

019-A-001-001

1-1 India St, Portland, ME

The Longfellow at Ocean Gateway  
Riverwalk, LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1AP: Open Space</b>	Runoff Area=13,340 sf Flow Length=165'	Runoff Depth>0.03" Tc=6.1 min CN=52 Runoff=0.00 cfs 0.001 af
<b>Subcatchment 1BP: Parking Garage</b>	Runoff Area=33,985 sf	Runoff Depth>2.13" Tc=6.0 min CN=98 Runoff=1.83 cfs 0.139 af
<b>Subcatchment 3OG: Beginning of Commercial St. Ext</b>	Runoff Area=0.600 ac Flow Length=456'	Runoff Depth>1.68" Tc=4.8 min CN=93 Runoff=1.25 cfs 0.084 af
<b>Subcatchment 3P: Turner Barker</b>	Runoff Area=9,230 sf Flow Length=100' Slope=0.0100 '/'	Runoff Depth>1.68" Tc=1.7 min CN=93 Runoff=0.47 cfs 0.030 af
<b>Subcatchment 4P: Back of PS</b>	Runoff Area=3,655 sf Flow Length=110' Slope=0.0300 '/'	Runoff Depth=0.00" Tc=8.7 min CN=39 Runoff=0.00 cfs 0.000 af
<b>Subcatchment 5AOG: Upper Gravel Parking Lot</b>	Runoff Area=1.950 ac Flow Length=445'	Runoff Depth>2.13" Tc=13.2 min CN=98 Runoff=3.73 cfs 0.346 af
<b>Subcatchment 5AP: West Half of Complex</b>	Runoff Area=14,410 sf	Runoff Depth>2.13" Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af
<b>Subcatchment 5BP: East Half of Complex</b>	Runoff Area=38,510 sf	Runoff Depth>2.13" Tc=6.0 min CN=98 Runoff=2.08 cfs 0.157 af
<b>Subcatchment 5CP: Plaza</b>	Runoff Area=4,995 sf Flow Length=75' Slope=0.0125 '/'	Runoff Depth>2.13" Tc=1.2 min CN=98 Runoff=0.31 cfs 0.020 af
<b>Subcatchment 6OG: Hancock St., Commercial St. Ext.</b>	Runoff Area=1.350 ac Flow Length=550'	Runoff Depth>1.86" Tc=2.8 min CN=95 Runoff=3.25 cfs 0.209 af
<b>Subcatchment 8OG: Parking Area</b>	Runoff Area=0.800 ac Flow Length=125'	Runoff Depth>0.62" Tc=27.5 min CN=76 Runoff=0.35 cfs 0.042 af
<b>Pond 1B: Subsurface Detention for Parking Ga</b>	Peak Elev=20.22' Storage=917 cf	Inflow=1.83 cfs 0.139 af Outflow=1.06 cfs 0.137 af
<b>Pond 5A: CB16</b>	Peak Elev=13.19' Storage=1,170 cf	Inflow=3.73 cfs 0.346 af Outflow=3.40 cfs 0.344 af
<b>Pond 5C: Subsurface Detention for Plaza</b>	Peak Elev=11.05' Storage=682 cf	Inflow=3.06 cfs 0.236 af Outflow=2.64 cfs 0.235 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=9.18' 15.0" x 192.0' Culvert	Inflow=0.47 cfs 0.030 af Outflow=0.47 cfs 0.030 af

<b>Pond D3: Commercial</b>	Peak Elev=9.09' Inflow=0.47 cfs 0.030 af 15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af
<b>Pond D4: Drainage Manhole #4</b>	Peak Elev=9.08' Inflow=4.93 cfs 0.487 af 36.0" x 250.0' Culvert Outflow=4.93 cfs 0.487 af
<b>Pond D5: Pipe from Commercial St. to Treatment Unit and Outf</b>	Peak Elev=8.53' Inflow=9.64 cfs 1.039 af 36.0" x 137.0' Culvert Outflow=9.64 cfs 1.039 af
<b>Pond D7: Hancock</b>	Peak Elev=9.10' Inflow=1.06 cfs 0.138 af 30.0" x 36.0' Culvert Outflow=1.06 cfs 0.138 af
<b>Pond D8: Hancock Street Storm System</b>	Peak Elev=10.22' Inflow=1.06 cfs 0.138 af 24.0" x 196.0' Culvert Outflow=1.06 cfs 0.138 af
<b>Pond HIL: DMH #10/DD</b>	Peak Elev=8.08' Inflow=9.74 cfs 1.081 af 36.0" x 102.0' Culvert Outflow=9.74 cfs 1.081 af
<b>Pond UH1: Hancock Link DMH1</b>	Peak Elev=12.05' Inflow=1.06 cfs 0.138 af 24.0" x 125.0' Culvert Outflow=1.06 cfs 0.138 af
<b>Pond UH2: Hancock Link DMH2</b>	Peak Elev=16.81' Inflow=1.06 cfs 0.138 af 24.0" x 106.0' Culvert Outflow=1.06 cfs 0.138 af

**Total Runoff Area = 7.412 ac Runoff Volume = 1.085 af Average Runoff Depth = 1.76"**  
**12.05% Pervious Area = 0.893 ac 87.95% Impervious Area = 6.519 ac**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1AP: Open Space</b>	Runoff Area=13,340 sf Runoff Depth>0.92" Flow Length=165' Tc=6.1 min CN=52 Runoff=0.29 cfs 0.024 af
<b>Subcatchment 1BP: Parking Garage</b>	Runoff Area=33,985 sf Runoff Depth>4.87" Tc=6.0 min CN=98 Runoff=4.10 cfs 0.317 af
<b>Subcatchment 3OG: Beginning of Commercial St. Ext</b>	Runoff Area=0.600 ac Runoff Depth>4.43" Flow Length=456' Tc=4.8 min CN=93 Runoff=3.13 cfs 0.221 af
<b>Subcatchment 3P: Turner Barker</b>	Runoff Area=9,230 sf Runoff Depth>4.43" Flow Length=100' Slope=0.0100 '/' Tc=1.7 min CN=93 Runoff=1.18 cfs 0.078 af
<b>Subcatchment 4P: Back of PS</b>	Runoff Area=3,655 sf Runoff Depth>0.25" Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af
<b>Subcatchment 5AOG: Upper Gravel Parking Lot</b>	Runoff Area=1.950 ac Runoff Depth>4.87" Flow Length=445' Tc=13.2 min CN=98 Runoff=8.35 cfs 0.792 af
<b>Subcatchment 5AP: West Half of Complex</b>	Runoff Area=14,410 sf Runoff Depth>4.87" Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af
<b>Subcatchment 5BP: East Half of Complex</b>	Runoff Area=38,510 sf Runoff Depth>4.87" Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af
<b>Subcatchment 5CP: Plaza</b>	Runoff Area=4,995 sf Runoff Depth>4.87" Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af
<b>Subcatchment 6OG: Hancock St., Commercial St. Ext.</b>	Runoff Area=1.350 ac Runoff Depth>4.62" Flow Length=550' Tc=2.8 min CN=95 Runoff=7.70 cfs 0.520 af
<b>Subcatchment 8OG: Parking Area</b>	Runoff Area=0.800 ac Runoff Depth>2.73" Flow Length=125' Tc=27.5 min CN=76 Runoff=1.62 cfs 0.182 af
<b>Pond 1B: Subsurface Detention for Parking G</b>	Peak Elev=21.24' Storage=2,187 cf Inflow=4.10 cfs 0.317 af Outflow=2.28 cfs 0.315 af
<b>Pond 5A: CB16</b>	Peak Elev=13.39' Storage=2,048 cf Inflow=8.35 cfs 0.792 af Outflow=7.87 cfs 0.789 af
<b>Pond 5C: Subsurface Detention for Plaza</b>	Peak Elev=12.83' Storage=1,700 cf Inflow=6.84 cfs 0.540 af Outflow=5.69 cfs 0.539 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=10.04' Inflow=1.18 cfs 0.080 af 15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

**Pond D3: Commercial**

Peak Elev=10.04' Inflow=1.18 cfs 0.080 af  
15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

**Pond D4: Drainage Manhole #4**

Peak Elev=10.03' Inflow=11.11 cfs 1.178 af  
36.0" x 250.0' Culvert Outflow=11.11 cfs 1.178 af

**Pond D5: Pipe from Commercial St. to Treatment Unit and Out**

Peak Elev=9.64' Inflow=22.85 cfs 2.487 af  
36.0" x 137.0' Culvert Outflow=22.85 cfs 2.487 af

**Pond D7: Hancock**

Peak Elev=10.04' Inflow=2.49 cfs 0.338 af  
30.0" x 36.0' Culvert Outflow=2.49 cfs 0.338 af

**Pond D8: Hancock Street Storm System**

Peak Elev=10.61' Inflow=2.49 cfs 0.338 af  
24.0" x 196.0' Culvert Outflow=2.49 cfs 0.338 af

**Pond HIL: DMH #10/DD**

Peak Elev=9.02' Inflow=23.11 cfs 2.669 af  
36.0" x 102.0' Culvert Outflow=23.11 cfs 2.669 af

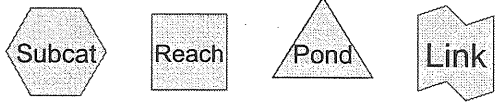
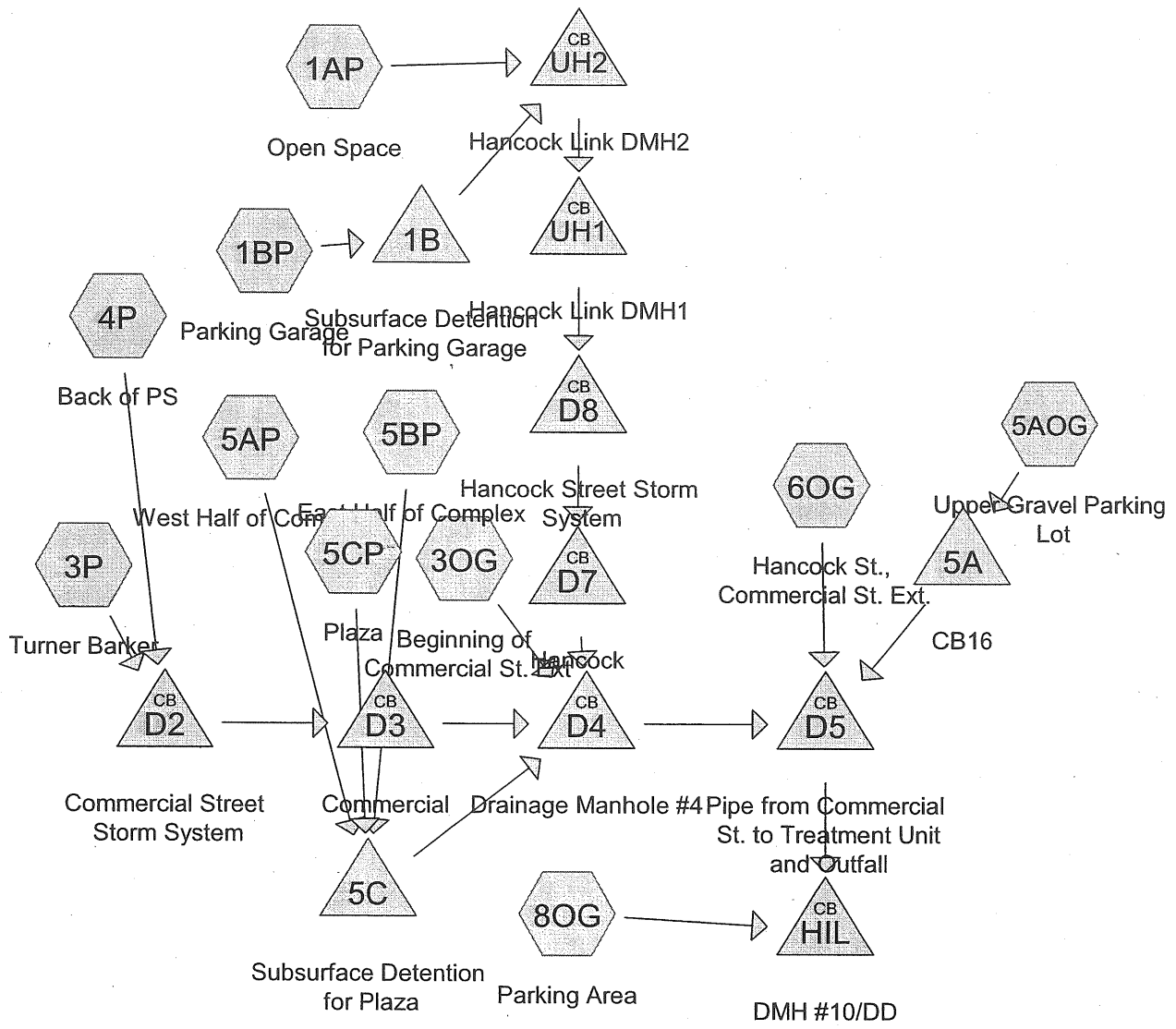
**Pond UH1: Hancock Link DMH1**

Peak Elev=12.29' Inflow=2.49 cfs 0.338 af  
24.0" x 125.0' Culvert Outflow=2.49 cfs 0.338 af

**Pond UH2: Hancock Link DMH2**

Peak Elev=17.05' Inflow=2.49 cfs 0.338 af  
24.0" x 106.0' Culvert Outflow=2.49 cfs 0.338 af

**Total Runoff Area = 7.412 ac Runoff Volume = 2.676 af Average Runoff Depth = 4.33"**  
**12.05% Pervious Area = 0.893 ac 87.95% Impervious Area = 6.519 ac**



Drainage Diagram for Ocean Gateway and The Longfellow-Residences and Garage-ST  
 Prepared by Woodard & Curran 11/3/2006  
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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
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<b>Subcatchment 1AP: Open Space</b>	Runoff Area=13,340 sf Flow Length=165'	Runoff Depth>0.03" Tc=6.1 min CN=52 Runoff=0.00 cfs 0.001 af
<b>Subcatchment 1BP: Parking Garage</b>	Runoff Area=33,985 sf Tc=6.0 min CN=98	Runoff Depth>2.13" Runoff=1.83 cfs 0.139 af
<b>Subcatchment 3OG: Beginning of Commercial St. Ext</b>	Runoff Area=0.600 ac Flow Length=456'	Runoff Depth>1.68" Tc=4.8 min CN=93 Runoff=1.25 cfs 0.084 af
<b>Subcatchment 3P: Turner Barker</b>	Runoff Area=9,230 sf Flow Length=100' Slope=0.0100 '/'	Runoff Depth>1.68" Tc=1.7 min CN=93 Runoff=0.47 cfs 0.030 af
<b>Subcatchment 4P: Back of PS</b>	Runoff Area=3,655 sf Flow Length=110' Slope=0.0300 '/'	Runoff Depth=0.00" Tc=8.7 min CN=39 Runoff=0.00 cfs 0.000 af
<b>Subcatchment 5AOG: Upper Gravel Parking Lot</b>	Runoff Area=1.950 ac Flow Length=445'	Runoff Depth>2.13" Tc=13.2 min CN=98 Runoff=3.73 cfs 0.346 af
<b>Subcatchment 5AP: West Half of Complex</b>	Runoff Area=14,410 sf Tc=6.0 min CN=98	Runoff Depth>2.13" Runoff=0.78 cfs 0.059 af
<b>Subcatchment 5BP: East Half of Complex</b>	Runoff Area=38,510 sf Tc=6.0 min CN=98	Runoff Depth>2.13" Runoff=2.08 cfs 0.157 af
<b>Subcatchment 5CP: Plaza</b>	Runoff Area=4,995 sf Flow Length=75' Slope=0.0125 '/'	Runoff Depth>2.13" Tc=1.2 min CN=98 Runoff=0.31 cfs 0.020 af
<b>Subcatchment 6OG: Hancock St., Commercial St. Ext.</b>	Runoff Area=1.350 ac Flow Length=550'	Runoff Depth>1.86" Tc=2.8 min CN=95 Runoff=3.25 cfs 0.209 af
<b>Subcatchment 8OG: Parking Area</b>	Runoff Area=0.800 ac Flow Length=125'	Runoff Depth>0.62" Tc=27.5 min CN=76 Runoff=0.35 cfs 0.042 af
<b>Pond 1B: Subsurface Detention for Parking Ga</b>	Peak Elev=20.18'	Storage=979 cf Inflow=1.83 cfs 0.139 af Outflow=1.01 cfs 0.137 af
<b>Pond 5A: CB16</b>	Peak Elev=13.19'	Storage=1,170 cf Inflow=3.73 cfs 0.346 af Outflow=3.40 cfs 0.344 af
<b>Pond 5C: Subsurface Detention for Plaza</b>	Peak Elev=11.00'	Storage=806 cf Inflow=3.06 cfs 0.236 af Outflow=2.50 cfs 0.235 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=9.18'	Inflow=0.47 cfs 0.030 af 15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af

<b>Pond D3: Commercial</b>	Peak Elev=9.07' Inflow=0.47 cfs 0.030 af 15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af
<b>Pond D4: Drainage Manhole #4</b>	Peak Elev=9.06' Inflow=4.70 cfs 0.486 af 36.0" x 250.0' Culvert Outflow=4.70 cfs 0.486 af
<b>Pond D5: Pipe from Commercial St. to Treatment Unit and Outf</b>	Peak Elev=8.51' Inflow=9.42 cfs 1.039 af 36.0" x 137.0' Culvert Outflow=9.42 cfs 1.039 af
<b>Pond D7: Hancock</b>	Peak Elev=9.08' Inflow=1.01 cfs 0.138 af 30.0" x 36.0' Culvert Outflow=1.01 cfs 0.138 af
<b>Pond D8: Hancock Street Storm System</b>	Peak Elev=10.21' Inflow=1.01 cfs 0.138 af 24.0" x 196.0' Culvert Outflow=1.01 cfs 0.138 af
<b>Pond HIL: DMH #10/DD</b>	Peak Elev=8.06' Inflow=9.52 cfs 1.081 af 36.0" x 102.0' Culvert Outflow=9.52 cfs 1.081 af
<b>Pond UH1: Hancock Link DMH1</b>	Peak Elev=12.04' Inflow=1.01 cfs 0.138 af 24.0" x 125.0' Culvert Outflow=1.01 cfs 0.138 af
<b>Pond UH2: Hancock Link DMH2</b>	Peak Elev=16.80' Inflow=1.01 cfs 0.138 af 24.0" x 106.0' Culvert Outflow=1.01 cfs 0.138 af

**Total Runoff Area = 7.412 ac Runoff Volume = 1.085 af Average Runoff Depth = 1.76"**  
**12.05% Pervious Area = 0.893 ac 87.95% Impervious Area = 6.519 ac**



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1AP: Open Space</b>	Runoff Area=13,340 sf Runoff Depth>0.92" Flow Length=165' Tc=6.1 min CN=52 Runoff=0.29 cfs 0.024 af
<b>Subcatchment 1BP: Parking Garage</b>	Runoff Area=33,985 sf Runoff Depth>4.87" Tc=6.0 min CN=98 Runoff=4.10 cfs 0.317 af
<b>Subcatchment 3OG: Beginning of Commercial St. Ext</b>	Runoff Area=0.600 ac Runoff Depth>4.43" Flow Length=456' Tc=4.8 min CN=93 Runoff=3.13 cfs 0.221 af
<b>Subcatchment 3P: Turner Barker</b>	Runoff Area=9,230 sf Runoff Depth>4.43" Flow Length=100' Slope=0.0100 '/' Tc=1.7 min CN=93 Runoff=1.18 cfs 0.078 af
<b>Subcatchment 4P: Back of PS</b>	Runoff Area=3,655 sf Runoff Depth>0.25" Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af
<b>Subcatchment 5AOG: Upper Gravel Parking Lot</b>	Runoff Area=1.950 ac Runoff Depth>4.87" Flow Length=445' Tc=13.2 min CN=98 Runoff=8.35 cfs 0.792 af
<b>Subcatchment 5AP: West Half of Complex</b>	Runoff Area=14,410 sf Runoff Depth>4.87" Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af
<b>Subcatchment 5BP: East Half of Complex</b>	Runoff Area=38,510 sf Runoff Depth>4.87" Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af
<b>Subcatchment 5CP: Plaza</b>	Runoff Area=4,995 sf Runoff Depth>4.87" Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af
<b>Subcatchment 6OG: Hancock St., Commercial St. Ext.</b>	Runoff Area=1.350 ac Runoff Depth>4.62" Flow Length=550' Tc=2.8 min CN=95 Runoff=7.70 cfs 0.520 af
<b>Subcatchment 8OG: Parking Area</b>	Runoff Area=0.800 ac Runoff Depth>2.73" Flow Length=125' Tc=27.5 min CN=76 Runoff=1.62 cfs 0.182 af
<b>Pond 1B: Subsurface Detention for Parking G</b>	Peak Elev=21.14' Storage=2,325 cf Inflow=4.10 cfs 0.317 af Outflow=2.19 cfs 0.315 af
<b>Pond 5A: CB16</b>	Peak Elev=13.39' Storage=2,048 cf Inflow=8.35 cfs 0.792 af Outflow=7.87 cfs 0.789 af
<b>Pond 5C: Subsurface Detention for Plaza</b>	Peak Elev=12.50' Storage=1,881 cf Inflow=6.84 cfs 0.540 af Outflow=5.79 cfs 0.539 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=10.04' Inflow=1.18 cfs 0.080 af 15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

**Pond D3: Commercial** Peak Elev=10.03' Inflow=1.18 cfs 0.080 af  
15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

**Pond D4: Drainage Manhole #4** Peak Elev=10.02' Inflow=11.17 cfs 1.178 af  
36.0" x 250.0' Culvert Outflow=11.17 cfs 1.178 af

**Pond D5: Pipe from Commercial St. to Treatment Unit and Out** Peak Elev=9.63' Inflow=22.39 cfs 2.487 af  
36.0" x 137.0' Culvert Outflow=22.39 cfs 2.487 af

**Pond D7: Hancock** Peak Elev=10.04' Inflow=2.40 cfs 0.338 af  
30.0" x 36.0' Culvert Outflow=2.40 cfs 0.338 af

**Pond D8: Hancock Street Storm System** Peak Elev=10.60' Inflow=2.40 cfs 0.338 af  
24.0" x 196.0' Culvert Outflow=2.40 cfs 0.338 af

**Pond HIL: DMH #10/DD** Peak Elev=9.02' Inflow=23.10 cfs 2.669 af  
36.0" x 102.0' Culvert Outflow=23.10 cfs 2.669 af

**Pond UH1: Hancock Link DMH1** Peak Elev=12.28' Inflow=2.40 cfs 0.338 af  
24.0" x 125.0' Culvert Outflow=2.40 cfs 0.338 af

**Pond UH2: Hancock Link DMH2** Peak Elev=17.04' Inflow=2.40 cfs 0.338 af  
24.0" x 106.0' Culvert Outflow=2.40 cfs 0.338 af

**Total Runoff Area = 7.412 ac Runoff Volume = 2.676 af Average Runoff Depth = 4.33"**  
**12.05% Pervious Area = 0.893 ac 87.95% Impervious Area = 6.519 ac**

**Pre-Development**

Prepared by Woodard & Curran

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Pre-Development

Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D8: Hancock Street Storm System**

Inflow Area = 1.016 ac, Inflow Depth > 4.87" for 25-Year Storm event  
Inflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af  
Outflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af, Atten= 0%, Lag= 0.0 min  
Primary = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 10.78' @ 12.08 hrs

Flood Elev= 15.38'

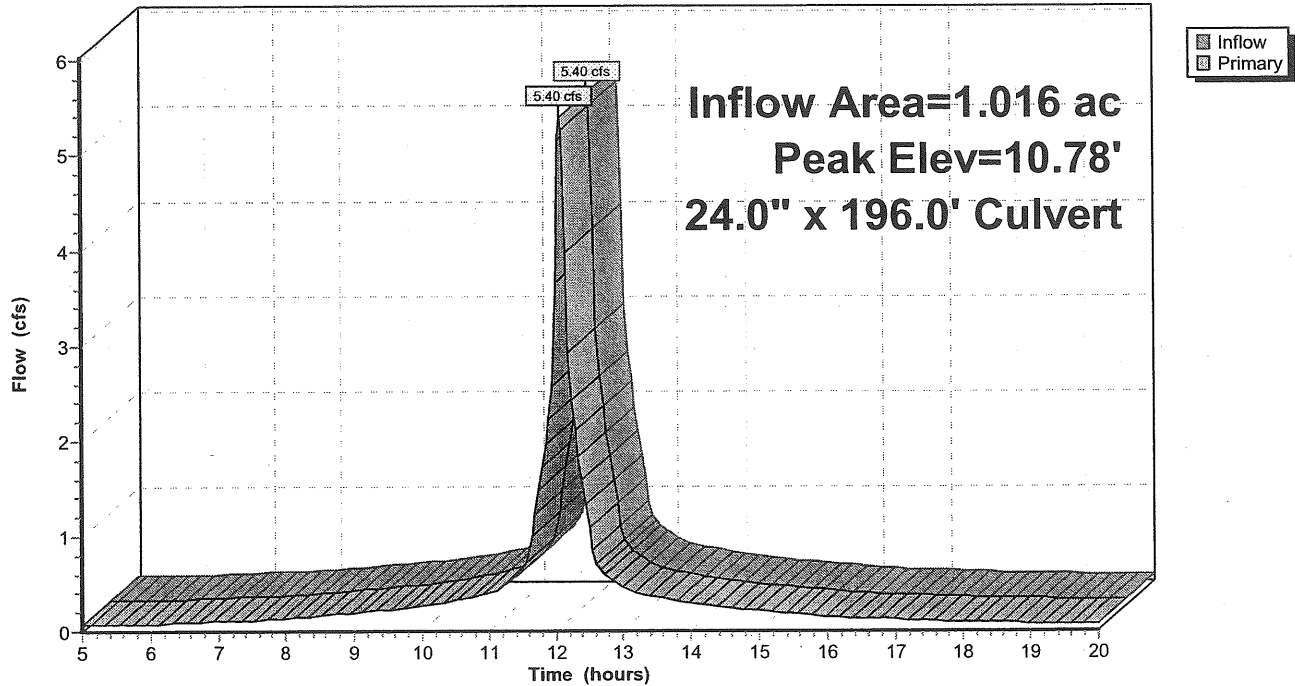
Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=5.23 cfs @ 12.08 hrs HW=10.77' TW=9.29' (Dynamic Tailwater)

1=Culvert (Inlet Controls 5.23 cfs @ 3.38 fps)

**Pond D8: Hancock Street Storm System**

Hydrograph



**Pre-Development**

Prepared by Woodard & Curran

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Pre-Development  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D7: Hancock**

Inflow Area = 1.016 ac, Inflow Depth > 4.87" for 25-Year Storm event  
Inflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af  
Outflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af, Atten= 0%, Lag= 0.0 min  
Primary = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.31' @ 12.08 hrs

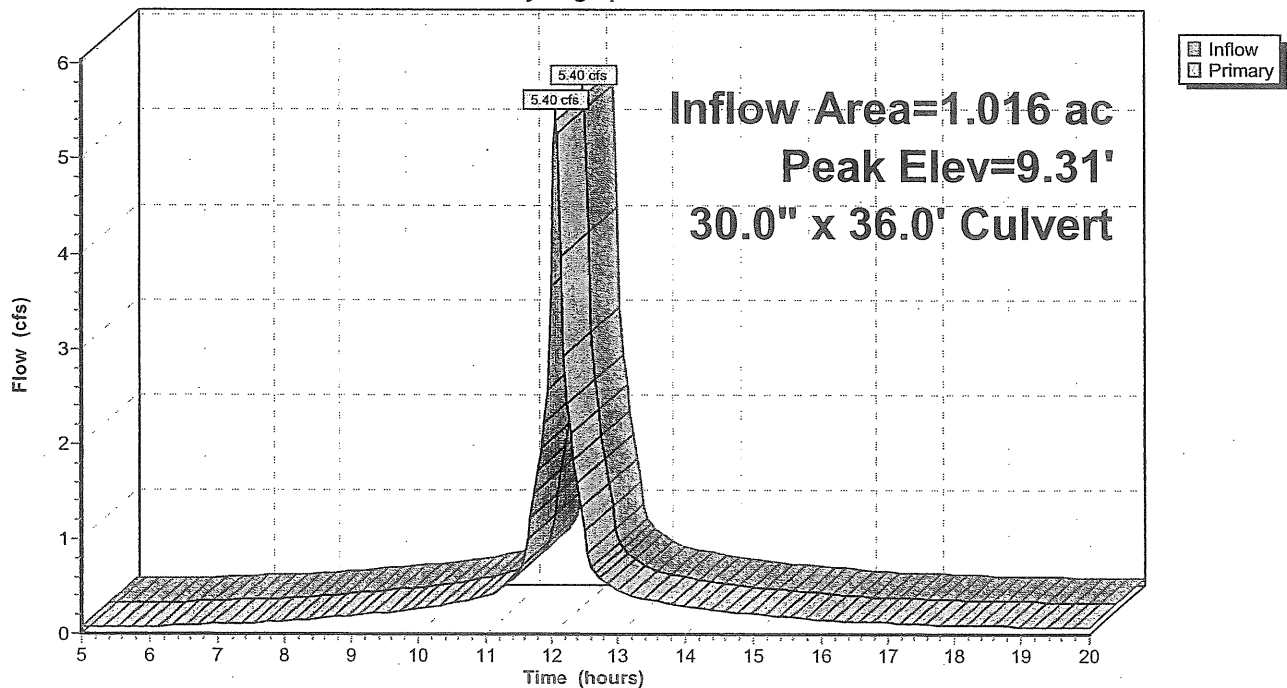
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	<b>30.0" x 36.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/ Cc= 0.900 n= 0.012

**Primary OutFlow** Max=5.23 cfs @ 12.08 hrs HW=9.29' TW=0.00' (Dynamic Tailwater)  
↑=Culvert (Barrel Controls 5.23 cfs @ 3.26 fps)

**Pond D7: Hancock**

Hydrograph



**Pre-Development**

Prepared by Woodard & Curran

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Pre-Development  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D3: Commercial**

Inflow Area = 0.430 ac, Inflow Depth > 4.71" for 25-Year Storm event  
Inflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af  
Outflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.36' @ 12.06 hrs

Flood Elev= 13.91'

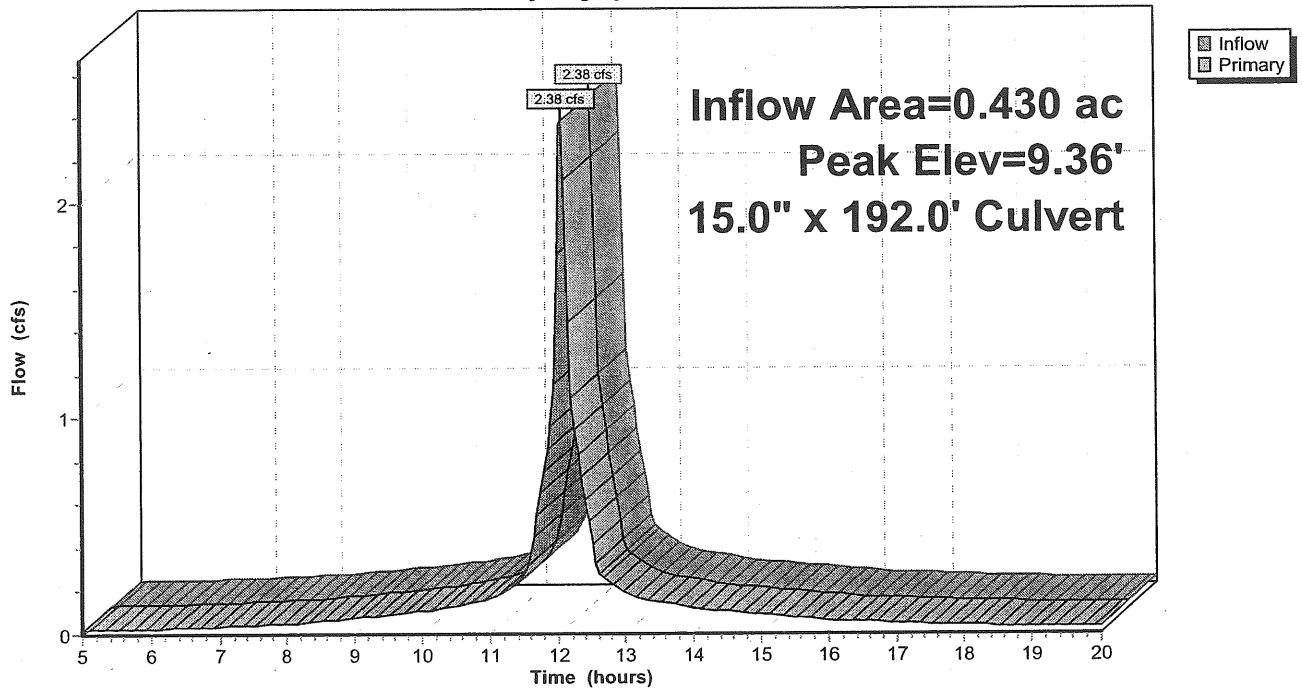
Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=2.31 cfs @ 12.06 hrs HW=9.35' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 2.31 cfs @ 3.02 fps)

**Pond D3: Commercial**

Hydrograph



**Pre-Development**

Prepared by Woodard & Curran

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Pre-Development

Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D2: Commercial Street Storm System**

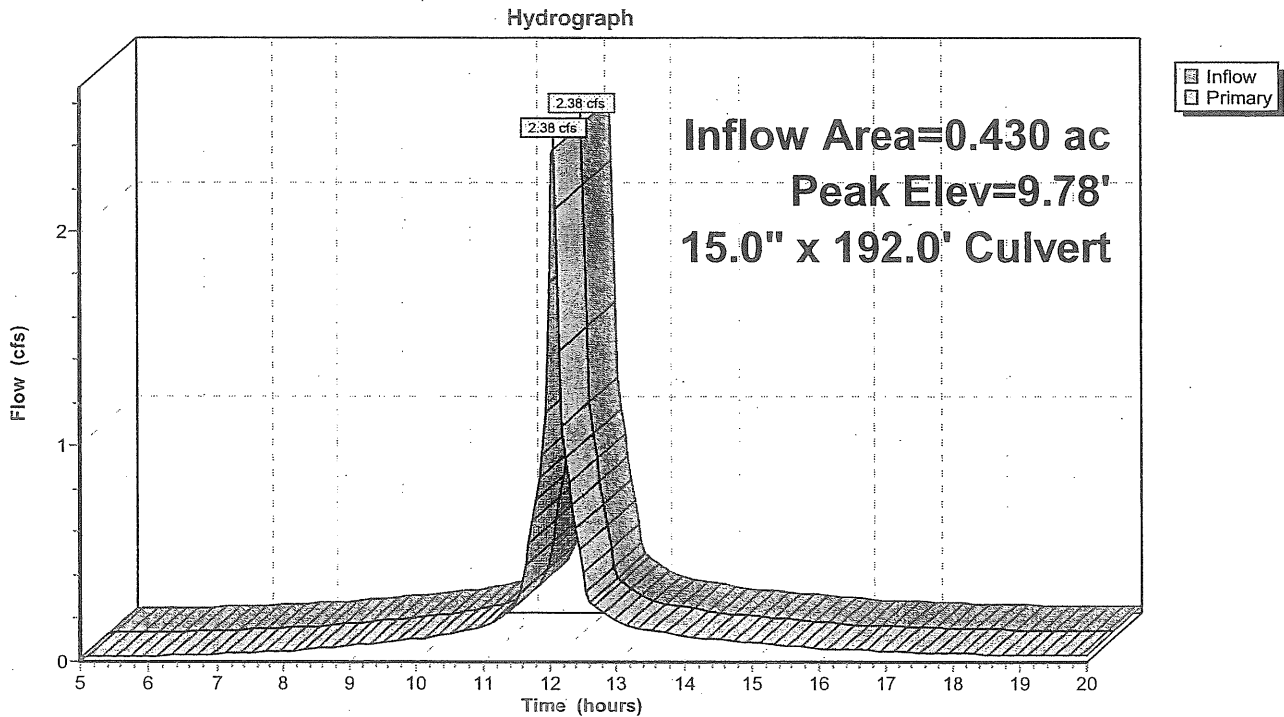
Inflow Area = 0.430 ac, Inflow Depth > 4.71" for 25-Year Storm event  
Inflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af  
Outflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 9.78' @ 12.08 hrs  
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=2.06 cfs @ 12.06 hrs HW=9.75' TW=9.35' (Dynamic Tailwater)  
←1=Culvert (Outlet Controls 2.06 cfs @ 2.63 fps)

**Pond D2: Commercial Street Storm System**



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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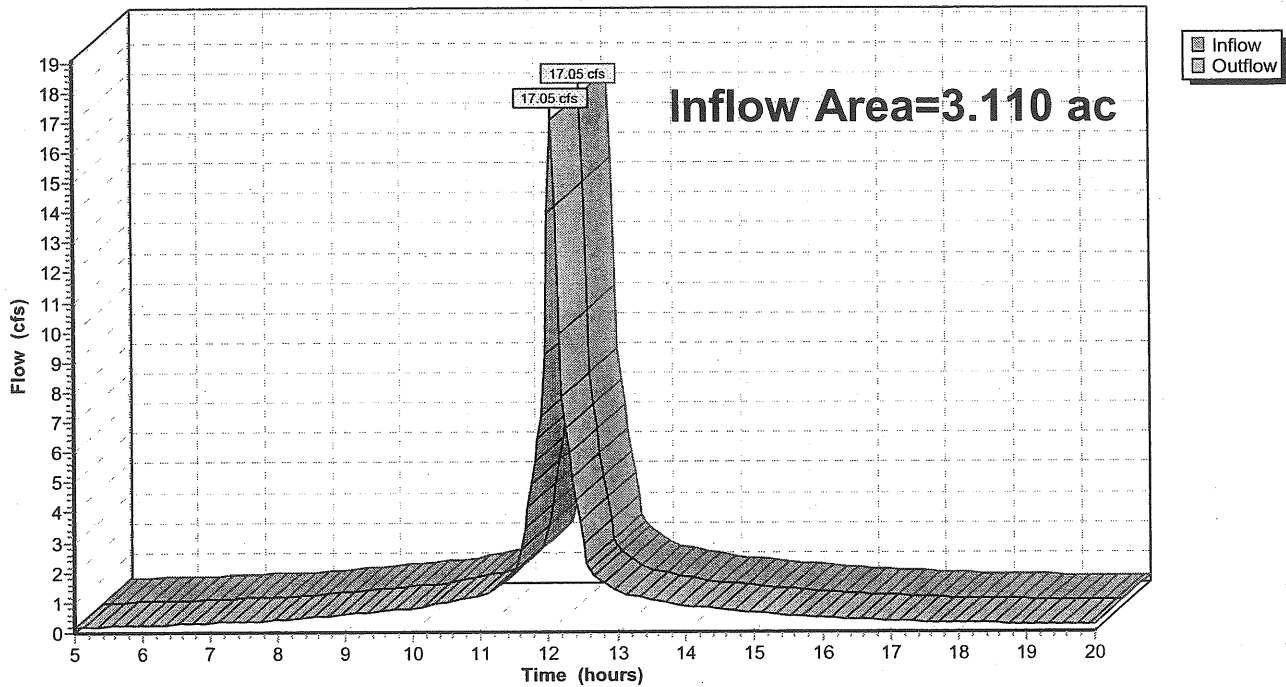
**Reach TOT: (new node)**

Inflow Area = 3.110 ac, Inflow Depth > 4.84" for 25-Year Storm event  
Inflow = 17.05 cfs @ 12.05 hrs, Volume= 1.254 af  
Outflow = 17.05 cfs @ 12.05 hrs, Volume= 1.254 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach TOT: (new node)**

Hydrograph

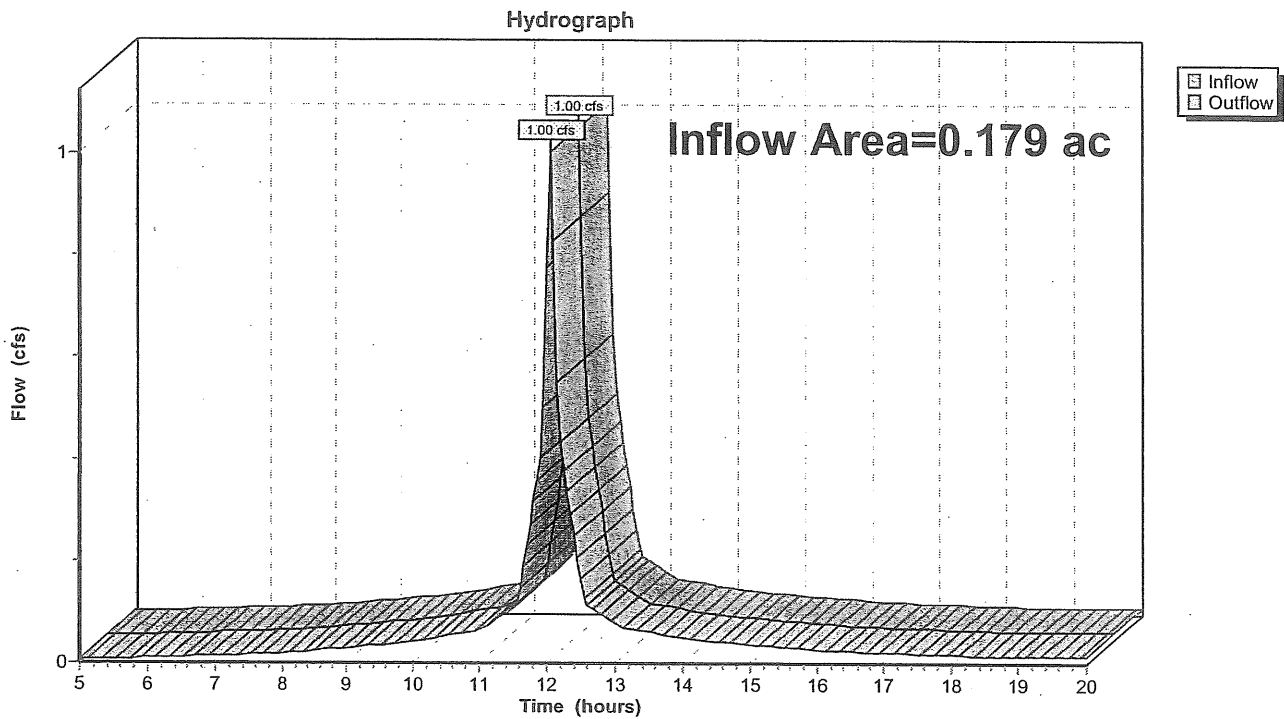


Reach S2: (new node)

Inflow Area = 0.179 ac, Inflow Depth > 4.62" for 25-Year Storm event  
Inflow = 1.00 cfs @ 12.05 hrs, Volume= 0.069 af  
Outflow = 1.00 cfs @ 12.05 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach S2: (new node)





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Type III 24-hr 25-Year Storm Rainfall=5.50"

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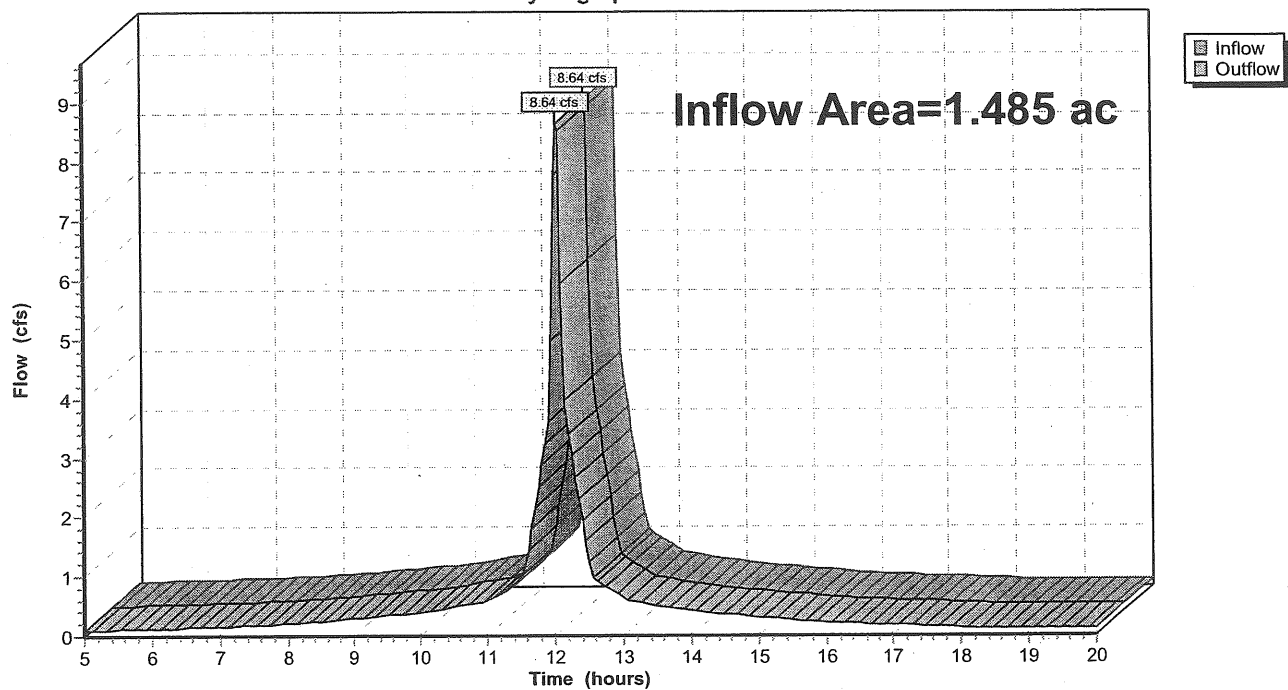
**Reach S1: (new node)**

Inflow Area = 1.485 ac, Inflow Depth > 4.87" for 25-Year Storm event  
Inflow = 8.64 cfs @ 12.04 hrs, Volume= 0.603 af  
Outflow = 8.64 cfs @ 12.04 hrs, Volume= 0.603 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach S1: (new node)**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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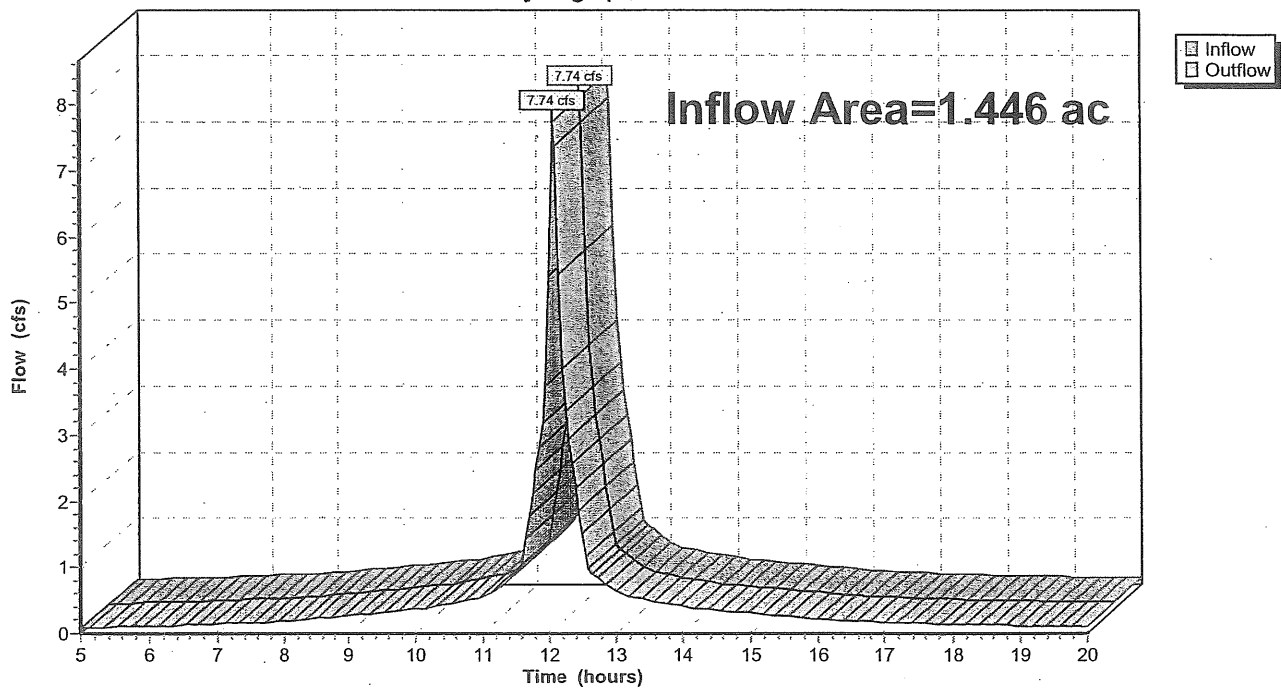
**Reach FR: Fore River**

Inflow Area = 1.446 ac, Inflow Depth > 4.83" for 25-Year Storm event  
Inflow = 7.74 cfs @ 12.07 hrs, Volume= 0.582 af  
Outflow = 7.74 cfs @ 12.07 hrs, Volume= 0.582 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach FR: Fore River**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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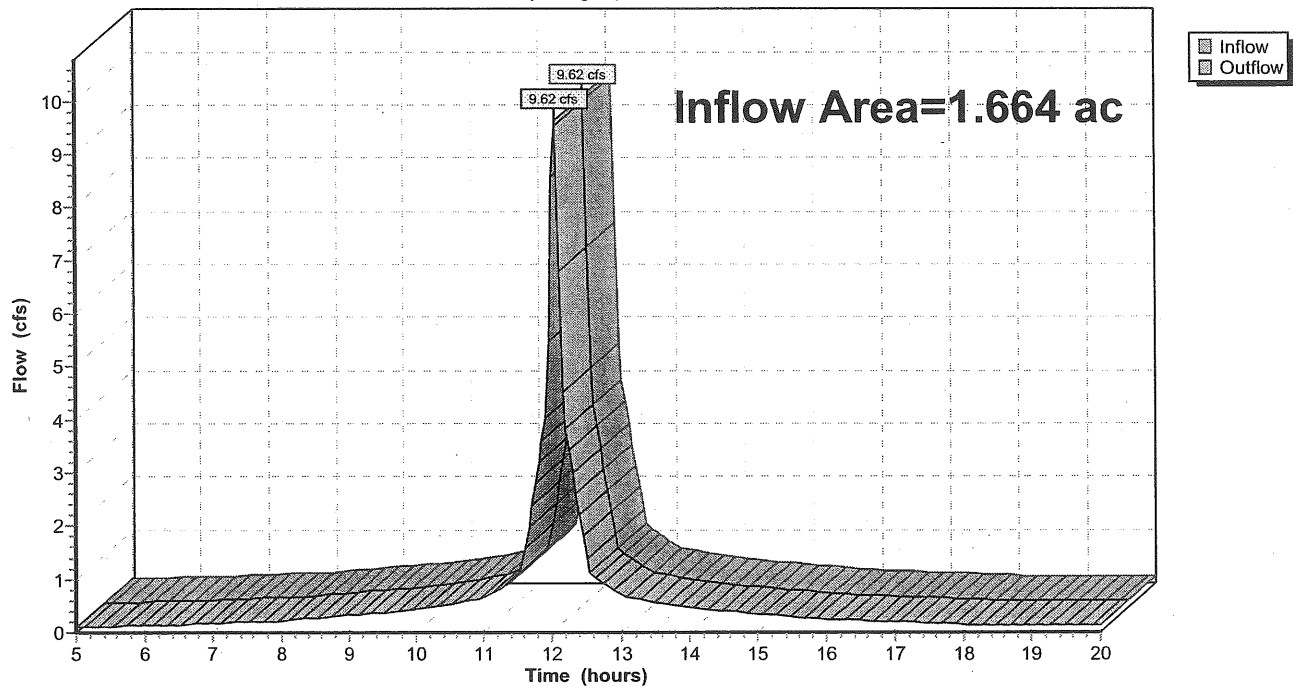
**Reach CS: Combined Sewer**

Inflow Area = 1.664 ac, Inflow Depth > 4.85" for 25-Year Storm event  
Inflow = 9.62 cfs @ 12.04 hrs, Volume= 0.672 af  
Outflow = 9.62 cfs @ 12.04 hrs, Volume= 0.672 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach CS: Combined Sewer**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 5X: Ocean Gateway Gravel Lot**

Runoff = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af, Depth> 4.87"

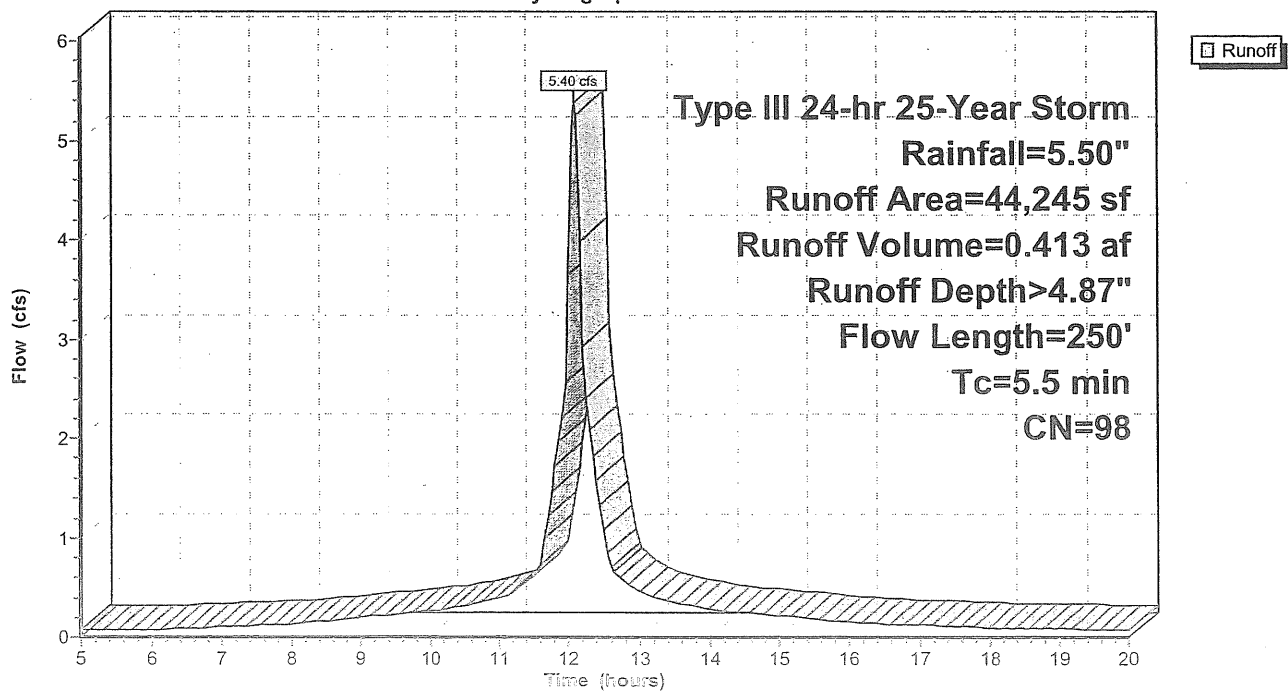
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
675	98	Buildings
1,415	98	Paved
41,460	98	Gravel Parking
695	68	<50% Grass cover, Poor, HSG A
44,245	98	Weighted Average
695		Pervious Area
43,550		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	15	0.0100	0.09		Sheet Flow, BC Grass: Short n= 0.150 P2= 3.00"
1.4	85	0.0100	0.98		Sheet Flow, CD Smooth surfaces n= 0.011 P2= 3.00"
1.2	150	0.0171	2.11		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
5.5	250	Total			

**Subcatchment 5X: Ocean Gateway Gravel Lot**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 4X: Turner Barker Gravel Lot**

Runoff = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af, Depth> 4.71"

