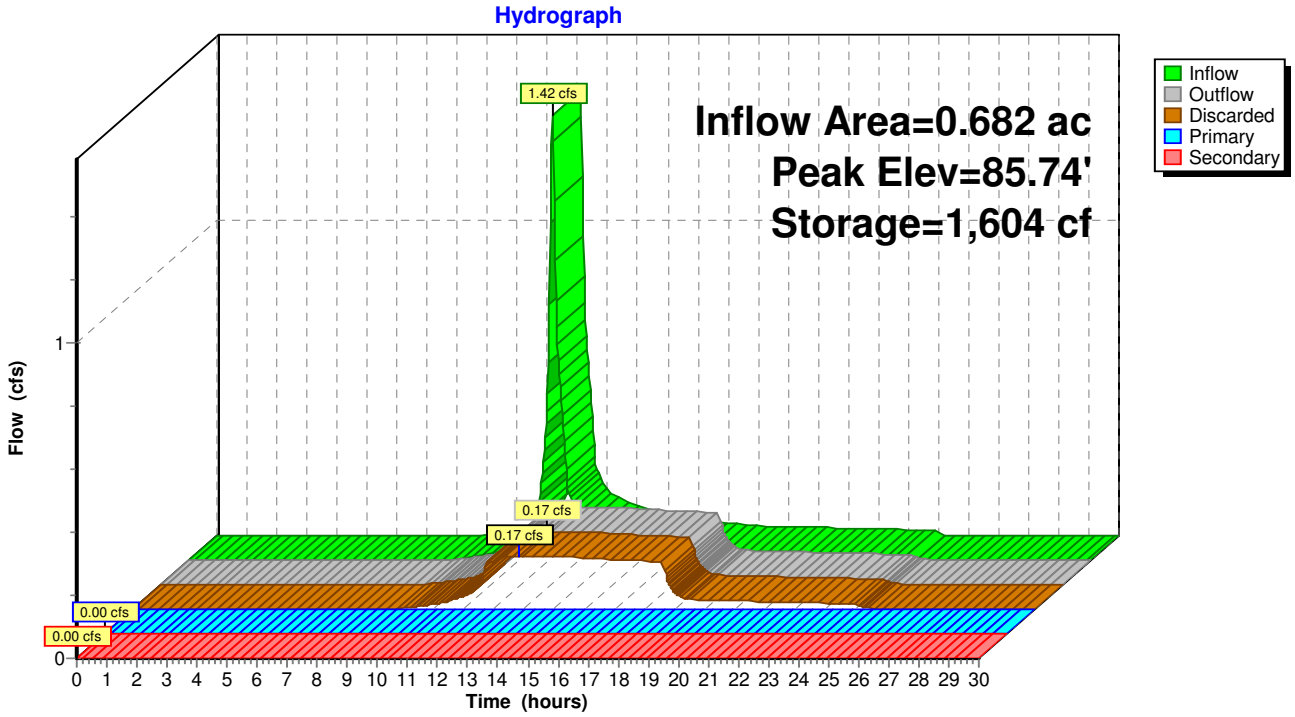
Device	Routing	Invert	Outlet Devices
#1	Primary	85.50'	**12.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.50' / 85.00' S= 0.0238 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	85.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	86.25'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	86.75'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.17 cfs @ 12.86 hrs HW=85.74' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 2: Extended Detention/Infiltration Basin 2



Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment POST-1: Post Runoff Area=210,010 sf 81.60% Impervious Runoff Depth=3.79"
Tc=6.0 min CN=91 Runoff=20.44 cfs 1.522 af

Subcatchment POST-2: Post Development Runoff Area=29,717 sf 51.34% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=82 Runoff=2.30 cfs 0.165 af

Subcatchment POST-3: Post Development Runoff Area=150,851 sf 2.08% Impervious Runoff Depth=1.45"
Flow Length=390' Slope=0.0100 '/' Tc=13.8 min CN=64 Runoff=4.25 cfs 0.419 af

Subcatchment POST-5: Post Development Runoff Area=66,789 sf 54.70% Impervious Runoff Depth=2.81"
Flow Length=300' Slope=0.0100 '/' Tc=9.9 min CN=81 Runoff=4.40 cfs 0.359 af

Subcatchment POST-6: Post Development Runoff Area=43,316 sf 78.89% Impervious Runoff Depth=3.68"
Tc=6.0 min CN=90 Runoff=4.13 cfs 0.305 af

Subcatchment POST-7: Post Runoff Area=109,739 sf 43.74% Impervious Runoff Depth=2.37"
Flow Length=487' Tc=13.6 min CN=76 Runoff=5.47 cfs 0.498 af

Subcatchment POST-8: Post Development Runoff Area=80,316 sf 0.00% Impervious Runoff Depth=1.12"
Tc=6.0 min CN=59 Runoff=2.09 cfs 0.172 af

Pond AP-1: Easterly Wetland Inflow=13.71 cfs 1.477 af
Primary=13.71 cfs 1.477 af

Pond AP-2: City Drainage System Inflow=26.86 cfs 2.812 af
Primary=26.86 cfs 2.812 af

Pond AP-3: Abutting Parcel Inflow=2.09 cfs 0.172 af
Primary=2.09 cfs 0.172 af

Pond AP-4: Duchaine Boulevard Inflow=10.26 cfs 0.837 af
Primary=10.26 cfs 0.837 af

Pond POND 1: Extended Peak Elev=86.86' Storage=22,613 cf Inflow=20.44 cfs 1.522 af
Discarded=0.34 cfs 0.466 af Primary=9.55 cfs 1.056 af Secondary=0.00 cfs 0.000 af Outflow=9.89 cfs 1.522 af

Pond POND 2: Extended Detention/Infiltration Peak Elev=85.93' Storage=3,029 cf Inflow=2.30 cfs 0.165 af
Discarded=0.19 cfs 0.163 af Primary=0.01 cfs 0.002 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.165 af

Total Runoff Area = 15.857 ac Runoff Volume = 3.441 af Average Runoff Depth = 2.60"
55.34% Pervious = 8.776 ac 44.66% Impervious = 7.081 ac

Summary for Subcatchment POST-1: Post Development Area 1

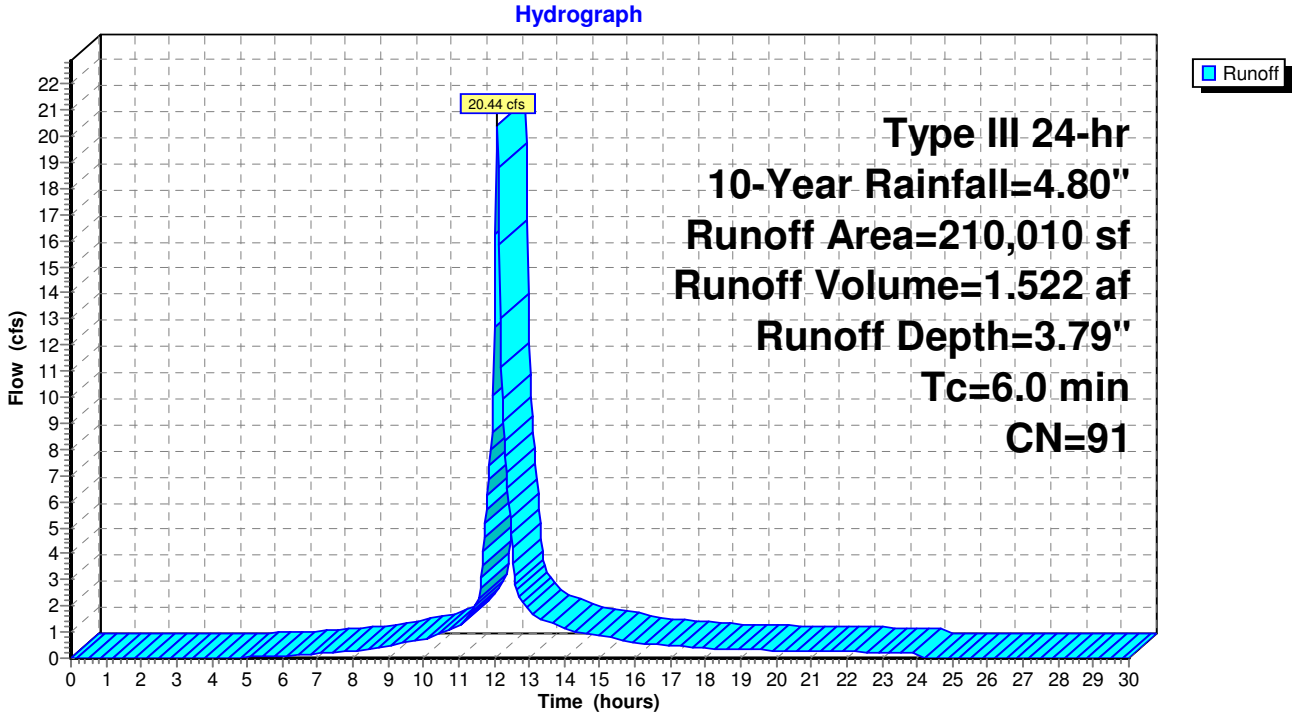
Runoff = 20.44 cfs @ 12.09 hrs, Volume= 1.522 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
117,140	98	Roofs, HSG B
54,222	98	Paved parking, HSG B
38,648	61	>75% Grass cover, Good, HSG B
210,010	91	Weighted Average
38,648		18.40% Pervious Area
171,362		81.60% Impervious Area

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

Subcatchment POST-1: Post Development Area 1



Summary for Subcatchment POST-2: Post Development Area 2

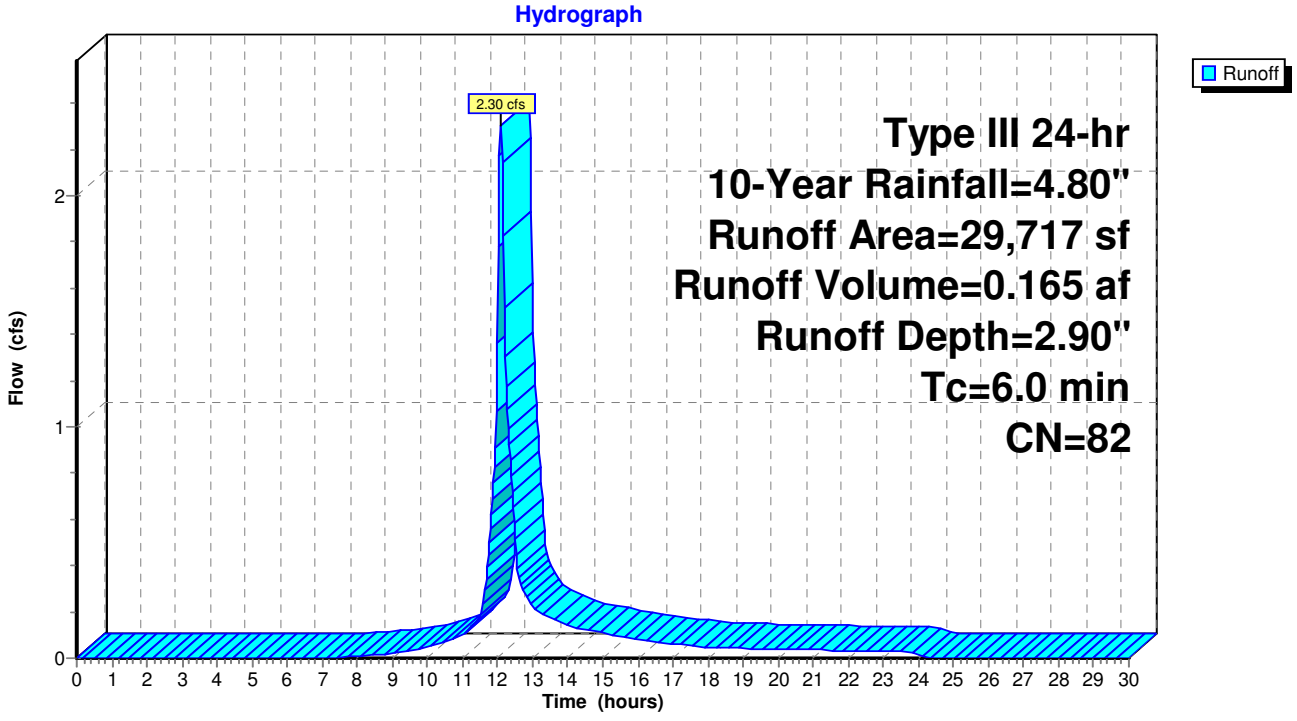
Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.165 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
15,256	98	Paved parking, HSG B
10,651	61	>75% Grass cover, Good, HSG B
3,810	80	>75% Grass cover, Good, HSG D
29,717	82	Weighted Average
14,461		48.66% Pervious Area
15,256		51.34% Impervious Area

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

Subcatchment POST-2: Post Development Area 2



Summary for Subcatchment POST-3: Post Development Area 3

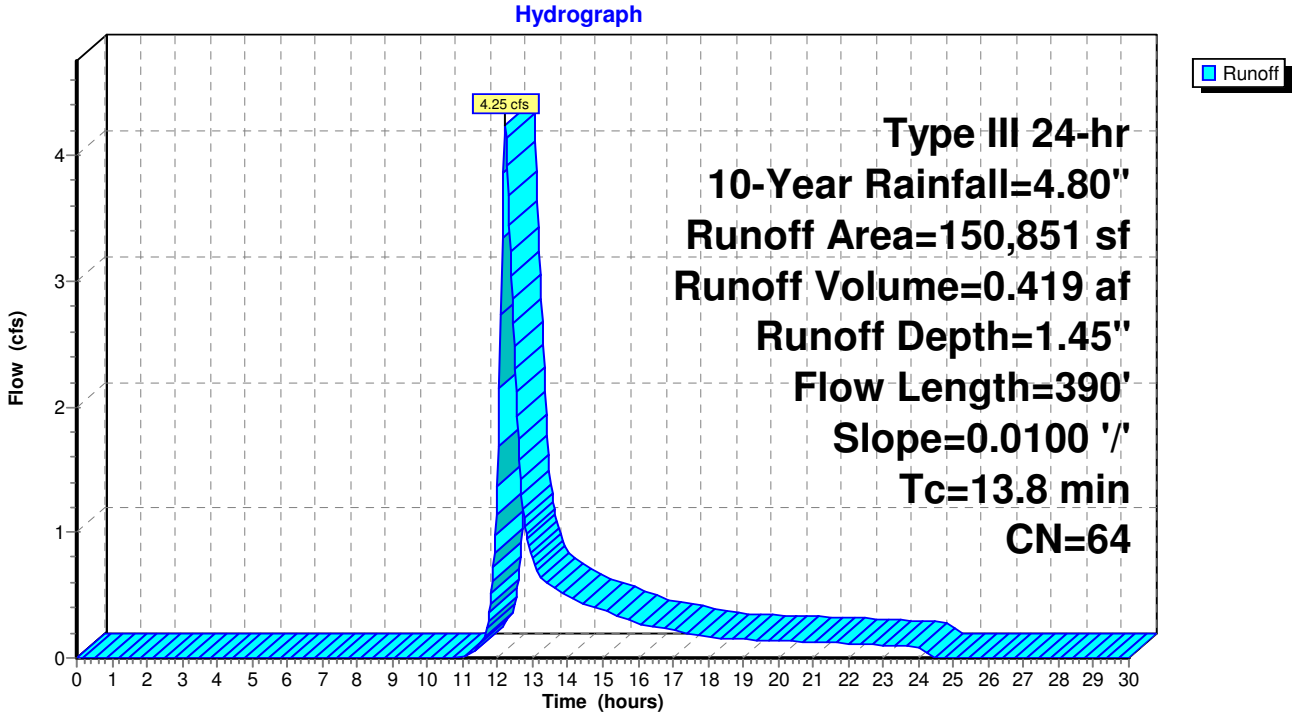
Runoff = 4.25 cfs @ 12.21 hrs, Volume= 0.419 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
3,139	98	Paved parking, HSG B
15,504	61	>75% Grass cover, Good, HSG B
11,430	80	>75% Grass cover, Good, HSG D
81,786	55	Woods, Good, HSG B
38,992	77	Woods, Good, HSG D
150,851	64	Weighted Average
147,712		97.92% Pervious Area
3,139		2.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.50"
3.5	340	0.0100	1.61		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	390	Total			

Subcatchment POST-3: Post Development Area 3



Summary for Subcatchment POST-5: Post Development Area 5

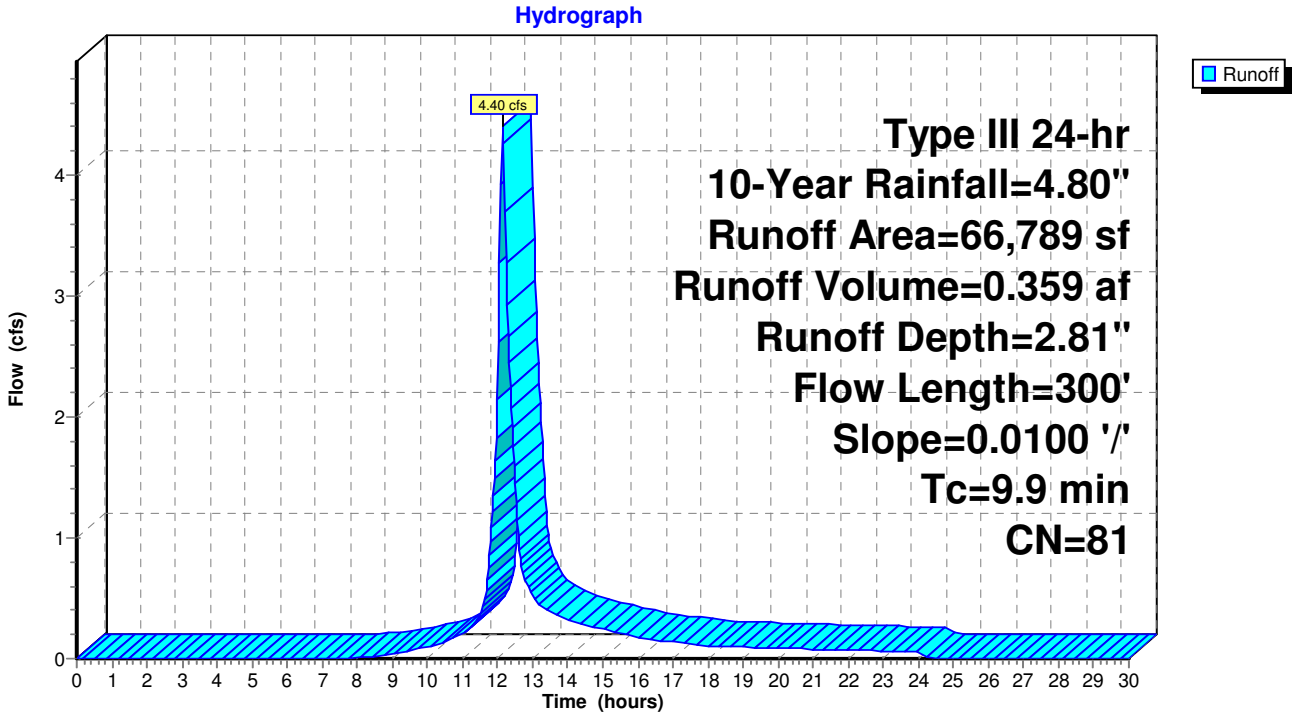
Runoff = 4.40 cfs @ 12.14 hrs, Volume= 0.359 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
36,536	98	Paved parking, HSG B
30,253	61	>75% Grass cover, Good, HSG B
66,789	81	Weighted Average
30,253		45.30% Pervious Area
36,536		54.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
2.8	250	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
9.9	300	Total			

