CASE #PL2020-112

Hydrology Report

Seagate Minnesota Campus Parking Ramp

Bloomington, MN

Prepared by Loucks

July 8, 2020

Loucks Project No. 20244

Seagate Minnesota Campus Parking Ramp

Bloomington, Minnesota

Stormwater Management Plan

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Stormwater Management Plan

Introduction

This stormwater management plan was created for the Seagate Minnesota Campus Parking Ramp project located at 7801 Computer Ave in Bloomington, Minnesota. The total site area encompasses 34.05 acres (located in both Bloomington and Edina) with 6.14 acres disturbed (located entirely in Bloomington).

The project generally consists of constructing a parking ramp, surface pavements, landscape islands, an infiltration basin, an underground filtration system, and associated utilities. A future building addition on the east side of the project is also included in this analysis. A large portion of the existing parking lot will be milled & overlaid which will not be included in the analysis as it is considered maintenance.

Included in this plan are calculations for the existing and proposed discharge of stormwater offsite to Computer Avenue and an existing drainage ditch on the south side of the property.

Requirements and Methodology

City of Bloomington and Nine Mile Creek Watershed District (NMCWD) Requirements:

1. Rate Control – Limit peak runoff flow rates to that from existing conditions for the 2-yr, 10-yr, and 100-yr frequency storm events.

2. Volume Control – Provide for the retention onsite of 1.1-inches of runoff from the new and/or redeveloped impervious surfaces.

3. Water Quality – Provide for at least 60 percent annual removal efficiency for total phosphorus (TP) and at least 90 percent annual removal efficiency for total suspended solids (TSS) from site runoff.

Methodology

The stormwater calculations were made utilizing the stormwater-modeling program HydroCAD 10.00. Calculations were performed for the MSE 24-hour 100-year rainfall event of 7.32 inches, 10-year rainfall event of 4.26 inches, and the 2-year rainfall event of 2.86 inches. For purposes of analyzing the 6.14 acre project area, a drainage area of about 10.95 acres was included in the hydrologic analysis to account for all runoff that affects the proposed project.

Soils information based on boring logs provided by Braun Intertec dated June 4, 2020 indicate that the project area generally consists of fill material placed over organic swamp deposits. Soils above and below the organic swamp deposits varied from sands, silty sands, clayey sands, and lean clay. The groundwater elevation was found to be as high as 816.50 within the project area. Borings in one portion of the project area showed the potential to be conducive for infiltration practices.

Based on these soil conditions, a combination of infiltration and filtration stormwater management BMPs will be utilized to meet stormwater requirements.

Existing Conditions

The existing site consists largely of untreated parking lot surface. The existing site is broken up into four drainage areas. DA-1E sheet drains to an existing drainage ditch on the south side of the property. DA-2E sheet drains to an existing pond on the west side of the property prior to discharging to Computer Ave. DA-3E sheet drains directly to Computer Ave. Overall, the existing project area being analyzed contains 86.8% impervious surface area.

Proposed Conditions

The proposed site will include a parking ramp, future building addition, landscaping and parking. A infiltration basin (INF1) and a underground filtration system (FIL1) are proposed for rate control, volume control, and treatment. Overall, the proposed project area being analyzed contains 72.1% impervious surface area.

The proposed site is broken up into nine drainage areas. DA-1P and DA-2P drain to the infiltration basin (INF1) prior to discharging to the existing drainage ditch on the south side of the property. DA-3P, DA-4P, and DA-5P drain to the underground infiltration system (FIL1) prior to discharging to the existing pond on the west side of the property. DA-6P and DA-7P drain directly to the existing pond on the west side of the property. DA-8P drains directly to computer Ave. DA-9P drains directly to the existing drainage ditch on the south side of the property.

Common Scheme of Development (Rule 4.2.5)
Per NMCWD requirements, development on a parcel since 2008 shall be considered in aggregate. If the project will disturb or increase impervious surfaces, in aggregate since 2008, the stormwater management requirements will apply to the entire parcel.

Based on a Permit Application Review report conducted by NMCWD, dated February 2, 2017, for the Switchgear project on the Seagate campus, the following information was found:

- Total Site Area = 34.05 Acres
- Existing Total Site Impervious Area to Date = 26.0 Acres (1,132,170 SF)
- Total Existing Site Impervious Increased to Date = 0.0 Acres
- Total Existing Site Impervious Area Disturbed to Date = 4.7% (52,777 SF)

The proposed project will remove or replace 267,367 square-feet of impervious surfaces. Combing the total existing site impervious area disturbed to date with the proposed:
Aggregate Impervious Area Disturbed = 267,367 SF + 52,777 SF = 320,144 SF
Total Site Impervious Area Disturbed = 320,144 SF / 1,132,170 SF = **28.3%**

Rate Control
Per City of Bloomington and NMCWD requirements, runoff rates for the proposed activity shall not existing runoff rates for the 2-year, 10-year, and 100-year critical storm events.

Table 1.1 to Table 1.3 below compares the existing and proposed peak runoff rates and volumes for the discharge points analyzed.

Table 1.1 – Peak Runoff Rates and Volumes to Existing Pond (Northwest)

24-HR Storm Event	Existing Peak Runoff Rate and Volume	Proposed Peak Runoff Rate and Volume
2-yr (2.86")	21.44 cfs, 1.084 ac-ft	11.39 cfs, 1.148 ac-ft
10-yr (4.26")	33.17 cfs, 1.728 ac-ft	22.78 cfs, 1.774 ac-ft
100-yr (7.32")	58.43 cfs, 3.151 ac-ft	48.93 cfs, 3.175 ac-ft

Table 1.2 – Peak Runoff Rates and Volumes to Computer Avenue (West)

24-HR Storm Event	Existing Peak Runoff Rate and Volume	Proposed Peak Runoff Rate and Volume
2-yr (2.86")	22.15 cfs, 1.117 ac-ft	12.10 cfs, 1.182 ac-ft
10-yr (4.26")	34.60 cfs, 1.795 ac-ft	24.19 cfs, 1.841 ac-ft
100-yr (7.32")	61.55 cfs, 3.301 ac-ft	52.04 cfs, 3.325 ac-ft

Table 1.3 – Peak Runoff Rates and Volumes to Existing Drainage Ditch (South)

24-HR Storm Event	Existing Peak Runoff Rate and Volume	Proposed Peak Runoff Rate and Volume
2-yr (2.86")	19.37 cfs, 0.997 ac-ft	5.63 cfs, 0.461 ac-ft
10-yr (4.26")	29.63 cfs, 1.568 ac-ft	14.21 cfs, 0.968 ac-ft
100-yr (7.32")	51.77 cfs, 2.826 ac-ft	32.18 cfs, 2.160 ac-ft

Volume Control

Per City of Bloomington and NMCWD requirements, the project shall provide for the retention onsite of 1.1-inches of runoff from new and/or redeveloped impervious surfaces. Soils information provided by Braun Intertec indicated that the majority of the project area, and the parcel as a whole, is not conducive for infiltration practices due to the large presence of clays and organic swamp deposits. A groundwater elevation of 816.50 also prevents infiltration practices on the southern portion of the site due to the required 3-feet of separation from the bottom of the facility. One portion of the site, between the proposed parking ramp and future building addition, showed the presence of sand within 7-feet of the surface. To provide onsite retention to the furthest extent possible, the proposed design incorporates an infiltration basin within this area. The infiltration basin was maximized within our site constraints.

The proposed infiltration basin (INF1) is designed to meet the requirement of retaining 1.1-inches of runoff from new and/or redeveloped impervious surfaces. The bottom of the proposed infiltration basin (INF1) is at an elevation of 819.50, which is 3-feet above the groundwater elevation. An underground filtration system (FIL1), which is designed to filtrate 1.1-inches of runoff from the contributing impervious surfaces per MIDS standards, is provided as well for additional water quality treatment.

The proposed project incorporates 199,726 square-feet of new and redeveloped impervious surfaces. A portion of the new and redeveloped impervious surfaces, from the addition of landscape islands and asphalt patches, are sporadically located throughout the existing parking lot. Since the majority of the existing parking lot will remain, it was found that capturing those areas of new and redeveloped impervious surfaces would not be feasible. In lieu of that, we are proposing to route other existing untreated impervious areas to the underground infiltration system.

A summary of the total impervious surfaces being routed to each stormwater management system and the water quality volume being provided is shown below:

Infiltration Basin (INF1):
Req. Volume (ft^3) = Impervious Surfaces to System (ft^2) * 1.1 (in) * 1/12 (ft/in)
Req. Volume (ft^3) = 109,113 (ft^2) * 1.1 (in) * 1/12 (ft/in) = 10,002 ft^3

Volume Provided Below Outlet for INF1 = 19,105 ft^3

Underground Filtration System (FIL1):
Req. Volume (ft^3) = Impervious Surfaces to System (ft^2) * 1.1 (in) * 1/12 (ft/in)
Req. Volume (ft^3) = 90,635 (ft^2) * 1.1 (in) * 1/12 (ft/in) = 8,308 ft^3

Volume Provided Below Outlet for FIL1 = 8,328 ft^3

The combination of new, redeveloped, and existing untreated impervious surfaces routed to the stormwater management systems is **119,748 square-feet** which is greater than the 199,726 square-feet of new and redeveloped impervious surfaces being created by the project.

In order for the project to meet the requirement of retaining 1.1-inches of runoff from new and reconstructed impervious surfaces, the total water quality volume required to be retained is:

Req. Volume (ft^3) = Impervious Surfaces (ft^2) * 1.1 (in) * 1/12 (ft/in)
Req. Volume (ft^3) = 199,726 (ft^2) * 1.1 (in) * 1/12 (ft/in) = 18,308 ft^3

The proposed infiltration basin is designed to retain a volume of **19,105 square-feet** which is greater than the required volume of 18,308 square-feet.

Drawdown
The stormwater management systems are designed to drawdown within approximately 48 hours. The calculation for the drawdown time is shown below:

Infiltration Basin (INF1):
Footprint of infiltration = 18,279 ft^2

Allow. Vol. for 48 Hr. Drawdown=Infiltration Rate(in/hr)*48(hr)*Footprint of infiltration(ft^2)*(ft/12 in)
Allow. Vol. for 48 Hr. Drawdown=0.45(in/hr)*48(hr)*18,279(ft^2)*(ft/12 in)=32,902 ft^3

The proposed volume below the outlet for the INF1 is **19,105 cubic-feet** which is less than the allowable volume of 32,902 cubic-feet; therefore, the system will drawdown in 48 hours.

Underground Filtration System (FIL1):
Footprint of filtration = 9,239 ft^2

Allow. Vol. for 48 Hr. Drawdown=Infiltration Rate(in/hr)*48(hr)*Footprint of filtration(ft^2)*(ft/12 in)
Allow. Vol. for 48 Hr. Drawdown=1.63(in/hr)*48(hr)*9,239(ft^2)*(ft/12 in)=60,238 ft^3

The proposed volume below the outlet for the FIL1 is **8,328 cubic-feet** which is less than the allowable volume of 60,238 cubic-feet; therefore, the system will drawdown in 48 hours.

Water Quality Treatment Standard
Per City of Bloomington and NMCWD requirements, provide for at least 60 percent annual removal efficiency for total phosphorus (TP) and at least 90 percent annual removal efficiency for total suspended solids from site runoff.

As outlined in the Volume Control Section, the MIDS analysis accounted for the impervious surfaces going to the proposed BMPs. All other impervious surfaces within the drainage area being analyzed not going to a BMP are either existing to remain or being accounted for through treatment of untreated existing impervious surfaces.

Calculations for proposed water quality were conducted for the site using the MIDS calculator. Table 1.4 below shows a summary of the percent annual removals for total phosphorus and total suspended solids. Refer to appendix C for the full report.

Table 1.4 – MIDS Table

	Total
Total Phosphorus	76%
Total Suspended Solids	93%

Best Management Practices

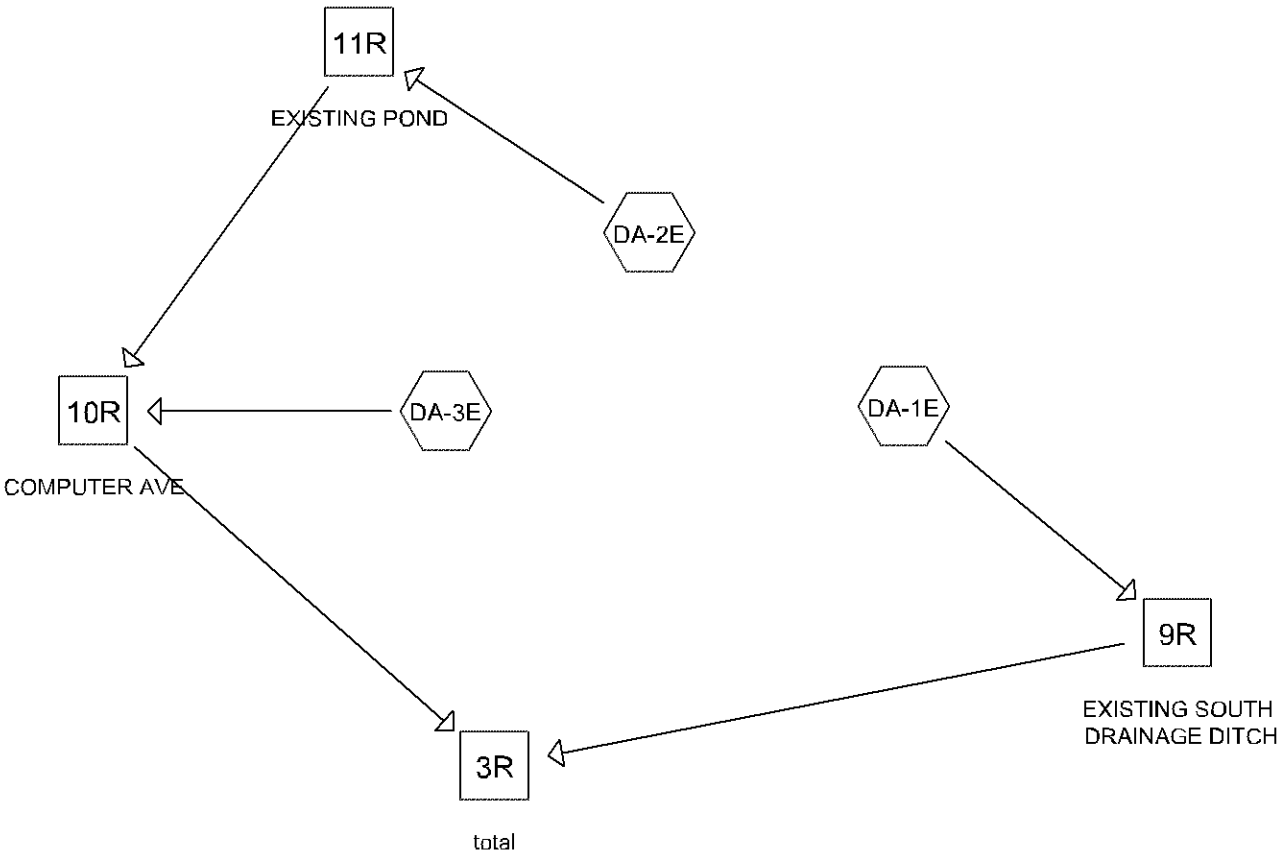
Best management practices (BMP's) will be implemented during construction per the project Stormwater Pollution Prevention Plan (231.SW-232.SW). During construction, erosion control measures will include dust control, silt fencing, bio rolls, inlet protection, and erosion control blankets. Permanent BMP's will include stormwater management systems and turf establishment (vegetation) of disturbed areas.

Conclusion

The proposed Stormwater Management Plan for the Seagate Minnesota Campus Parking Ramp project provides an improved solution for the conveyance of stormwater on this site. The infiltration basin and underground filtration system will capture runoff and provide additional rate control and treatment on the site.

Appendix A

HydroCAD Report, Existing



Subcat Reach Pond Link

Routing Diagram for 20244-Existing
Prepared by {enter your company name here}, Printed 7/8/2020
HydroCAD® 10.00-20 s/n 02676 © 2017 HydroCAD Software Solutions LLC

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 5327 MN Hennepin

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.445	74	>75% Grass cover, Good, HSG C (DA-1E, DA-2E, DA-3E)
0.079	98	Paved parking, HSG C (DA-3E)
9.425	98	Unconnected pavement, HSG C (DA-1E, DA-2E)
10.949	**95**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
10.949	HSG C	DA-1E, DA-2E, DA-3E
0.000	HSG D	
0.000	Other	
10.949		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.445	0.000	0.000	1.445	>75% Grass cover, Good	DA-1E, DA-2E, DA-3E
0.000	0.000	0.079	0.000	0.000	0.079	Paved parking	DA-3E
0.000	0.000	9.425	0.000	0.000	9.425	Unconnected pavement	DA-1E, DA-2E
0.000	**0.000**	**10.949**	**0.000**	**0.000**	**10.949**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1E: Runoff Area=4.956 ac 92.80% Impervious Runoff Depth=2.41"
Tc=7.0 min CN=96 Runoff=19.37 cfs 0.997 af

SubcatchmentDA-2E: Runoff Area=5.624 ac 85.81% Impervious Runoff Depth=2.31"
Tc=7.0 min CN=95 Runoff=21.44 cfs 1.084 af

SubcatchmentDA-3E: Runoff Area=0.369 ac 21.41% Impervious Runoff Depth=1.09"
Tc=7.0 min CN=79 Runoff=0.71 cfs 0.033 af

Reach 3R: total Inflow=41.52 cfs 2.115 af
Outflow=41.52 cfs 2.115 af

Reach 9R: EXISTING SOUTH DRAINAGE DITCH Inflow=19.37 cfs 0.997 af
Outflow=19.37 cfs 0.997 af

Reach 10R: COMPUTER AVE Inflow=22.15 cfs 1.117 af
Outflow=22.15 cfs 1.117 af

Reach 11R: EXISTING POND Inflow=21.44 cfs 1.084 af
Outflow=21.44 cfs 1.084 af

Total Runoff Area = 10.949 ac Runoff Volume = 2.115 af Average Runoff Depth = 2.32"
13.20% Pervious = 1.445 ac 86.80% Impervious = 9.504 ac

Summary for Subcatchment DA-1E:

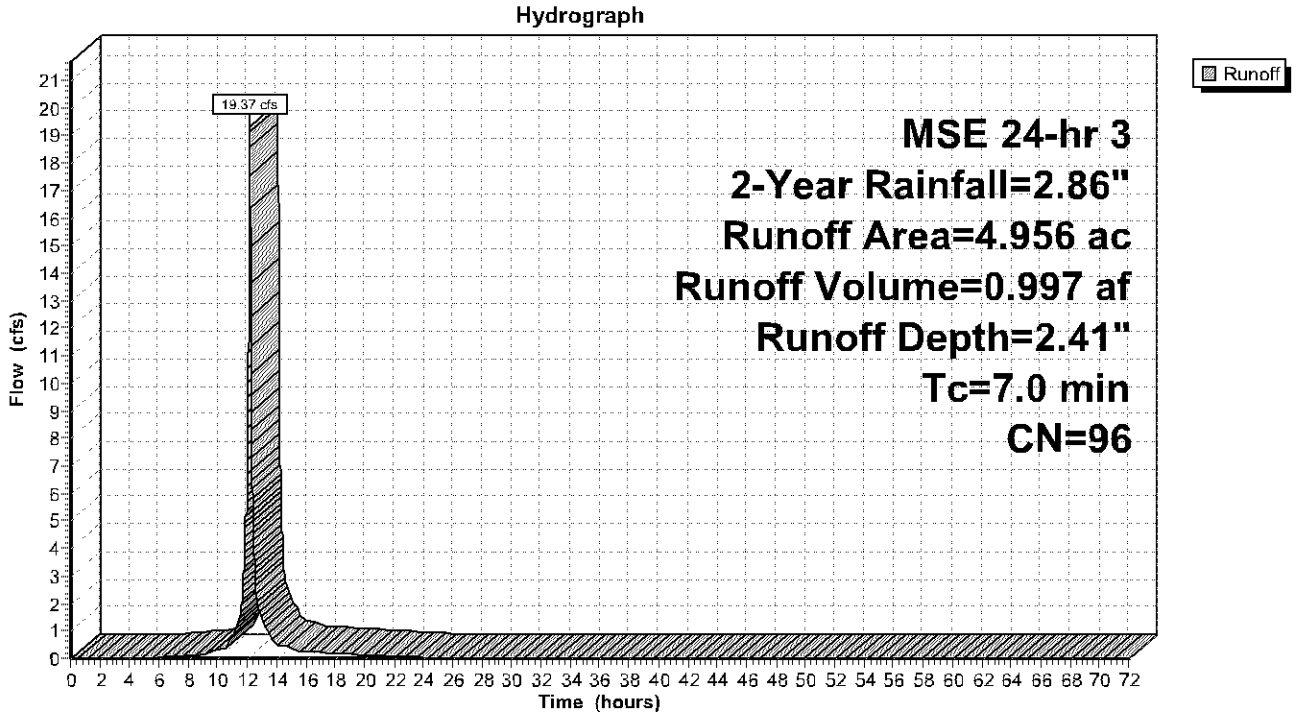
Runoff = 19.37 cfs @ 12.14 hrs, Volume= 0.997 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
4.599	98	Unconnected pavement, HSG C
0.357	74	>75% Grass cover, Good, HSG C
4.956	96	Weighted Average
0.357		7.20% Pervious Area
4.599		92.80% Impervious Area
4.599		100.00% Unconnected

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

Subcatchment DA-1E:



Summary for Subcatchment DA-2E:

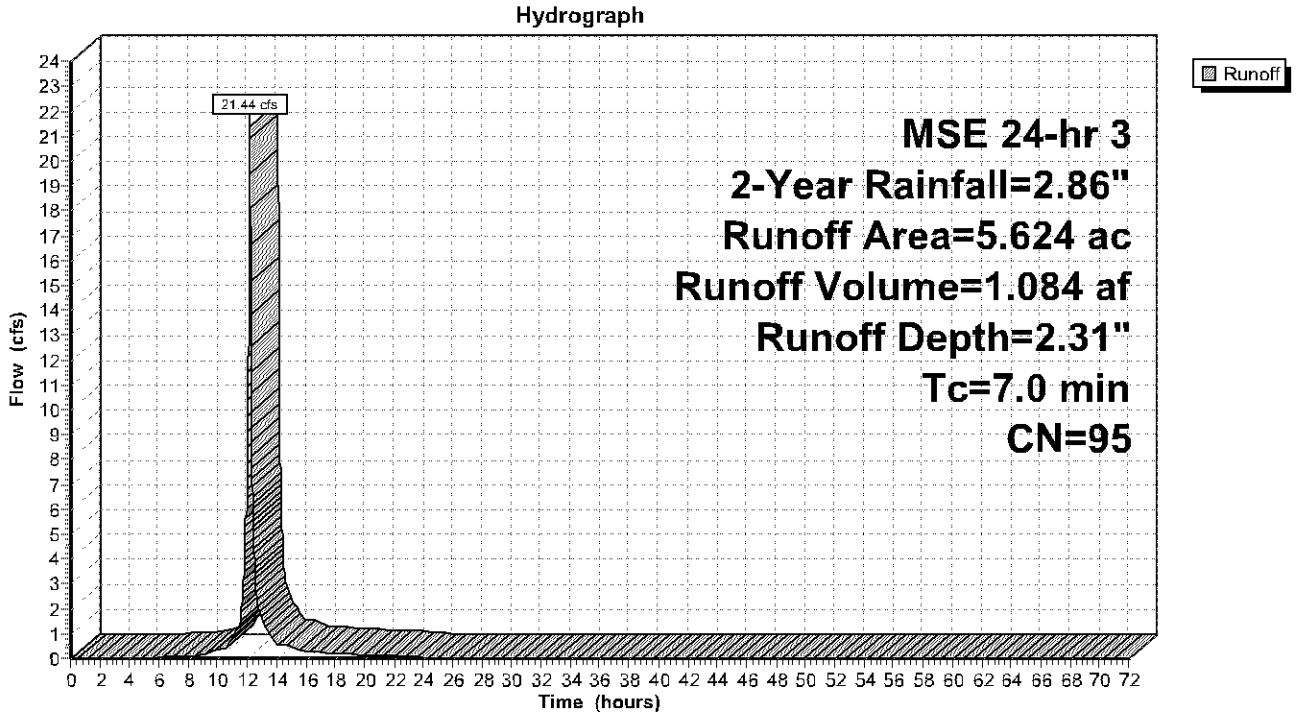
Runoff = 21.44 cfs @ 12.14 hrs, Volume= 1.084 af, Depth= 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
4.826	98	Unconnected pavement, HSG C
0.798	74	>75% Grass cover, Good, HSG C
5.624	95	Weighted Average
0.798		14.19% Pervious Area
4.826		85.81% Impervious Area
4.826		100.00% Unconnected

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

Subcatchment DA-2E:



Summary for Subcatchment DA-3E:

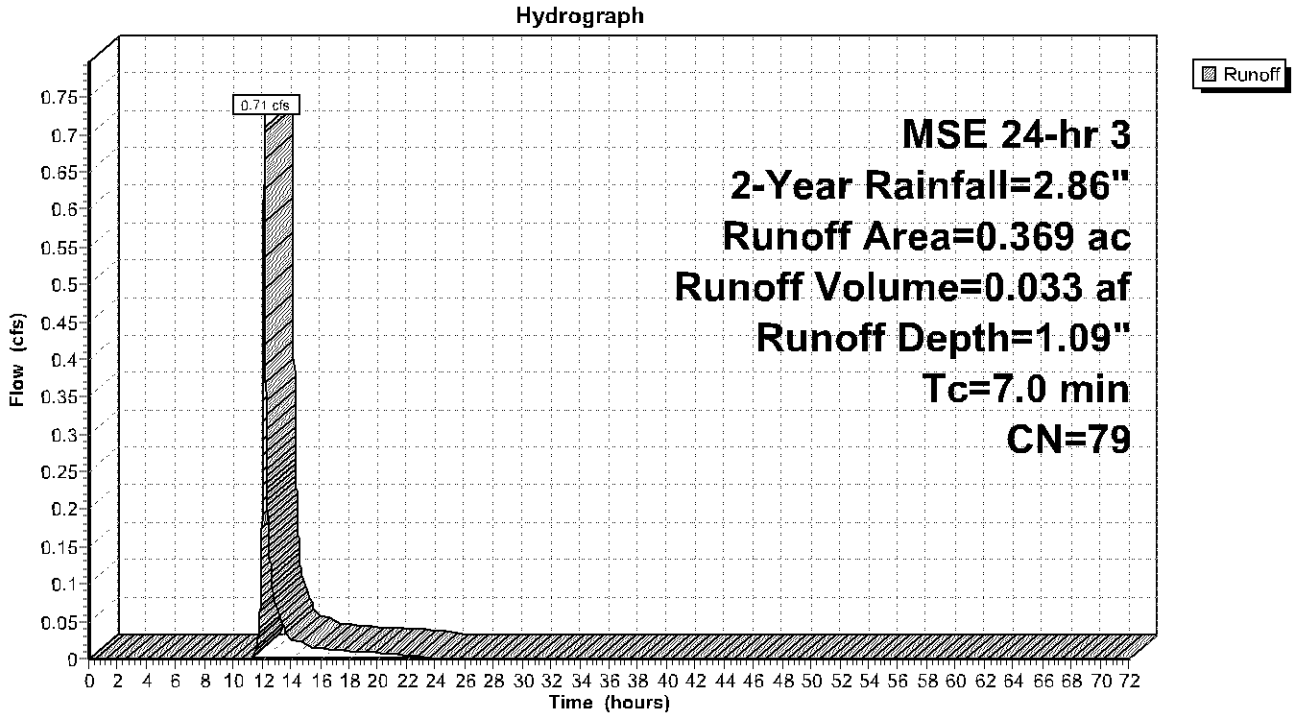
Runoff = 0.71 cfs @ 12.15 hrs, Volume= 0.033 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.079	98	Paved parking, HSG C
0.290	74	>75% Grass cover, Good, HSG C
0.369	79	Weighted Average
0.290		78.59% Pervious Area
0.079		21.41% Impervious Area

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

Subcatchment DA-3E:



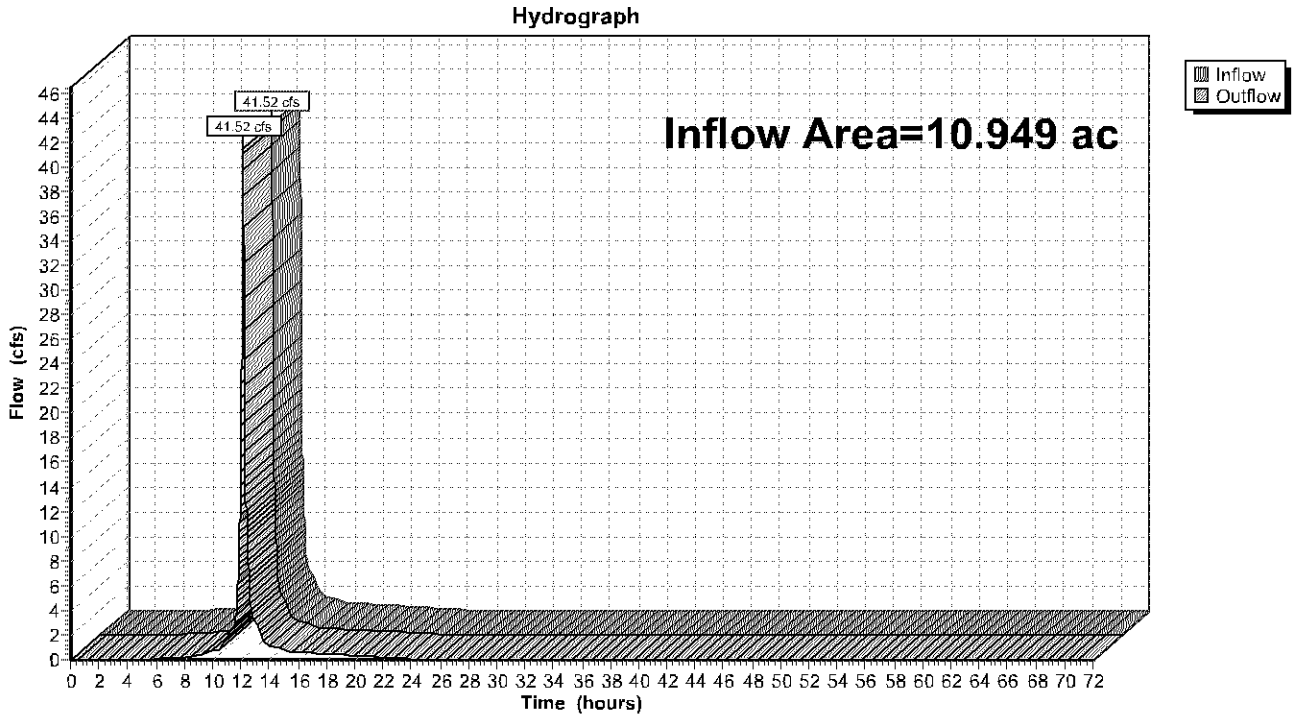
Summary for Reach 3R: total

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

Inflow Area = 10.949 ac, 86.80% Impervious, Inflow Depth = 2.32" for 2-Year event
Inflow = 41.52 cfs @ 12.14 hrs, Volume= 2.115 af
Outflow = 41.52 cfs @ 12.14 hrs, Volume= 2.115 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 3R: total



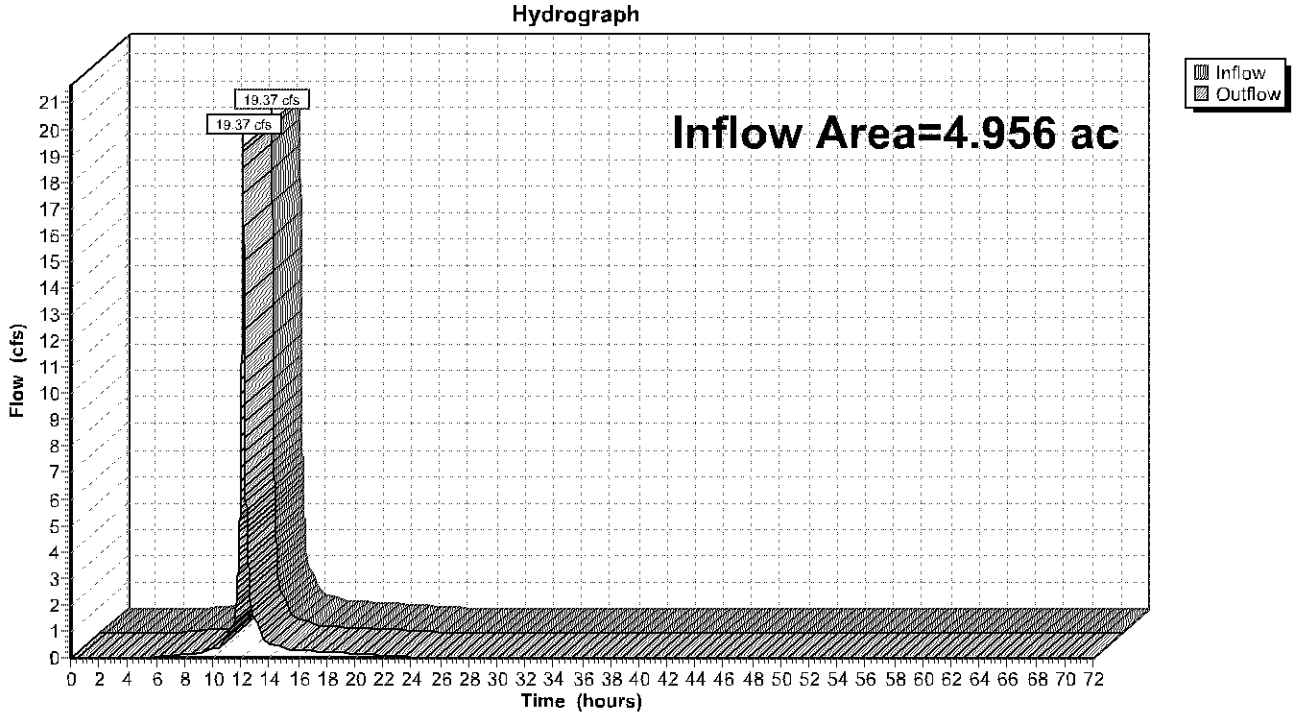
Summary for Reach 9R: EXISTING SOUTH DRAINAGE DITCH

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

Inflow Area = 4.956 ac, 92.80% Impervious, Inflow Depth = 2.41" for 2-Year event
Inflow = 19.37 cfs @ 12.14 hrs, Volume= 0.997 af
Outflow = 19.37 cfs @ 12.14 hrs, Volume= 0.997 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: EXISTING SOUTH DRAINAGE DITCH



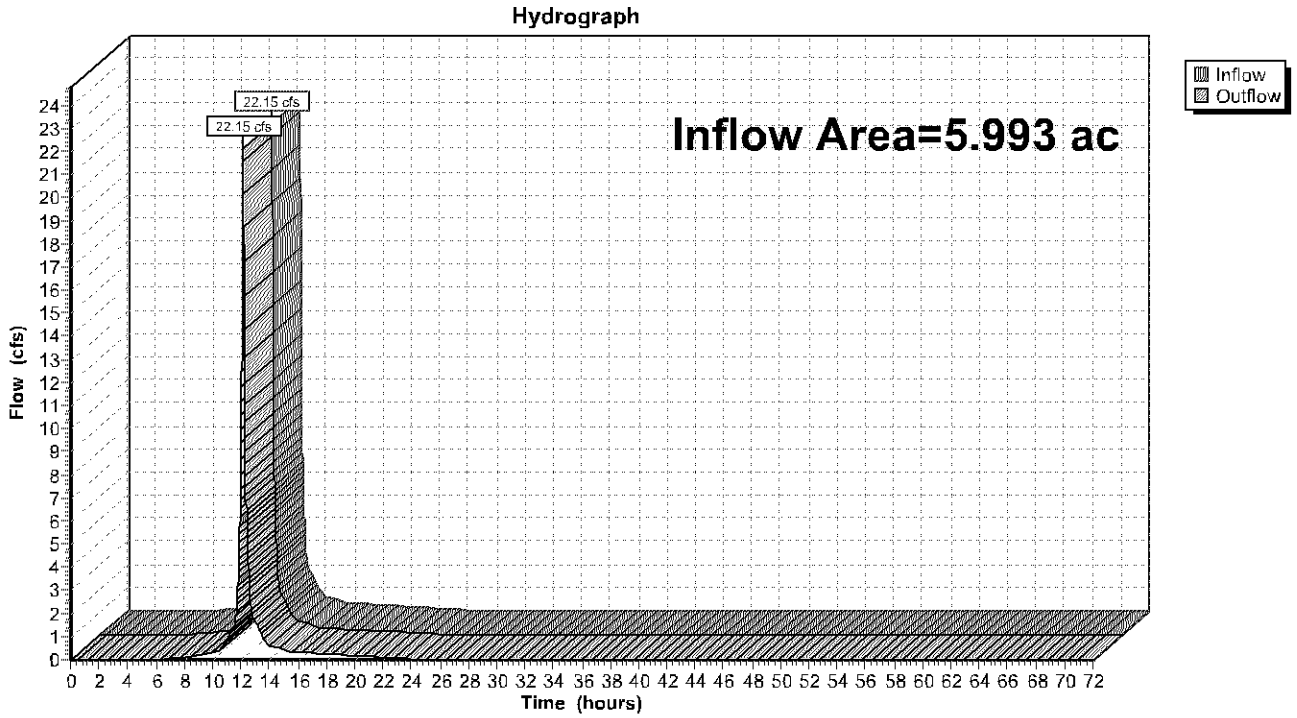
Summary for Reach 10R: COMPUTER AVE

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

Inflow Area = 5.993 ac, 81.85% Impervious, Inflow Depth = 2.24" for 2-Year event
Inflow = 22.15 cfs @ 12.14 hrs, Volume= 1.117 af
Outflow = 22.15 cfs @ 12.14 hrs, Volume= 1.117 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 10R: COMPUTER AVE



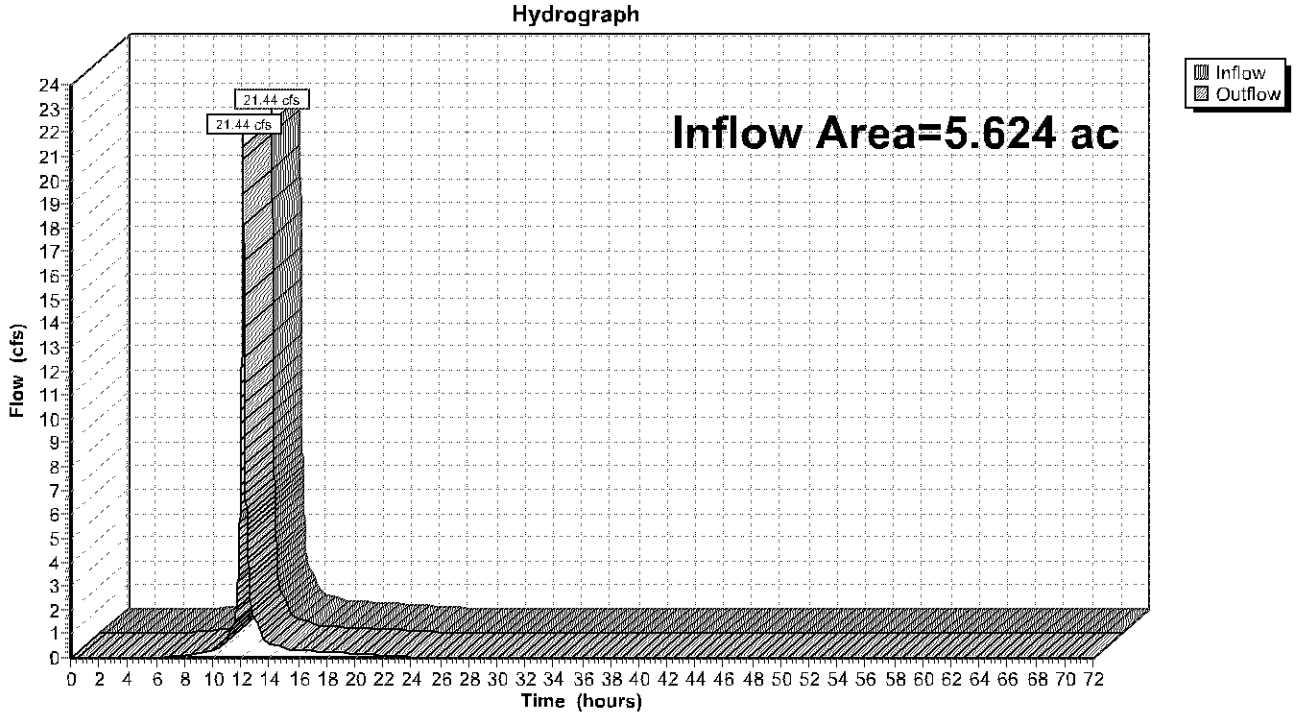
Summary for Reach 11R: EXISTING POND

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

Inflow Area = 5.624 ac, 85.81% Impervious, Inflow Depth = 2.31" for 2-Year event
Inflow = 21.44 cfs @ 12.14 hrs, Volume= 1.084 af
Outflow = 21.44 cfs @ 12.14 hrs, Volume= 1.084 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 11R: EXISTING POND



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1E: Runoff Area=4.956 ac 92.80% Impervious Runoff Depth=3.80"
Tc=7.0 min CN=96 Runoff=29.63 cfs 1.568 af

SubcatchmentDA-2E: Runoff Area=5.624 ac 85.81% Impervious Runoff Depth=3.69"
Tc=7.0 min CN=95 Runoff=33.17 cfs 1.728 af

SubcatchmentDA-3E: Runoff Area=0.369 ac 21.41% Impervious Runoff Depth=2.18"
Tc=7.0 min CN=79 Runoff=1.43 cfs 0.067 af

Reach 3R: total Inflow=64.22 cfs 3.364 af
Outflow=64.22 cfs 3.364 af

Reach 9R: EXISTING SOUTH DRAINAGE DITCH Inflow=29.63 cfs 1.568 af
Outflow=29.63 cfs 1.568 af

Reach 10R: COMPUTER AVE Inflow=34.60 cfs 1.795 af
Outflow=34.60 cfs 1.795 af

Reach 11R: EXISTING POND Inflow=33.17 cfs 1.728 af
Outflow=33.17 cfs 1.728 af

Total Runoff Area = 10.949 ac Runoff Volume = 3.364 af Average Runoff Depth = 3.69"
13.20% Pervious = 1.445 ac 86.80% Impervious = 9.504 ac

Summary for Subcatchment DA-1E:

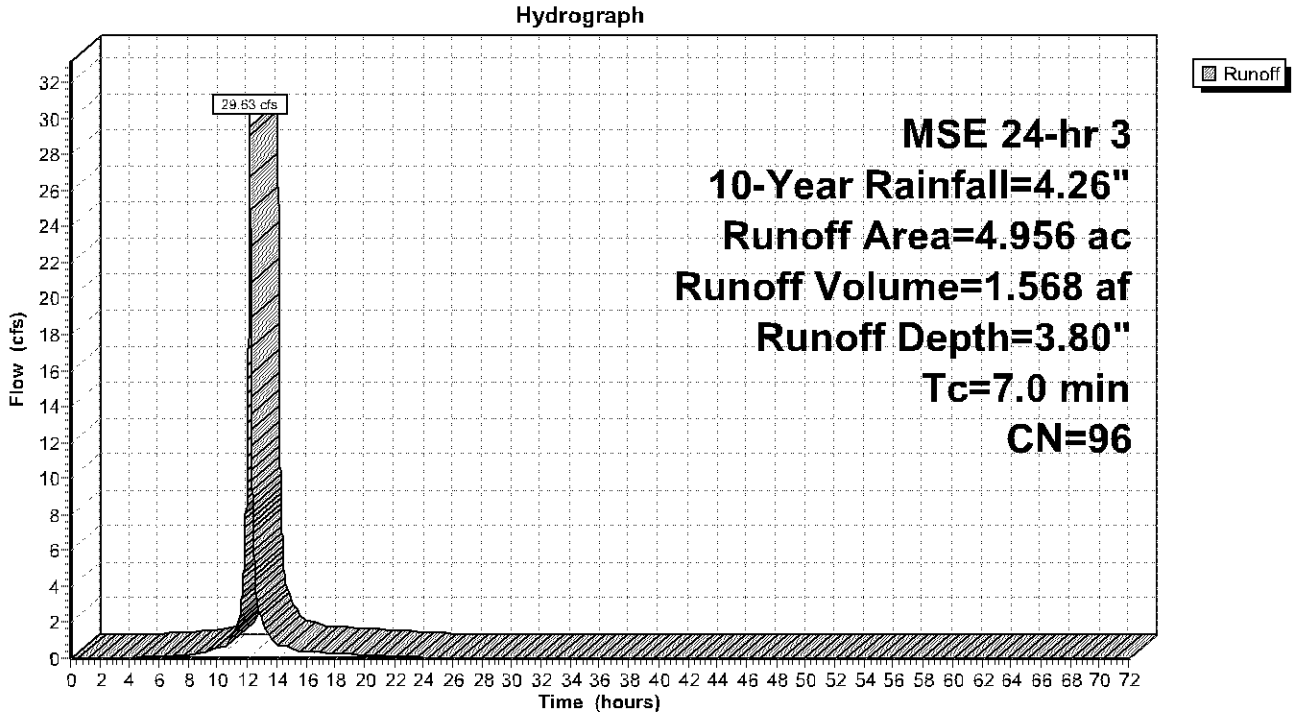
Runoff = 29.63 cfs @ 12.14 hrs, Volume= 1.568 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
4.599	98	Unconnected pavement, HSG C
0.357	74	>75% Grass cover, Good, HSG C
4.956	96	Weighted Average
0.357		7.20% Pervious Area
4.599		92.80% Impervious Area
4.599		100.00% Unconnected

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

Subcatchment DA-1E:



Summary for Subcatchment DA-2E:

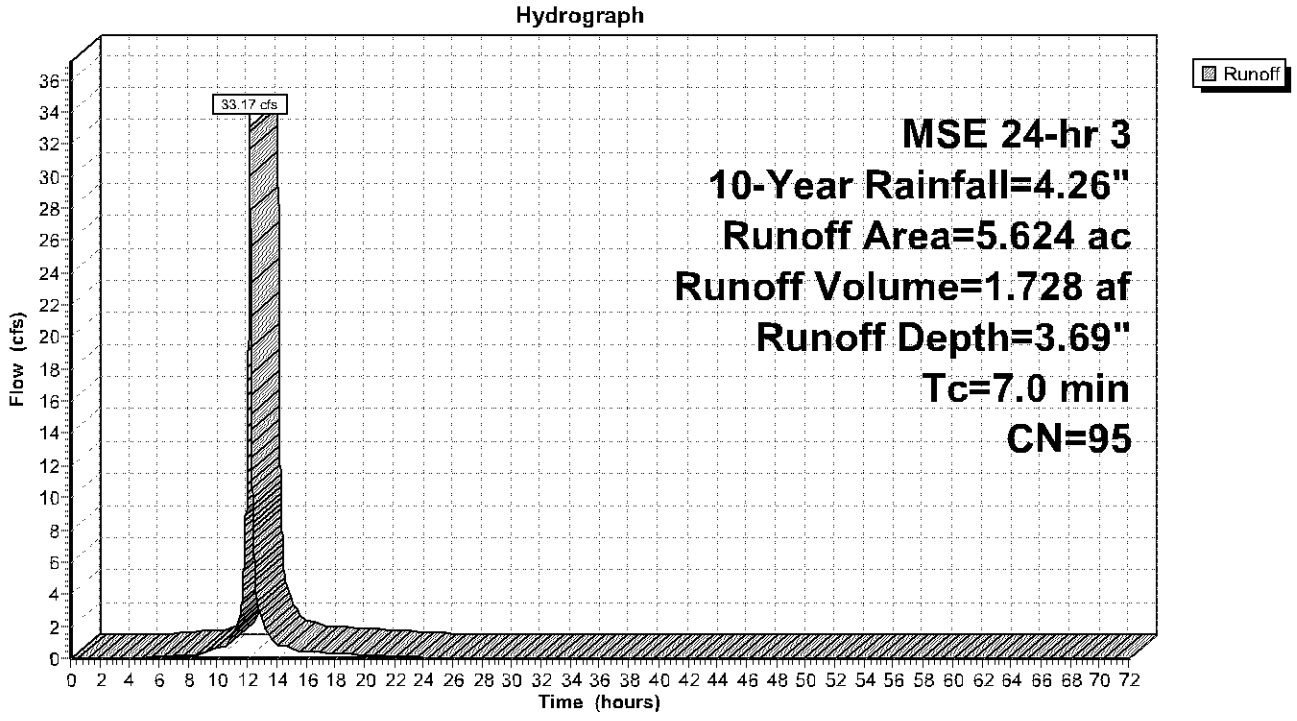
Runoff = 33.17 cfs @ 12.14 hrs, Volume= 1.728 af, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
4.826	98	Unconnected pavement, HSG C
0.798	74	>75% Grass cover, Good, HSG C
5.624	95	Weighted Average
0.798		14.19% Pervious Area
4.826		85.81% Impervious Area
4.826		100.00% Unconnected

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

Subcatchment DA-2E:



Summary for Subcatchment DA-3E:

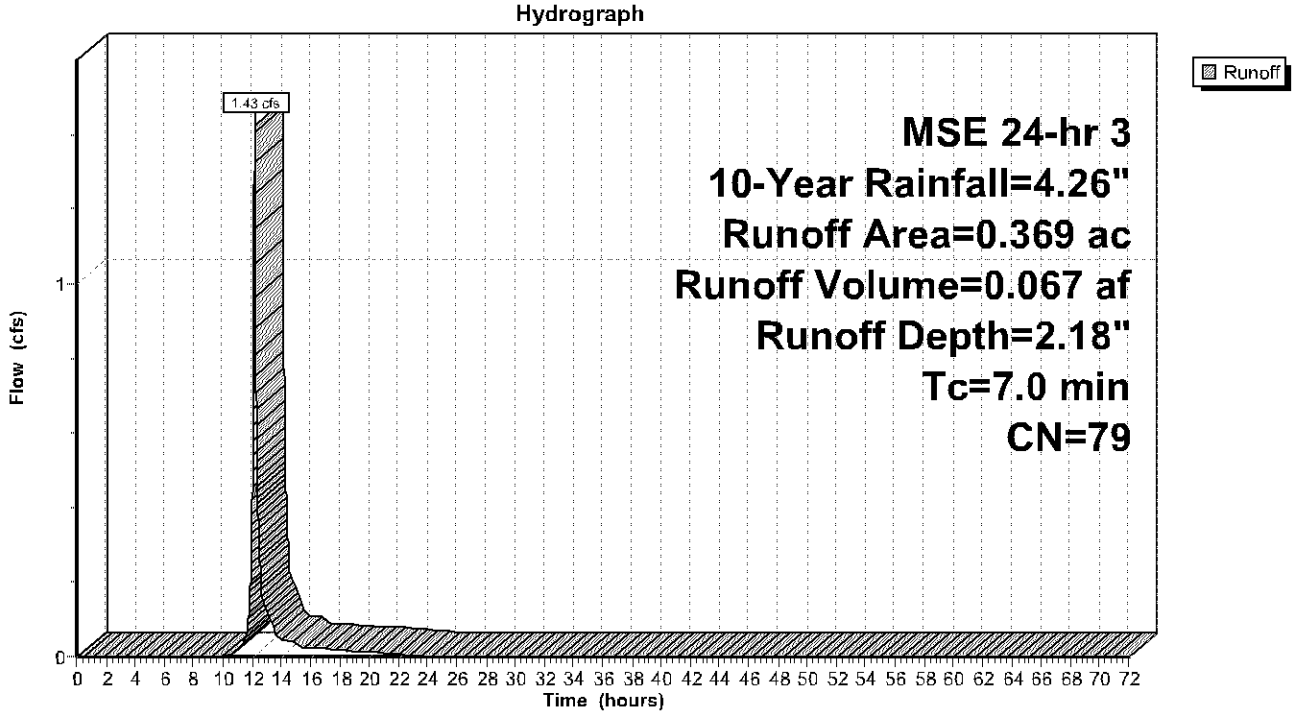
Runoff = 1.43 cfs @ 12.14 hrs, Volume= 0.067 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.079	98	Paved parking, HSG C
0.290	74	>75% Grass cover, Good, HSG C
0.369	79	Weighted Average
0.290		78.59% Pervious Area
0.079		21.41% Impervious Area

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

Subcatchment DA-3E:



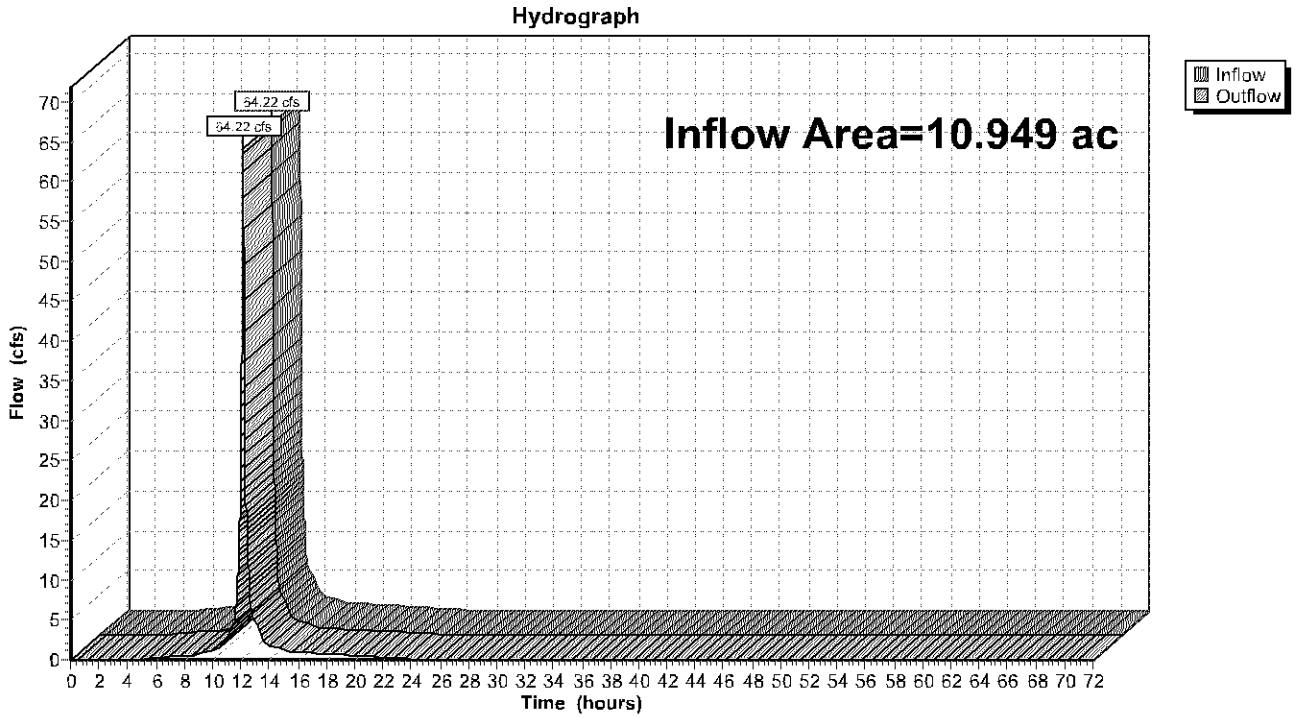
Summary for Reach 3R: total

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

Inflow Area = 10.949 ac, 86.80% Impervious, Inflow Depth = 3.69" for 10-Year event
Inflow = 64.22 cfs @ 12.14 hrs, Volume= 3.364 af
Outflow = 64.22 cfs @ 12.14 hrs, Volume= 3.364 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 3R: total



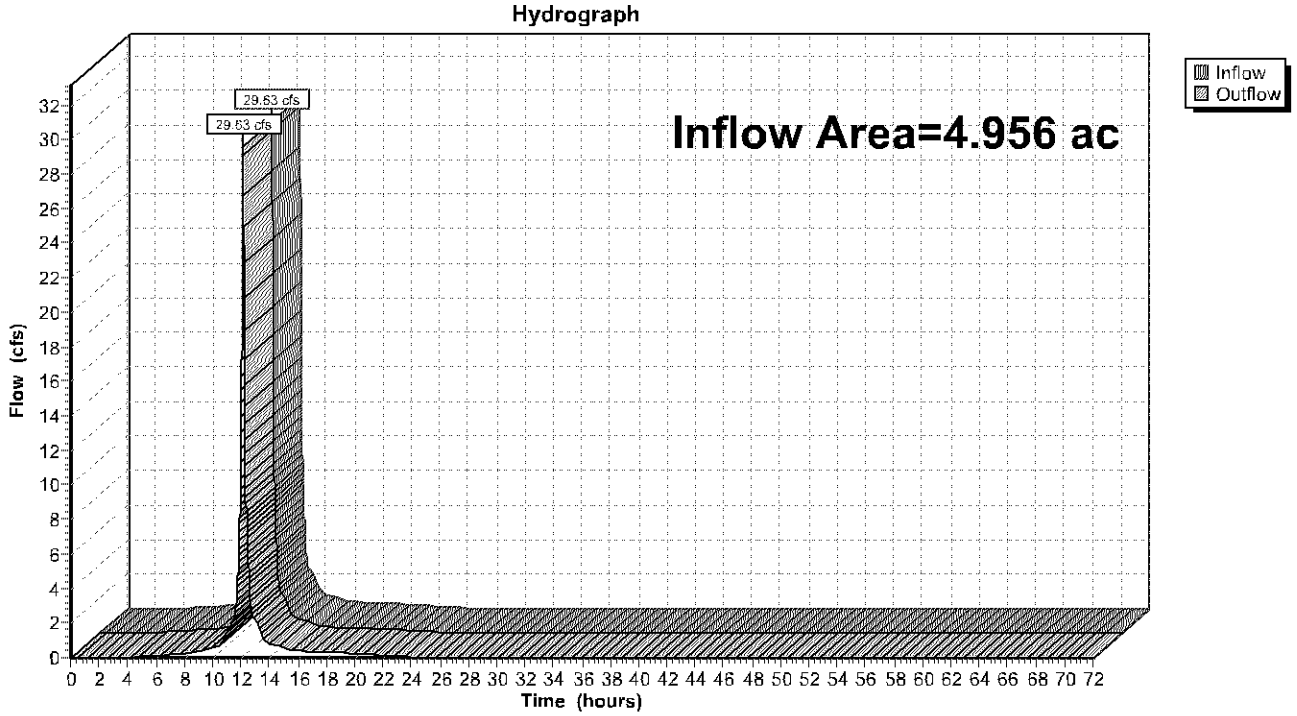
Summary for Reach 9R: EXISTING SOUTH DRAINAGE DITCH