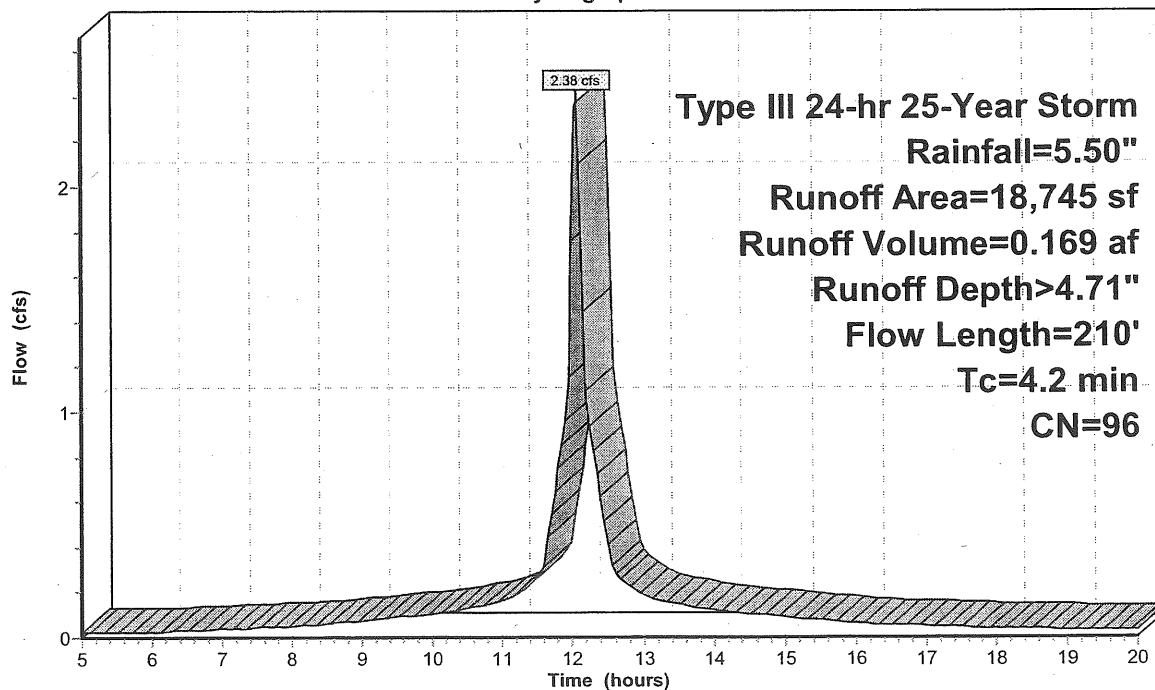
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
1,030	98	Buildings
285	98	Paved
16,130	98	Gravel Parking
1,300	68	<50% Grass cover, Poor, HSG A
18,745	96	Weighted Average
1,300		Pervious Area
17,445		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.9	110	0.0150	1.97		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
4.2	210	Total			

**Subcatchment 4X: Turner Barker Gravel Lot**

Hydrograph



Runoff

Type III 24-hr 25-Year Storm  
Rainfall=5.50"

Runoff Area=18,745 sf

Runoff Volume=0.169 af

Runoff Depth>4.71"

Flow Length=210'

Tc=4.2 min

CN=96

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 3X: Turner Barker**

Runoff = 1.00 cfs @ 12.05 hrs, Volume= 0.069 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

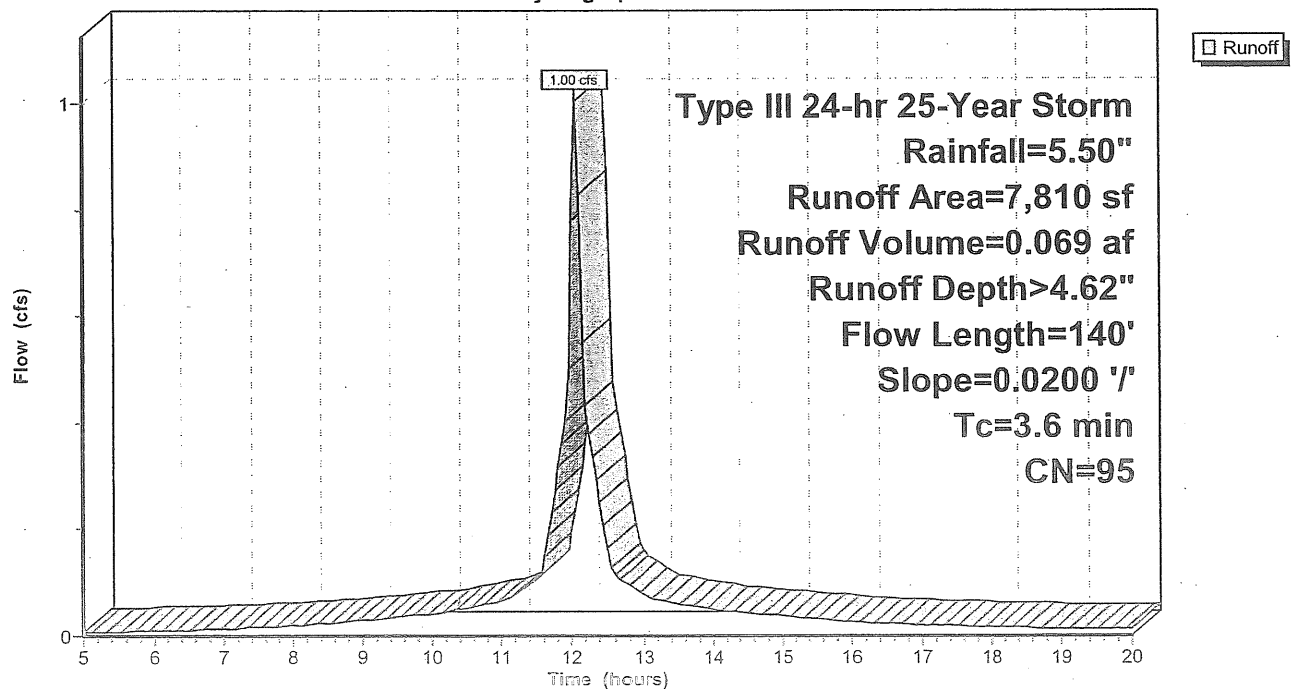
Area (sf)	CN	Description
4,000	98	Building
2,980	98	Gravel Parking
830	68	<50% Grass cover, Poor, HSG A
7,810	95	Weighted Average
830		Pervious Area
6,980		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.0200	2.28		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
3.6	140	Total			

**Subcatchment 3X: Turner Barker**

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 2X: Breakaway**

Runoff = 0.94 cfs @ 12.01 hrs, Volume= 0.064 af, Depth> 4.87"

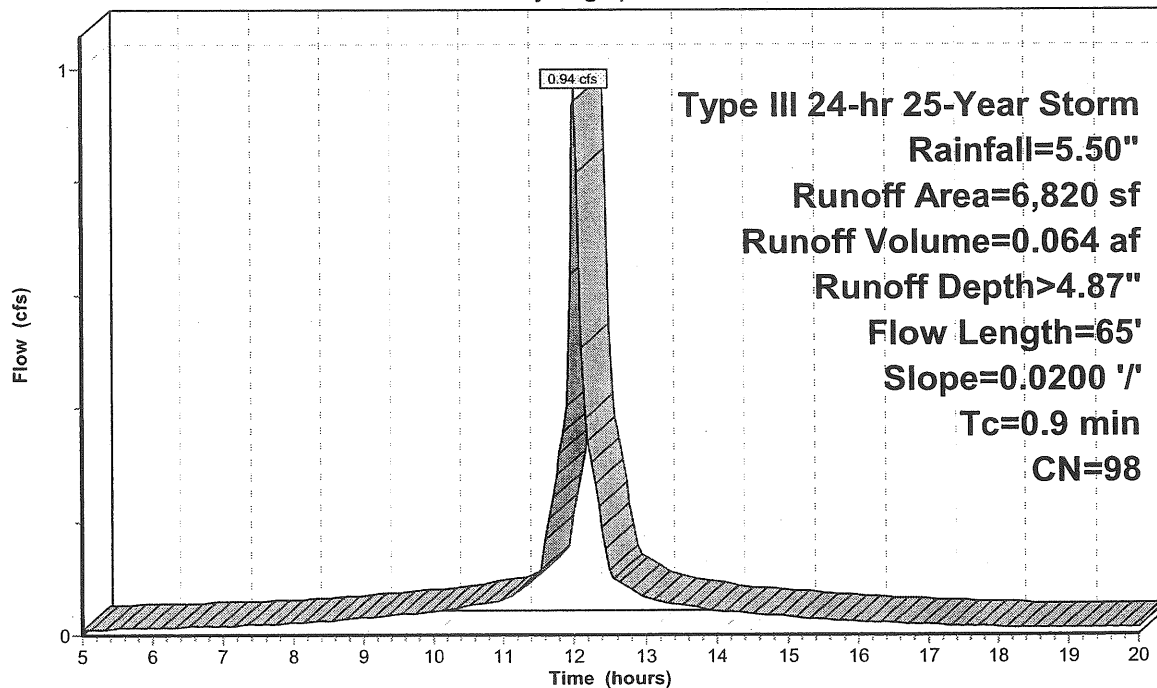
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
5,870	98	Building
950	98	Gravel Parking
6,820	98	Weighted Average
6,820		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	65	0.0200	1.22		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

**Subcatchment 2X: Breakaway**

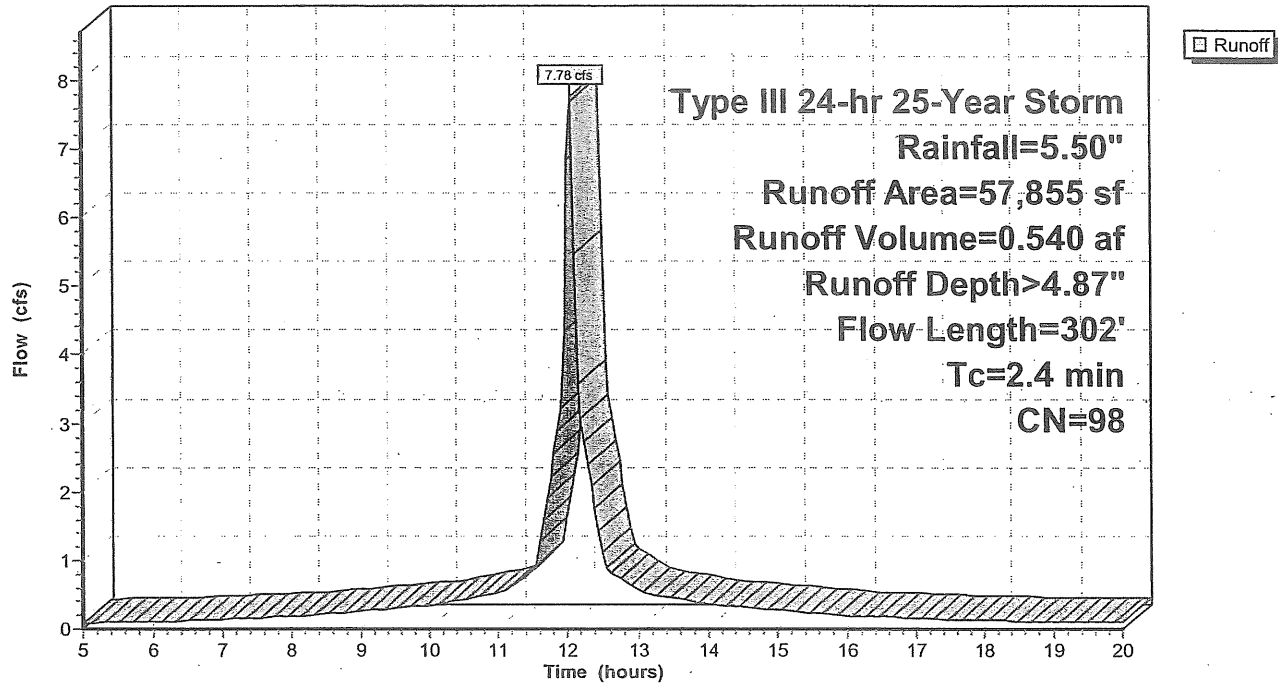
Hydrograph



Runoff

### Subcatchment 1X: Shipyard Gravel Lot

Hydrograph





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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 1X: Shipyard Gravel Lot**

Runoff = 7.78 cfs @ 12.04 hrs, Volume= 0.540 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
2,635	98	Building
29,940	98	Gravel Parking
25,280	98	Paved
57,855	98	Weighted Average
57,855		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	60	0.0333	1.47		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.1000	2.11		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.2	40	0.0500	3.60		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
0.9	90	0.0111	1.70		<b>Shallow Concentrated Flow, DE</b> Unpaved Kv= 16.1 fps
0.2	40	0.0625	4.03		<b>Shallow Concentrated Flow, EF</b> Unpaved Kv= 16.1 fps
0.1	32	0.0100	5.90	4.63	<b>Circular Channel (pipe), FG</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
2.4	302	Total			

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1X: Shipyard Gravel Lot</b>	Runoff Area=57,855 sf	Runoff Depth>4.87"
	Flow Length=302'	Tc=2.4 min CN=98 Runoff=7.78 cfs 0.540 af
<b>Subcatchment 2X: Breakaway</b>	Runoff Area=6,820 sf	Runoff Depth>4.87"
	Flow Length=65'	Slope=0.0200 '/' Tc=0.9 min CN=98 Runoff=0.94 cfs 0.064 af
<b>Subcatchment 3X: Turner Barker</b>	Runoff Area=7,810 sf	Runoff Depth>4.62"
	Flow Length=140'	Slope=0.0200 '/' Tc=3.6 min CN=95 Runoff=1.00 cfs 0.069 af
<b>Subcatchment 4X: Turner Barker Gravel Lot</b>	Runoff Area=18,745 sf	Runoff Depth>4.71"
	Flow Length=210'	Tc=4.2 min CN=96 Runoff=2.38 cfs 0.169 af
<b>Subcatchment 5X: Ocean Gateway Gravel Lot</b>	Runoff Area=44,245 sf	Runoff Depth>4.87"
	Flow Length=250'	Tc=5.5 min CN=98 Runoff=5.40 cfs 0.413 af
<b>Reach CS: Combined Sewer</b>	Inflow=9.62 cfs	0.672 af
	Outflow=9.62 cfs	0.672 af
<b>Reach FR: Fore River</b>	Inflow=7.74 cfs	0.582 af
	Outflow=7.74 cfs	0.582 af
<b>Reach S1: (new node)</b>	Inflow=8.64 cfs	0.603 af
	Outflow=8.64 cfs	0.603 af
<b>Reach S2: (new node)</b>	Inflow=1.00 cfs	0.069 af
	Outflow=1.00 cfs	0.069 af
<b>Reach TOT: (new node)</b>	Inflow=17.05 cfs	1.254 af
	Outflow=17.05 cfs	1.254 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=9.78'	Inflow=2.38 cfs 0.169 af
	15.0" x 192.0' Culvert	Outflow=2.38 cfs 0.169 af
<b>Pond D3: Commercial</b>	Peak Elev=9.36'	Inflow=2.38 cfs 0.169 af
	15.0" x 192.0' Culvert	Outflow=2.38 cfs 0.169 af
<b>Pond D7: Hancock</b>	Peak Elev=9.31'	Inflow=5.40 cfs 0.413 af
	30.0" x 36.0' Culvert	Outflow=5.40 cfs 0.413 af
<b>Pond D8: Hancock Street Storm System</b>	Peak Elev=10.78'	Inflow=5.40 cfs 0.413 af
	24.0" x 196.0' Culvert	Outflow=5.40 cfs 0.413 af

Total Runoff Area = 3.110 ac Runoff Volume = 1.254 af Average Runoff Depth = 4.84"  
 2.09% Pervious Area = 0.065 ac 97.91% Impervious Area = 3.045 ac

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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D8: Hancock Street Storm System**

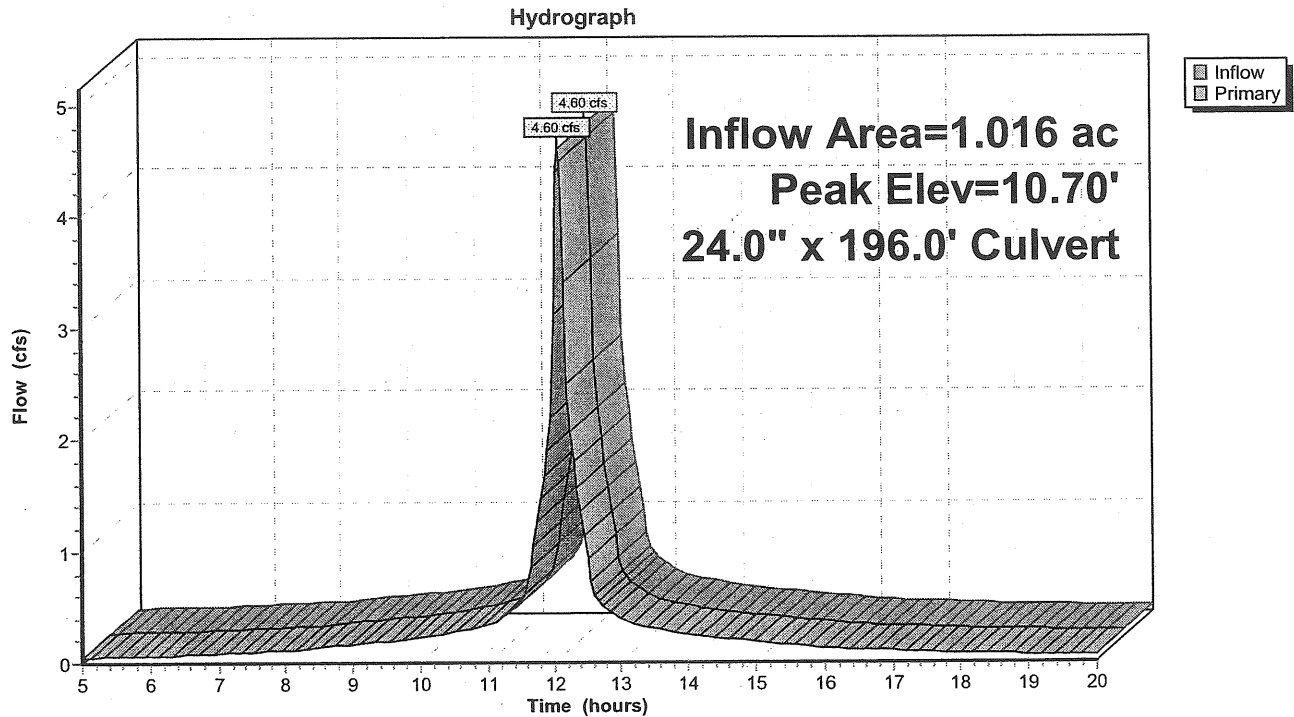
Inflow Area = 1.016 ac, Inflow Depth > 4.15" for 10-Year Storm event  
Inflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af  
Outflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min  
Primary = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 10.70' @ 12.08 hrs  
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	<b>24.0" x 196.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

**Primary OutFlow** Max=4.46 cfs @ 12.08 hrs HW=10.68' TW=9.19' (Dynamic Tailwater)  
↑=Culvert (Inlet Controls 4.46 cfs @ 3.24 fps)

**Pond D8: Hancock Street Storm System**



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D7: Hancock**

Inflow Area = 1.016 ac, Inflow Depth > 4.15" for 10-Year Storm event  
Inflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af  
Outflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min  
Primary = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.21' @ 12.08 hrs

Flood Elev= 13.91'

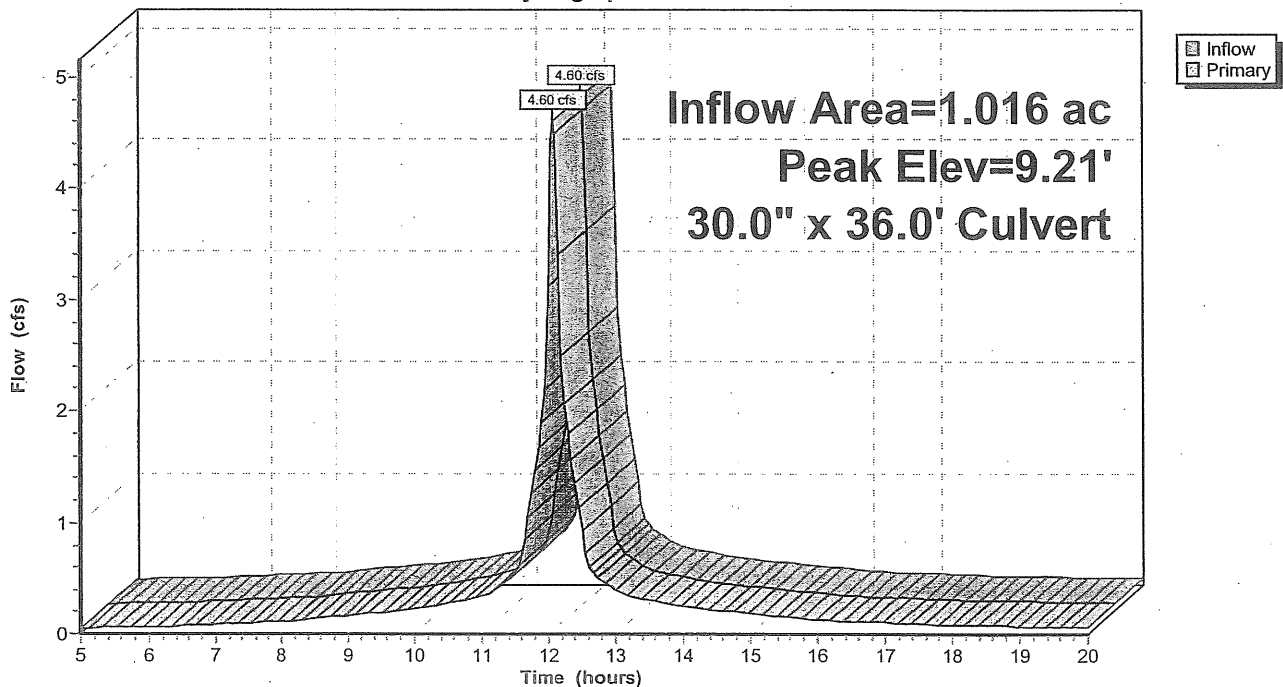
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=4.46 cfs @ 12.08 hrs HW=9.19' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 4.46 cfs @ 3.11 fps)

**Pond D7: Hancock**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D3: Commercial**

Inflow Area = 0.430 ac, Inflow Depth > 3.98" for 10-Year Storm event  
Inflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af  
Outflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af

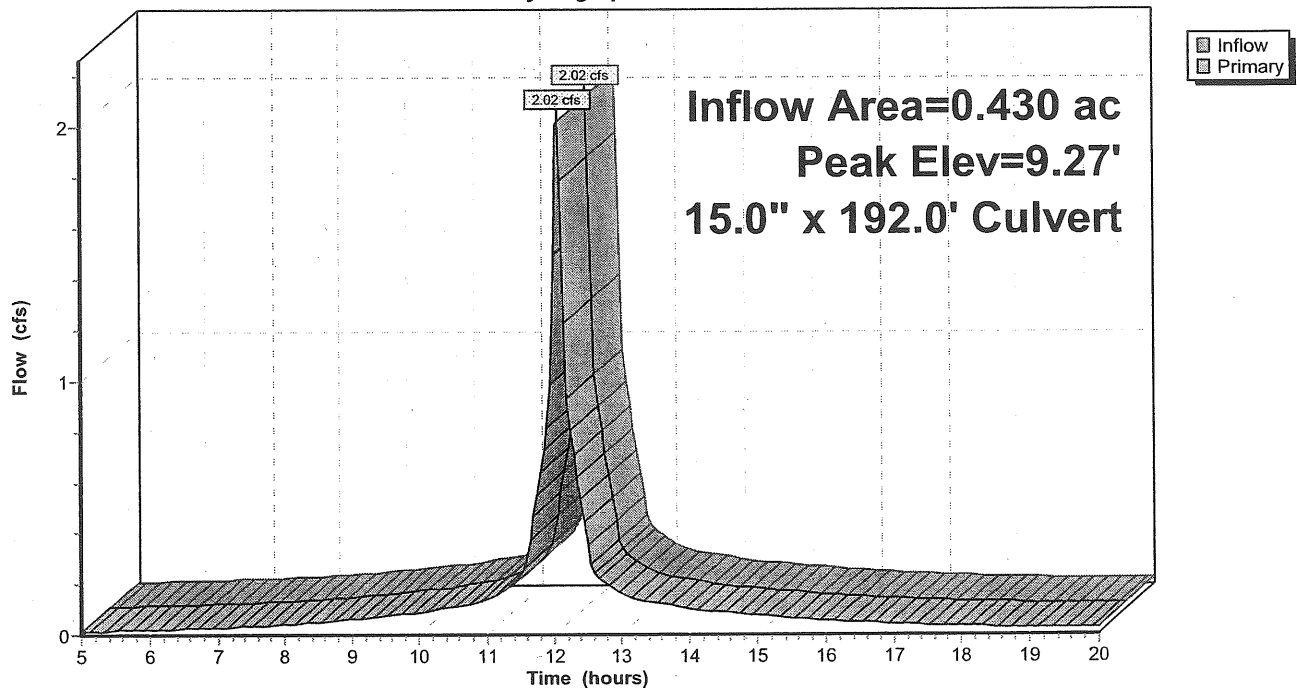
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 9.27' @ 12.06 hrs  
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=1.96 cfs @ 12.06 hrs HW=9.25' TW=0.00' (Dynamic Tailwater)  
1=Culvert (Barrel Controls 1.96 cfs @ 2.89 fps)

**Pond D3: Commercial**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D2: Commercial Street Storm System**

Inflow Area = 0.430 ac, Inflow Depth > 3.98" for 10-Year Storm event  
 Inflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af  
 Outflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.68' @ 12.08 hrs

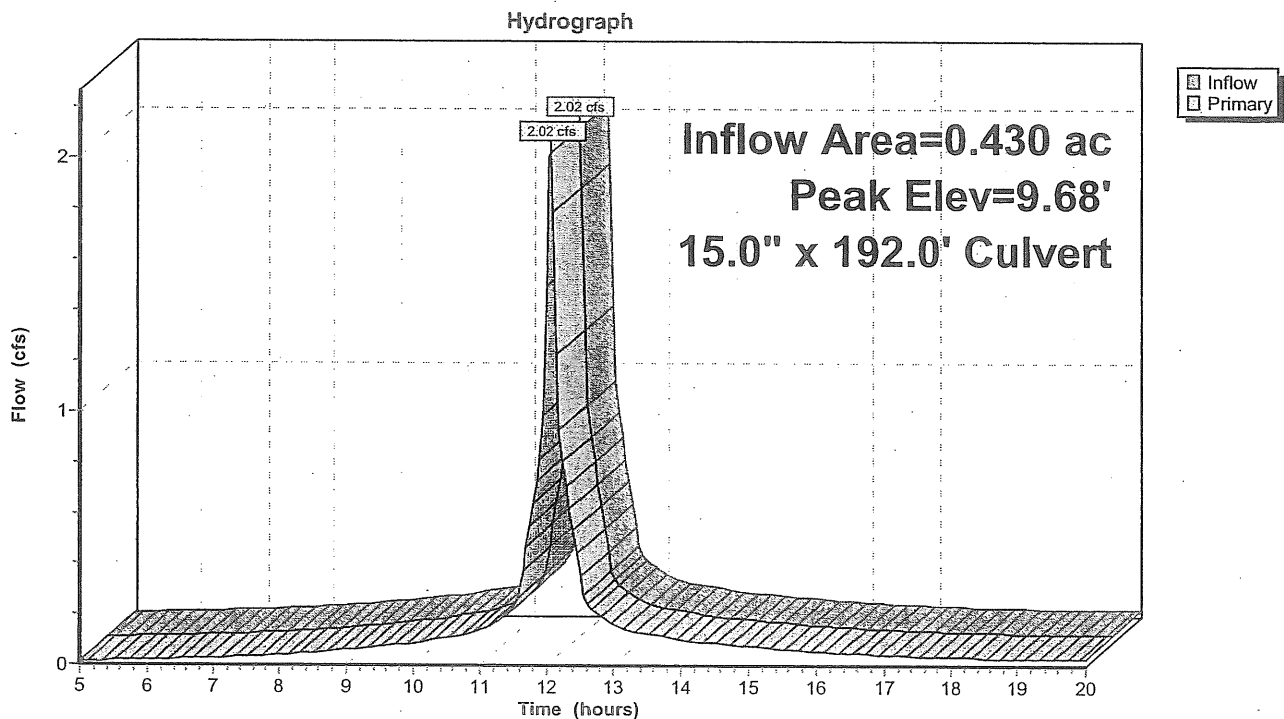
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=1.78 cfs @ 12.06 hrs HW=9.66' TW=9.25' (Dynamic Tailwater)

1=Culvert (Outlet Controls 1.78 cfs @ 2.57 fps)

**Pond D2: Commercial Street Storm System**



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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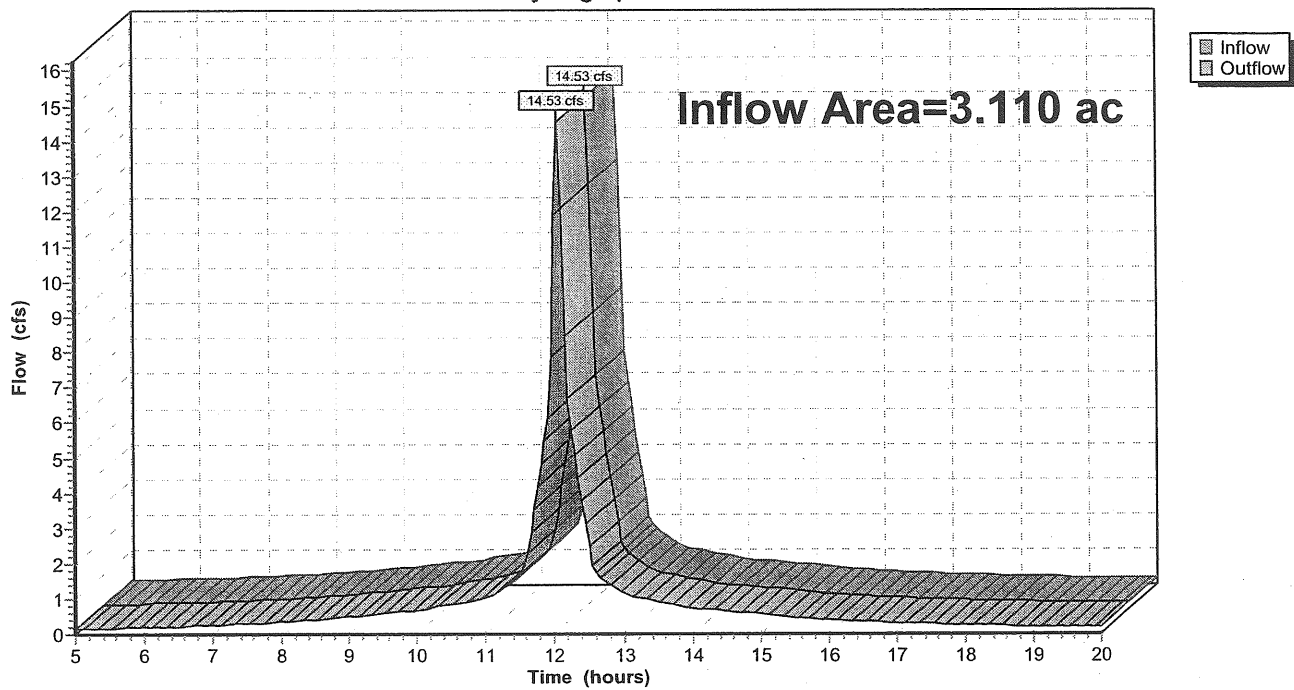
**Reach TOT: (new node)**

Inflow Area = 3.110 ac, Inflow Depth > 4.11" for 10-Year Storm event  
Inflow = 14.53 cfs @ 12.05 hrs, Volume= 1.065 af  
Outflow = 14.53 cfs @ 12.05 hrs, Volume= 1.065 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach TOT: (new node)**

Hydrograph



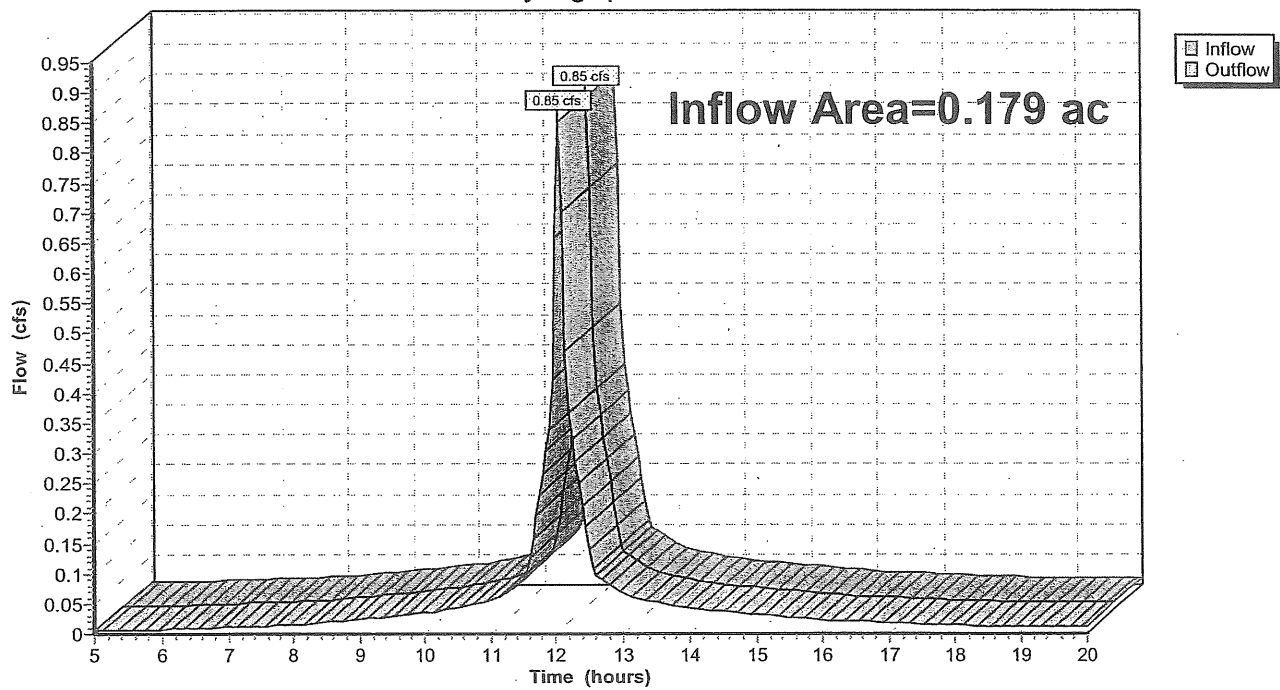
Reach S2: (new node)

Inflow Area = 0.179 ac, Inflow Depth > 3.89" for 10-Year Storm event  
Inflow = 0.85 cfs @ 12.05 hrs, Volume= 0.058 af  
Outflow = 0.85 cfs @ 12.05 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach S2: (new node)

Hydrograph





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Type III 24-hr 10-Year Storm Rainfall=4.70"

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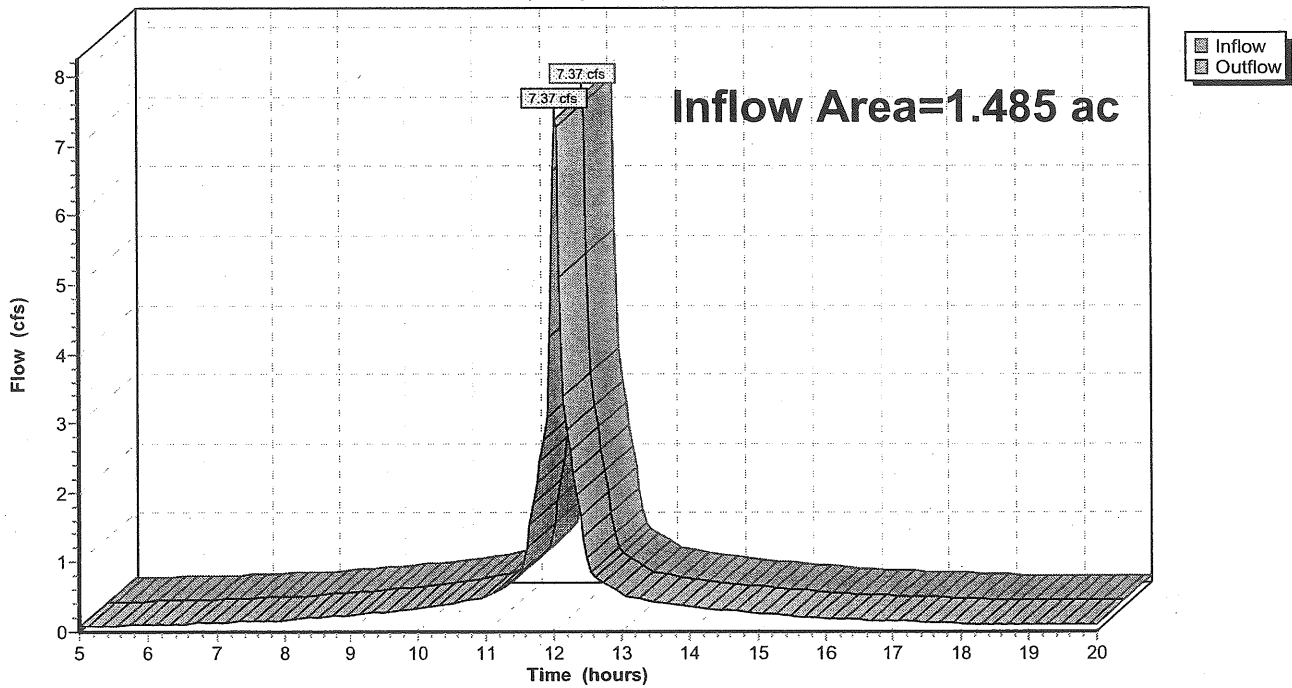
**Reach S1: (new node)**

Inflow Area = 1.485 ac, Inflow Depth > 4.15" for 10-Year Storm event  
Inflow = 7.37 cfs @ 12.04 hrs, Volume= 0.513 af  
Outflow = 7.37 cfs @ 12.04 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach S1: (new node)**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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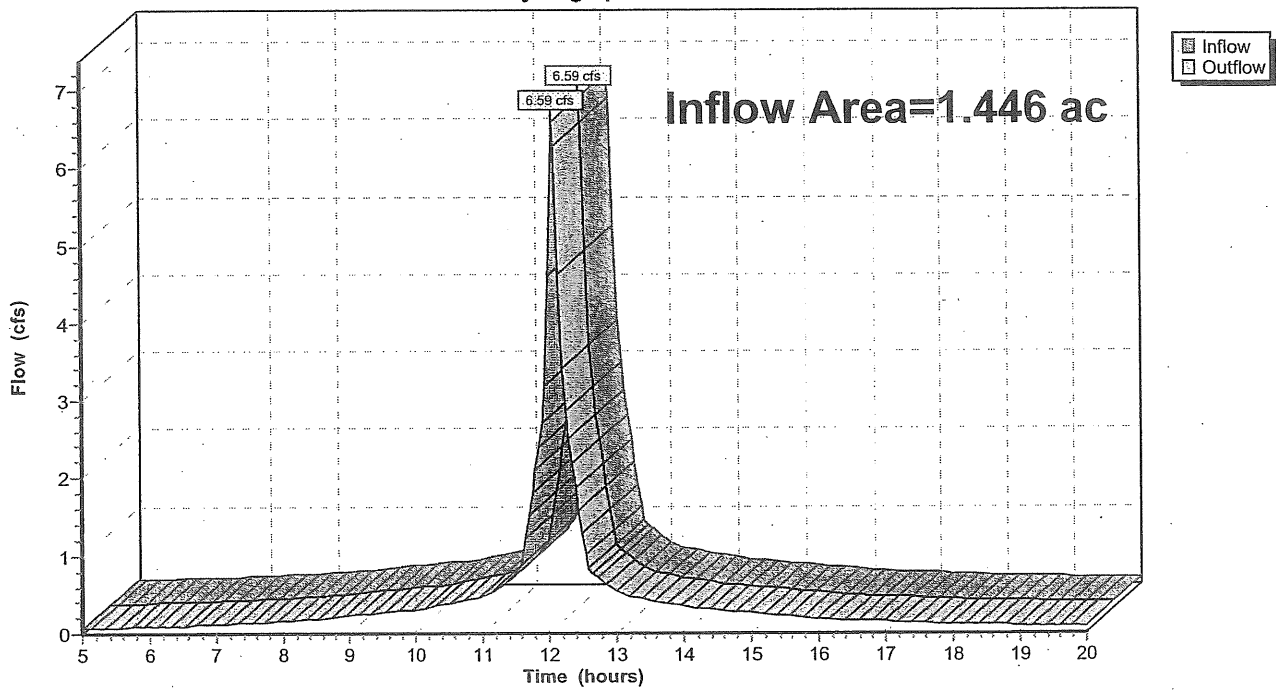
**Reach FR: Fore River**

Inflow Area = 1.446 ac, Inflow Depth > 4.10" for 10-Year Storm event  
Inflow = 6.59 cfs @ 12.07 hrs; Volume= 0.494 af  
Outflow = 6.59 cfs @ 12.07 hrs, Volume= 0.494 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach FR: Fore River**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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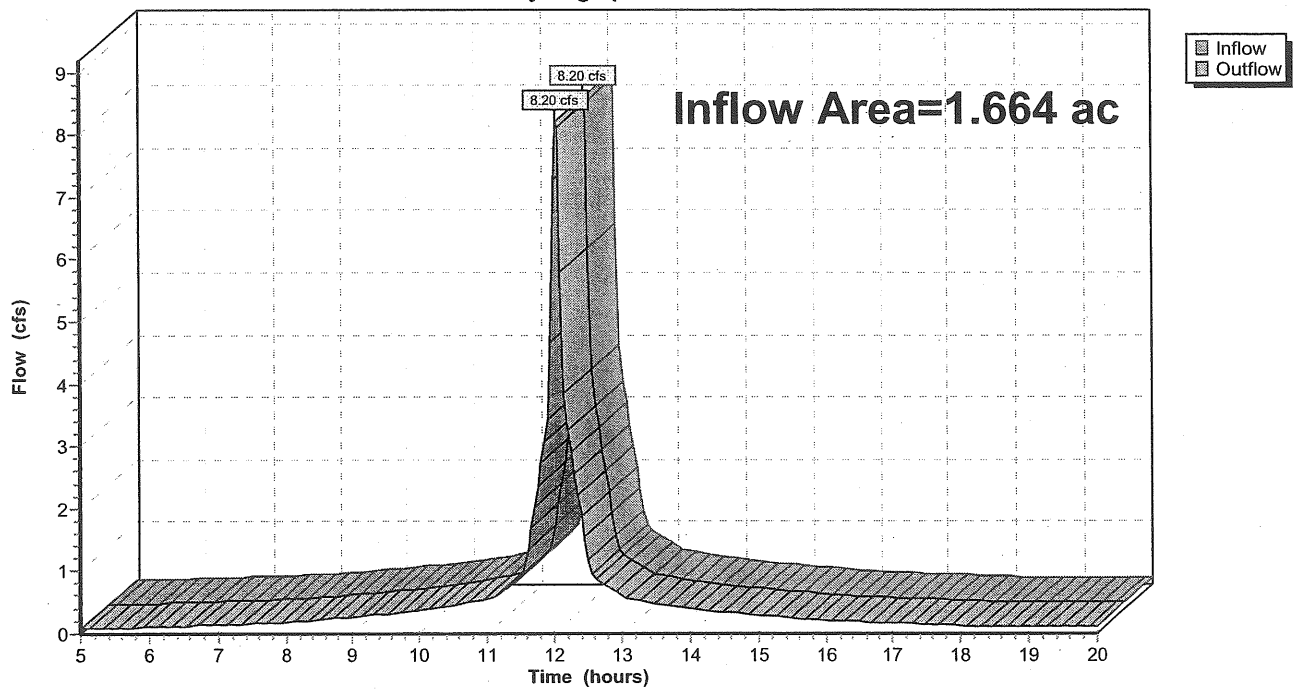
**Reach CS: Combined Sewer**

Inflow Area = 1.664 ac, Inflow Depth > 4.12" for 10-Year Storm event  
Inflow = 8.20 cfs @ 12.04 hrs, Volume= 0.571 af  
Outflow = 8.20 cfs @ 12.04 hrs, Volume= 0.571 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach CS: Combined Sewer**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 5X: Ocean Gateway Gravel Lot**

Runoff = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af, Depth> 4.15"

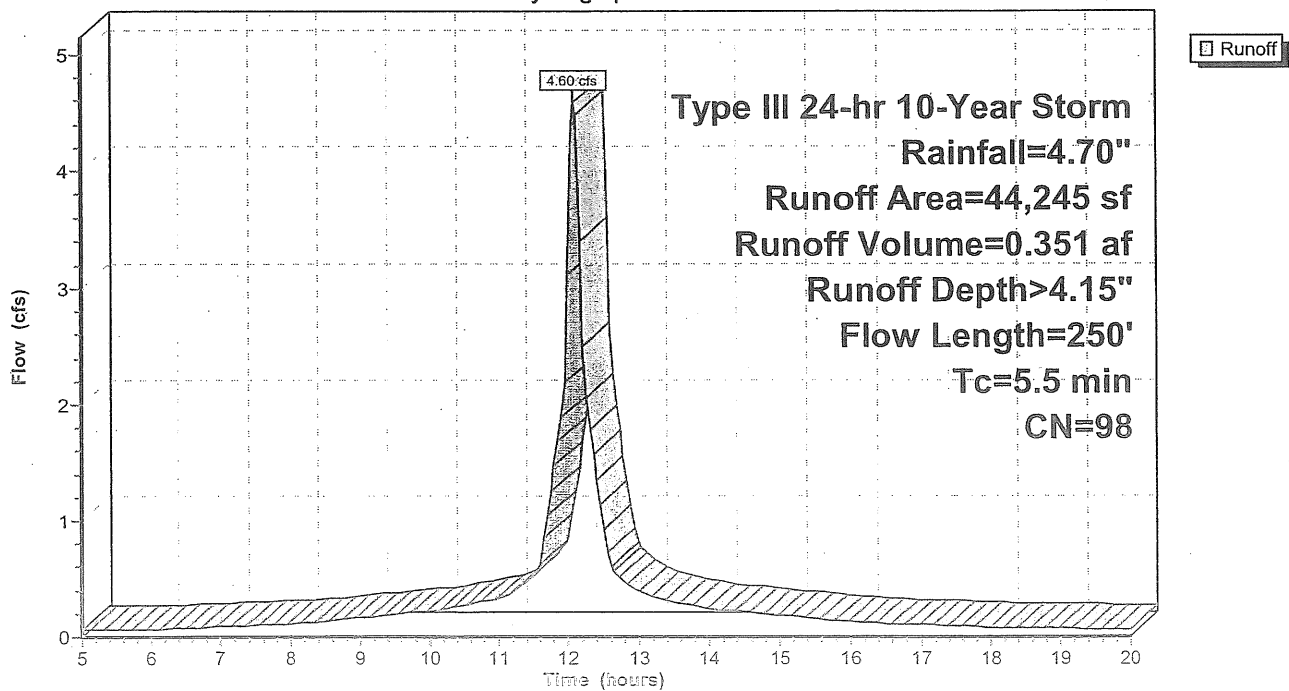
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
675	98	Buildings
1,415	98	Paved
41,460	98	Gravel Parking
695	68	<50% Grass cover, Poor, HSG A
44,245	98	Weighted Average
695		Pervious Area
43,550		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	15	0.0100	0.09		<b>Sheet Flow, BC</b> Grass: Short n= 0.150 P2= 3.00"
1.4	85	0.0100	0.98		<b>Sheet Flow, CD</b> Smooth surfaces n= 0.011 P2= 3.00"
1.2	150	0.0171	2.11		<b>Shallow Concentrated Flow, DE</b> Unpaved Kv= 16.1 fps
5.5	250	Total			

**Subcatchment 5X: Ocean Gateway Gravel Lot**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 4X: Turner Barker Gravel Lot**

Runoff = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af, Depth> 3.98"

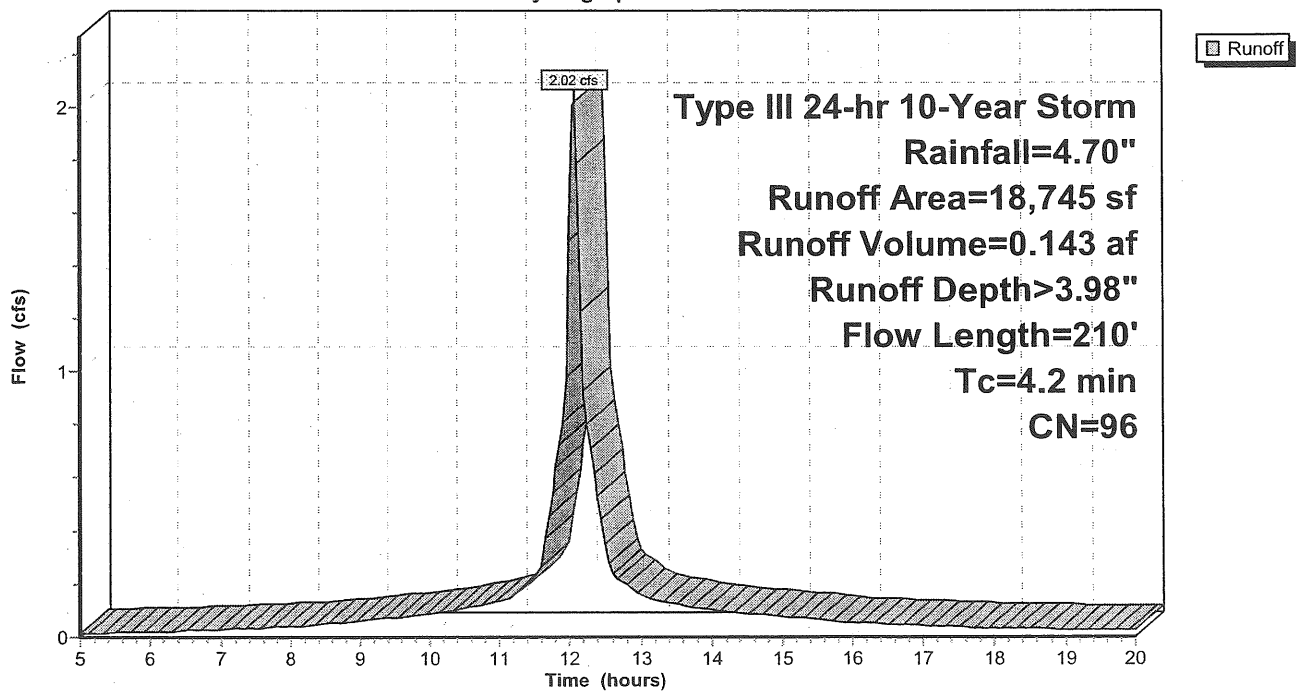
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
1,030	98	Buildings
285	98	Paved
16,130	98	Gravel Parking
1,300	68	<50% Grass cover, Poor, HSG A
18,745	96	Weighted Average
1,300		Pervious Area
17,445		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.9	110	0.0150	1.97		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
4.2	210	Total			

**Subcatchment 4X: Turner Barker Gravel Lot**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 3X: Turner Barker**

Runoff = 0.85 cfs @ 12.05 hrs, Volume= 0.058 af, Depth> 3.89"

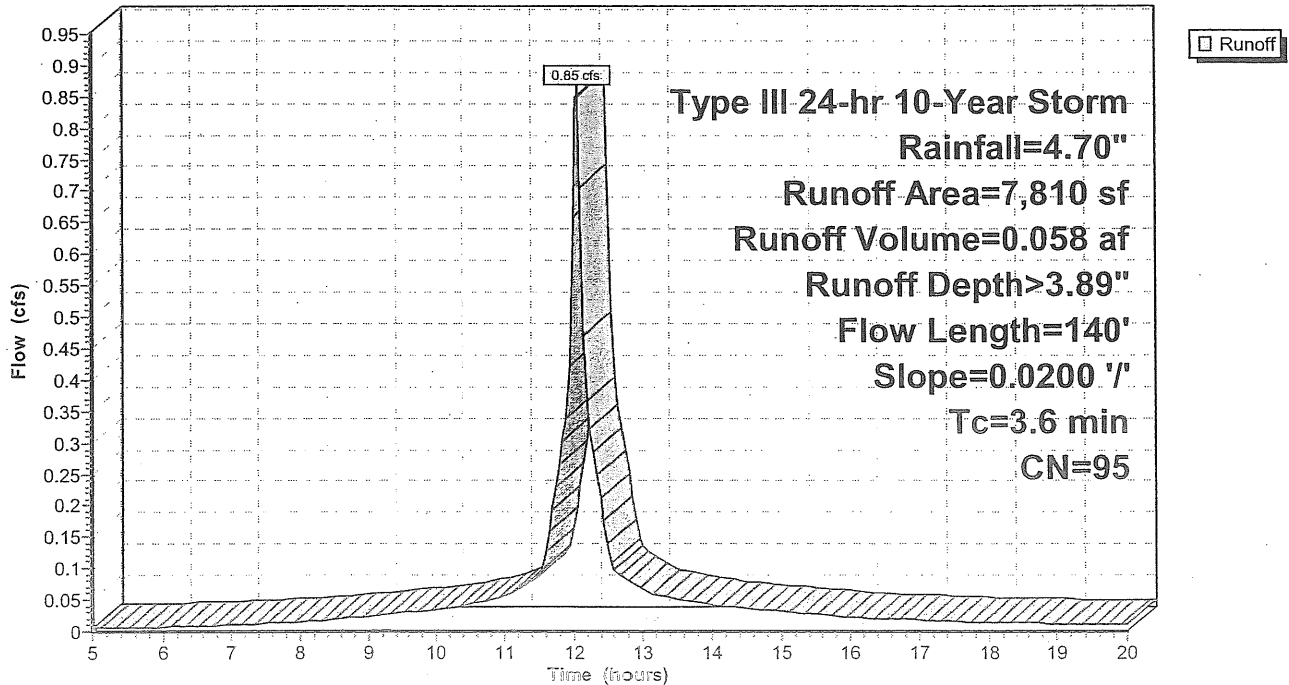
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
4,000	98	Building
2,980	98	Gravel Parking
830	68	<50% Grass cover, Poor, HSG A
7,810	95	Weighted Average
830		Pervious Area
6,980		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.0200	2.28		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
3.6	140	Total			

**Subcatchment 3X: Turner Barker**

Hydrograph



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Pre-Development  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 2X: Breakaway**

Runoff = 0.81 cfs @ 12.01 hrs, Volume= 0.054 af, Depth> 4.15"

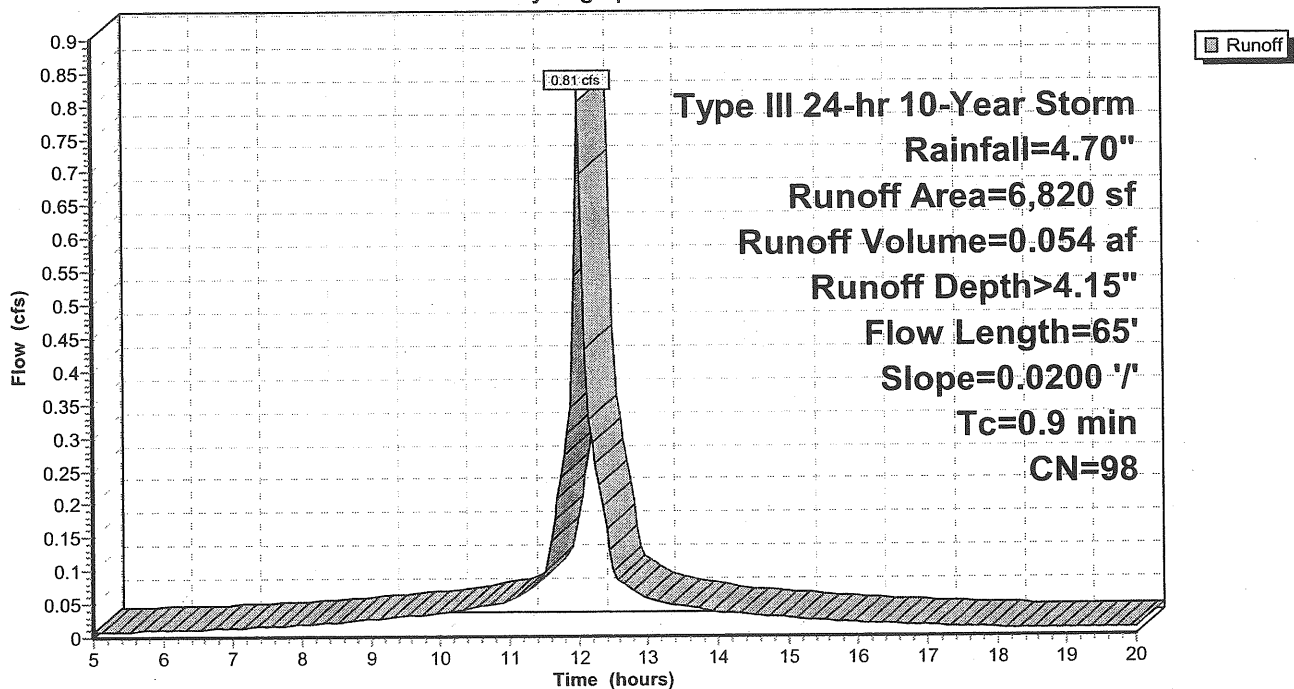
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
5,870	98	Building
950	98	Gravel Parking
6,820	98	Weighted Average
6,820		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	65	0.0200	1.22		Sheet Flow, AB Smooth surfaces n=0.011 P2= 3.00"