Subcatchment POST-5: Post Development Area 5



Summary for Subcatchment POST-6: Post Development Area 6

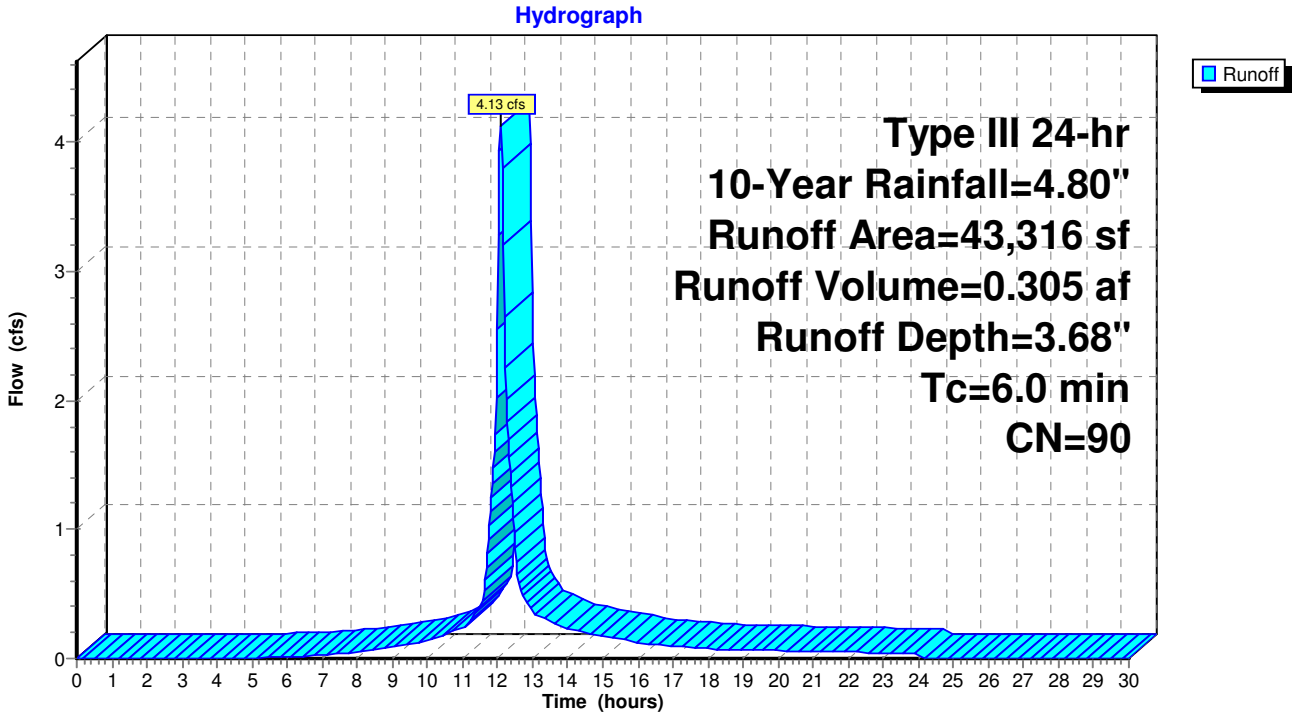
Runoff = 4.13 cfs @ 12.09 hrs, Volume= 0.305 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
34,171	98	Paved parking, HSG B
9,145	61	>75% Grass cover, Good, HSG B
43,316	90	Weighted Average
9,145		21.11% Pervious Area
34,171		78.89% Impervious Area

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

Subcatchment POST-6: Post Development Area 6



Summary for Subcatchment POST-7: Post Development Area 7

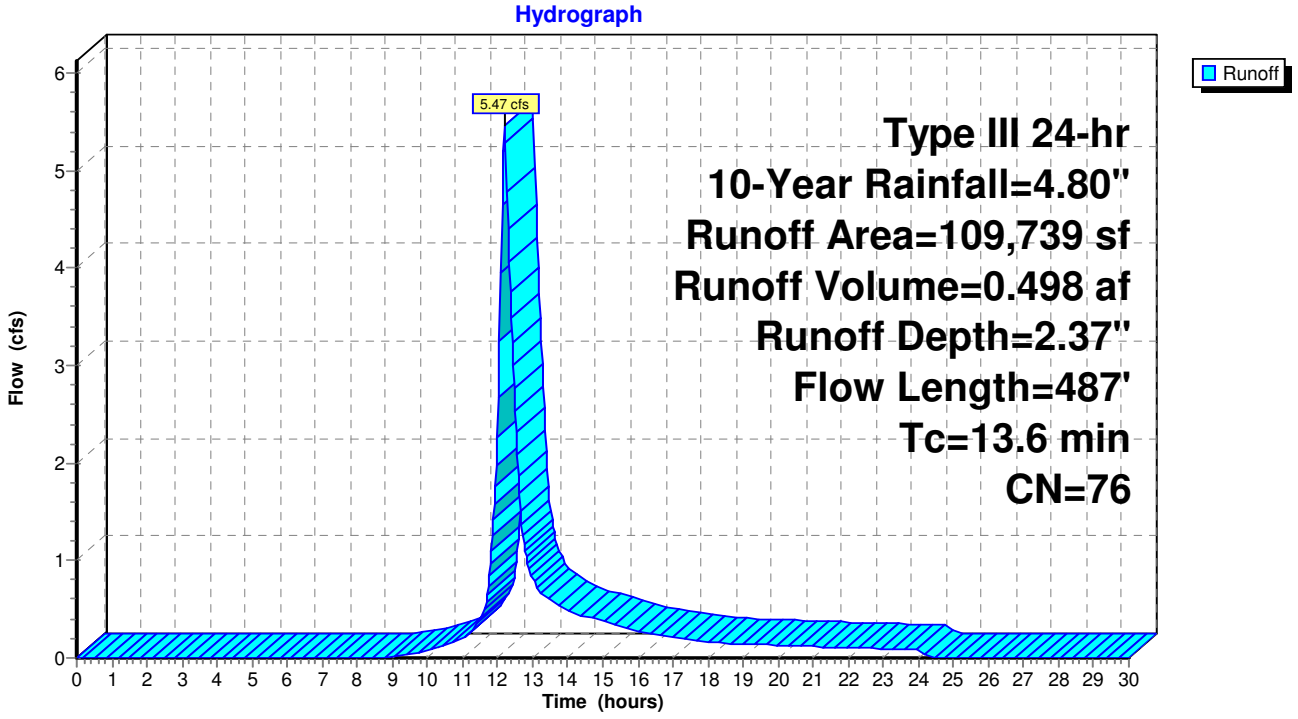
Runoff = 5.47 cfs @ 12.19 hrs, Volume= 0.498 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
47,999	98	Paved parking, HSG B
7,096	39	>75% Grass cover, Good, HSG A
54,644	61	>75% Grass cover, Good, HSG B
109,739	76	Weighted Average
61,740		56.26% Pervious Area
47,999		43.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
0.2	37	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
6.3	400	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
13.6	487	Total			

Subcatchment POST-7: Post Development Area 7



Summary for Subcatchment POST-8: Post Development Area 8

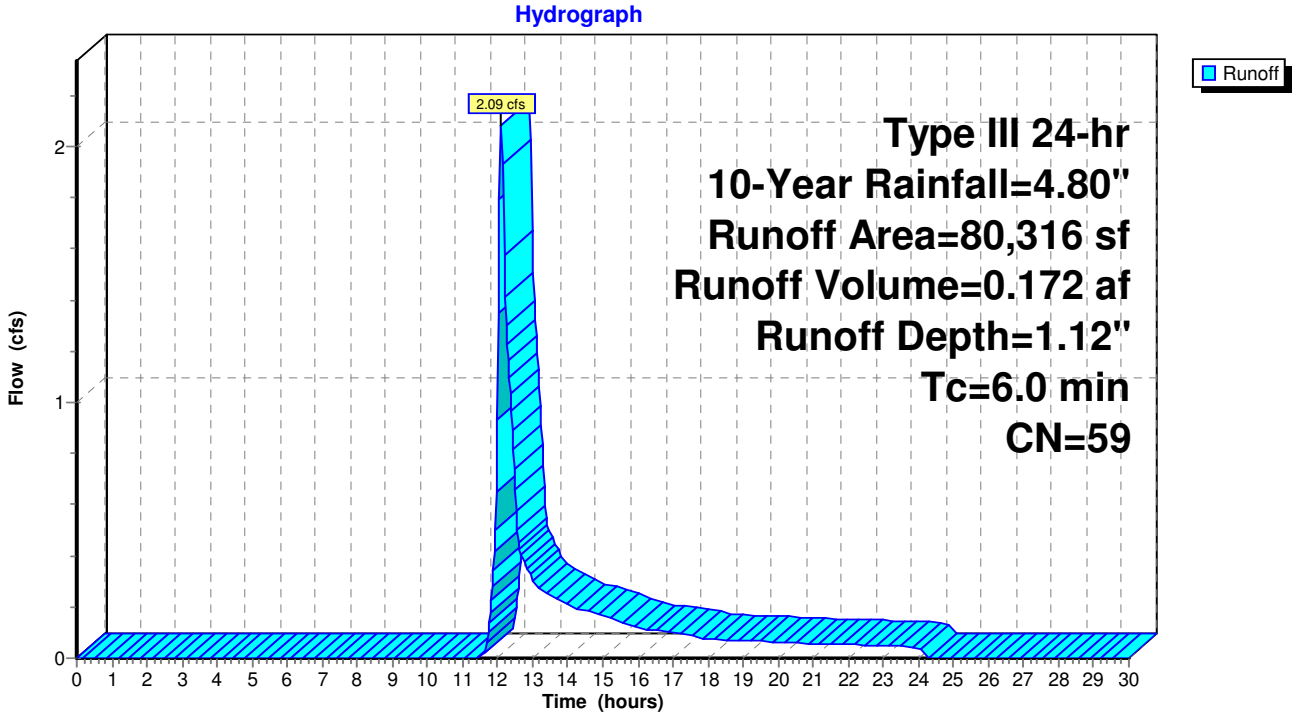
Runoff = 2.09 cfs @ 12.10 hrs, Volume= 0.172 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
43,702	55	Woods, Good, HSG B
28,772	61	>75% Grass cover, Good, HSG B
1,347	80	>75% Grass cover, Good, HSG D
6,495	77	Woods, Good, HSG D
80,316	59	Weighted Average
80,316		100.00% Pervious Area

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

Subcatchment POST-8: Post Development Area 8



Summary for Pond AP-1: Easterly Wetland

Analysis Point 1 is taken at the Boundary of the Easterly Wetland System

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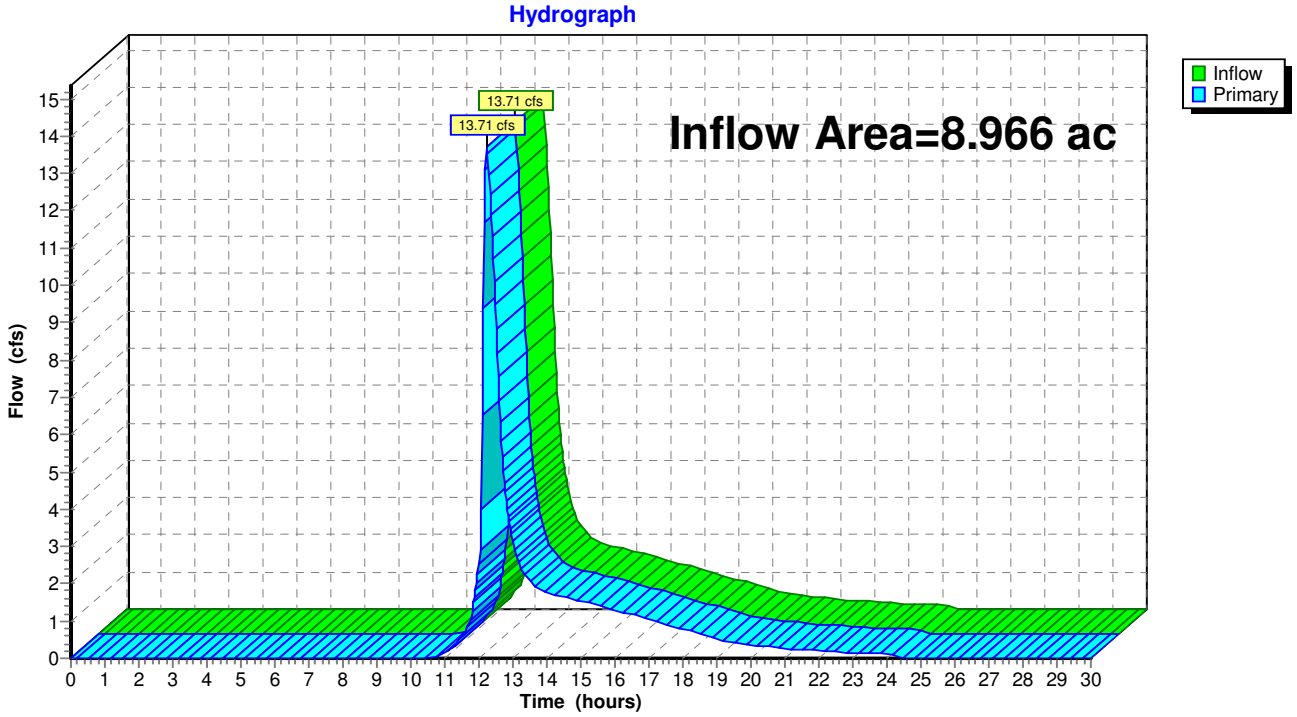
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.966 ac, 48.58% Impervious, Inflow Depth = 1.98" for 10-Year event
Inflow = 13.71 cfs @ 12.23 hrs, Volume= 1.477 af
Primary = 13.71 cfs @ 12.23 hrs, Volume= 1.477 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-1: Easterly Wetland



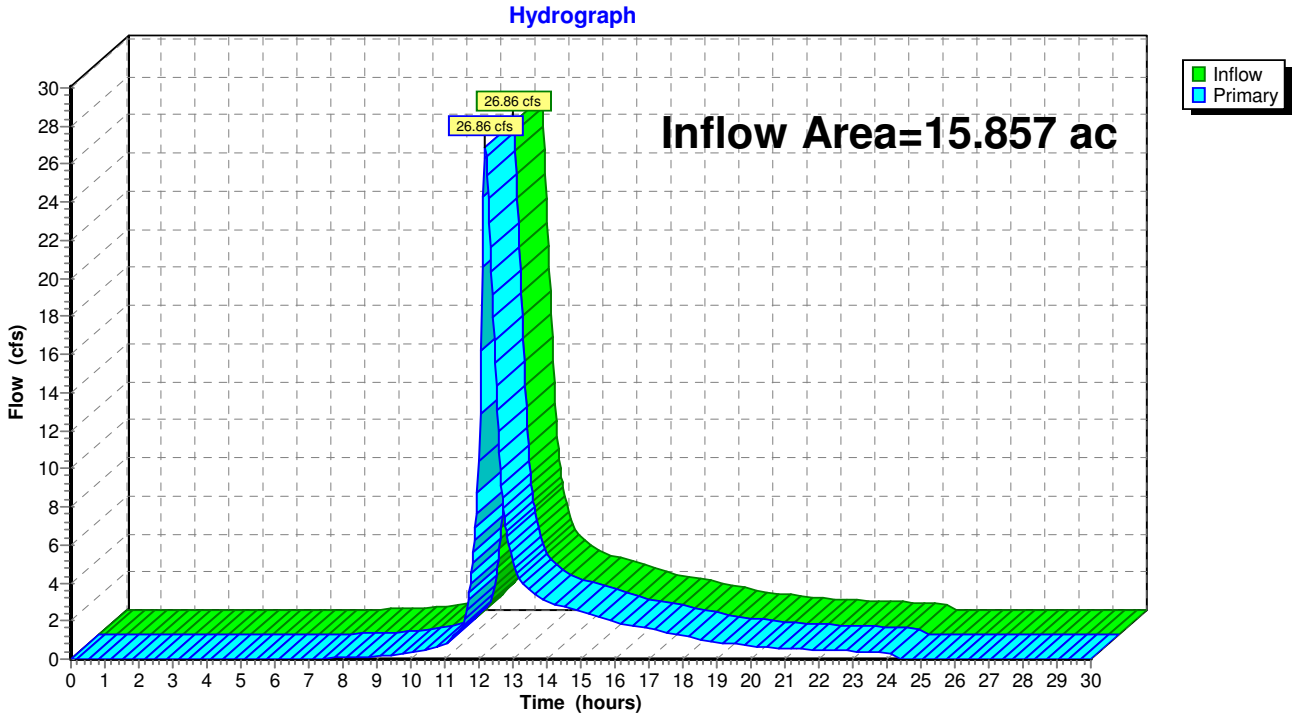
Summary for Pond AP-2: City Drainage System

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

Inflow Area = 15.857 ac, 44.66% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 26.86 cfs @ 12.18 hrs, Volume= 2.812 af
Primary = 26.86 cfs @ 12.18 hrs, Volume= 2.812 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-2: City Drainage System



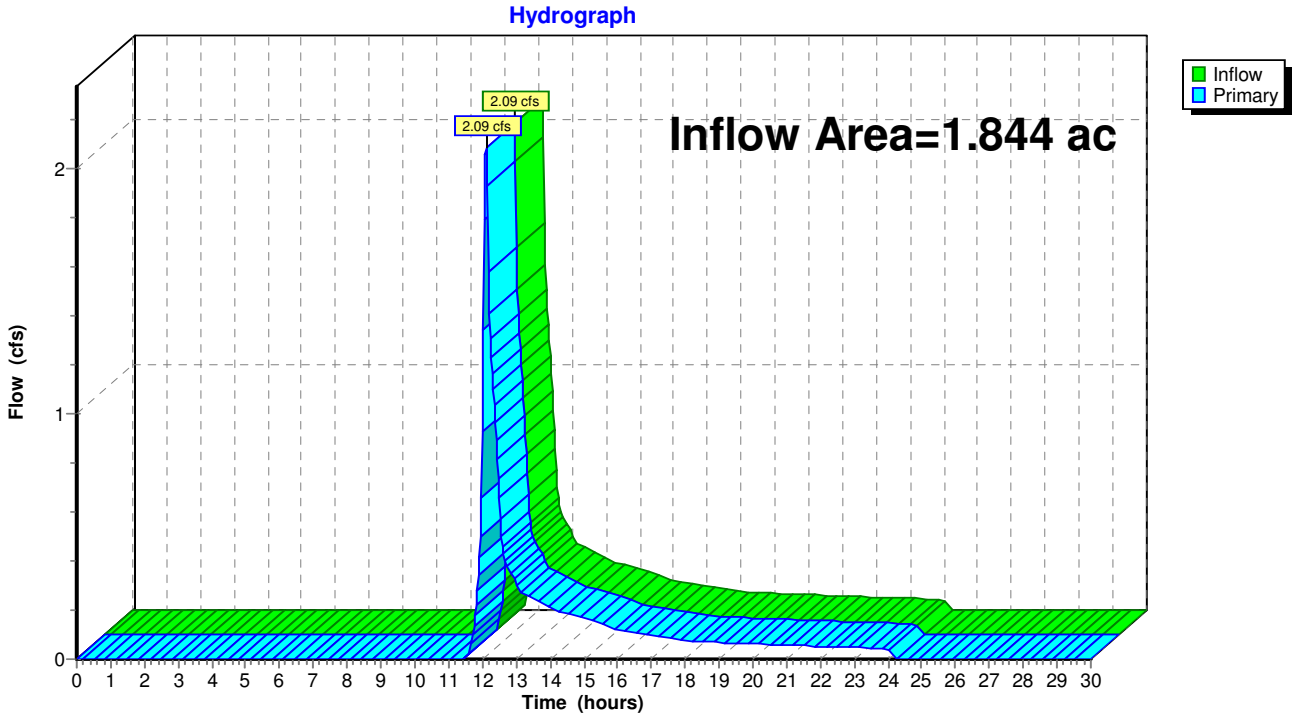
Summary for Pond AP-3: Abutting Parcel

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

Inflow Area = 1.844 ac, 0.00% Impervious, Inflow Depth = 1.12" for 10-Year event
Inflow = 2.09 cfs @ 12.10 hrs, Volume= 0.172 af
Primary = 2.09 cfs @ 12.10 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-3: Abutting Parcel