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

Inflow Area = 4.956 ac, 92.80% Impervious, Inflow Depth = 3.80" for 10-Year event
Inflow = 29.63 cfs @ 12.14 hrs, Volume= 1.568 af
Outflow = 29.63 cfs @ 12.14 hrs, Volume= 1.568 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: EXISTING SOUTH DRAINAGE DITCH



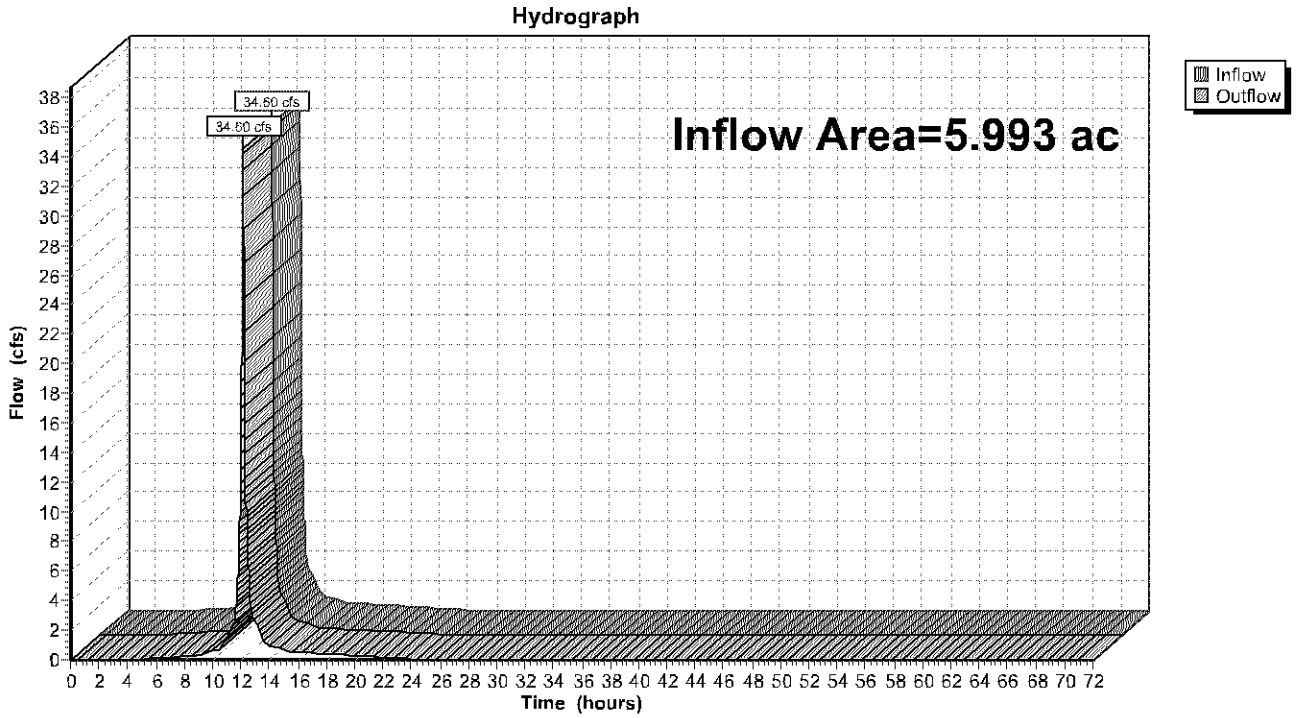
Summary for Reach 10R: COMPUTER AVE

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

Inflow Area = 5.993 ac, 81.85% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 34.60 cfs @ 12.14 hrs, Volume= 1.795 af
Outflow = 34.60 cfs @ 12.14 hrs, Volume= 1.795 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 10R: COMPUTER AVE



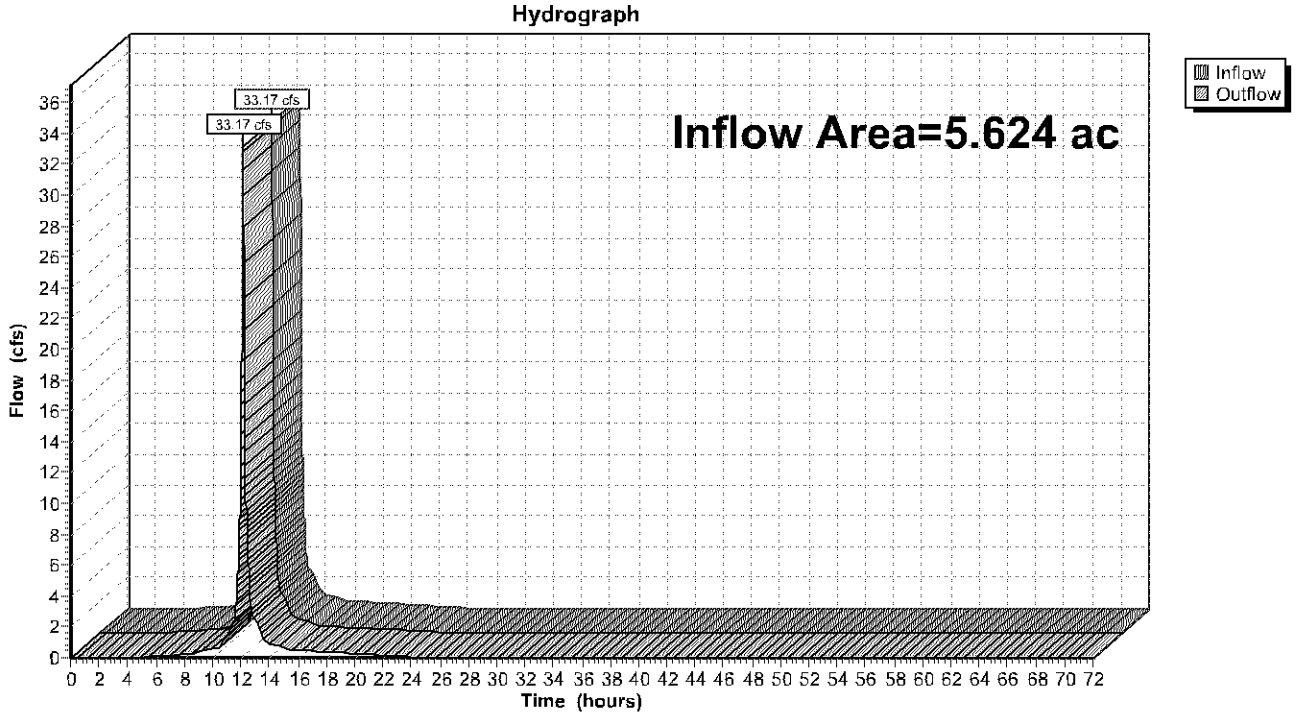
Summary for Reach 11R: EXISTING POND

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

Inflow Area = 5.624 ac, 85.81% Impervious, Inflow Depth = 3.69" for 10-Year event
Inflow = 33.17 cfs @ 12.14 hrs, Volume= 1.728 af
Outflow = 33.17 cfs @ 12.14 hrs, Volume= 1.728 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 11R: EXISTING POND



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1E: Runoff Area=4.956 ac 92.80% Impervious Runoff Depth=6.84"
Tc=7.0 min CN=96 Runoff=51.77 cfs 2.826 af

SubcatchmentDA-2E: Runoff Area=5.624 ac 85.81% Impervious Runoff Depth=6.72"
Tc=7.0 min CN=95 Runoff=58.43 cfs 3.151 af

SubcatchmentDA-3E: Runoff Area=0.369 ac 21.41% Impervious Runoff Depth=4.88"
Tc=7.0 min CN=79 Runoff=3.12 cfs 0.150 af

Reach 3R: total Inflow=113.32 cfs 6.127 af
Outflow=113.32 cfs 6.127 af

Reach 9R: EXISTING SOUTH DRAINAGE DITCH Inflow=51.77 cfs 2.826 af
Outflow=51.77 cfs 2.826 af

Reach 10R: COMPUTER AVE Inflow=61.55 cfs 3.301 af
Outflow=61.55 cfs 3.301 af

Reach 11R: EXISTING POND Inflow=58.43 cfs 3.151 af
Outflow=58.43 cfs 3.151 af

Total Runoff Area = 10.949 ac Runoff Volume = 6.127 af Average Runoff Depth = 6.72"
13.20% Pervious = 1.445 ac 86.80% Impervious = 9.504 ac

Summary for Subcatchment DA-1E:

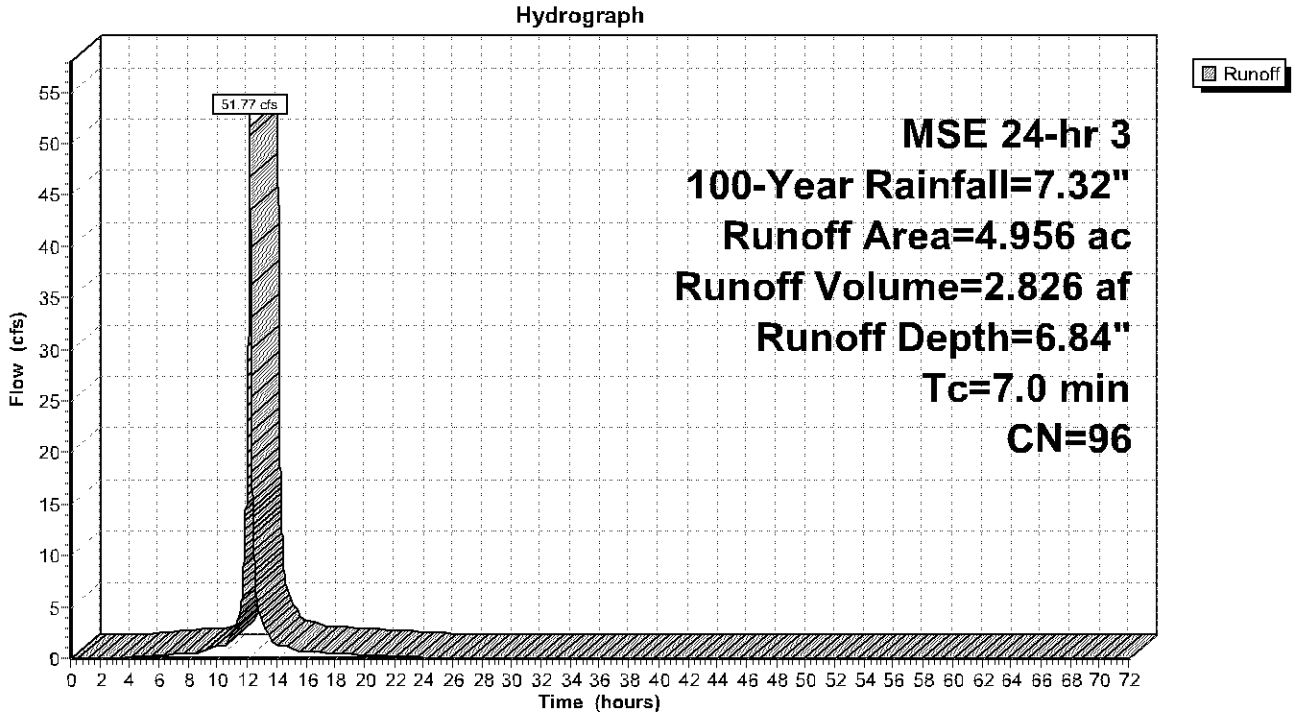
Runoff = 51.77 cfs @ 12.14 hrs, Volume= 2.826 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
4.599	98	Unconnected pavement, HSG C
0.357	74	>75% Grass cover, Good, HSG C
4.956	96	Weighted Average
0.357		7.20% Pervious Area
4.599		92.80% Impervious Area
4.599		100.00% Unconnected

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

Subcatchment DA-1E:



Summary for Subcatchment DA-2E:

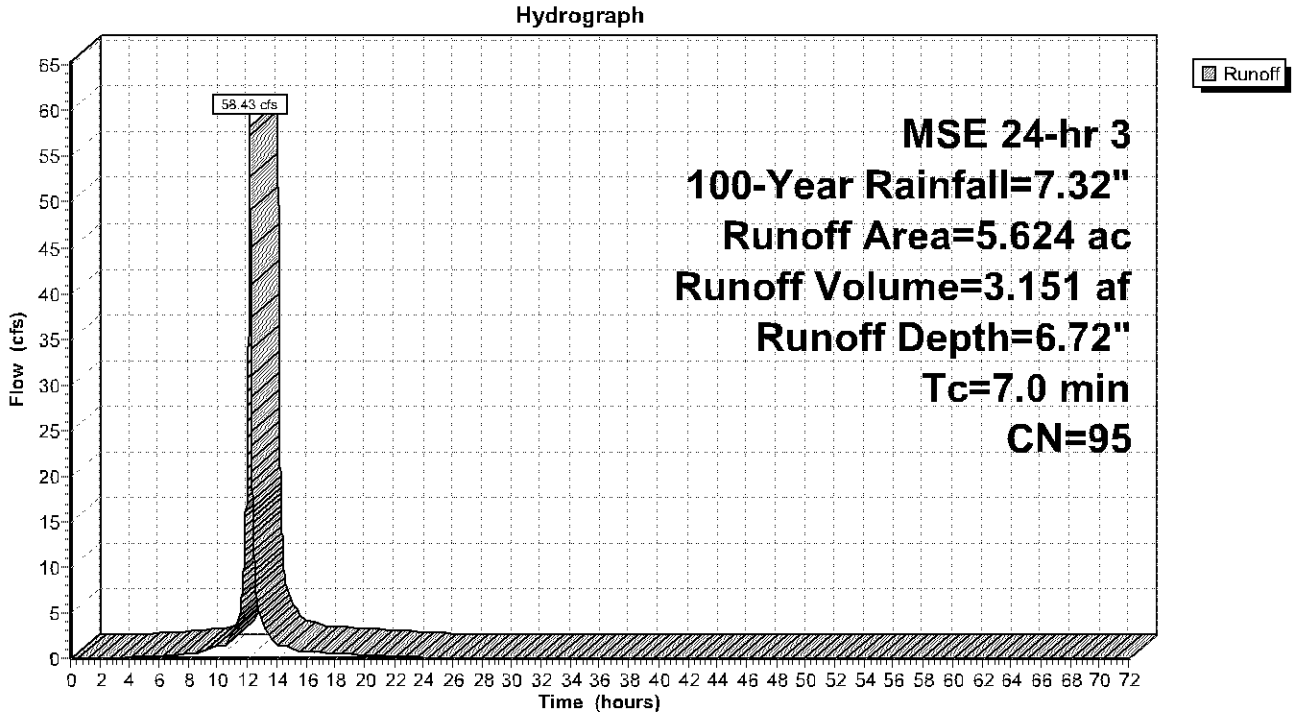
Runoff = 58.43 cfs @ 12.14 hrs, Volume= 3.151 af, Depth= 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
4.826	98	Unconnected pavement, HSG C
0.798	74	>75% Grass cover, Good, HSG C
5.624	95	Weighted Average
0.798		14.19% Pervious Area
4.826		85.81% Impervious Area
4.826		100.00% Unconnected

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

Subcatchment DA-2E:



Summary for Subcatchment DA-3E:

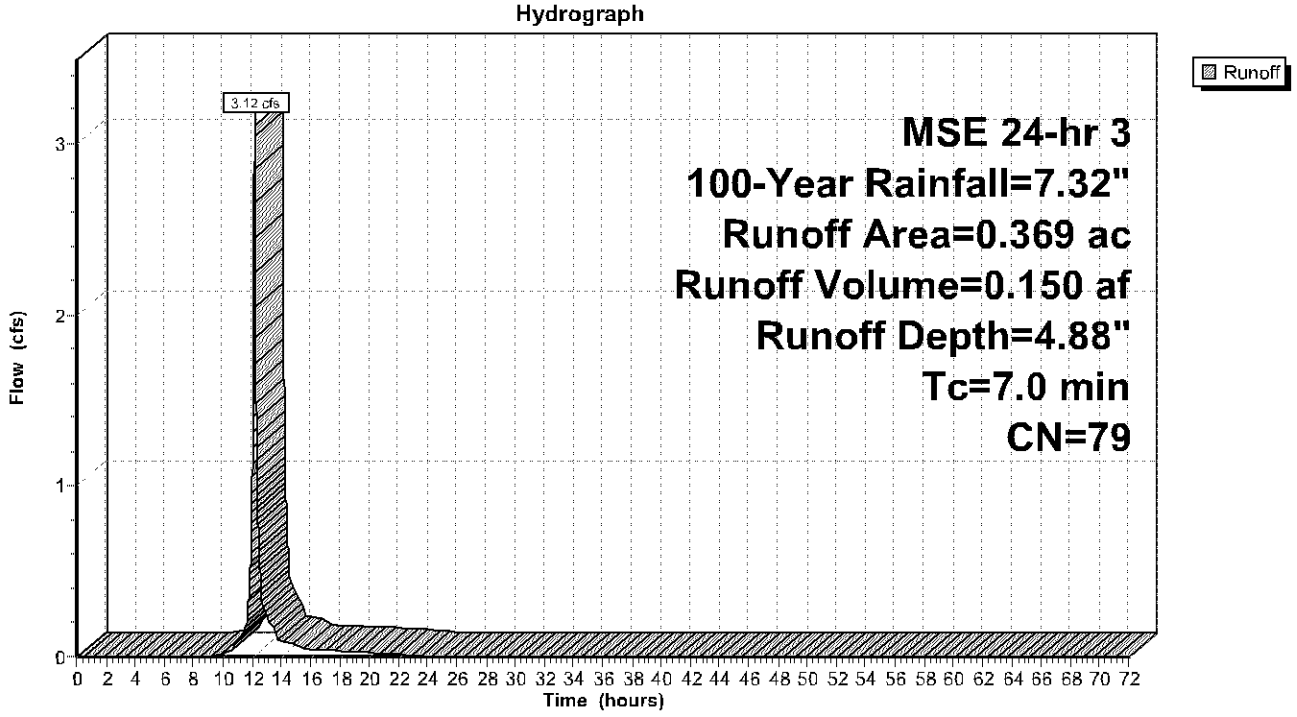
Runoff = 3.12 cfs @ 12.14 hrs, Volume= 0.150 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.079	98	Paved parking, HSG C
0.290	74	>75% Grass cover, Good, HSG C
0.369	79	Weighted Average
0.290		78.59% Pervious Area
0.079		21.41% Impervious Area

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

Subcatchment DA-3E:



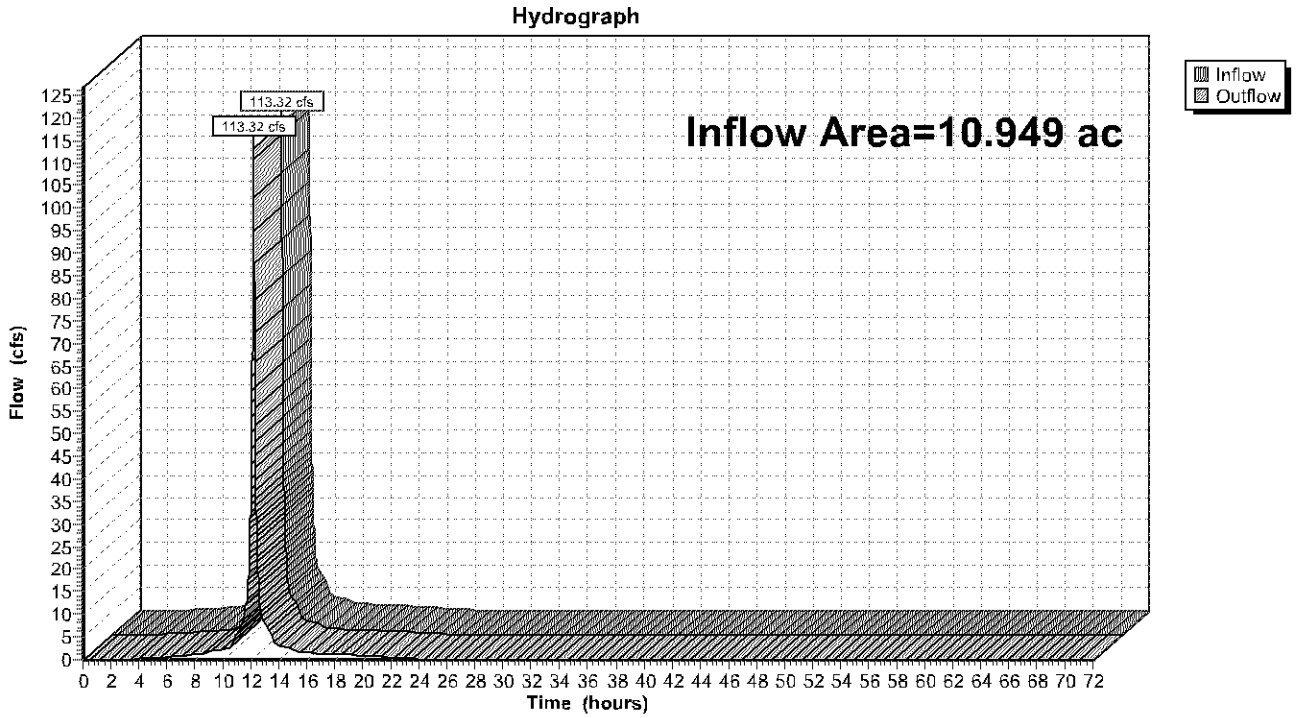
Summary for Reach 3R: total

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

Inflow Area = 10.949 ac, 86.80% Impervious, Inflow Depth = 6.72" for 100-Year event
Inflow = 113.32 cfs @ 12.14 hrs, Volume= 6.127 af
Outflow = 113.32 cfs @ 12.14 hrs, Volume= 6.127 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 3R: total



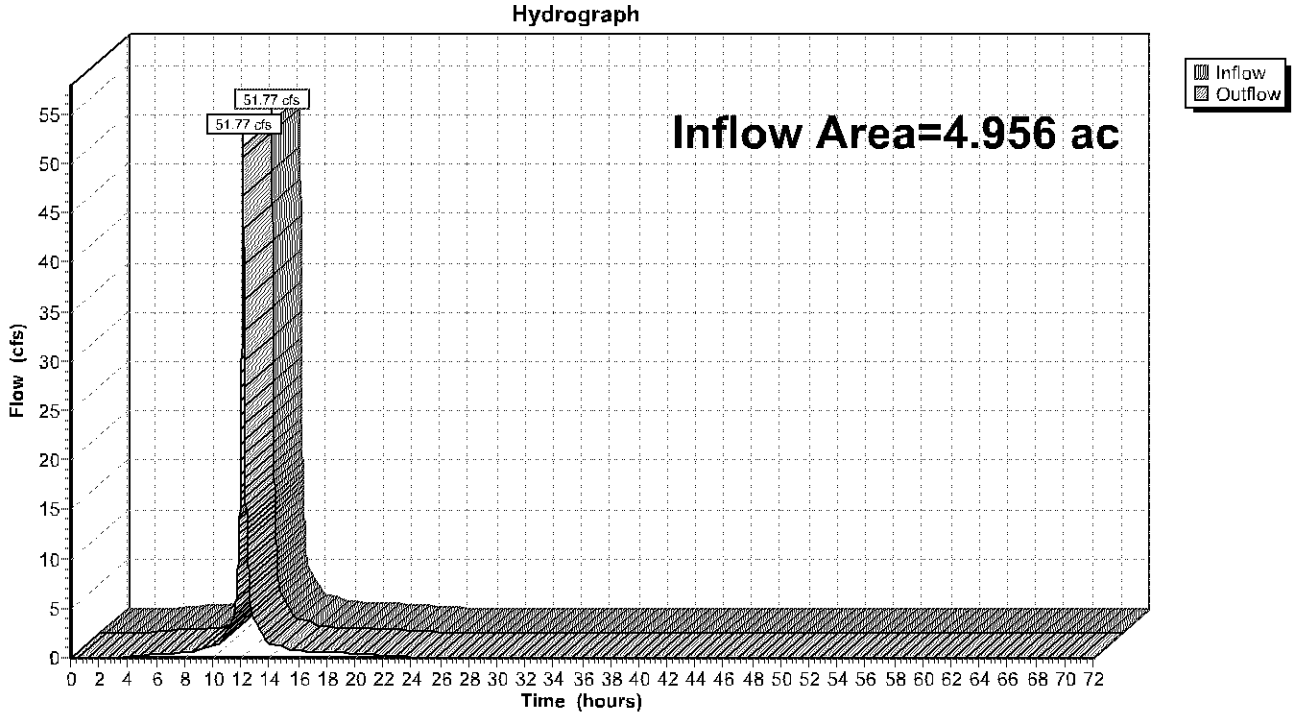
Summary for Reach 9R: EXISTING SOUTH DRAINAGE DITCH

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

Inflow Area = 4.956 ac, 92.80% Impervious, Inflow Depth = 6.84" for 100-Year event
Inflow = 51.77 cfs @ 12.14 hrs, Volume= 2.826 af
Outflow = 51.77 cfs @ 12.14 hrs, Volume= 2.826 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: EXISTING SOUTH DRAINAGE DITCH



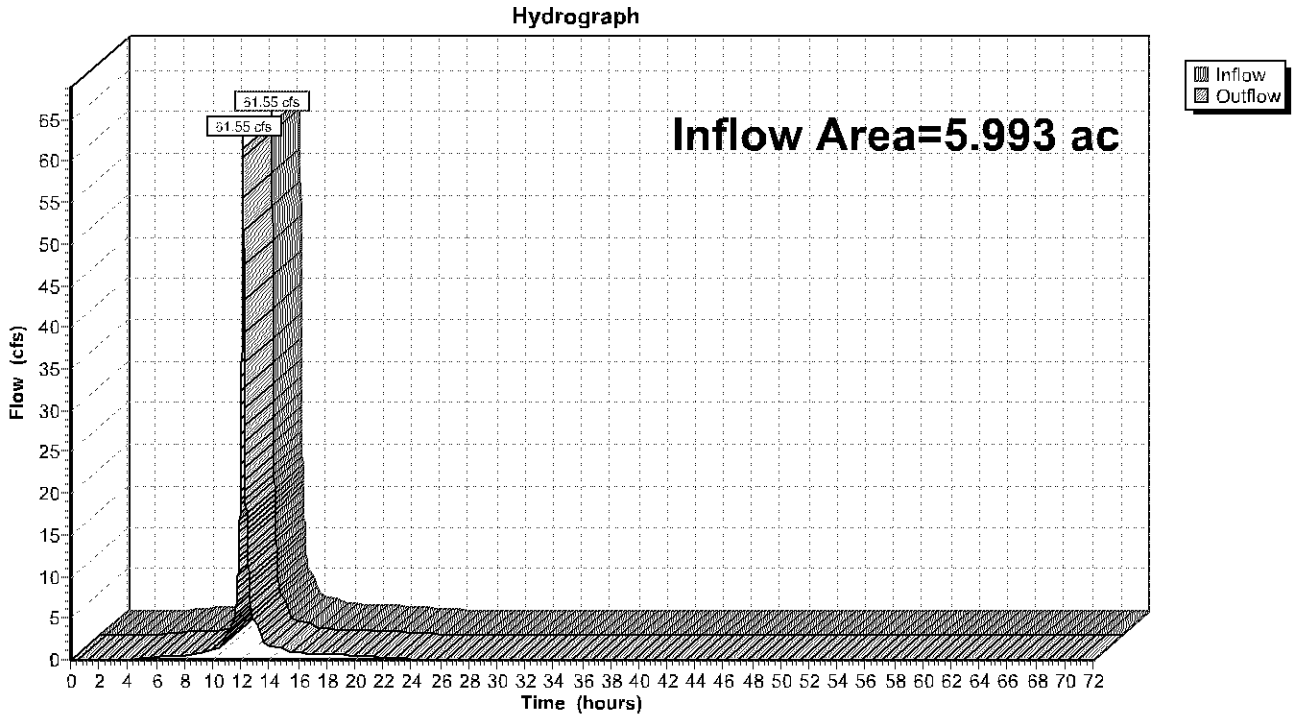
Summary for Reach 10R: COMPUTER AVE

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

Inflow Area = 5.993 ac, 81.85% Impervious, Inflow Depth = 6.61" for 100-Year event
Inflow = 61.55 cfs @ 12.14 hrs, Volume= 3.301 af
Outflow = 61.55 cfs @ 12.14 hrs, Volume= 3.301 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 10R: COMPUTER AVE