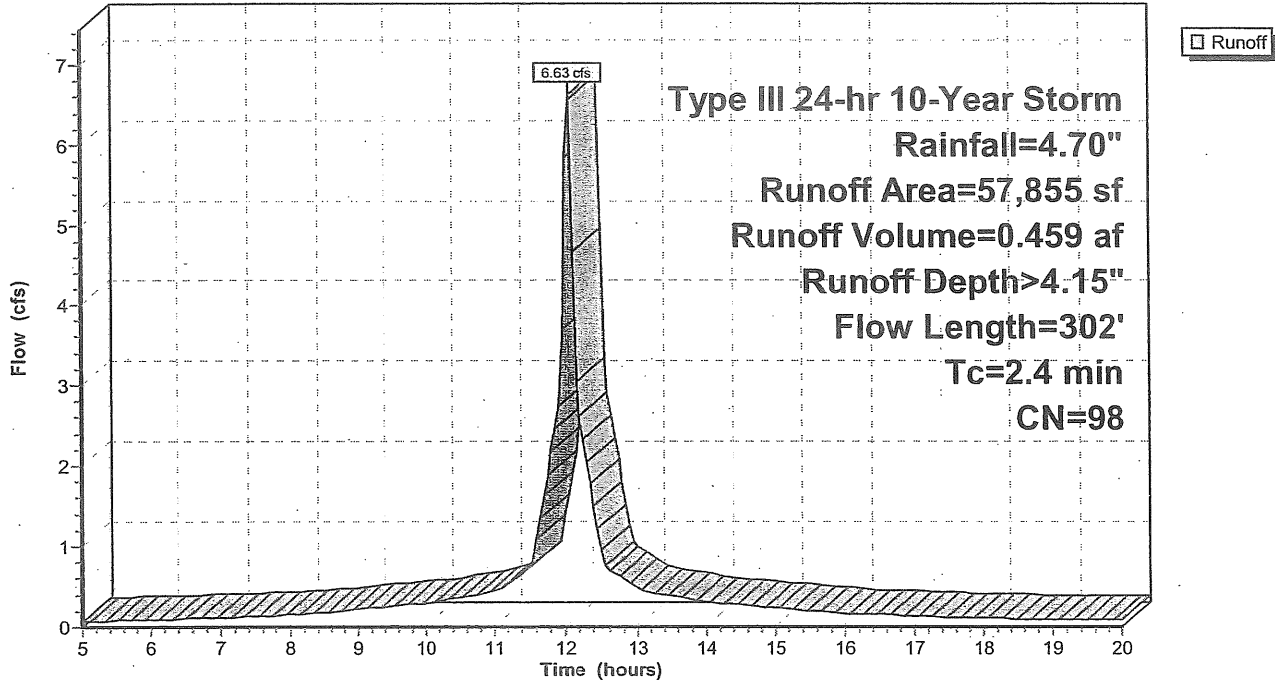
**Subcatchment 2X: Breakaway**

Hydrograph



### Subcatchment 1X: Shipyard Gravel Lot

Hydrograph





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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 1X: Shipyard Gravel Lot**

Runoff = 6.63 cfs @ 12.04 hrs, Volume= 0.459 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs.  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
2,635	98	Building
29,940	98	Gravel Parking
25,280	98	Paved
57,855	98	Weighted Average
57,855		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	60	0.0333	1.47		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.1000	2.11		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.2	40	0.0500	3.60		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
0.9	90	0.0111	1.70		<b>Shallow Concentrated Flow, DE</b> Unpaved Kv= 16.1 fps
0.2	40	0.0625	4.03		<b>Shallow Concentrated Flow, EF</b> Unpaved Kv= 16.1 fps
0.1	32	0.0100	5.90	4.63	<b>Circular Channel (pipe), FG</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
2.4	302	Total			

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Type III 24-hr 10-Year Storm Rainfall=4.70"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1X: Shipyard Gravel Lot** Runoff Area=57,855 sf Runoff Depth>4.15"  
Flow Length=302' Tc=2.4 min CN=98 Runoff=6.63 cfs 0.459 af

**Subcatchment 2X: Breakaway** Runoff Area=6,820 sf Runoff Depth>4.15"  
Flow Length=65' Slope=0.0200 '/' Tc=0.9 min CN=98 Runoff=0.81 cfs 0.054 af

**Subcatchment 3X: Turner Barker** Runoff Area=7,810 sf Runoff Depth>3.89"  
Flow Length=140' Slope=0.0200 '/' Tc=3.6 min CN=95 Runoff=0.85 cfs 0.058 af

**Subcatchment 4X: Turner Barker Gravel Lot** Runoff Area=18,745 sf Runoff Depth>3.98"  
Flow Length=210' Tc=4.2 min CN=96 Runoff=2.02 cfs 0.143 af

**Subcatchment 5X: Ocean Gateway Gravel Lot** Runoff Area=44,245 sf Runoff Depth>4.15"  
Flow Length=250' Tc=5.5 min CN=98 Runoff=4.60 cfs 0.351 af

**Reach CS: Combined Sewer** Inflow=8.20 cfs 0.571 af  
Outflow=8.20 cfs 0.571 af

**Reach FR: Fore River** Inflow=6.59 cfs 0.494 af  
Outflow=6.59 cfs 0.494 af

**Reach S1: (new node)** Inflow=7.37 cfs 0.513 af  
Outflow=7.37 cfs 0.513 af

**Reach S2: (new node)** Inflow=0.85 cfs 0.058 af  
Outflow=0.85 cfs 0.058 af

**Reach TOT: (new node)** Inflow=14.53 cfs 1.065 af  
Outflow=14.53 cfs 1.065 af

**Pond D2: Commercial Street Storm System** Peak Elev=9.68' Inflow=2.02 cfs 0.143 af  
15.0" x 192.0' Culvert Outflow=2.02 cfs 0.143 af

**Pond D3: Commercial** Peak Elev=9.27' Inflow=2.02 cfs 0.143 af  
15.0" x 192.0' Culvert Outflow=2.02 cfs 0.143 af

**Pond D7: Hancock** Peak Elev=9.21' Inflow=4.60 cfs 0.351 af  
30.0" x 36.0' Culvert Outflow=4.60 cfs 0.351 af

**Pond D8: Hancock Street Storm System** Peak Elev=10.70' Inflow=4.60 cfs 0.351 af  
24.0" x 196.0' Culvert Outflow=4.60 cfs 0.351 af

Total Runoff Area = 3.110 ac Runoff Volume = 1.065 af Average Runoff Depth = 4.11"  
2.09% Pervious Area = 0.065 ac 97.91% Impervious Area = 3.045 ac

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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond D8: Hancock Street Storm System**

Inflow Area = 1.016 ac, Inflow Depth > 2.59" for 2-Year Storm event  
Inflow = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af  
Outflow = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af

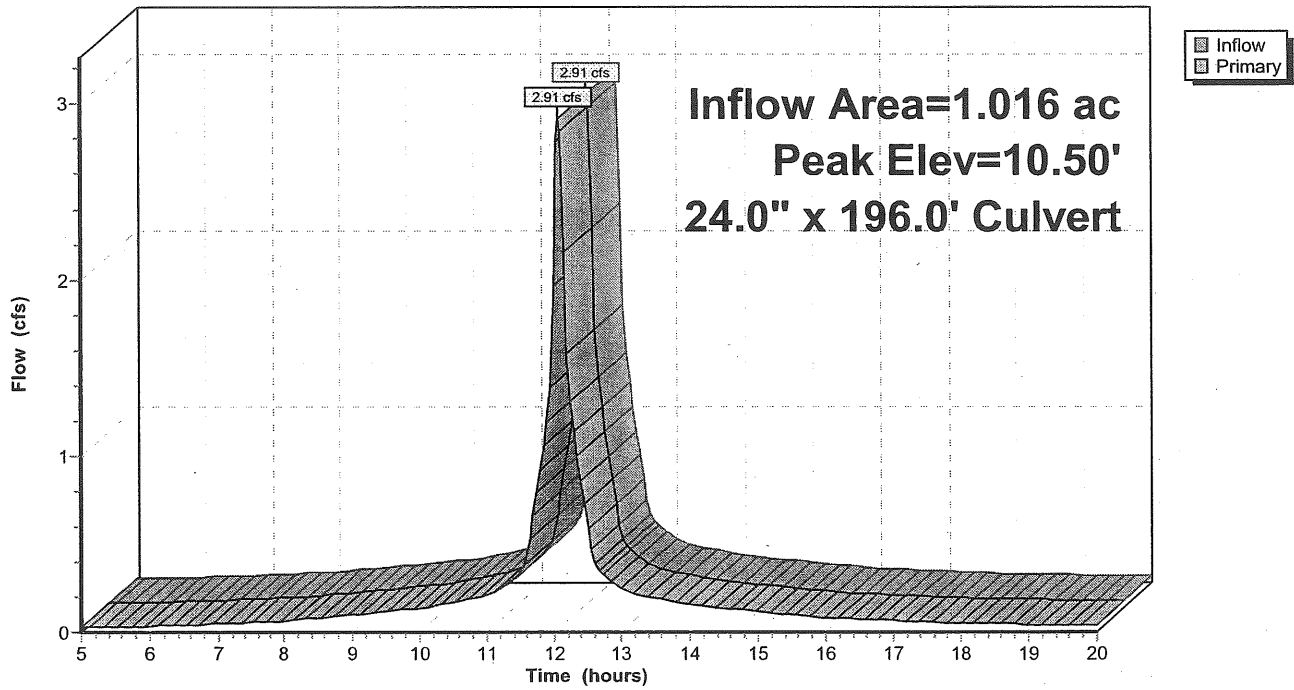
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 10.50' @ 12.08 hrs  
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=2.82 cfs @ 12.08 hrs HW=10.48' TW=8.96' (Dynamic Tailwater)  
1=Culvert (Inlet Controls 2.82 cfs @ 2.86 fps)

**Pond D8: Hancock Street Storm System**

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond D7: Hancock**

Inflow Area = 1.016 ac, Inflow Depth > 2.59" for 2-Year Storm event  
Inflow = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af  
Outflow = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af

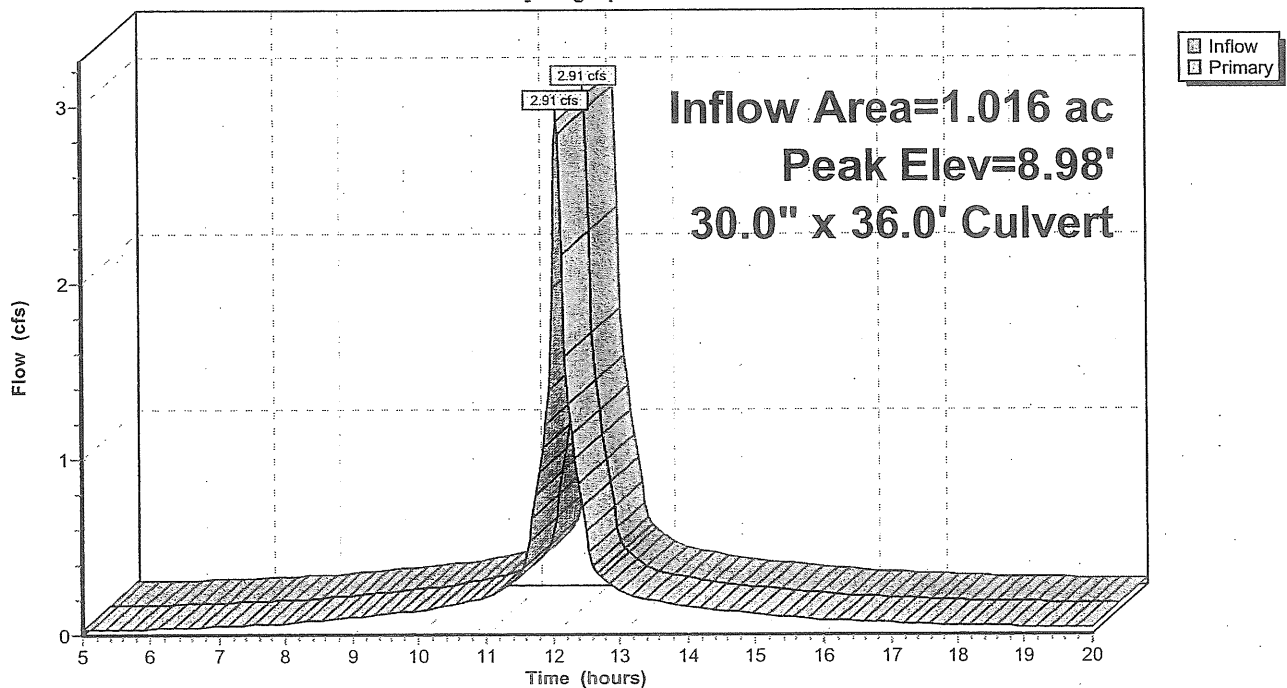
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 8.98' @ 12.08 hrs  
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	<b>30.0" x 36.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=2.82 cfs @ 12.08 hrs HW=8.96' TW=0.00' (Dynamic Tailwater)  
↑1=Culvert (Barrel Controls 2.82 cfs @ 2.70 fps)

**Pond D7: Hancock**

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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## Pond D3: Commercial

Inflow Area = 0.430 ac, Inflow Depth > 2.41" for 2-Year Storm event  
Inflow = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af  
Outflow = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.05' @ 12.06 hrs

Flood Elev= 13.91'

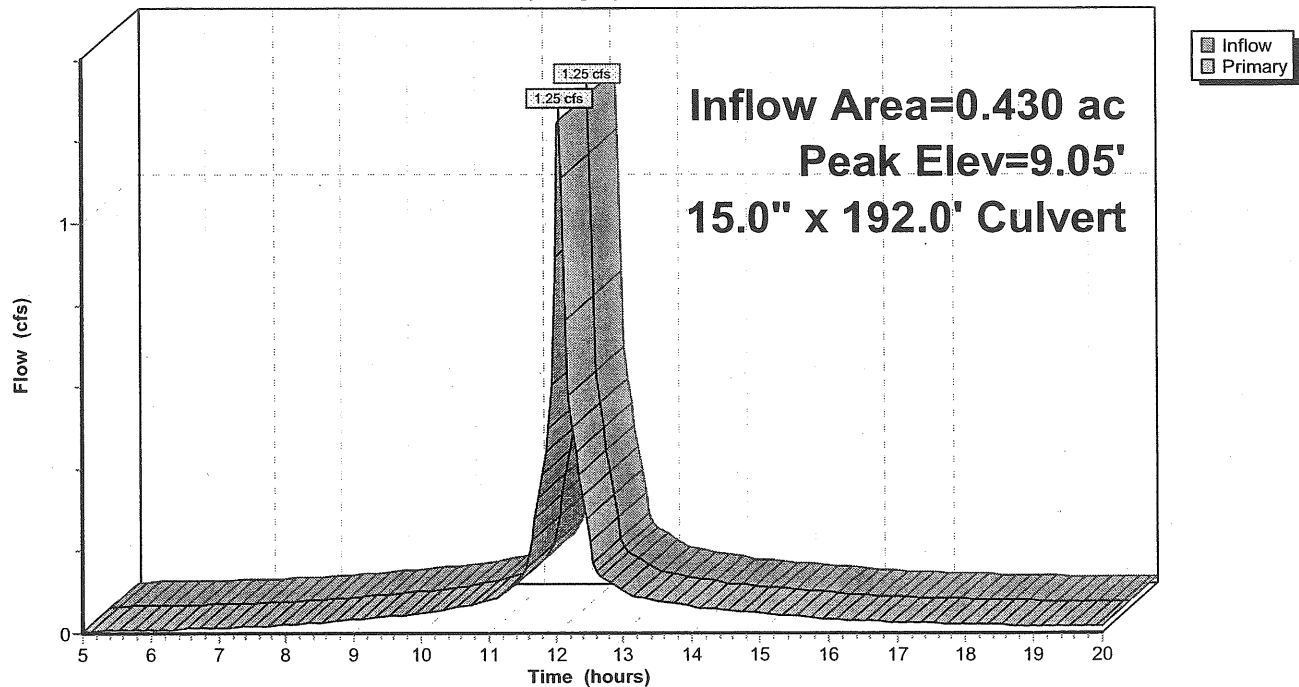
Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=1.22 cfs @ 12.06 hrs HW=9.04' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 1.22 cfs @ 2.53 fps)

## Pond D3: Commercial

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond D2: Commercial Street Storm System**

Inflow Area = 0.430 ac; Inflow Depth > 2.41" for 2-Year Storm event  
Inflow = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af  
Outflow = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

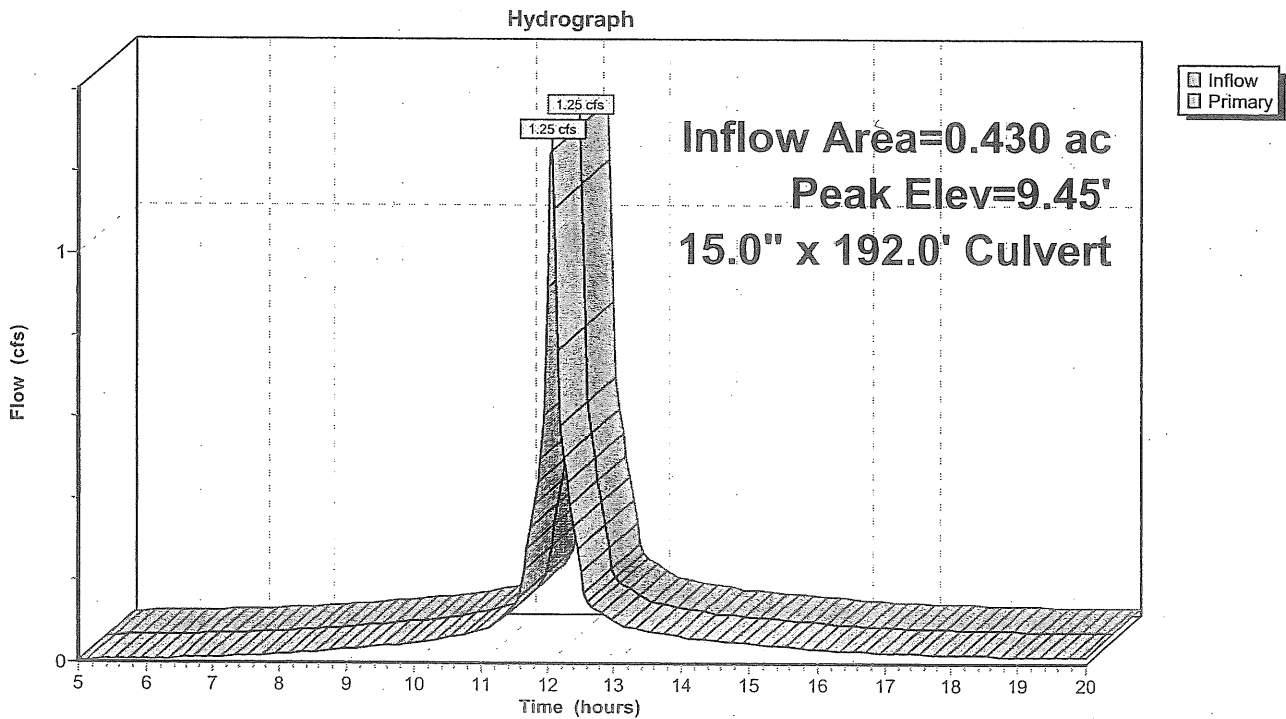
Peak Elev= 9.45' @ 12.07 hrs

Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	<b>15.0" x 192.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

**Primary OutFlow** Max=1.15 cfs @ 12.06 hrs HW=9.44' TW=9.04' (Dynamic Tailwater)  
↑1=Culvert (Outlet Controls 1.15 cfs @ 2.35 fps)

**Pond D2: Commercial Street Storm System**

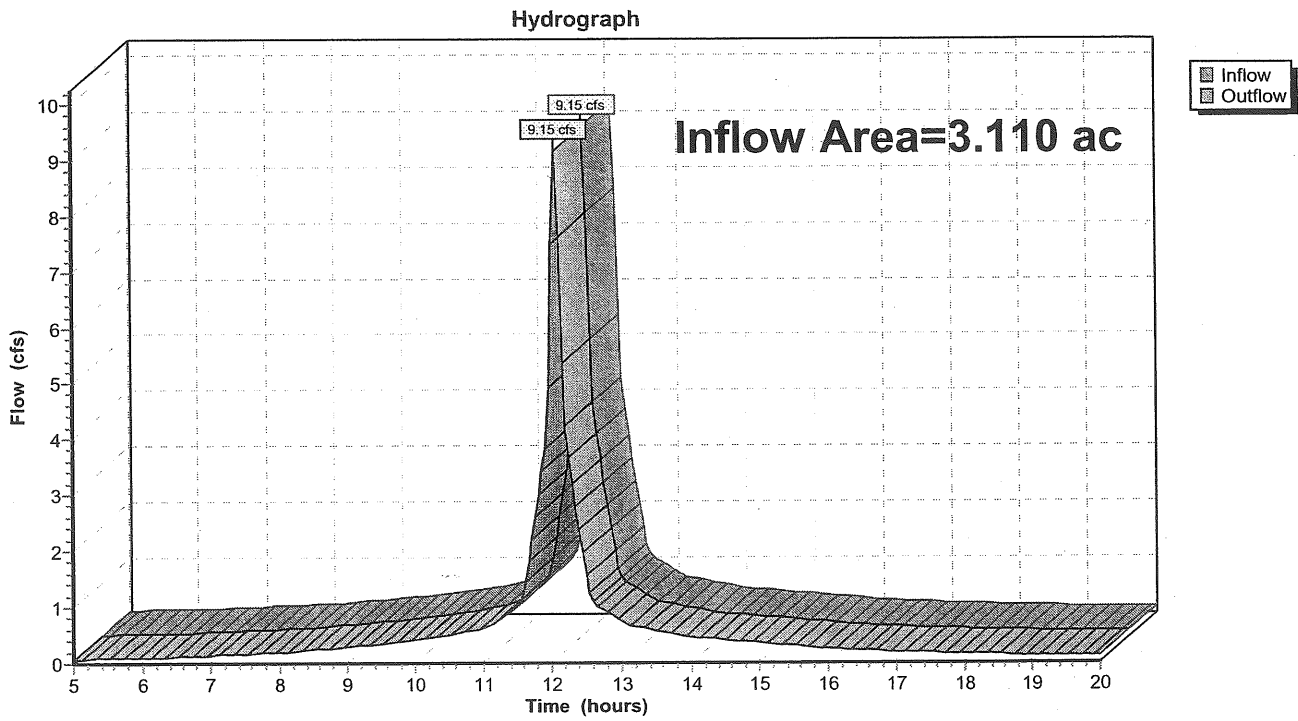


**Reach TOT: (new node)**

Inflow Area = 3.110 ac, Inflow Depth > 2.55" for 2-Year Storm event  
Inflow = 9.15 cfs @ 12.05 hrs, Volume= 0.661 af  
Outflow = 9.15 cfs @ 12.05 hrs, Volume= 0.661 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach TOT: (new node)**



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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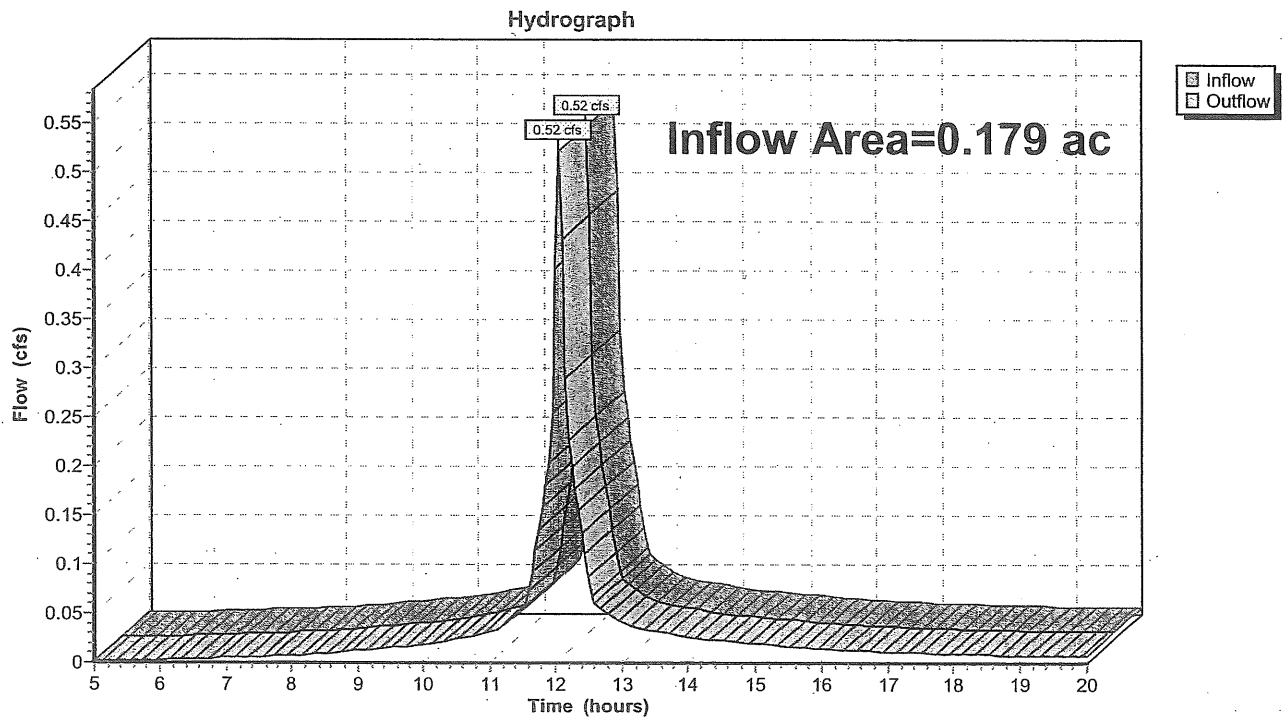
10/30/2006

**Reach S2: (new node)**

Inflow Area = 0.179 ac, Inflow Depth > 2.32" for 2-Year Storm event  
Inflow = 0.52 cfs @ 12.05 hrs, Volume= 0.035 af  
Outflow = 0.52 cfs @ 12.05 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach S2: (new node)**





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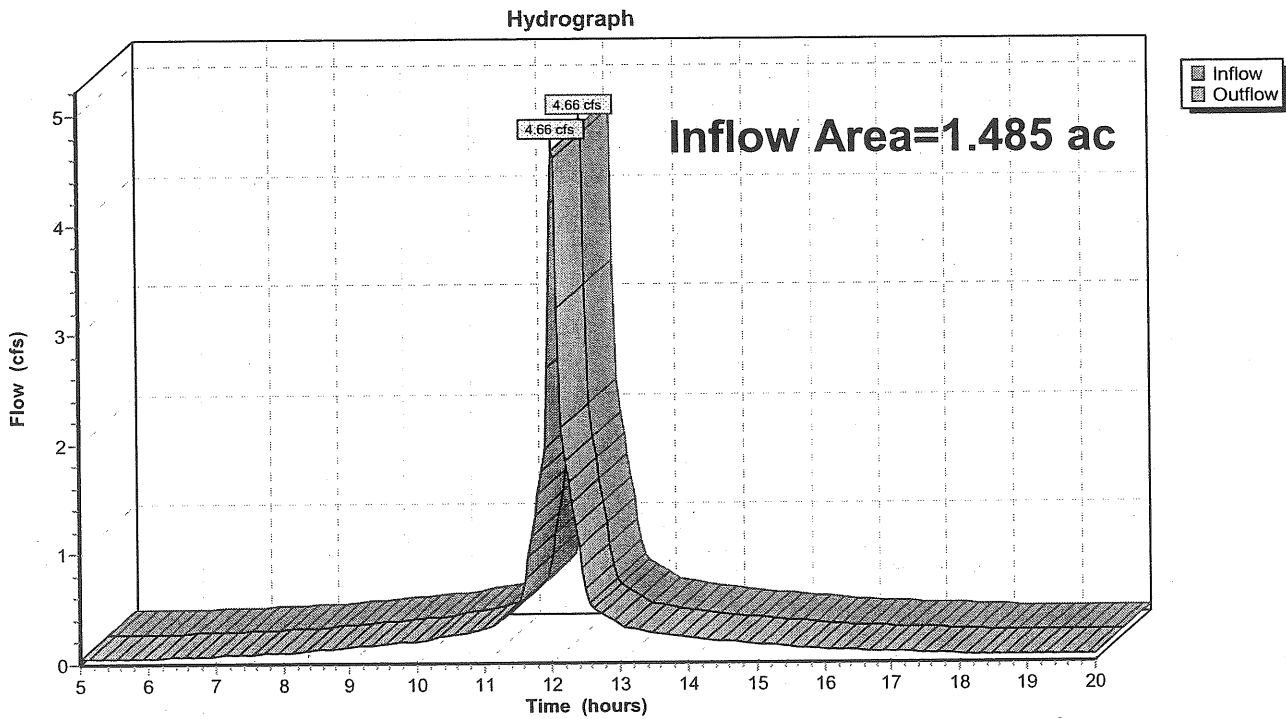
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**Reach S1: (new node)**

Inflow Area = 1.485 ac, Inflow Depth > 2.59" for 2-Year Storm event  
Inflow = 4.66 cfs @ 12.04 hrs, Volume= 0.321 af  
Outflow = 4.66 cfs @ 12.04 hrs, Volume= 0.321 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach S1: (new node)**



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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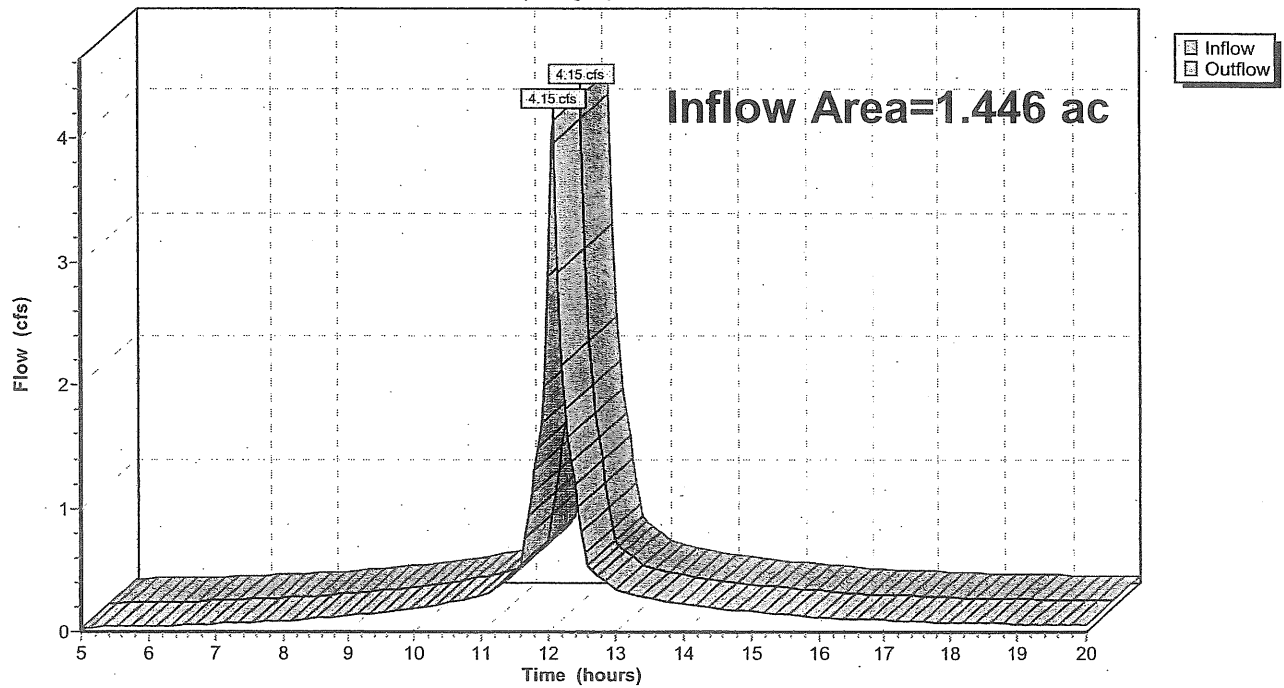
**Reach FR: Fore River**

Inflow Area = 1.446 ac, Inflow Depth > 2.54" for 2-Year Storm event  
Inflow = 4.15 cfs @ 12.07 hrs, Volume= 0.306 af  
Outflow = 4.15 cfs @ 12.07 hrs, Volume= 0.306 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach FR: Fore River**

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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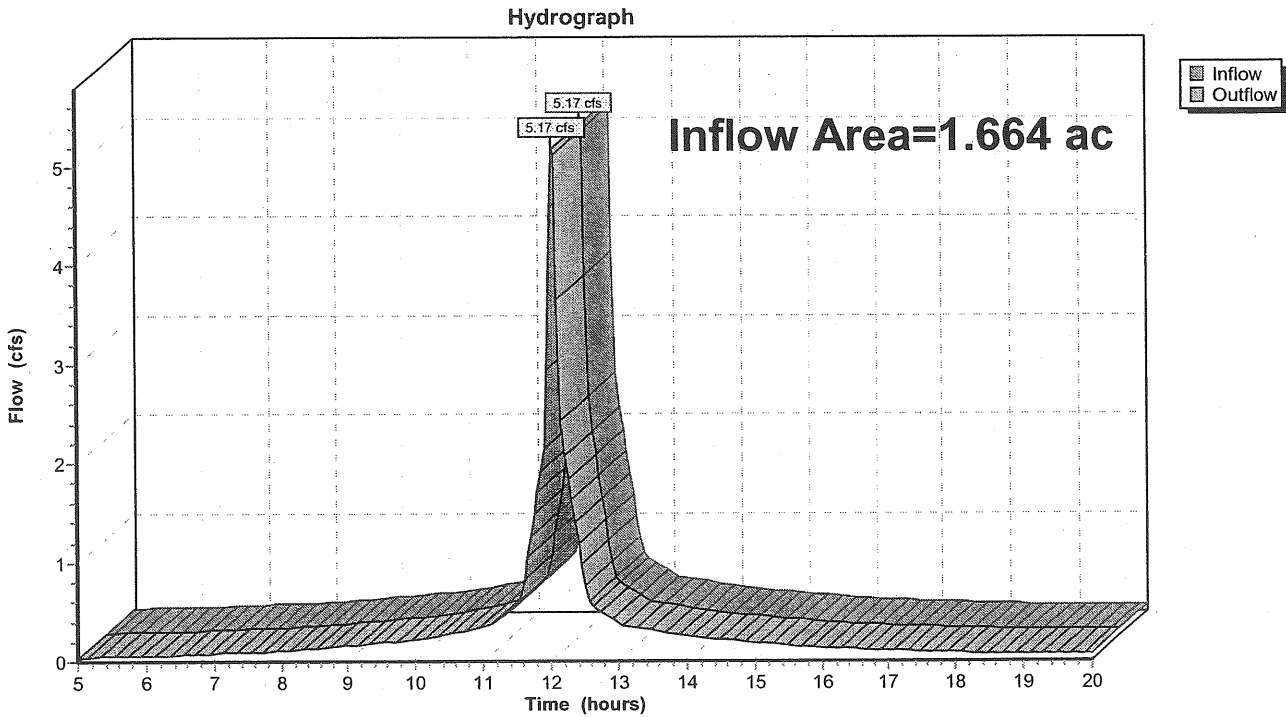
10/30/2006

**Reach CS: Combined Sewer**

Inflow Area = 1.664 ac, Inflow Depth > 2.56" for 2-Year Storm event  
Inflow = 5.17 cfs @ 12.04 hrs, Volume= 0.355 af  
Outflow = 5.17 cfs @ 12.04 hrs, Volume= 0.355 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach CS: Combined Sewer**



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 5X: Ocean Gateway Gravel Lot**

Runoff = 2.91 cfs @ 12.08 hrs, Volume= 0.219 af, Depth> 2.59"

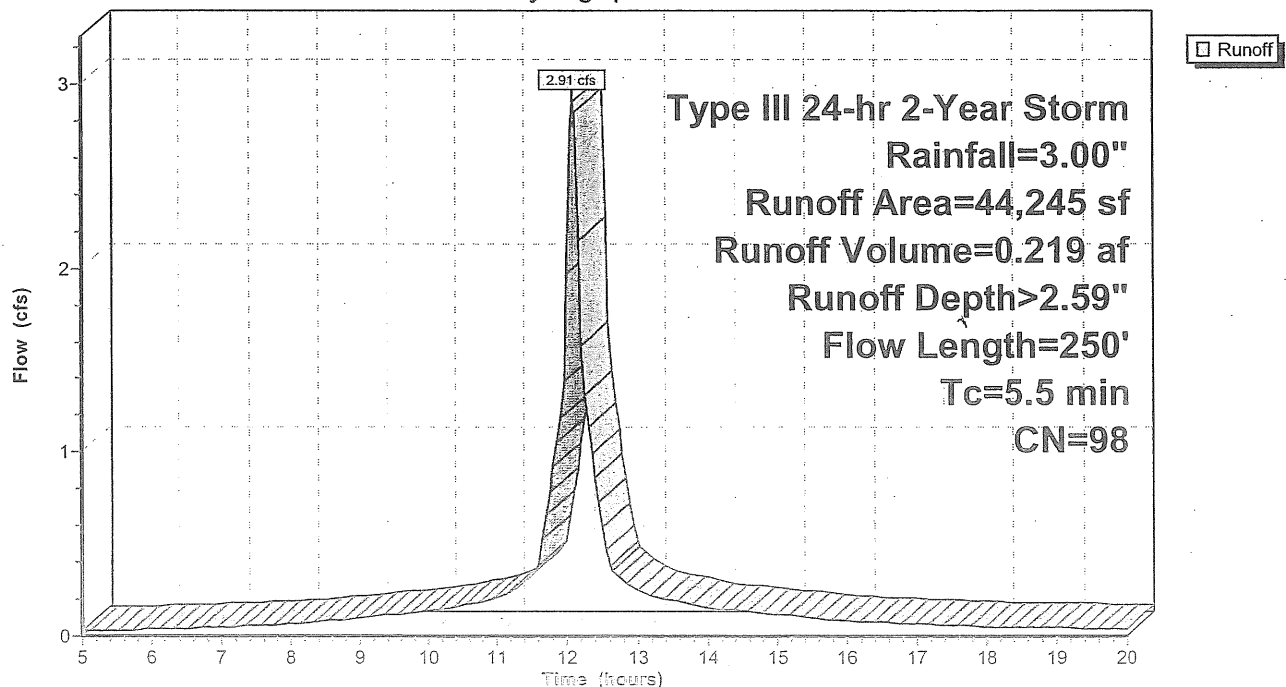
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
675	98	Buildings
1,415	98	Paved
41,460	98	Gravel Parking
695	68	<50% Grass cover, Poor, HSG A
44,245	98	Weighted Average
695		Pervious Area
43,550		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	15	0.0100	0.09		<b>Sheet Flow, BC</b> Grass: Short n= 0.150 P2= 3.00"
1.4	85	0.0100	0.98		<b>Sheet Flow, CD</b> Smooth surfaces n= 0.011 P2= 3.00"
1.2	150	0.0171	2.11		<b>Shallow Concentrated Flow, DE</b> Unpaved Kv= 16.1 fps
5.5	250	Total			

**Subcatchment 5X: Ocean Gateway Gravel Lot**

Hydrograph



**Pre-Development**

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Pre-Development  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 4X: Turner Barker Gravel Lot**

Runoff = 1.25 cfs @ 12.06 hrs, Volume= 0.086 af, Depth> 2.41"

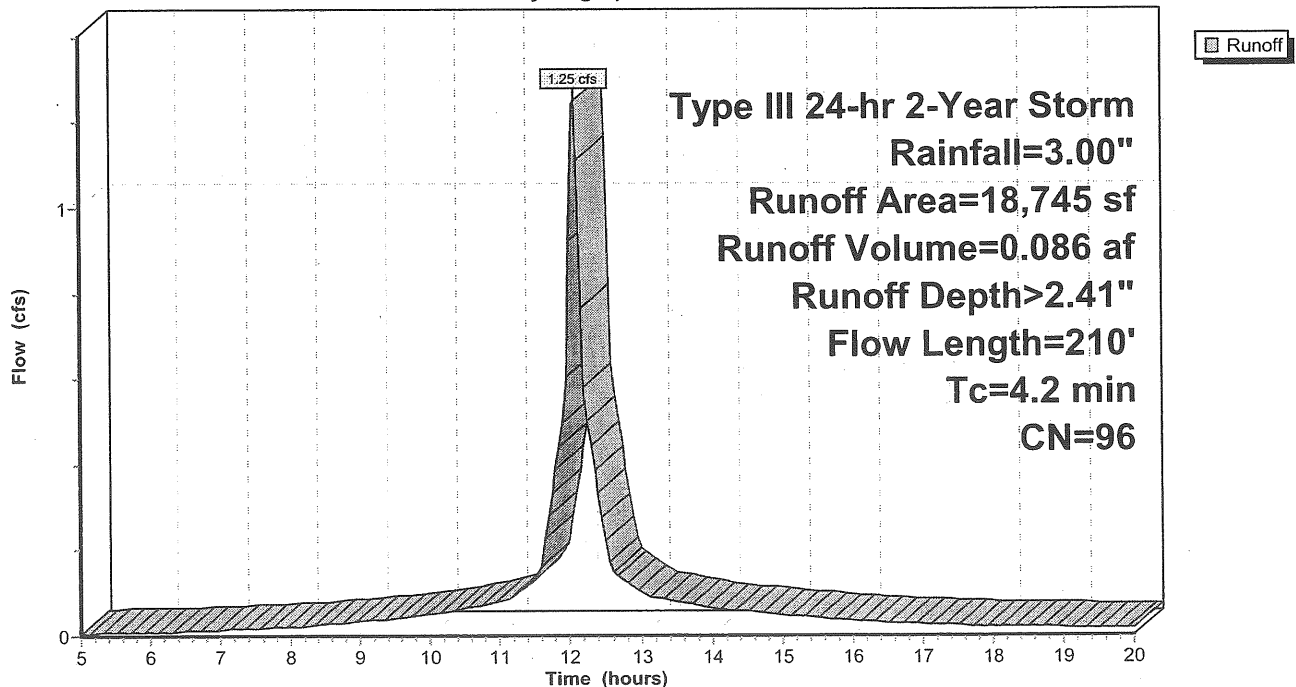
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
1,030	98	Buildings
285	98	Paved
16,130	98	Gravel Parking
1,300	68	<50% Grass cover, Poor, HSG A
18,745	96	Weighted Average
1,300		Pervious Area
17,445		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.9	110	0.0150	1.97		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
4.2	210	Total			

**Subcatchment 4X: Turner Barker Gravel Lot**

Hydrograph



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Pre-Development

Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 3X: Turner Barker**

Runoff = 0.52 cfs @ 12.05 hrs, Volume= 0.035 af, Depth> 2.32"

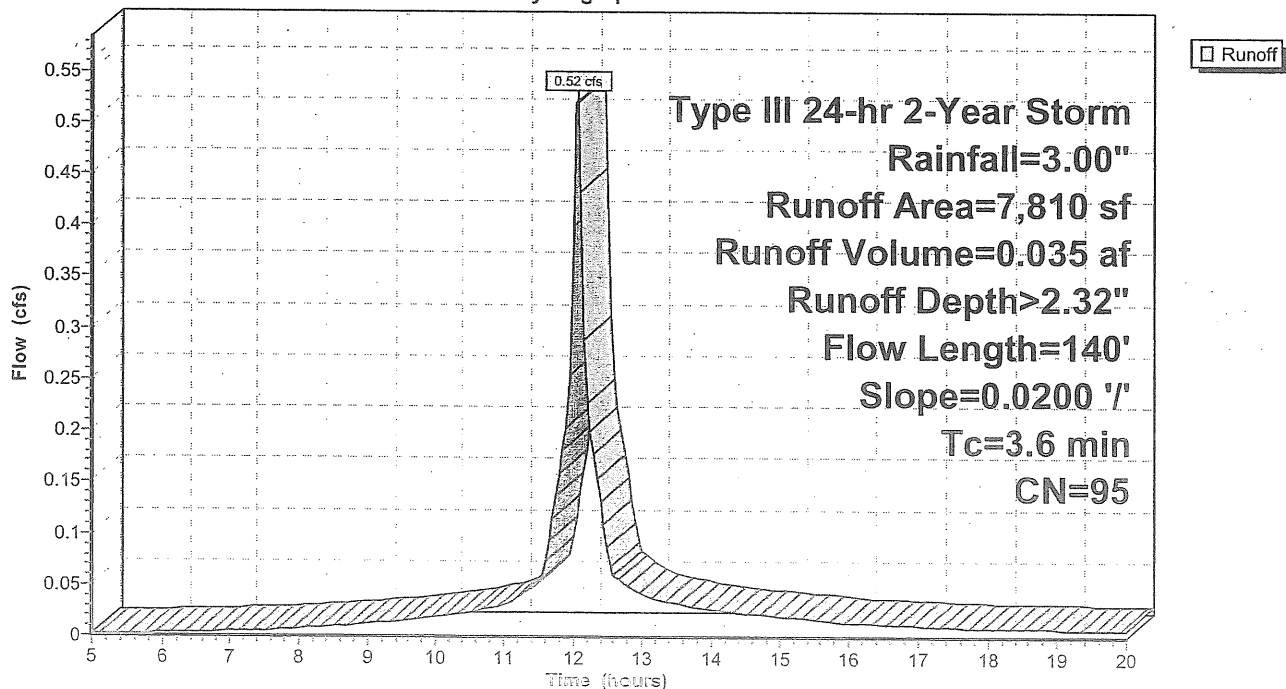
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
4,000	98	Building
2,980	98	Gravel Parking
830	68	<50% Grass cover, Poor, HSG A
7,810	95	Weighted Average
830		Pervious Area
6,980		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.0200	2.28		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
3.6	140	Total			

**Subcatchment 3X: Turner Barker**

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 2X: Breakaway**

Runoff = 0.51 cfs @ 12.01 hrs, Volume= 0.034 af, Depth> 2.59"

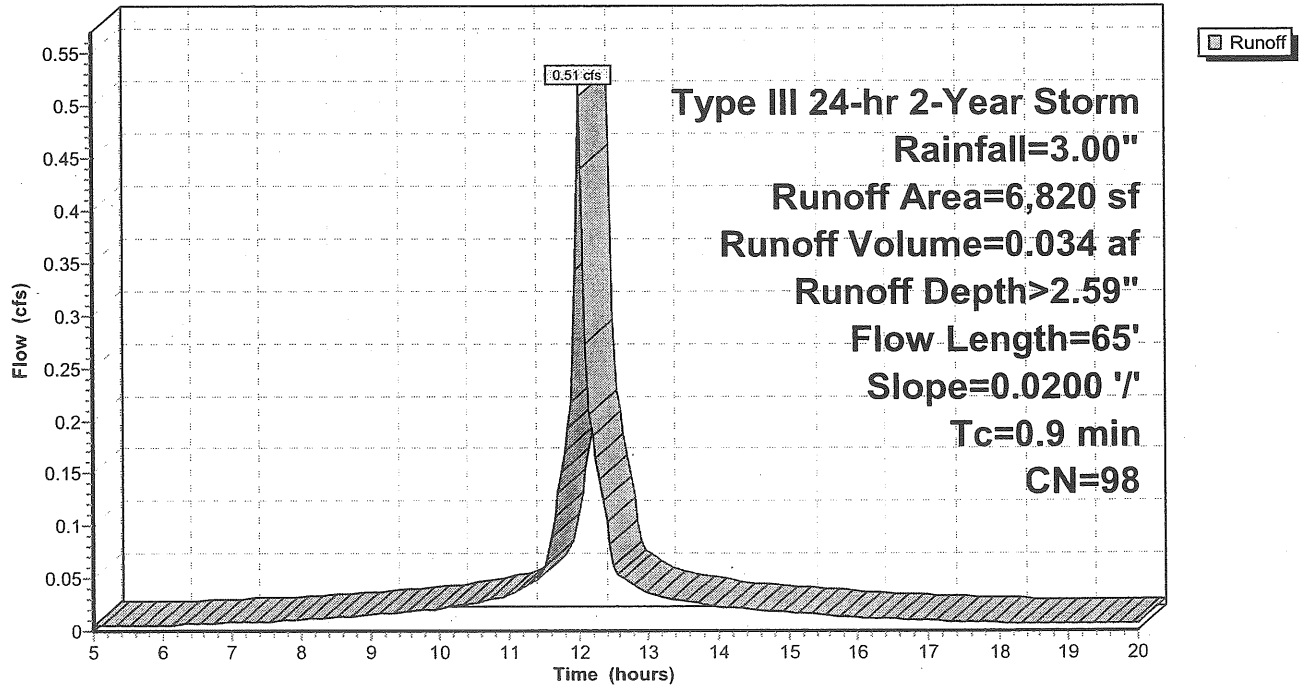
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
5,870	98	Building
950	98	Gravel Parking
6,820	98	Weighted Average
6,820		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	65	0.0200	1.22		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

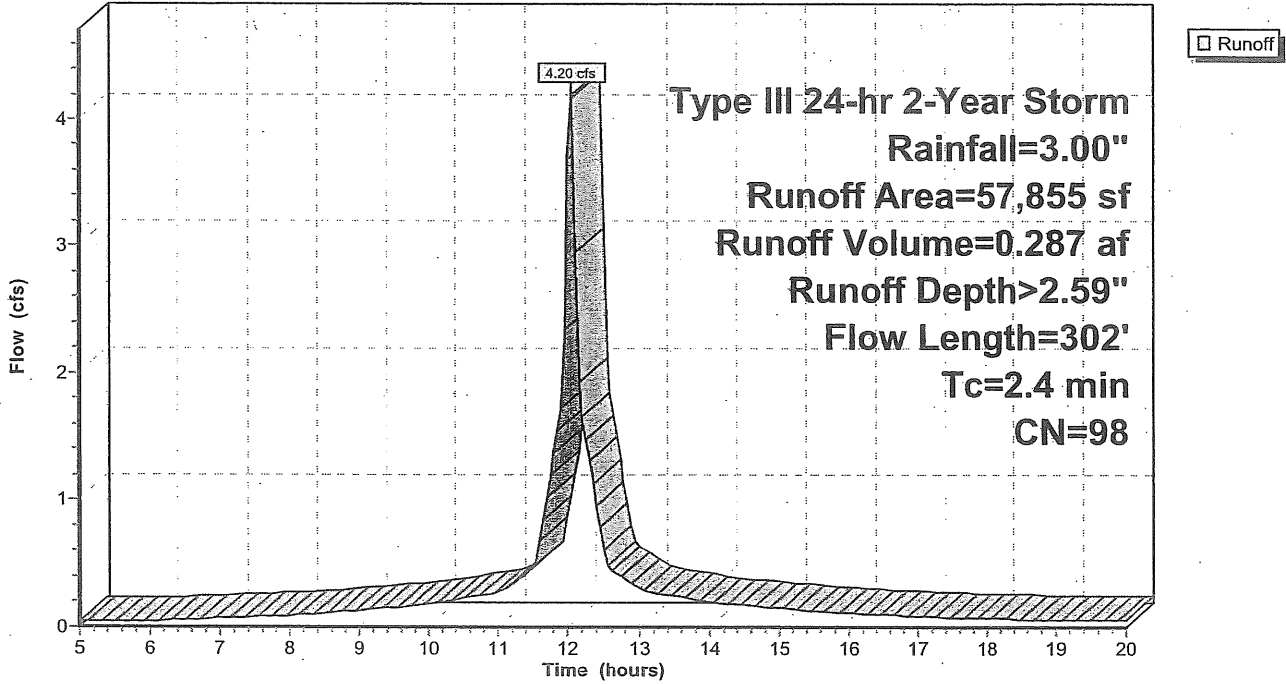
**Subcatchment 2X: Breakaway**

Hydrograph



Subcatchment 1X: Shipyard Gravel Lot

Hydrograph





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**Subcatchment 1X: Shipyard Gravel Lot**

Runoff = 4.20 cfs @ 12.04 hrs, Volume= 0.287 af, Depth&gt; 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
2,635	98	Building
29,940	98	Gravel Parking
25,280	98	Paved
57,855	98	Weighted Average
57,855		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	60	0.0333	1.47		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.1000	2.11		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.2	40	0.0500	3.60		<b>Shallow Concentrated Flow, CD</b> Unpaved Kv= 16.1 fps
0.9	90	0.0111	1.70		<b>Shallow Concentrated Flow, DE</b> Unpaved Kv= 16.1 fps
0.2	40	0.0625	4.03		<b>Shallow Concentrated Flow, EF</b> Unpaved Kv= 16.1 fps
0.1	32	0.0100	5.90	4.63	<b>Circular Channel (pipe), FG</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
2.4	302	Total			

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Pre-Development  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1X: Shipyard Gravel Lot</b>	Runoff Area=57,855 sf	Runoff Depth>2.59"
Flow Length=302'	Tc=2.4 min	CN=98
	Runoff=4.20 cfs	0.287 af
<b>Subcatchment 2X: Breakaway</b>	Runoff Area=6,820 sf	Runoff Depth>2.59"
Flow Length=65'	Slope=0.0200 1'	Tc=0.9 min
	CN=98	Runoff=0.51 cfs
		0.034 af
<b>Subcatchment 3X: Turner Barker</b>	Runoff Area=7,810 sf	Runoff Depth>2.32"
Flow Length=140'	Slope=0.0200 1'	Tc=3.6 min
	CN=95	Runoff=0.52 cfs
		0.035 af
<b>Subcatchment 4X: Turner Barker Gravel Lot</b>	Runoff Area=18,745 sf	Runoff Depth>2.41"
Flow Length=210'	Tc=4.2 min	CN=96
	Runoff=1.25 cfs	0.086 af
<b>Subcatchment 5X: Ocean Gateway Gravel Lot</b>	Runoff Area=44,245 sf	Runoff Depth>2.59"
Flow Length=250'	Tc=5.5 min	CN=98
	Runoff=2.91 cfs	0.219 af
<b>Reach CS: Combined Sewer</b>	Inflow=5.17 cfs	0.355 af
	Outflow=5.17 cfs	0.355 af
<b>Reach FR: Fore River</b>	Inflow=4.15 cfs	0.306 af
	Outflow=4.15 cfs	0.306 af
<b>Reach S1: (new node)</b>	Inflow=4.66 cfs	0.321 af
	Outflow=4.66 cfs	0.321 af
<b>Reach S2: (new node)</b>	Inflow=0.52 cfs	0.035 af
	Outflow=0.52 cfs	0.035 af
<b>Reach TOT: (new node)</b>	Inflow=9.15 cfs	0.661 af
	Outflow=9.15 cfs	0.661 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=9.45'	Inflow=1.25 cfs
	15.0" x 192.0' Culvert	Outflow=1.25 cfs
		0.086 af
<b>Pond D3: Commercial</b>	Peak Elev=9.05'	Inflow=1.25 cfs
	15.0" x 192.0' Culvert	Outflow=1.25 cfs
		0.086 af
<b>Pond D7: Hancock</b>	Peak Elev=8.98'	Inflow=2.91 cfs
	30.0" x 36.0' Culvert	Outflow=2.91 cfs
		0.219 af
<b>Pond D8: Hancock Street Storm System</b>	Peak Elev=10.50'	Inflow=2.91 cfs
	24.0" x 196.0' Culvert	Outflow=2.91 cfs
		0.219 af

Total Runoff Area = 3.110 ac Runoff Volume = 0.661 af Average Runoff Depth = 2.55"  
2.09% Pervious Area = 0.065 ac 97.91% Impervious Area = 3.045 ac