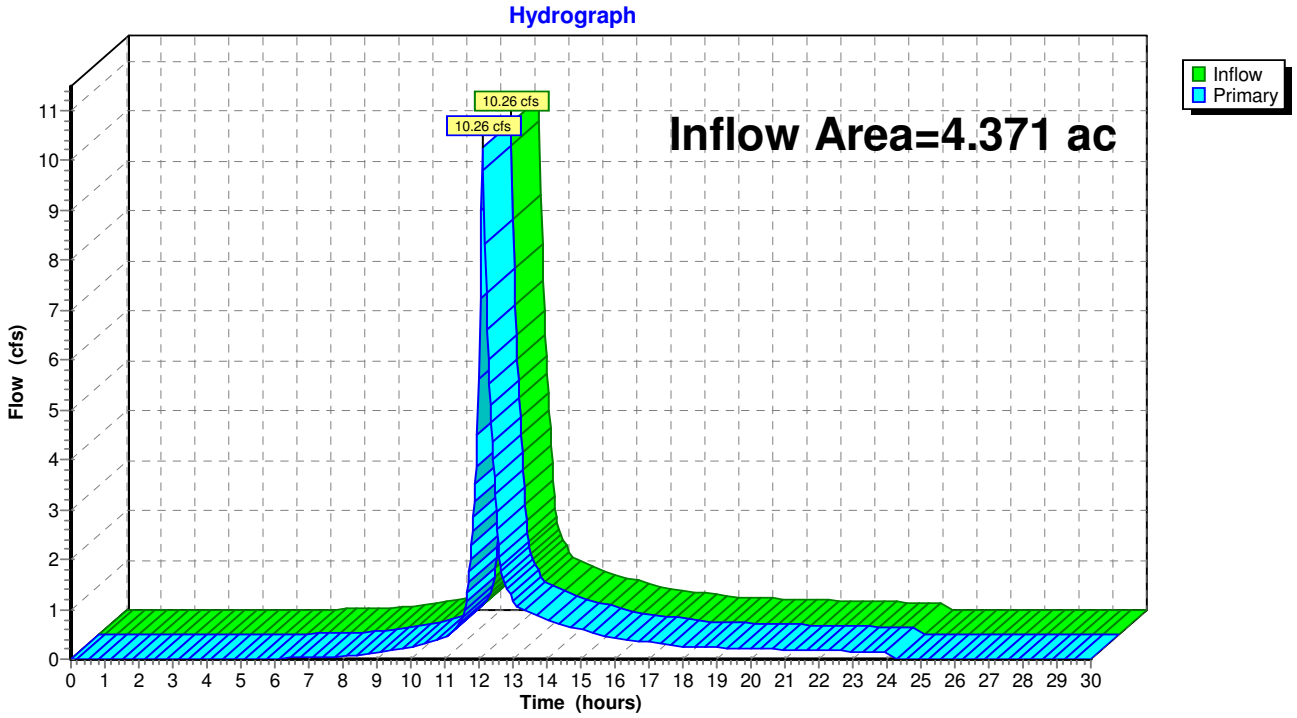
Summary for Pond AP-4: Duchaine Boulevard

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

Inflow Area = 4.371 ac, 37.13% Impervious, Inflow Depth = 2.30" for 10-Year event
Inflow = 10.26 cfs @ 12.11 hrs, Volume= 0.837 af
Primary = 10.26 cfs @ 12.11 hrs, Volume= 0.837 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-4: Duchaine Boulevard



Summary for Pond POND 1: Extended Detention/Infiltration Basin 1

Inflow Area = 4.821 ac, 81.60% Impervious, Inflow Depth = 3.79" for 10-Year event
Inflow = 20.44 cfs @ 12.09 hrs, Volume= 1.522 af
Outflow = 9.89 cfs @ 12.24 hrs, Volume= 1.522 af, Atten= 52%, Lag= 9.5 min
Discarded = 0.34 cfs @ 12.24 hrs, Volume= 0.466 af
Primary = 9.55 cfs @ 12.24 hrs, Volume= 1.056 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 86.86' @ 12.24 hrs Surf.Area= 14,402 sf Storage= 22,613 cf

Plug-Flow detention time= 117.6 min calculated for 1.522 af (100% of inflow)
Center-of-Mass det. time= 117.6 min (905.8 - 788.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	42,129 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	9,930	0	0
86.00	12,307	11,119	11,119
87.00	14,741	13,524	24,643
88.00	20,231	17,486	42,129

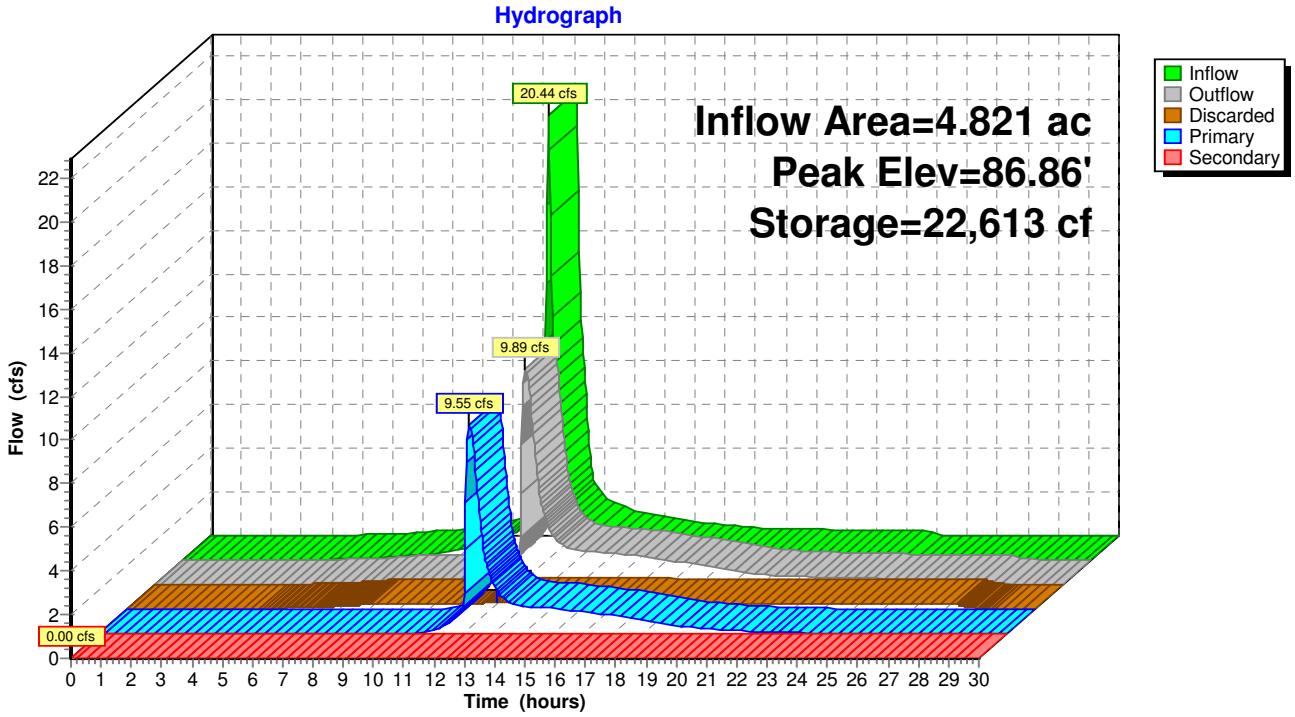
Device	Routing	Invert	Outlet Devices
#1	Primary	85.25'	**15.0" Round Culvert X 2.00** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 85.25' / 85.00' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	85.25'	**5.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	86.40'	**4.0' long Sharp-Crested Rectangular Weir X 2.00** 2 End Contraction(s)
#4	Secondary	87.50'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.34 cfs @ 12.24 hrs HW=86.86' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=9.53 cfs @ 12.24 hrs HW=86.86' (Free Discharge)
└**1=Culvert** (Passes 9.53 cfs of 10.38 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.55 cfs @ 5.70 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 7.98 cfs @ 2.22 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 1: Extended Detention/Infiltration Basin 1



Summary for Pond POND 2: Extended Detention/Infiltration Basin 2

Inflow Area = 0.682 ac, 51.34% Impervious, Inflow Depth = 2.90" for 10-Year event
Inflow = 2.30 cfs @ 12.09 hrs, Volume= 0.165 af
Outflow = 0.20 cfs @ 13.18 hrs, Volume= 0.165 af, Atten= 92%, Lag= 65.5 min
Discarded = 0.19 cfs @ 13.18 hrs, Volume= 0.163 af
Primary = 0.01 cfs @ 13.18 hrs, Volume= 0.002 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs / 4
Peak Elev= 85.93' @ 13.18 hrs Surf.Area= 7,867 sf Storage= 3,029 cf

Plug-Flow detention time= 152.8 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 152.6 min (970.6 - 818.0)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	15,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.50	6,257	0	0
86.00	8,134	3,598	3,598
87.00	10,100	9,117	12,715
87.25	10,585	2,586	15,300

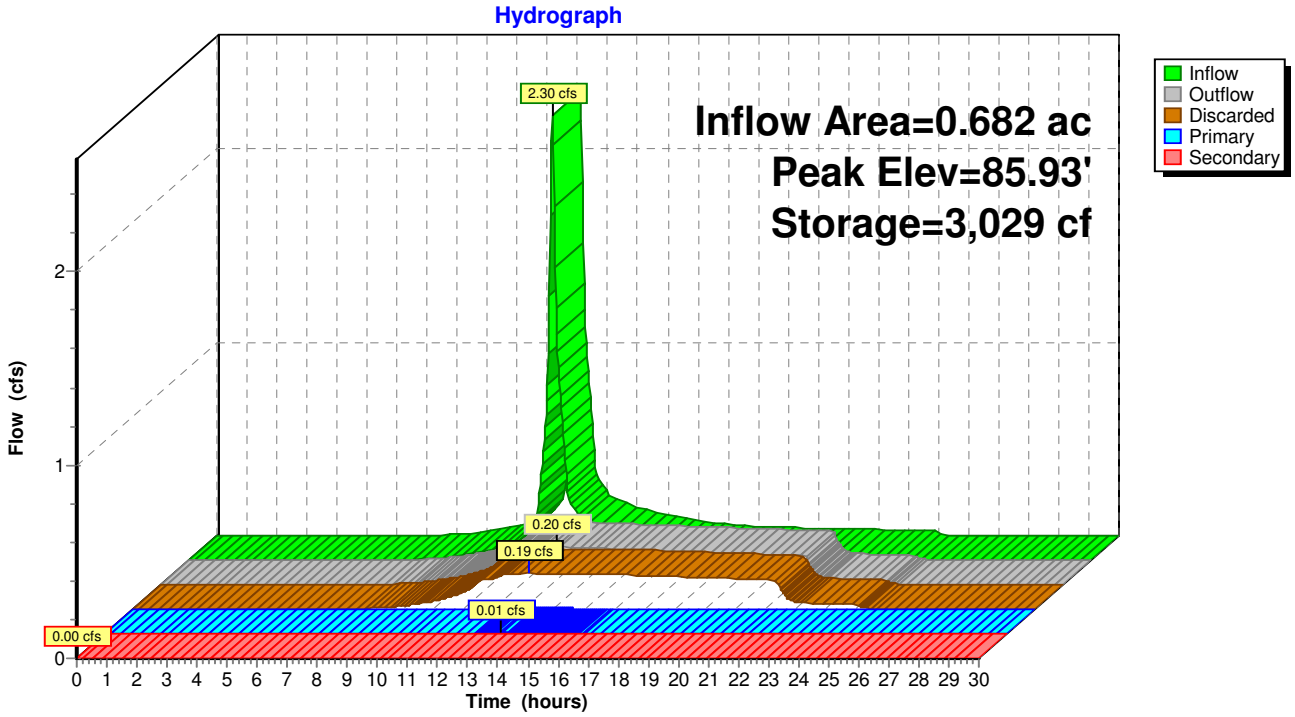
Device	Routing	Invert	Outlet Devices
#1	Primary	85.50'	**12.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.50' / 85.00' S= 0.0238 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	85.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	86.25'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	86.75'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.19 cfs @ 13.18 hrs HW=85.93' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.01 cfs @ 13.18 hrs HW=85.93' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 0.72 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.96 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 2: Extended Detention/Infiltration Basin 2



Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment POST-1: Post Runoff Area=210,010 sf 81.60% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=91 Runoff=24.38 cfs 1.835 af

Subcatchment POST-2: Post Development Runoff Area=29,717 sf 51.34% Impervious Runoff Depth=3.62"
Tc=6.0 min CN=82 Runoff=2.86 cfs 0.206 af

Subcatchment POST-3: Post Development Runoff Area=150,851 sf 2.08% Impervious Runoff Depth=1.98"
Flow Length=390' Slope=0.0100 '/' Tc=13.8 min CN=64 Runoff=6.00 cfs 0.572 af

Subcatchment POST-5: Post Development Runoff Area=66,789 sf 54.70% Impervious Runoff Depth=3.52"
Flow Length=300' Slope=0.0100 '/' Tc=9.9 min CN=81 Runoff=5.51 cfs 0.450 af

Subcatchment POST-6: Post Development Runoff Area=43,316 sf 78.89% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=90 Runoff=4.95 cfs 0.369 af

Subcatchment POST-7: Post Runoff Area=109,739 sf 43.74% Impervious Runoff Depth=3.04"
Flow Length=487' Tc=13.6 min CN=76 Runoff=7.03 cfs 0.638 af

Subcatchment POST-8: Post Development Runoff Area=80,316 sf 0.00% Impervious Runoff Depth=1.59"
Tc=6.0 min CN=59 Runoff=3.14 cfs 0.244 af

Pond AP-1: Easterly Wetland Inflow=17.43 cfs 1.925 af
Primary=17.43 cfs 1.925 af

Pond AP-2: City Drainage System Inflow=35.26 cfs 3.626 af
Primary=35.26 cfs 3.626 af

Pond AP-3: Abutting Parcel Inflow=3.14 cfs 0.244 af
Primary=3.14 cfs 0.244 af

Pond AP-4: Duchaine Boulevard Inflow=13.14 cfs 1.063 af
Primary=13.14 cfs 1.063 af

Pond POND 1: Extended Peak Elev=87.08' Storage=25,765 cf Inflow=24.38 cfs 1.835 af
Discarded=0.36 cfs 0.492 af Primary=11.47 cfs 1.343 af Secondary=0.00 cfs 0.000 af Outflow=11.83 cfs 1.835 af

Pond POND 2: Extended Detention/Infiltration Peak Elev=86.04' Storage=3,937 cf Inflow=2.86 cfs 0.206 af
Discarded=0.19 cfs 0.196 af Primary=0.03 cfs 0.010 af Secondary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.206 af

Total Runoff Area = 15.857 ac Runoff Volume = 4.314 af Average Runoff Depth = 3.26"
55.34% Pervious = 8.776 ac 44.66% Impervious = 7.081 ac

Summary for Subcatchment POST-1: Post Development Area 1

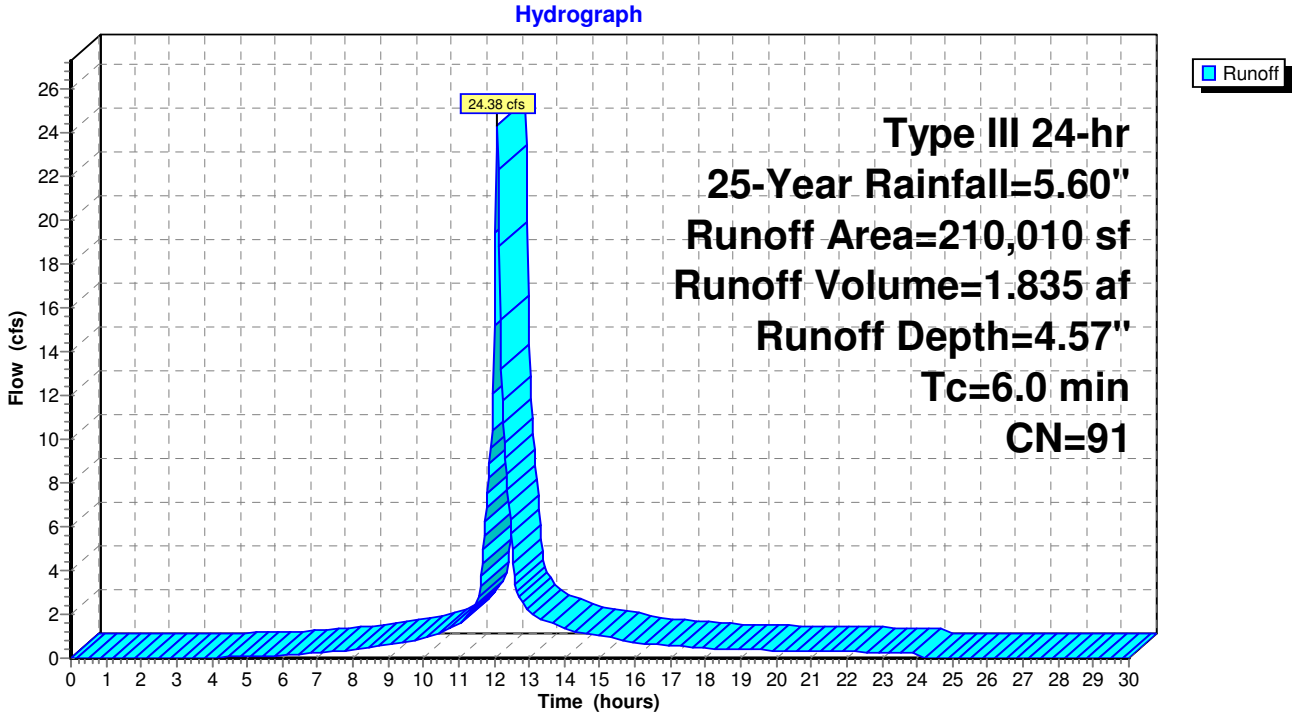
Runoff = 24.38 cfs @ 12.09 hrs, Volume= 1.835 af, Depth= 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
117,140	98	Roofs, HSG B
54,222	98	Paved parking, HSG B
38,648	61	>75% Grass cover, Good, HSG B
210,010	91	Weighted Average
38,648		18.40% Pervious Area
171,362		81.60% Impervious Area