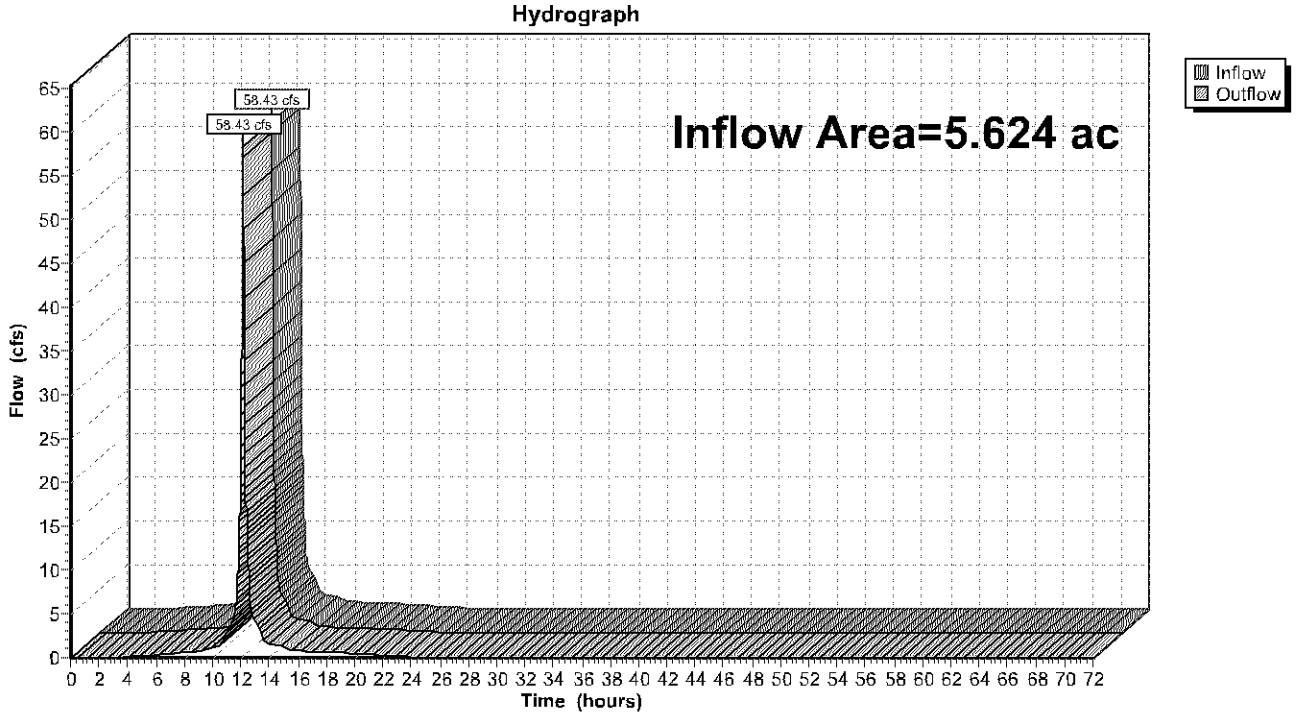
Summary for Reach 11R: EXISTING POND

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

Inflow Area = 5.624 ac, 85.81% Impervious, Inflow Depth = 6.72" for 100-Year event
Inflow = 58.43 cfs @ 12.14 hrs, Volume= 3.151 af
Outflow = 58.43 cfs @ 12.14 hrs, Volume= 3.151 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

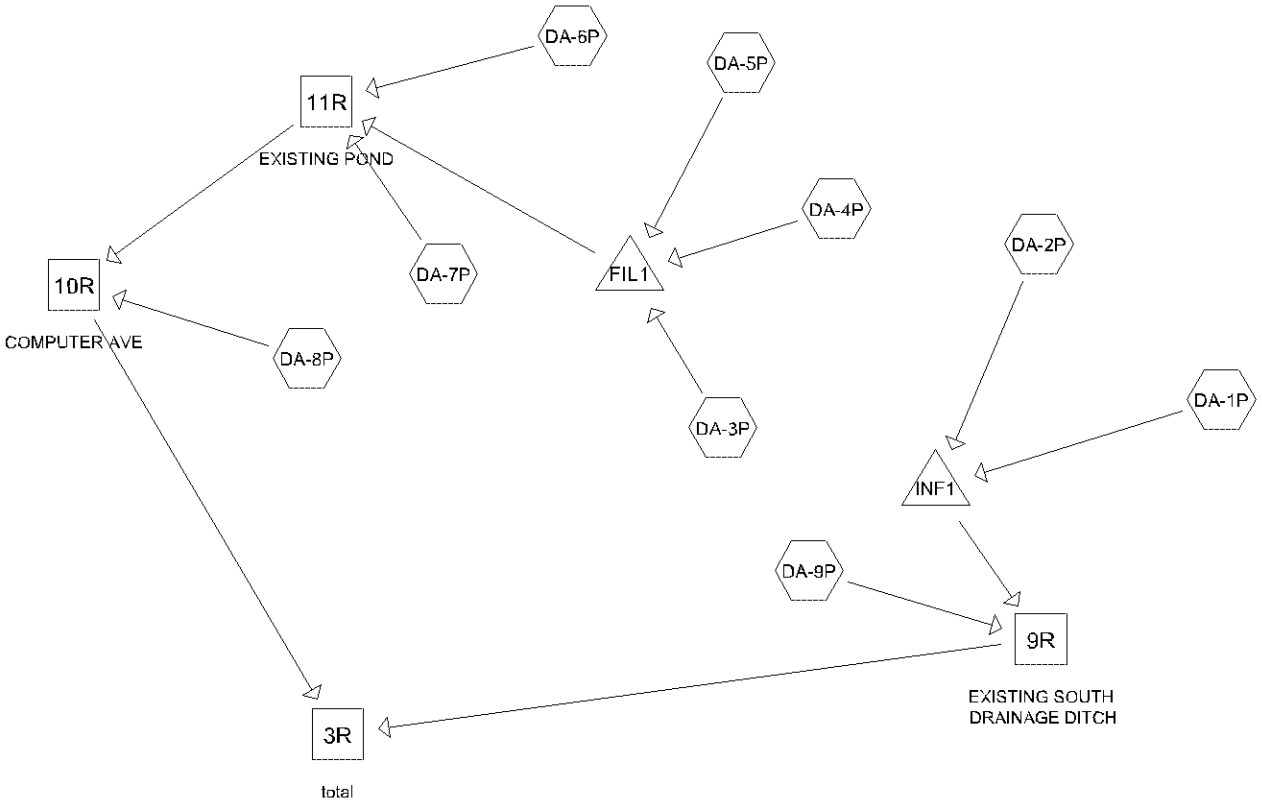
Reach 11R: EXISTING POND



Appendix B

HydroCAD Report, Proposed

CASE #PL2020-112



Subcat Reach Pond Link

Routing Diagram for 20244-Proposed
Prepared by {enter your company name here}, Printed 7/8/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.054	74	>75% Grass cover, Good, HSG C (DA-2P, DA-4P, DA-7P, DA-8P, DA-9P)
4.218	98	Paved parking, HSG C (DA-2P, DA-4P, DA-7P, DA-8P, DA-9P)
3.677	98	Roofs, HSG C (DA-1P, DA-3P, DA-5P, DA-6P)
10.949	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
10.949	HSG C	DA-1P, DA-2P, DA-3P, DA-4P, DA-5P, DA-6P, DA-7P, DA-8P, DA-9P
0.000	HSG D	
0.000	Other	
10.949		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.054	0.000	0.000	3.054	>75% Grass cover, Good	DA-2P, DA-4P, DA-7P, DA-8P, DA-9P
0.000	0.000	4.218	0.000	0.000	4.218	Paved parking	DA-2P, DA-4P, DA-7P, DA-8P, DA-9P
0.000	0.000	3.677	0.000	0.000	3.677	Roofs	DA-1P, DA-3P, DA-5P, DA-6P
0.000	**0.000**	**10.949**	**0.000**	**0.000**	**10.949**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	FIL1	815.50	815.45	5.0	0.0100	0.012	24.0	0.0	0.0
2	FIL1	815.50	815.50	220.0	0.0000	0.010	8.0	0.0	0.0
3	INF1	817.00	816.00	56.0	0.0179	0.012	24.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Runoff Area=1.718 ac 100.00% Impervious Runoff Depth=2.63"
Tc=7.0 min CN=98 Runoff=6.98 cfs 0.376 af

SubcatchmentDA-2P: Runoff Area=1.529 ac 51.47% Impervious Runoff Depth=1.54"
Tc=7.0 min CN=86 Runoff=4.19 cfs 0.197 af

SubcatchmentDA-3P: Runoff Area=1.186 ac 100.00% Impervious Runoff Depth=2.63"
Tc=7.0 min CN=98 Runoff=4.82 cfs 0.260 af

SubcatchmentDA-4P: Runoff Area=0.615 ac 82.93% Impervious Runoff Depth=2.21"
Tc=7.0 min CN=94 Runoff=2.28 cfs 0.114 af

SubcatchmentDA-5P: Runoff Area=0.385 ac 100.00% Impervious Runoff Depth=2.63"
Tc=7.0 min CN=98 Runoff=1.56 cfs 0.084 af

SubcatchmentDA-6P: Runoff Area=0.388 ac 100.00% Impervious Runoff Depth=2.63"
Tc=7.0 min CN=98 Runoff=1.58 cfs 0.085 af

SubcatchmentDA-7P: Runoff Area=3.037 ac 63.91% Impervious Runoff Depth=1.77"
Tc=7.0 min CN=89 Runoff=9.45 cfs 0.449 af

SubcatchmentDA-8P: Runoff Area=0.369 ac 21.41% Impervious Runoff Depth=1.09"
Tc=7.0 min CN=79 Runoff=0.71 cfs 0.033 af

SubcatchmentDA-9P: Runoff Area=1.722 ac 52.32% Impervious Runoff Depth=1.62"
Tc=7.0 min CN=87 Runoff=4.93 cfs 0.232 af

Reach 3R: total Inflow=17.03 cfs 1.223 af
Outflow=17.03 cfs 1.223 af

Reach 9R: EXISTING SOUTH DRAINAGE DITCH Inflow=4.93 cfs 0.232 af
Outflow=4.93 cfs 0.232 af

Reach 10R: COMPUTER AVE Inflow=12.10 cfs 0.991 af
Outflow=12.10 cfs 0.991 af

Reach 11R: EXISTING POND Inflow=11.39 cfs 0.957 af
Outflow=11.39 cfs 0.957 af

Pond FIL1: Peak Elev=817.25' Storage=10,634 cf Inflow=8.66 cfs 0.458 af
Outflow=2.01 cfs 0.423 af

Pond INF1: Peak Elev=820.40' Storage=17,101 cf Inflow=11.16 cfs 0.573 af
Discarded=0.21 cfs 0.573 af Primary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.573 af

Total Runoff Area = 10.949 ac Runoff Volume = 1.830 af Average Runoff Depth = 2.01"
27.89% Pervious = 3.054 ac 72.11% Impervious = 7.895 ac

Summary for Subcatchment DA-1P:

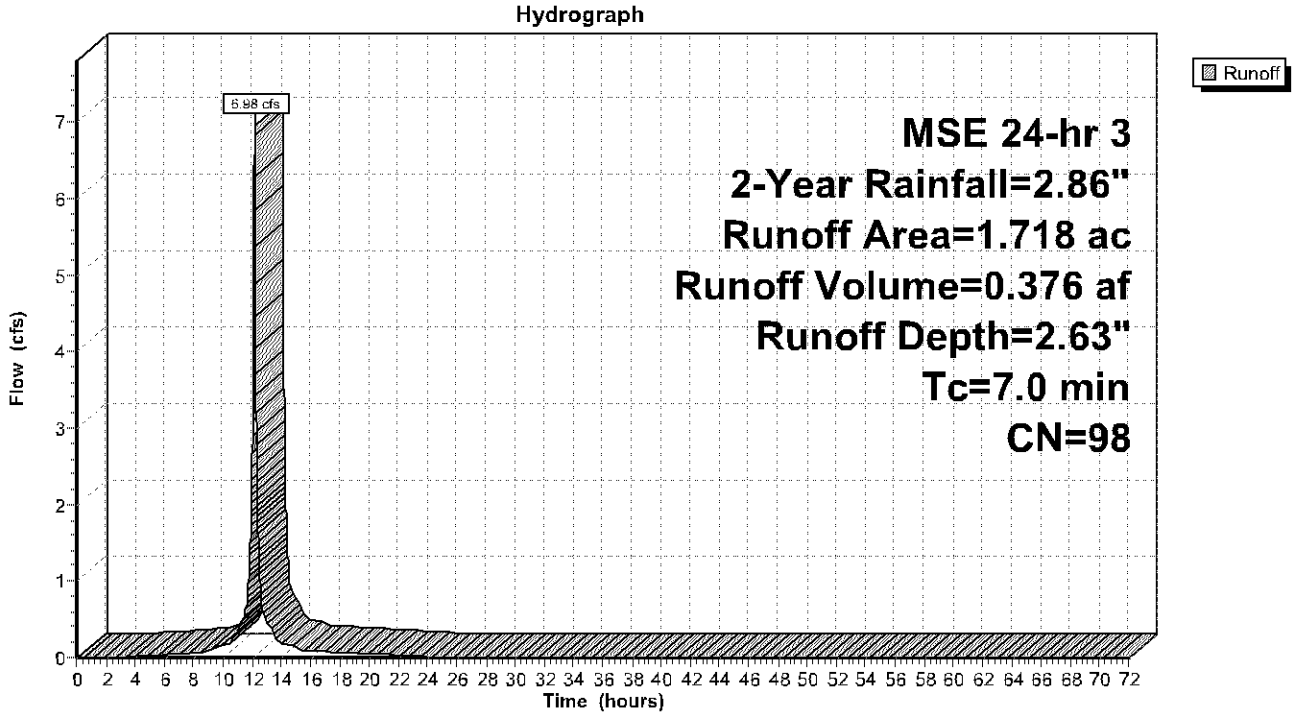
Runoff = 6.98 cfs @ 12.14 hrs, Volume= 0.376 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
1.718	98	Roofs, HSG C
1.718		100.00% Impervious Area

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

Subcatchment DA-1P:



Summary for Subcatchment DA-2P:

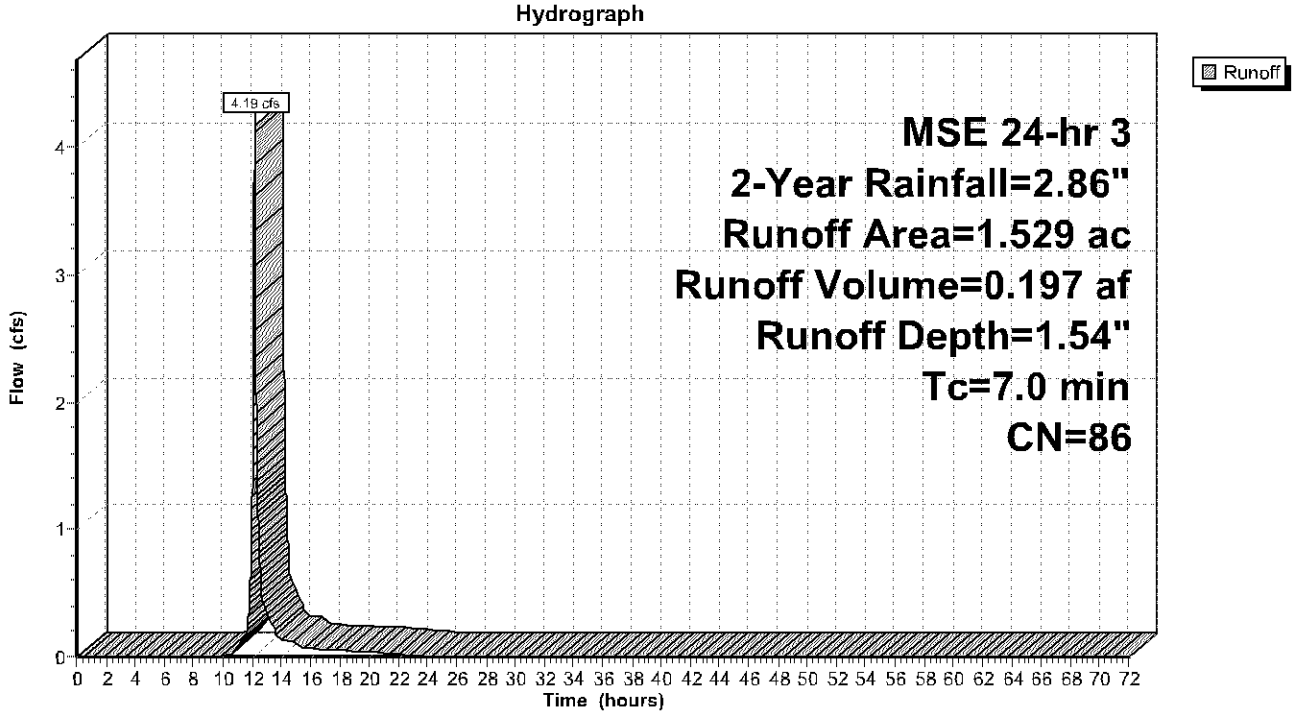
Runoff = 4.19 cfs @ 12.14 hrs, Volume= 0.197 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.787	98	Paved parking, HSG C
0.742	74	>75% Grass cover, Good, HSG C
1.529	86	Weighted Average
0.742		48.53% Pervious Area
0.787		51.47% Impervious Area

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

Subcatchment DA-2P:



Summary for Subcatchment DA-3P:

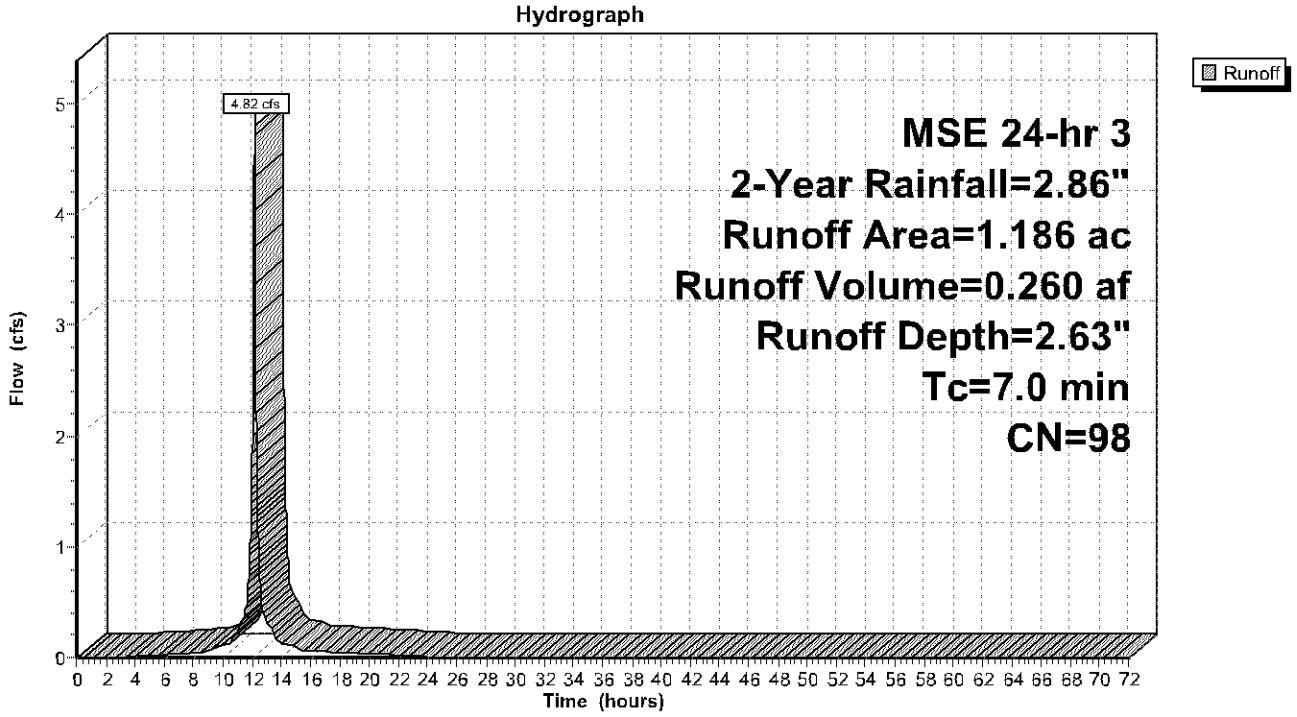
Runoff = 4.82 cfs @ 12.14 hrs, Volume= 0.260 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
1.186	98	Roofs, HSG C
1.186		100.00% Impervious Area

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

Subcatchment DA-3P:



Summary for Subcatchment DA-4P:

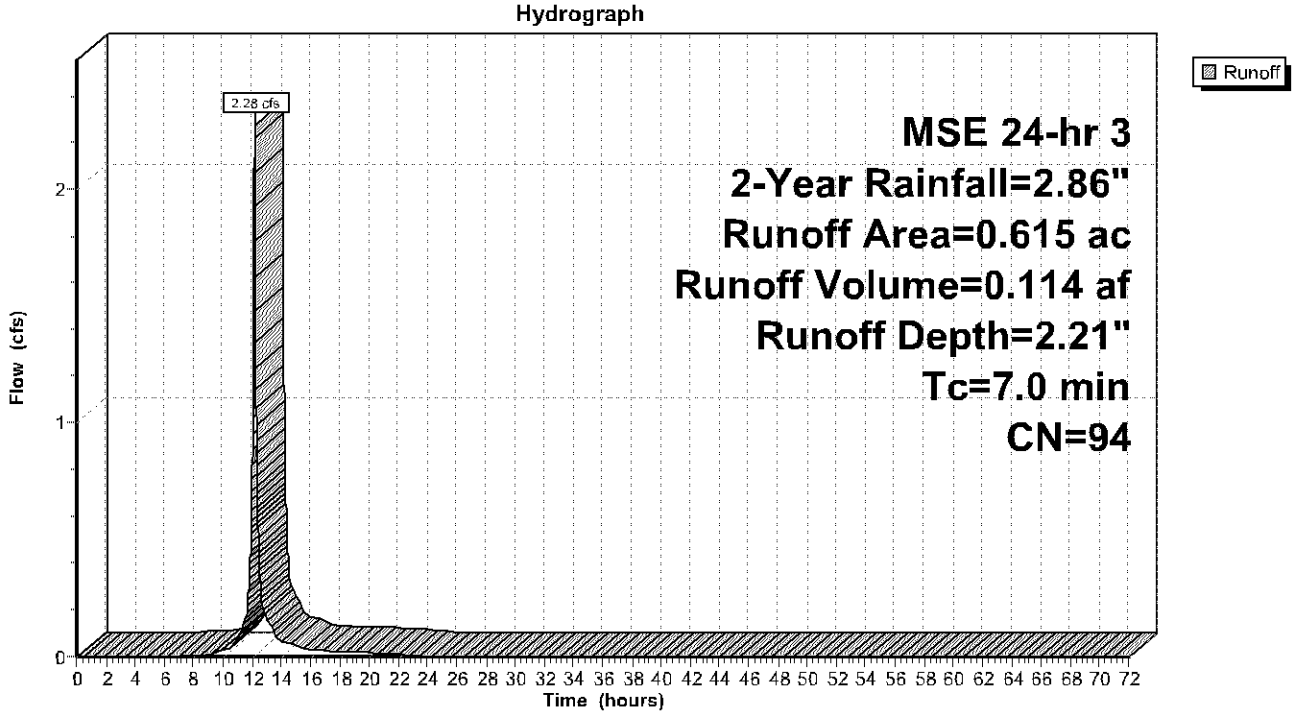
Runoff = 2.28 cfs @ 12.14 hrs, Volume= 0.114 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG C
0.105	74	>75% Grass cover, Good, HSG C
0.615	94	Weighted Average
0.105		17.07% Pervious Area
0.510		82.93% Impervious Area

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

Subcatchment DA-4P:



Summary for Subcatchment DA-5P:

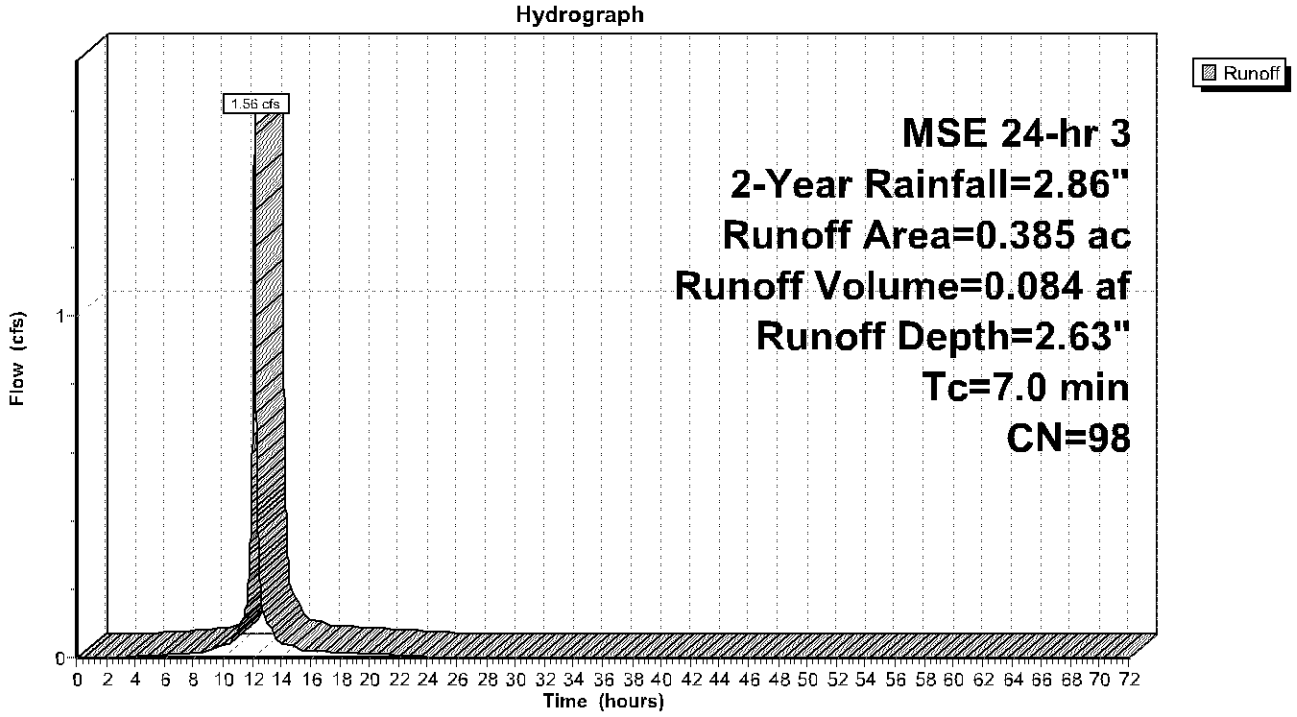
Runoff = 1.56 cfs @ 12.14 hrs, Volume= 0.084 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.385	98	Roofs, HSG C
0.385		100.00% Impervious Area

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

Subcatchment DA-5P:



Summary for Subcatchment DA-6P:

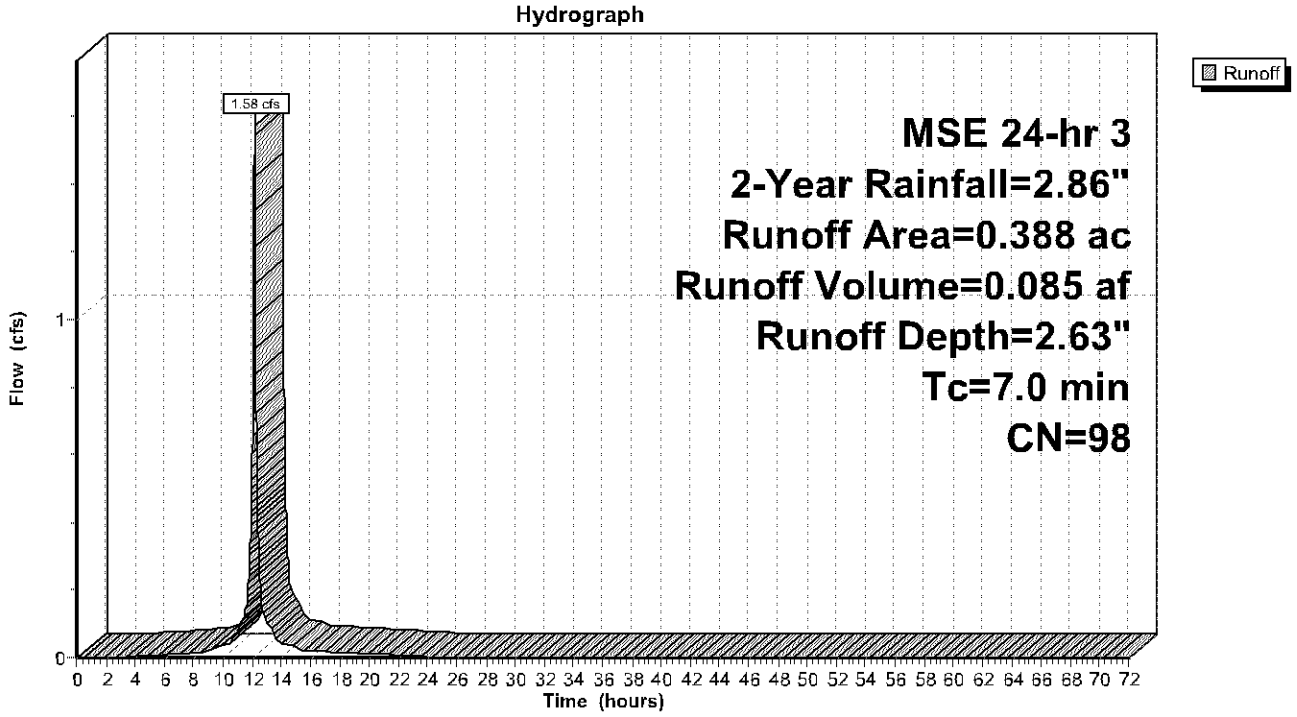
Runoff = 1.58 cfs @ 12.14 hrs, Volume= 0.085 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.388	98	Roofs, HSG C
0.388		100.00% Impervious Area