**Pre-Development**

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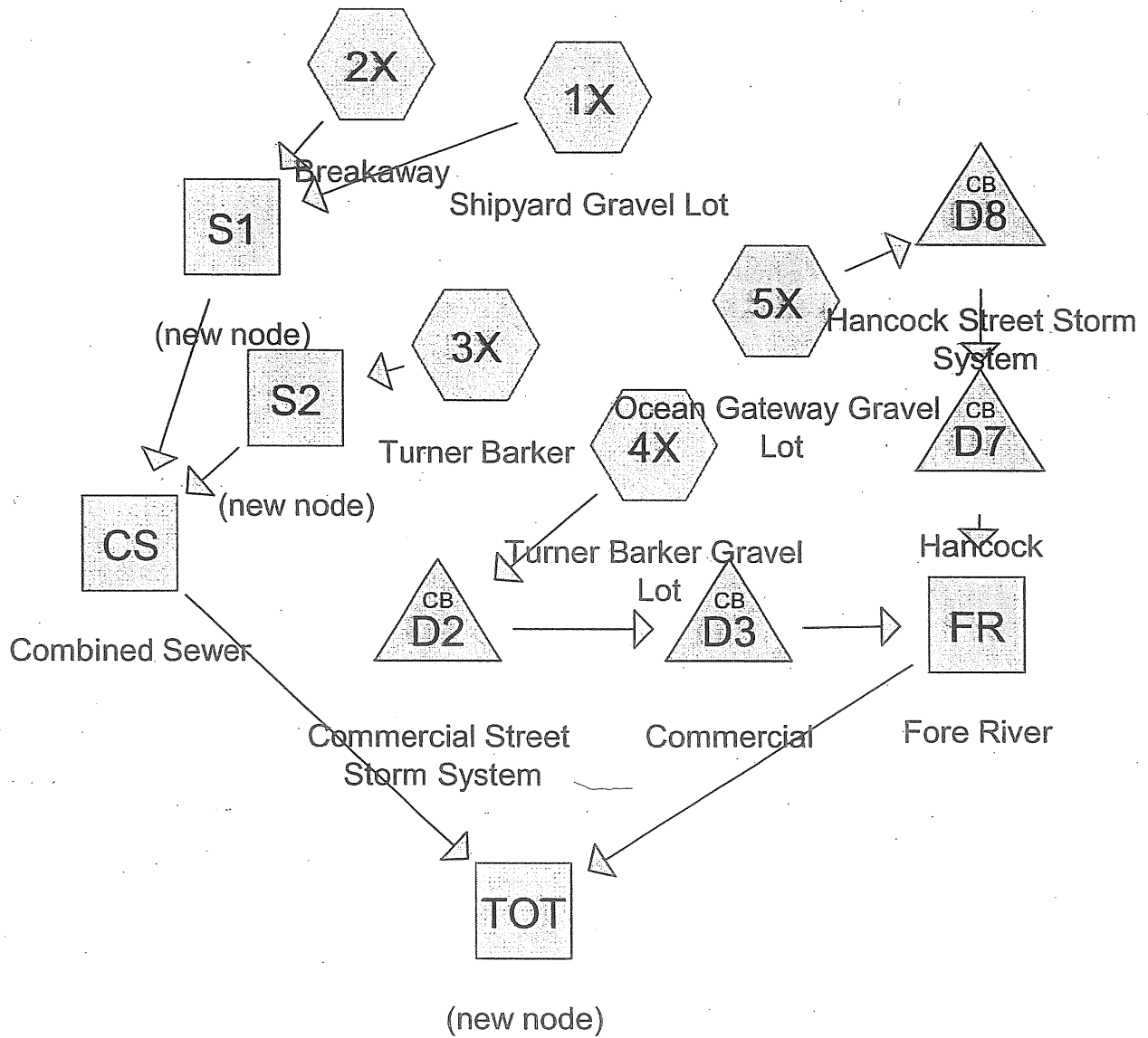
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**Area Listing (all nodes)**

<u>Area (acres)</u>	<u>CN</u>	<u>Description (subcats)</u>
0.065	68	<50% Grass cover, Poor, HSG A (3X,4X,5X)
0.287	98	Building (1X,2X,3X)
0.039	98	Buildings (4X,5X)
2.100	98	Gravel Parking (1X,2X,3X,4X,5X)
0.619	98	Paved (1X,4X,5X)
<hr/>		
3.110		



# Post-Development-SC

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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond UH2: Hancock Link DMH2

Inflow Area = 1.086 ac, Inflow Depth > 3.74" for 25-Year Storm event  
Inflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af  
Outflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 17.05' @ 12.19 hrs

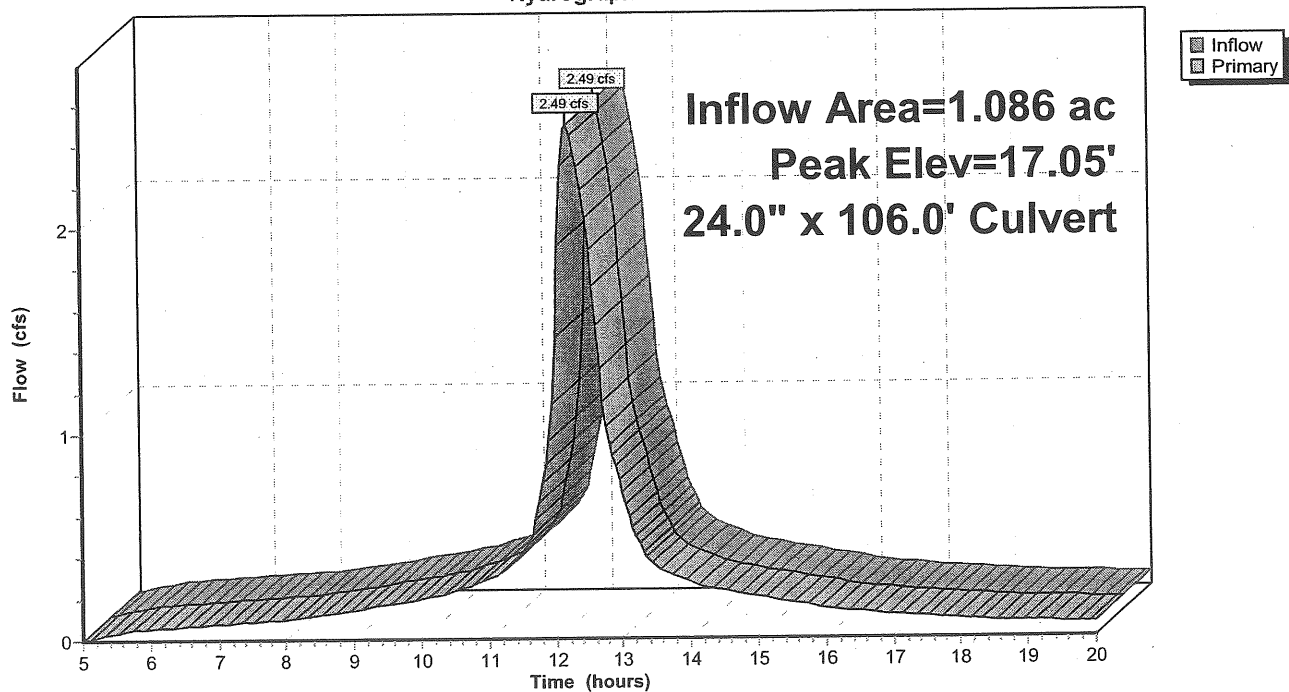
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	<b>24.0" x 106.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 ' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.49 cfs @ 12.19 hrs HW=17.05' TW=12.29' (Dynamic Tailwater)  
↑1=Culvert (Inlet Controls 2.49 cfs @ 2.76 fps)

## Pond UH2: Hancock Link DMH2

Hydrograph



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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond UH1: Hancock Link DMH1**

Inflow Area = 1.086 ac, Inflow Depth > 3.74" for 25-Year Storm event  
 Inflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af  
 Outflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 12.29' @ 12.19 hrs

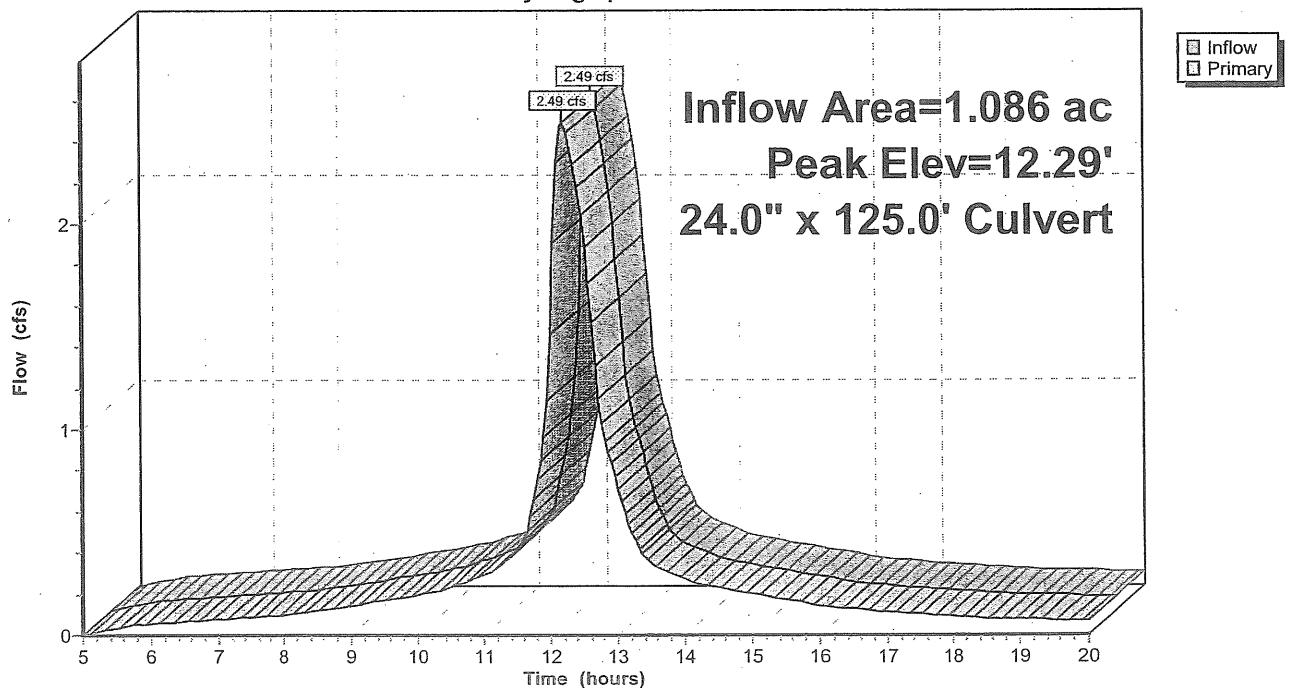
Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	<b>24.0" x 125.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.49 cfs @ 12.19 hrs HW=12.29' TW=10.44' (Dynamic Tailwater)  
 ←1=Culvert (Inlet Controls 2.49 cfs @ 2.76 fps)

**Pond UH1: Hancock Link DMH1**

Hydrograph



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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D8: Hancock Street Storm System**

Inflow Area = 1.086 ac, Inflow Depth > 3.74" for 25-Year Storm event  
 Inflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af  
 Outflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af

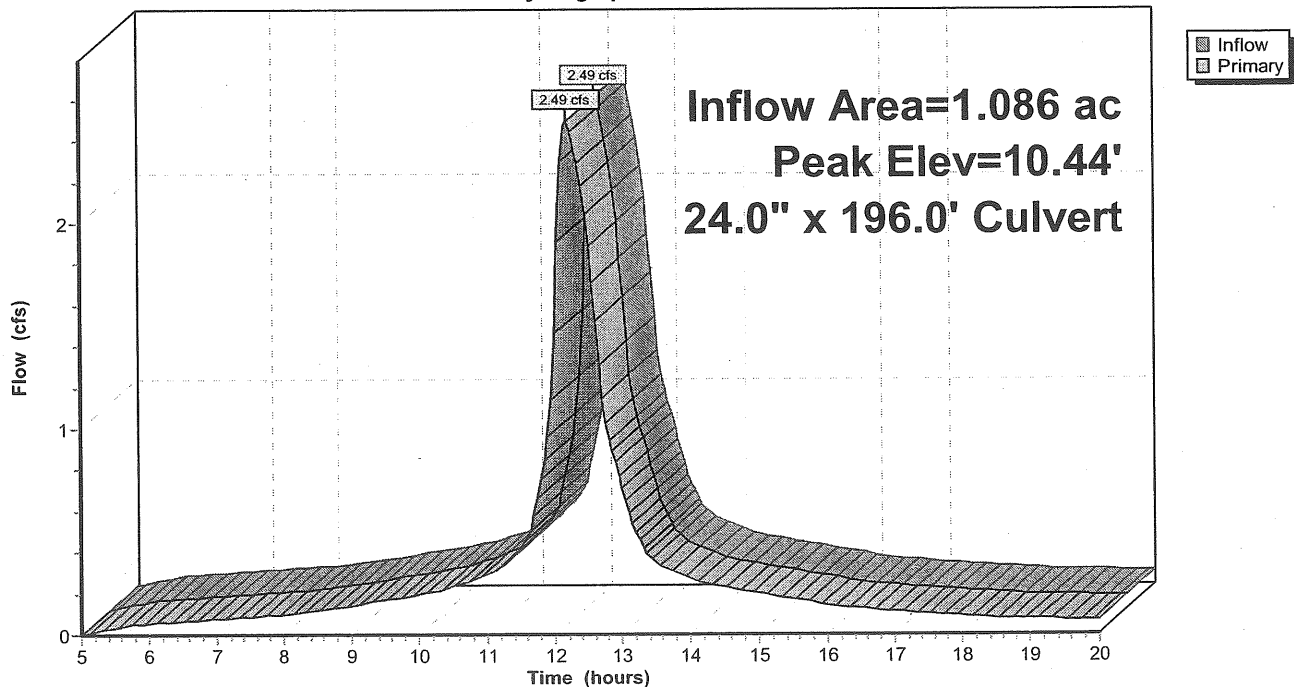
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 10.44' @ 12.19 hrs  
 Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	<b>24.0" x 196.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/ Cc= 0.900 n= 0.011

**Primary OutFlow** Max=2.49 cfs @ 12.19 hrs HW=10.44' TW=8.91' (Dynamic Tailwater)  
 ↳1=Culvert (Inlet Controls 2.49 cfs @ 2.76 fps)

**Pond D8: Hancock Street Storm System**

Hydrograph



# Post-Development-SC

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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond D7: Hancock

Inflow Area = 1.086 ac, Inflow Depth > 3.74" for 25-Year Storm event  
Inflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af  
Outflow = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.49 cfs @ 12.19 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.91' @ 12.19 hrs

Flood Elev= 13.91'

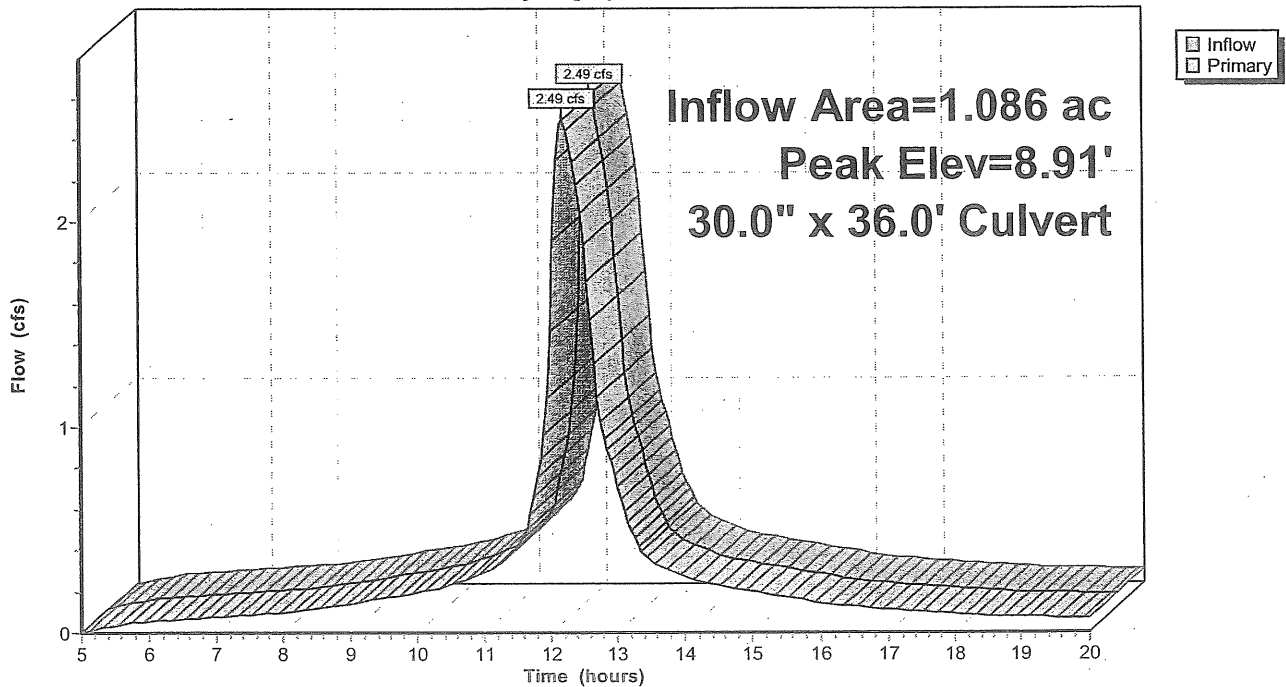
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.49 cfs @ 12.19 hrs HW=8.91' TW=0.00' (Dynamic Tailwater)

←1=Culvert (Barrel Controls 2.49 cfs @ 2.60 fps)

## Pond D7: Hancock

Hydrograph





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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D3: Commercial**

Inflow Area = 0.296 ac, Inflow Depth > 3.24" for 25-Year Storm event  
Inflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af  
Outflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af

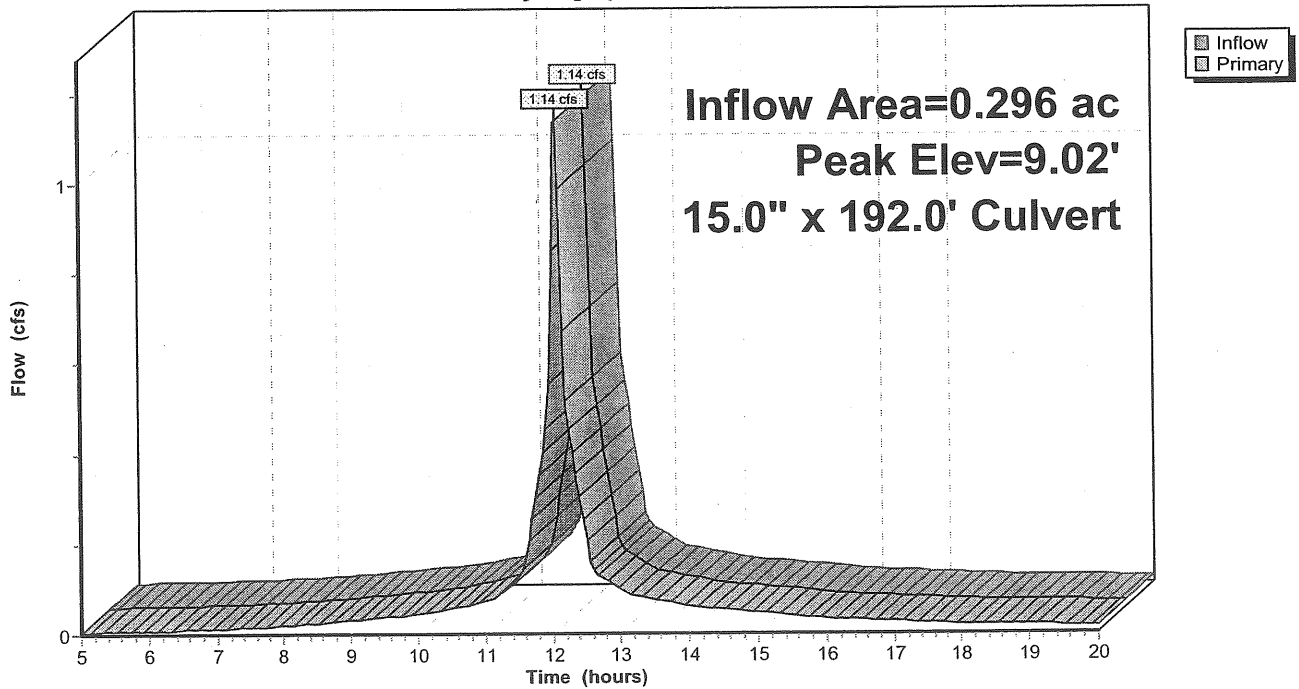
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 9.02' @ 12.06 hrs  
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=1.11 cfs @ 12.06 hrs HW=9.01' TW=0.00' (Dynamic Tailwater)  
↑1=Culvert (Barrel Controls 1.11 cfs @ 2.47 fps)

**Pond D3: Commercial**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond D2: Commercial Street Storm System

Inflow Area = 0.296 ac, Inflow Depth > 3.24" for 25-Year Storm event  
Inflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af  
Outflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.41' @ 12.07 hrs

Flood Elev= 14.95'

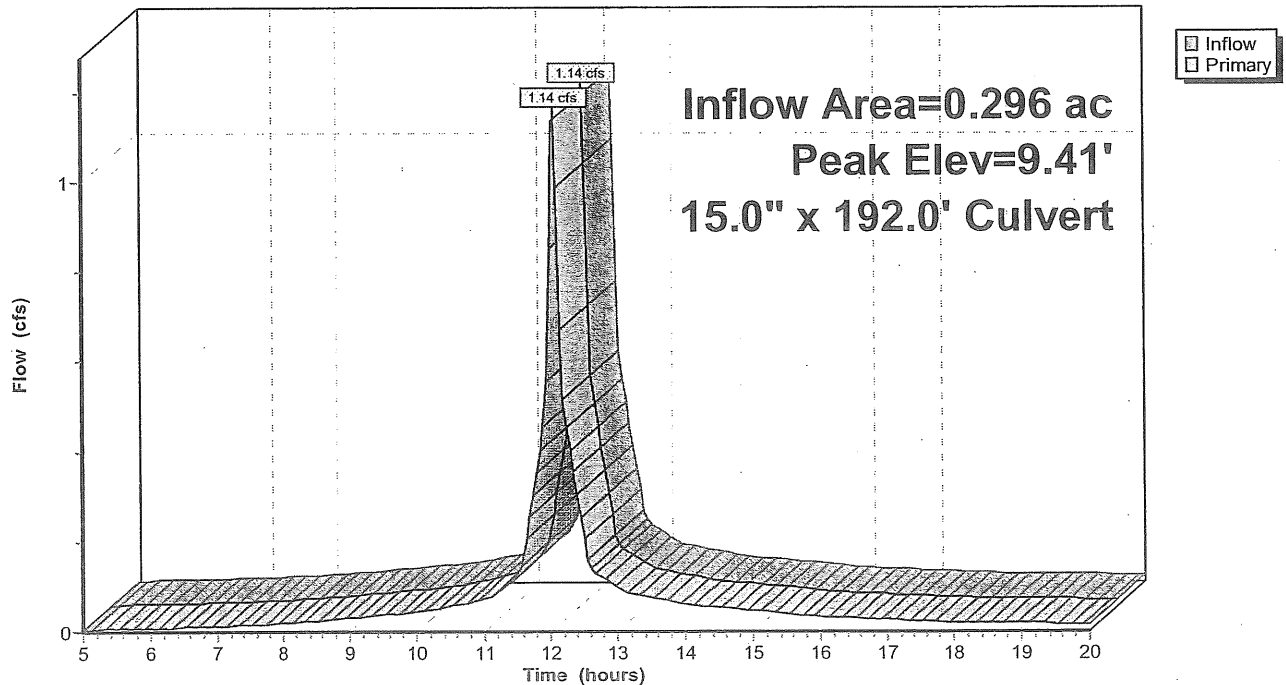
Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=1.05 cfs @ 12.06 hrs HW=9.40' TW=9.01' (Dynamic Tailwater)

↑=Culvert (Outlet Controls 1.05 cfs @ 2.31 fps)

## Pond D2: Commercial Street Storm System

Hydrograph



**Post-Development-SC**

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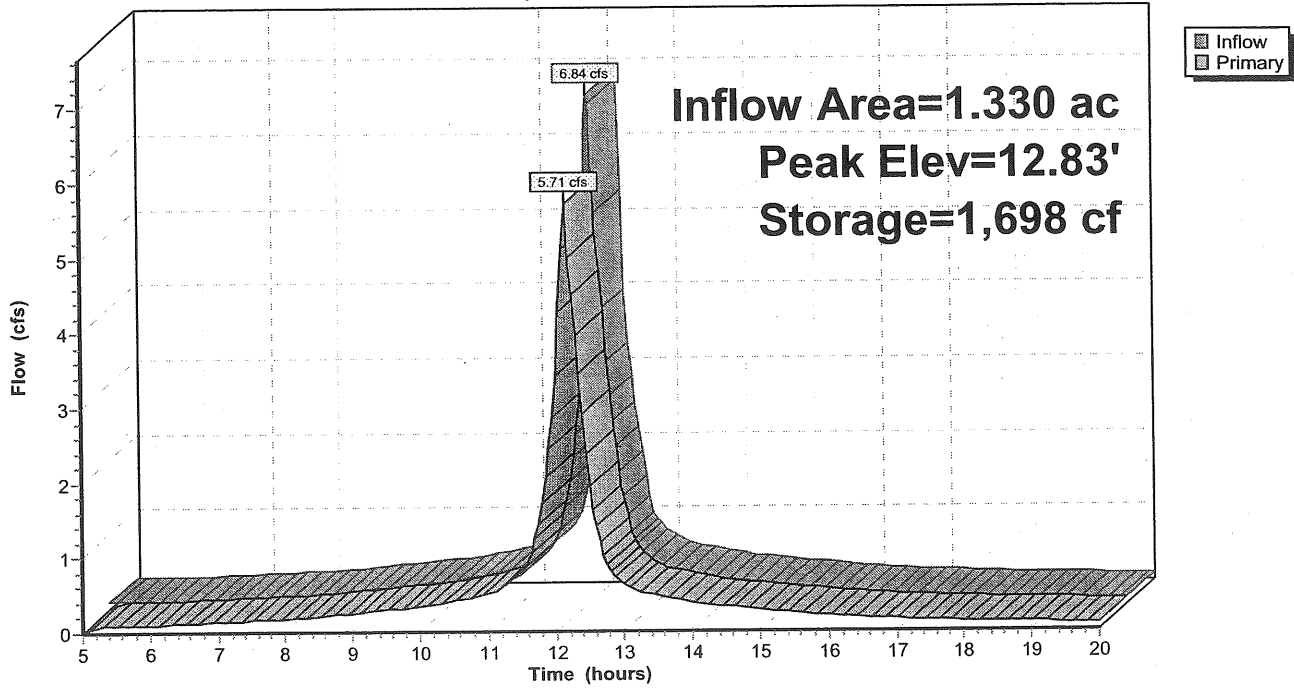
Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond 5C: Subsurface Detention for Plaza**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond 5C: Subsurface Detention for Plaza

Inflow Area = 1.330 ac, Inflow Depth > 4.87" for 25-Year Storm event  
 Inflow = 6.84 cfs @ 12.08 hrs, Volume= 0.540 af  
 Outflow = 5.71 cfs @ 12.15 hrs, Volume= 0.539 af, Atten= 16%, Lag= 4.0 min  
 Primary = 5.71 cfs @ 12.15 hrs, Volume= 0.539 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 12.83' @ 12.15 hrs Surf.Area= 835 sf Storage= 1,698 cf

Plug-Flow detention time= 5.6 min calculated for 0.537 af (99% of inflow)  
 Center-of-Mass det. time= 4.2 min ( 738.5 - 734.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	1,086 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 3,758 cf Overall - 1,044 cf Embedded = 2,714 cf x 40.0% Voids
#2	10.50'	1,044 cf	<b>58.4"W x 34.8"H x 7.60'L StormChamber</b> x 14 Inside #1
		2,129 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	835	0	0
14.00	835	3,758	3,758

Device	Routing	Invert	Outlet Devices
#1	Primary	9.50'	<b>12.0" x 50.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.00' S= 0.0100 1' Cc= 0.900 n= 0.011
#2	Device 1	9.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	10.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	12.50'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=5.68 cfs @ 12.15 hrs HW=12.82' TW=0.00' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 5.68 cfs of 6.35 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 2.90 cfs @ 8.32 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 2.37 cfs @ 6.78 fps)
- ↑ 4=Orifice/Grate (Orifice Controls 0.41 cfs @ 1.91 fps)

**Post-Development-SC**

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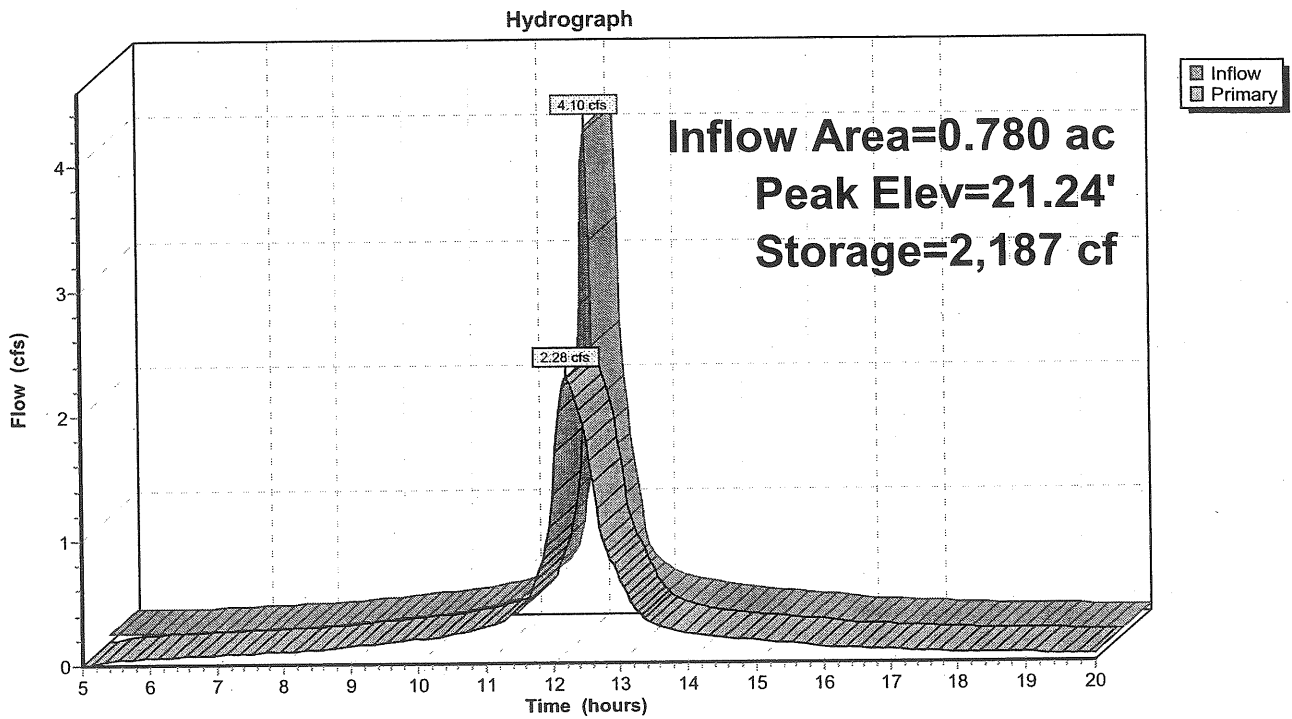
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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond 1B: Subsurface Detention for Parking Garage**



**Post-Development-SC**

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond 1B: Subsurface Detention for Parking Garage**

Inflow Area = 0.780 ac, Inflow Depth > 4.87" for 25-Year Storm event  
 Inflow = 4.10 cfs @ 12.09 hrs, Volume= 0.317 af  
 Outflow = 2.28 cfs @ 12.22 hrs, Volume= 0.315 af, Atten= 45%, Lag= 7.7 min  
 Primary = 2.28 cfs @ 12.22 hrs, Volume= 0.315 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 21.24' @ 12.22 hrs Surf.Area= 1,590 sf Storage= 2,187 cf

Plug-Flow detention time= 15.6 min calculated for 0.315 af (99% of inflow)  
 Center-of-Mass det. time= 12.4 min ( 747.0 - 734.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	1,967 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 7,155 cf Overall - 2,236 cf Embedded = 4,919 cf x 40.0% Voids
#2	20.00'	2,236 cf	<b>58.4"W x 34.8"H x 7.60'L StormChamber</b> x 30 Inside #1
		4,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,590	0	0
23.50	1,590	7,155	7,155

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	<b>12.0" x 150.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 18.00' S= 0.0067 '/' Cc= 0.900 n= 0.011
#2	Device 1	20.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	19.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	22.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.27 cfs @ 12.22 hrs HW=21.23' TW=17.05' (Dynamic Tailwater)

- 1=Culvert (Passes 2.27 cfs of 4.27 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.94 cfs @ 4.77 fps)
- 3=Orifice/Grate (Orifice Controls 1.33 cfs @ 6.78 fps)
- 4=Orifice/Grate (Controls 0.00 cfs)

**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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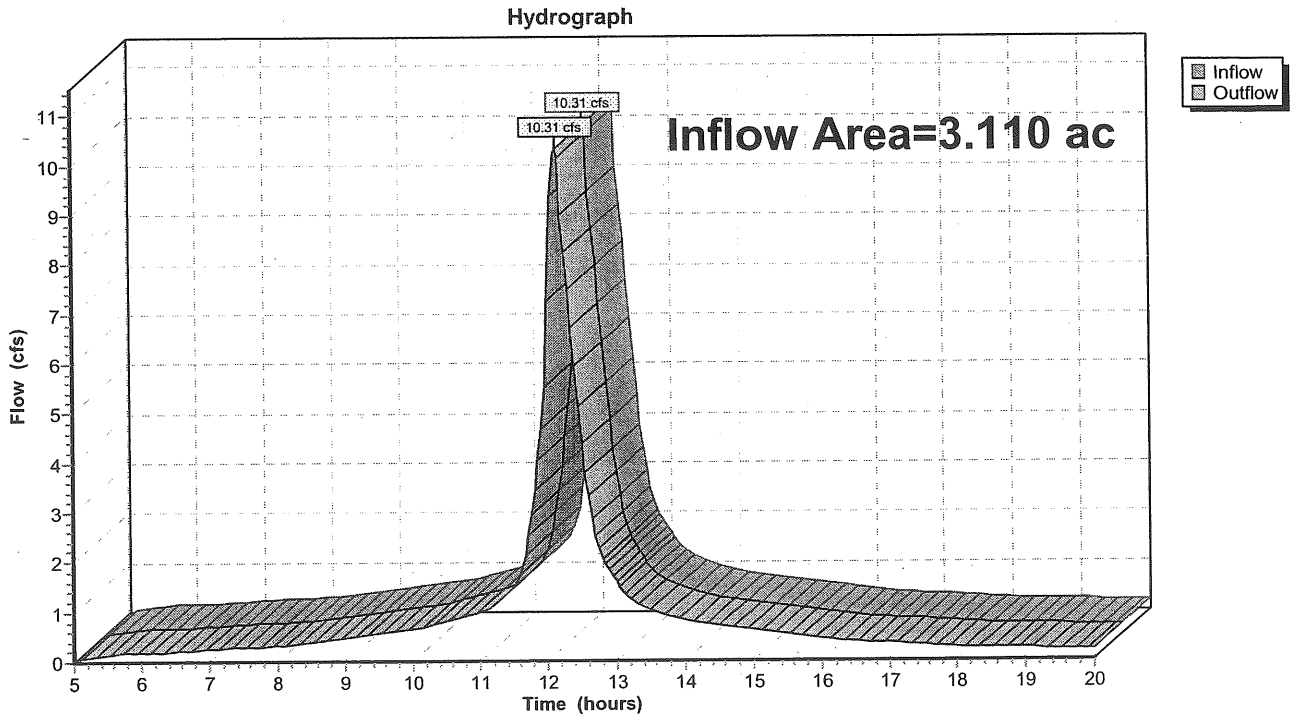
11/3/2006

**Reach TOT: (new node)**

Inflow Area = 3.110 ac, Inflow Depth > 4.23" for 25-Year Storm event  
Inflow = 10.31 cfs @ 12.12 hrs, Volume= 1.097 af  
Outflow = 10.31 cfs @ 12.12 hrs, Volume= 1.097 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach TOT: (new node)**



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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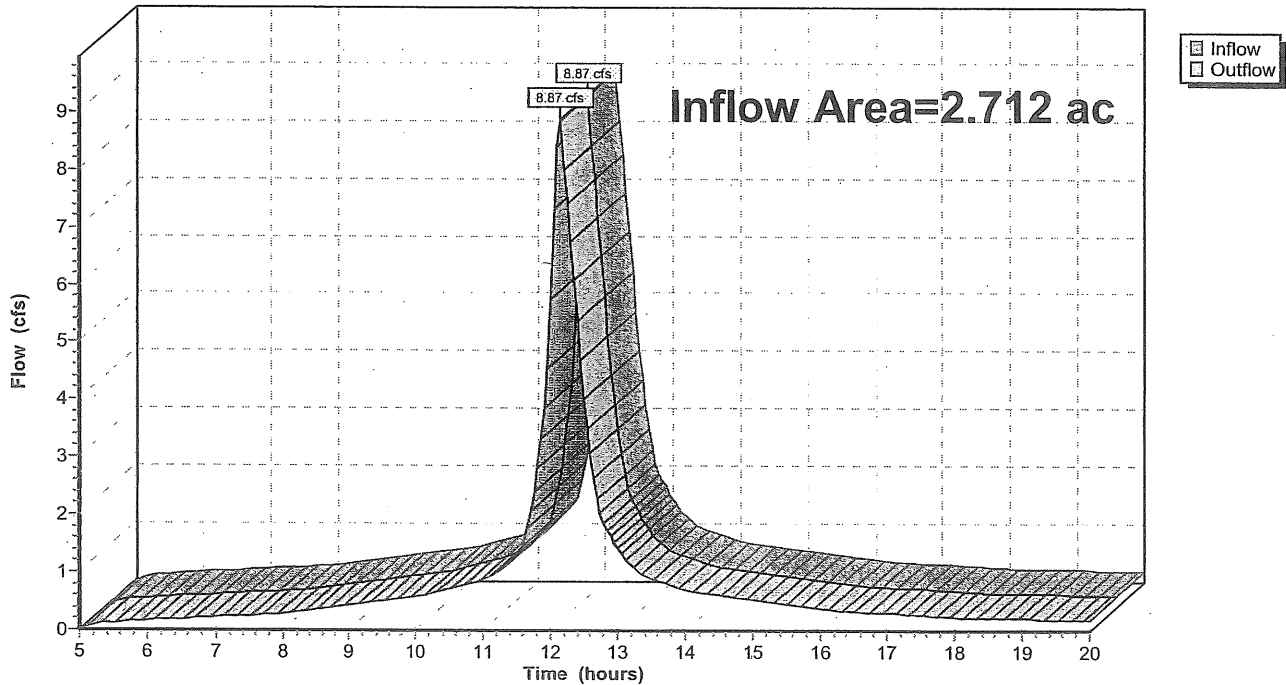
**Reach FR: Fore River**

Inflow Area = 2.712 ac, Inflow Depth > 4.24" for 25-Year Storm event  
Inflow = 8.87 cfs @ 12.14 hrs, Volume= 0.957 af  
Outflow = 8.87 cfs @ 12.14 hrs, Volume= 0.957 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach FR: Fore River**

Hydrograph





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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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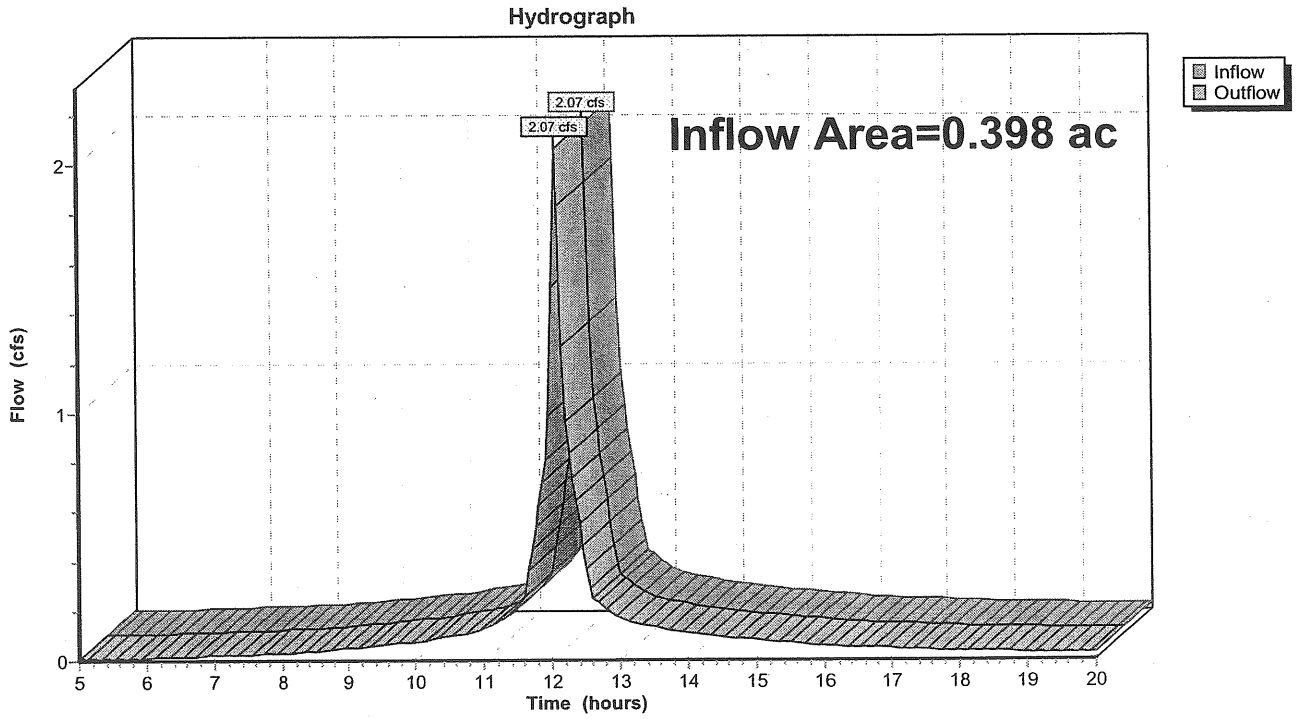
11/3/2006

**Reach CS: Combined Sewer**

Inflow Area = 0.398 ac, Inflow Depth > 4.22" for 25-Year Storm event  
Inflow = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af  
Outflow = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach CS: Combined Sewer**



# Post-Development-SC

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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Subcatchment 5CP: Plaza

Runoff = 0.68 cfs @ 12.02 hrs, Volume= 0.047 af, Depth> 4.87"

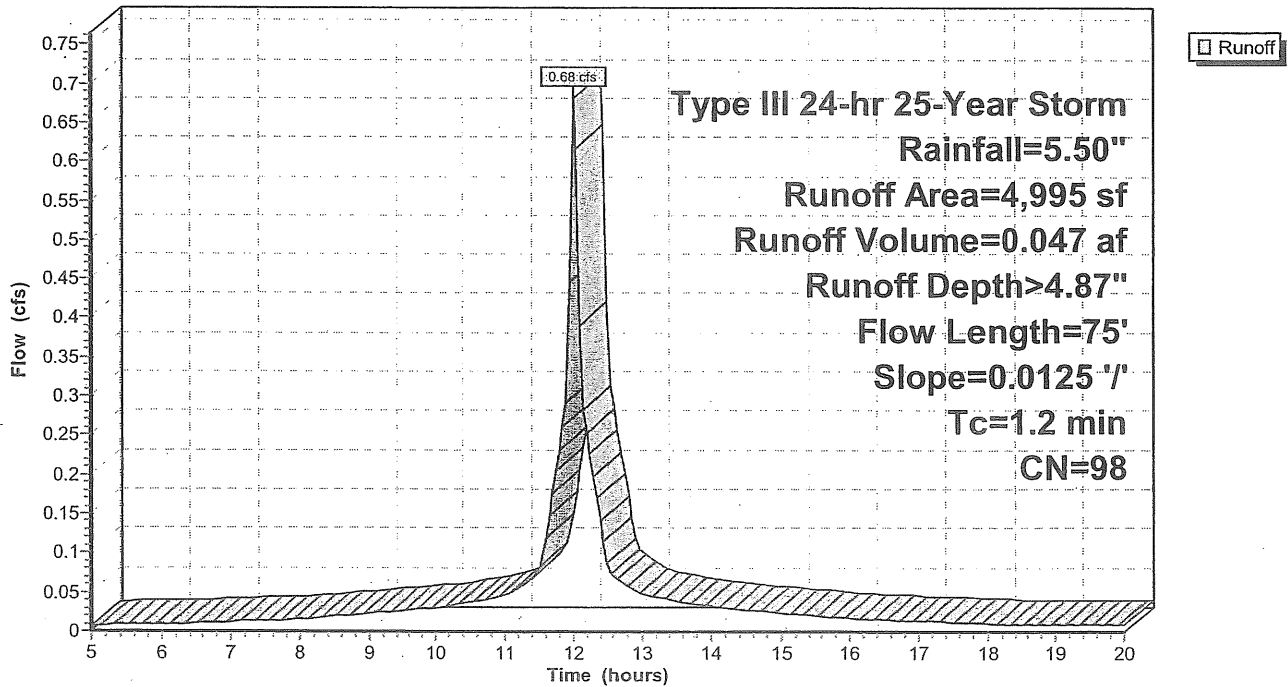
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

## Subcatchment 5CP: Plaza

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 5BP: East Half of Complex**

Runoff = 4.65 cfs @ 12.09 hrs, Volume= 0.359 af, Depth> 4.87"

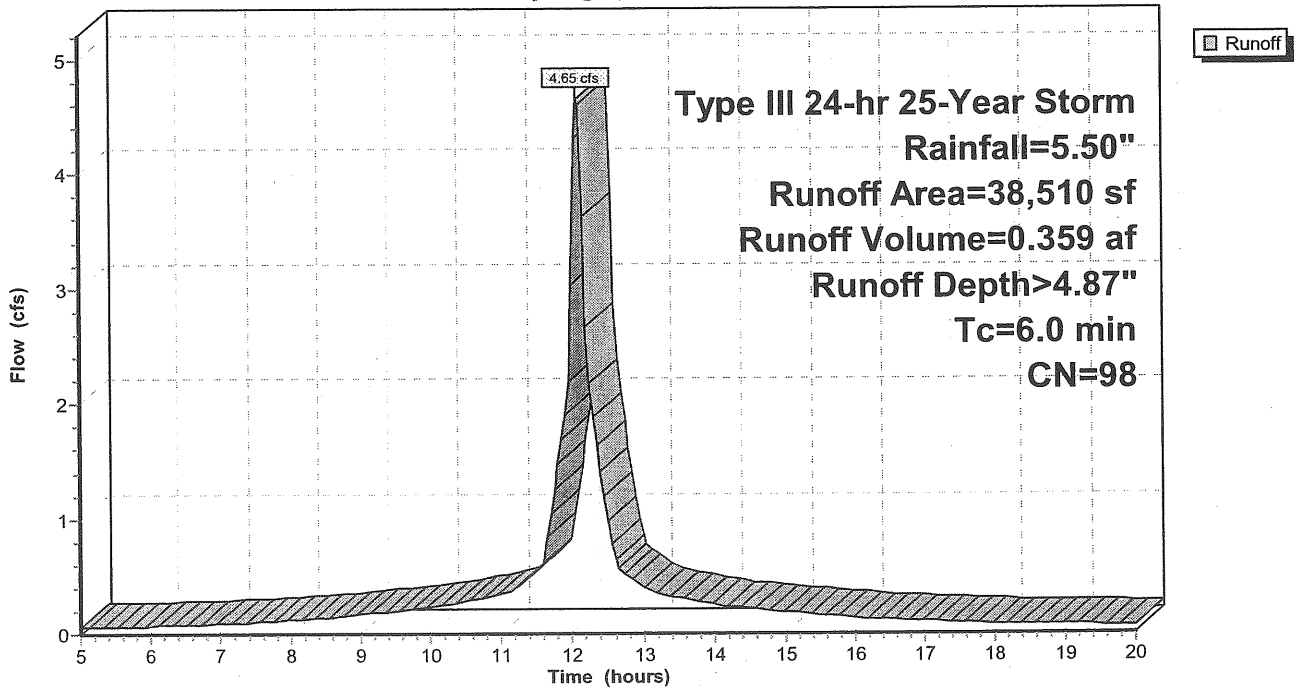
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

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

**Subcatchment 5BP: East Half of Complex**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 5AP: West Half of Complex**

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.134 af, Depth> 4.87"

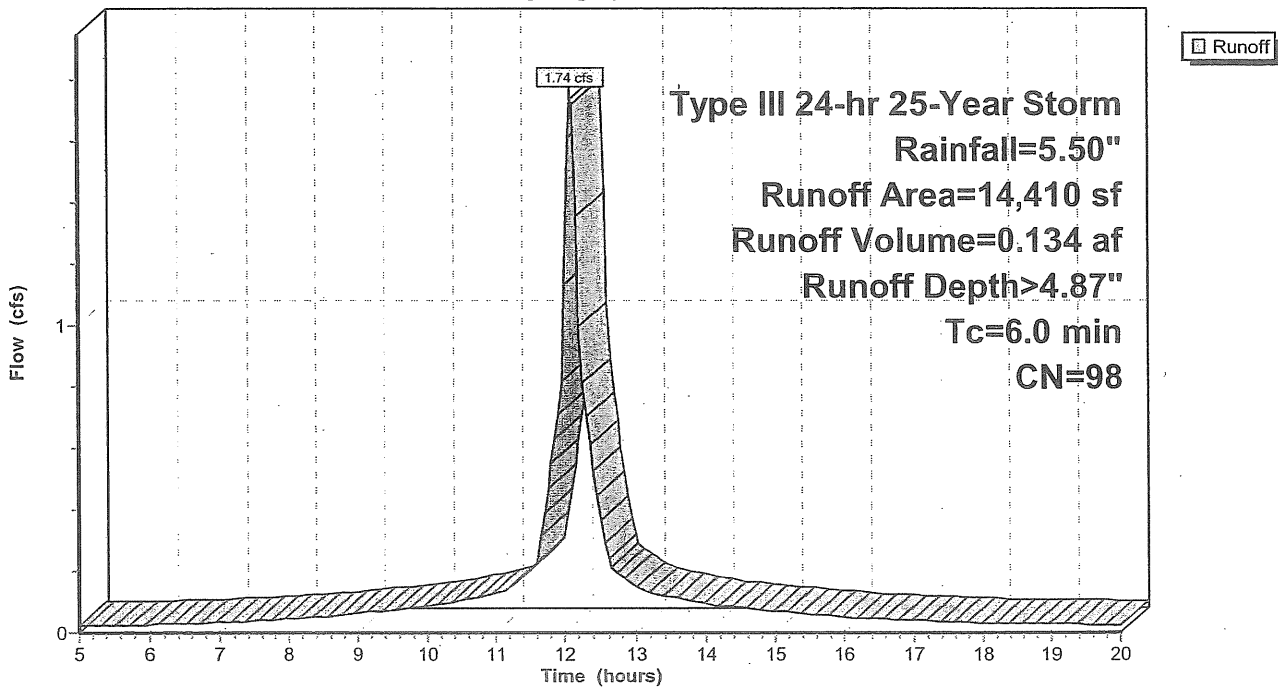
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

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

**Subcatchment 5AP: West Half of Complex**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 4P: Back of PS**

Runoff = 0.01 cfs @ 12.44 hrs, Volume= 0.002 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

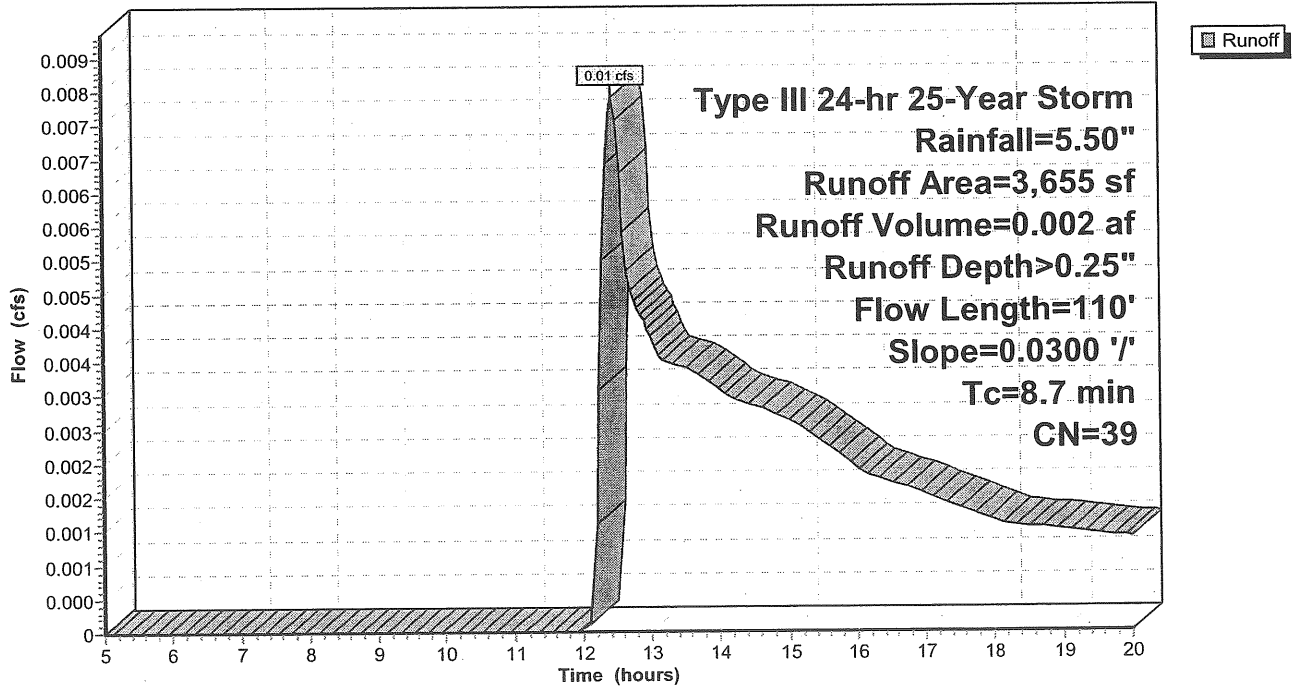
Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, AB</b> Grass: Short n=0.150 P2= 3.00"
0.1	10	0.0300	1.21		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

**Subcatchment 4P: Back of PS**

Hydrograph



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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 3P: Turner Barker**

Runoff = 1.14 cfs @ 12.06 hrs, Volume= 0.078 af, Depth> 4.43"

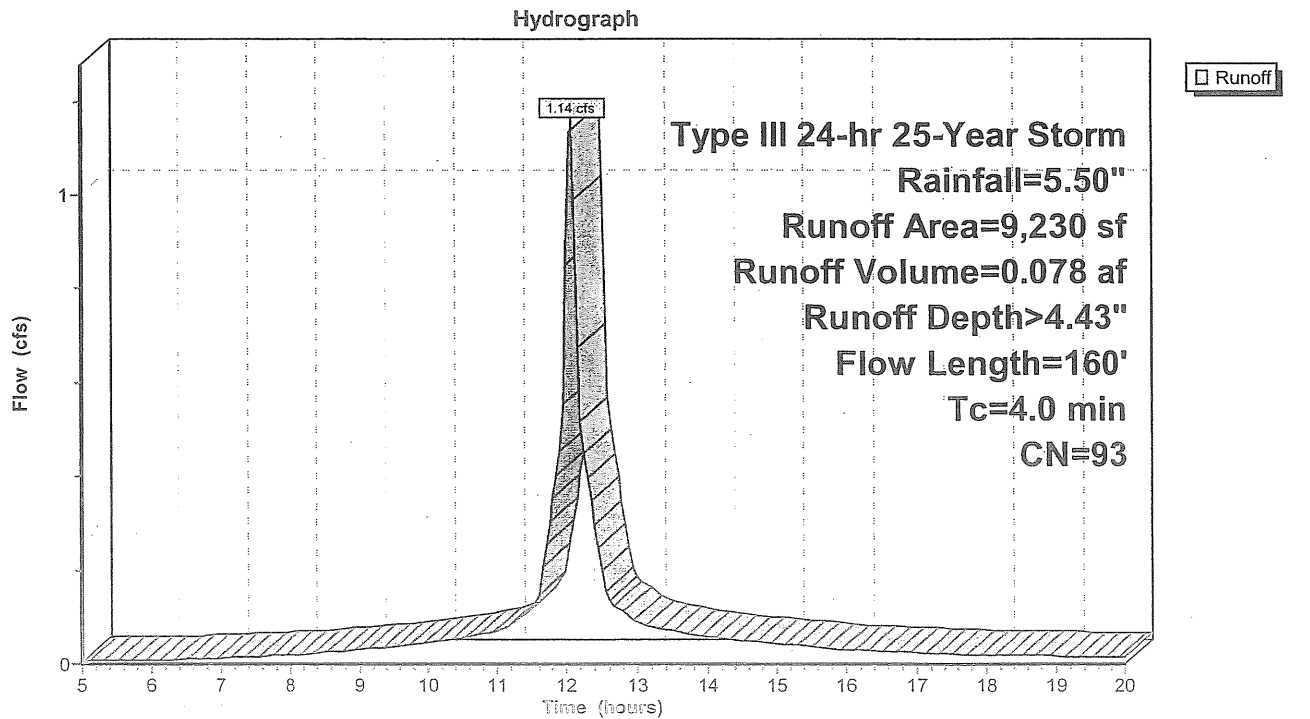
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	Circular Channel (pipe), CDE Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