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

Subcatchment POST-1: Post Development Area 1



Summary for Subcatchment POST-2: Post Development Area 2

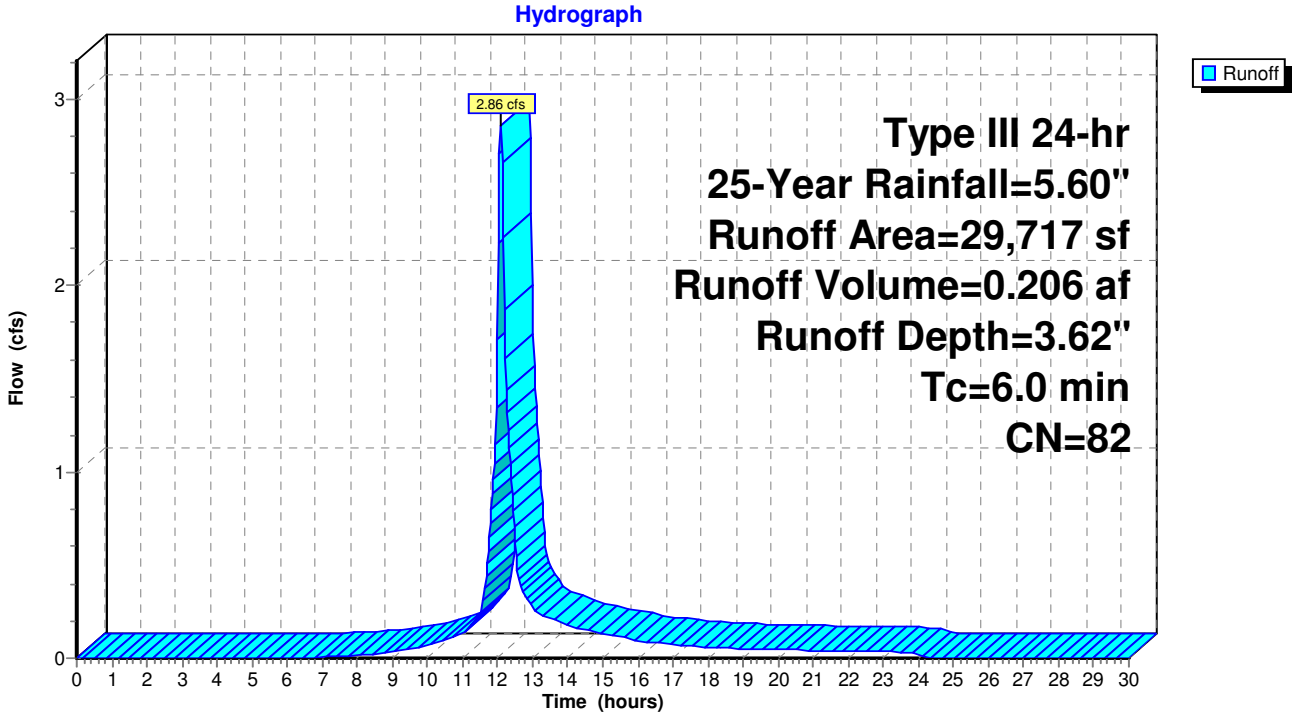
Runoff = 2.86 cfs @ 12.09 hrs, Volume= 0.206 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
15,256	98	Paved parking, HSG B
10,651	61	>75% Grass cover, Good, HSG B
3,810	80	>75% Grass cover, Good, HSG D
29,717	82	Weighted Average
14,461		48.66% Pervious Area
15,256		51.34% Impervious Area

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

Subcatchment POST-2: Post Development Area 2



Summary for Subcatchment POST-3: Post Development Area 3

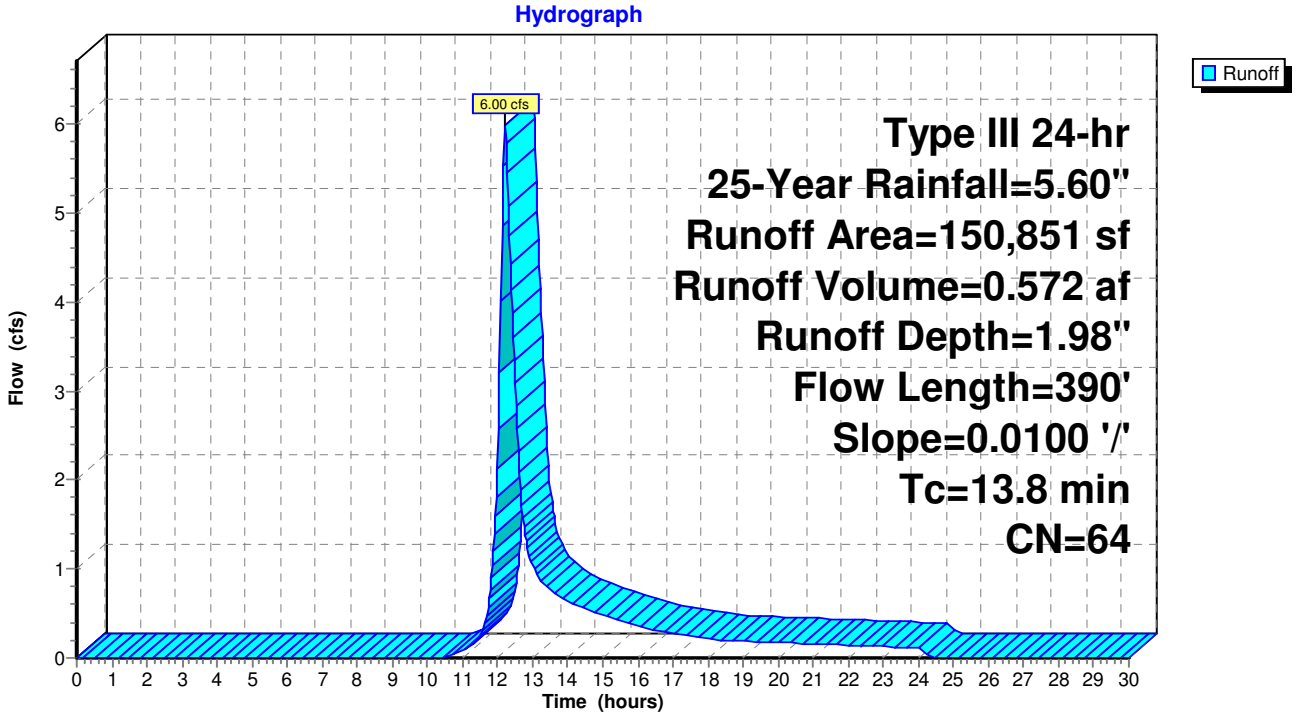
Runoff = 6.00 cfs @ 12.20 hrs, Volume= 0.572 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
3,139	98	Paved parking, HSG B
15,504	61	>75% Grass cover, Good, HSG B
11,430	80	>75% Grass cover, Good, HSG D
81,786	55	Woods, Good, HSG B
38,992	77	Woods, Good, HSG D
150,851	64	Weighted Average
147,712		97.92% Pervious Area
3,139		2.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.50"
3.5	340	0.0100	1.61		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	390	Total			

Subcatchment POST-3: Post Development Area 3



Summary for Subcatchment POST-5: Post Development Area 5

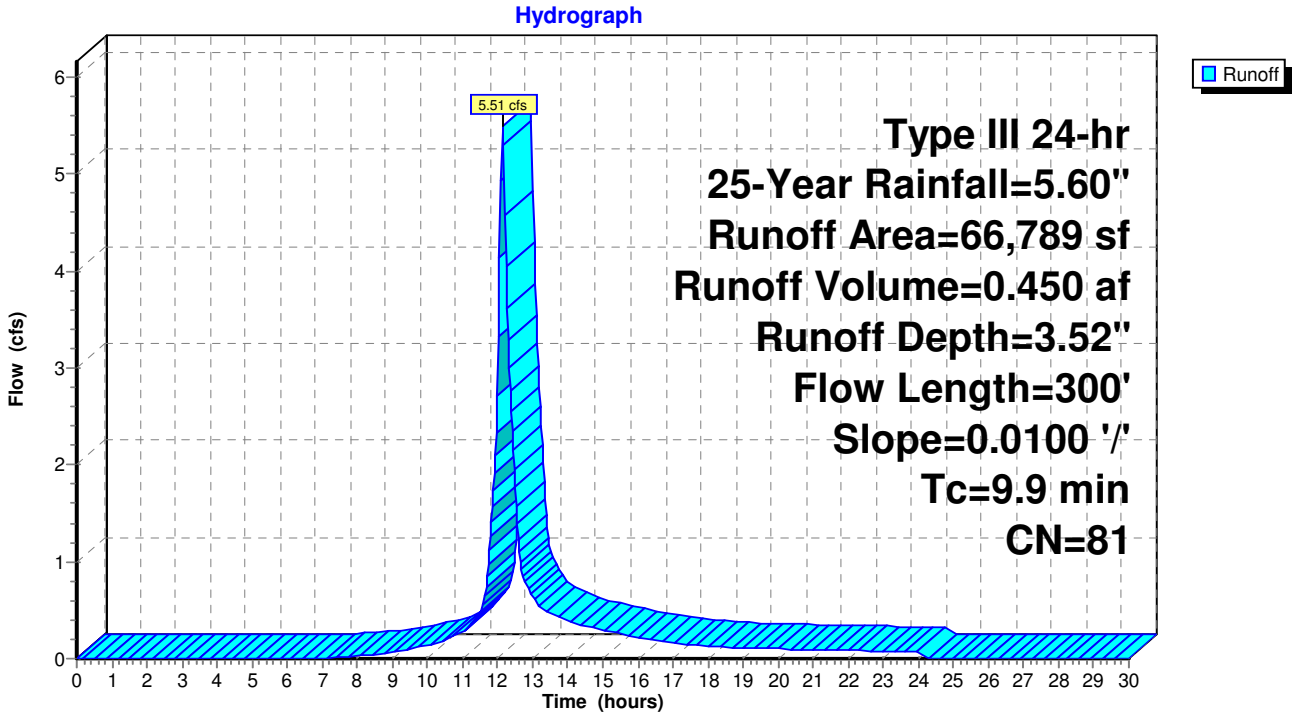
Runoff = 5.51 cfs @ 12.14 hrs, Volume= 0.450 af, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
36,536	98	Paved parking, HSG B
30,253	61	>75% Grass cover, Good, HSG B
66,789	81	Weighted Average
30,253		45.30% Pervious Area
36,536		54.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
2.8	250	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
9.9	300	Total			

Subcatchment POST-5: Post Development Area 5



Summary for Subcatchment POST-6: Post Development Area 6

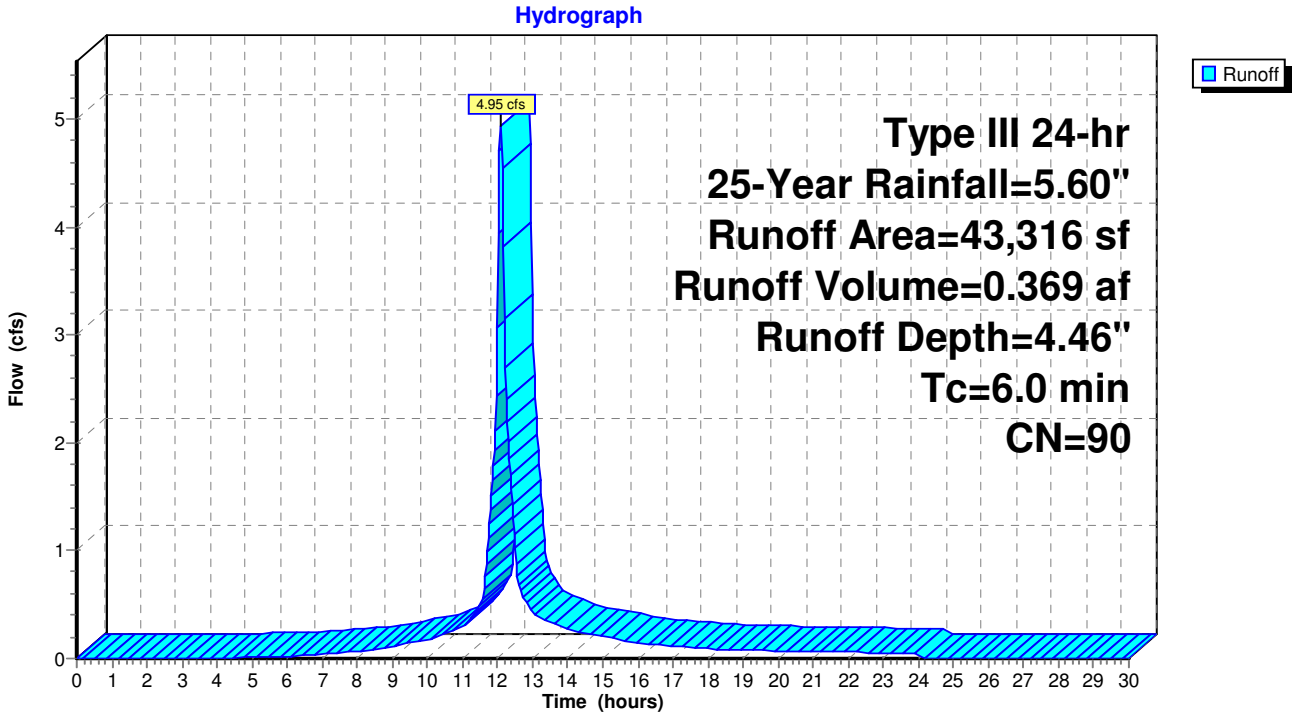
Runoff = 4.95 cfs @ 12.09 hrs, Volume= 0.369 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
34,171	98	Paved parking, HSG B
9,145	61	>75% Grass cover, Good, HSG B
43,316	90	Weighted Average
9,145		21.11% Pervious Area
34,171		78.89% Impervious Area

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

Subcatchment POST-6: Post Development Area 6



Summary for Subcatchment POST-7: Post Development Area 7

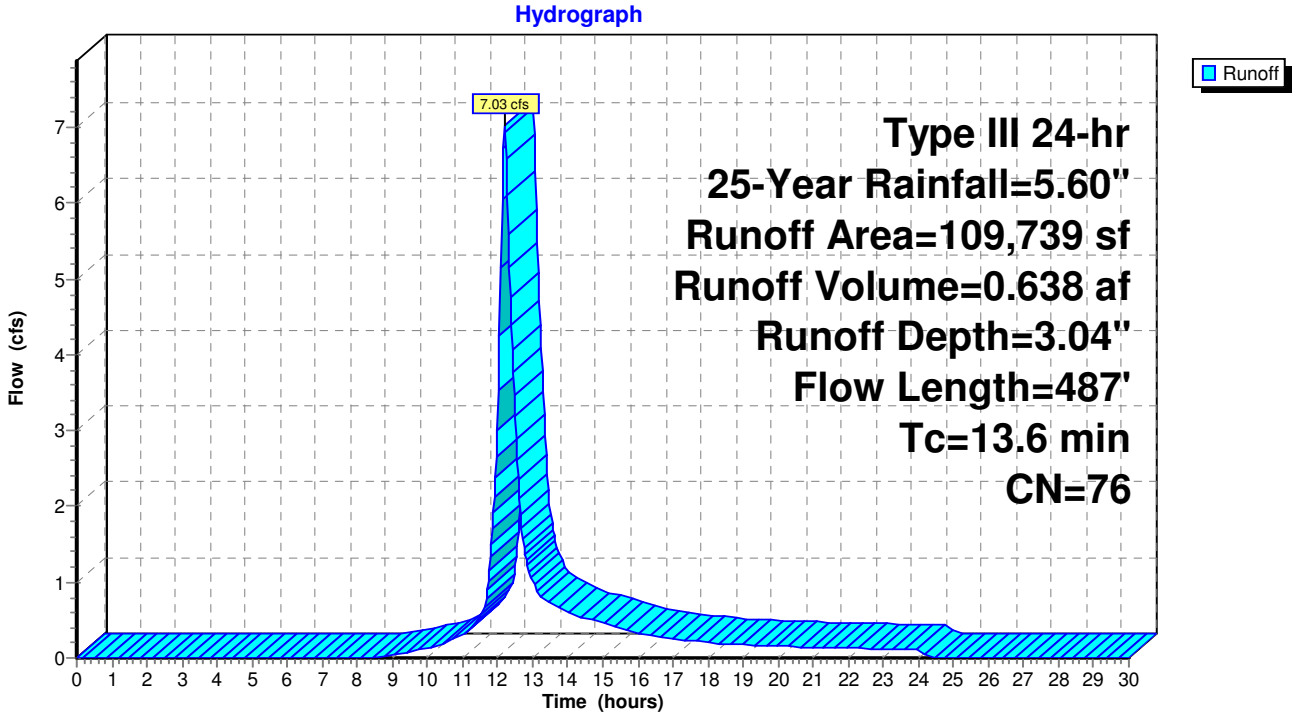
Runoff = 7.03 cfs @ 12.19 hrs, Volume= 0.638 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
47,999	98	Paved parking, HSG B
7,096	39	>75% Grass cover, Good, HSG A
54,644	61	>75% Grass cover, Good, HSG B
109,739	76	Weighted Average
61,740		56.26% Pervious Area
47,999		43.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
0.2	37	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
6.3	400	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
13.6	487	Total			

Subcatchment POST-7: Post Development Area 7



Summary for Subcatchment POST-8: Post Development Area 8

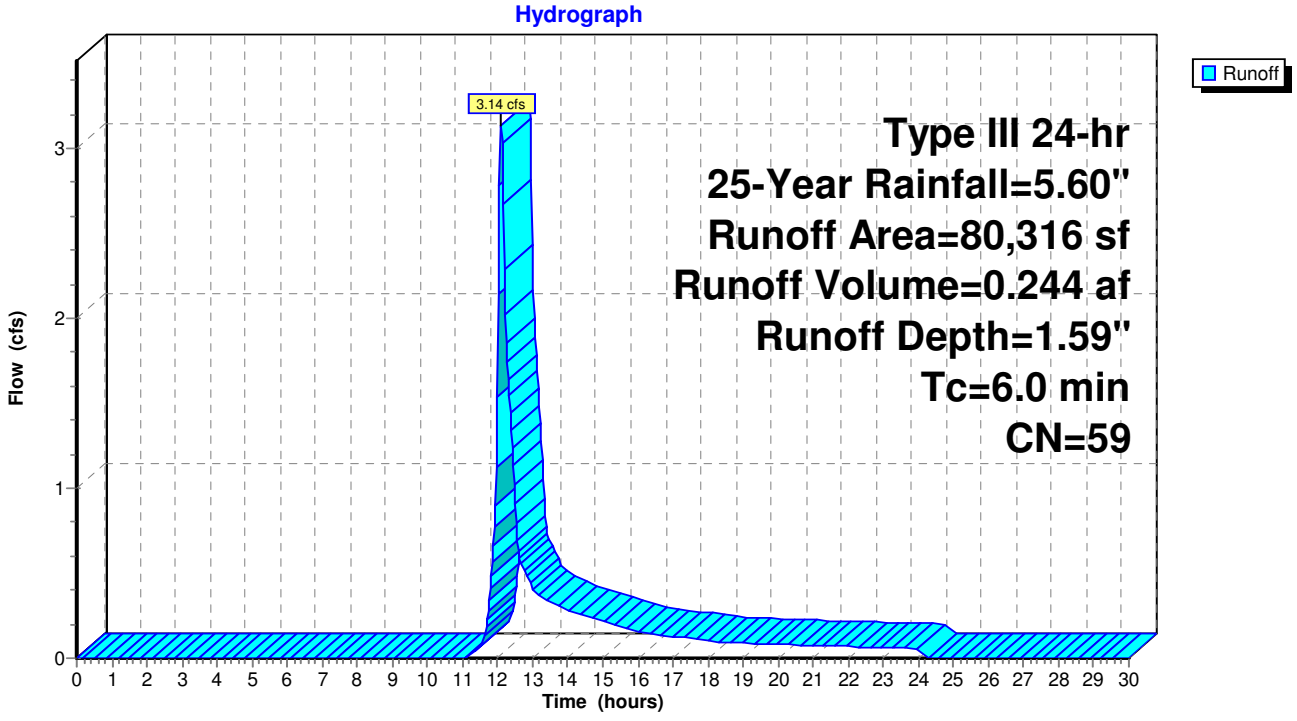
Runoff = 3.14 cfs @ 12.10 hrs, Volume= 0.244 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.60"