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

Subcatchment DA-6P:



Summary for Subcatchment DA-7P:

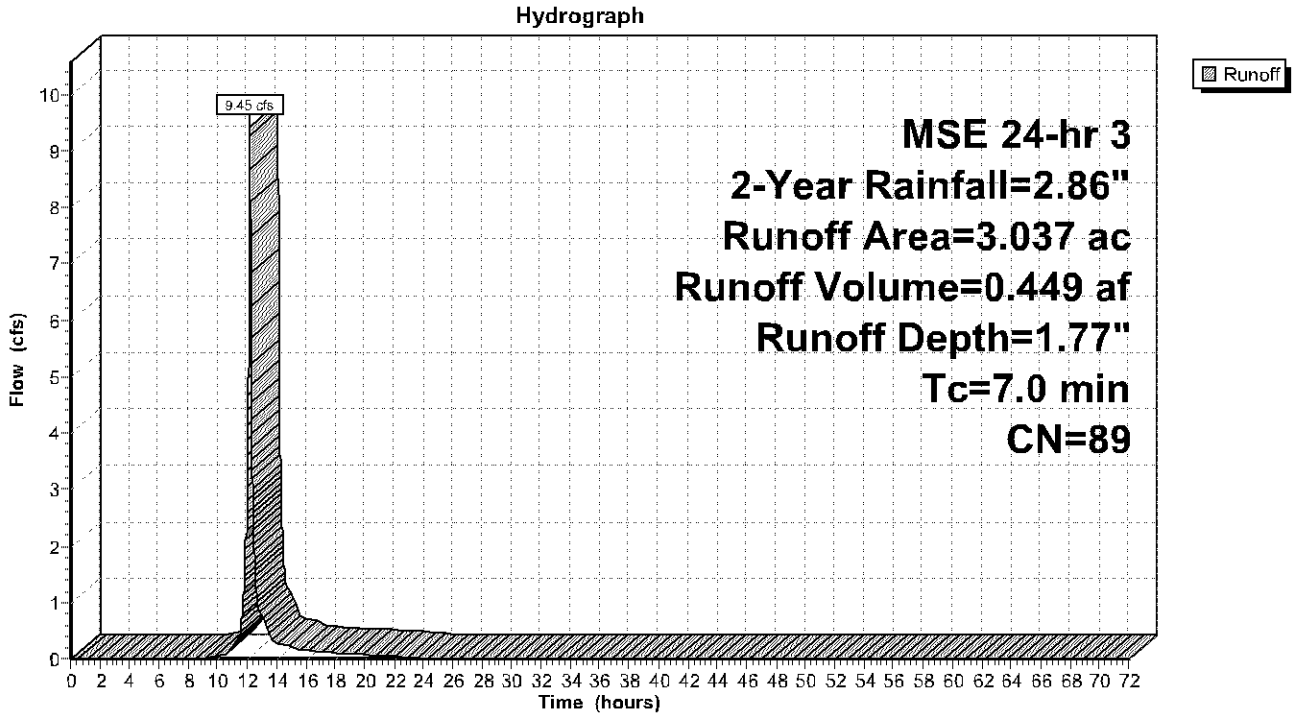
Runoff = 9.45 cfs @ 12.14 hrs, Volume= 0.449 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
1.941	98	Paved parking, HSG C
1.096	74	>75% Grass cover, Good, HSG C
3.037	89	Weighted Average
1.096		36.09% Pervious Area
1.941		63.91% Impervious Area

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

Subcatchment DA-7P:



Summary for Subcatchment DA-8P:

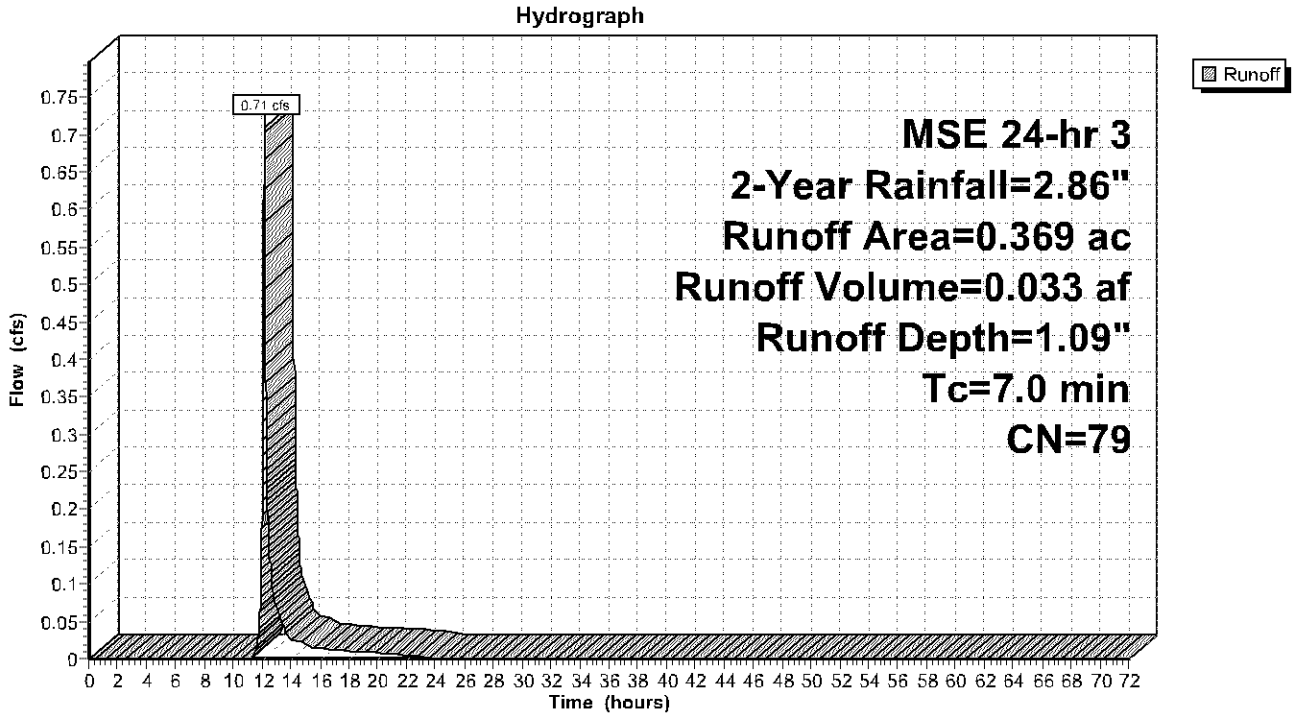
Runoff = 0.71 cfs @ 12.15 hrs, Volume= 0.033 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.079	98	Paved parking, HSG C
0.290	74	>75% Grass cover, Good, HSG C
0.369	79	Weighted Average
0.290		78.59% Pervious Area
0.079		21.41% Impervious Area

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

Subcatchment DA-8P:



Summary for Subcatchment DA-9P:

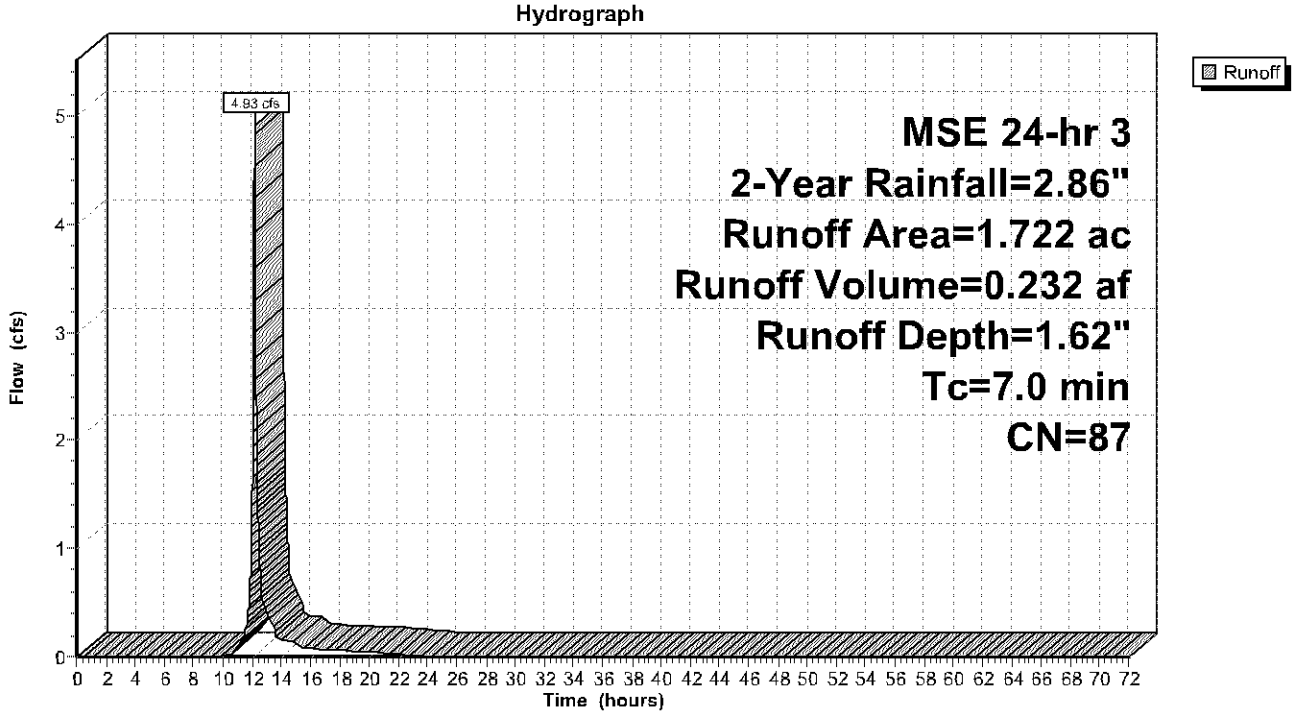
Runoff = 4.93 cfs @ 12.14 hrs, Volume= 0.232 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.901	98	Paved parking, HSG C
0.821	74	>75% Grass cover, Good, HSG C
1.722	87	Weighted Average
0.821		47.68% Pervious Area
0.901		52.32% Impervious Area

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

Subcatchment DA-9P:



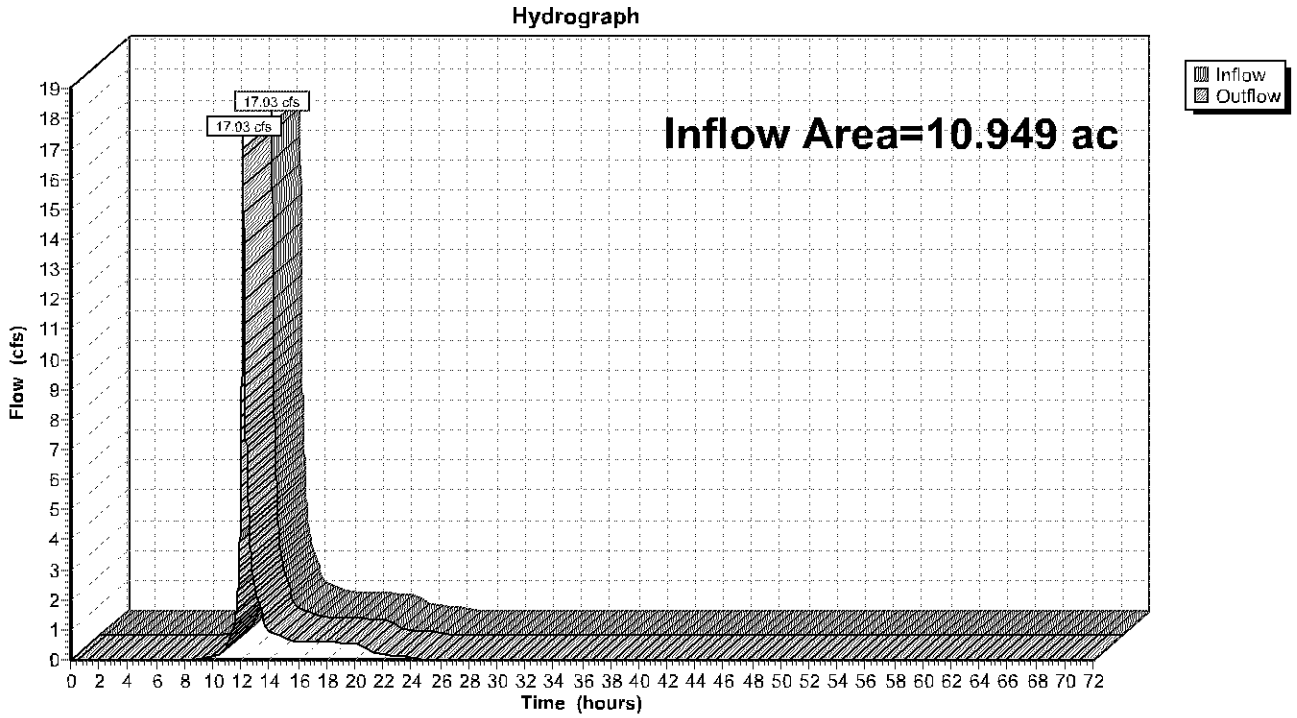
Summary for Reach 3R: total

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

Inflow Area = 10.949 ac, 72.11% Impervious, Inflow Depth = 1.34" for 2-Year event
Inflow = 17.03 cfs @ 12.14 hrs, Volume= 1.223 af
Outflow = 17.03 cfs @ 12.14 hrs, Volume= 1.223 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 3R: total



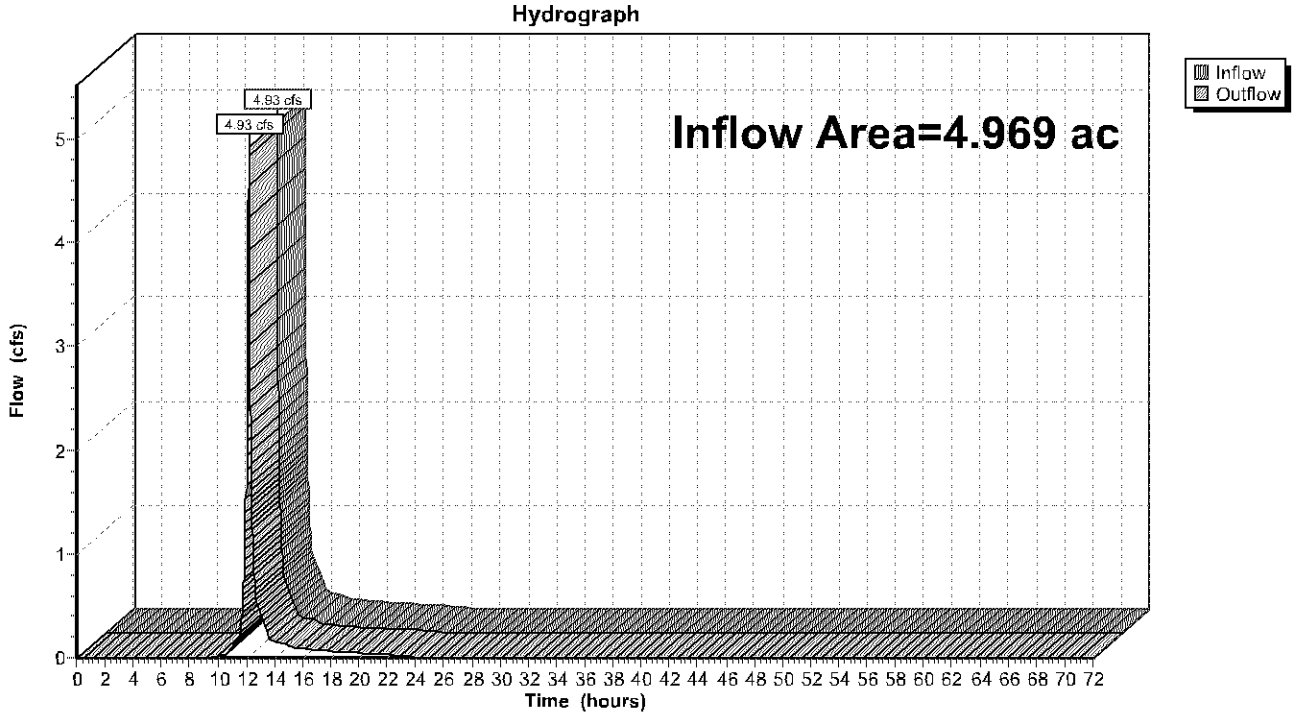
Summary for Reach 9R: EXISTING SOUTH DRAINAGE DITCH

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

Inflow Area = 4.969 ac, 68.54% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 4.93 cfs @ 12.14 hrs, Volume= 0.232 af
Outflow = 4.93 cfs @ 12.14 hrs, Volume= 0.232 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: EXISTING SOUTH DRAINAGE DITCH



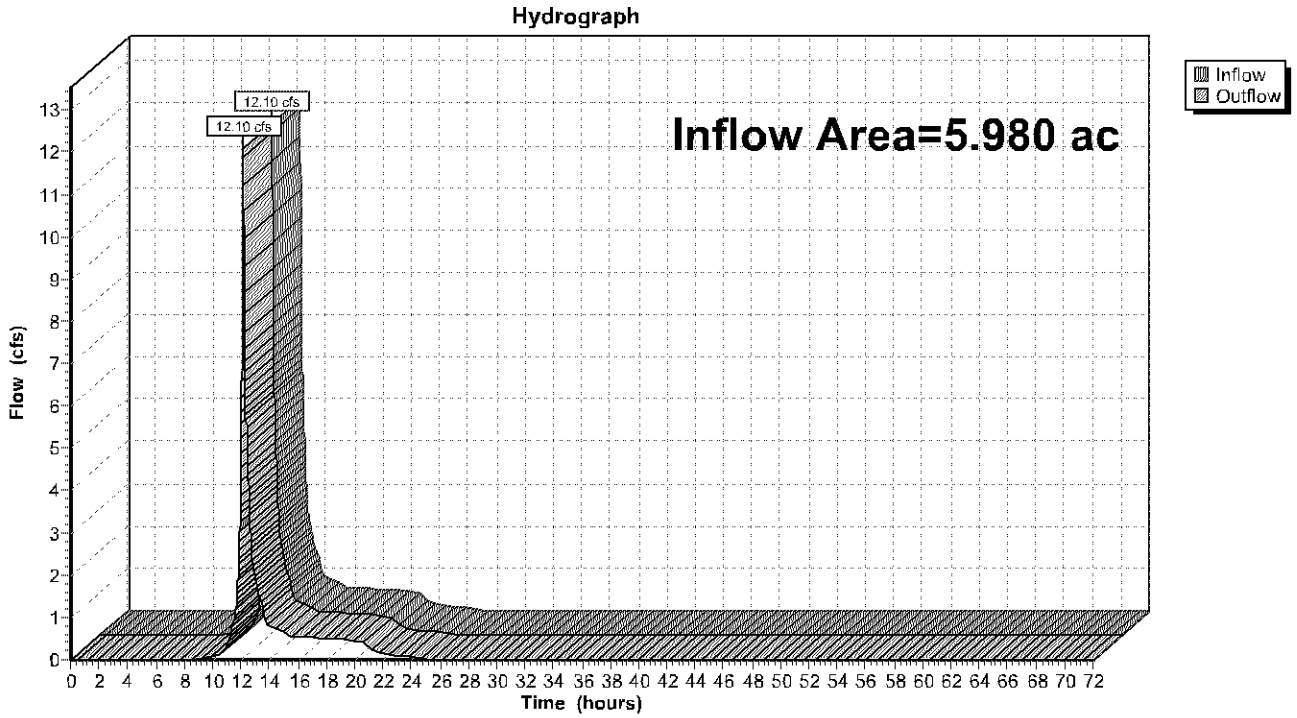
Summary for Reach 10R: COMPUTER AVE

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

Inflow Area = 5.980 ac, 75.07% Impervious, Inflow Depth = 1.99" for 2-Year event
Inflow = 12.10 cfs @ 12.14 hrs, Volume= 0.991 af
Outflow = 12.10 cfs @ 12.14 hrs, Volume= 0.991 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 10R: COMPUTER AVE



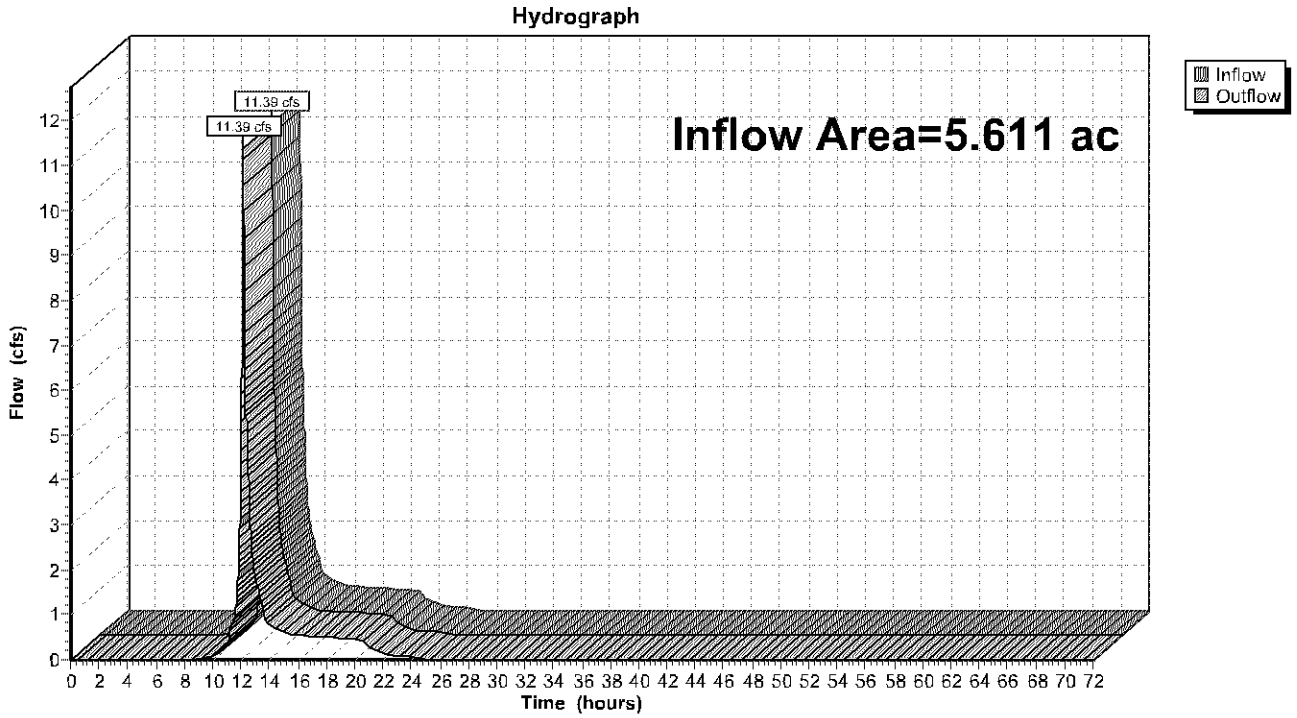
Summary for Reach 11R: EXISTING POND

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

Inflow Area = 5.611 ac, 78.60% Impervious, Inflow Depth = 2.05" for 2-Year event
Inflow = 11.39 cfs @ 12.14 hrs, Volume= 0.957 af
Outflow = 11.39 cfs @ 12.14 hrs, Volume= 0.957 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 11R: EXISTING POND



Summary for Pond FIL1:

Inflow Area = 2.186 ac, 95.20% Impervious, Inflow Depth = 2.51" for 2-Year event
Inflow = 8.66 cfs @ 12.14 hrs, Volume= 0.458 af
Outflow = 2.01 cfs @ 12.38 hrs, Volume= 0.423 af, Atten= 77%, Lag= 14.7 min
Primary = 2.01 cfs @ 12.38 hrs, Volume= 0.423 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 817.25' @ 12.38 hrs Surf.Area= 9,750 sf Storage= 10,634 cf

Plug-Flow detention time= 223.7 min calculated for 0.423 af (92% of inflow)
Center-of-Mass det. time= 189.3 min (949.9 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	815.00'	8,836 cf	**21.67'W x 450.00'L x 4.00'H Field A** 39,000 cf Overall - 9,547 cf Embedded = 29,453 cf x 30.0% Voids
#2A	815.50'	9,547 cf	**CMP Round 36** x 66 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L Row Length Adjustment= +5.00' x 7.07 sf x 3 rows 15.67' Header x 7.07 sf x 1 = 110.7 cf Inside
		18,383 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	**24.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 815.50' / 815.45' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	815.50'	**8.0" Round Culvert X 6.00** L= 220.0' Ke= 0.500 Inlet / Outlet Invert= 815.50' / 815.50' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	815.00'	**1.630 in/hr Exfiltration over Surface area**
#4	Device 1	816.85'	**18.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=2.00 cfs @ 12.38 hrs HW=817.25' (Free Discharge)
└**1=Culvert** (Passes 2.00 cfs of 9.86 cfs potential flow)
  └**2=Culvert** (Passes 0.37 cfs of 6.00 cfs potential flow)
    └**3=Exfiltration** (Exfiltration Controls 0.37 cfs)
  └**4=Orifice/Grate** (Orifice Controls 1.64 cfs @ 2.16 fps)

Pond FIL1: - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L
Row Length Adjustment= +5.00' x 7.07 sf x 3 rows

36.0" Wide + 40.0" Spacing = 76.0" C-C Row Spacing

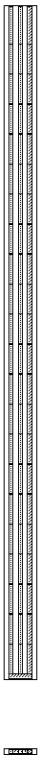
22 Chambers/Row x 20.00' Long +5.00' Row Adjustment +3.00' Header x 1 = 448.00' Row Length +12.0" End Stone x 2 = 450.00' Base Length
3 Rows x 36.0" Wide + 40.0" Spacing x 2 + 36.0" Side Stone x 2 = 21.67' Base Width
6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

66 Chambers x 141.4 cf +5.00' Row Adjustment x 7.07 sf x 3 Rows + 15.67' Header x 7.07 sf = 9,547.3 cf Chamber Storage

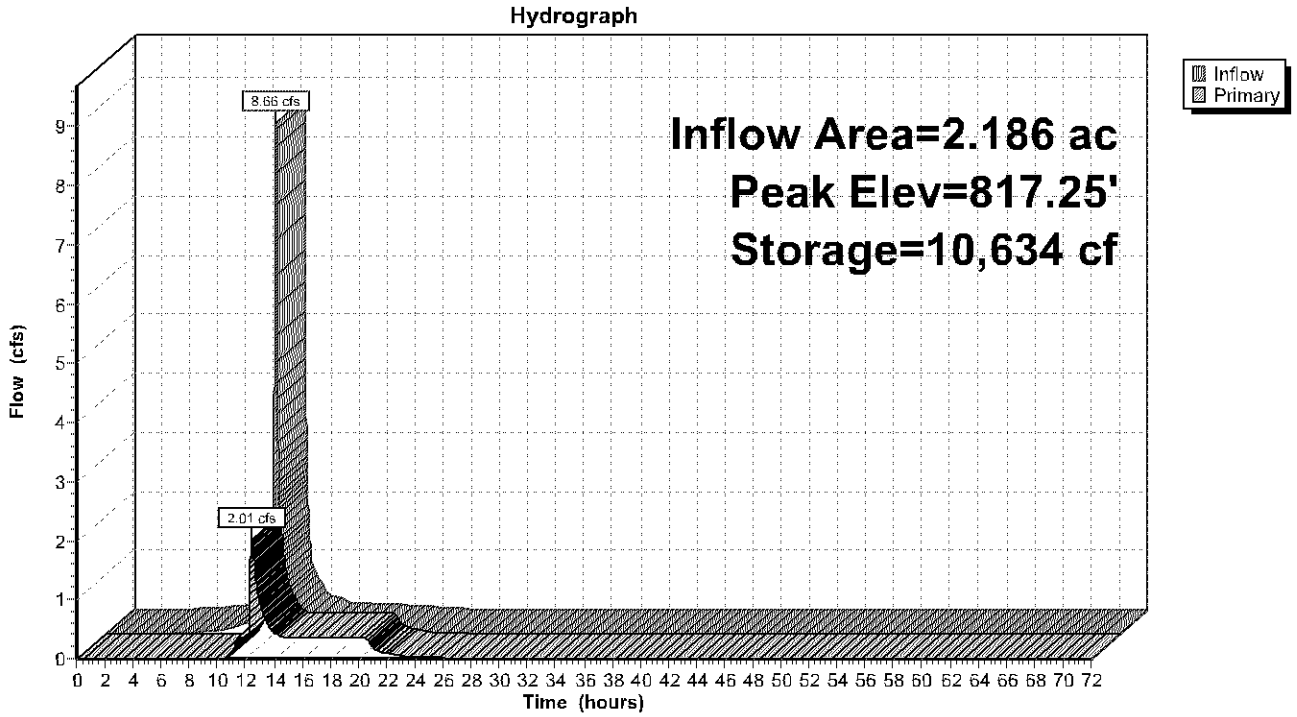
39,000.0 cf Field - 9,547.3 cf Chambers = 29,452.7 cf Stone x 30.0% Voids = 8,835.8 cf Stone Storage