**Subcatchment 3P: Turner Barker**



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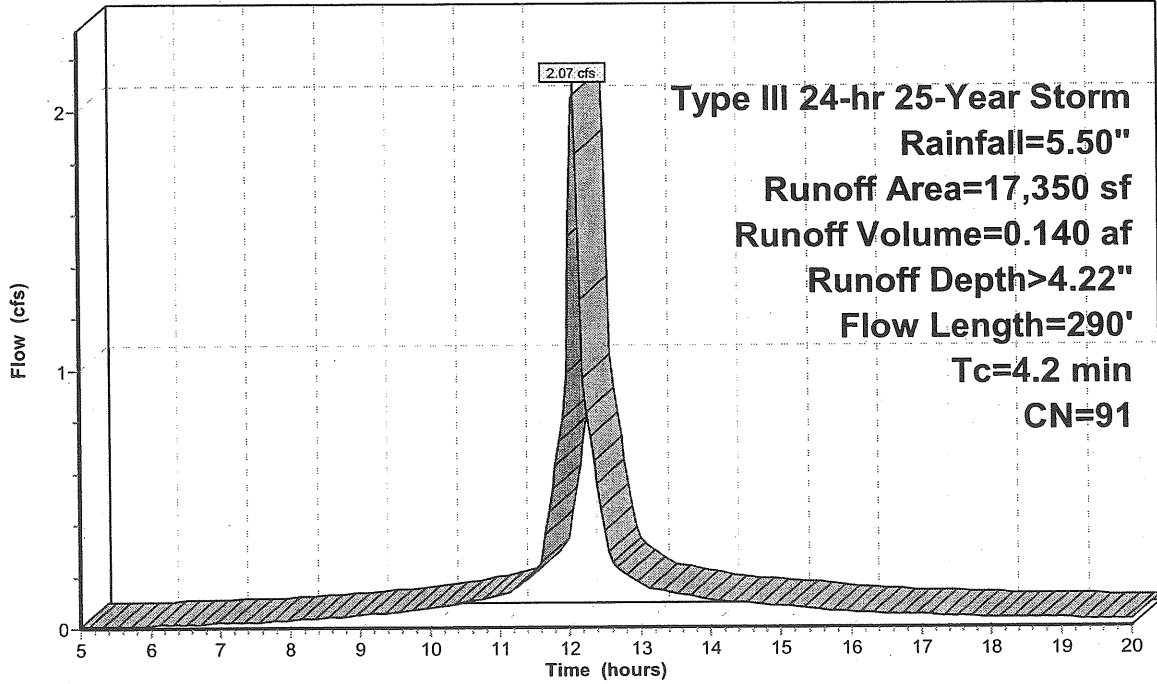
Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 2P: Office Building**

Hydrograph



**Post-Development-SC**

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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 2P: Office Building**

Runoff = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		<b>Shallow Concentrated Flow, DE</b> Paved Kv= 20.3 fps
4.2	290	Total			



**Post-Development-SC**

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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 1BP: Parking Garage**

Runoff = 4.10 cfs @ 12.09 hrs, Volume= 0.317 af, Depth> 4.87"

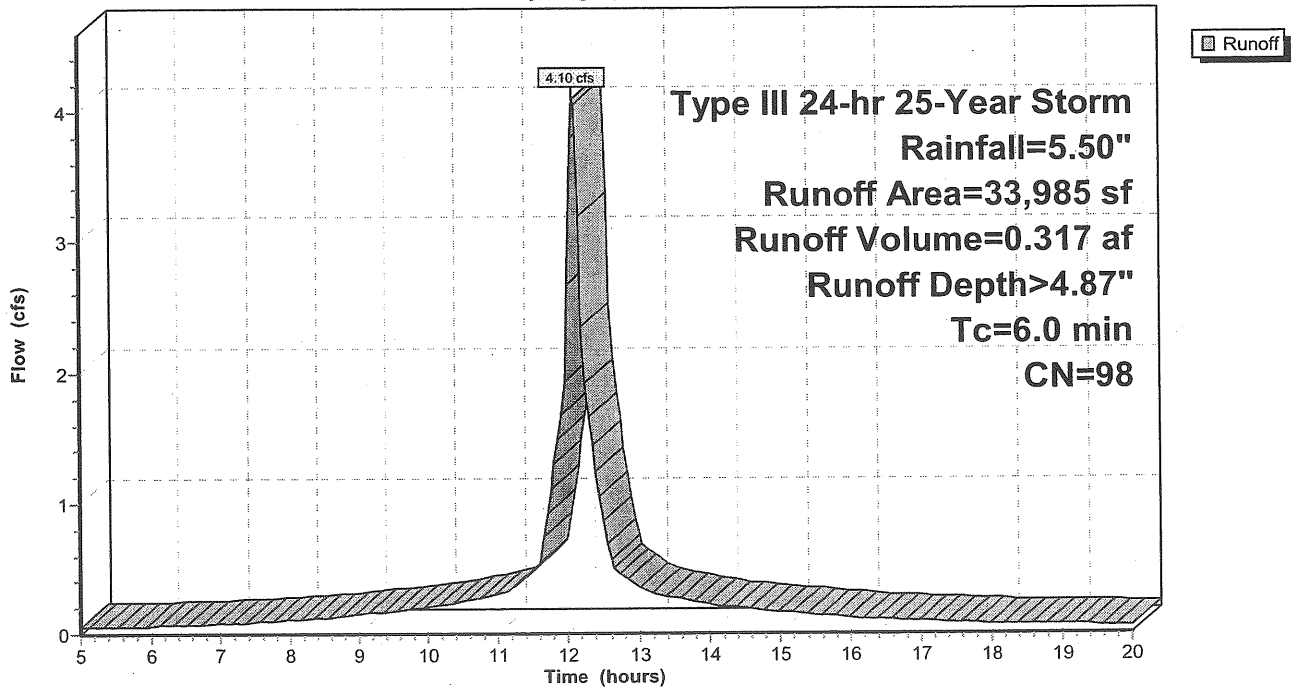
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

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

**Subcatchment 1BP: Parking Garage**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 1AP: Open Space**

Runoff = 0.29 cfs @ 12.11 hrs, Volume= 0.024 af, Depth> 0.92"

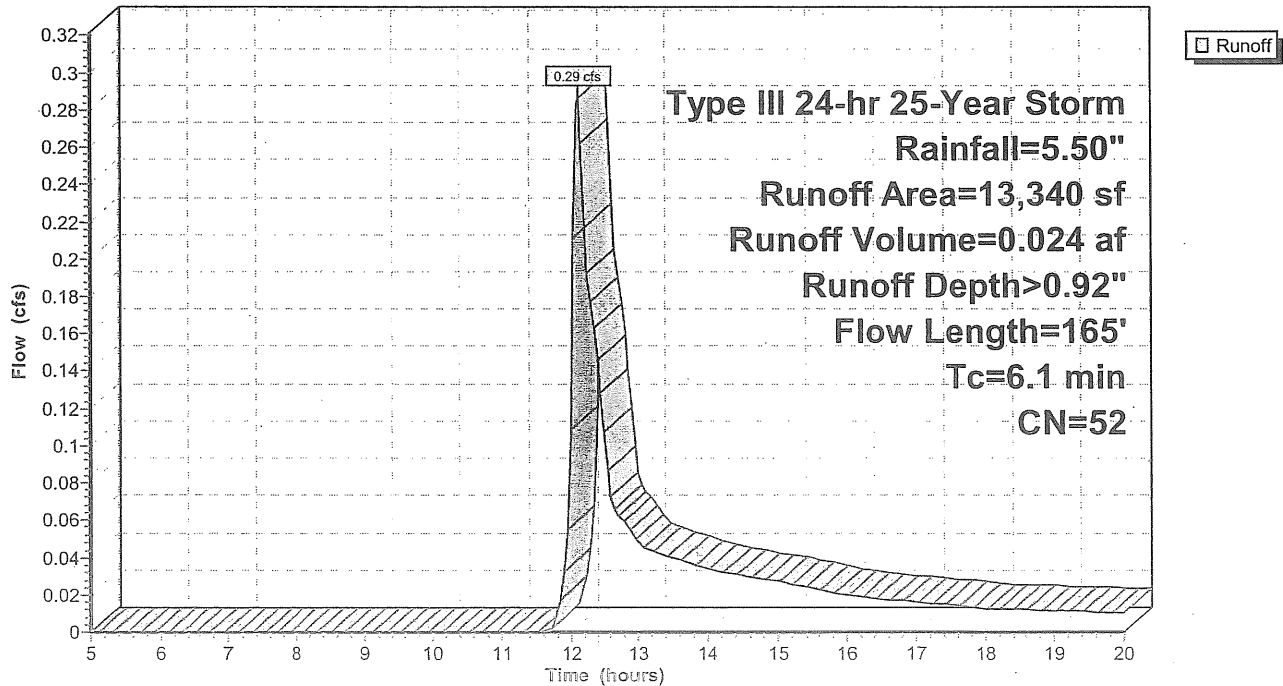
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		<b>Sheet Flow, BC</b> Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

**Subcatchment 1AP: Open Space**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D7: Hancock**

Peak Elev=8.91' Inflow=2.49 cfs 0.338 af  
30.0" x 36.0' Culvert Outflow=2.49 cfs 0.338 af

**Pond D8: Hancock Street Storm System**

Peak Elev=10.44' Inflow=2.49 cfs 0.338 af  
24.0" x 196.0' Culvert Outflow=2.49 cfs 0.338 af

**Pond UH1: Hancock Link DMH1**

Peak Elev=12.29' Inflow=2.49 cfs 0.338 af  
24.0" x 125.0' Culvert Outflow=2.49 cfs 0.338 af

**Pond UH2: Hancock Link DMH2**

Peak Elev=17.05' Inflow=2.49 cfs 0.338 af  
24.0" x 106.0' Culvert Outflow=2.49 cfs 0.338 af

**Total Runoff Area = 3.110 ac Runoff Volume = 1.101 af Average Runoff Depth = 4.25"**  
**12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac**

# Post-Development-SC

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Post-Development w/ StormChamber  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

## Subcatchment 1AP: Open Space

Runoff Area=13,340 sf Runoff Depth>0.92"  
Flow Length=165' Tc=6.1 min CN=52 Runoff=0.29 cfs 0.024 af

## Subcatchment 1BP: Parking Garage

Runoff Area=33,985 sf Runoff Depth>4.87"  
Tc=6.0 min CN=98 Runoff=4.10 cfs 0.317 af

## Subcatchment 2P: Office Building

Runoff Area=17,350 sf Runoff Depth>4.22"  
Flow Length=290' Tc=4.2 min CN=91 Runoff=2.07 cfs 0.140 af

## Subcatchment 3P: Turner Barker

Runoff Area=9,230 sf Runoff Depth>4.43"  
Flow Length=160' Tc=4.0 min CN=93 Runoff=1.14 cfs 0.078 af

## Subcatchment 4P: Back of PS

Runoff Area=3,655 sf Runoff Depth>0.25"  
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af

## Subcatchment 5AP: West Half of Complex

Runoff Area=14,410 sf Runoff Depth>4.87"  
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

## Subcatchment 5BP: East Half of Complex

Runoff Area=38,510 sf Runoff Depth>4.87"  
Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af

## Subcatchment 5CP: Plaza

Runoff Area=4,995 sf Runoff Depth>4.87"  
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af

## Reach CS: Combined Sewer

Inflow=2.07 cfs 0.140 af  
Outflow=2.07 cfs 0.140 af

## Reach FR: Fore River

Inflow=8.87 cfs 0.957 af  
Outflow=8.87 cfs 0.957 af

## Reach TOT: (new node)

Inflow=10.31 cfs 1.097 af  
Outflow=10.31 cfs 1.097 af

## Pond 1B: Subsurface Detention for Parking G Peak Elev=21.24' Storage=2,187 cf Inflow=4.10 cfs 0.317 af

Outflow=2.28 cfs 0.315 af

## Pond 5C: Subsurface Detention for Plaza Peak Elev=12.83' Storage=1,698 cf Inflow=6.84 cfs 0.540 af

Outflow=5.71 cfs 0.539 af

## Pond D2: Commercial Street Storm System

Peak Elev=9.41' Inflow=1.14 cfs 0.080 af  
15.0' x 192.0' Culvert Outflow=1.14 cfs 0.080 af

## Pond D3: Commercial

Peak Elev=9.02' Inflow=1.14 cfs 0.080 af  
15.0' x 192.0' Culvert Outflow=1.14 cfs 0.080 af

**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond UH2: Hancock Link DMH2**

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af  
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

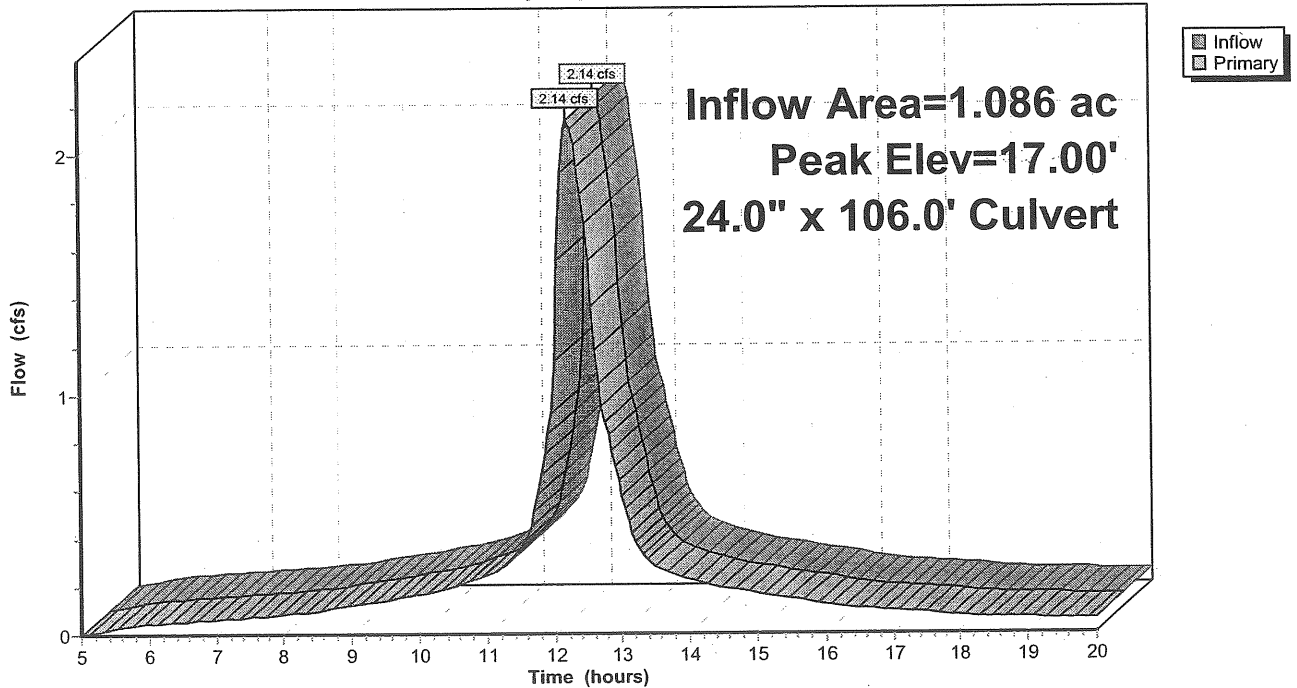
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 17.00' @ 12.20 hrs  
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	<b>24.0" x 106.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=17.00' TW=12.24' (Dynamic Tailwater)  
↑=Culvert (Inlet Controls 2.14 cfs @ 2.65 fps)

**Pond UH2: Hancock Link DMH2**

Hydrograph



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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond UH1: Hancock Link DMH1**

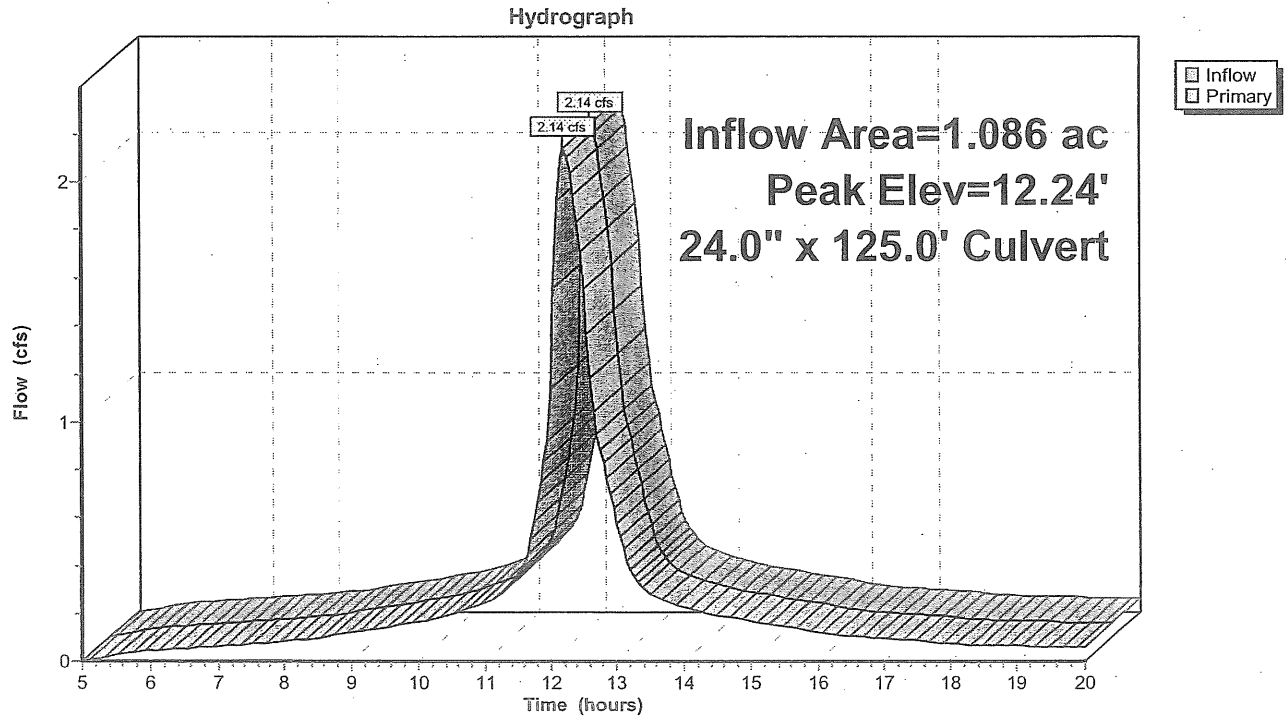
Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af  
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 12.24' @ 12.20 hrs  
Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	<b>24.0" x 125.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 '/' Cc= 0.900 n= 0.012

**Primary OutFlow** Max=2.14 cfs @ 12.20 hrs HW=12.24' TW=10.39' (Dynamic Tailwater)  
1=Culvert (Inlet Controls 2.14 cfs @ 2.65 fps)

**Pond UH1: Hancock Link DMH1**



# Post-Development-SC

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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Pond D8: Hancock Street Storm System

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af  
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 10.39' @ 12.20 hrs

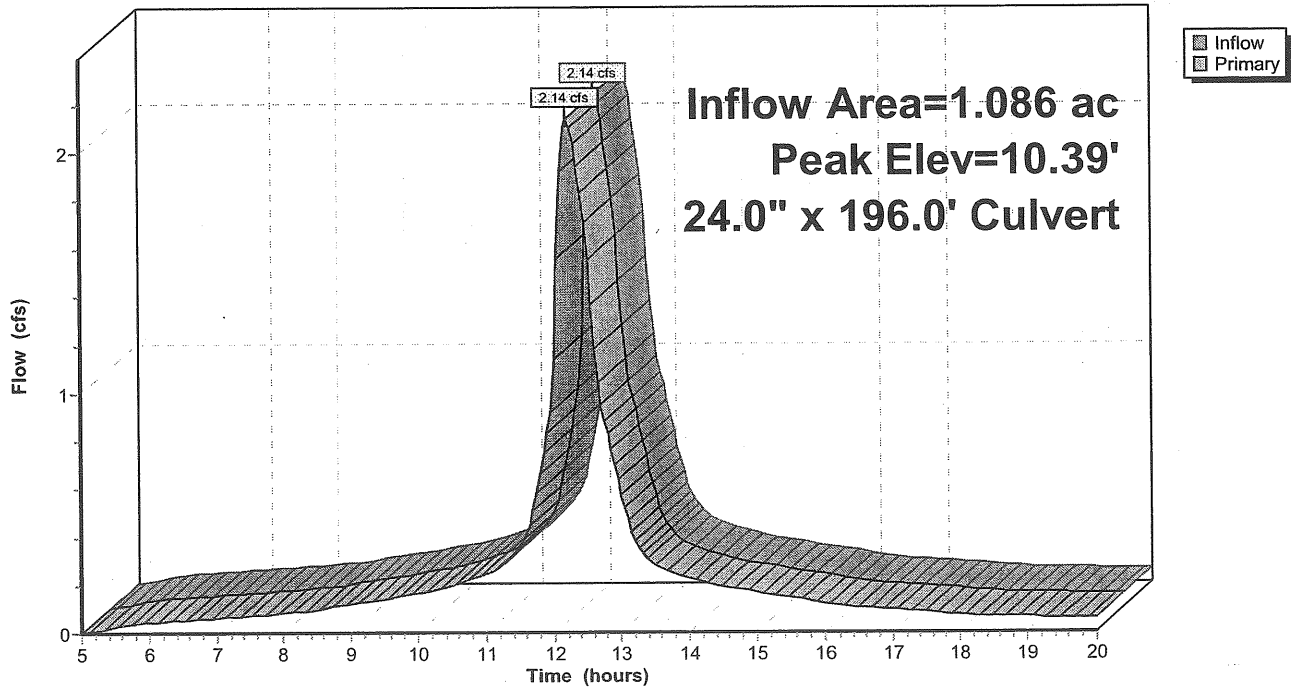
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=10.39' TW=8.85' (Dynamic Tailwater)  
↑ 1=Culvert (Inlet Controls 2.14 cfs @ 2.65 fps)

## Pond D8: Hancock Street Storm System

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Pond D7: Hancock

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af  
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.85' @ 12.20 hrs

Flood Elev= 13.91'

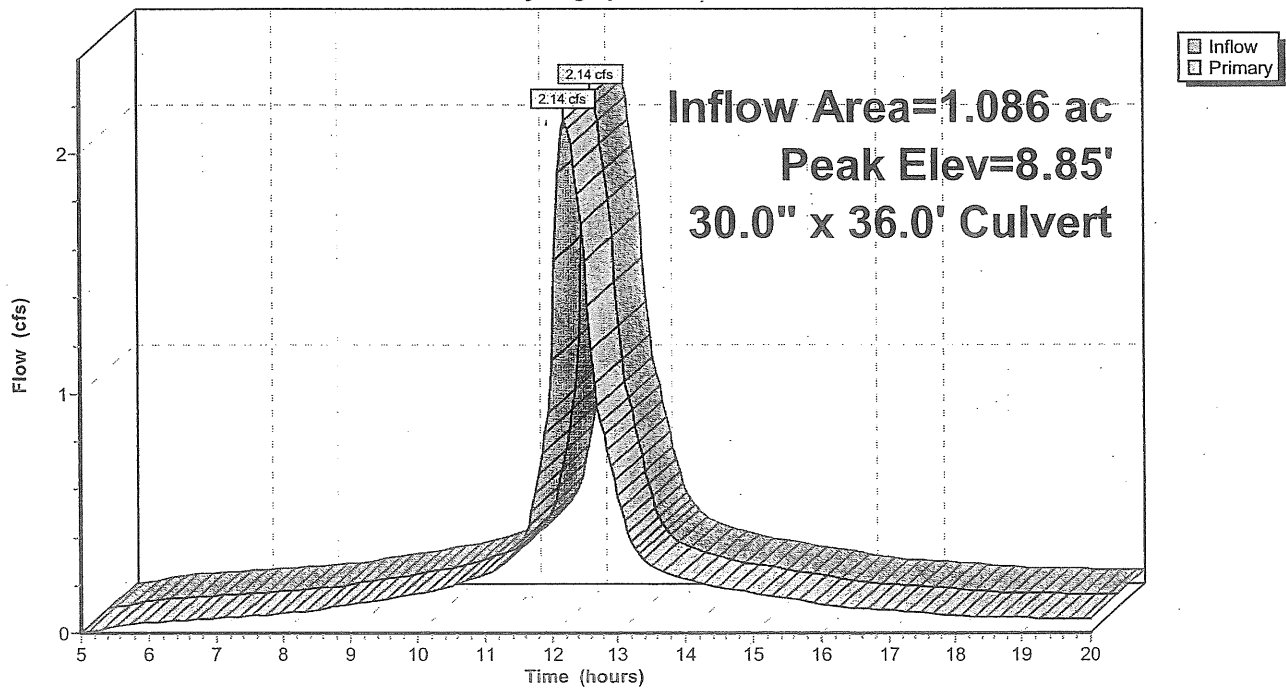
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 ' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=8.85' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 2.14 cfs @ 2.48 fps)

## Pond D7: Hancock

Hydrograph





**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D3: Commercial**

Inflow Area = 0.296 ac, Inflow Depth > 2.67" for 10-Year Storm event  
Inflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af  
Outflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af

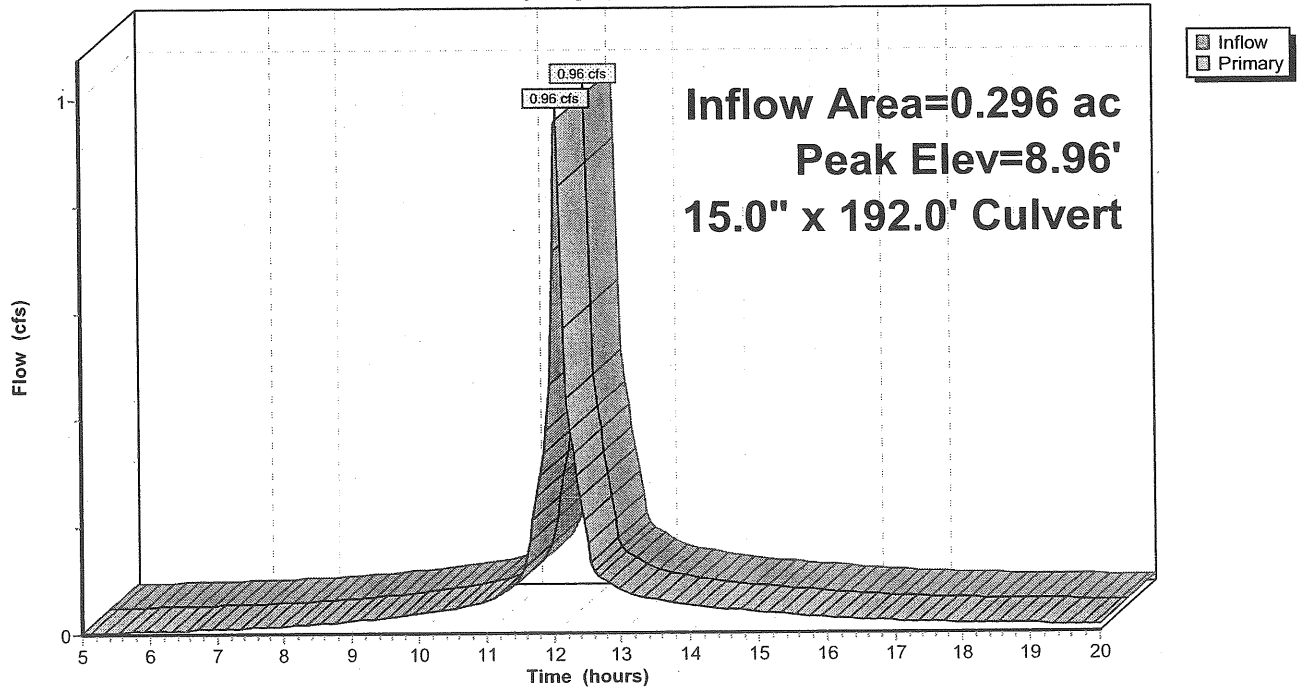
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 8.96' @ 12.06 hrs  
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=0.94 cfs @ 12.06 hrs HW=8.95' TW=0.00' (Dynamic Tailwater)  
1=Culvert (Barrel Controls 0.94 cfs @ 2.35 fps)

**Pond D3: Commercial**

Hydrograph



**Post-Development-SC**

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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D2: Commercial Street Storm System**

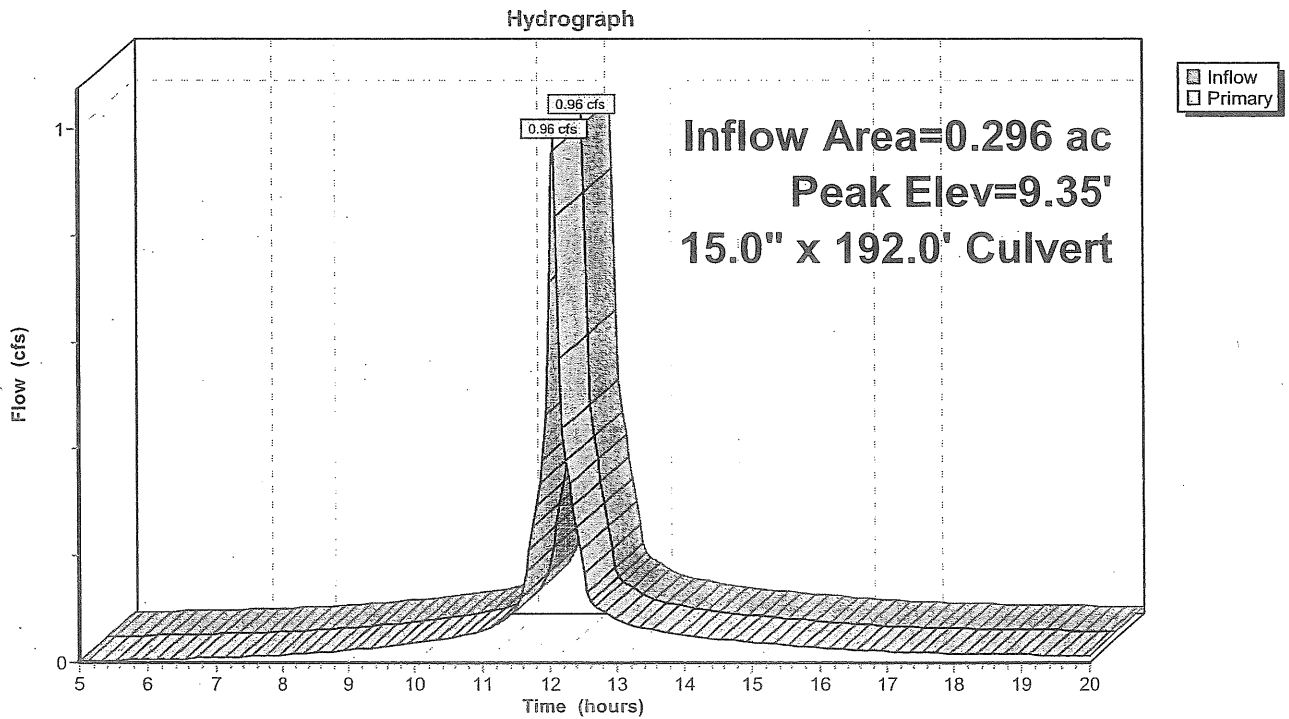
Inflow Area = 0.296 ac, Inflow Depth > 2.67" for 10-Year Storm event  
Inflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af  
Outflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 9.35' @ 12.07 hrs  
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=0.90 cfs @ 12.06 hrs HW=9.34' TW=8.95' (Dynamic Tailwater)  
↑1=Culvert (Outlet Controls 0.90 cfs @ 2.23 fps)

**Pond D2: Commercial Street Storm System**



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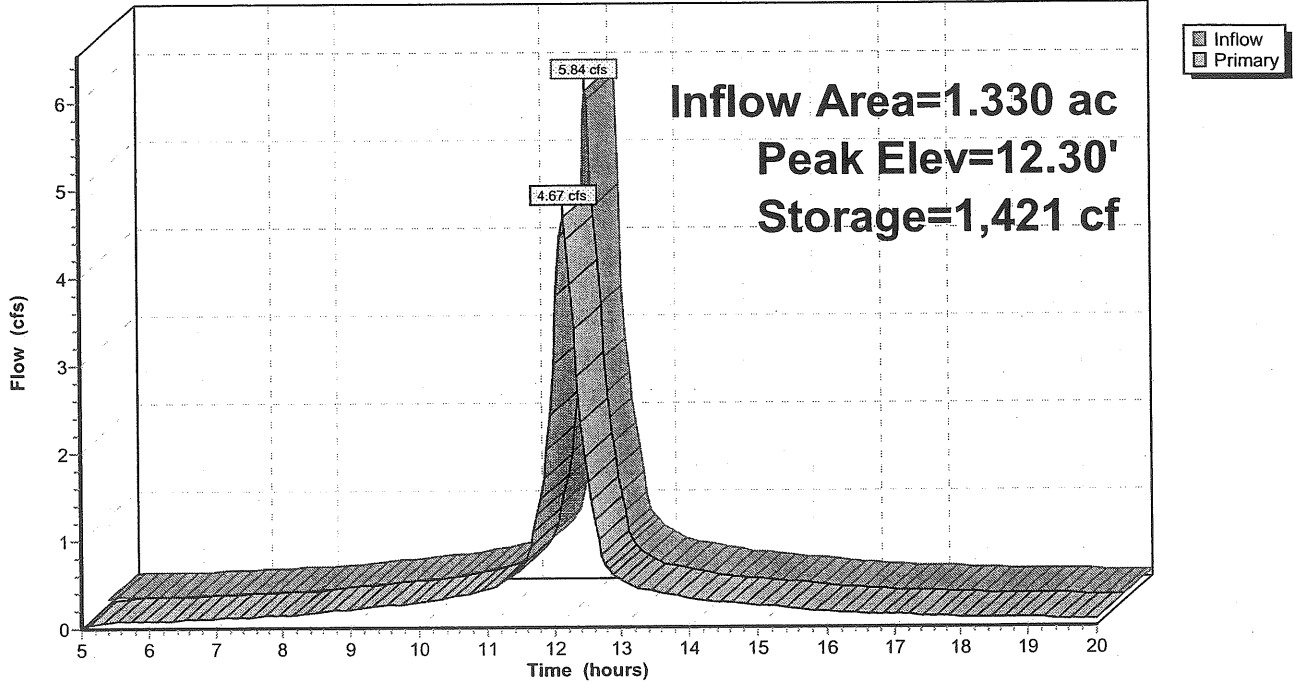
Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond 5C: Subsurface Detention for Plaza**

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond 5C: Subsurface Detention for Plaza**

Inflow Area = 1.330 ac, Inflow Depth > 4.15" for 10-Year Storm event  
 Inflow = 5.84 cfs @ 12.08 hrs, Volume= 0.459 af  
 Outflow = 4.67 cfs @ 12.15 hrs, Volume= 0.458 af, Atten= 20%, Lag= 4.1 min  
 Primary = 4.67 cfs @ 12.15 hrs, Volume= 0.458 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 12.30' @ 12.15 hrs Surf.Area= 835 sf Storage= 1,421 cf

Plug-Flow detention time= 5.8 min calculated for 0.456 af (99% of inflow)  
 Center-of-Mass det. time= 4.3 min ( 739.5 - 735.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	1,086 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 3,758 cf Overall - 1,044 cf Embedded = 2,714 cf x 40.0% Voids
#2	10.50'	1,044 cf	<b>58.4"W x 34.8"H x 7.60'L StormChamber</b> x 14 Inside #1
		2,129 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	835	0	0
14.00	835	3,758	3,758

Device	Routing	Invert	Outlet Devices
#1	Primary	9.50'	<b>12.0" x 50.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.00' S= 0.0100 '/' Cc= 0.900 n= 0.011
#2	Device 1	9.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	10.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	12.50'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=4.66 cfs @ 12.15 hrs HW=12.29' TW=0.00' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 4.66 cfs of 5.72 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 2.63 cfs @ 7.55 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 2.03 cfs @ 5.81 fps)
- ↑ 4=Orifice/Grate ( Controls 0.00 cfs)

**Post-Development-SC**

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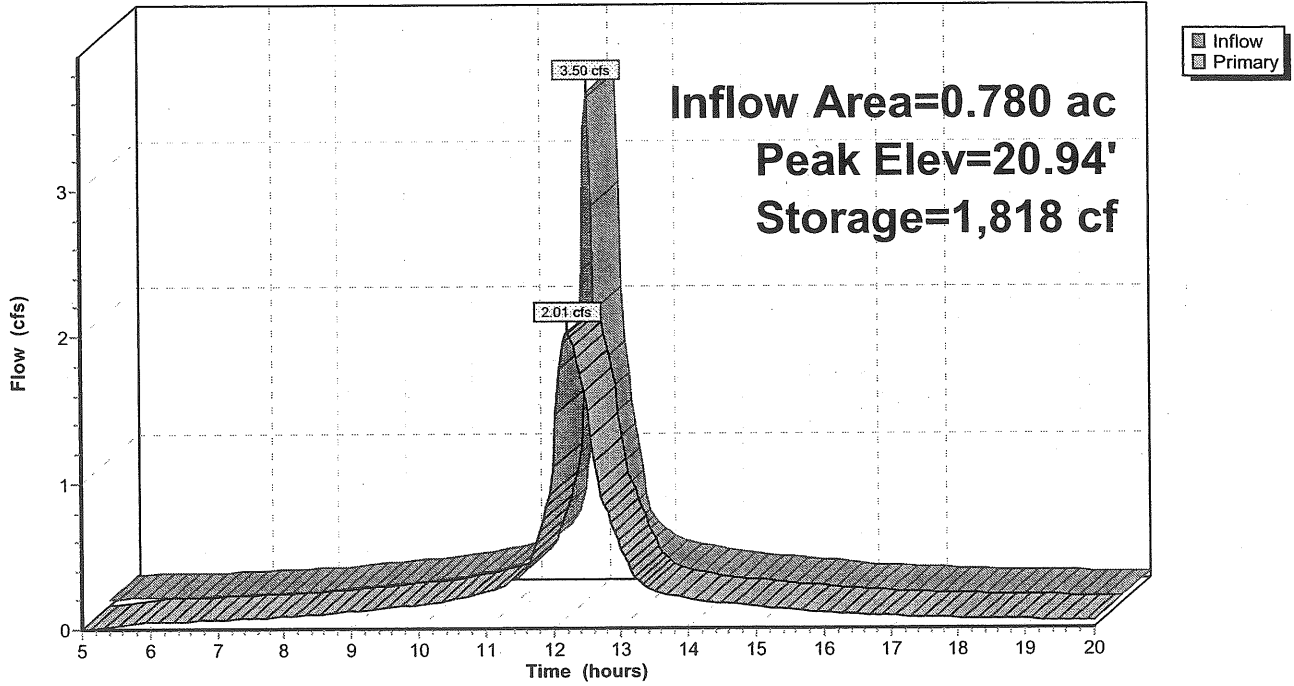
Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond 1B: Subsurface Detention for Parking Garage**

Hydrograph



**Post-Development-SC**

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Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond 1B: Subsurface Detention for Parking Garage**

Inflow Area = 0.780 ac, Inflow Depth > 4.15" for 10-Year Storm event  
 Inflow = 3.50 cfs @ 12.09 hrs, Volume= 0.270 af  
 Outflow = 2.01 cfs @ 12.21 hrs, Volume= 0.268 af, Atten= 42%, Lag= 7.4 min  
 Primary = 2.01 cfs @ 12.21 hrs, Volume= 0.268 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 20.94' @ 12.21 hrs Surf.Area= 1,590 sf Storage= 1,818 cf

Plug-Flow detention time= 15.9 min calculated for 0.268 af (99% of inflow)  
 Center-of-Mass det. time= 12.4 min ( 747.9 - 735.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	1,967 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc)</b> 7,155 cf Overall - 2,236 cf Embedded = 4,919 cf x 40.0% Voids
#2	20.00'	2,236 cf	<b>58.4"W x 34.8"H x 7.60'L StormChamber x 30 Inside #1</b>
		4,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,590	0	0
23.50	1,590	7,155	7,155

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	<b>12.0" x 150.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 18.00' S= 0.0067 '/' Cc= 0.900 n= 0.011
#2	Device 1	20.00'	<b>6.0" Vert. Orifice/Grate C= 0.600</b>
#3	Device 1	19.00'	<b>6.0" Vert. Orifice/Grate C= 0.600</b>
#4	Device 1	22.00'	<b>12.0" Vert. Orifice/Grate C= 0.600</b>

**Primary OutFlow** Max=2.01 cfs @ 12.21 hrs HW=20.93' TW=17.00' (Dynamic Tailwater)

- 1=Culvert (Passes 2.01 cfs of 3.97 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.78 cfs @ 3.98 fps)
- 3=Orifice/Grate (Orifice Controls 1.23 cfs @ 6.24 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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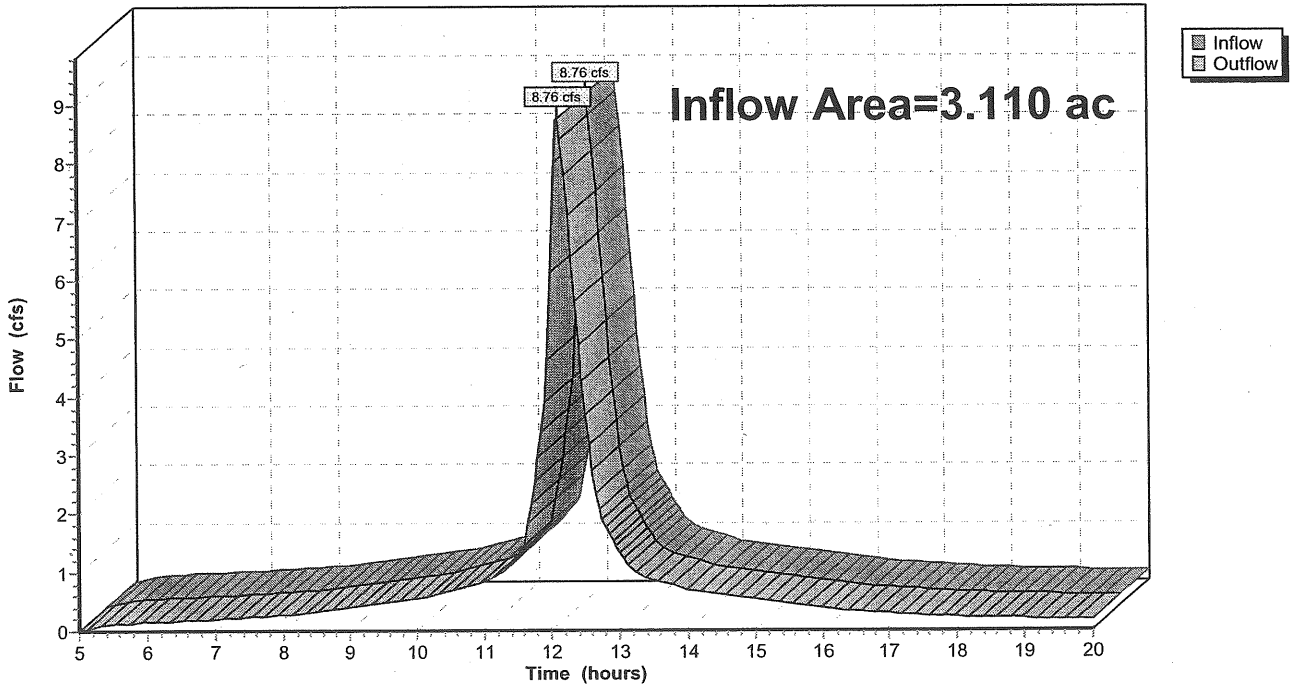
**Reach TOT: (new node)**

Inflow Area = 3.110 ac, Inflow Depth > 3.56" for 10-Year Storm event  
Inflow = 8.76 cfs @ 12.11 hrs, Volume= 0.923 af  
Outflow = 8.76 cfs @ 12.11 hrs, Volume= 0.923 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach TOT: (new node)**

Hydrograph



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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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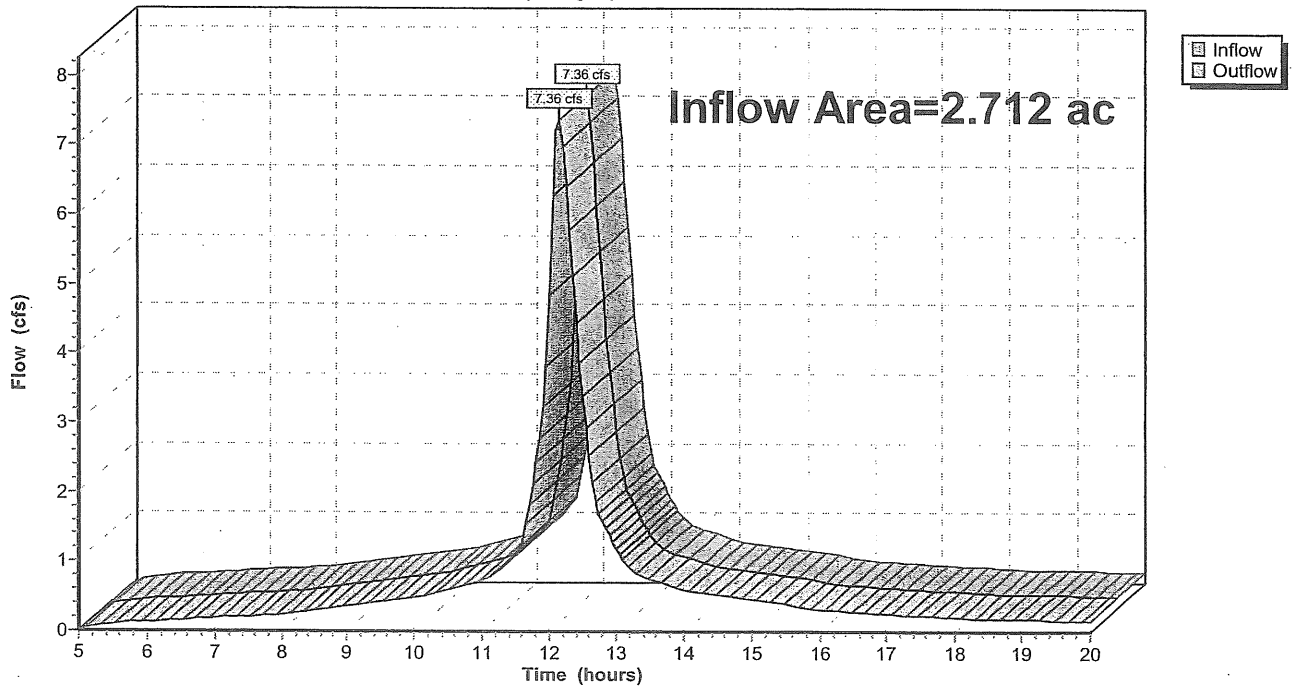
**Reach FR: Fore River**

Inflow Area = 2.712 ac, Inflow Depth > 3.57" for 10-Year Storm event  
Inflow = 7.36 cfs @ 12.14 hrs, Volume= 0.807 af  
Outflow = 7.36 cfs @ 12.14 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach FR: Fore River**

Hydrograph





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Type III 24-hr 10-Year Storm Rainfall=4.70"

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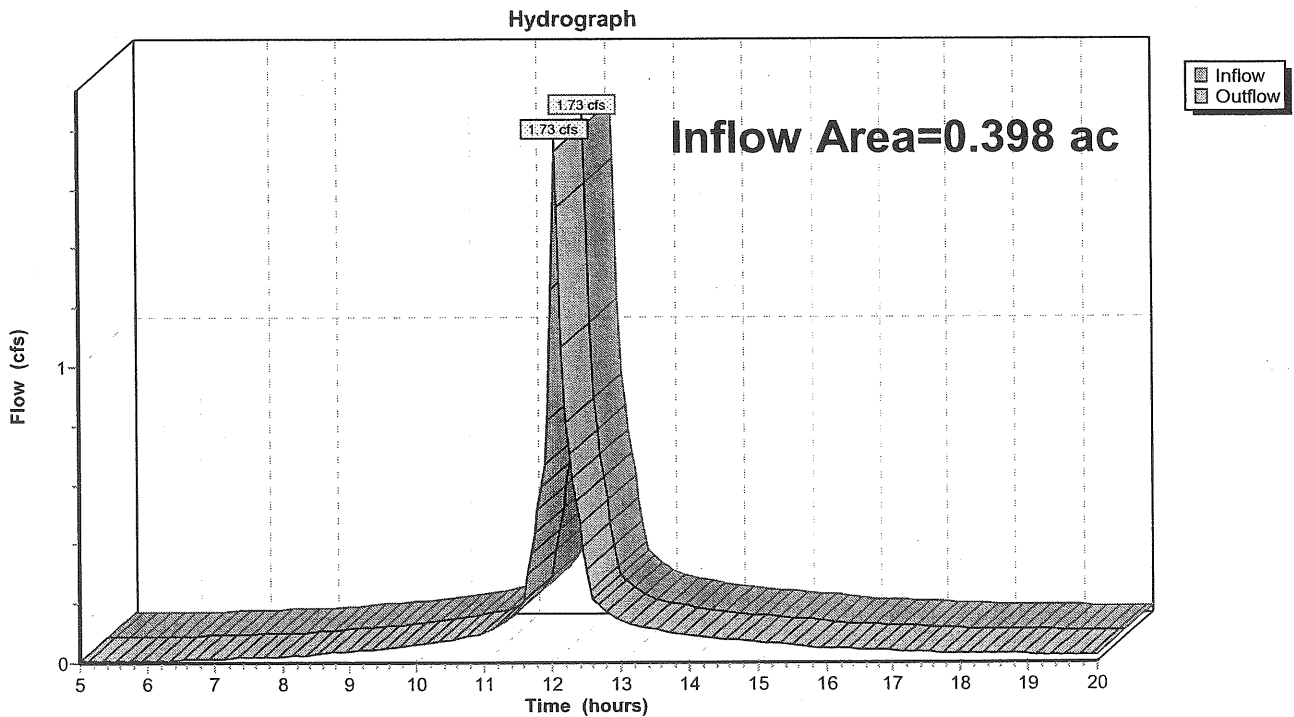
11/3/2006

**Reach CS: Combined Sewer**

Inflow Area = 0.398 ac, Inflow Depth > 3.49" for 10-Year Storm event  
Inflow = 1.73 cfs @ 12.06 hrs, Volume= 0.116 af  
Outflow = 1.73 cfs @ 12.06 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach CS: Combined Sewer**



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Subcatchment 5CP: Plaza

Runoff = 0.58 cfs @ 12.02 hrs, Volume= 0.040 af, Depth> 4.15"

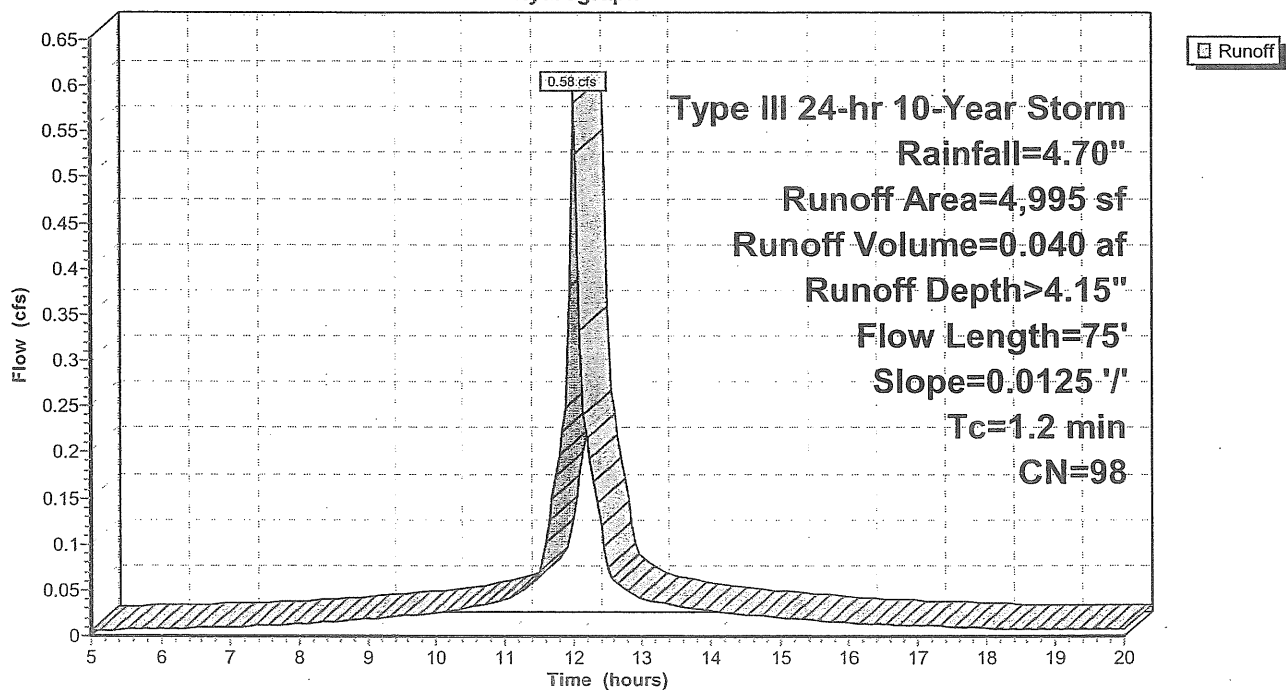
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

## Subcatchment 5CP: Plaza

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 5BP: East Half of Complex**

Runoff = 3.97 cfs @ 12.09 hrs, Volume= 0.305 af, Depth> 4.15"

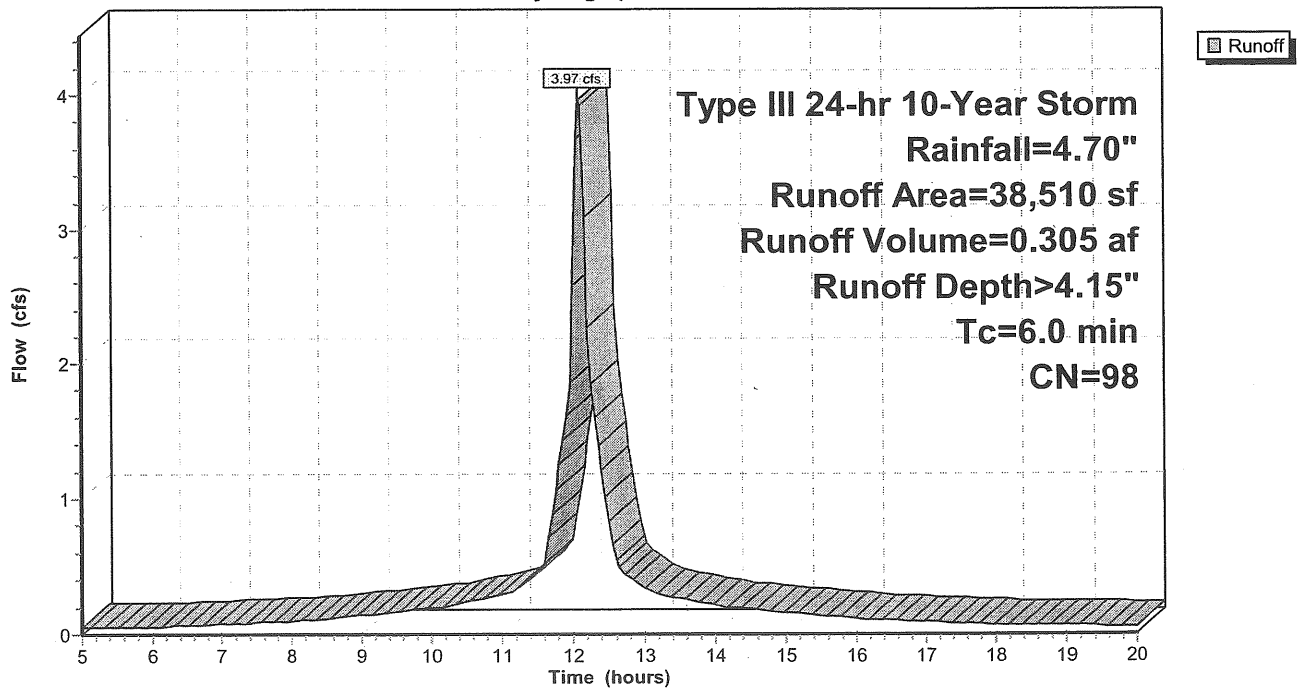
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

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

**Subcatchment 5BP: East Half of Complex**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 5AP: West Half of Complex**

Runoff = 1.48 cfs @ 12.09 hrs, Volume= 0.114 af, Depth> 4.15"