Area (sf)	CN	Description
43,702	55	Woods, Good, HSG B
28,772	61	>75% Grass cover, Good, HSG B
1,347	80	>75% Grass cover, Good, HSG D
6,495	77	Woods, Good, HSG D
80,316	59	Weighted Average
80,316		100.00% Pervious Area

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

Subcatchment POST-8: Post Development Area 8



Summary for Pond AP-1: Easterly Wetland

Analysis Point 1 is taken at the Boundary of the Easterly Wetland System

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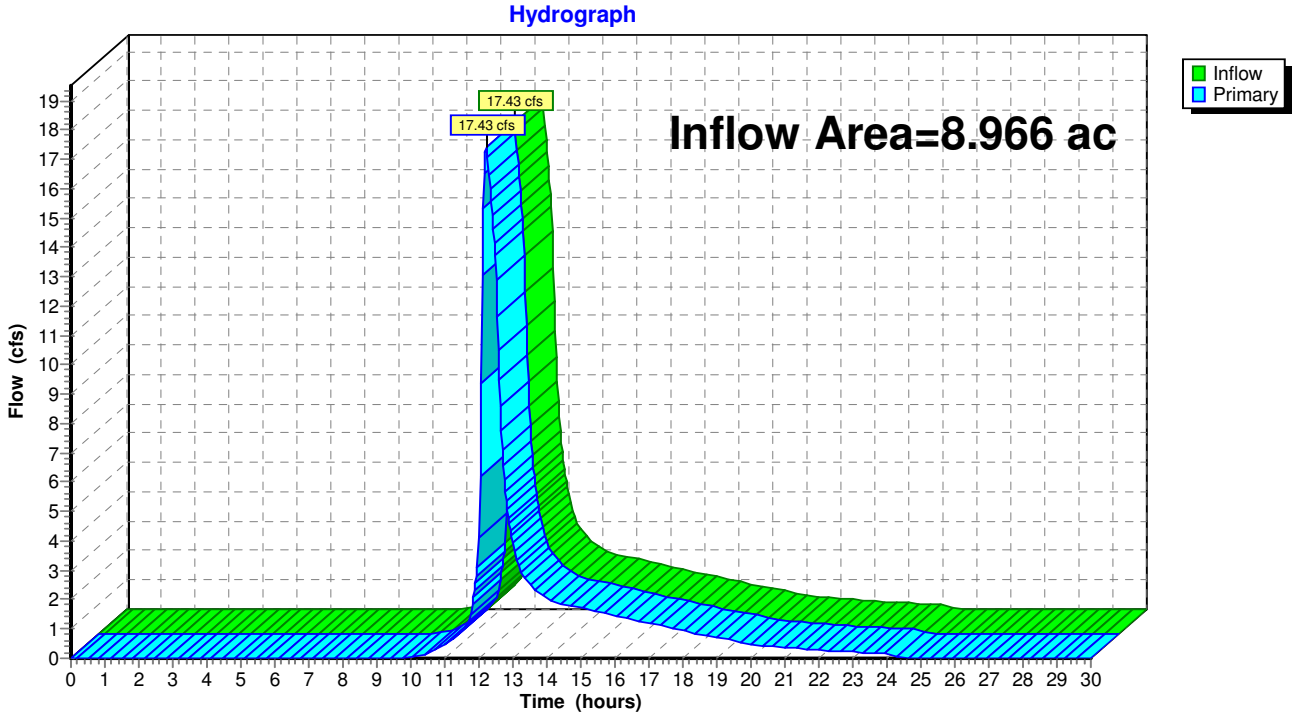
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.966 ac, 48.58% Impervious, Inflow Depth = 2.58" for 25-Year event
Inflow = 17.43 cfs @ 12.21 hrs, Volume= 1.925 af
Primary = 17.43 cfs @ 12.21 hrs, Volume= 1.925 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-1: Easterly Wetland



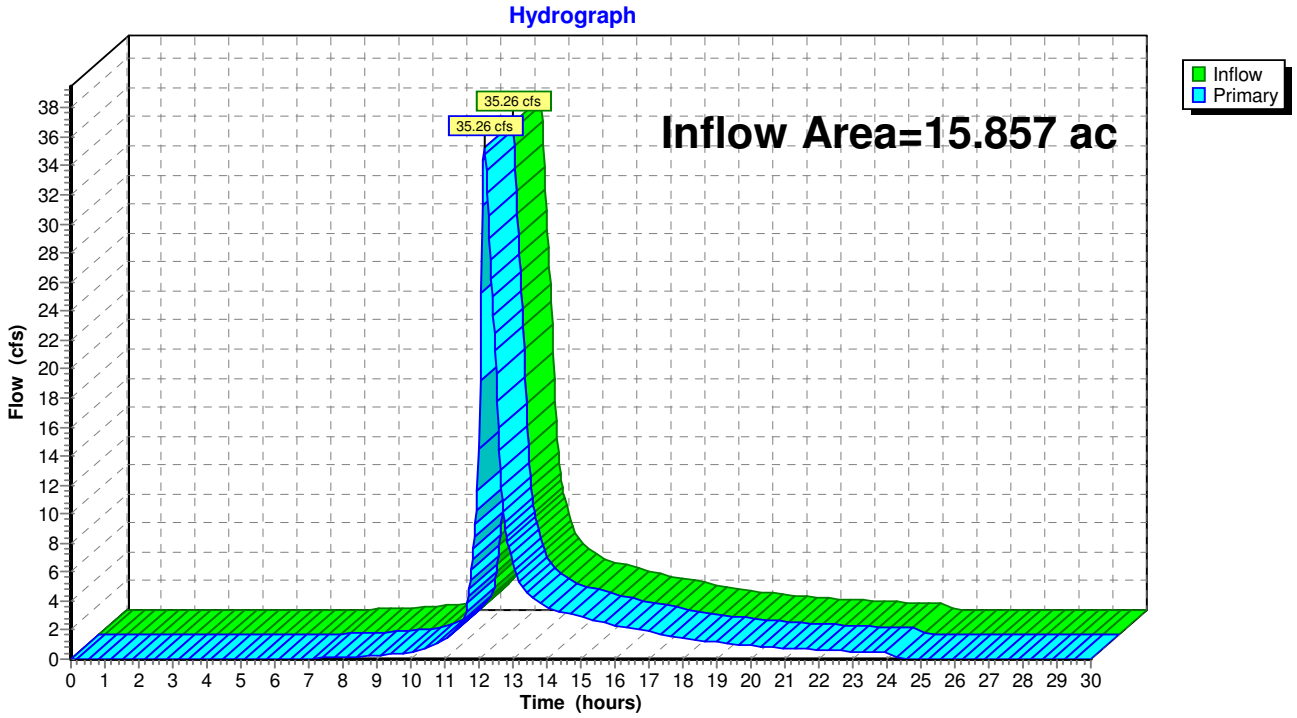
Summary for Pond AP-2: City Drainage System

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

Inflow Area = 15.857 ac, 44.66% Impervious, Inflow Depth = 2.74" for 25-Year event
Inflow = 35.26 cfs @ 12.15 hrs, Volume= 3.626 af
Primary = 35.26 cfs @ 12.15 hrs, Volume= 3.626 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-2: City Drainage System



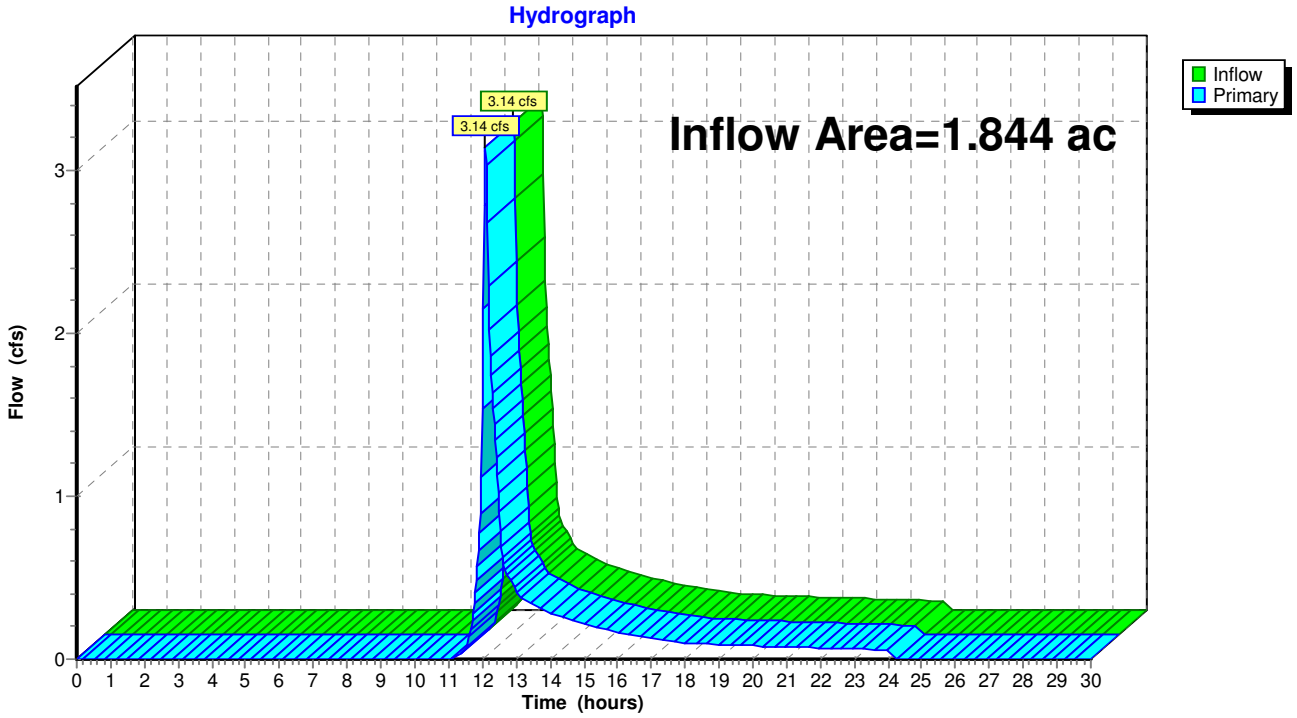
Summary for Pond AP-3: Abutting Parcel

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

Inflow Area = 1.844 ac, 0.00% Impervious, Inflow Depth = 1.59" for 25-Year event
Inflow = 3.14 cfs @ 12.10 hrs, Volume= 0.244 af
Primary = 3.14 cfs @ 12.10 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-3: Abutting Parcel



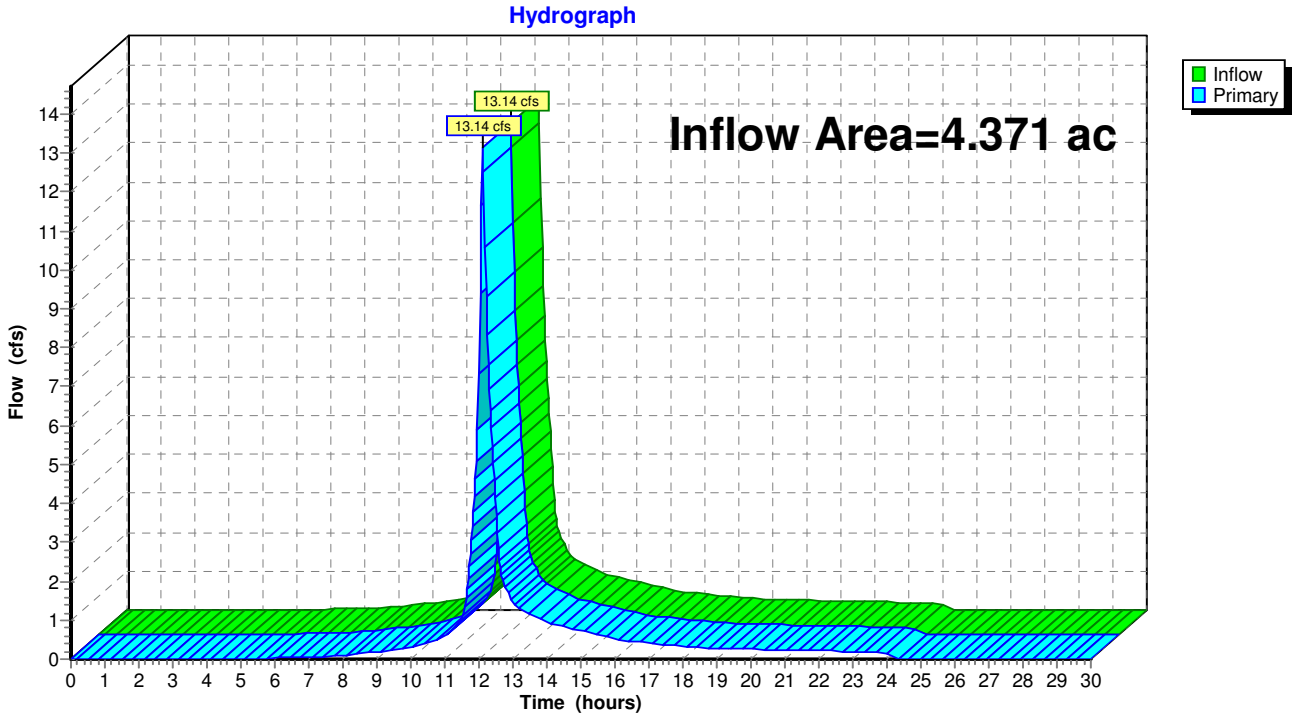
Summary for Pond AP-4: Duchaine Boulevard

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

Inflow Area = 4.371 ac, 37.13% Impervious, Inflow Depth = 2.92" for 25-Year event
Inflow = 13.14 cfs @ 12.11 hrs, Volume= 1.063 af
Primary = 13.14 cfs @ 12.11 hrs, Volume= 1.063 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-4: Duchaine Boulevard



Summary for Pond POND 1: Extended Detention/Infiltration Basin 1

Inflow Area = 4.821 ac, 81.60% Impervious, Inflow Depth = 4.57" for 25-Year event
Inflow = 24.38 cfs @ 12.09 hrs, Volume= 1.835 af
Outflow = 11.83 cfs @ 12.24 hrs, Volume= 1.835 af, Atten= 51%, Lag= 9.3 min
Discarded = 0.36 cfs @ 12.24 hrs, Volume= 0.492 af
Primary = 11.47 cfs @ 12.24 hrs, Volume= 1.343 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 87.08' @ 12.24 hrs Surf.Area= 15,153 sf Storage= 25,765 cf

Plug-Flow detention time= 109.0 min calculated for 1.833 af (100% of inflow)
Center-of-Mass det. time= 109.2 min (892.3 - 783.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	42,129 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	9,930	0	0
86.00	12,307	11,119	11,119
87.00	14,741	13,524	24,643
88.00	20,231	17,486	42,129

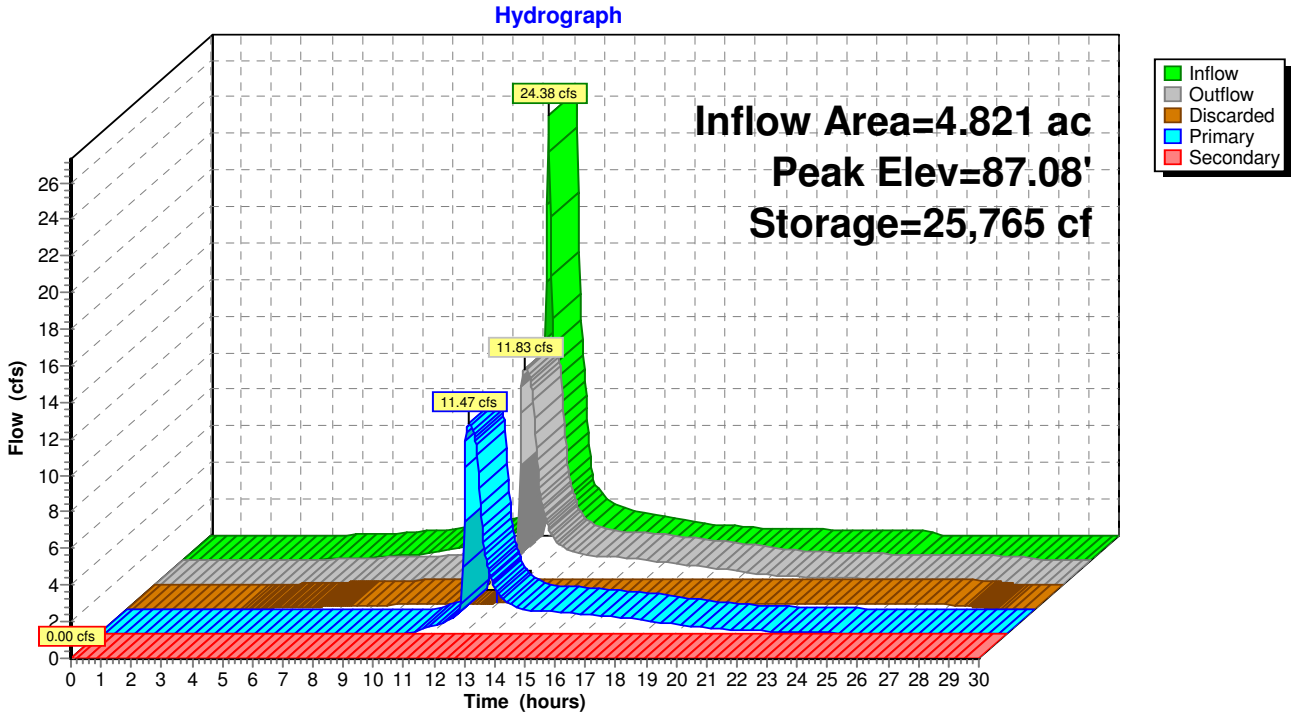
Device	Routing	Invert	Outlet Devices
#1	Primary	85.25'	**15.0" Round Culvert X 2.00** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 85.25' / 85.00' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	85.25'	**5.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	86.40'	**4.0' long Sharp-Crested Rectangular Weir X 2.00** 2 End Contraction(s)
#4	Secondary	87.50'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.36 cfs @ 12.24 hrs HW=87.07' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.36 cfs)

Primary OutFlow Max=11.47 cfs @ 12.24 hrs HW=87.07' (Free Discharge)
└**1=Culvert** (Barrel Controls 11.47 cfs @ 4.67 fps)
  ├**2=Orifice/Grate** (Passes < 1.67 cfs potential flow)
  └**3=Sharp-Crested Rectangular Weir** (Passes < 14.02 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 1: Extended Detention/Infiltration Basin 1