Chamber Storage + Stone Storage = 18,383.1 cf = 0.422 af
Overall Storage Efficiency = 47.1%
Overall System Size = 450.00' x 21.67' x 4.00'

66 Chambers
1,444.4 cy Field
1,090.8 cy Stone



Pond FIL1:


Hydrograph
Inflow
Primary
8.66 cfs
2.01 cfs
Inflow Area=2.186 ac
Peak Elev=817.25'
Storage=10,634 cf
Flow (cfs)
0 1 2 3 4 5 6 7 8 9
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond INF1:

Inflow Area = 3.247 ac, 77.15% Impervious, Inflow Depth = 2.12" for 2-Year event
Inflow = 11.16 cfs @ 12.14 hrs, Volume= 0.573 af
Outflow = 0.21 cfs @ 15.12 hrs, Volume= 0.573 af, Atten= 98%, Lag= 178.8 min
Discarded = 0.21 cfs @ 15.12 hrs, Volume= 0.573 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 820.40' @ 15.12 hrs Surf.Area= 19,772 sf Storage= 17,101 cf

Plug-Flow detention time= 776.5 min calculated for 0.573 af (100% of inflow)
Center-of-Mass det. time= 776.6 min (1,548.3 - 771.8)

Volume	Invert	Avail.Storage	Storage Description
#1	819.50'	39,895 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

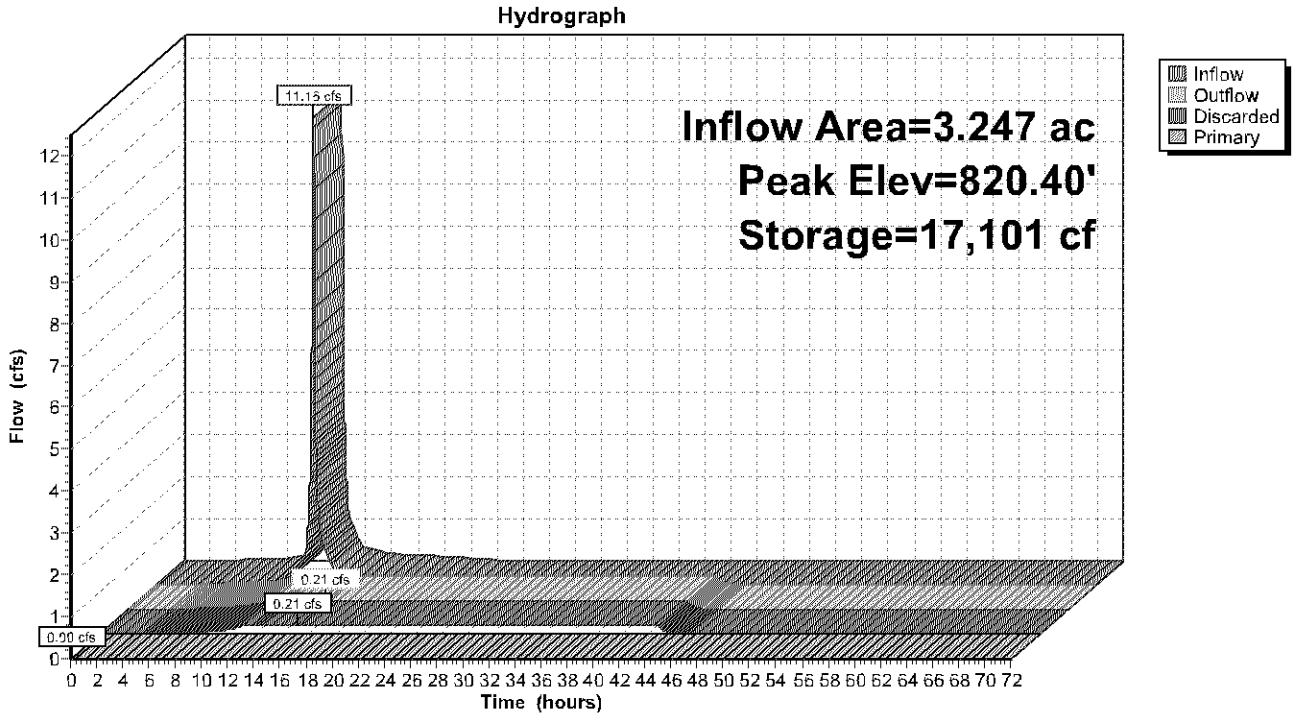
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
819.50	18,279	0	0
820.00	19,100	9,345	9,345
821.00	20,784	19,942	29,287
821.50	21,647	10,608	39,895

Device	Routing	Invert	Outlet Devices
#1	Discarded	819.50'	**0.450 in/hr Exfiltration over Surface area**
#2	Device 3	820.50'	**27.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	817.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 817.00' / 816.00' S= 0.0179 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Discarded OutFlow Max=0.21 cfs @ 15.12 hrs HW=820.40' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=819.50' (Free Discharge)
↑—**3=Culvert** (Passes 0.00 cfs of 18.53 cfs potential flow)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF1:


Hydrograph
Inflow Area=3.247 ac
Peak Elev=820.40'
Storage=17,101 cf
11.15 cfs
0.21 cfs
0.21 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Runoff Area=1.718 ac 100.00% Impervious Runoff Depth=4.02"
Tc=7.0 min CN=98 Runoff=10.47 cfs 0.576 af

SubcatchmentDA-2P: Runoff Area=1.529 ac 51.47% Impervious Runoff Depth=2.78"
Tc=7.0 min CN=86 Runoff=7.41 cfs 0.355 af

SubcatchmentDA-3P: Runoff Area=1.186 ac 100.00% Impervious Runoff Depth=4.02"
Tc=7.0 min CN=98 Runoff=7.23 cfs 0.398 af

SubcatchmentDA-4P: Runoff Area=0.615 ac 82.93% Impervious Runoff Depth=3.58"
Tc=7.0 min CN=94 Runoff=3.57 cfs 0.183 af

SubcatchmentDA-5P: Runoff Area=0.385 ac 100.00% Impervious Runoff Depth=4.02"
Tc=7.0 min CN=98 Runoff=2.35 cfs 0.129 af

SubcatchmentDA-6P: Runoff Area=0.388 ac 100.00% Impervious Runoff Depth=4.02"
Tc=7.0 min CN=98 Runoff=2.37 cfs 0.130 af

SubcatchmentDA-7P: Runoff Area=3.037 ac 63.91% Impervious Runoff Depth=3.07"
Tc=7.0 min CN=89 Runoff=15.91 cfs 0.776 af

SubcatchmentDA-8P: Runoff Area=0.369 ac 21.41% Impervious Runoff Depth=2.18"
Tc=7.0 min CN=79 Runoff=1.43 cfs 0.067 af

SubcatchmentDA-9P: Runoff Area=1.722 ac 52.32% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=87 Runoff=8.57 cfs 0.413 af

Reach 3R: total Inflow=32.61 cfs 2.312 af
Outflow=32.61 cfs 2.312 af

Reach 9R: EXISTING SOUTH DRAINAGE DITCH Inflow=8.57 cfs 0.663 af
Outflow=8.57 cfs 0.663 af

Reach 10R: COMPUTER AVE Inflow=24.16 cfs 1.649 af
Outflow=24.16 cfs 1.649 af

Reach 11R: EXISTING POND Inflow=22.75 cfs 1.582 af
Outflow=22.75 cfs 1.582 af

Pond FIL1: Peak Elev=817.72' Storage=13,236 cf Inflow=13.15 cfs 0.710 af
Outflow=7.06 cfs 0.676 af

Pond INF1: Peak Elev=820.69' Storage=22,974 cf Inflow=17.88 cfs 0.931 af
Discarded=0.21 cfs 0.681 af Primary=1.95 cfs 0.250 af Outflow=2.16 cfs 0.931 af

Total Runoff Area = 10.949 ac Runoff Volume = 3.027 af Average Runoff Depth = 3.32"
27.89% Pervious = 3.054 ac 72.11% Impervious = 7.895 ac

Summary for Subcatchment DA-1P:

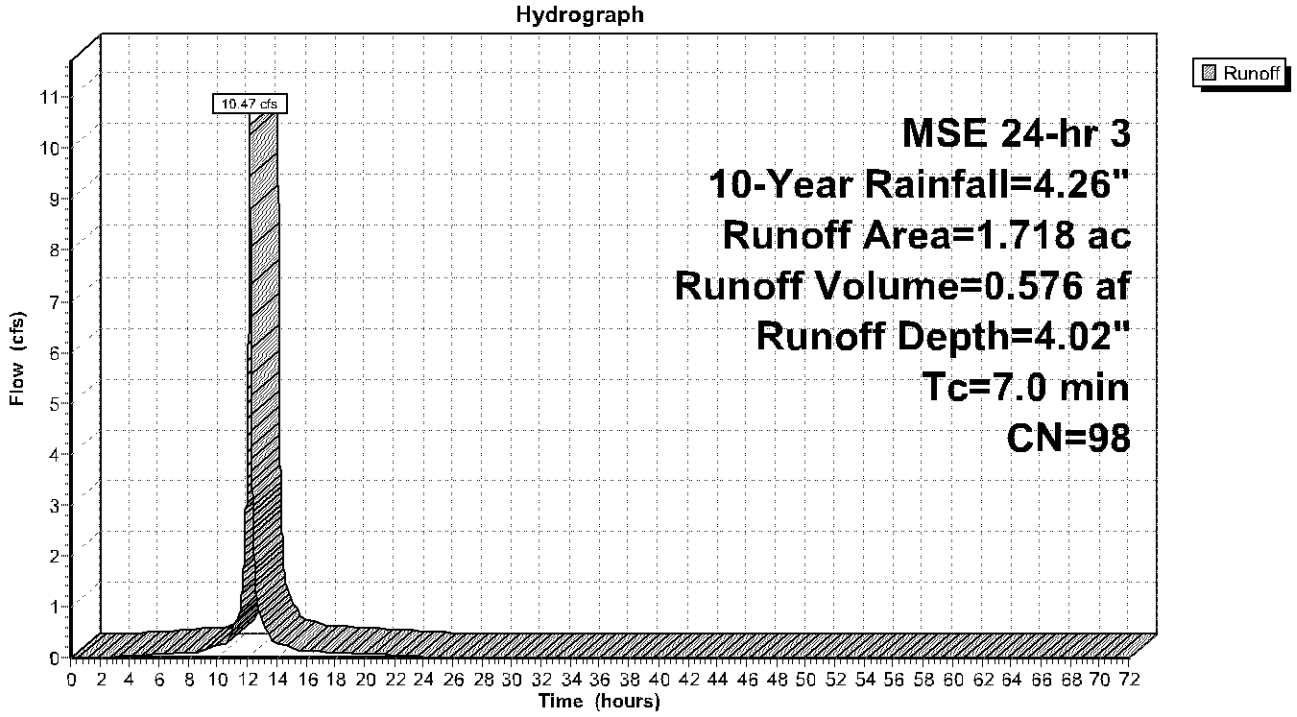
Runoff = 10.47 cfs @ 12.14 hrs, Volume= 0.576 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
1.718	98	Roofs, HSG C
1.718		100.00% Impervious Area

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

Subcatchment DA-1P:



Summary for Subcatchment DA-2P:

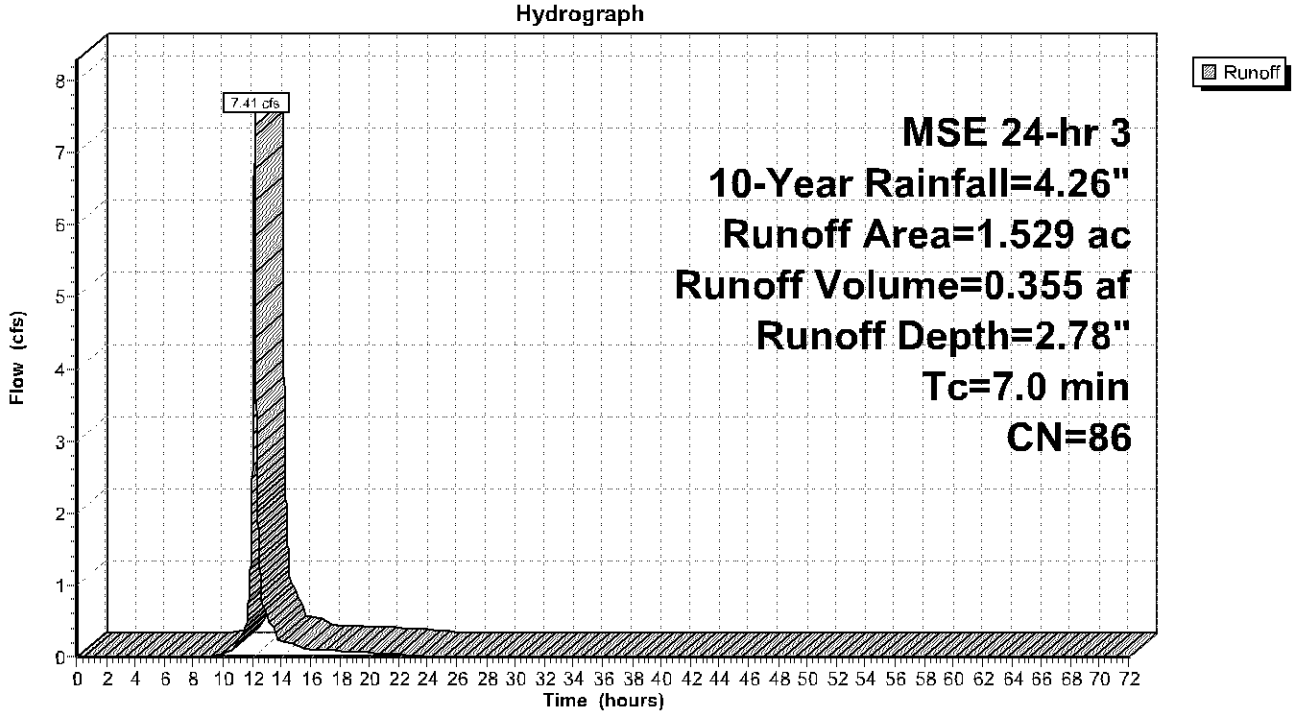
Runoff = 7.41 cfs @ 12.14 hrs, Volume= 0.355 af, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.787	98	Paved parking, HSG C
0.742	74	>75% Grass cover, Good, HSG C
1.529	86	Weighted Average
0.742		48.53% Pervious Area
0.787		51.47% Impervious Area

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

Subcatchment DA-2P:



Summary for Subcatchment DA-3P:

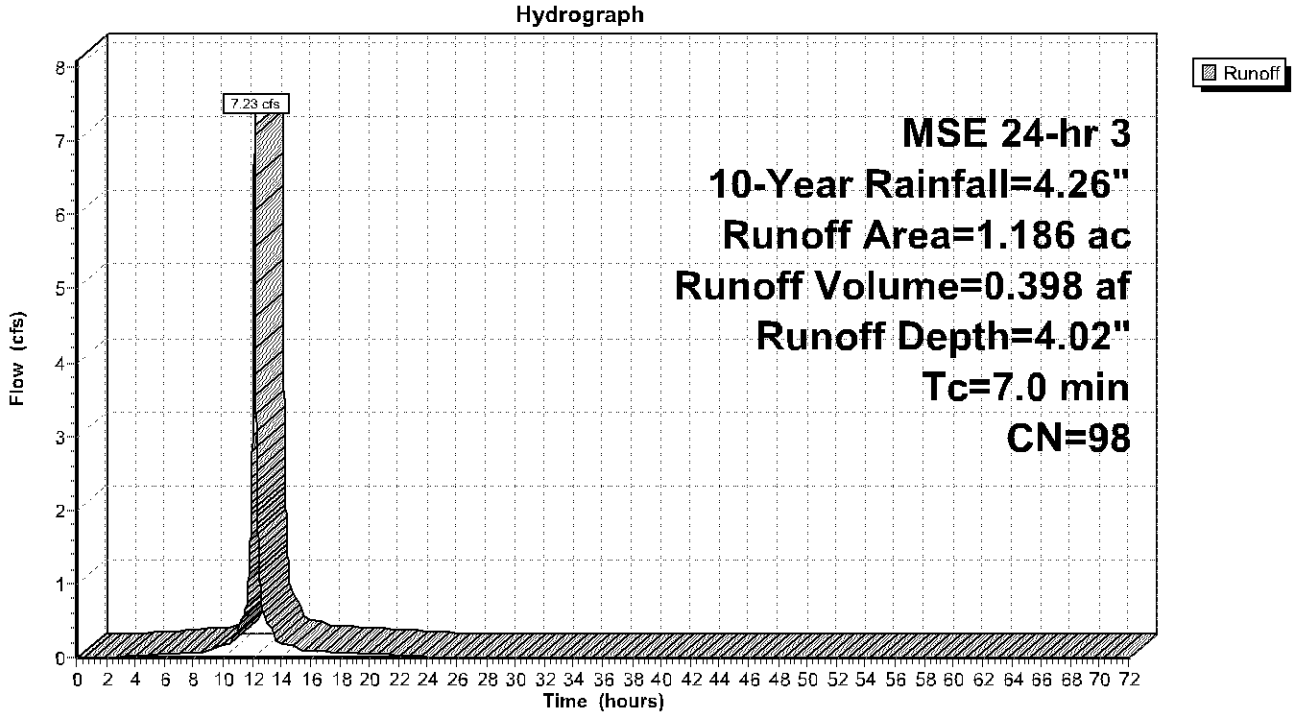
Runoff = 7.23 cfs @ 12.14 hrs, Volume= 0.398 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
1.186	98	Roofs, HSG C
1.186		100.00% Impervious Area

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

Subcatchment DA-3P:



Summary for Subcatchment DA-4P:

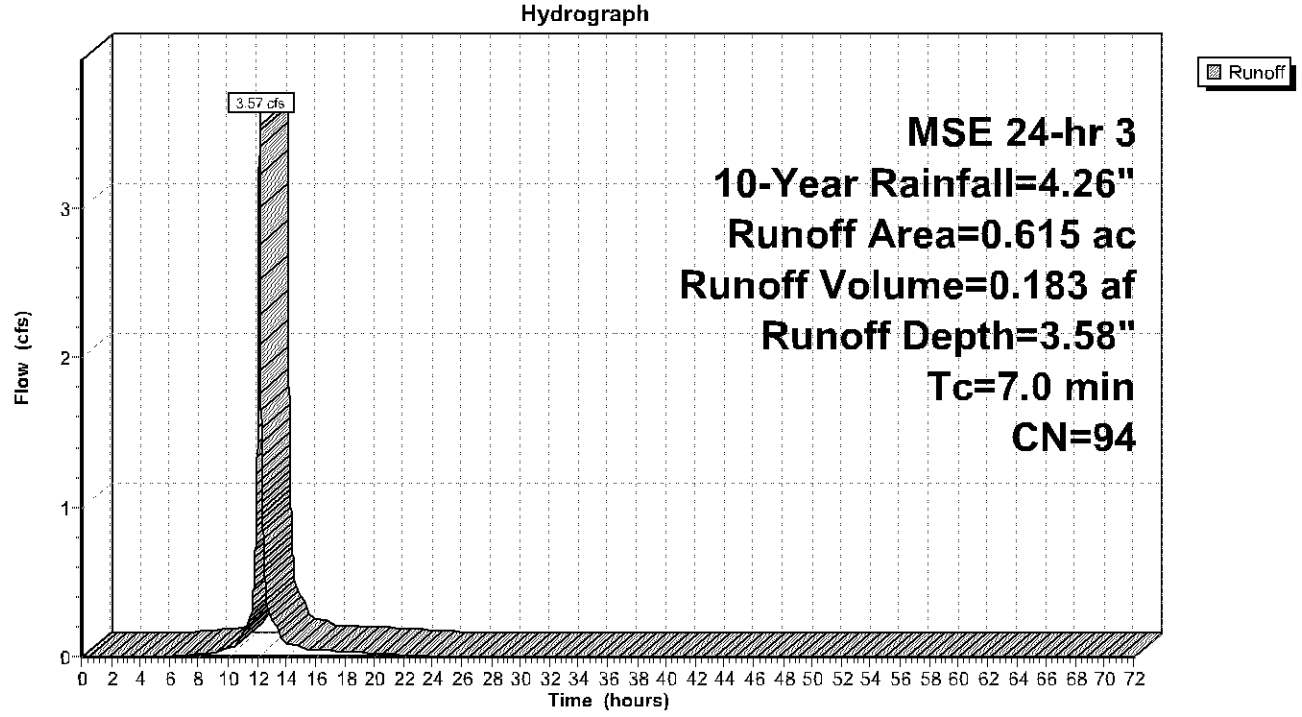
Runoff = 3.57 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG C
0.105	74	>75% Grass cover, Good, HSG C
0.615	94	Weighted Average
0.105		17.07% Pervious Area
0.510		82.93% Impervious Area

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

Subcatchment DA-4P:



Summary for Subcatchment DA-5P:

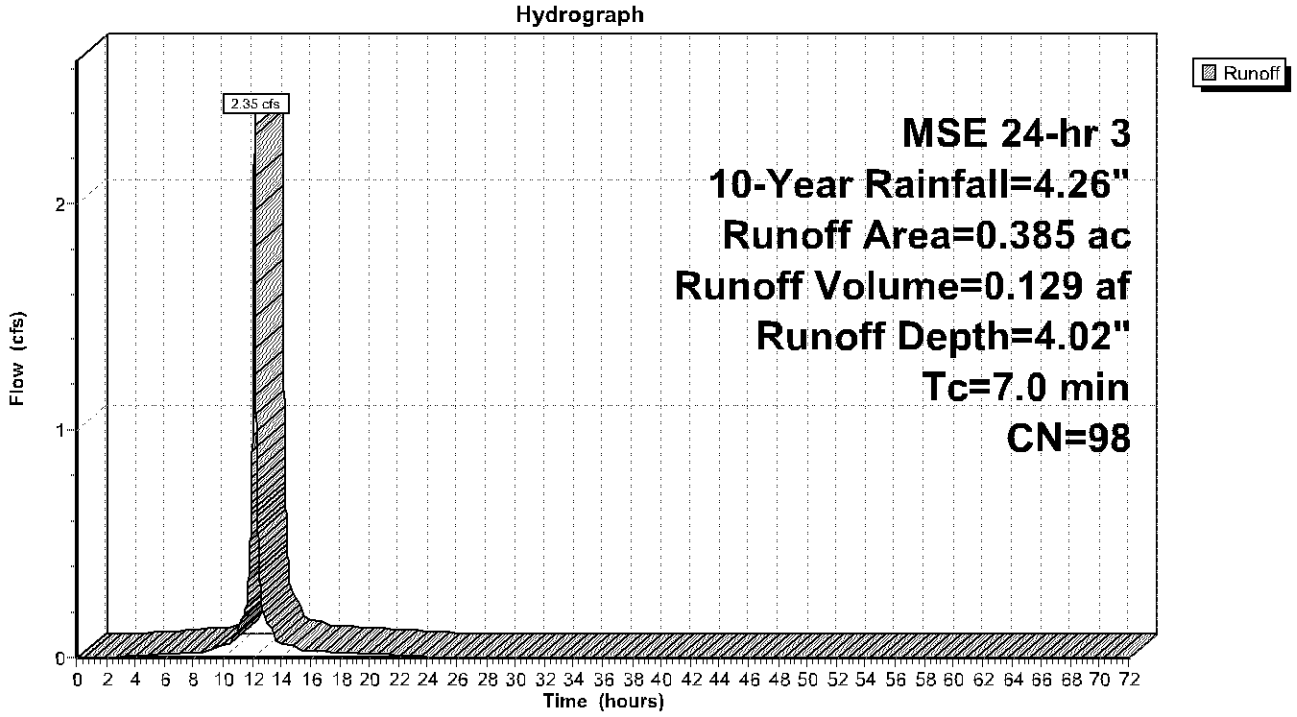
Runoff = 2.35 cfs @ 12.14 hrs, Volume= 0.129 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.385	98	Roofs, HSG C
0.385		100.00% Impervious Area

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

Subcatchment DA-5P:



Summary for Subcatchment DA-6P:

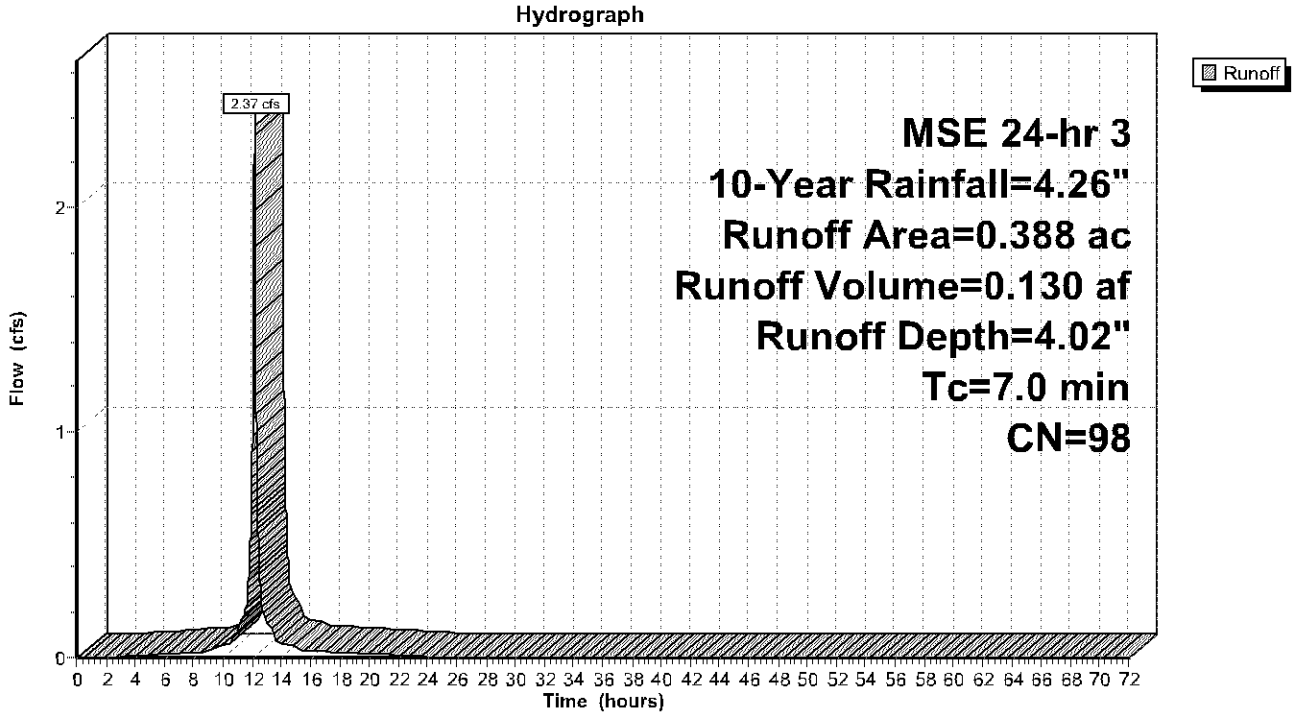
Runoff = 2.37 cfs @ 12.14 hrs, Volume= 0.130 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.388	98	Roofs, HSG C
0.388		100.00% Impervious Area

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

Subcatchment DA-6P:



Summary for Subcatchment DA-7P:

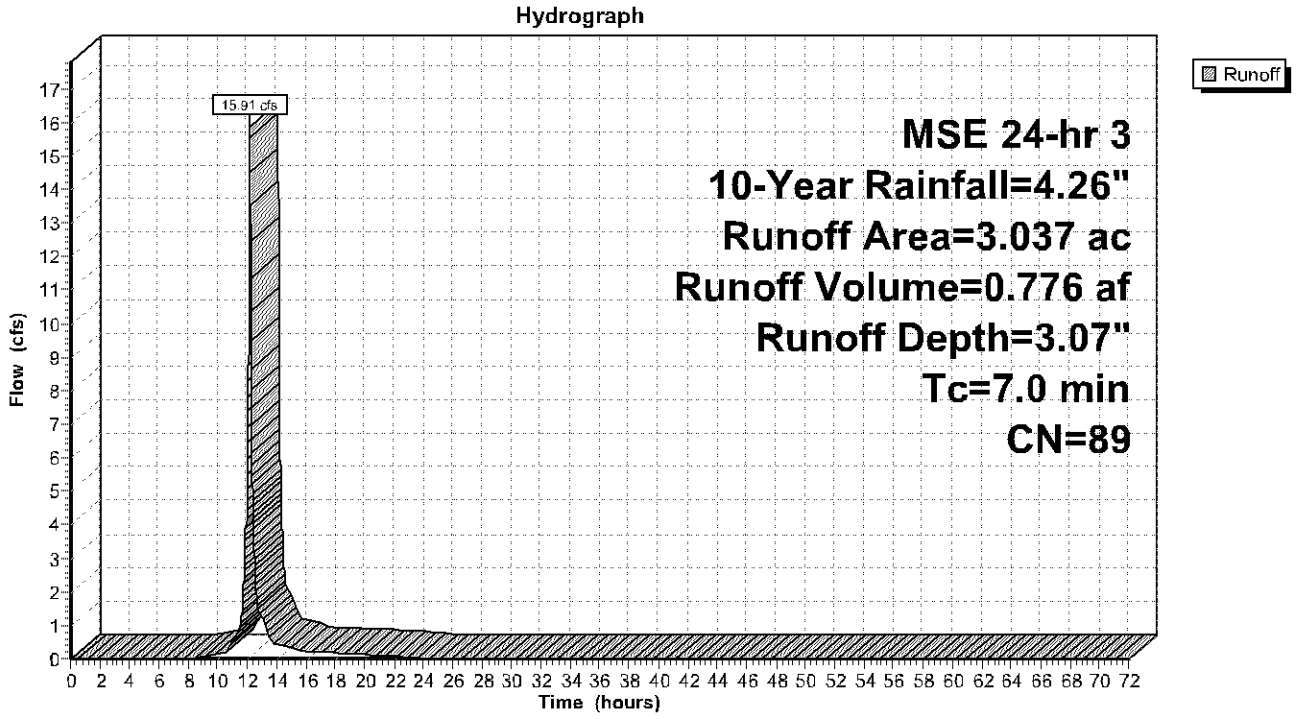
Runoff = 15.91 cfs @ 12.14 hrs, Volume= 0.776 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
1.941	98	Paved parking, HSG C
1.096	74	>75% Grass cover, Good, HSG C
3.037	89	Weighted Average
1.096		36.09% Pervious Area
1.941		63.91% Impervious Area

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

Subcatchment DA-7P:



Summary for Subcatchment DA-8P:

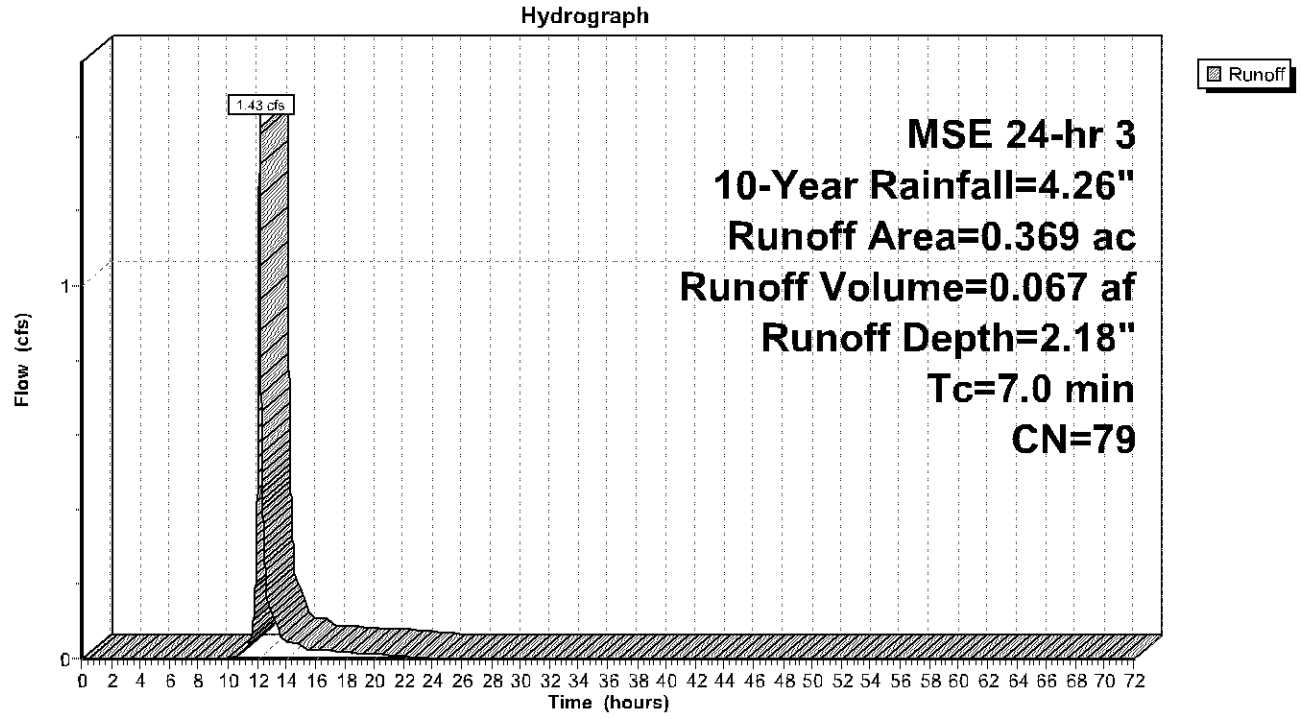
Runoff = 1.43 cfs @ 12.14 hrs, Volume= 0.067 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.079	98	Paved parking, HSG C
0.290	74	>75% Grass cover, Good, HSG C
0.369	79	Weighted Average
0.290		78.59% Pervious Area
0.079		21.41% Impervious Area

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

Subcatchment DA-8P:



Summary for Subcatchment DA-9P:

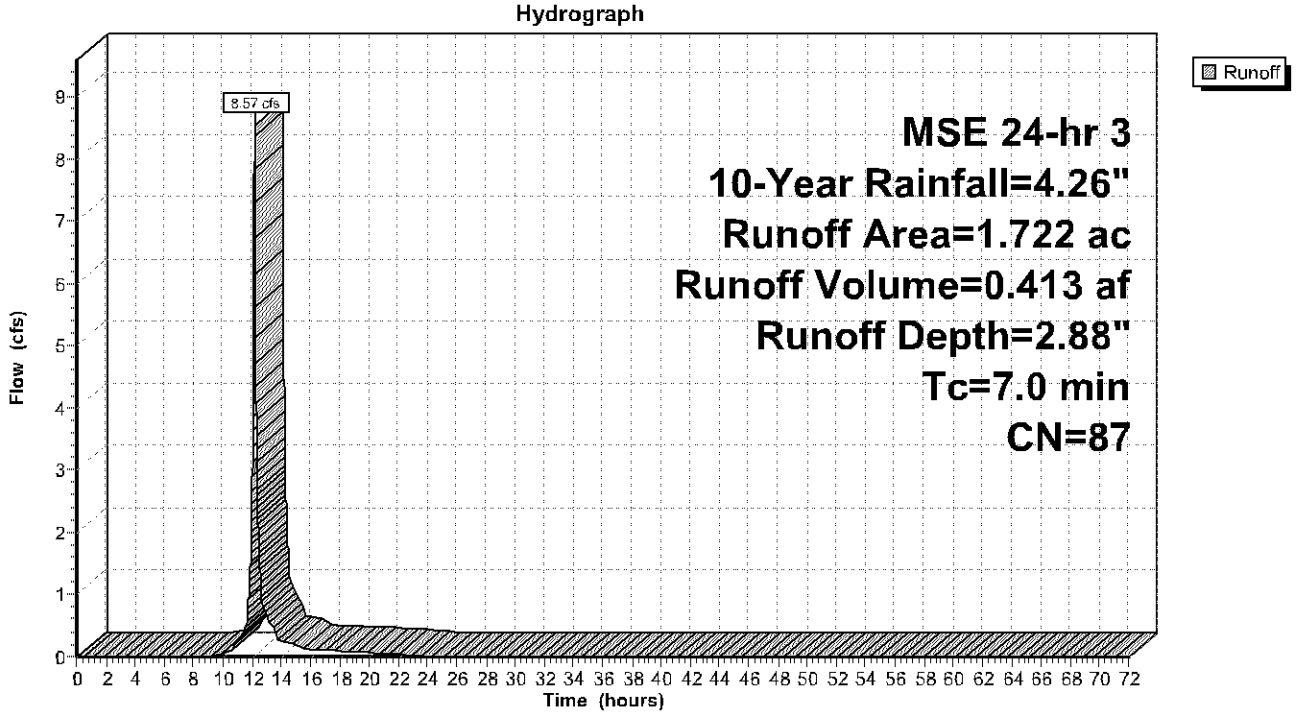
Runoff = 8.57 cfs @ 12.14 hrs, Volume= 0.413 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.901	98	Paved parking, HSG C
0.821	74	>75% Grass cover, Good, HSG C
1.722	87	Weighted Average
0.821		47.68% Pervious Area
0.901		52.32% Impervious Area

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

Subcatchment DA-9P:



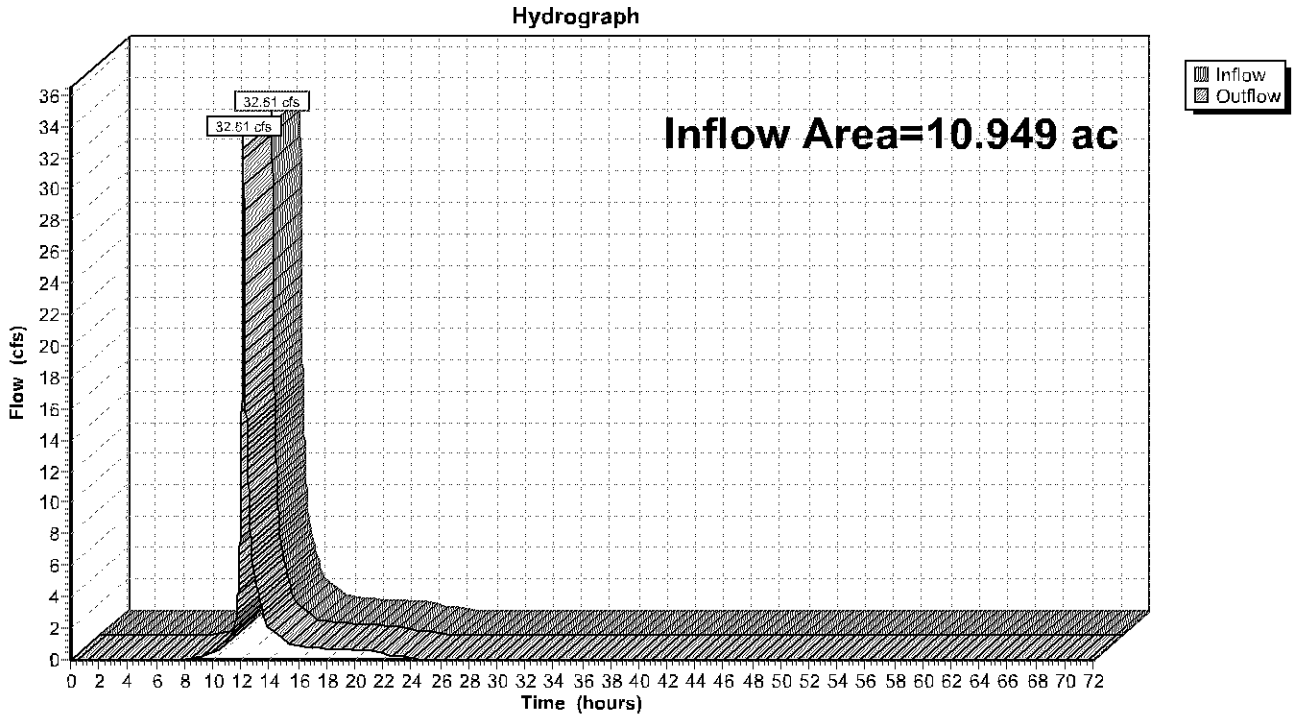
Summary for Reach 3R: total

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

Inflow Area = 10.949 ac, 72.11% Impervious, Inflow Depth = 2.53" for 10-Year event
Inflow = 32.61 cfs @ 12.15 hrs, Volume= 2.312 af
Outflow = 32.61 cfs @ 12.15 hrs, Volume= 2.312 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 3R: total



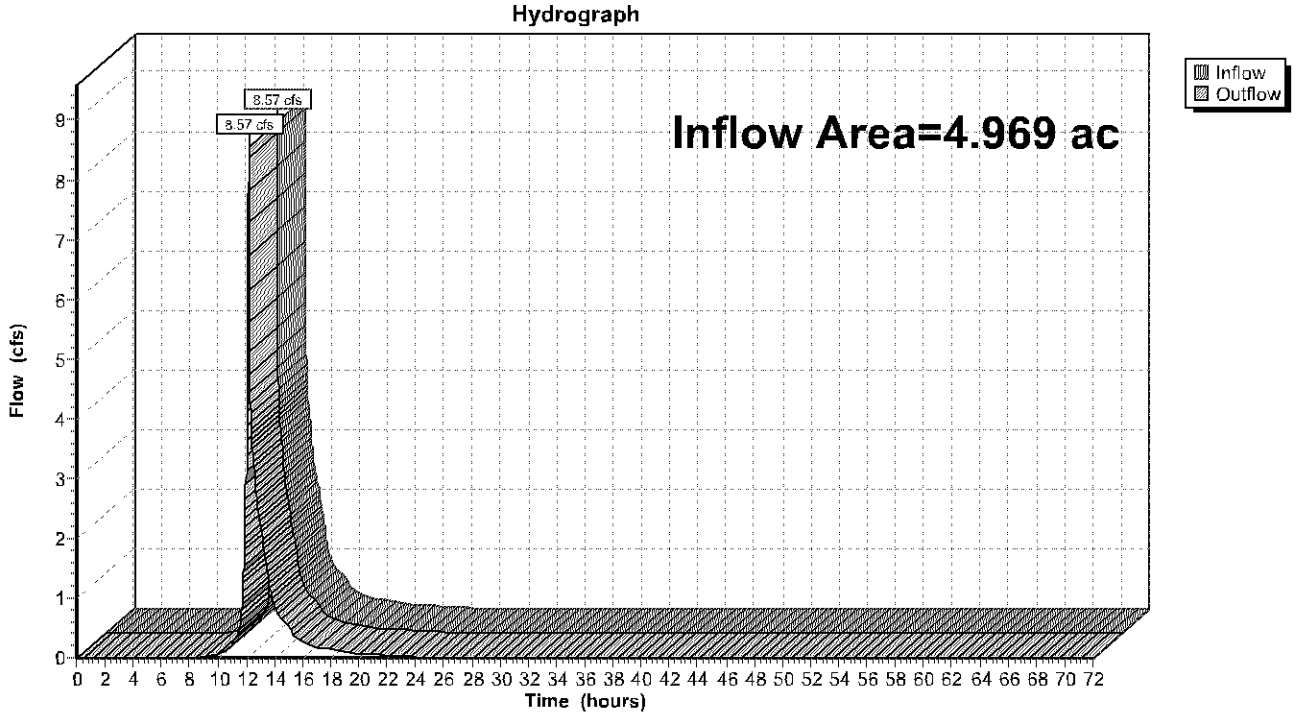
Summary for Reach 9R: EXISTING SOUTH DRAINAGE DITCH

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

Inflow Area = 4.969 ac, 68.54% Impervious, Inflow Depth = 1.60" for 10-Year event
Inflow = 8.57 cfs @ 12.14 hrs, Volume= 0.663 af
Outflow = 8.57 cfs @ 12.14 hrs, Volume= 0.663 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: EXISTING SOUTH DRAINAGE DITCH



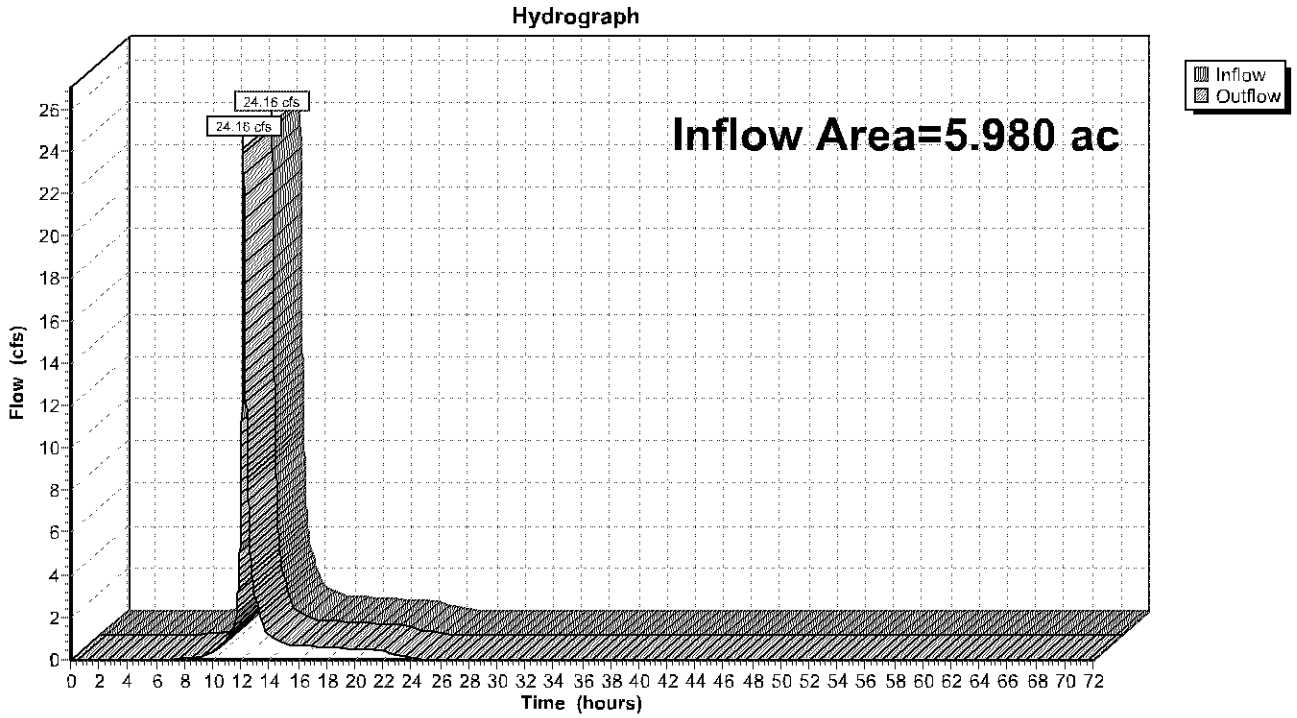
Summary for Reach 10R: COMPUTER AVE

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

Inflow Area = 5.980 ac, 75.07% Impervious, Inflow Depth = 3.31" for 10-Year event
Inflow = 24.16 cfs @ 12.16 hrs, Volume= 1.649 af
Outflow = 24.16 cfs @ 12.16 hrs, Volume= 1.649 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 10R: COMPUTER AVE



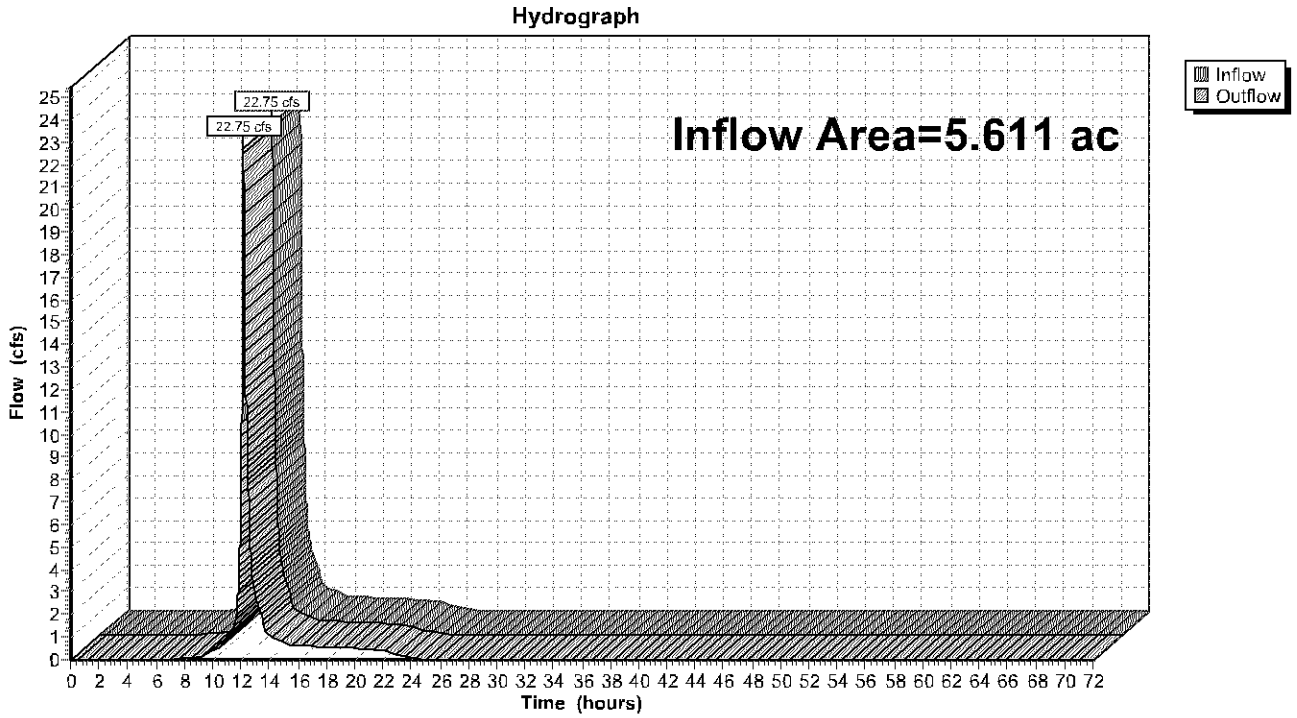
Summary for Reach 11R: EXISTING POND

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

Inflow Area = 5.611 ac, 78.60% Impervious, Inflow Depth = 3.38" for 10-Year event
Inflow = 22.75 cfs @ 12.16 hrs, Volume= 1.582 af
Outflow = 22.75 cfs @ 12.16 hrs, Volume= 1.582 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 11R: EXISTING POND



Summary for Pond FIL1:

Inflow Area = 2.186 ac, 95.20% Impervious, Inflow Depth = 3.90" for 10-Year event
Inflow = 13.15 cfs @ 12.14 hrs, Volume= 0.710 af
Outflow = 7.06 cfs @ 12.23 hrs, Volume= 0.676 af, Atten= 46%, Lag= 5.4 min
Primary = 7.06 cfs @ 12.23 hrs, Volume= 0.676 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 817.72' @ 12.23 hrs Surf.Area= 9,750 sf Storage= 13,236 cf

Plug-Flow detention time= 172.9 min calculated for 0.676 af (95% of inflow)
Center-of-Mass det. time= 148.0 min (901.8 - 753.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	815.00'	8,836 cf	**21.67'W x 450.00'L x 4.00'H Field A** 39,000 cf Overall - 9,547 cf Embedded = 29,453 cf x 30.0% Voids
#2A	815.50'	9,547 cf	**CMP Round 36** x 66 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L Row Length Adjustment= +5.00' x 7.07 sf x 3 rows 15.67' Header x 7.07 sf x 1 = 110.7 cf Inside
		18,383 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	**24.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 815.50' / 815.45' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	815.50'	**8.0" Round Culvert X 6.00** L= 220.0' Ke= 0.500 Inlet / Outlet Invert= 815.50' / 815.50' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	815.00'	**1.630 in/hr Exfiltration over Surface area**
#4	Device 1	816.85'	**18.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=7.06 cfs @ 12.23 hrs HW=817.72' (Free Discharge)
└**1=Culvert** (Passes 7.06 cfs of 14.02 cfs potential flow)
  └**2=Culvert** (Passes 0.37 cfs of 7.17 cfs potential flow)
    └**3=Exfiltration** (Exfiltration Controls 0.37 cfs)
  └**4=Orifice/Grate** (Orifice Controls 6.69 cfs @ 3.17 fps)

Pond FIL1: - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L
Row Length Adjustment= +5.00' x 7.07 sf x 3 rows

36.0" Wide + 40.0" Spacing = 76.0" C-C Row Spacing

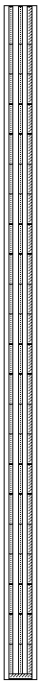
22 Chambers/Row x 20.00' Long +5.00' Row Adjustment +3.00' Header x 1 = 448.00' Row Length +12.0" End Stone x 2 = 450.00' Base Length
3 Rows x 36.0" Wide + 40.0" Spacing x 2 + 36.0" Side Stone x 2 = 21.67' Base Width
6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

66 Chambers x 141.4 cf +5.00' Row Adjustment x 7.07 sf x 3 Rows + 15.67' Header x 7.07 sf = 9,547.3 cf Chamber Storage

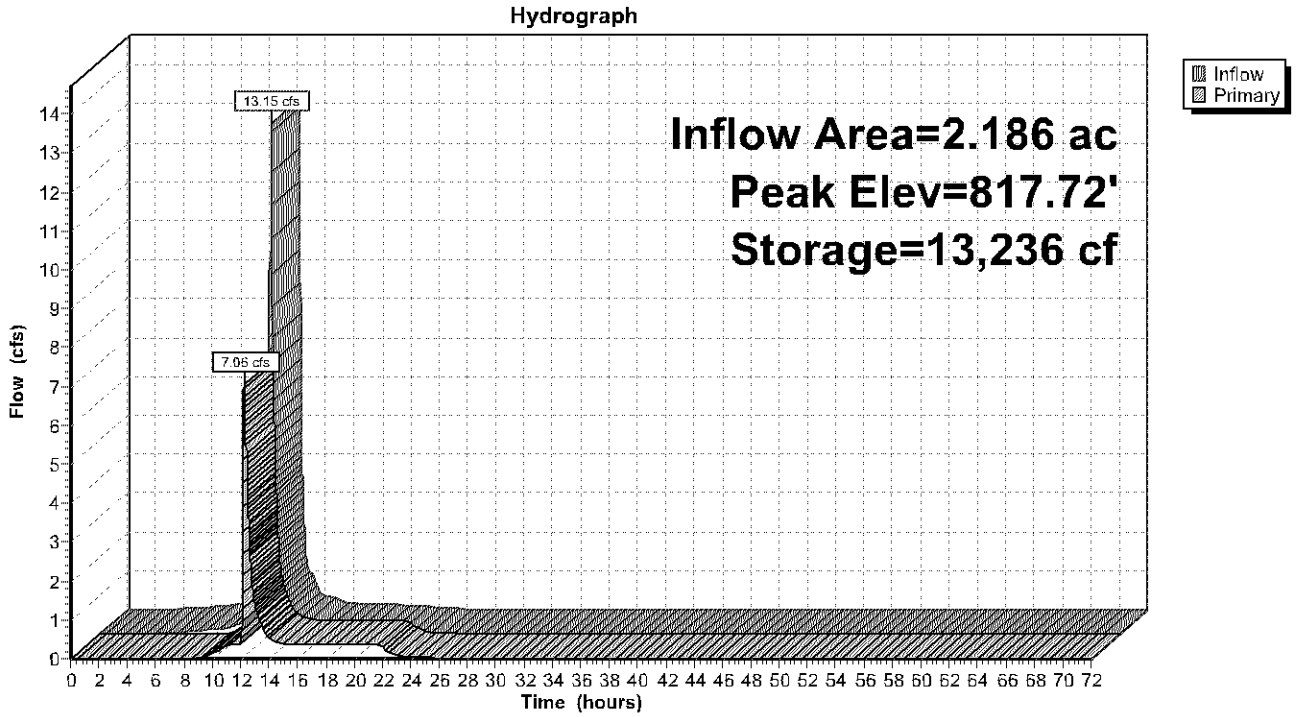
39,000.0 cf Field - 9,547.3 cf Chambers = 29,452.7 cf Stone x 30.0% Voids = 8,835.8 cf Stone Storage

Chamber Storage + Stone Storage = 18,383.1 cf = 0.422 af
Overall Storage Efficiency = 47.1%
Overall System Size = 450.00' x 21.67' x 4.00'

66 Chambers
1,444.4 cy Field
1,090.8 cy Stone



Pond FIL1:


Hydrograph
Inflow
Primary
13.15 cfs
7.06 cfs
Inflow Area=2.186 ac
Peak Elev=817.72'
Storage=13,236 cf
Flow (cfs)
Time (hours)

Summary for Pond INF1:

Inflow Area = 3.247 ac, 77.15% Impervious, Inflow Depth = 3.44" for 10-Year event
Inflow = 17.88 cfs @ 12.14 hrs, Volume= 0.931 af
Outflow = 2.16 cfs @ 12.59 hrs, Volume= 0.931 af, Atten= 88%, Lag= 26.8 min
Discarded = 0.21 cfs @ 12.59 hrs, Volume= 0.681 af
Primary = 1.95 cfs @ 12.59 hrs, Volume= 0.250 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 820.69' @ 12.59 hrs Surf.Area= 20,266 sf Storage= 22,974 cf

Plug-Flow detention time= 658.0 min calculated for 0.931 af (100% of inflow)
Center-of-Mass det. time= 658.1 min (1,423.4 - 765.2)

Volume	Invert	Avail.Storage	Storage Description
#1	819.50'	39,895 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