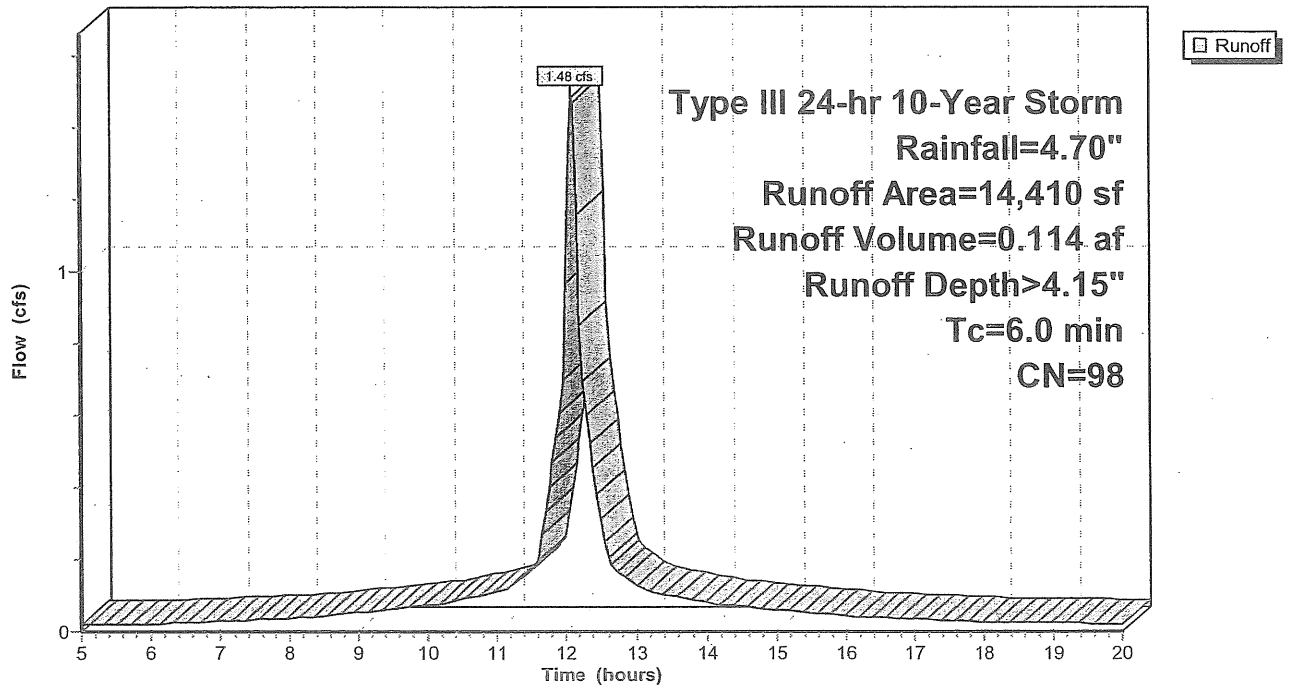
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

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

**Subcatchment 5AP: West Half of Complex**

Hydrograph



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Post-Development w/ StormChamber  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 4P: Back of PS**

Runoff = 0.00 cfs @ 13.81 hrs, Volume= 0.001 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

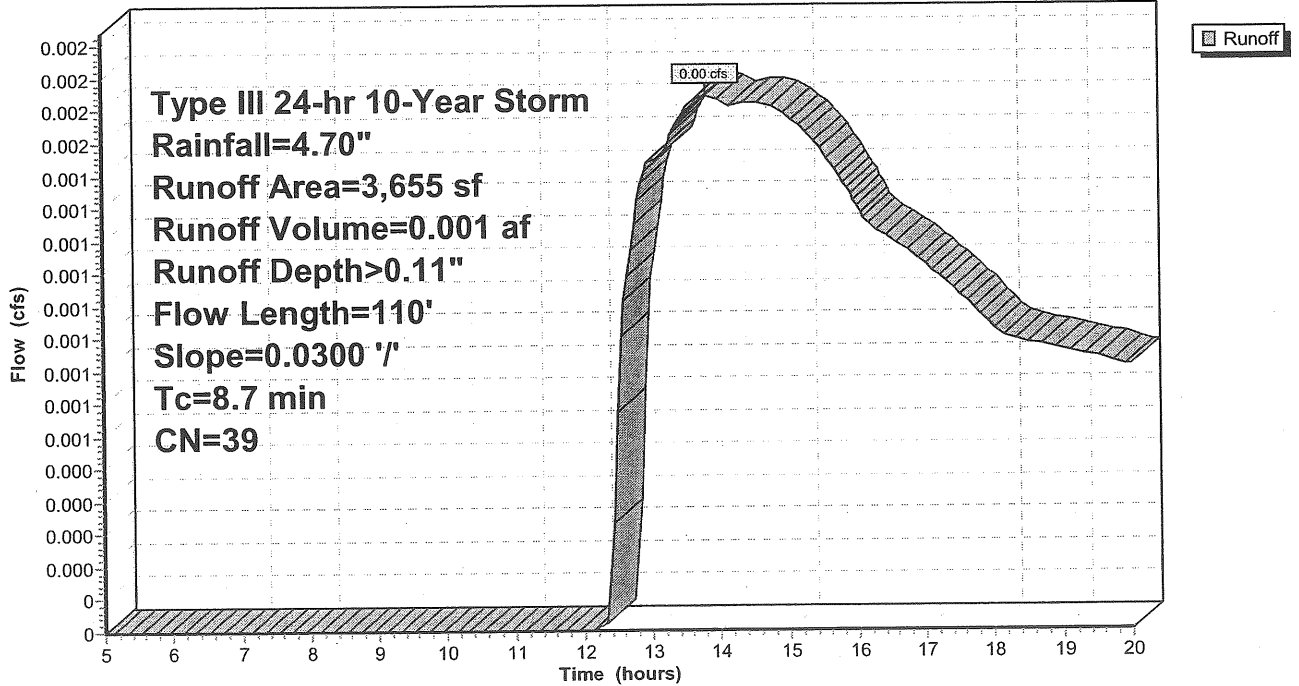
Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
0.1	10	0.0300	1.21		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

**Subcatchment 4P: Back of PS**

Hydrograph



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 Type III 24-hr 10-Year Storm Rainfall=4.70"

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 11/3/2006

**Subcatchment 3P: Turner Barker**

Runoff = 0.96 cfs @ 12.06 hrs, Volume= 0.065 af, Depth> 3.69"

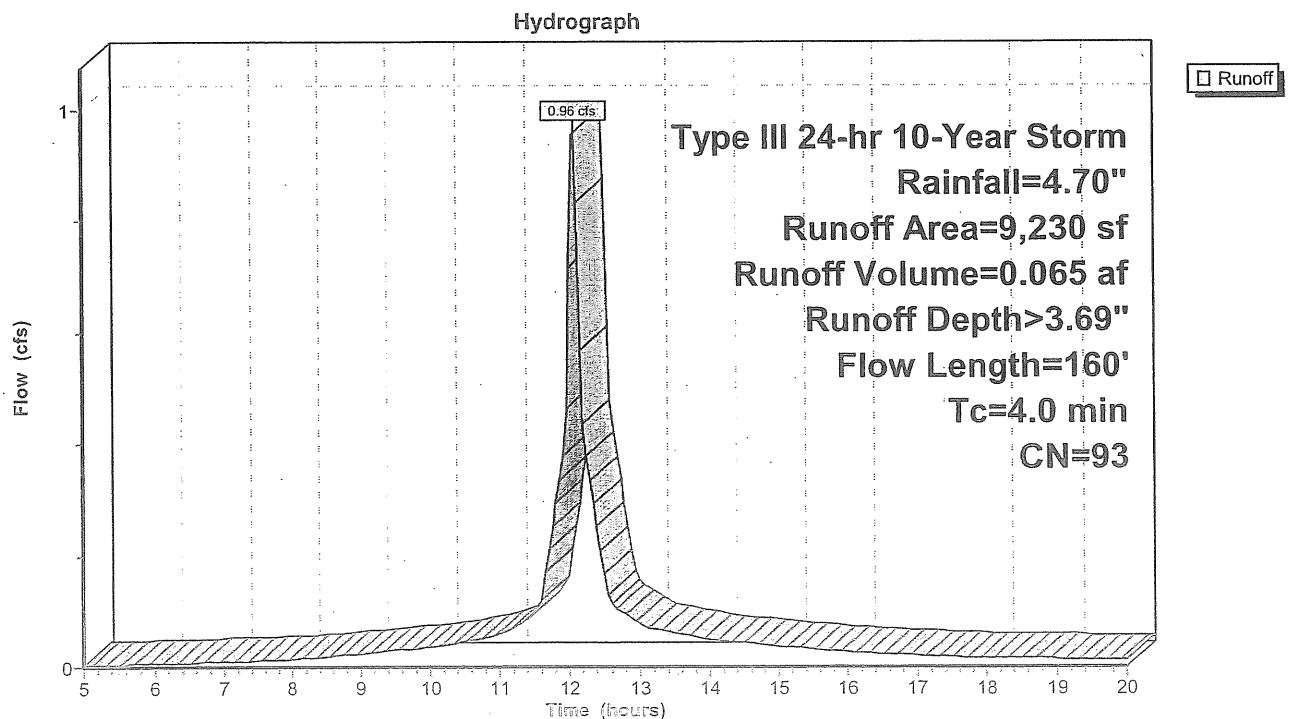
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	Circular Channel (pipe), CDE Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

**Subcatchment 3P: Turner Barker**



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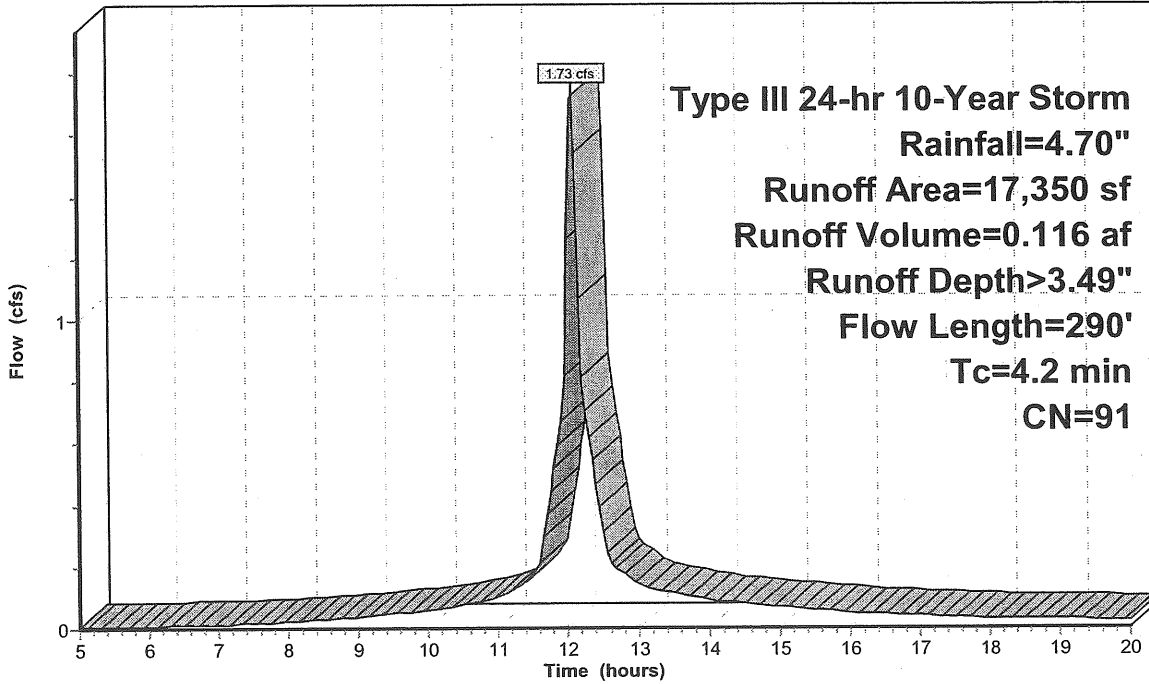
Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 2P: Office Building**

Hydrograph



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Post-Development w/ StormChamber  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 2P: Office Building**

Runoff = 1.73 cfs @ 12.06 hrs, Volume= 0.116 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		<b>Shallow Concentrated Flow, DE</b> Paved Kv= 20.3 fps
4.2	290	Total			



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Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Subcatchment 1BP: Parking Garage

Runoff = 3.50 cfs @ 12.09 hrs, Volume= 0.270 af, Depth> 4.15"

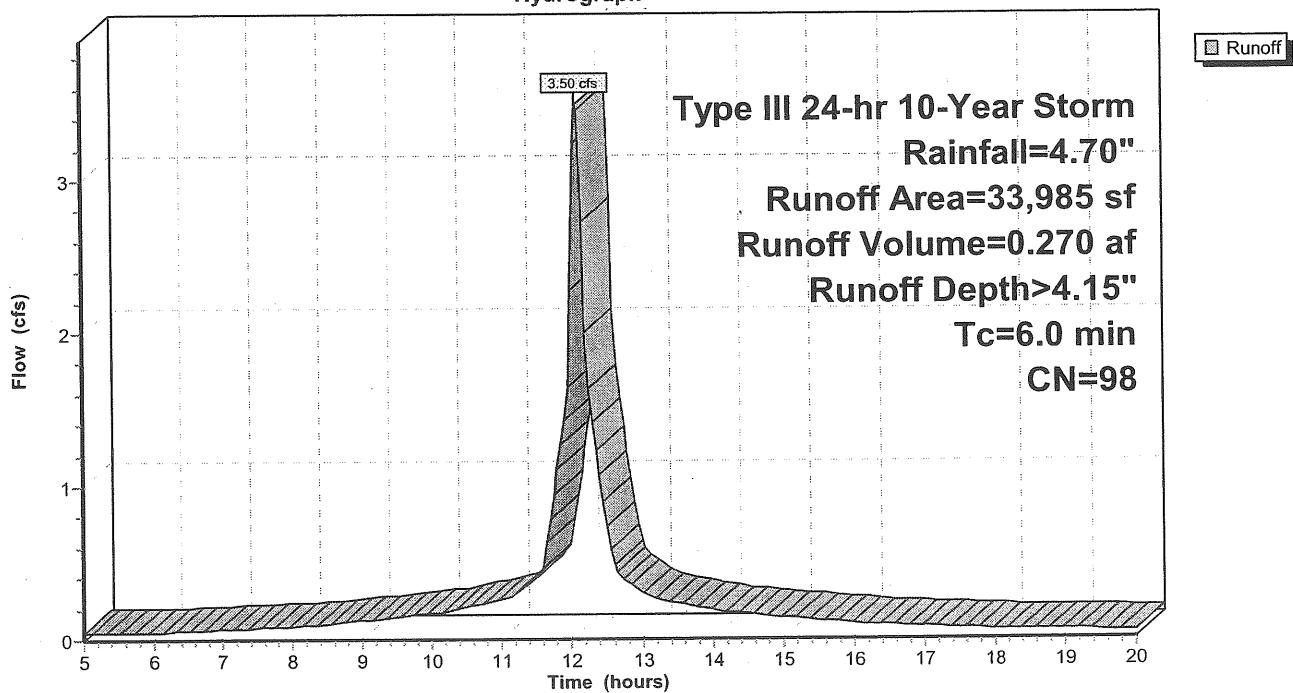
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

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

## Subcatchment 1BP: Parking Garage

Hydrograph



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 Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Subcatchment 1AP: Open Space**

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 0.59"

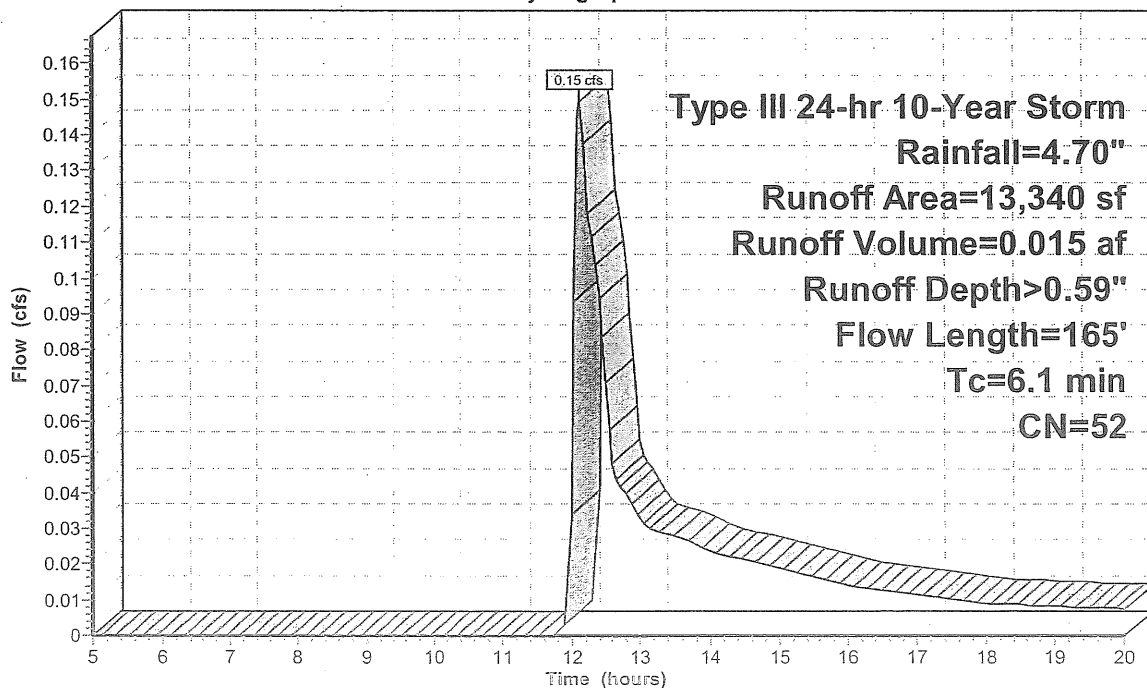
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		<b>Sheet Flow, BC</b> Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

**Subcatchment 1AP: Open Space**

Hydrograph



Runoff

**Type III 24-hr 10-Year Storm**  
**Rainfall=4.70"**  
**Runoff Area=13,340 sf**  
**Runoff Volume=0.015 af**  
**Runoff Depth>0.59"**  
**Flow Length=165'**  
**Tc=6.1 min**  
**CN=52**

**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond D7: Hancock**

Peak Elev=8.85' Inflow=2.14 cfs 0.283 af  
30.0" x 36.0' Culvert Outflow=2.14 cfs 0.283 af

**Pond D8: Hancock Street Storm System**

Peak Elev=10.39' Inflow=2.14 cfs 0.283 af  
24.0" x 196.0' Culvert Outflow=2.14 cfs 0.283 af

**Pond UH1: Hancock Link DMH1**

Peak Elev=12.24' Inflow=2.14 cfs 0.283 af  
24.0" x 125.0' Culvert Outflow=2.14 cfs 0.283 af

**Pond UH2: Hancock Link DMH2**

Peak Elev=17.00' Inflow=2.14 cfs 0.283 af  
24.0" x 106.0' Culvert Outflow=2.14 cfs 0.283 af

**Total Runoff Area = 3.110 ac Runoff Volume = 0.926 af Average Runoff Depth = 3.57"**  
**12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac**

**Post-Development-SC**

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Type III 24-hr 10-Year Storm Rainfall=4.70"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1AP: Open Space</b>	Runoff Area=13,340 sf	Runoff Depth>0.59"
Flow Length=165'	Tc=6.1 min	CN=52
	Runoff=0.15 cfs	0.015 af
<b>Subcatchment 1BP: Parking Garage</b>	Runoff Area=33,985 sf	Runoff Depth>4.15"
	Tc=6.0 min	CN=98
	Runoff=3.50 cfs	0.270 af
<b>Subcatchment 2P: Office Building</b>	Runoff Area=17,350 sf	Runoff Depth>3.49"
Flow Length=290'	Tc=4.2 min	CN=91
	Runoff=1.73 cfs	0.116 af
<b>Subcatchment 3P: Turner Barker</b>	Runoff Area=9,230 sf	Runoff Depth>3.69"
Flow Length=160'	Tc=4.0 min	CN=93
	Runoff=0.96 cfs	0.065 af
<b>Subcatchment 4P: Back of PS</b>	Runoff Area=3,655 sf	Runoff Depth>0.11"
Flow Length=110'	Slope=0.0300 '/'	Tc=8.7 min
	CN=39	Runoff=0.00 cfs
		0.001 af
<b>Subcatchment 5AP: West Half of Complex</b>	Runoff Area=14,410 sf	Runoff Depth>4.15"
	Tc=6.0 min	CN=98
	Runoff=1.48 cfs	0.114 af
<b>Subcatchment 5BP: East Half of Complex</b>	Runoff Area=38,510 sf	Runoff Depth>4.15"
	Tc=6.0 min	CN=98
	Runoff=3.97 cfs	0.305 af
<b>Subcatchment 5CP: Plaza</b>	Runoff Area=4,995 sf	Runoff Depth>4.15"
Flow Length=75'	Slope=0.0125 '/'	Tc=1.2 min
	CN=98	Runoff=0.58 cfs
		0.040 af
<b>Reach CS: Combined Sewer</b>	Inflow=1.73 cfs	0.116 af
	Outflow=1.73 cfs	0.116 af
<b>Reach FR: Fore River</b>	Inflow=7.36 cfs	0.807 af
	Outflow=7.36 cfs	0.807 af
<b>Reach TOT: (new node)</b>	Inflow=8.76 cfs	0.923 af
	Outflow=8.76 cfs	0.923 af
<b>Pond 1B: Subsurface Detention for Parking G</b>	Peak Elev=20.94'	Storage=1,818 cf
	Inflow=3.50 cfs	0.270 af
	Outflow=2.01 cfs	0.268 af
<b>Pond 5C: Subsurface Detention for Plaza</b>	Peak Elev=12.30'	Storage=1,421 cf
	Inflow=5.84 cfs	0.459 af
	Outflow=4.67 cfs	0.458 af
<b>Pond D2: Commercial Street Storm System</b>	Peak Elev=9.35'	Inflow=0.96 cfs
	15.0" x 192.0' Culvert	Outflow=0.96 cfs
		0.066 af
<b>Pond D3: Commercial</b>	Peak Elev=8.96'	Inflow=0.96 cfs
	15.0" x 192.0' Culvert	Outflow=0.96 cfs
		0.066 af

**Post-Development-SC**

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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond UH2: Hancock Link DMH2**

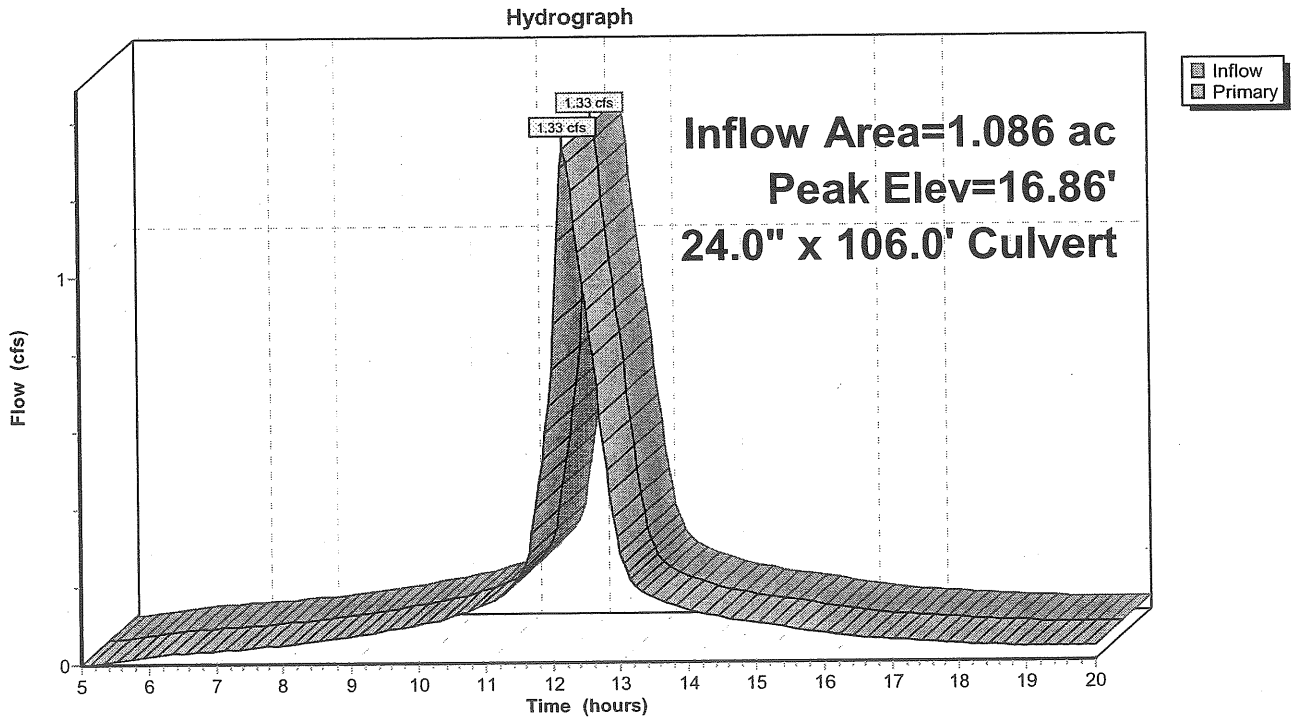
Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event  
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af  
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 16.86' @ 12.20 hrs  
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	<b>24.0" x 106.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 ' Cc= 0.900 n= 0.012

**Primary OutFlow** Max=1.32 cfs @ 12.20 hrs HW=16.86' TW=12.10' (Dynamic Tailwater)  
↑1=Culvert (Inlet Controls 1.32 cfs @ 2.34 fps)

**Pond UH2: Hancock Link DMH2**



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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## Pond UH1: Hancock Link DMH1

Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event  
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af  
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 12.10' @ 12.20 hrs

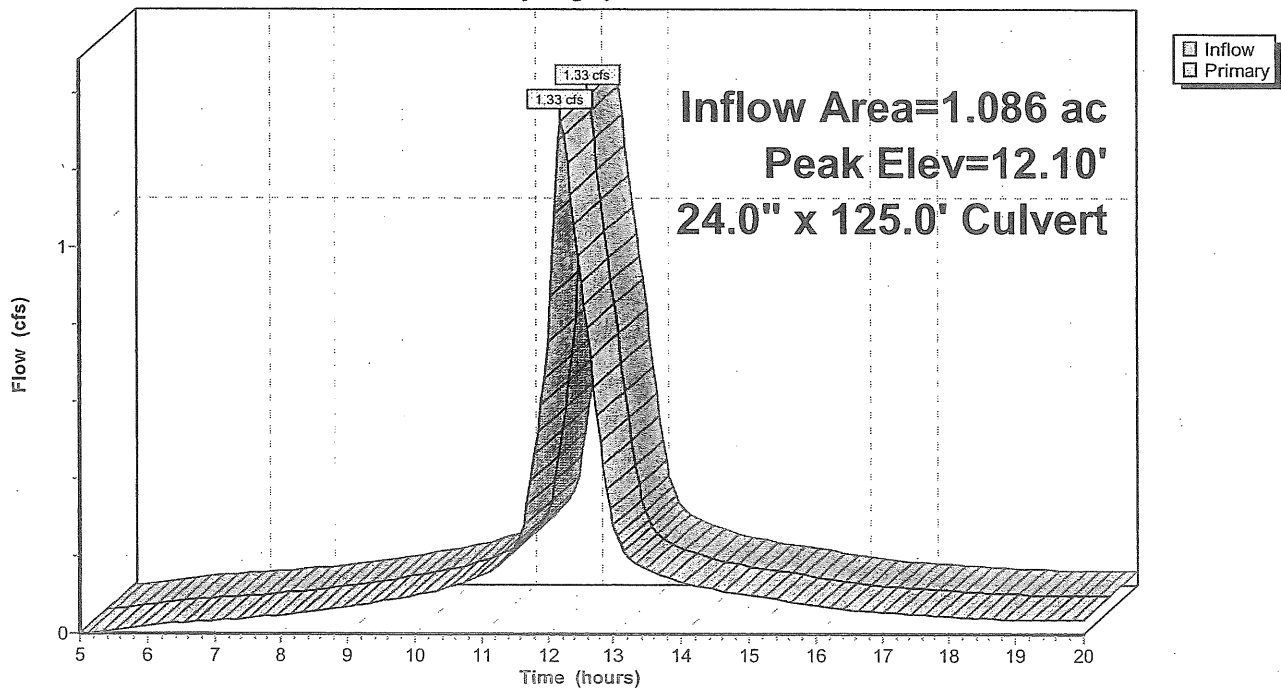
Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	<b>24.0" x 125.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=12.10' TW=10.25' (Dynamic Tailwater)  
1=Culvert (Inlet Controls 1.32 cfs @ 2.34 fps)

## Pond UH1: Hancock Link DMH1

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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## Pond D8: Hancock Street Storm System

Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event  
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af  
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 10.25' @ 12.20 hrs

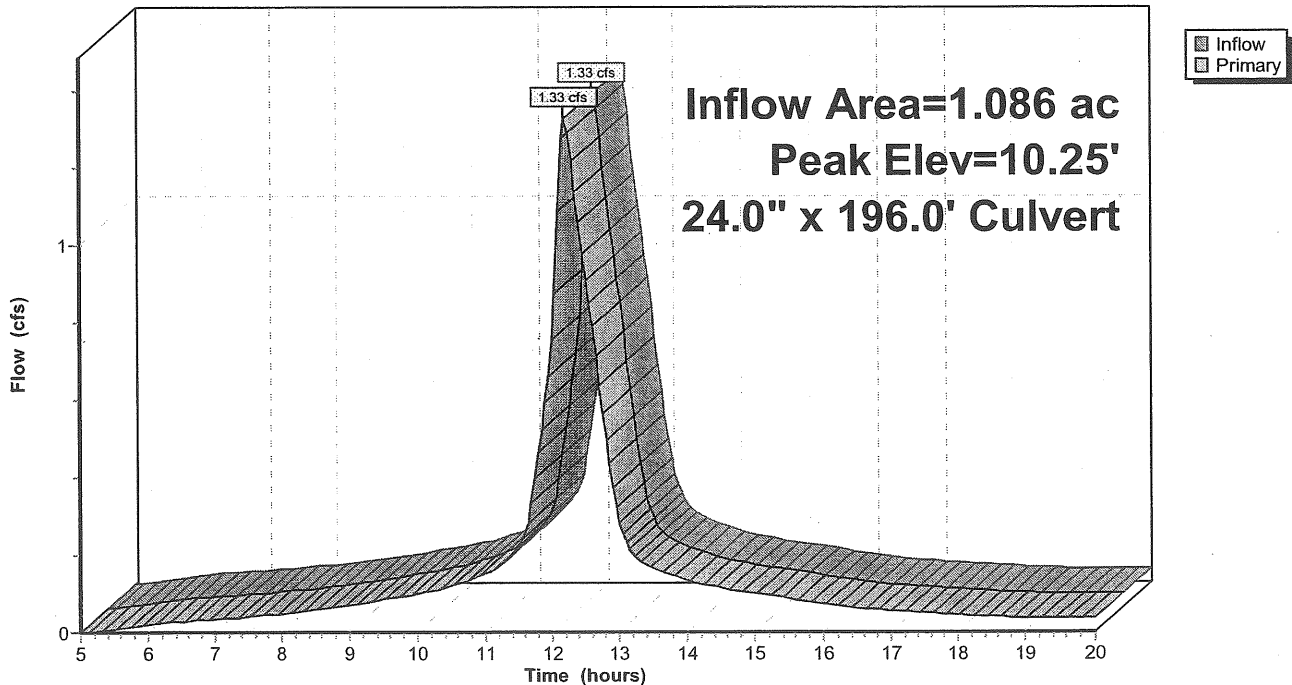
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	<b>24.0" x 196.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/ Cc= 0.900 n= 0.011

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=10.25' TW=8.69' (Dynamic Tailwater)  
↑1=Culvert (Inlet Controls 1.32 cfs @ 2.34 fps)

## Pond D8: Hancock Street Storm System

Hydrograph



# Post-Development-SC

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Post-Development w/ StormChamber  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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## Pond D7: Hancock

Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event  
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af  
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.70' @ 12.20 hrs

Flood Elev= 13.91'

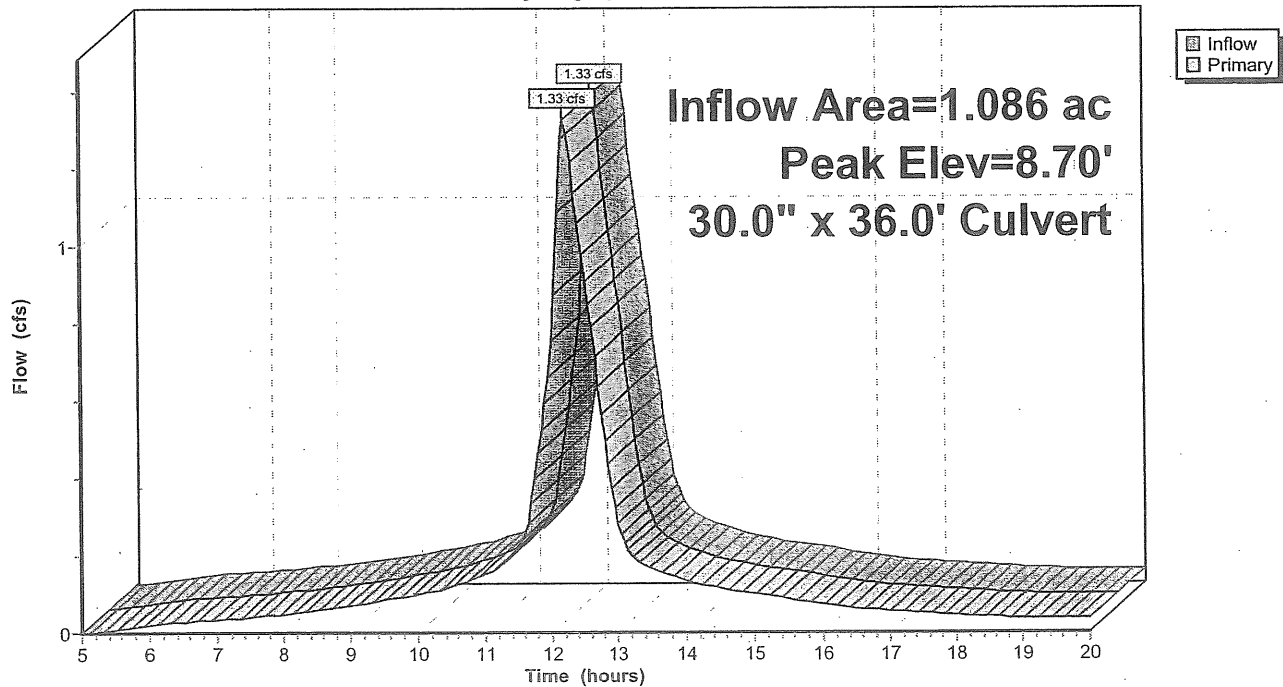
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=8.69' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 1.32 cfs @ 2.13 fps)

## Pond D7: Hancock

Hydrograph





# Post-Development-SC

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Type III 24-hr 2-Year Storm Rainfall=3.00"

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## Pond D3: Commercial

Inflow Area = 0.296 ac, Inflow Depth > 1.53" for 2-Year Storm event  
Inflow = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af  
Outflow = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.81' @ 12.06 hrs

Flood Elev= 13.91'

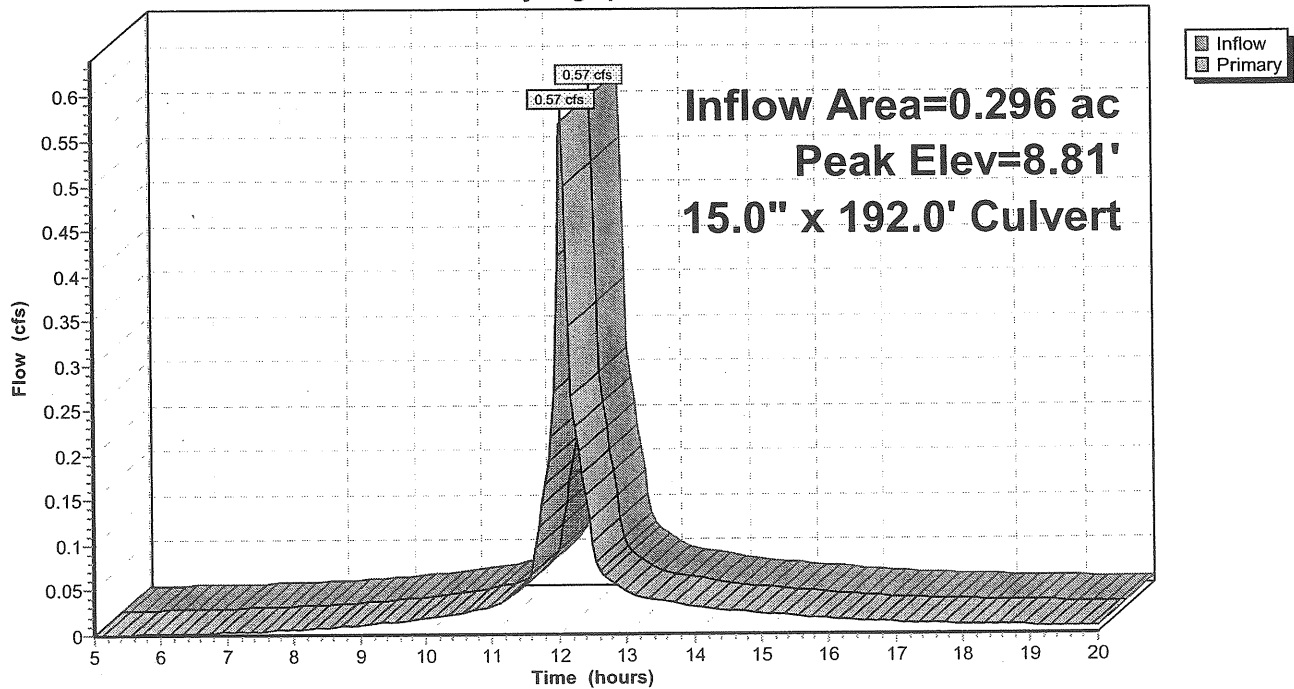
Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 /' Cc= 0.900 n= 0.010

Primary OutFlow Max=0.56 cfs @ 12.06 hrs HW=8.81' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 0.56 cfs @ 2.03 fps)

## Pond D3: Commercial

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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## Pond D2: Commercial Street Storm System

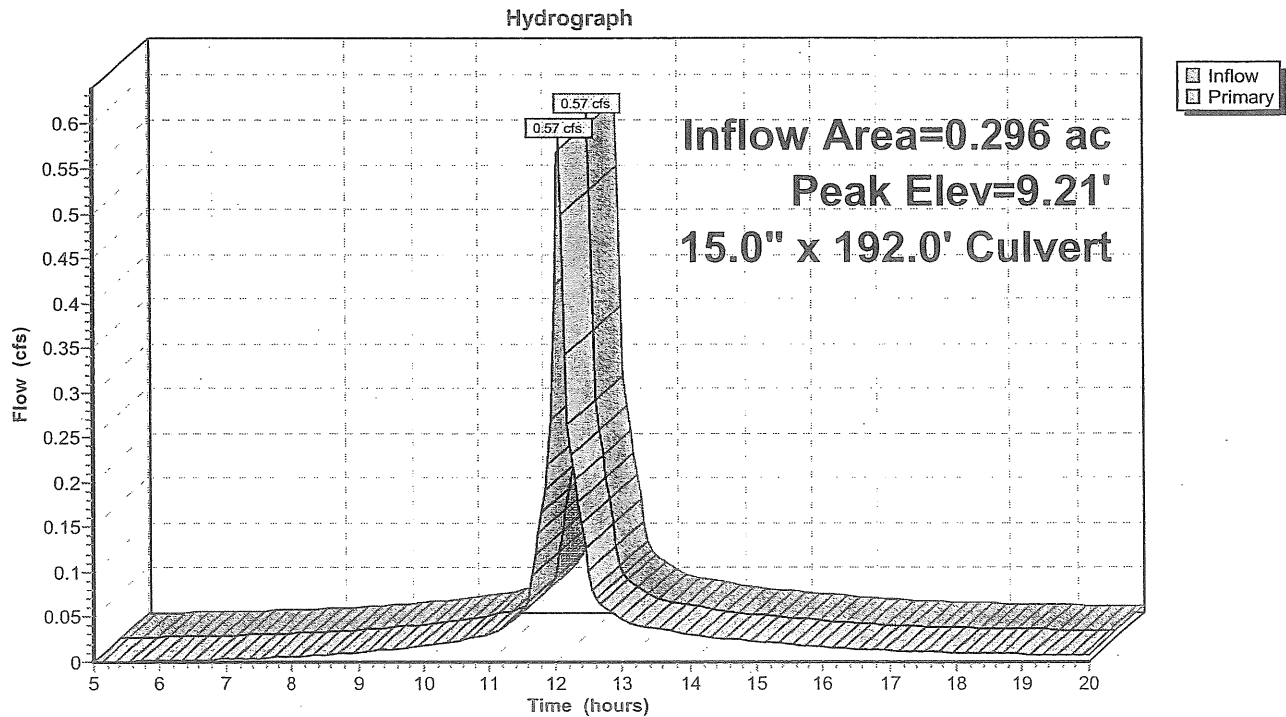
Inflow Area = 0.296 ac, Inflow Depth > 1.53" for 2-Year Storm event  
Inflow = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af  
Outflow = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 9.21' @ 12.06 hrs  
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 ' Cc= 0.900 n= 0.010

Primary OutFlow Max=0.55 cfs @ 12.06 hrs HW=9.20' TW=8.81' (Dynamic Tailwater)  
1=Culvert (Outlet Controls 0.55 cfs @ 2.00 fps)

## Pond D2: Commercial Street Storm System



**Post-Development-SC**

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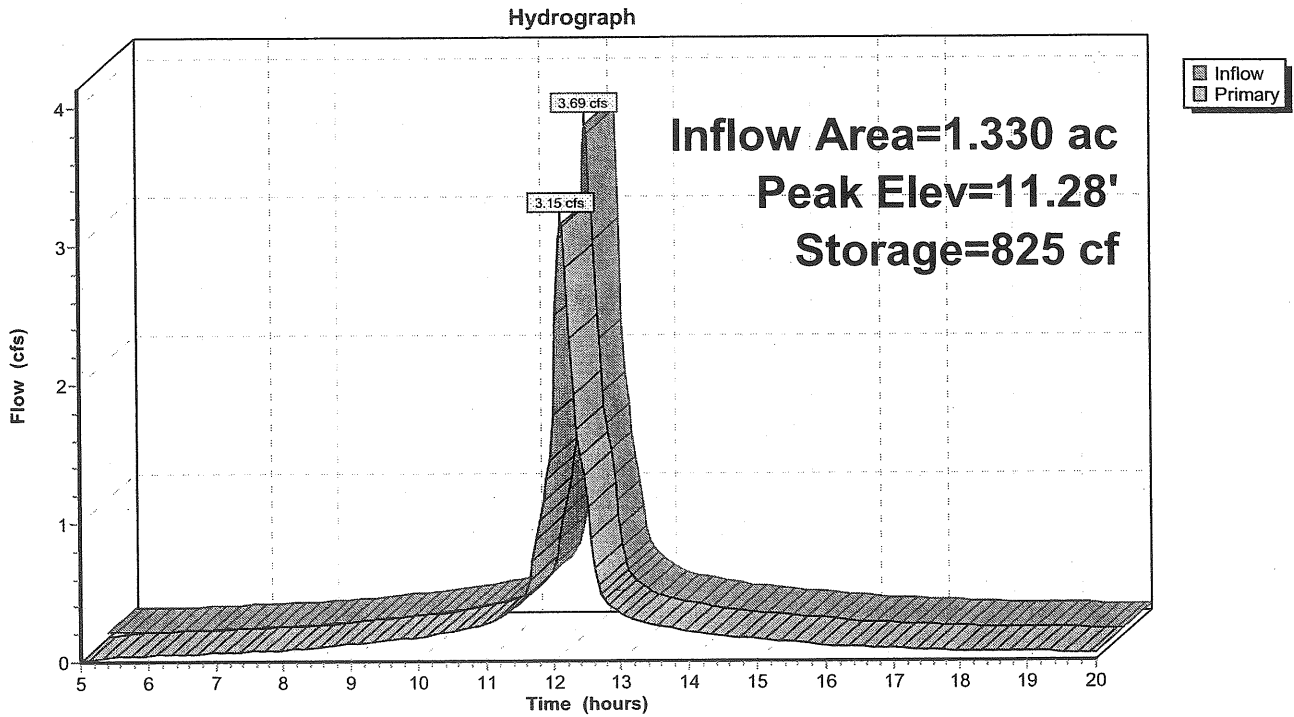
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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond 5C: Subsurface Detention for Plaza**



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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond 5C: Subsurface Detention for Plaza**

Inflow Area = 1.330 ac, Inflow Depth > 2.59" for 2-Year Storm event  
 Inflow = 3.69 cfs @ 12.08 hrs, Volume= 0.287 af  
 Outflow = 3.15 cfs @ 12.14 hrs, Volume= 0.286 af, Atten= 15%, Lag= 3.3 min  
 Primary = 3.15 cfs @ 12.14 hrs, Volume= 0.286 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 11.28' @ 12.14 hrs Surf.Area= 835 sf Storage= 825 cf

Plug-Flow detention time= 6.4 min calculated for 0.285 af (99% of inflow)  
 Center-of-Mass det. time= 4.7 min ( 743.6 - 738.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	1,086 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 3,758 cf Overall - 1,044 cf Embedded = 2,714 cf x 40.0% Voids
#2	10.50'	1,044 cf	<b>58.4"W x 34.8"H x 7.60'L StormChamber</b> x 14 Inside #1
		2,129 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	835	0	0
14.00	835	3,758	3,758

Device	Routing	Invert	Outlet Devices
#1	Primary	9.50'	<b>12.0" x 50.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.00' S= 0.0100 '/' Cc= 0.900 n= 0.011
#2	Device 1	9.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	10.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	12.50'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=3.11 cfs @ 12.14 hrs HW=11.26' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 3.11 cfs of 4.25 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 2.01 cfs @ 5.76 fps)
- 3=Orifice/Grate (Orifice Controls 1.10 cfs @ 3.16 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Post-Development-SC**

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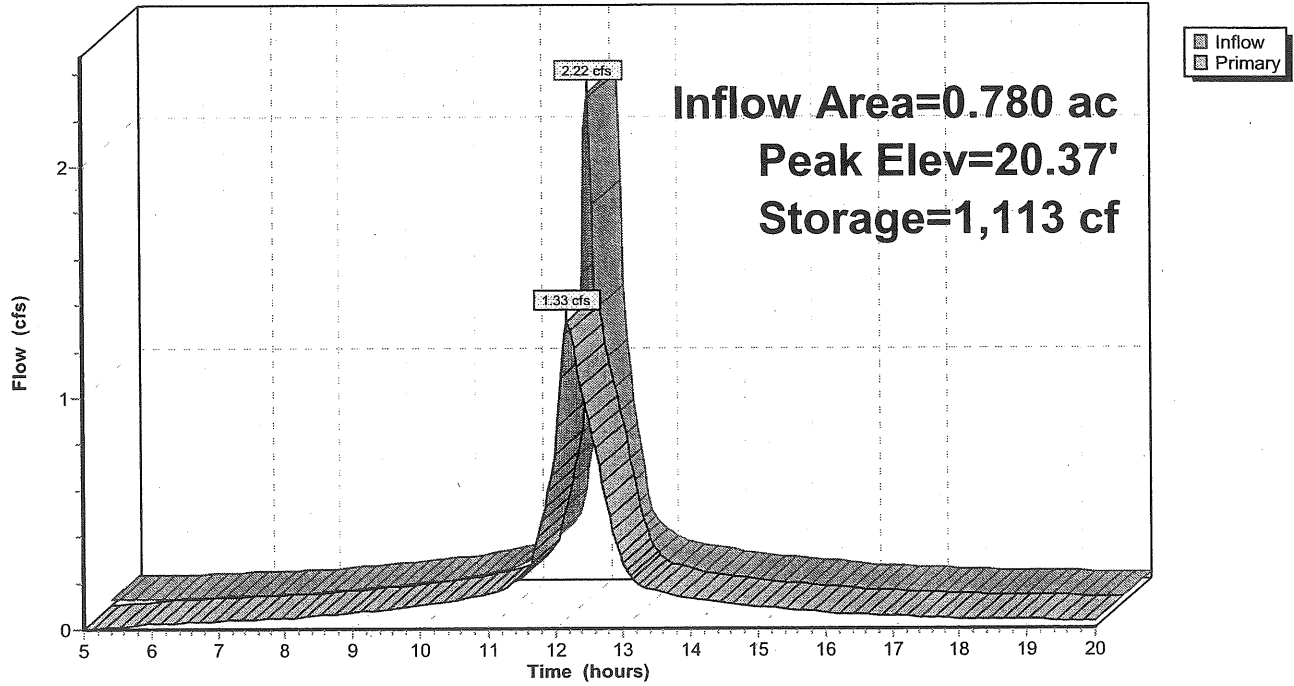
Post-Development w/ StormChamber  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond 1B: Subsurface Detention for Parking Garage**

Hydrograph



**Post-Development-SC**

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Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond 1B: Subsurface Detention for Parking Garage**

Inflow Area = 0.780 ac, Inflow Depth > 2.59" for 2-Year Storm event  
 Inflow = 2.22 cfs @ 12.09 hrs, Volume= 0.168 af  
 Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.167 af, Atten= 40%, Lag= 7.0 min  
 Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.167 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 20.37' @ 12.20 hrs Surf.Area= 1,590 sf Storage= 1,113 cf

Plug-Flow detention time= 17.5 min calculated for 0.167 af (99% of inflow)  
 Center-of-Mass det. time= 13.3 min ( 752.5 - 739.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	1,967 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 7,155 cf Overall - 2,236 cf Embedded = 4,919 cf x 40.0% Voids
#2	20.00'	2,236 cf	<b>58.4"W x 34.8"H x 7.60'L StormChamber</b> x 30 Inside #1
		4,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,590	0	0
23.50	1,590	7,155	7,155

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	<b>12.0" x 150.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 18.00' S= 0.0067 '/ Cc= 0.900 n= 0.011
#2	Device 1	20.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	19.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	22.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=1.32 cfs @ 12.20 hrs HW=20.37' TW=16.86' (Dynamic Tailwater)

- 1=Culvert (Passes 1.32 cfs of 3.34 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.32 cfs @ 2.07 fps)
- 3=Orifice/Grate (Orifice Controls 1.00 cfs @ 5.10 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Post-Development-SC**

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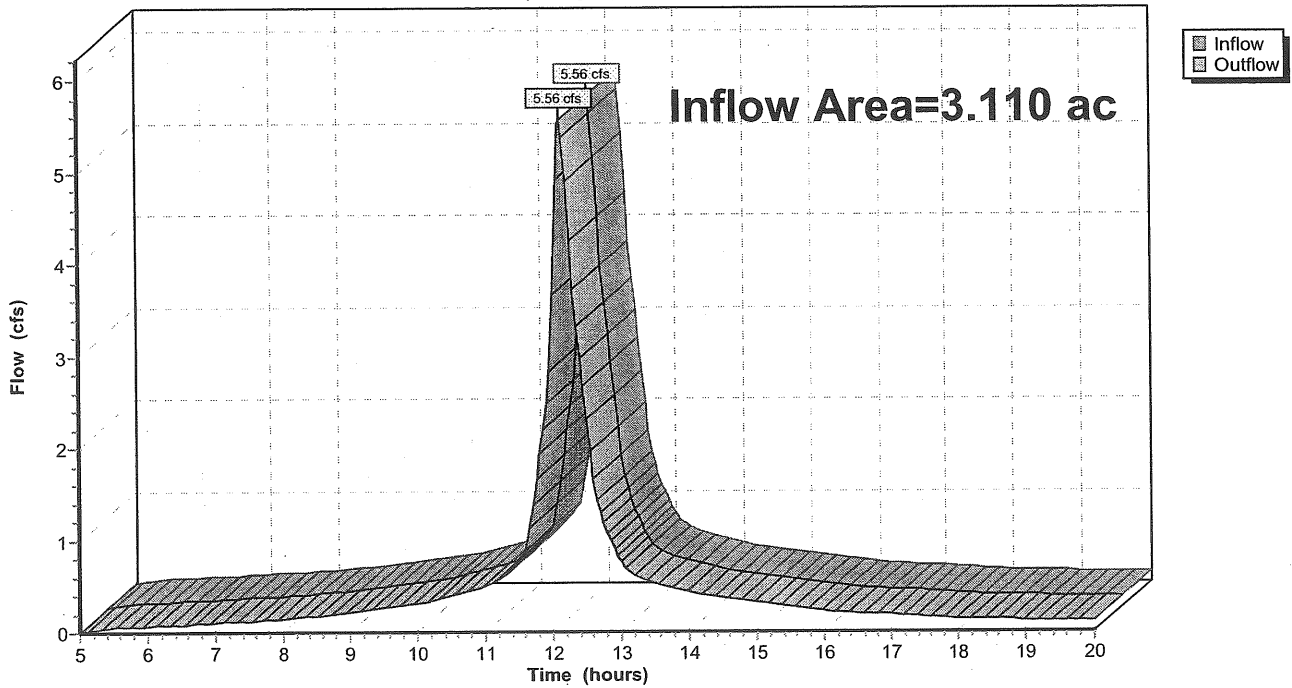
**Reach TOT: (new node)**

Inflow Area = 3.110 ac, Inflow Depth > 2.15" for 2-Year Storm event  
Inflow = 5.56 cfs @ 12.12 hrs, Volume= 0.558 af  
Outflow = 5.56 cfs @ 12.12 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach TOT: (new node)**

Hydrograph



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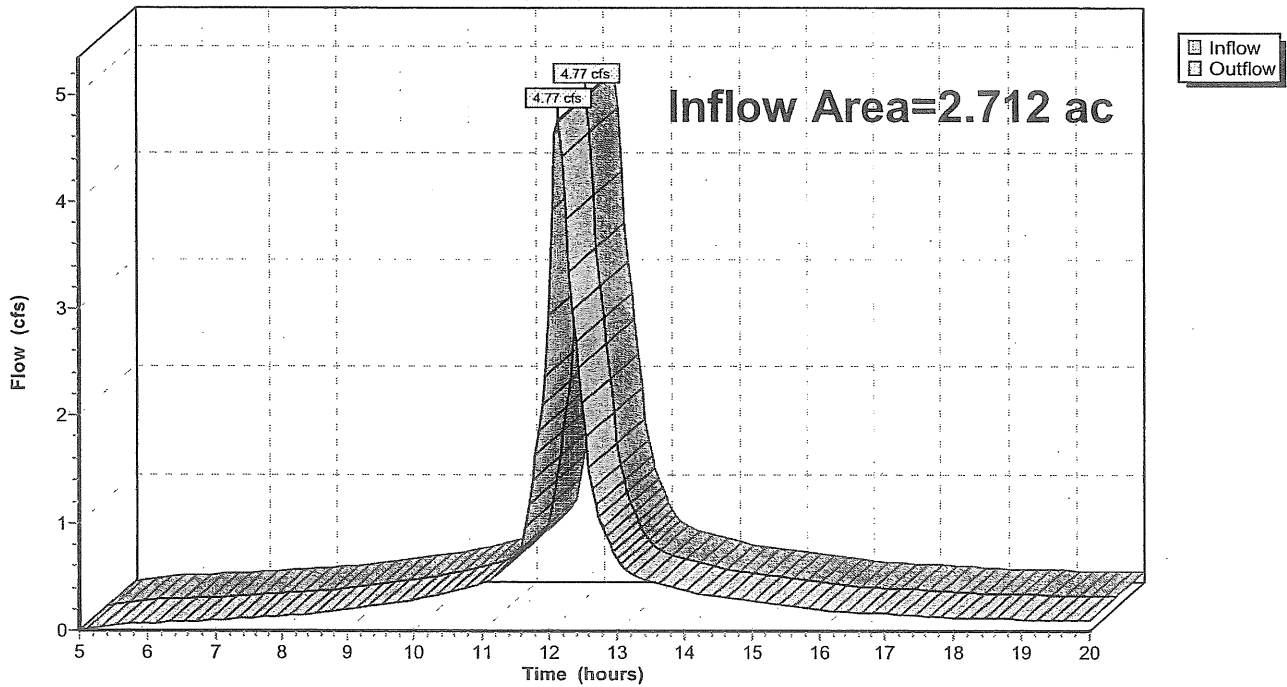
**Reach FR: Fore River**

Inflow Area = 2.712 ac, Inflow Depth > 2.18" for 2-Year Storm event  
Inflow = 4.77 cfs @ 12.14 hrs, Volume= 0.493 af  
Outflow = 4.77 cfs @ 12.14 hrs, Volume= 0.493 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach FR: Fore River**

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Type III 24-hr 2-Year Storm Rainfall=3.00"