Summary for Pond POND 2: Extended Detention/Infiltration Basin 2

Inflow Area = 0.682 ac, 51.34% Impervious, Inflow Depth = 3.62" for 25-Year event
Inflow = 2.86 cfs @ 12.09 hrs, Volume= 0.206 af
Outflow = 0.23 cfs @ 13.29 hrs, Volume= 0.206 af, Atten= 92%, Lag= 71.9 min
Discarded = 0.19 cfs @ 13.29 hrs, Volume= 0.196 af
Primary = 0.03 cfs @ 13.29 hrs, Volume= 0.010 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs / 4
Peak Elev= 86.04' @ 13.29 hrs Surf.Area= 8,215 sf Storage= 3,937 cf

Plug-Flow detention time= 181.8 min calculated for 0.206 af (100% of inflow)
Center-of-Mass det. time= 181.6 min (993.3 - 811.7)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	15,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.50	6,257	0	0
86.00	8,134	3,598	3,598
87.00	10,100	9,117	12,715
87.25	10,585	2,586	15,300

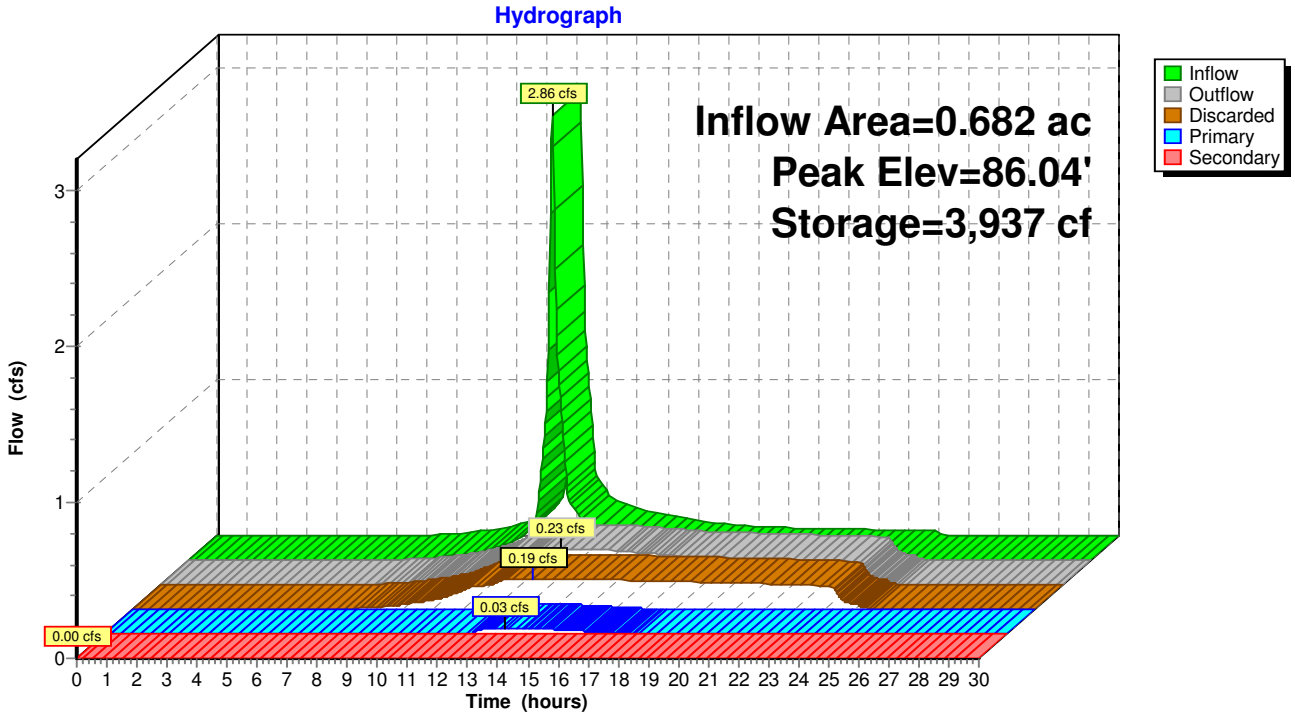
Device	Routing	Invert	Outlet Devices
#1	Primary	85.50'	**12.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.50' / 85.00' S= 0.0238 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	85.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	86.25'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	86.75'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.19 cfs @ 13.29 hrs HW=86.04' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.03 cfs @ 13.29 hrs HW=86.04' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 1.09 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.58 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 2: Extended Detention/Infiltration Basin 2



Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment POST-1: Post Runoff Area=210,010 sf 81.60% Impervious Runoff Depth=5.94"
Tc=6.0 min CN=91 Runoff=31.23 cfs 2.386 af

Subcatchment POST-2: Post Development Runoff Area=29,717 sf 51.34% Impervious Runoff Depth=4.92"
Tc=6.0 min CN=82 Runoff=3.85 cfs 0.279 af

Subcatchment POST-3: Post Development Runoff Area=150,851 sf 2.08% Impervious Runoff Depth=3.00"
Flow Length=390' Slope=0.0100 '/' Tc=13.8 min CN=64 Runoff=9.33 cfs 0.866 af

Subcatchment POST-5: Post Development Runoff Area=66,789 sf 54.70% Impervious Runoff Depth=4.81"
Flow Length=300' Slope=0.0100 '/' Tc=9.9 min CN=81 Runoff=7.45 cfs 0.614 af

Subcatchment POST-6: Post Development Runoff Area=43,316 sf 78.89% Impervious Runoff Depth=5.82"
Tc=6.0 min CN=90 Runoff=6.37 cfs 0.483 af

Subcatchment POST-7: Post Runoff Area=109,739 sf 43.74% Impervious Runoff Depth=4.26"
Flow Length=487' Tc=13.6 min CN=76 Runoff=9.85 cfs 0.894 af

Subcatchment POST-8: Post Development Runoff Area=80,316 sf 0.00% Impervious Runoff Depth=2.51"
Tc=6.0 min CN=59 Runoff=5.20 cfs 0.385 af

Pond AP-1: Easterly Wetland Inflow=23.06 cfs 2.751 af
Primary=23.06 cfs 2.751 af

Pond AP-2: City Drainage System Inflow=48.13 cfs 5.126 af
Primary=48.13 cfs 5.126 af

Pond AP-3: Abutting Parcel Inflow=5.20 cfs 0.385 af
Primary=5.20 cfs 0.385 af

Pond AP-4: Duchaine Boulevard Inflow=18.47 cfs 1.482 af
Primary=18.47 cfs 1.482 af

Pond POND 1: Extended Peak Elev=87.44' Storage=31,726 cf Inflow=31.23 cfs 2.386 af
Discarded=0.41 cfs 0.530 af Primary=13.80 cfs 1.856 af Secondary=0.00 cfs 0.000 af Outflow=14.20 cfs 2.386 af

Pond POND 2: Extended Detention/Infiltration Peak Elev=86.25' Storage=5,723 cf Inflow=3.85 cfs 0.279 af
Discarded=0.20 cfs 0.250 af Primary=0.06 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.279 af

Total Runoff Area = 15.857 ac Runoff Volume = 5.907 af Average Runoff Depth = 4.47"
55.34% Pervious = 8.776 ac 44.66% Impervious = 7.081 ac

Summary for Subcatchment POST-1: Post Development Area 1

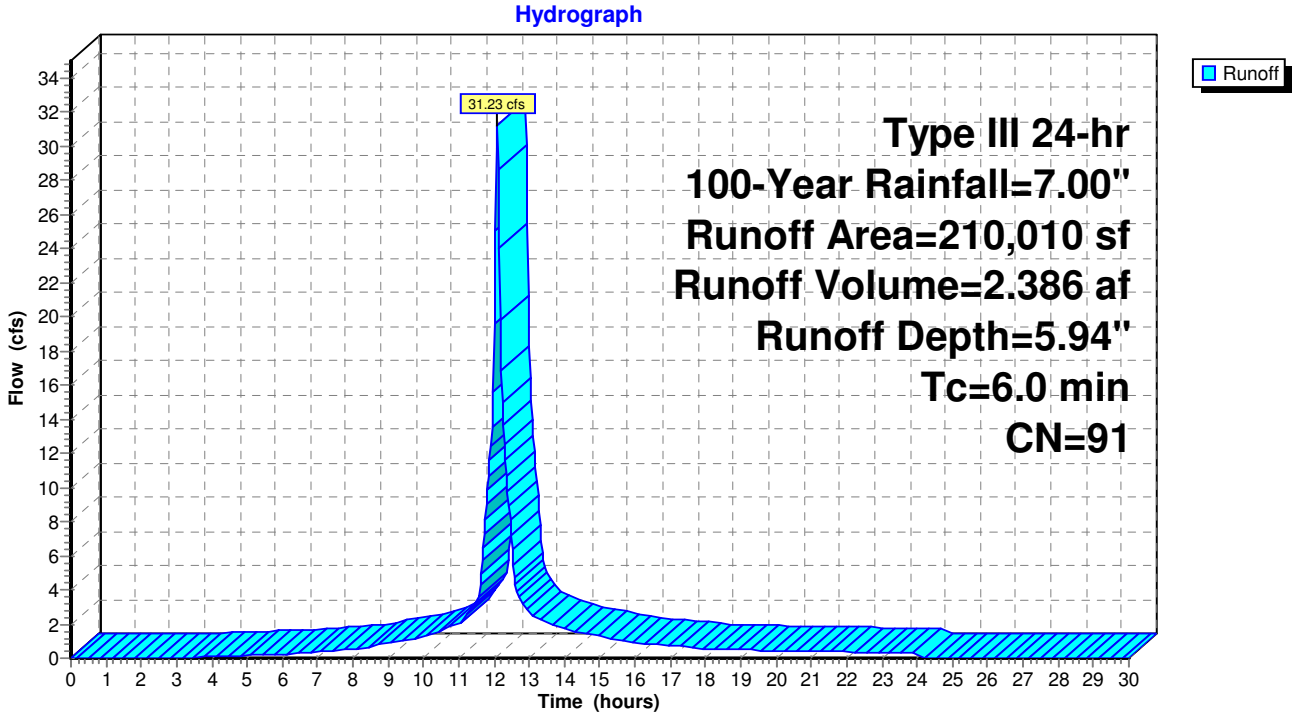
Runoff = 31.23 cfs @ 12.09 hrs, Volume= 2.386 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
117,140	98	Roofs, HSG B
54,222	98	Paved parking, HSG B
38,648	61	>75% Grass cover, Good, HSG B
210,010	91	Weighted Average
38,648		18.40% Pervious Area
171,362		81.60% Impervious Area

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

Subcatchment POST-1: Post Development Area 1



Summary for Subcatchment POST-2: Post Development Area 2

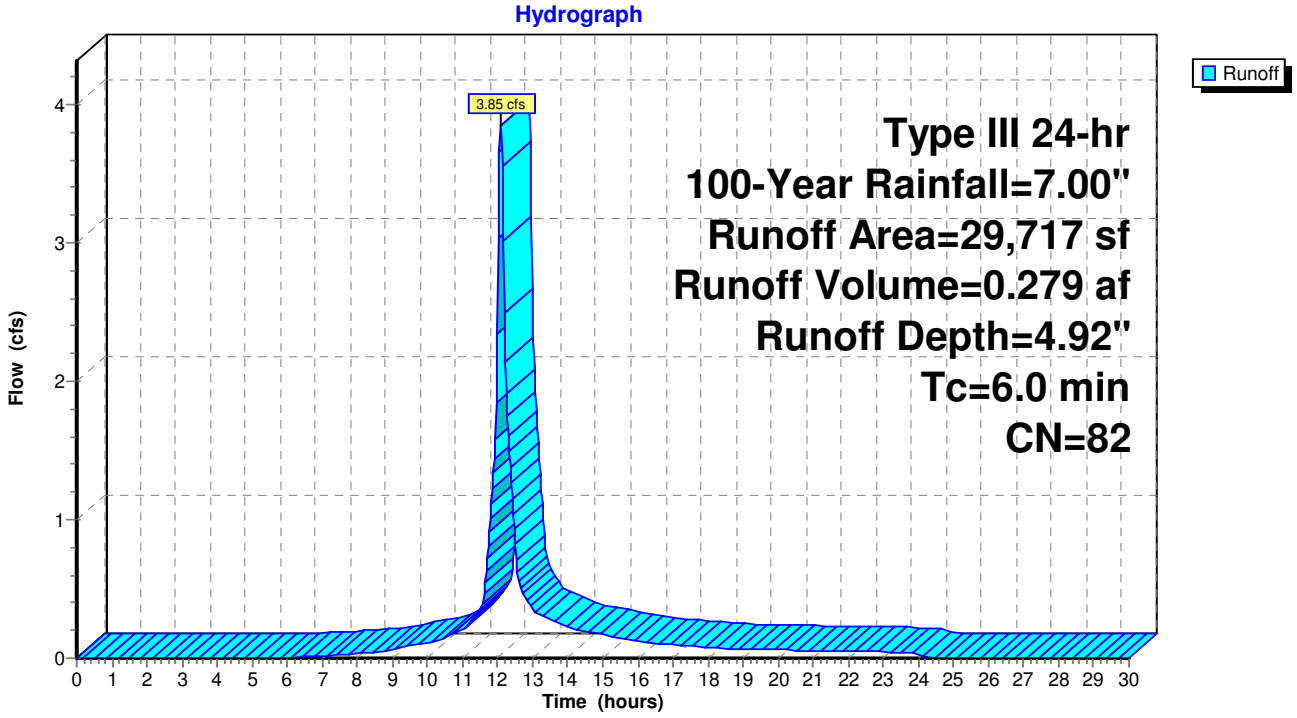
Runoff = 3.85 cfs @ 12.09 hrs, Volume= 0.279 af, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
15,256	98	Paved parking, HSG B
10,651	61	>75% Grass cover, Good, HSG B
3,810	80	>75% Grass cover, Good, HSG D
29,717	82	Weighted Average
14,461		48.66% Pervious Area
15,256		51.34% Impervious Area

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

Subcatchment POST-2: Post Development Area 2



Summary for Subcatchment POST-3: Post Development Area 3

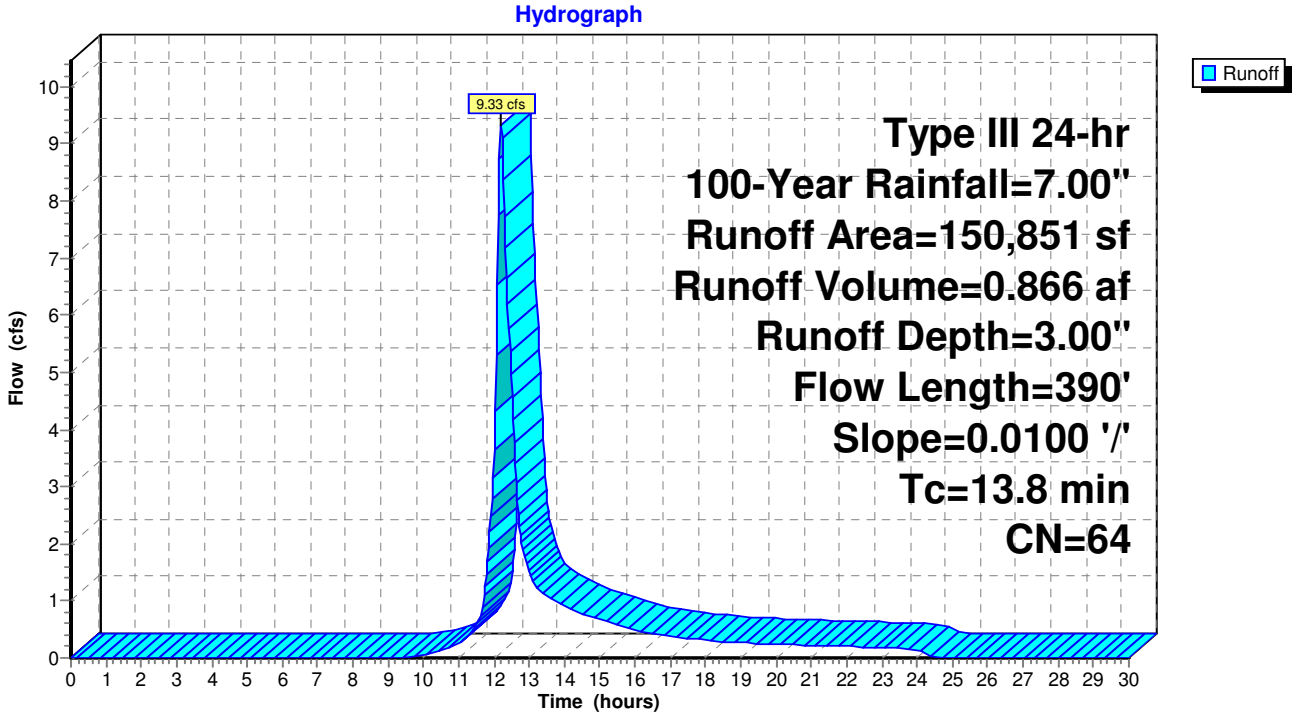
Runoff = 9.33 cfs @ 12.20 hrs, Volume= 0.866 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
3,139	98	Paved parking, HSG B
15,504	61	>75% Grass cover, Good, HSG B
11,430	80	>75% Grass cover, Good, HSG D
81,786	55	Woods, Good, HSG B
38,992	77	Woods, Good, HSG D
150,851	64	Weighted Average
147,712		97.92% Pervious Area
3,139		2.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0100	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.50"
3.5	340	0.0100	1.61		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	390	Total			

Subcatchment POST-3: Post Development Area 3



Summary for Subcatchment POST-5: Post Development Area 5

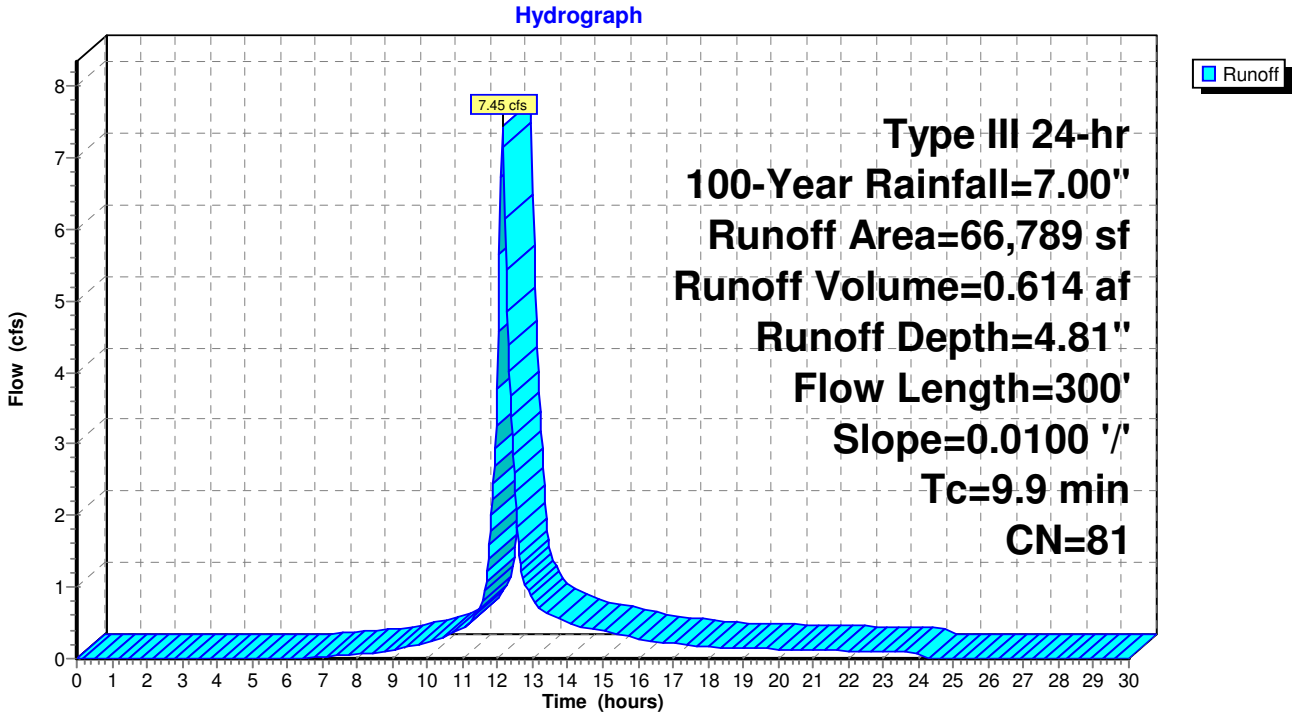
Runoff = 7.45 cfs @ 12.14 hrs, Volume= 0.614 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
36,536	98	Paved parking, HSG B
30,253	61	>75% Grass cover, Good, HSG B
66,789	81	Weighted Average
30,253		45.30% Pervious Area
36,536		54.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
2.8	250	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
9.9	300	Total			