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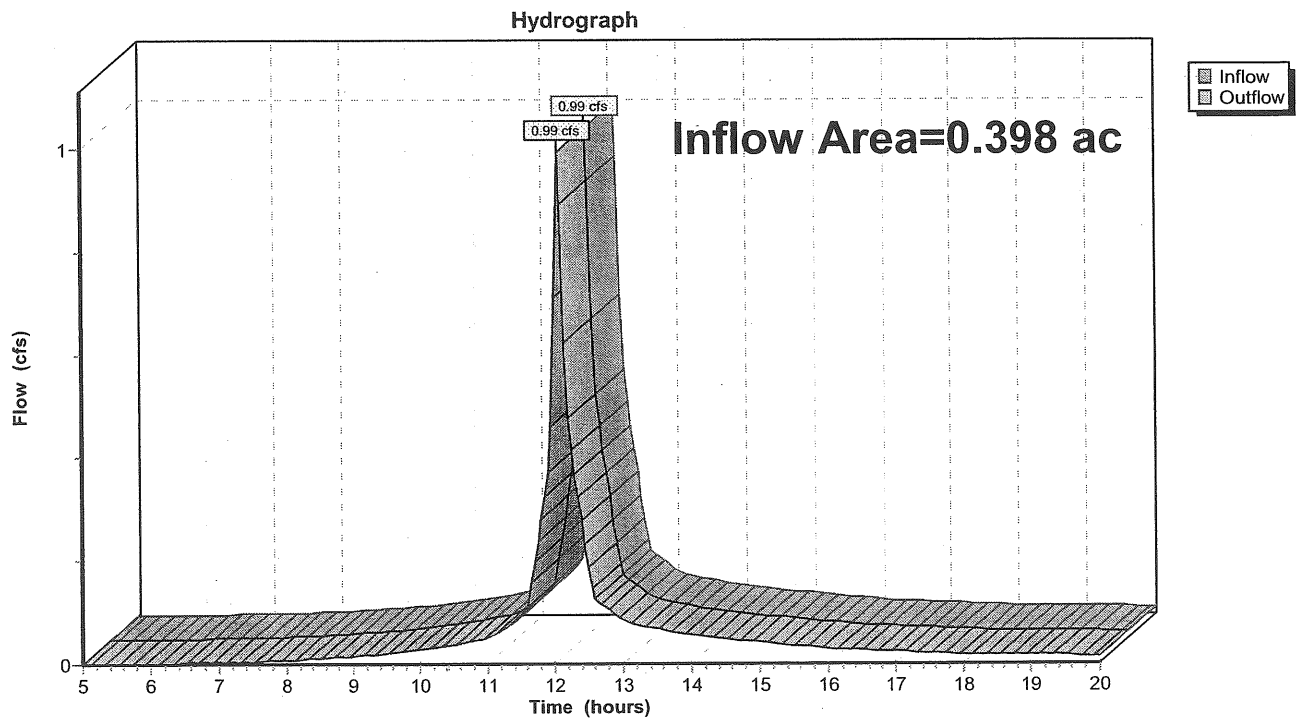
11/3/2006

## Reach CS: Combined Sewer

Inflow Area = 0.398 ac, Inflow Depth > 1.95" for 2-Year Storm event  
Inflow = 0.99 cfs @ 12.06 hrs, Volume= 0.065 af  
Outflow = 0.99 cfs @ 12.06 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## Reach CS: Combined Sewer



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 5CP: Plaza**

Runoff = 0.37 cfs @ 12.02 hrs, Volume= 0.025 af, Depth> 2.59"

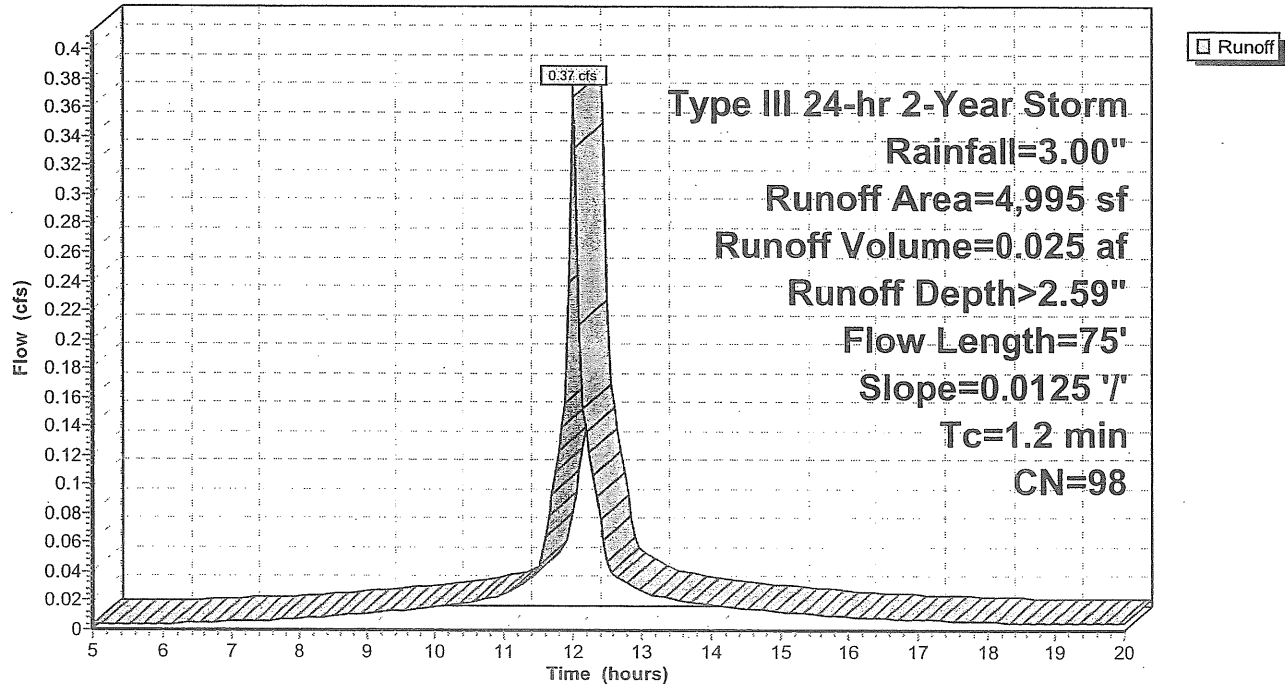
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

**Subcatchment 5CP: Plaza**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 5BP: East Half of Complex**

Runoff = 2.51 cfs @ 12.09 hrs, Volume= 0.191 af, Depth> 2.59"

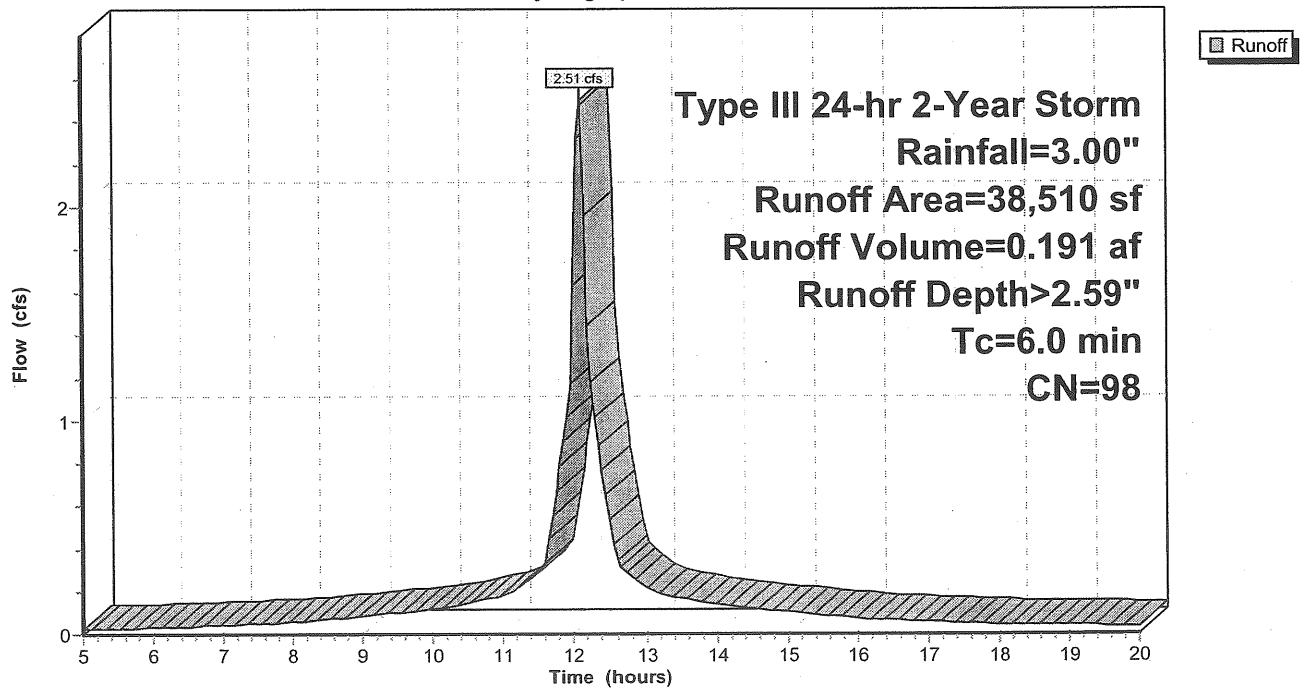
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

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

**Subcatchment 5BP: East Half of Complex**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 5AP: West Half of Complex**

Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.071 af, Depth> 2.59"

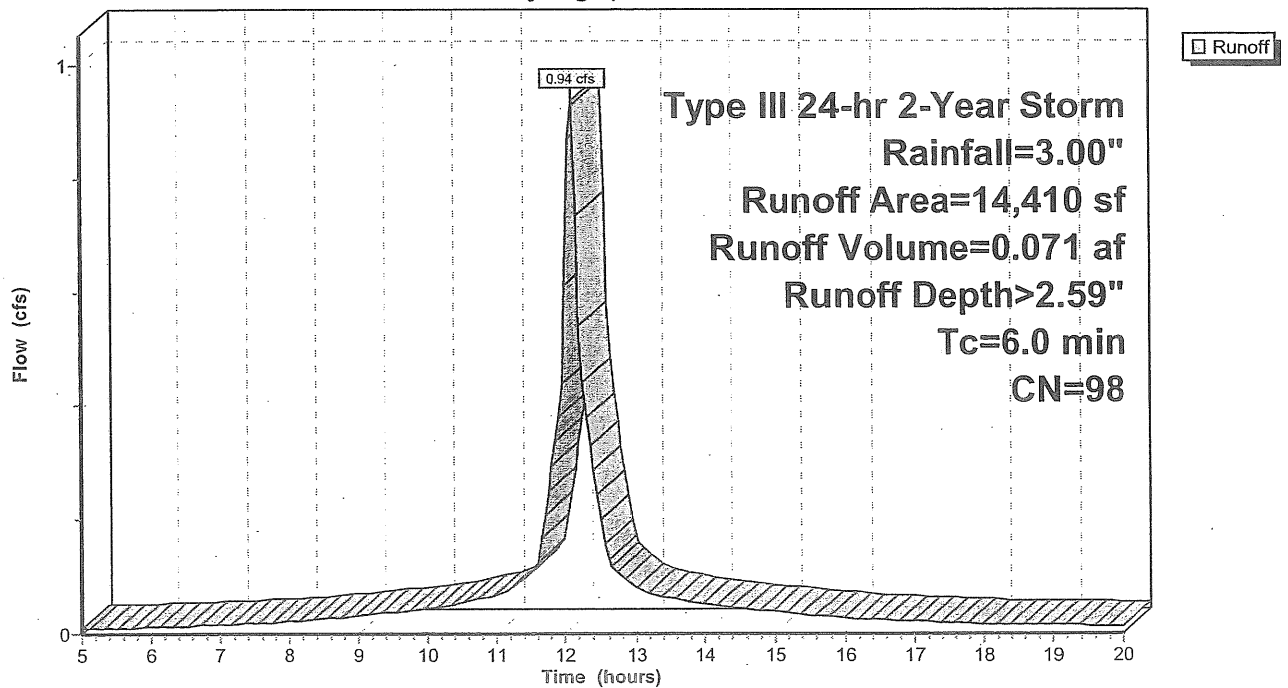
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs; dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

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

**Subcatchment 5AP: West Half of Complex**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 4P: Back of PS**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

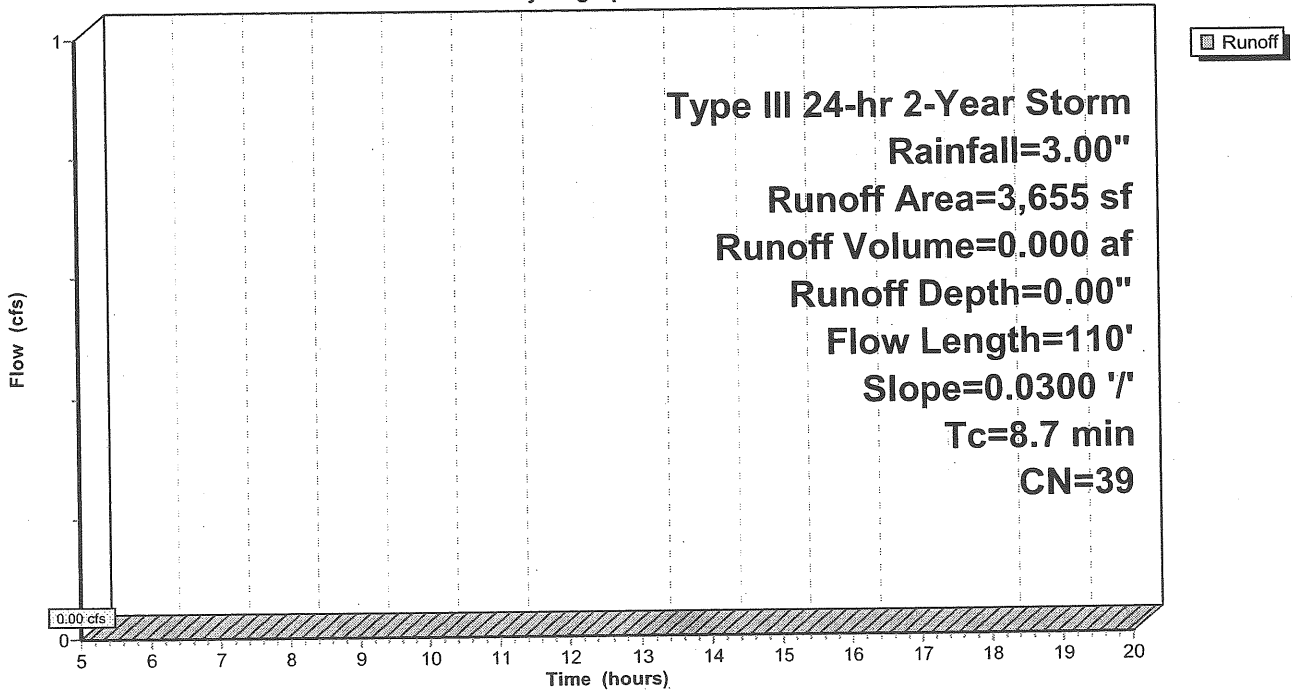
Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.1	10	0.0300	1.21		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

**Subcatchment 4P: Back of PS**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 3P: Turner Barker**

Runoff = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

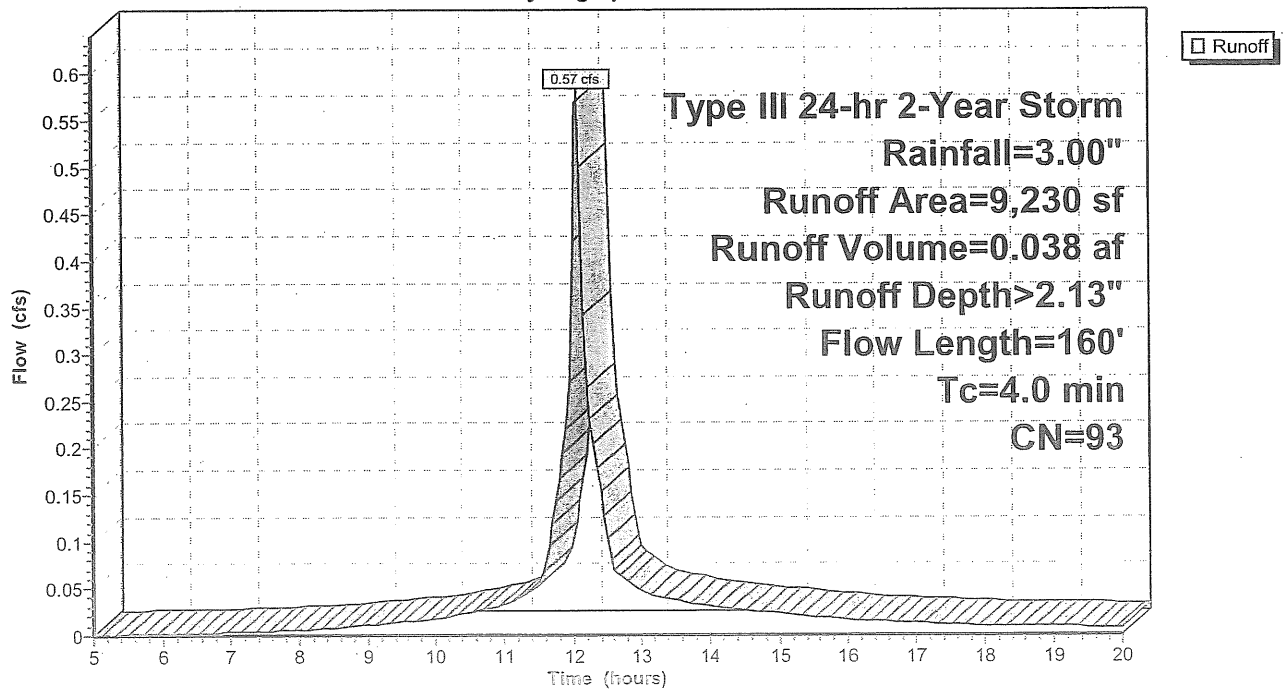
Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		<b>Sheet Flow, BC</b> Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	<b>Circular Channel (pipe), CDE</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

**Subcatchment 3P: Turner Barker**

Hydrograph



**Post-Development-SC**

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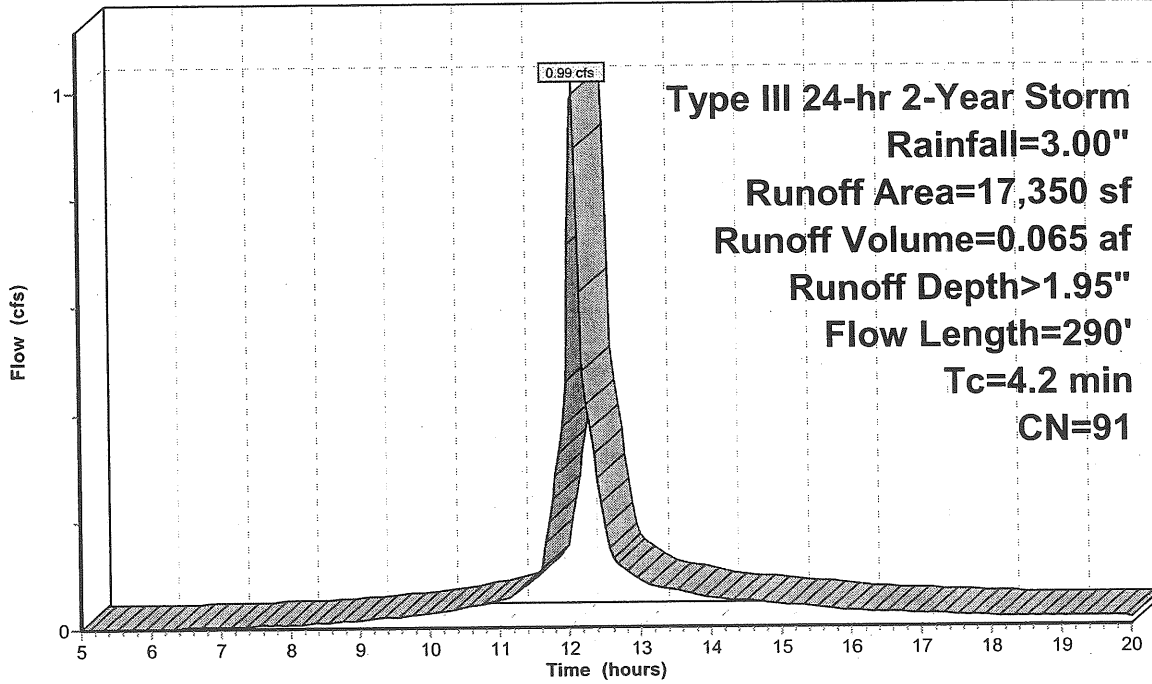
Post-Development w/ StormChamber  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 2P: Office Building**

Hydrograph



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Post-Development w/ StormChamber  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 2P: Office Building**

Runoff = 0.99 cfs @ 12.06 hrs, Volume= 0.065 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		<b>Shallow Concentrated Flow, DE</b> Paved Kv= 20.3 fps
4.2	290	Total			



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 1BP: Parking Garage**

Runoff = 2.22 cfs @ 12.09 hrs, Volume= 0.168 af, Depth> 2.59"

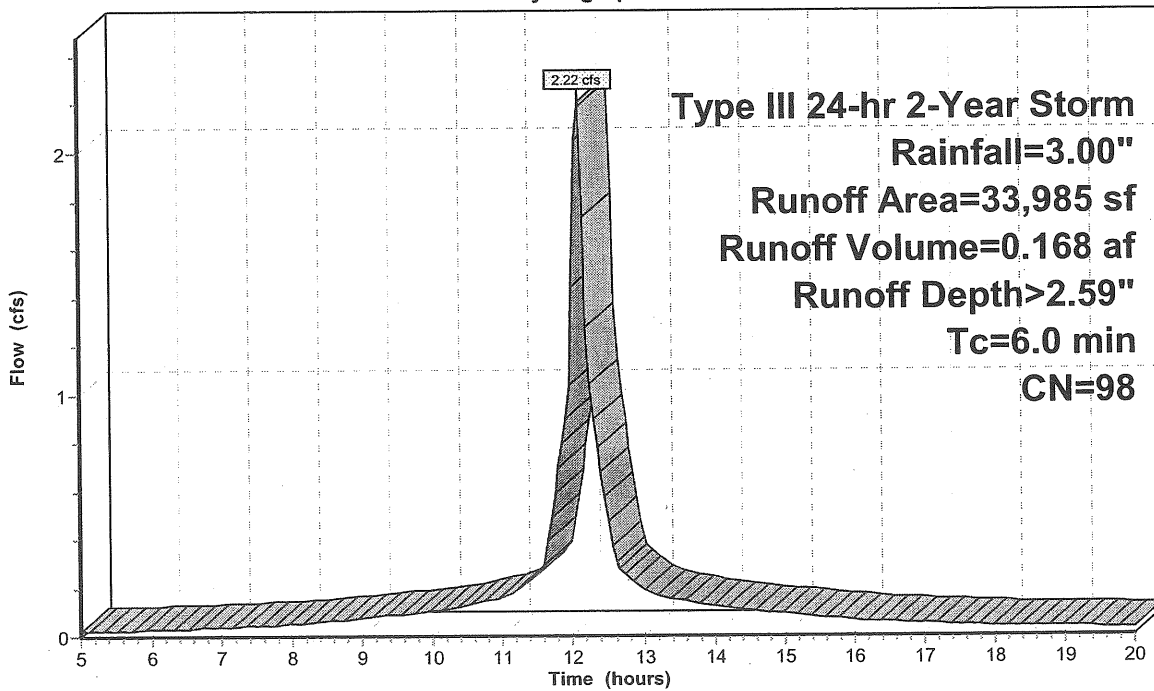
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

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

**Subcatchment 1BP: Parking Garage**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Subcatchment 1AP: Open Space**

Runoff = 0.01 cfs @ 12.46 hrs, Volume= 0.003 af, Depth> 0.10"

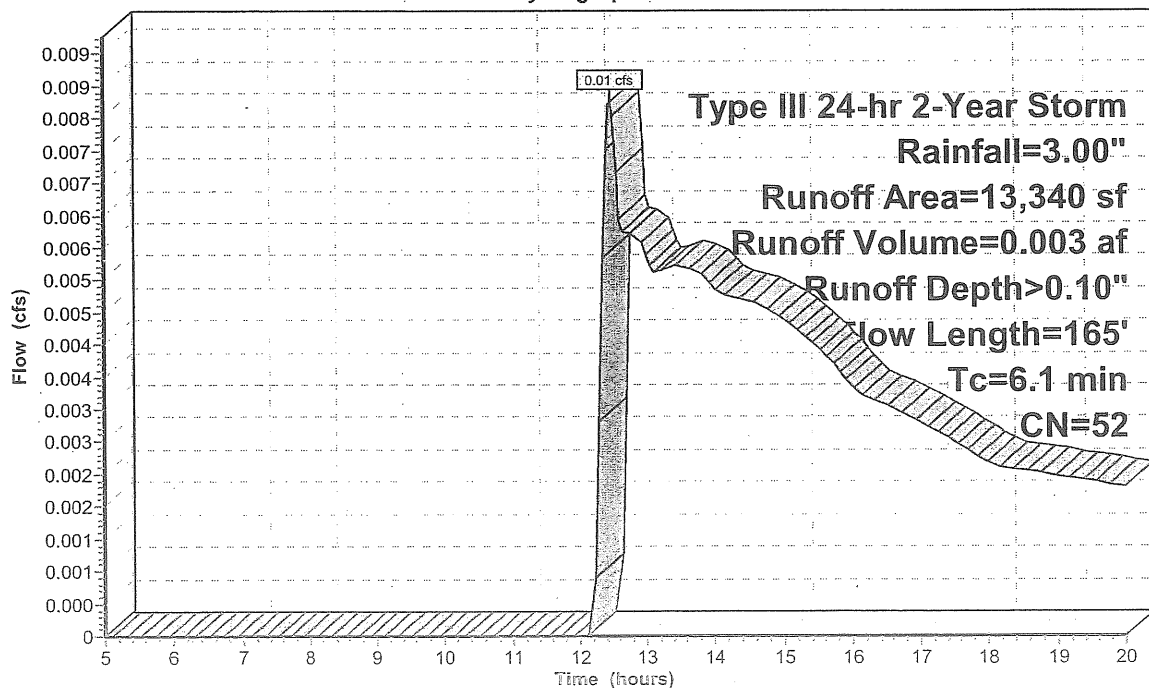
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		<b>Sheet Flow, BC</b> Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

**Subcatchment 1AP: Open Space**

Hydrograph



**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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**Pond D7: Hancock**

Peak Elev=8.70' Inflow=1.33 cfs 0.169 af  
30.0" x 36.0' Culvert Outflow=1.33 cfs 0.169 af

**Pond D8: Hancock Street Storm System**

Peak Elev=10.25' Inflow=1.33 cfs 0.169 af  
24.0" x 196.0' Culvert Outflow=1.33 cfs 0.169 af

**Pond UH1: Hancock Link DMH1**

Peak Elev=12.10' Inflow=1.33 cfs 0.169 af  
24.0" x 125.0' Culvert Outflow=1.33 cfs 0.169 af

**Pond UH2: Hancock Link DMH2**

Peak Elev=16.86' Inflow=1.33 cfs 0.169 af  
24.0" x 106.0' Culvert Outflow=1.33 cfs 0.169 af

**Total Runoff Area = 3.110 ac Runoff Volume = 0.560 af Average Runoff Depth = 2.16"**  
**12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac**

**Post-Development-SC**

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Post-Development w/ StormChamber  
Type III 24-hr 2-Year Storm Rainfall=3.00"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1AP: Open Space**

Runoff Area=13,340 sf Runoff Depth>0.10"  
Flow Length=165' Tc=6.1 min CN=52 Runoff=0.01 cfs 0.003 af

**Subcatchment 1BP: Parking Garage**

Runoff Area=33,985 sf Runoff Depth>2.59"  
Tc=6.0 min CN=98 Runoff=2.22 cfs 0.168 af

**Subcatchment 2P: Office Building**

Runoff Area=17,350 sf Runoff Depth>1.95"  
Flow Length=290' Tc=4.2 min CN=91 Runoff=0.99 cfs 0.065 af

**Subcatchment 3P: Turner Barker**

Runoff Area=9,230 sf Runoff Depth>2.13"  
Flow Length=160' Tc=4.0 min CN=93 Runoff=0.57 cfs 0.038 af

**Subcatchment 4P: Back of PS**

Runoff Area=3,655 sf Runoff Depth=0.00"  
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.00 cfs 0.000 af

**Subcatchment 5AP: West Half of Complex**

Runoff Area=14,410 sf Runoff Depth>2.59"  
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.071 af

**Subcatchment 5BP: East Half of Complex**

Runoff Area=38,510 sf Runoff Depth>2.59"  
Tc=6.0 min CN=98 Runoff=2.51 cfs 0.191 af

**Subcatchment 5CP: Plaza**

Runoff Area=4,995 sf Runoff Depth>2.59"  
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.37 cfs 0.025 af

**Reach CS: Combined Sewer**

Inflow=0.99 cfs 0.065 af  
Outflow=0.99 cfs 0.065 af

**Reach FR: Fore River**

Inflow=4.77 cfs 0.493 af  
Outflow=4.77 cfs 0.493 af

**Reach TOT: (new node)**

Inflow=5.56 cfs 0.558 af  
Outflow=5.56 cfs 0.558 af

**Pond 1B: Subsurface Detention for Parking G** Peak Elev=20.37' Storage=1,113 cf Inflow=2.22 cfs 0.168 af  
Outflow=1.33 cfs 0.167 af

**Pond 5C: Subsurface Detention for Plaza** Peak Elev=11.28' Storage=825 cf Inflow=3.69 cfs 0.287 af  
Outflow=3.15 cfs 0.286 af

**Pond D2: Commercial Street Storm System** Peak Elev=9.21' Inflow=0.57 cfs 0.038 af  
15.0" x 192.0' Culvert Outflow=0.57 cfs 0.038 af

**Pond D3: Commercial** Peak Elev=8.81' Inflow=0.57 cfs 0.038 af  
15.0" x 192.0' Culvert Outflow=0.57 cfs 0.038 af

**Post-Development-SC**

Prepared by Woodard &amp; Curran

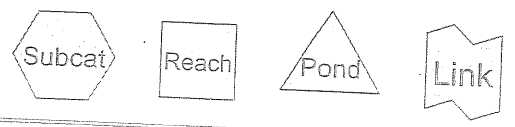
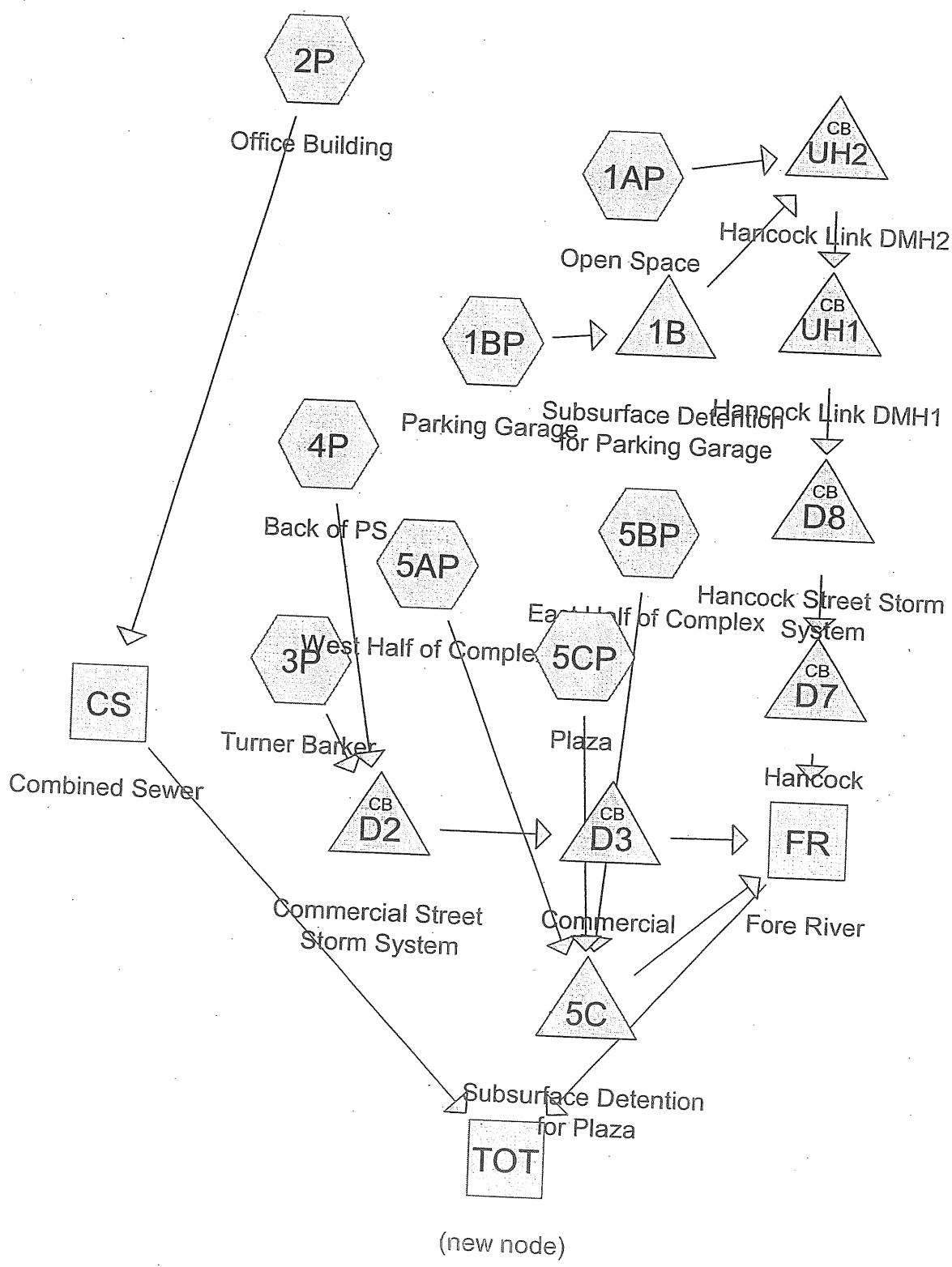
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**Area Listing (all nodes)**

<u>Area (acres)</u>	<u>CN</u>	<u>Description (subcats)</u>
0.392	39	>75% Grass cover, Good, HSG A (1AP,2P,3P,4P)
0.931	98	Building (1BP,2P,3P)
0.318	98	Buildings (5AP)
0.191	98	Gravel Parking (2P)
0.088	98	Paved (1BP,5AP)
1.037	98	Paved parking & roofs (1AP,3P,5BP,5CP)
0.025	98	Paved roads w/curbs & sewers (2P)
0.128	98	Plaza (5BP)
<hr/>		
3.110		



Drainage Diagram for Post-Development-SC  
 Prepared by Woodard & Curran 11/3/2006  
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# Post-Development-ST

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond UH2: Hancock Link DMH2

Inflow Area = 1.086 ac, Inflow Depth > 3.73" for 25-Year Storm event  
Inflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af  
Outflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 17.04' @ 12.20 hrs

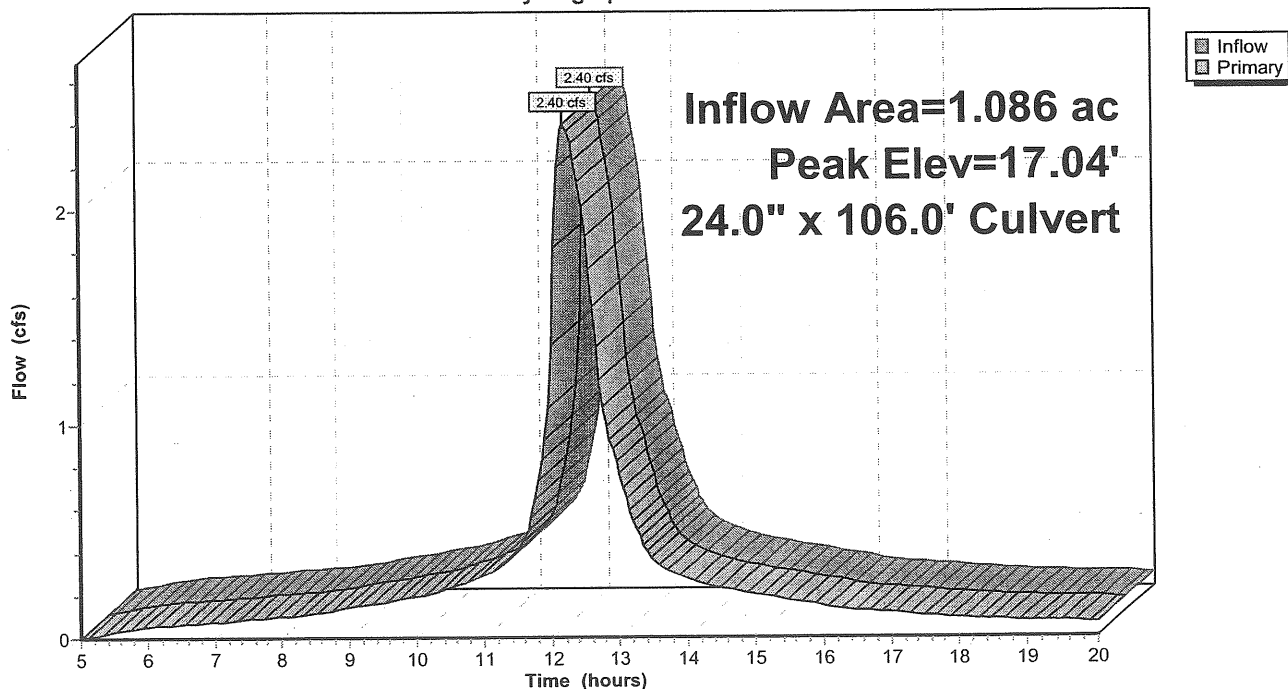
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	<b>24.0" x 106.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=2.40 cfs @ 12.20 hrs HW=17.04' TW=12.28' (Dynamic Tailwater)  
↑1=Culvert (Inlet Controls 2.40 cfs @ 2.74 fps)

## Pond UH2: Hancock Link DMH2

Hydrograph



**Post-Development-ST**

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond UH1: Hancock Link DMH1**

Inflow Area = 1.086 ac, Inflow Depth > 3.73" for 25-Year Storm event  
Inflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af  
Outflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af

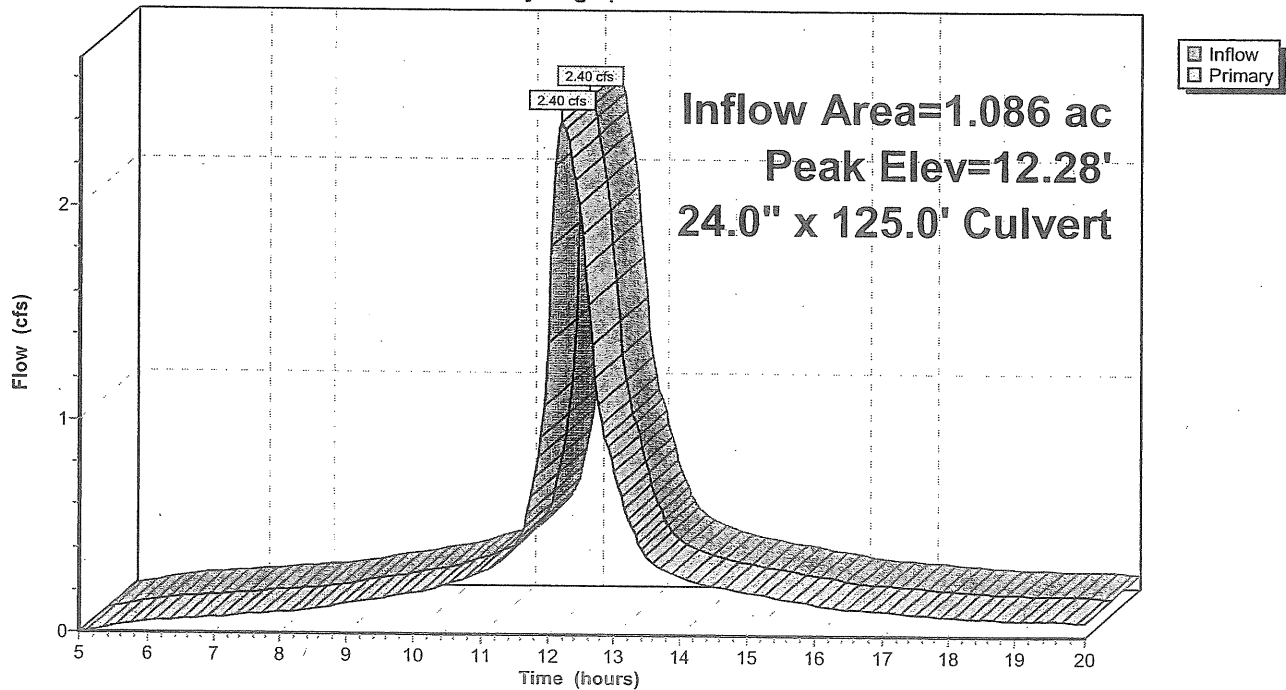
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 12.28' @ 12.20 hrs  
Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	<b>24.0" x 125.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=2.40 cfs @ 12.20 hrs HW=12.28' TW=10.43' (Dynamic Tailwater)  
1=Culvert (Inlet Controls 2.40 cfs @ 2.74 fps)

**Pond UH1: Hancock Link DMH1**

Hydrograph





**Post-Development-ST**

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**Pond D8: Hancock Street Storm System**

Inflow Area = 1.086 ac, Inflow Depth > 3.73" for 25-Year Storm event  
 Inflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af  
 Outflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af

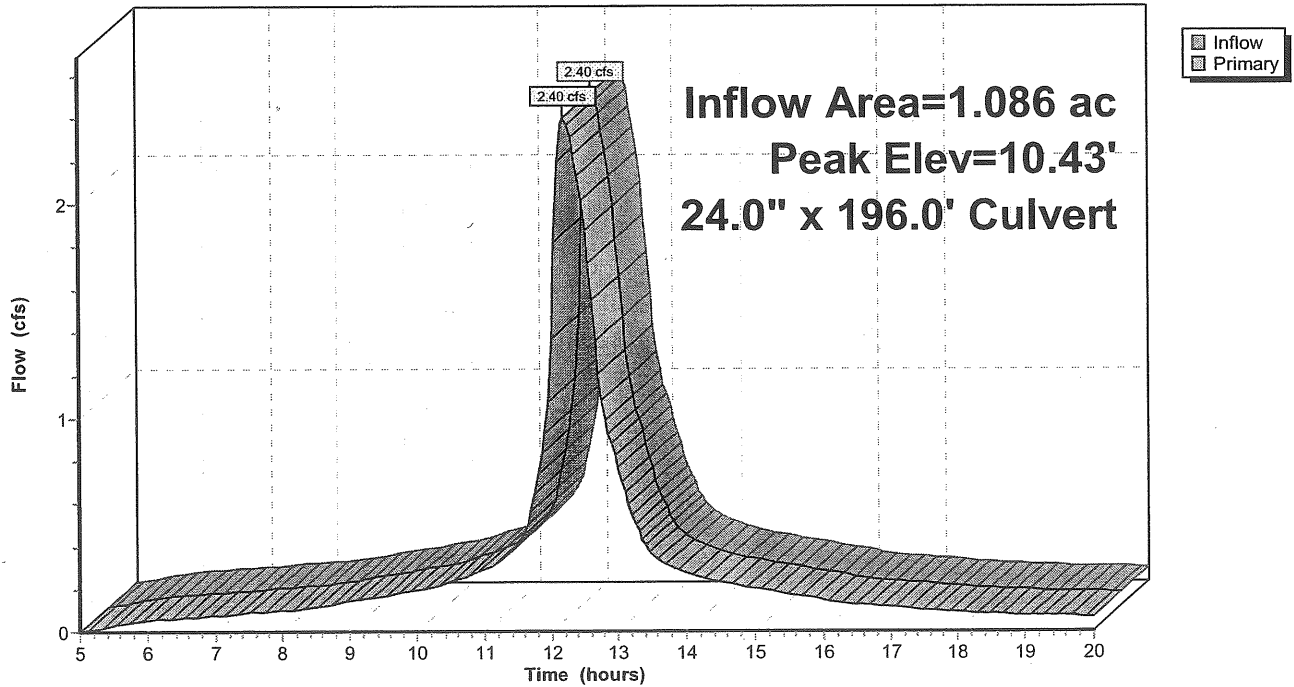
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 10.43' @ 12.20 hrs  
 Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	<b>24.0" x 196.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

**Primary OutFlow** Max=2.40 cfs @ 12.20 hrs HW=10.43' TW=8.90' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Inlet Controls 2.40 cfs @ 2.74 fps)

**Pond D8: Hancock Street Storm System**

Hydrograph



**Post-Development-ST**

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**Pond D7: Hancock**

Inflow Area = 1.086 ac, Inflow Depth > 3.73" for 25-Year Storm event  
 Inflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af  
 Outflow = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.40 cfs @ 12.20 hrs, Volume= 0.338 af

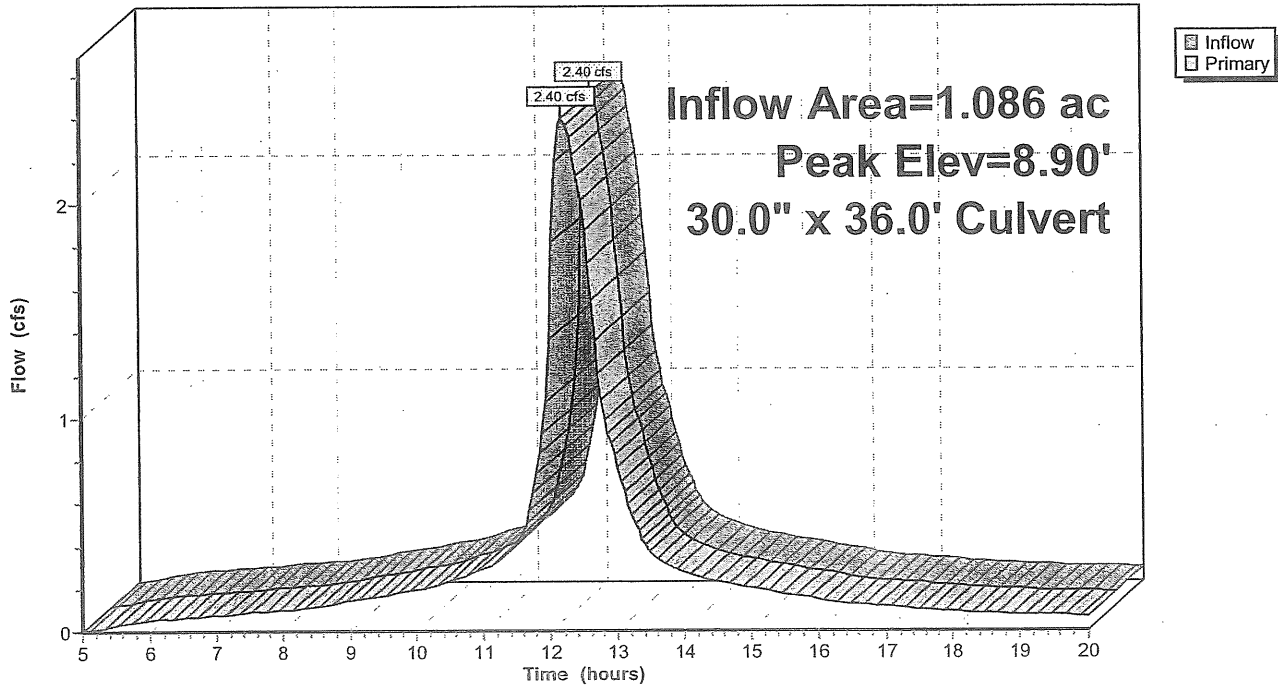
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 8.90' @ 12.20 hrs  
 Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=2.40 cfs @ 12.20 hrs HW=8.90' TW=0.00' (Dynamic Tailwater)  
 ←1=Culvert (Barrel Controls 2.40 cfs @ 2.57 fps)

**Pond D7: Hancock**

Hydrograph



**Post-Development-ST**

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D3: Commercial**

Inflow Area = 0.296 ac, Inflow Depth > 3.24" for 25-Year Storm event  
Inflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af  
Outflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.02' @ 12.06 hrs

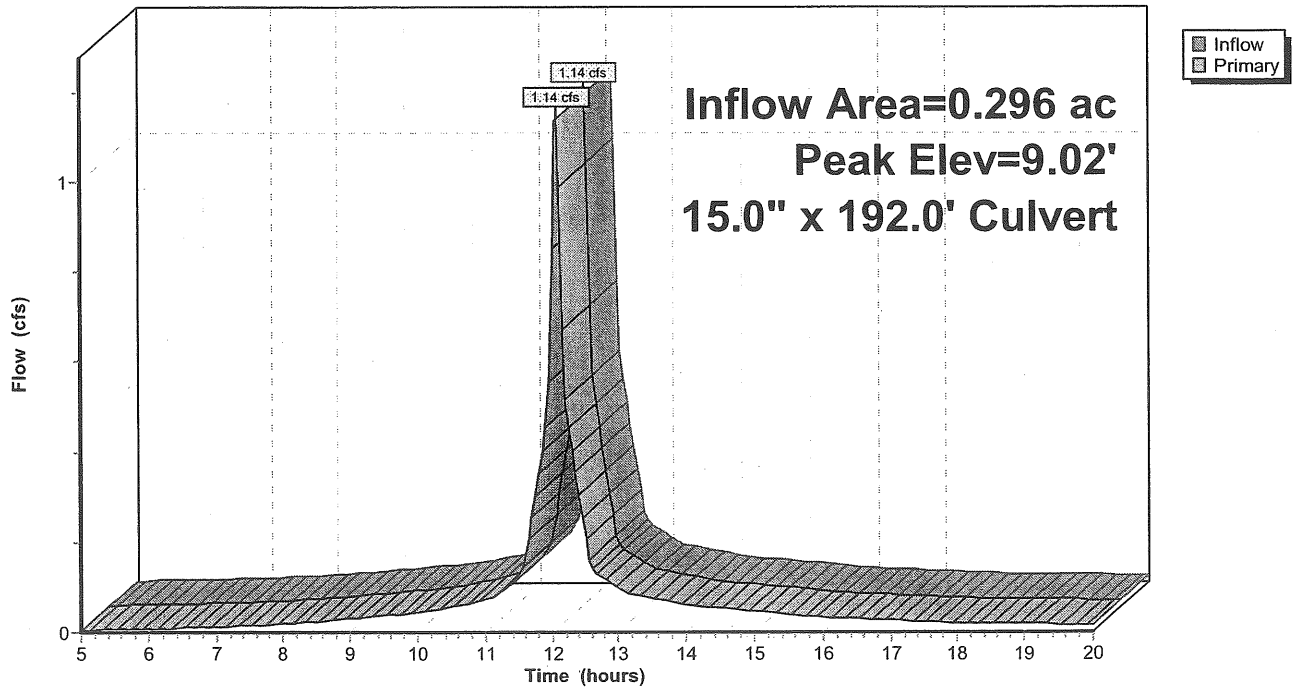
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=1.11 cfs @ 12.06 hrs HW=9.01' TW=0.00' (Dynamic Tailwater)  
↑1=Culvert (Barrel Controls 1.11 cfs @ 2.47 fps)

**Pond D3: Commercial**

Hydrograph



# Post-Development-ST

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond D2: Commercial Street Storm System

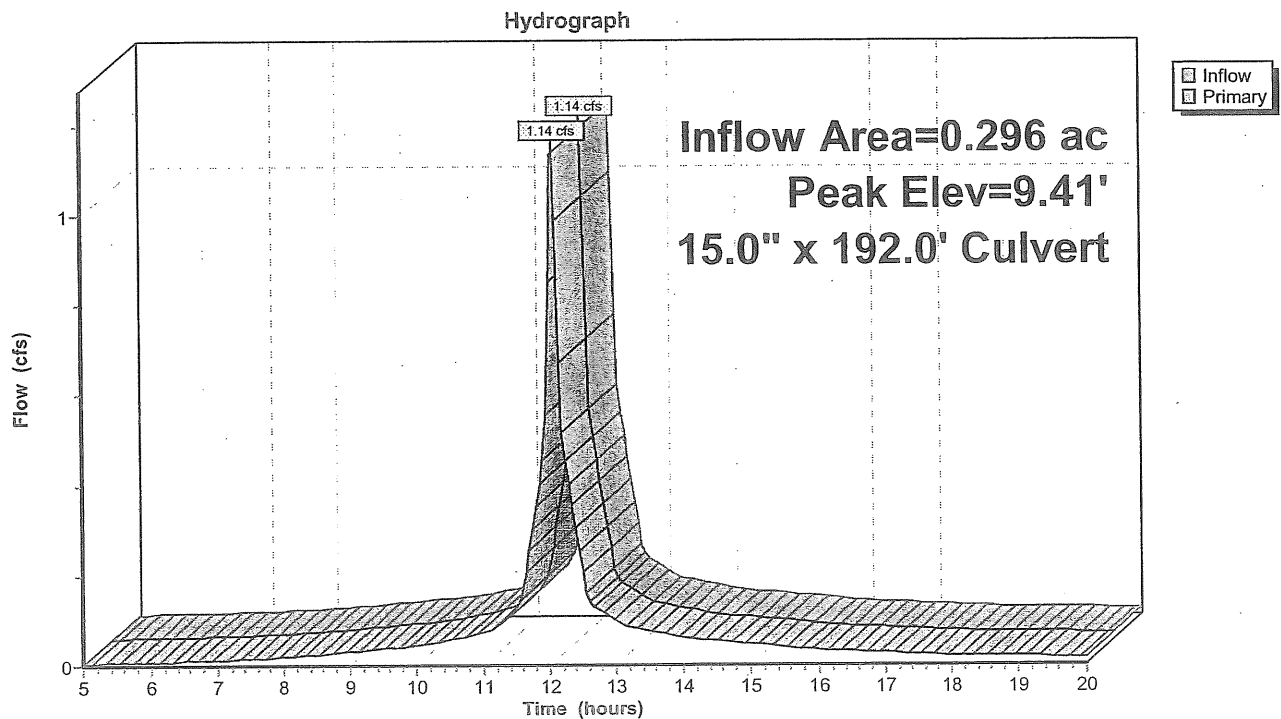
Inflow Area = 0.296 ac, Inflow Depth > 3.24" for 25-Year Storm event  
Inflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af  
Outflow = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.14 cfs @ 12.06 hrs, Volume= 0.080 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 9.41' @ 12.07 hrs  
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=1.05 cfs @ 12.06 hrs HW=9.40' TW=9.01' (Dynamic Tailwater)  
←1=Culvert (Outlet Controls 1.05 cfs @ 2.31 fps)

## Pond D2: Commercial Street Storm System



**Post-Development-ST**

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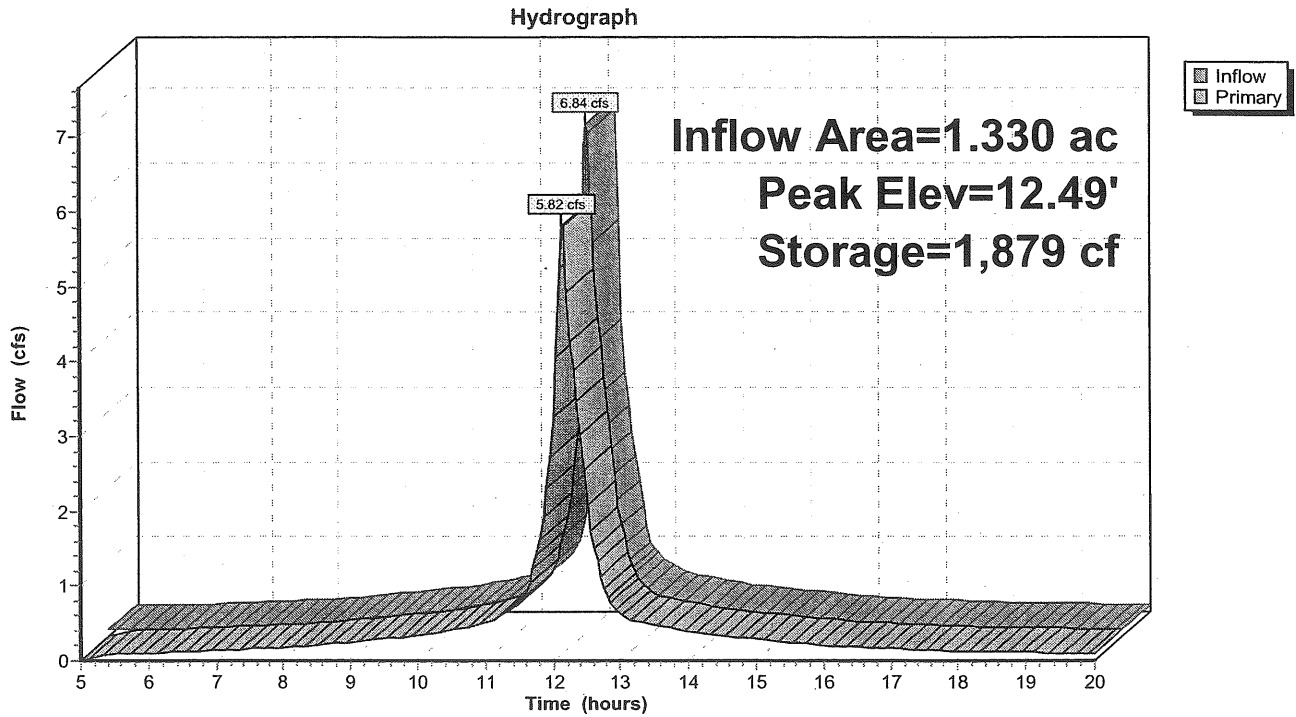
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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond 5C: Subsurface Detention for Plaza**



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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond 5C: Subsurface Detention for Plaza**

Inflow Area = 1.330 ac, Inflow Depth > 4.87" for 25-Year Storm event  
 Inflow = 6.84 cfs @ 12.08 hrs, Volume= 0.540 af  
 Outflow = 5.82 cfs @ 12.14 hrs, Volume= 0.539 af, Atten= 15%, Lag= 3.8 min  
 Primary = 5.82 cfs @ 12.14 hrs, Volume= 0.539 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 12.49' @ 12.14 hrs Surf.Area= 988 sf Storage= 1,879 cf

Plug-Flow detention time= 6.6 min calculated for 0.537 af (99% of inflow)  
 Center-of-Mass det. time= 5.0 min ( 739.3 - 734.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	1,085 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 3,952 cf Overall - 1,240 cf Embedded = 2,712 cf x 40.0% Voids
#2	10.50'	1,240 cf	<b>44.6"W x 30.0"H x 7.12'L StormTech SC-740</b> x 27 Inside #1
		2,325 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	988	0	0
13.50	988	3,952	3,952

Device	Routing	Invert	Outlet Devices
#1	Primary	9.50'	<b>12.0" x 50.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.00' S= 0.0100 '/ Cc= 0.900 n= 0.011
#2	Device 1	9.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	10.50'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	12.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

Primary OutFlow Max=5.74 cfs @ 12.14 hrs HW=12.47' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 5.74 cfs of 5.95 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 2.73 cfs @ 7.82 fps)
- 3=Orifice/Grate (Orifice Controls 2.15 cfs @ 6.17 fps)
- 4=Orifice/Grate (Orifice Controls 0.86 cfs @ 2.34 fps)

**Post-Development-ST**

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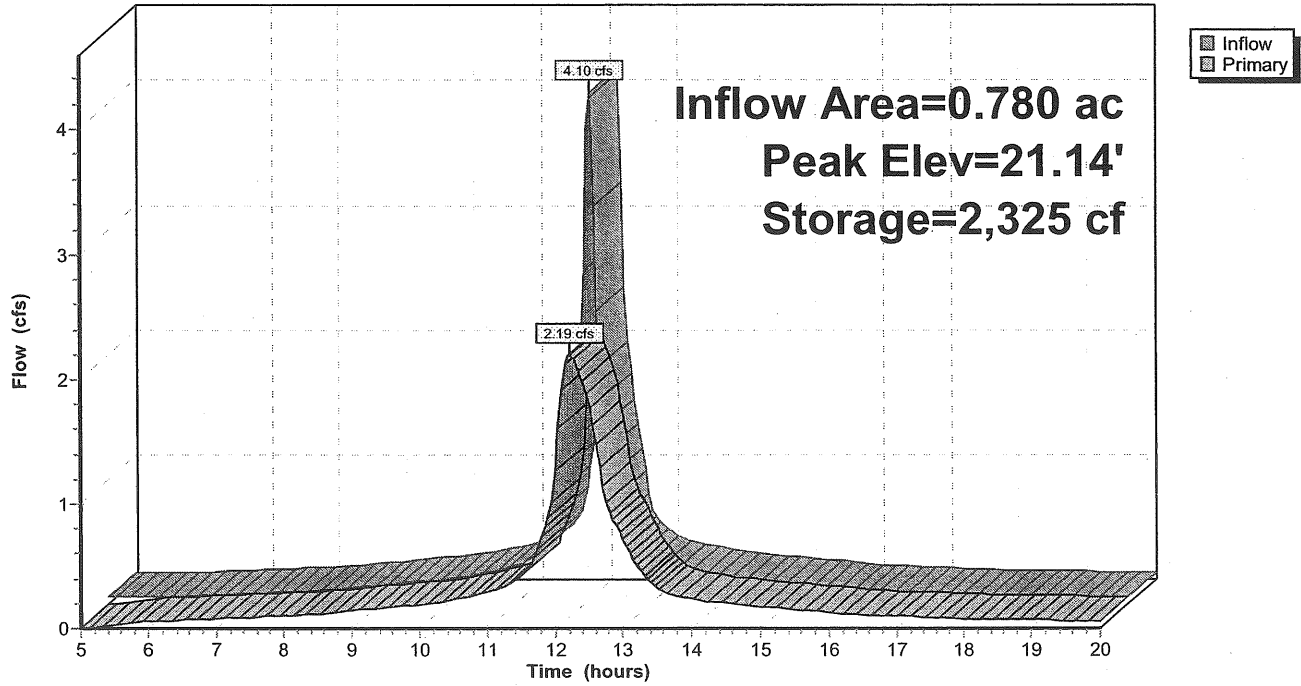
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond 1B: Subsurface Detention for Parking Garage**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Pond 1B: Subsurface Detention for Parking Garage

Inflow Area = 0.780 ac, Inflow Depth > 4.87" for 25-Year Storm event  
 Inflow = 4.10 cfs @ 12.09 hrs, Volume= 0.317 af  
 Outflow = 2.19 cfs @ 12.22 hrs, Volume= 0.315 af, Atten= 47%, Lag= 8.1 min  
 Primary = 2.19 cfs @ 12.22 hrs, Volume= 0.315 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 21.14' @ 12.22 hrs Surf.Area= 1,770 sf Storage= 2,325 cf

Plug-Flow detention time= 17.4 min calculated for 0.314 af (99% of inflow)  
 Center-of-Mass det. time= 13.8 min ( 748.4 - 734.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	1,950 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc). 7,080 cf Overall - 2,205 cf Embedded = 4,875 cf x 40.0% Voids
#2	20.00'	2,205 cf	<b>44.6"W x 30.0"H x 7.12'L StormTech SC-740</b> x 48 Inside #1
		4,155 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,770	0	0
23.00	1,770	7,080	7,080

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	<b>12.0" x 150.0' long Culvert</b> CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 18.00' S= 0.0067 '/ Cc= 0.900 n= 0.011
#2	Device 1	20.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	19.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#4	Device 1	21.50'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.18 cfs @ 12.22 hrs HW=21.13' TW=17.03' (Dynamic Tailwater)

- 1=Culvert (Passes 2.18 cfs of 4.17 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.89 cfs @ 4.52 fps)
- 3=Orifice/Grate (Orifice Controls 1.30 cfs @ 6.61 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)



# Post-Development-ST

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

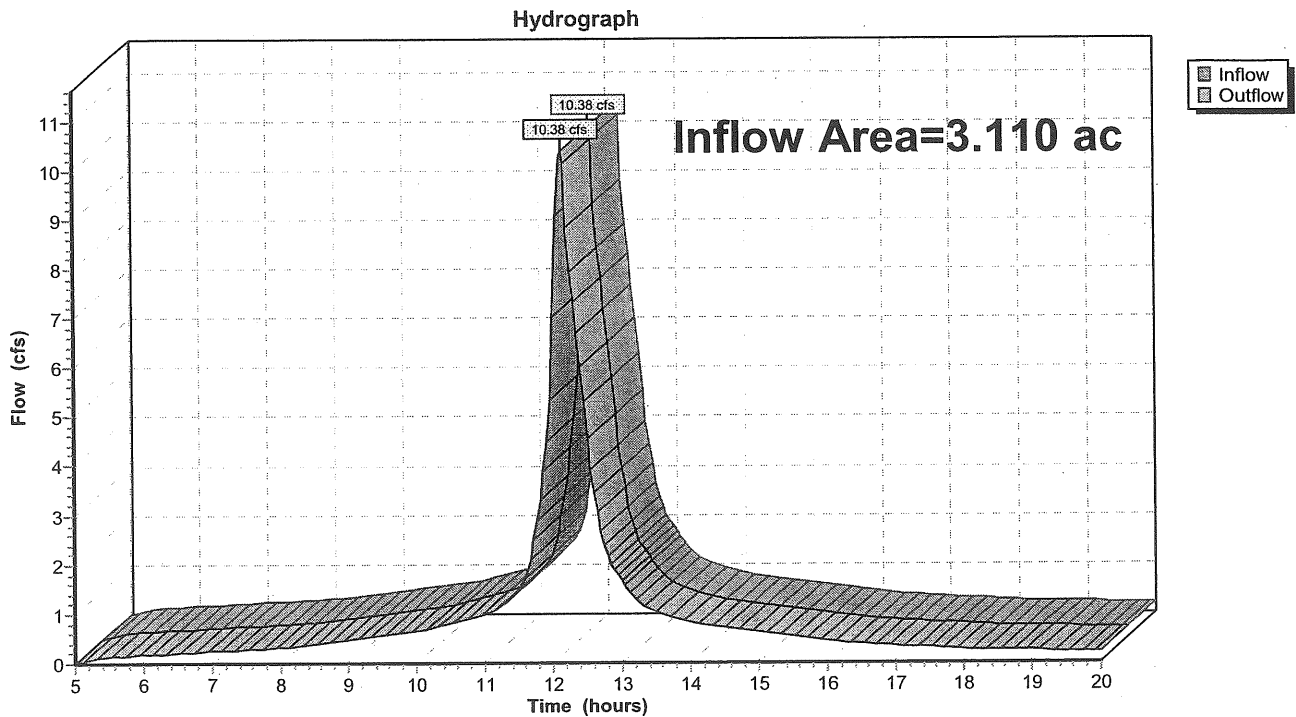
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## Reach TOT: (new node)

Inflow Area = 3.110 ac, Inflow Depth > 4.23" for 25-Year Storm event  
Inflow = 10.38 cfs @ 12.12 hrs, Volume= 1.097 af  
Outflow = 10.38 cfs @ 12.12 hrs, Volume= 1.097 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## Reach TOT: (new node)



# Post-Development-ST

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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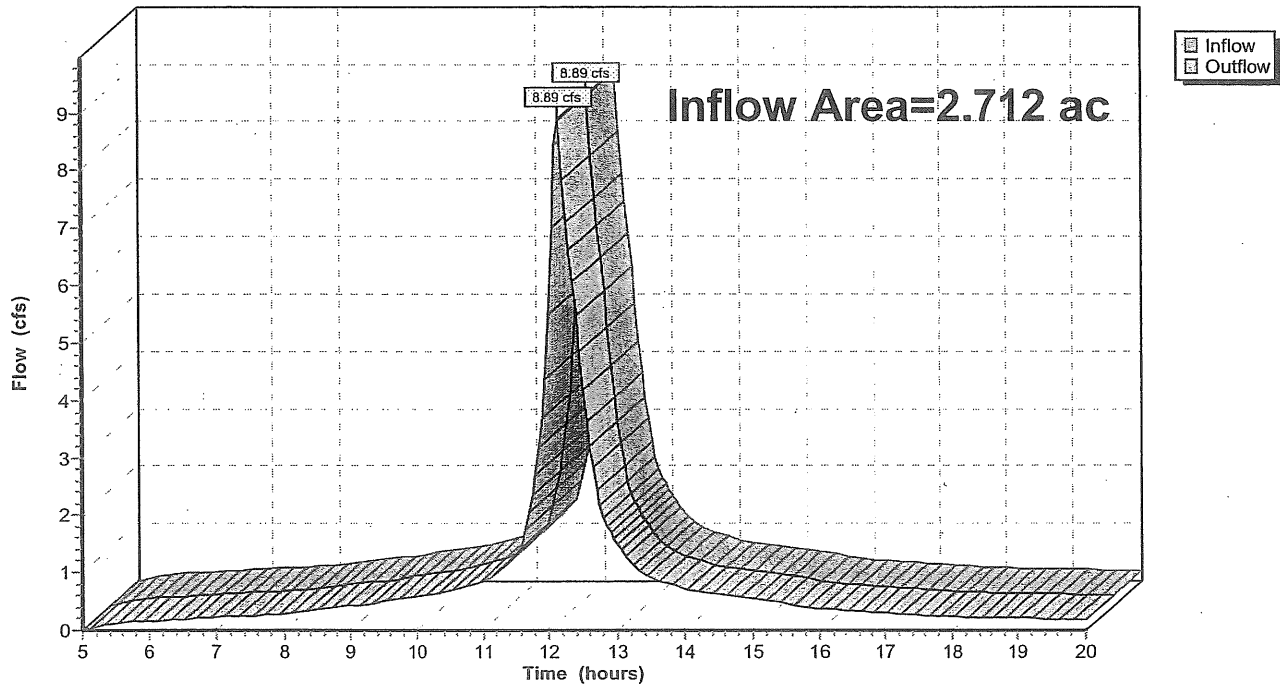
## Reach FR: Fore River

Inflow Area = 2.712 ac, Inflow Depth > 4.23" for 25-Year Storm event  
Inflow = 8.89 cfs @ 12.14 hrs, Volume= 0.957 af  
Outflow = 8.89 cfs @ 12.14 hrs, Volume= 0.957 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## Reach FR: Fore River

Hydrograph



**Post-Development-ST**

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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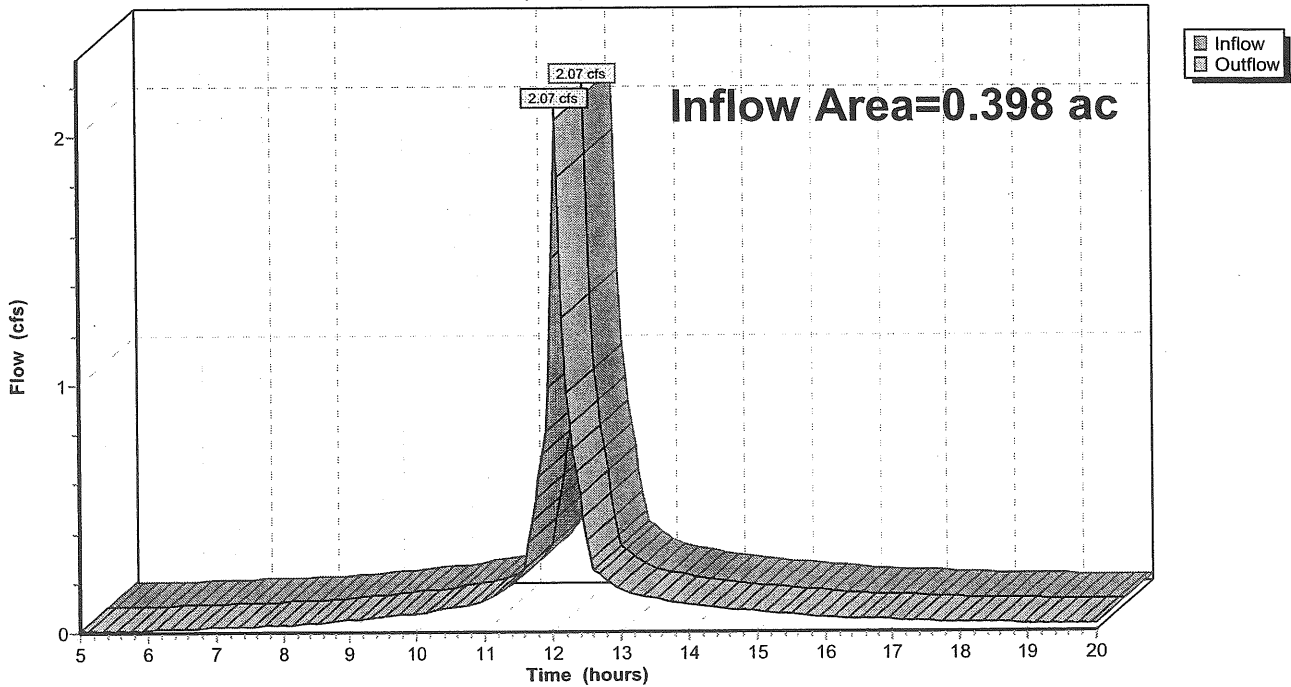
**Reach CS: Combined Sewer**

Inflow Area = 0.398 ac, Inflow Depth > 4.22" for 25-Year Storm event  
Inflow = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af  
Outflow = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach CS: Combined Sewer**

Hydrograph



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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 5CP: Plaza**

Runoff = 0.68 cfs @ 12.02 hrs, Volume= 0.047 af, Depth> 4.87"

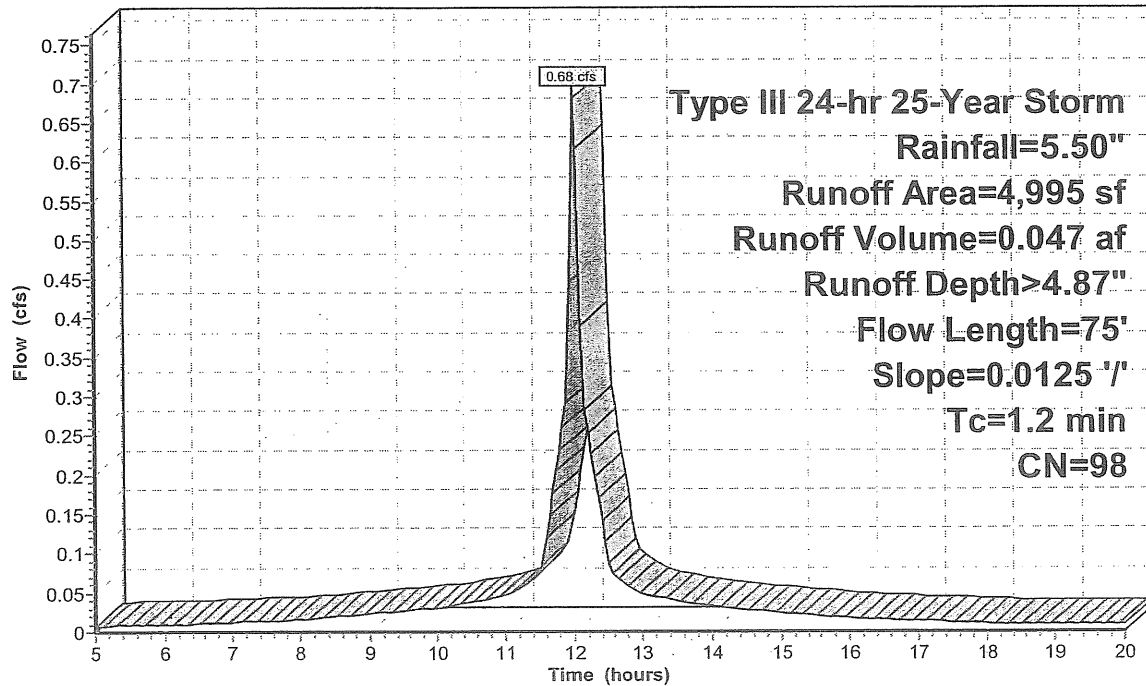
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

**Subcatchment 5CP: Plaza**

Hydrograph



Runoff

**Post-Development-ST**

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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 5BP: East Half of Complex**

Runoff = 4.65 cfs @ 12.09 hrs, Volume= 0.359 af, Depth> 4.87"

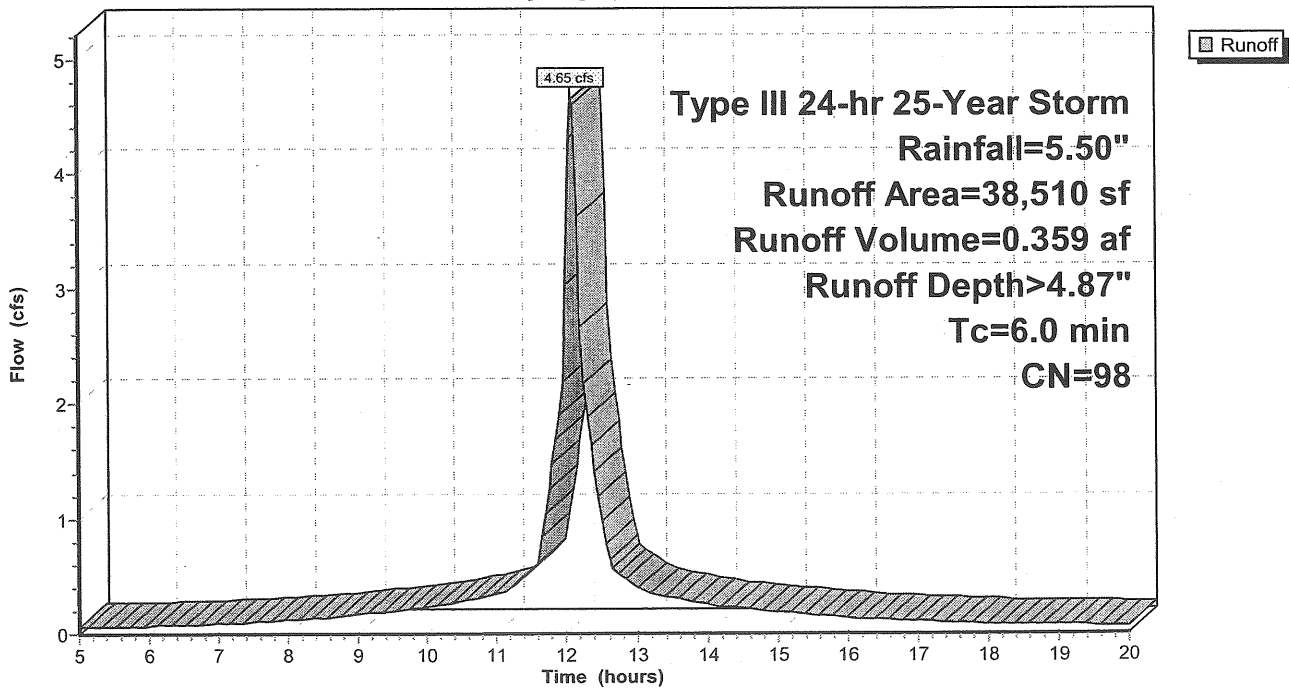
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

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

**Subcatchment 5BP: East Half of Complex**

Hydrograph



**Post-Development-ST**

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Post-Development w/ StormTech  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 5AP: West Half of Complex**

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.134 af, Depth> 4.87"

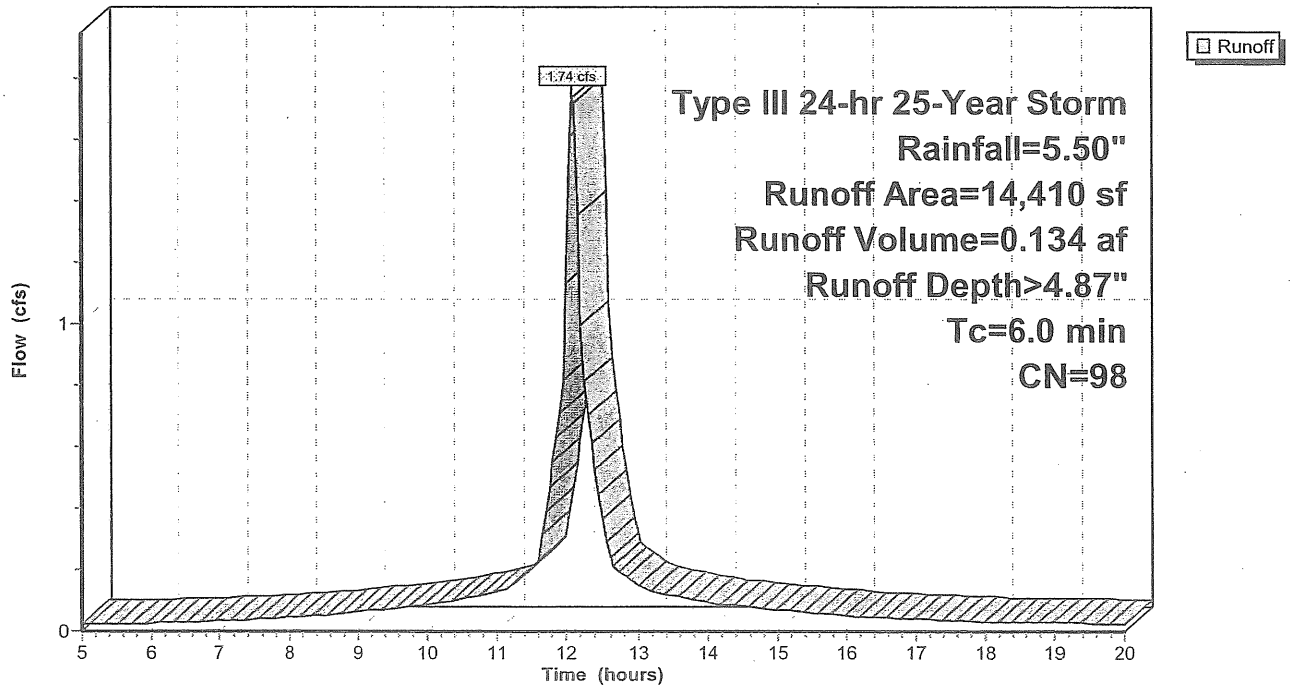
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

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

**Subcatchment 5AP: West Half of Complex**

Hydrograph



**Post-Development-ST**

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**Subcatchment 4P: Back of PS**

Runoff = 0.01 cfs @ 12.44 hrs, Volume= 0.002 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

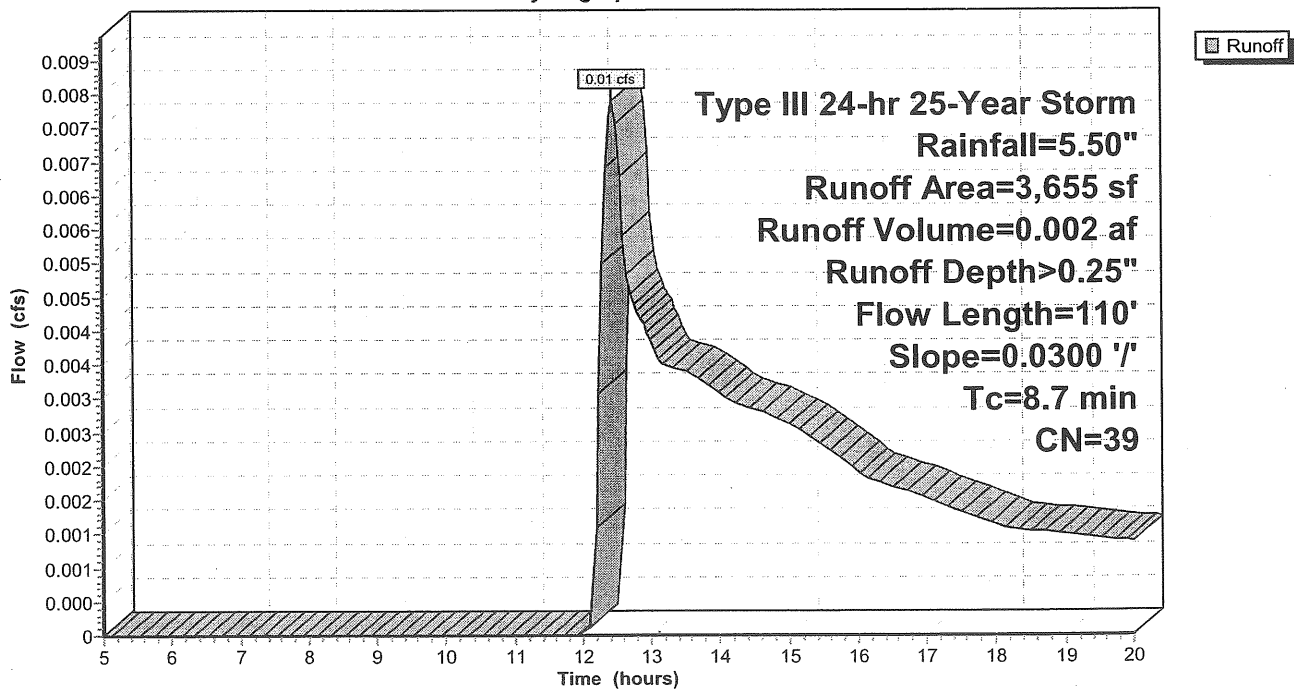
Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, AB</b> Grass: Short n= 0.150 P2= 3.00"
0.1	10	0.0300	1.21		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

**Subcatchment 4P: Back of PS**

Hydrograph



**Post-Development-ST**

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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 3P: Turner Barker**

Runoff = 1.14 cfs @ 12.06 hrs, Volume= 0.078 af, Depth> 4.43"

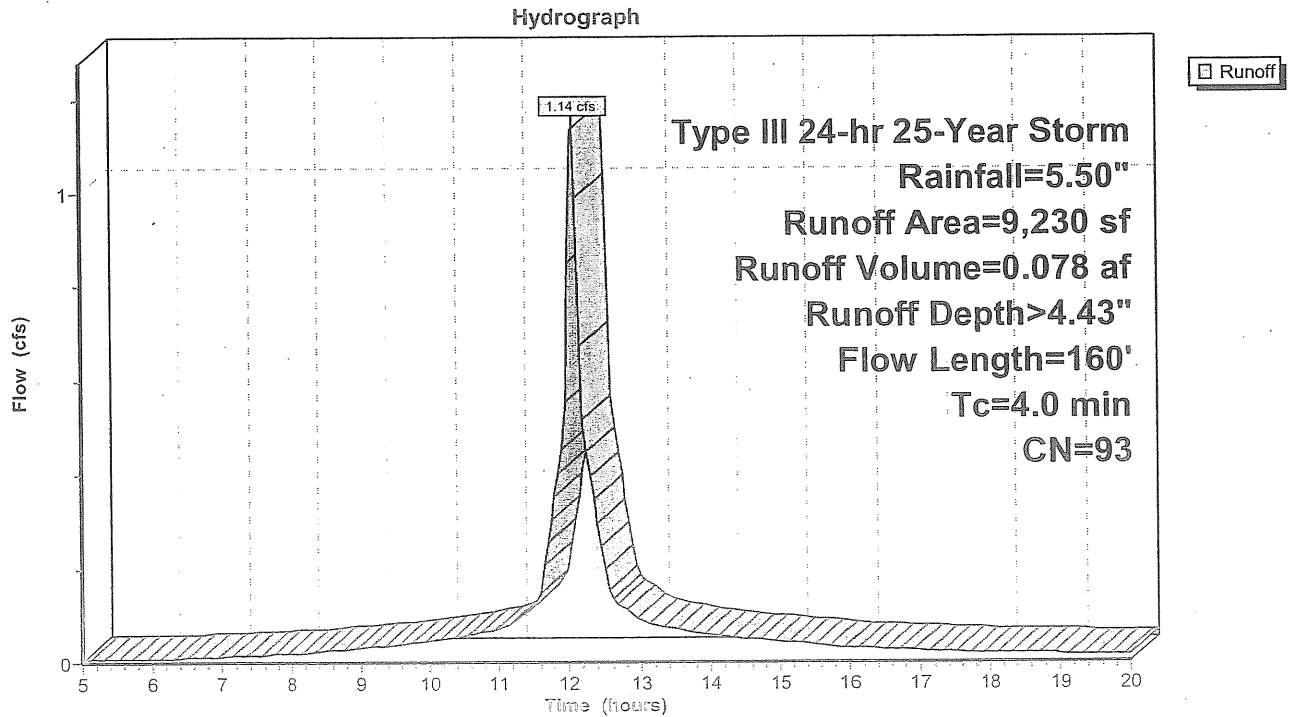
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	Circular Channel (pipe), CDE Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

**Subcatchment 3P: Turner Barker**





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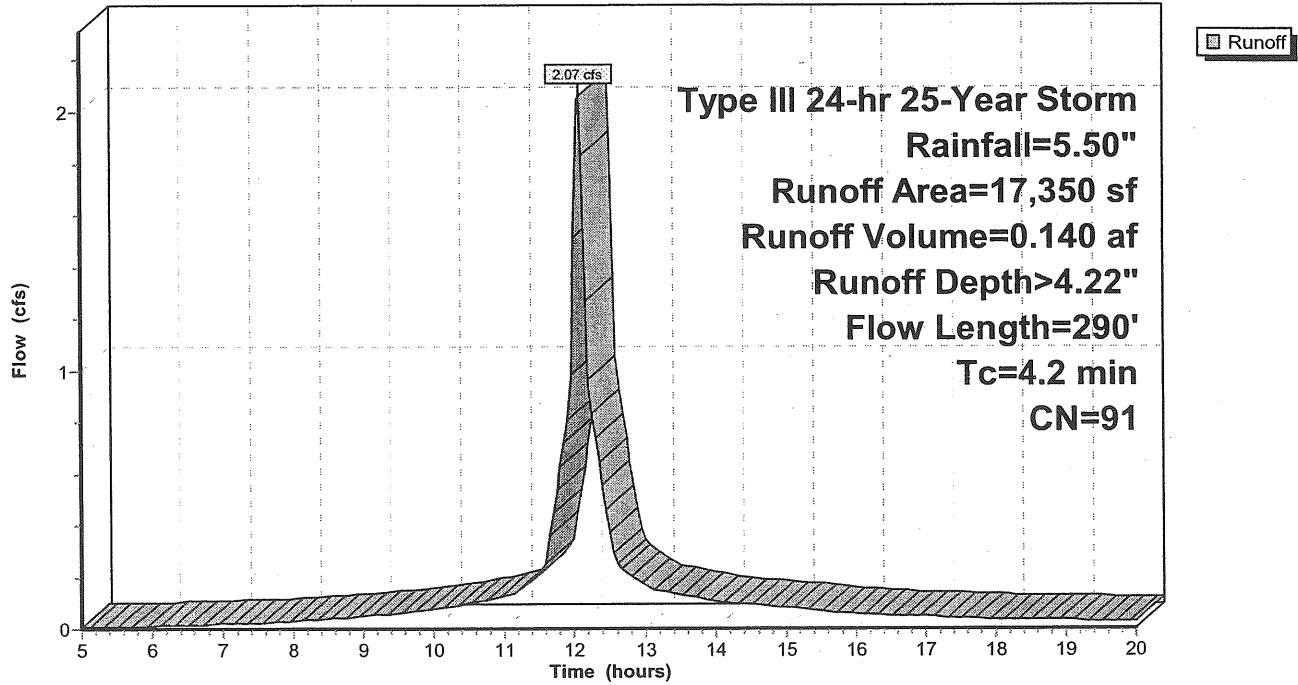
Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 2P: Office Building**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 2P: Office Building**

Runoff = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		<b>Shallow Concentrated Flow, BC</b> Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		<b>Shallow Concentrated Flow, DE</b> Paved Kv= 20.3 fps
4.2	290	Total			

**Post-Development-ST**

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 Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 1BP: Parking Garage**

Runoff = 4.10 cfs @ 12.09 hrs, Volume= 0.317 af, Depth> 4.87"

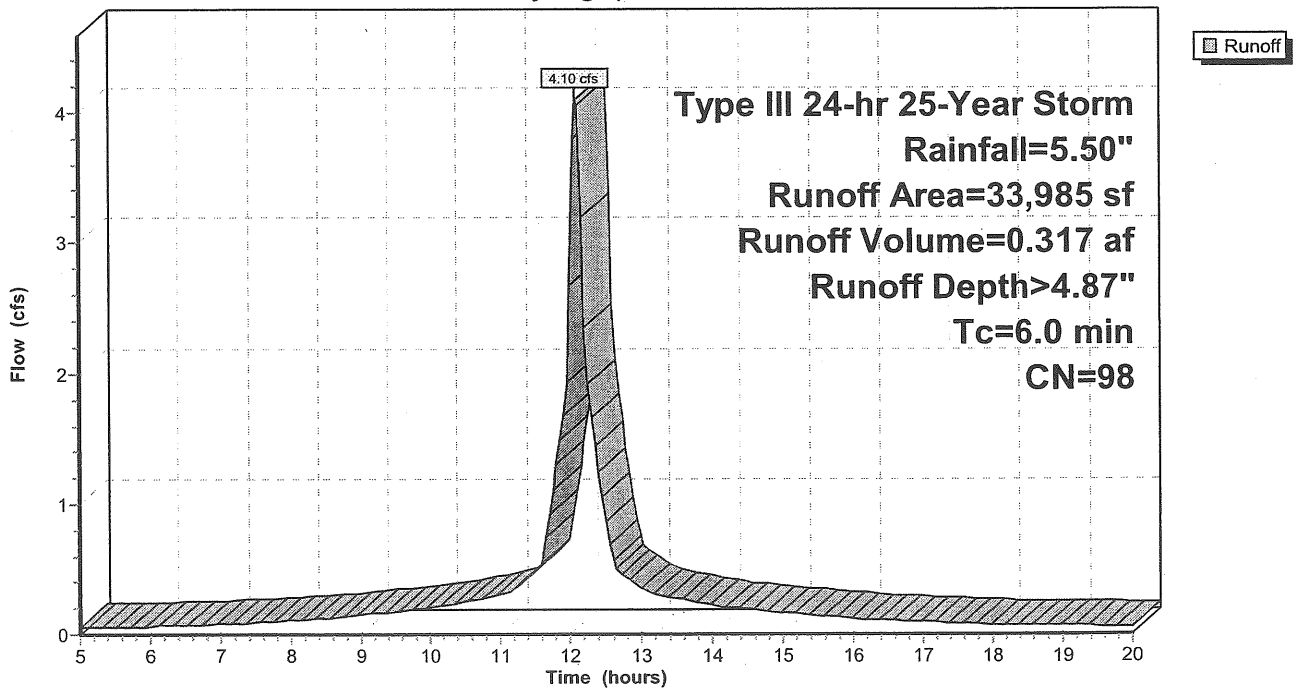
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

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

**Subcatchment 1BP: Parking Garage**

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Subcatchment 1AP: Open Space**

Runoff = 0.29 cfs @ 12.11 hrs, Volume= 0.024 af, Depth> 0.92"

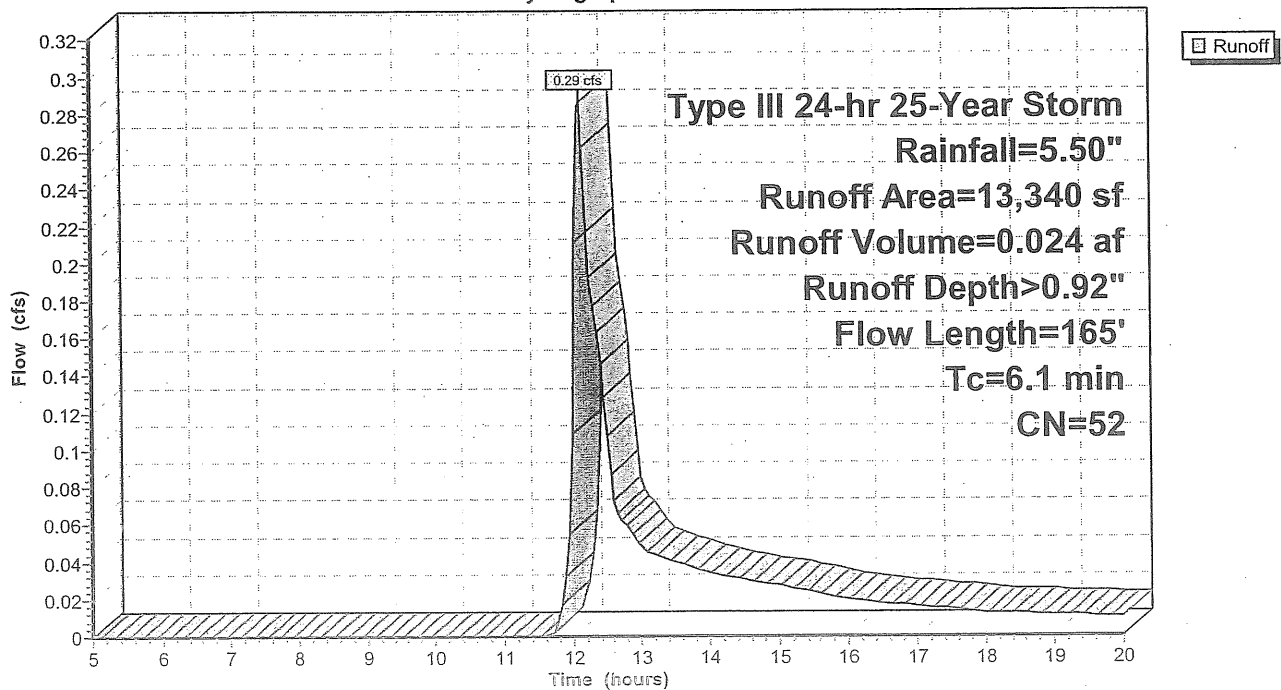
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		<b>Sheet Flow, AB</b> Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		<b>Sheet Flow, BC</b> Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		<b>Shallow Concentrated Flow, CD</b> Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

**Subcatchment 1AP: Open Space**

Hydrograph



**Post-Development-ST**

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Post-Development w/ StormTech  
Type III 24-hr 25-Year Storm Rainfall=5.50"

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**Pond D7: Hancock**

Peak Elev=8.90' Inflow=2.40 cfs 0.338 af  
30.0" x 36.0' Culvert Outflow=2.40 cfs 0.338 af

**Pond D8: Hancock Street Storm System**

Peak Elev=10.43' Inflow=2.40 cfs 0.338 af  
24.0" x 196.0' Culvert Outflow=2.40 cfs 0.338 af

**Pond UH1: Hancock Link DMH1**

Peak Elev=12.28' Inflow=2.40 cfs 0.338 af  
24.0" x 125.0' Culvert Outflow=2.40 cfs 0.338 af

**Pond UH2: Hancock Link DMH2**

Peak Elev=17.04' Inflow=2.40 cfs 0.338 af  
24.0" x 106.0' Culvert Outflow=2.40 cfs 0.338 af

**Total Runoff Area = 3.110 ac Runoff Volume = 1.101 af Average Runoff Depth = 4.25"**  
**12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac**

**Post-Development-ST**

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1AP: Open Space**

Runoff Area=13,340 sf Runoff Depth>0.92"  
Flow Length=165' Tc=6.1 min CN=52 Runoff=0.29 cfs 0.024 af

**Subcatchment 1BP: Parking Garage**

Runoff Area=33,985 sf Runoff Depth>4.87"  
Tc=6.0 min CN=98 Runoff=4.10 cfs 0.317 af

**Subcatchment 2P: Office Building**

Runoff Area=17,350 sf Runoff Depth>4.22"  
Flow Length=290' Tc=4.2 min CN=91 Runoff=2.07 cfs 0.140 af

**Subcatchment 3P: Turner Barker**

Runoff Area=9,230 sf Runoff Depth>4.43"  
Flow Length=160' Tc=4.0 min CN=93 Runoff=1.14 cfs 0.078 af

**Subcatchment 4P: Back of PS**

Runoff Area=3,655 sf Runoff Depth>0.25"  
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af

**Subcatchment 5AP: West Half of Complex**

Runoff Area=14,410 sf Runoff Depth>4.87"  
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

**Subcatchment 5BP: East Half of Complex**

Runoff Area=38,510 sf Runoff Depth>4.87"  
Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af

**Subcatchment 5CP: Plaza**

Runoff Area=4,995 sf Runoff Depth>4.87"  
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af

**Reach CS: Combined Sewer**

Inflow=2.07 cfs 0.140 af  
Outflow=2.07 cfs 0.140 af

**Reach FR: Fore River**

Inflow=8.89 cfs 0.957 af  
Outflow=8.89 cfs 0.957 af

**Reach TOT: (new node)**

Inflow=10.38 cfs 1.097 af  
Outflow=10.38 cfs 1.097 af

**Pond 1B: Subsurface Detention for Parking G Peak Elev=21.14' Storage=2,325 cf Inflow=4.10 cfs 0.317 af**

Outflow=2.19 cfs 0.315 af

**Pond 5C: Subsurface Detention for Plaza Peak Elev=12.49' Storage=1,879 cf Inflow=6.84 cfs 0.540 af**

Outflow=5.82 cfs 0.539 af

**Pond D2: Commercial Street Storm System**

Peak Elev=9.41' Inflow=1.14 cfs 0.080 af  
15.0" x 192.0' Culvert Outflow=1.14 cfs 0.080 af

**Pond D3: Commercial**

Peak Elev=9.02' Inflow=1.14 cfs 0.080 af  
15.0" x 192.0' Culvert Outflow=1.14 cfs 0.080 af

# Post-Development-ST

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Post-Development w/ StormTech  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Pond UH2: Hancock Link DMH2

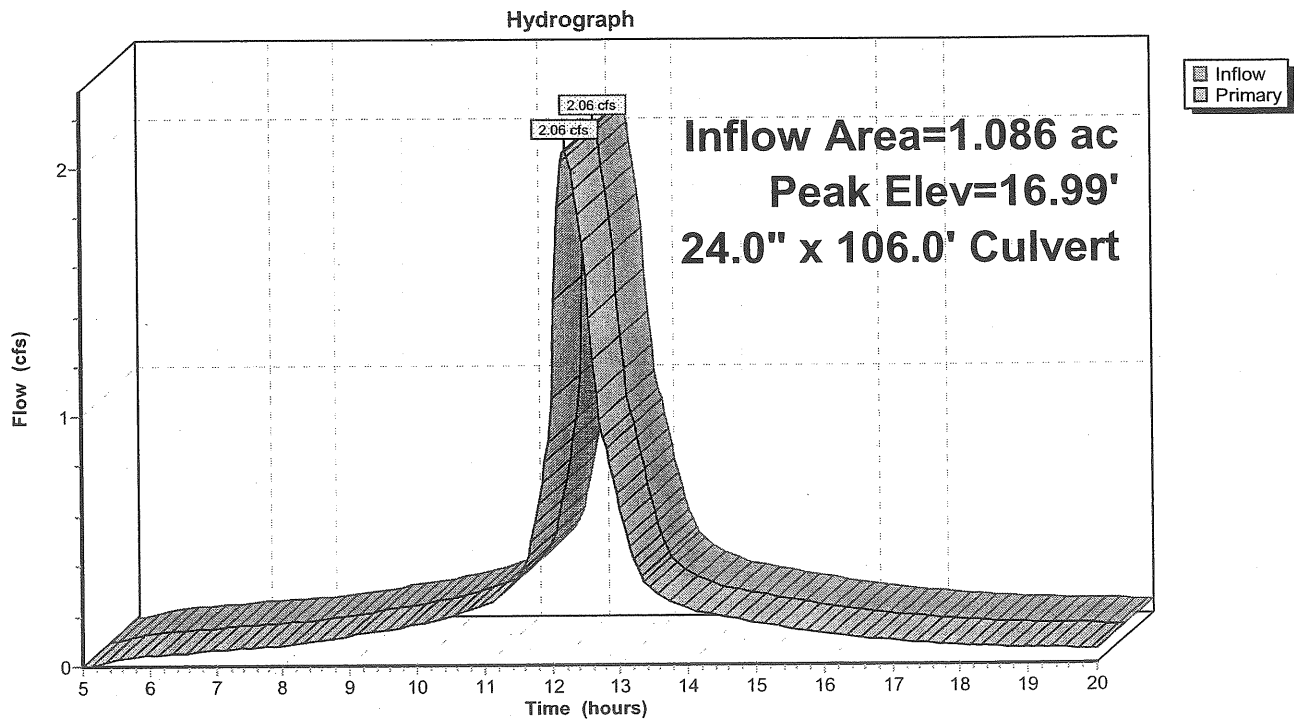
Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af  
Outflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 16.99' @ 12.21 hrs  
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	<b>24.0" x 106.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.06 cfs @ 12.21 hrs HW=16.98' TW=12.22' (Dynamic Tailwater)  
←1=Culvert (Inlet Controls 2.06 cfs @ 2.63 fps)

## Pond UH2: Hancock Link DMH2



**Post-Development-ST**

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Post-Development w/ StormTech  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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**Pond UH1: Hancock Link DMH1**

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af  
Outflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

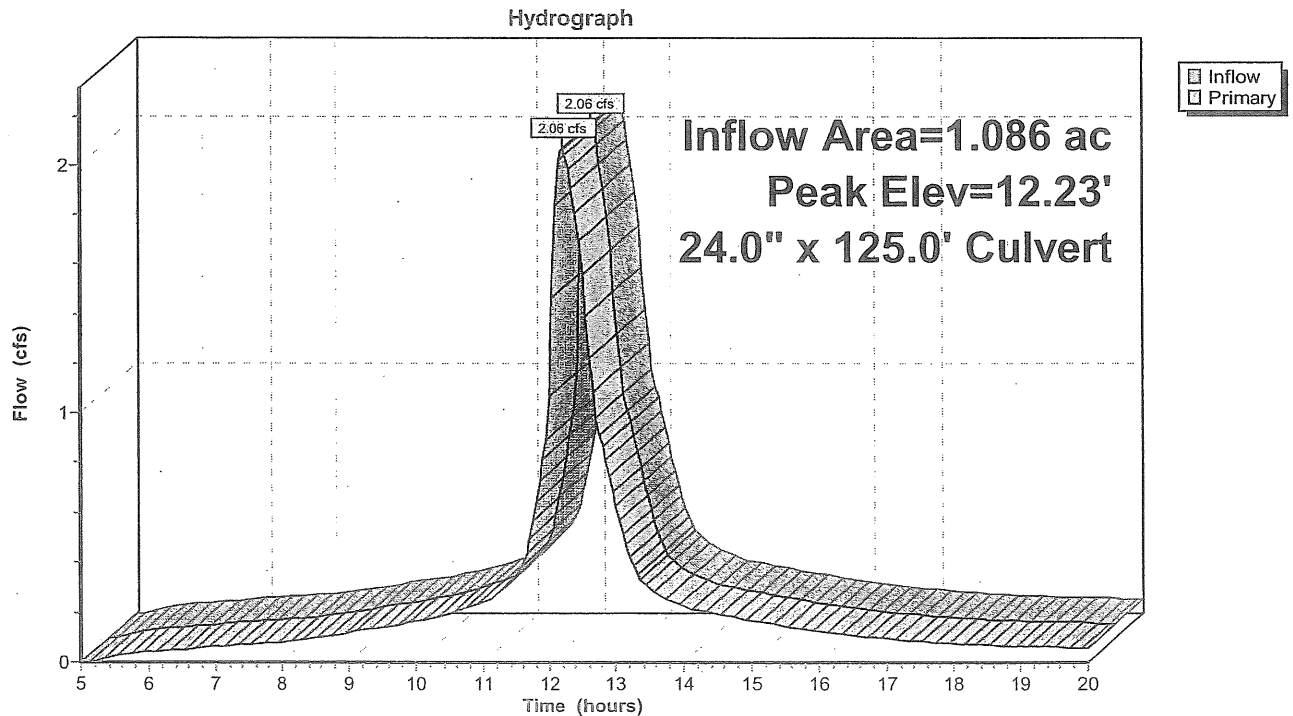
Peak Elev= 12.23' @ 12.21 hrs

Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	<b>24.0" x 125.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 ' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.06 cfs @ 12.21 hrs HW=12.22' TW=10.37' (Dynamic Tailwater)  
←1=Culvert (Inlet Controls 2.06 cfs @ 2.63 fps)

**Pond UH1: Hancock Link DMH1**





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Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Pond D8: Hancock Street Storm System

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af  
Outflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af

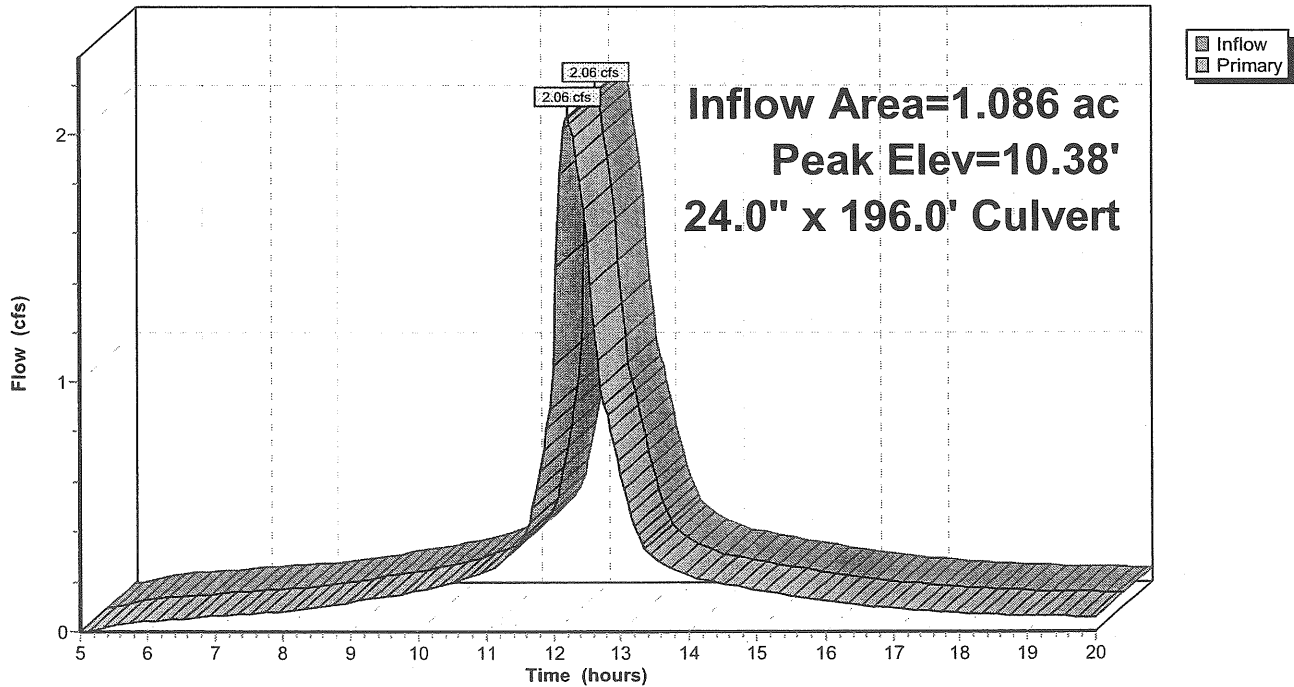
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 10.38' @ 12.21 hrs  
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=2.06 cfs @ 12.21 hrs HW=10.37' TW=8.84' (Dynamic Tailwater)  
↑1=Culvert (Inlet Controls 2.06 cfs @ 2.63 fps)

## Pond D8: Hancock Street Storm System

Hydrograph



# Post-Development-ST

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Post-Development w/ StormTech  
Type III 24-hr 10-Year Storm Rainfall=4.70"

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## Pond D7: Hancock

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event  
Inflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af  
Outflow = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.06 cfs @ 12.21 hrs, Volume= 0.282 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.84' @ 12.21 hrs

Flood Elev= 13.91'

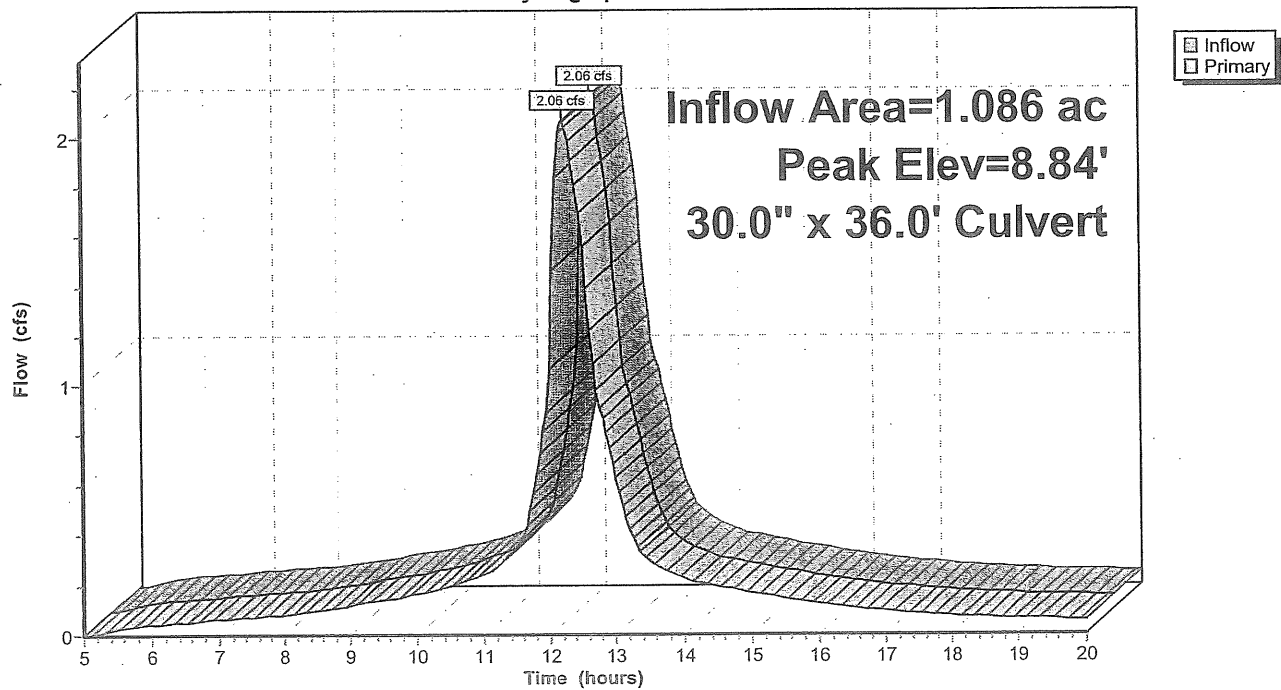
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=2.06 cfs @ 12.21 hrs HW=8.84' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 2.06 cfs @ 2.45 fps)

## Pond D7: Hancock

Hydrograph



**Post-Development-ST**

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**Pond D3: Commercial**

Inflow Area = 0.296 ac, Inflow Depth > 2.67" for 10-Year Storm event  
 Inflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af  
 Outflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.96' @ 12.06 hrs

Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	<b>15.0" x 192.0' long Culvert</b> Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/ Cc= 0.900 n= 0.010

**Primary OutFlow** Max=0.94 cfs @ 12.06 hrs HW=8.95' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Barrel Controls 0.94 cfs @ 2.35 fps)

**Pond D3: Commercial**

Hydrograph