Subcatchment POST-5: Post Development Area 5



Summary for Subcatchment POST-6: Post Development Area 6

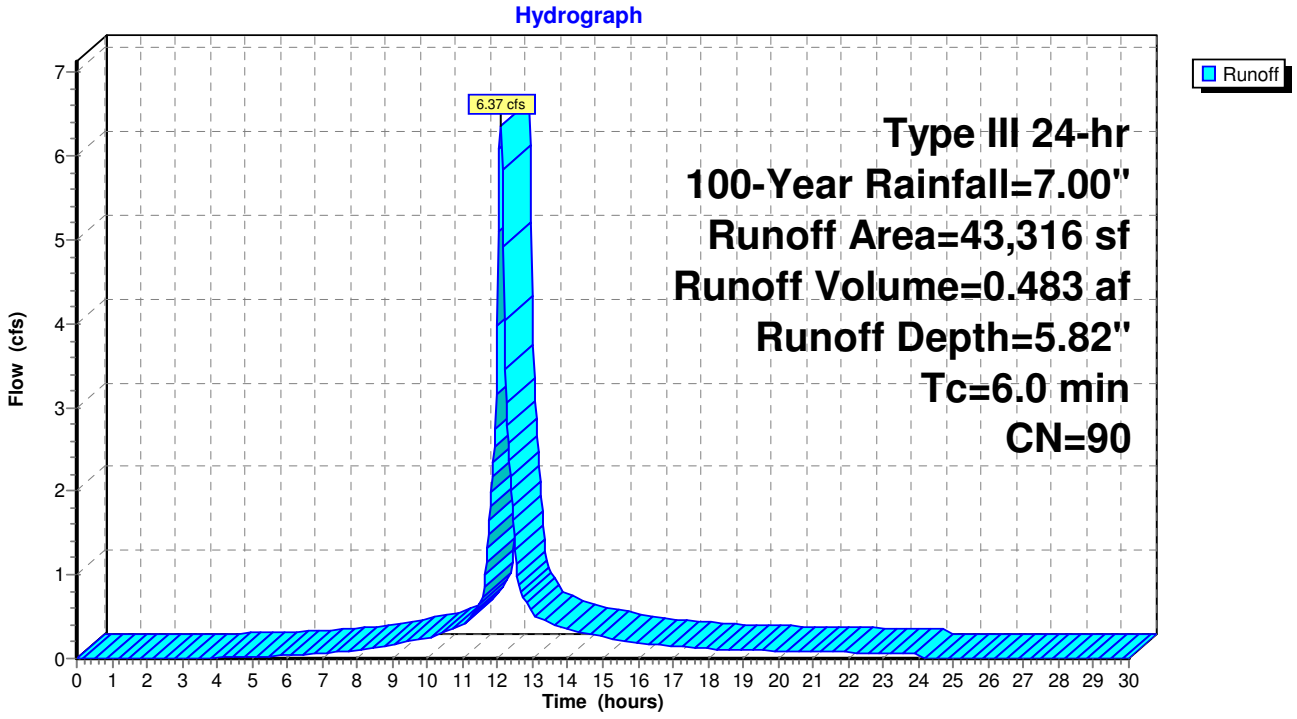
Runoff = 6.37 cfs @ 12.09 hrs, Volume= 0.483 af, Depth= 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
34,171	98	Paved parking, HSG B
9,145	61	>75% Grass cover, Good, HSG B
43,316	90	Weighted Average
9,145		21.11% Pervious Area
34,171		78.89% Impervious Area

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

Subcatchment POST-6: Post Development Area 6



Summary for Subcatchment POST-7: Post Development Area 7

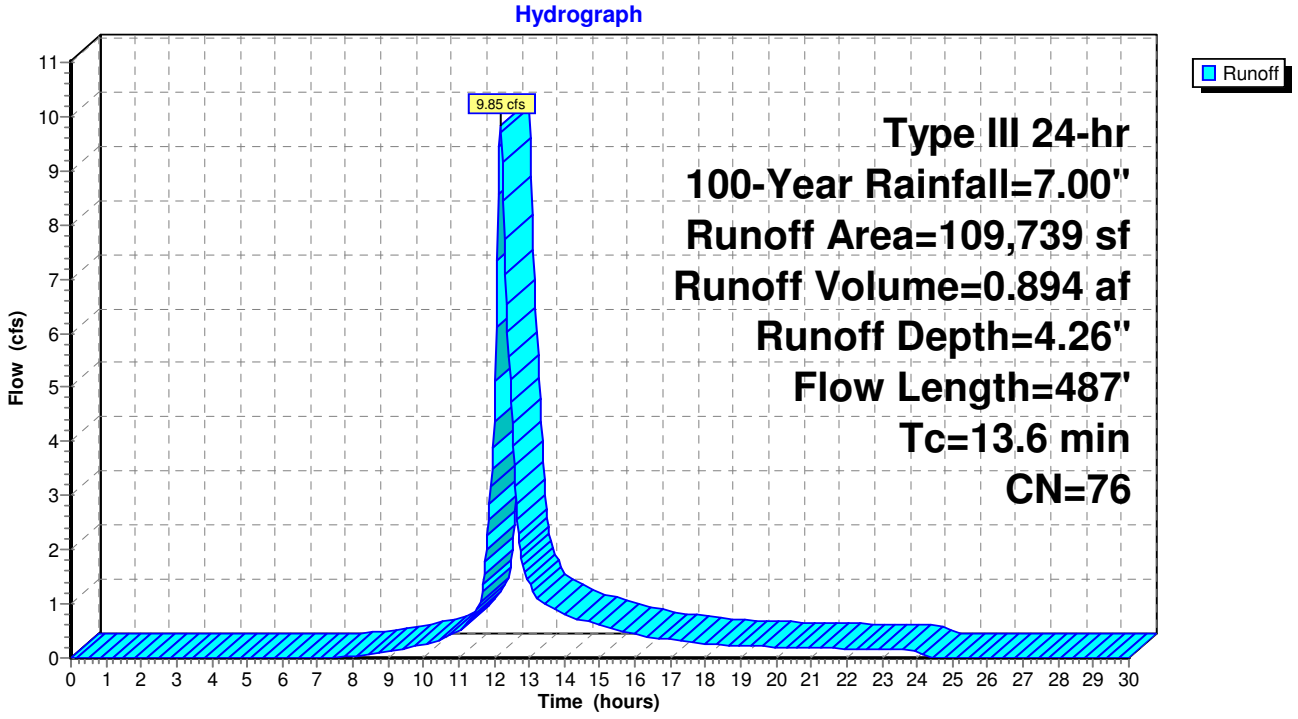
Runoff = 9.85 cfs @ 12.19 hrs, Volume= 0.894 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
47,999	98	Paved parking, HSG B
7,096	39	>75% Grass cover, Good, HSG A
54,644	61	>75% Grass cover, Good, HSG B
109,739	76	Weighted Average
61,740		56.26% Pervious Area
47,999		43.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.50"
0.2	37	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
6.3	400	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
13.6	487	Total			

Subcatchment POST-7: Post Development Area 7



Summary for Subcatchment POST-8: Post Development Area 8

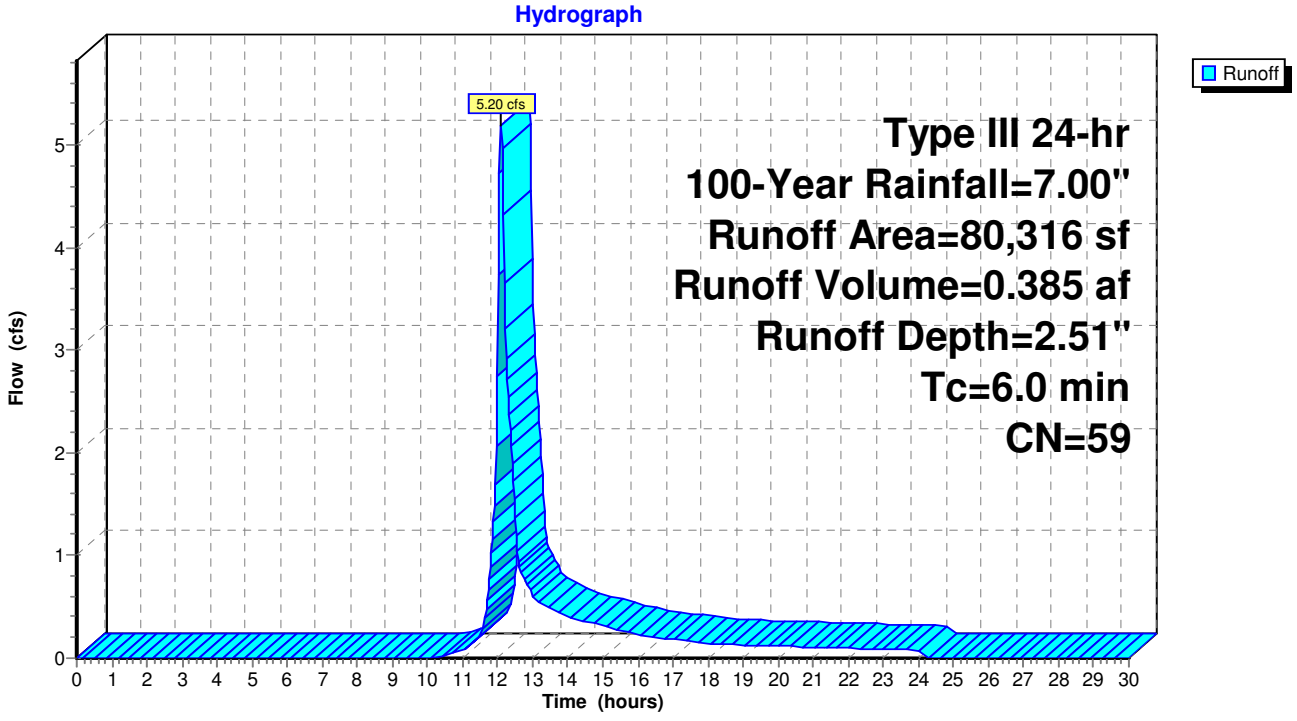
Runoff = 5.20 cfs @ 12.10 hrs, Volume= 0.385 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
43,702	55	Woods, Good, HSG B
28,772	61	>75% Grass cover, Good, HSG B
1,347	80	>75% Grass cover, Good, HSG D
6,495	77	Woods, Good, HSG D
80,316	59	Weighted Average
80,316		100.00% Pervious Area

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

Subcatchment POST-8: Post Development Area 8



Summary for Pond AP-1: Easterly Wetland

Analysis Point 1 is taken at the Boundary of the Easterly Wetland System

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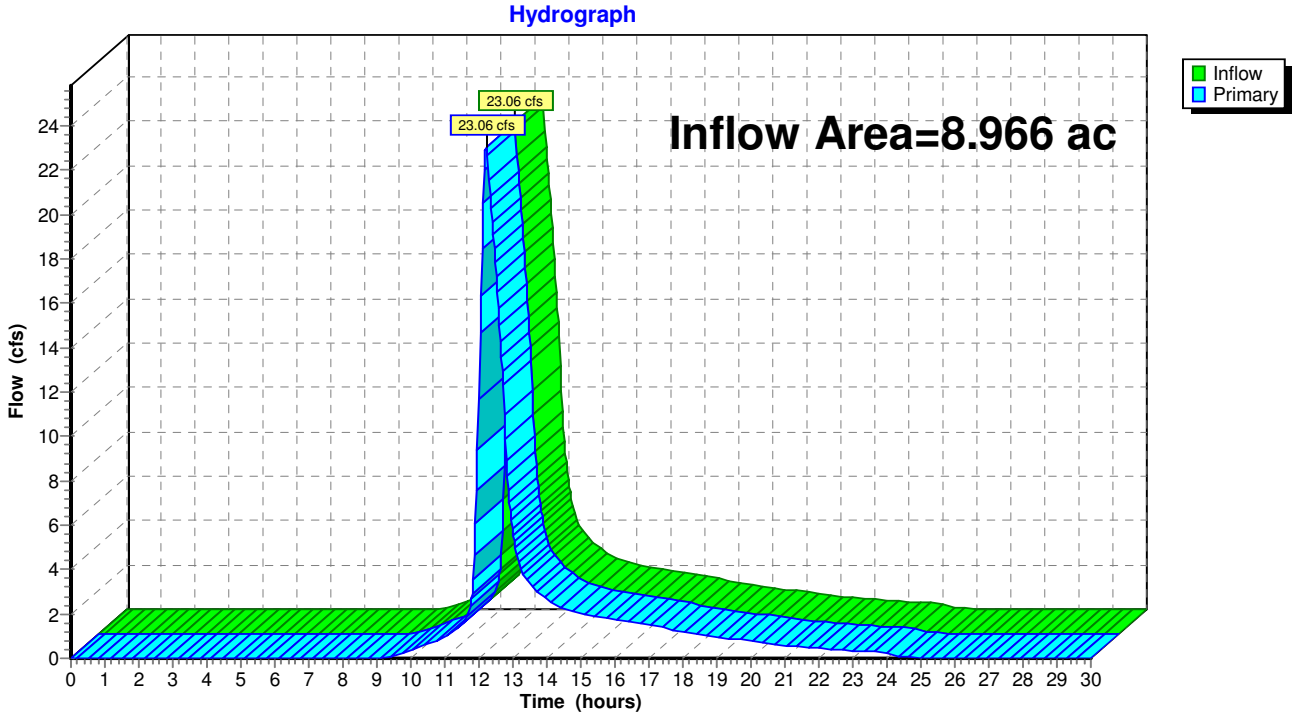
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.966 ac, 48.58% Impervious, Inflow Depth = 3.68" for 100-Year event
Inflow = 23.06 cfs @ 12.21 hrs, Volume= 2.751 af
Primary = 23.06 cfs @ 12.21 hrs, Volume= 2.751 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-1: Easterly Wetland



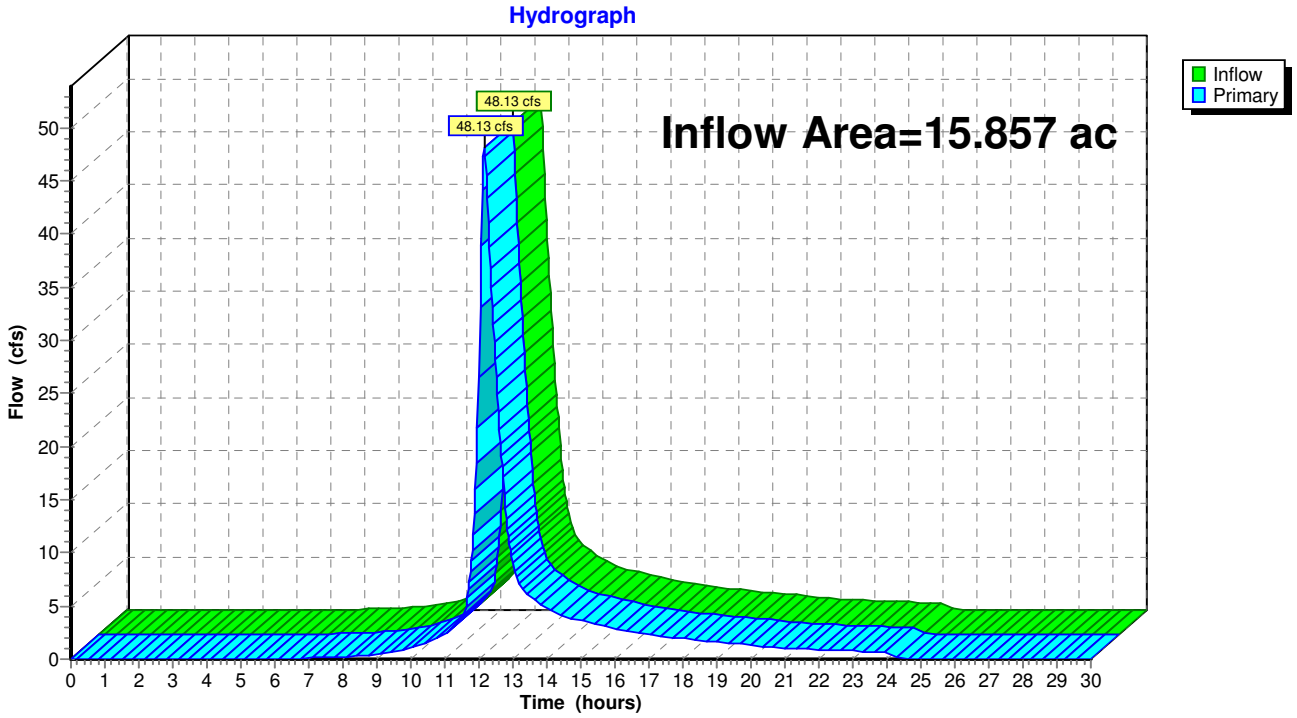
Summary for Pond AP-2: City Drainage System

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

Inflow Area = 15.857 ac, 44.66% Impervious, Inflow Depth = 3.88" for 100-Year event
Inflow = 48.13 cfs @ 12.15 hrs, Volume= 5.126 af
Primary = 48.13 cfs @ 12.15 hrs, Volume= 5.126 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-2: City Drainage System



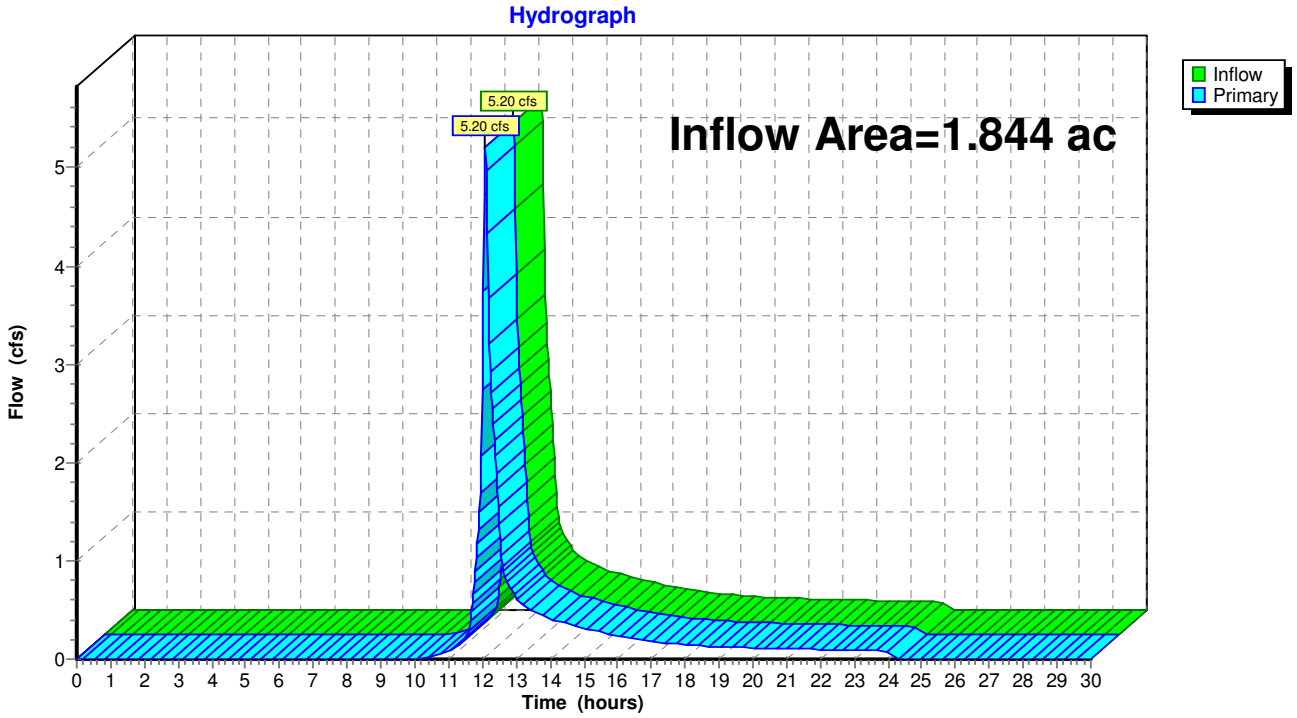
Summary for Pond AP-3: Abutting Parcel

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

Inflow Area = 1.844 ac, 0.00% Impervious, Inflow Depth = 2.51" for 100-Year event
Inflow = 5.20 cfs @ 12.10 hrs, Volume= 0.385 af
Primary = 5.20 cfs @ 12.10 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-3: Abutting Parcel



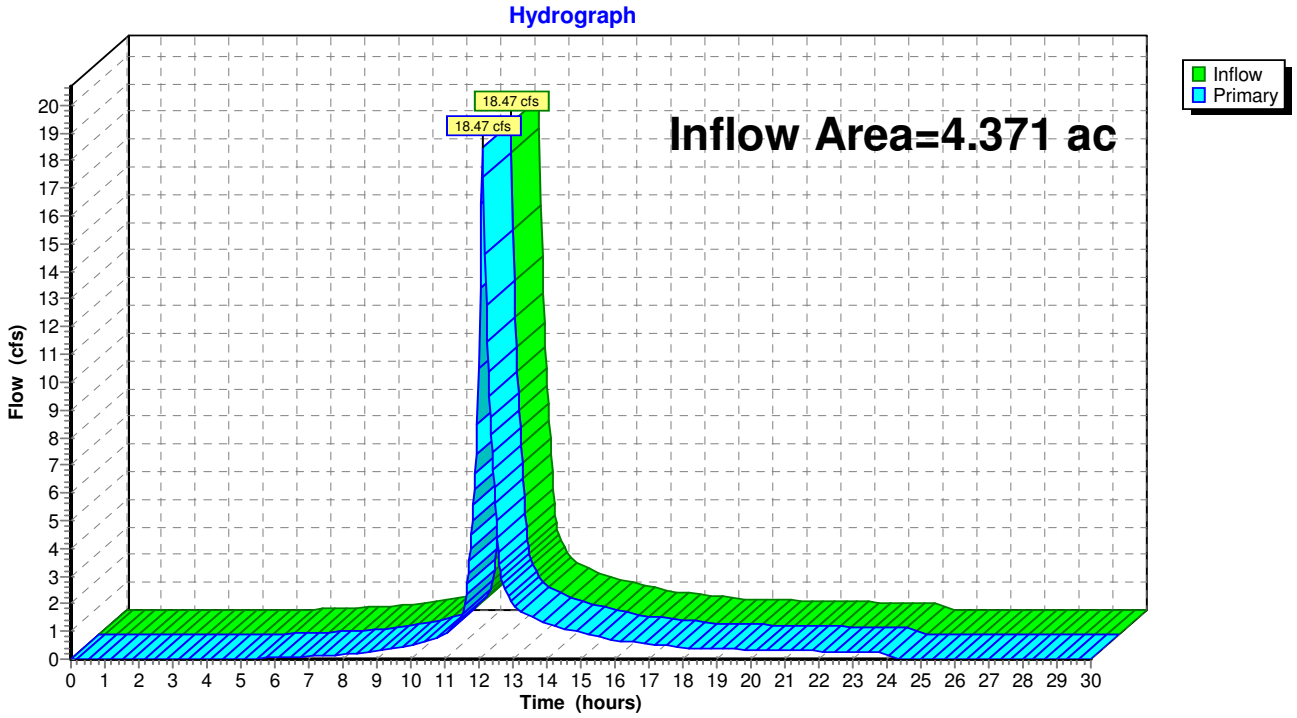
Summary for Pond AP-4: Duchaine Boulevard

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

Inflow Area = 4.371 ac, 37.13% Impervious, Inflow Depth = 4.07" for 100-Year event
Inflow = 18.47 cfs @ 12.10 hrs, Volume= 1.482 af
Primary = 18.47 cfs @ 12.10 hrs, Volume= 1.482 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Pond AP-4: Duchaine Boulevard



Summary for Pond POND 1: Extended Detention/Infiltration Basin 1

Inflow Area = 4.821 ac, 81.60% Impervious, Inflow Depth = 5.94" for 100-Year event
Inflow = 31.23 cfs @ 12.09 hrs, Volume= 2.386 af
Outflow = 14.20 cfs @ 12.26 hrs, Volume= 2.386 af, Atten= 55%, Lag= 10.4 min
Discarded = 0.41 cfs @ 12.26 hrs, Volume= 0.530 af
Primary = 13.80 cfs @ 12.26 hrs, Volume= 1.856 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 87.44' @ 12.26 hrs Surf.Area= 17,178 sf Storage= 31,726 cf

Plug-Flow detention time= 99.2 min calculated for 2.384 af (100% of inflow)
Center-of-Mass det. time= 99.4 min (875.8 - 776.4)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	42,129 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	9,930	0	0
86.00	12,307	11,119	11,119
87.00	14,741	13,524	24,643
88.00	20,231	17,486	42,129

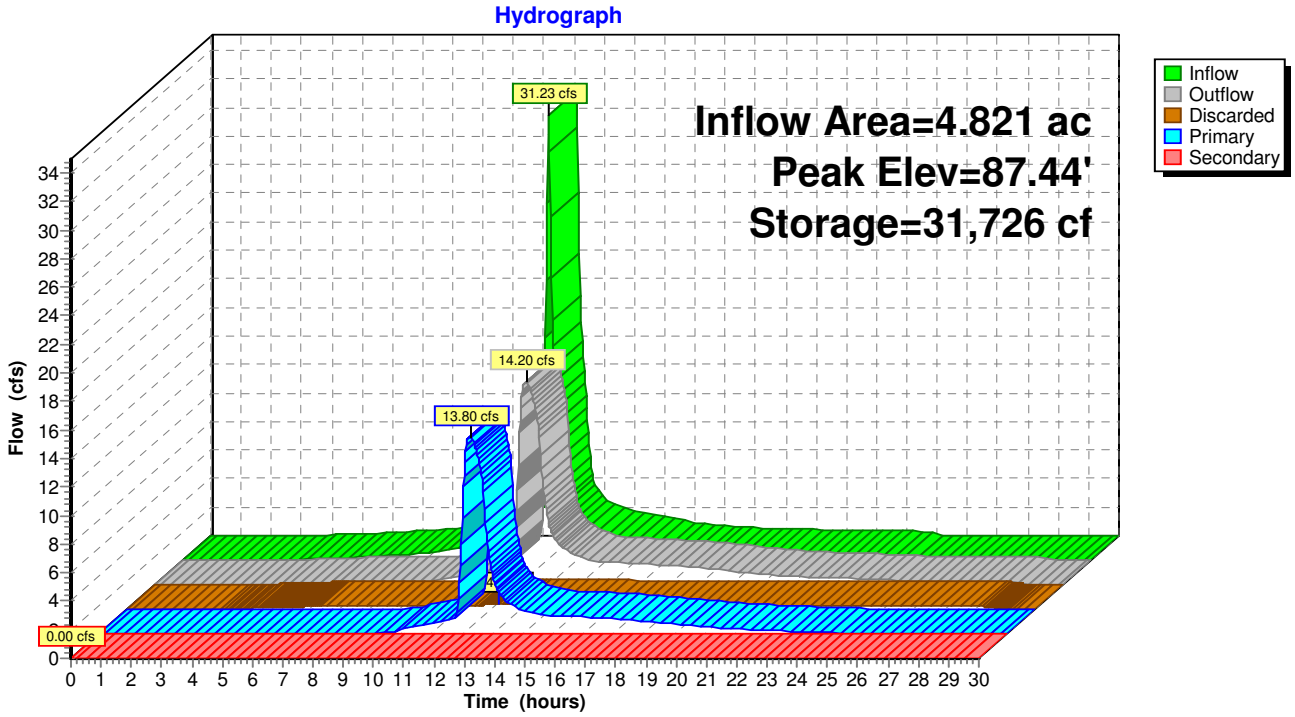
Device	Routing	Invert	Outlet Devices
#1	Primary	85.25'	**15.0" Round Culvert X 2.00** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 85.25' / 85.00' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	85.25'	**5.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	86.40'	**4.0' long Sharp-Crested Rectangular Weir X 2.00** 2 End Contraction(s)
#4	Secondary	87.50'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.41 cfs @ 12.26 hrs HW=87.44' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=13.79 cfs @ 12.26 hrs HW=87.44' (Free Discharge)
└**1=Culvert** (Barrel Controls 13.79 cfs @ 5.62 fps)
  ├**2=Orifice/Grate** (Passes < 1.85 cfs potential flow)
  └**3=Sharp-Crested Rectangular Weir** (Passes < 26.41 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 1: Extended Detention/Infiltration Basin 1



Summary for Pond POND 2: Extended Detention/Infiltration Basin 2

Inflow Area = 0.682 ac, 51.34% Impervious, Inflow Depth = 4.92" for 100-Year event
Inflow = 3.85 cfs @ 12.09 hrs, Volume= 0.279 af
Outflow = 0.27 cfs @ 13.61 hrs, Volume= 0.279 af, Atten= 93%, Lag= 91.3 min
Discarded = 0.20 cfs @ 13.61 hrs, Volume= 0.250 af
Primary = 0.06 cfs @ 13.61 hrs, Volume= 0.029 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs / 4
Peak Elev= 86.25' @ 13.61 hrs Surf.Area= 8,632 sf Storage= 5,723 cf

Plug-Flow detention time= 233.8 min calculated for 0.279 af (100% of inflow)
Center-of-Mass det. time= 233.7 min (1,036.7 - 803.0)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	15,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.50	6,257	0	0
86.00	8,134	3,598	3,598
87.00	10,100	9,117	12,715
87.25	10,585	2,586	15,300

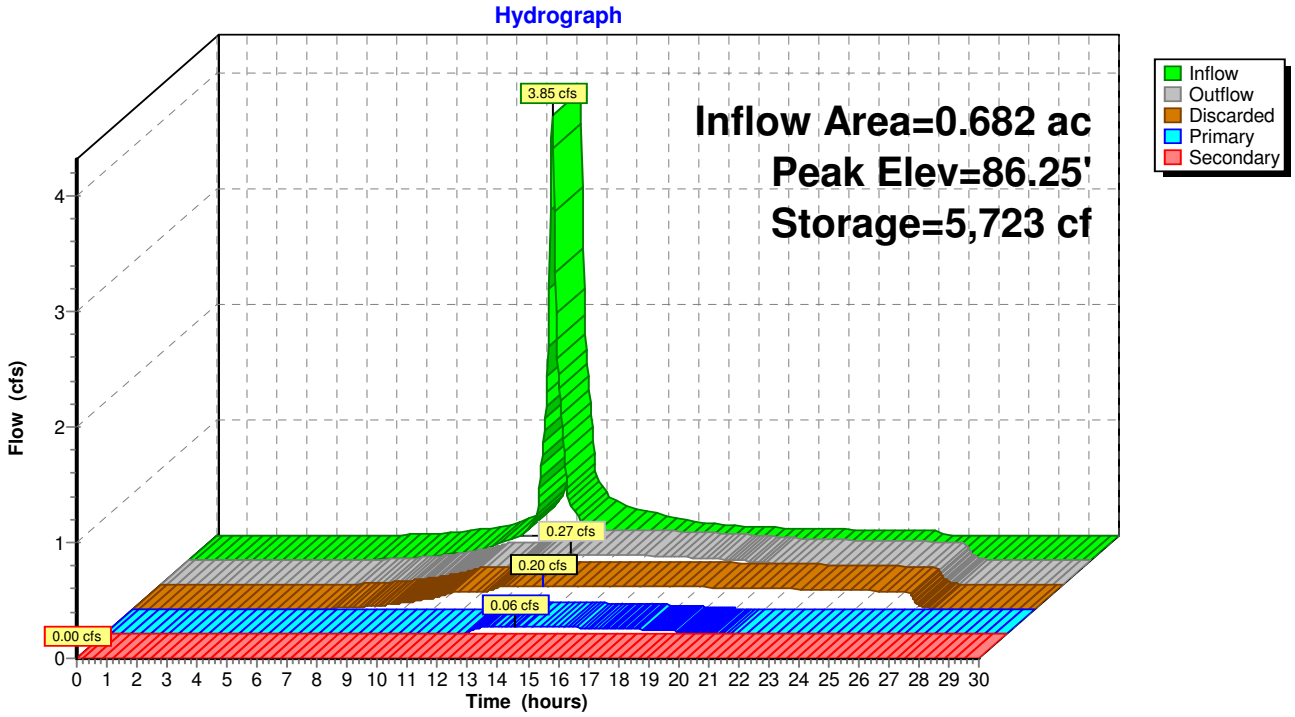
Device	Routing	Invert	Outlet Devices
#1	Primary	85.50'	**12.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 85.50' / 85.00' S= 0.0238 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	85.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	86.25'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Secondary	86.75'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#5	Discarded	85.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.20 cfs @ 13.61 hrs HW=86.25' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.20 cfs)

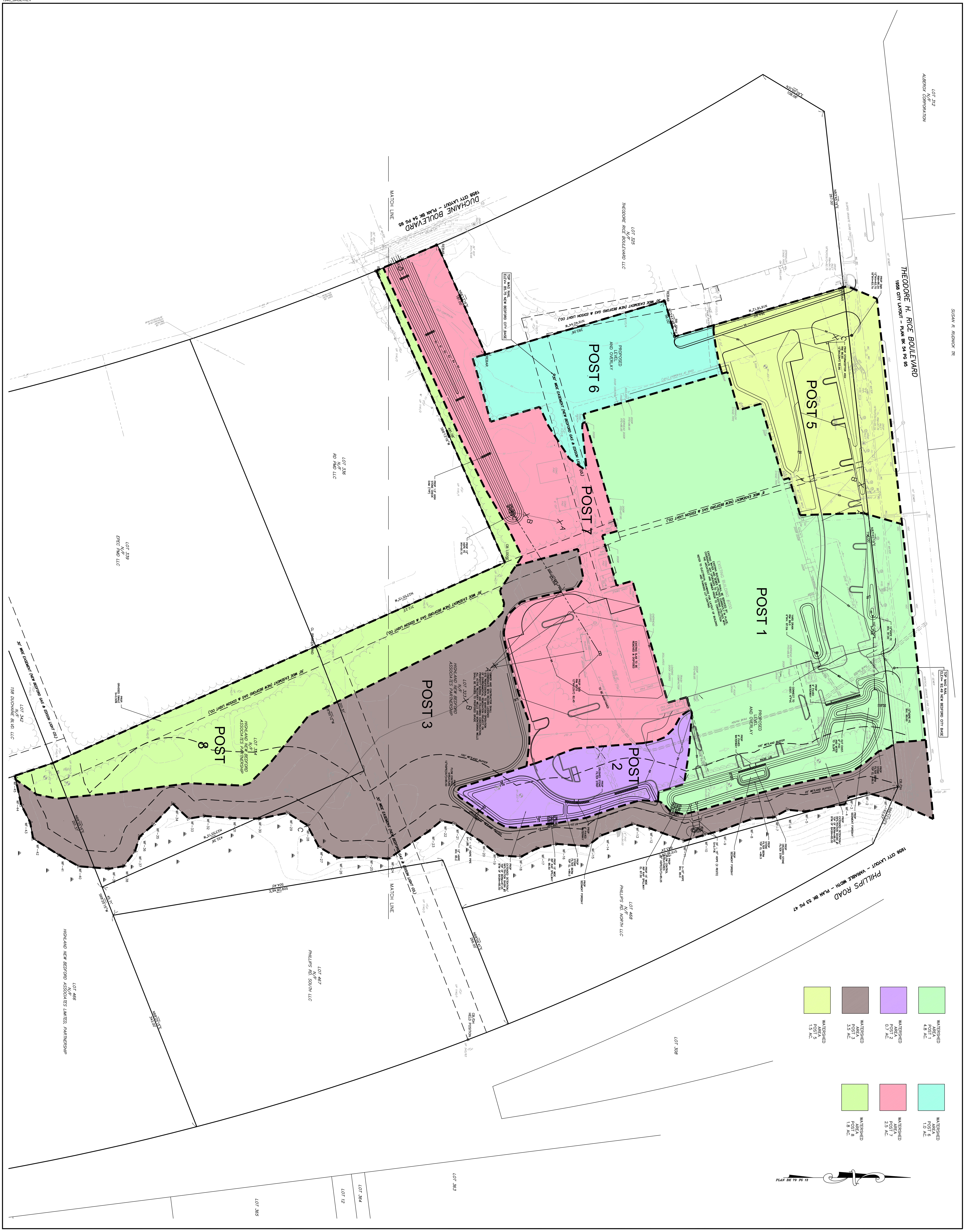
Primary OutFlow Max=0.06 cfs @ 13.61 hrs HW=86.25' (Free Discharge)
└**1=Culvert** (Passes 0.06 cfs of 1.88 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.72 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POND 2: Extended Detention/Infiltration Basin 2



1948_BASE-REV



PLAN TO ACCOMPANY AN AMENDED ORDER OF CONDITIONS REQUEST
FIRST HIGHLAND MANAGEMENT AND DEVELOPMENT CORPORATION

200 THEODORE H. RICE BOULEVARD
NEW BEDFORD, MASSACHUSETTS

Drawing Title: POST DEVELOPMENT WATERSHED

Project No. 1948 | Sheet 1 OF 1

Sheet No. POST

Issued For: PERMITTING

Drawn By	Designed By	Checked By
RMS/JCC	JCC	RRR

Scale: 1"=50'

Date: 7/23/13

Revisions

No.	Description	Date	Appvd.
1	REV PER CON COM CONSULTANT REVIEW	11/8/13	RRR
2	REV FOR AMENDED ORDER OF CONDITIONS	5/4/16	RRR

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