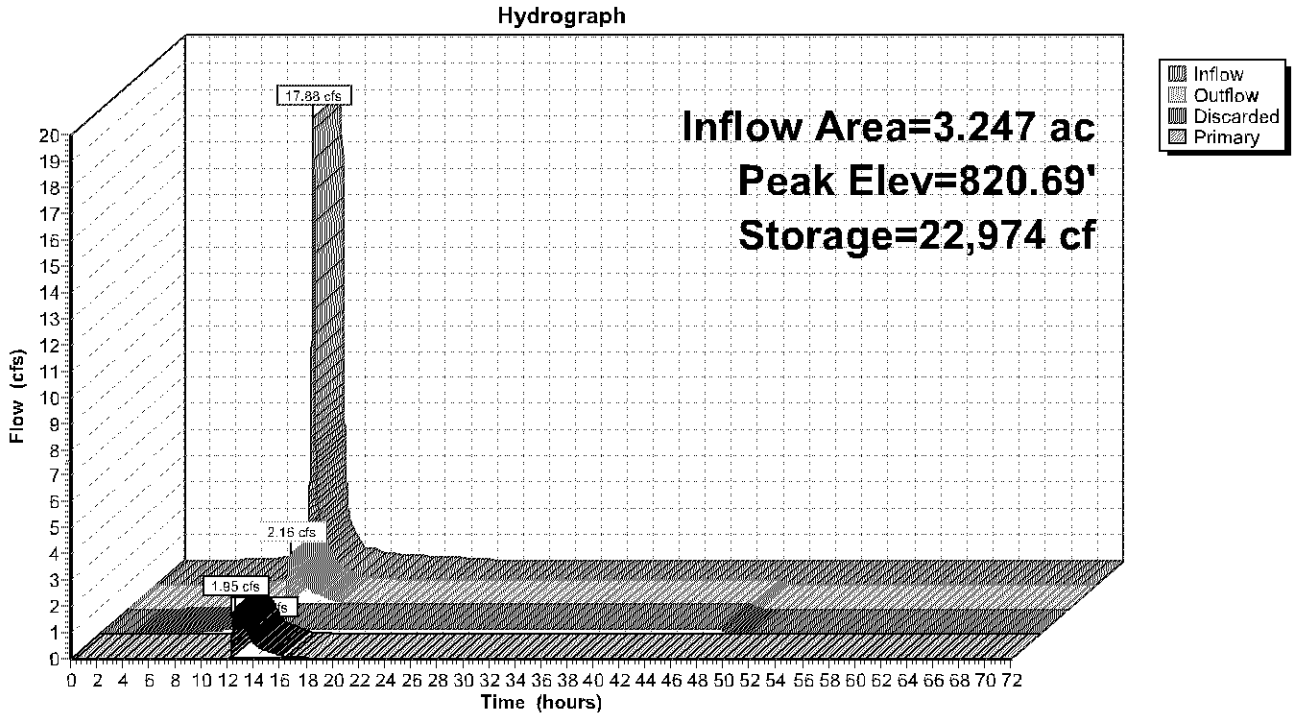
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
819.50	18,279	0	0
820.00	19,100	9,345	9,345
821.00	20,784	19,942	29,287
821.50	21,647	10,608	39,895

Device	Routing	Invert	Outlet Devices
#1	Discarded	819.50'	**0.450 in/hr Exfiltration over Surface area**
#2	Device 3	820.50'	**27.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	817.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 817.00' / 816.00' S= 0.0179 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Discarded OutFlow Max=0.21 cfs @ 12.59 hrs HW=820.69' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=1.95 cfs @ 12.59 hrs HW=820.69' (Free Discharge)
↑—**3=Culvert** (Passes 1.95 cfs of 24.82 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 1.95 cfs @ 1.43 fps)

Pond INF1:


Hydrograph
Inflow Area=3.247 ac
Peak Elev=820.69'
Storage=22,974 cf
17.88 cfs
2.16 cfs
1.95 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Runoff Area=1.718 ac 100.00% Impervious Runoff Depth=7.08"
Tc=7.0 min CN=98 Runoff=18.08 cfs 1.014 af

SubcatchmentDA-2P: Runoff Area=1.529 ac 51.47% Impervious Runoff Depth=5.67"
Tc=7.0 min CN=86 Runoff=14.51 cfs 0.723 af

SubcatchmentDA-3P: Runoff Area=1.186 ac 100.00% Impervious Runoff Depth=7.08"
Tc=7.0 min CN=98 Runoff=12.48 cfs 0.700 af

SubcatchmentDA-4P: Runoff Area=0.615 ac 82.93% Impervious Runoff Depth=6.61"
Tc=7.0 min CN=94 Runoff=6.35 cfs 0.339 af

SubcatchmentDA-5P: Runoff Area=0.385 ac 100.00% Impervious Runoff Depth=7.08"
Tc=7.0 min CN=98 Runoff=4.05 cfs 0.227 af

SubcatchmentDA-6P: Runoff Area=0.388 ac 100.00% Impervious Runoff Depth=7.08"
Tc=7.0 min CN=98 Runoff=4.08 cfs 0.229 af

SubcatchmentDA-7P: Runoff Area=3.037 ac 63.91% Impervious Runoff Depth=6.02"
Tc=7.0 min CN=89 Runoff=29.94 cfs 1.524 af

SubcatchmentDA-8P: Runoff Area=0.369 ac 21.41% Impervious Runoff Depth=4.88"
Tc=7.0 min CN=79 Runoff=3.12 cfs 0.150 af

SubcatchmentDA-9P: Runoff Area=1.722 ac 52.32% Impervious Runoff Depth=5.79"
Tc=7.0 min CN=87 Runoff=16.57 cfs 0.831 af

Reach 3R: total Inflow=77.56 cfs 4.953 af
Outflow=77.56 cfs 4.953 af

Reach 9R: EXISTING SOUTH DRAINAGE DITCH Inflow=26.00 cfs 1.819 af
Outflow=26.00 cfs 1.819 af

Reach 10R: COMPUTER AVE Inflow=52.04 cfs 3.134 af
Outflow=52.04 cfs 3.134 af

Reach 11R: EXISTING POND Inflow=48.93 cfs 2.984 af
Outflow=48.93 cfs 2.984 af

Pond FIL1: Peak Elev=818.54' Storage=17,038 cf Inflow=22.88 cfs 1.266 af
Outflow=16.87 cfs 1.231 af

Pond INF1: Peak Elev=821.22' Storage=33,885 cf Inflow=32.59 cfs 1.737 af
Discarded=0.22 cfs 0.748 af Primary=14.10 cfs 0.989 af Outflow=14.32 cfs 1.737 af

Total Runoff Area = 10.949 ac Runoff Volume = 5.736 af Average Runoff Depth = 6.29"
27.89% Pervious = 3.054 ac 72.11% Impervious = 7.895 ac

Summary for Subcatchment DA-1P:

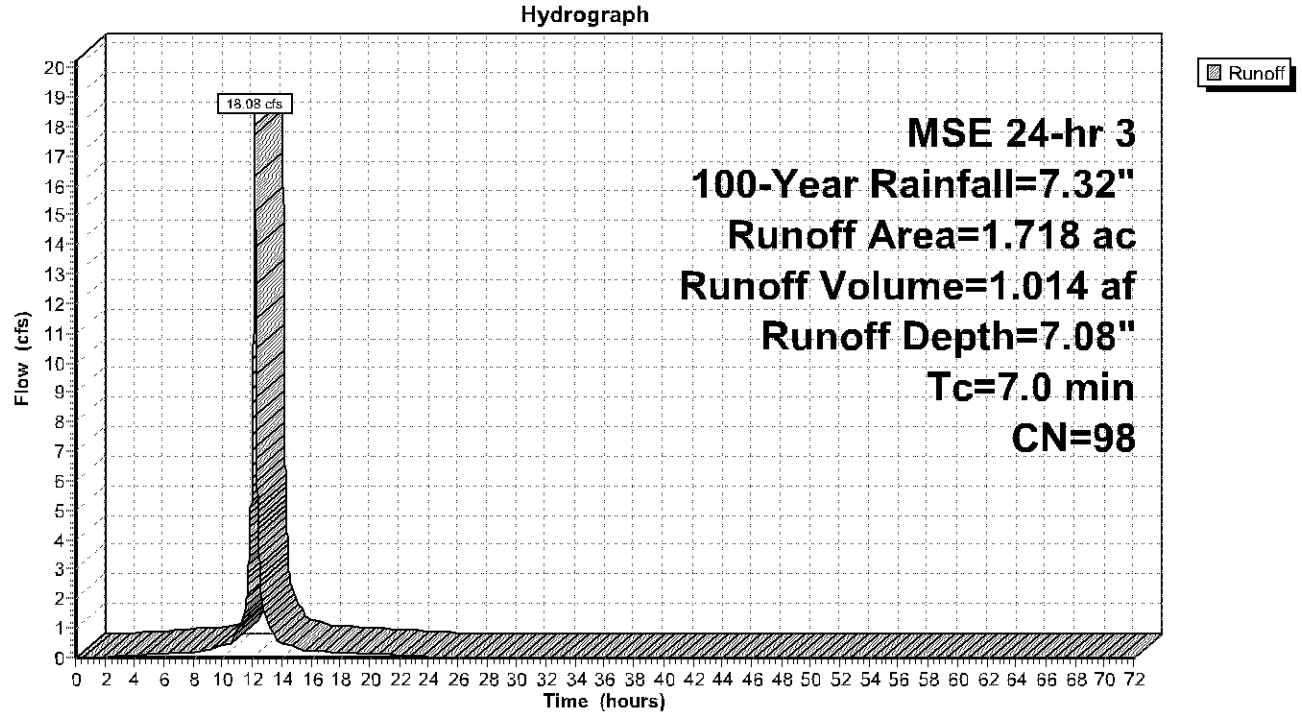
Runoff = 18.08 cfs @ 12.14 hrs, Volume= 1.014 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
1.718	98	Roofs, HSG C
1.718		100.00% Impervious Area

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

Subcatchment DA-1P:



Summary for Subcatchment DA-2P:

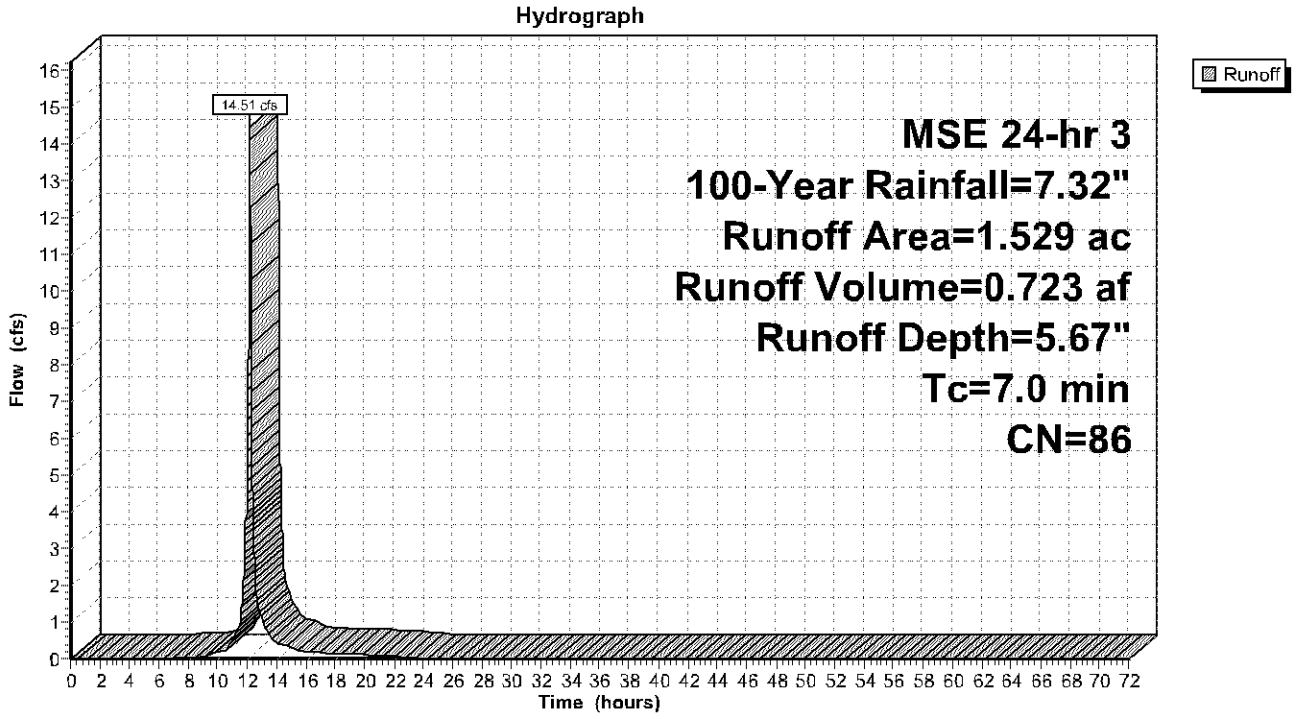
Runoff = 14.51 cfs @ 12.14 hrs, Volume= 0.723 af, Depth= 5.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.787	98	Paved parking, HSG C
0.742	74	>75% Grass cover, Good, HSG C
1.529	86	Weighted Average
0.742		48.53% Pervious Area
0.787		51.47% Impervious Area

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

Subcatchment DA-2P:



Summary for Subcatchment DA-3P:

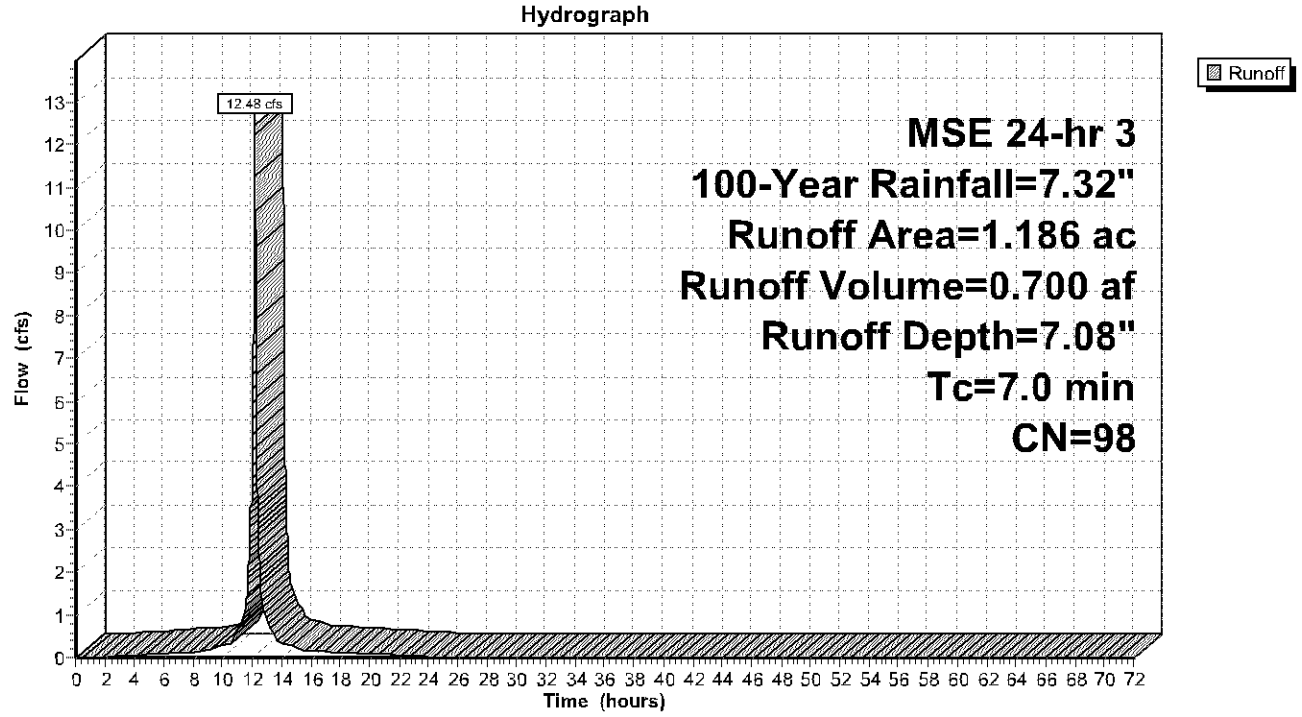
Runoff = 12.48 cfs @ 12.14 hrs, Volume= 0.700 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
1.186	98	Roofs, HSG C
1.186		100.00% Impervious Area

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

Subcatchment DA-3P:



Summary for Subcatchment DA-4P:

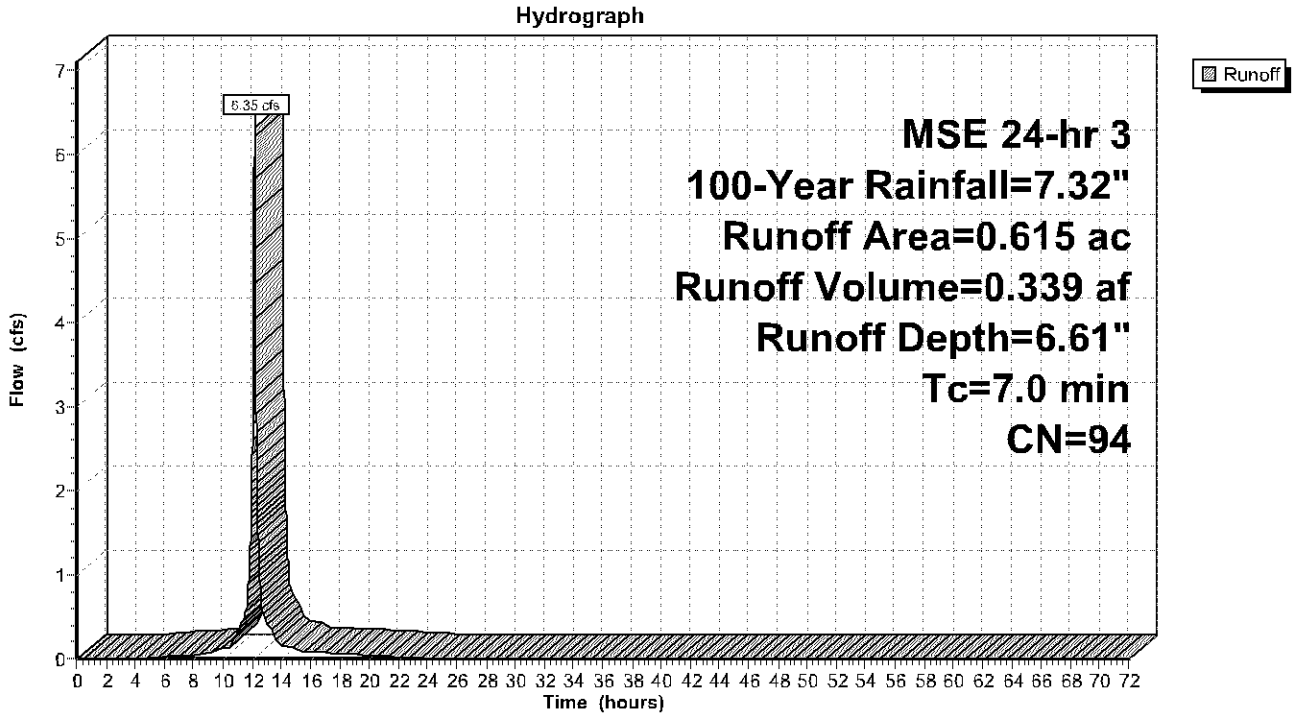
Runoff = 6.35 cfs @ 12.14 hrs, Volume= 0.339 af, Depth= 6.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG C
0.105	74	>75% Grass cover, Good, HSG C
0.615	94	Weighted Average
0.105		17.07% Pervious Area
0.510		82.93% Impervious Area

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

Subcatchment DA-4P:



Summary for Subcatchment DA-5P:

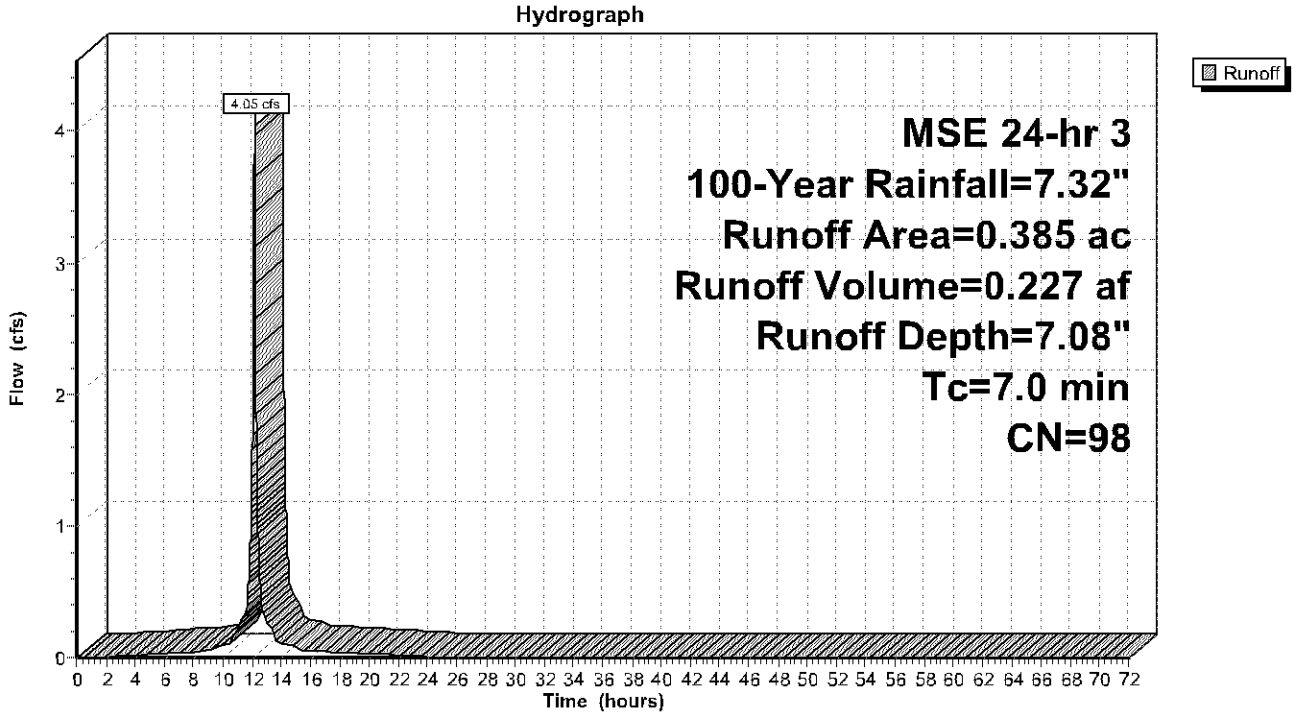
Runoff = 4.05 cfs @ 12.14 hrs, Volume= 0.227 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.385	98	Roofs, HSG C
0.385		100.00% Impervious Area

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

Subcatchment DA-5P:



Summary for Subcatchment DA-6P:

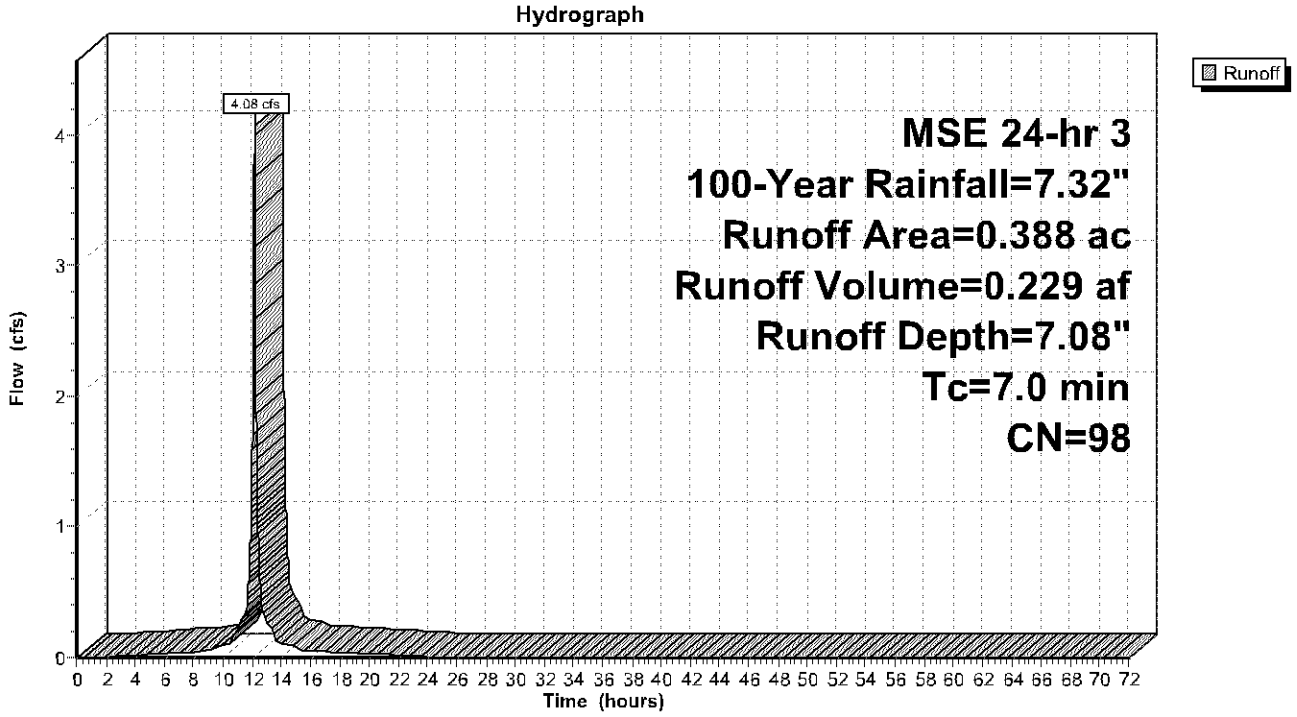
Runoff = 4.08 cfs @ 12.14 hrs, Volume= 0.229 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.388	98	Roofs, HSG C
0.388		100.00% Impervious Area

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

Subcatchment DA-6P:



Summary for Subcatchment DA-7P:

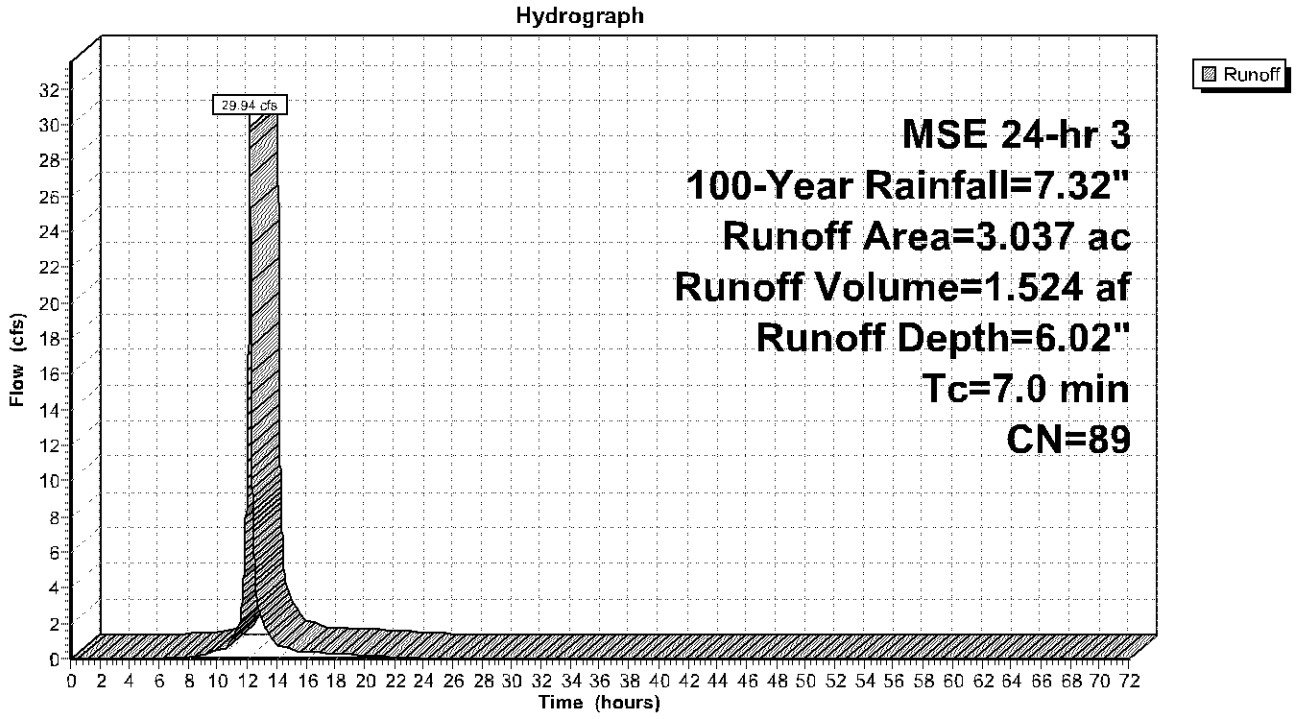
Runoff = 29.94 cfs @ 12.14 hrs, Volume= 1.524 af, Depth= 6.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
1.941	98	Paved parking, HSG C
1.096	74	>75% Grass cover, Good, HSG C
3.037	89	Weighted Average
1.096		36.09% Pervious Area
1.941		63.91% Impervious Area

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

Subcatchment DA-7P:



Summary for Subcatchment DA-8P:

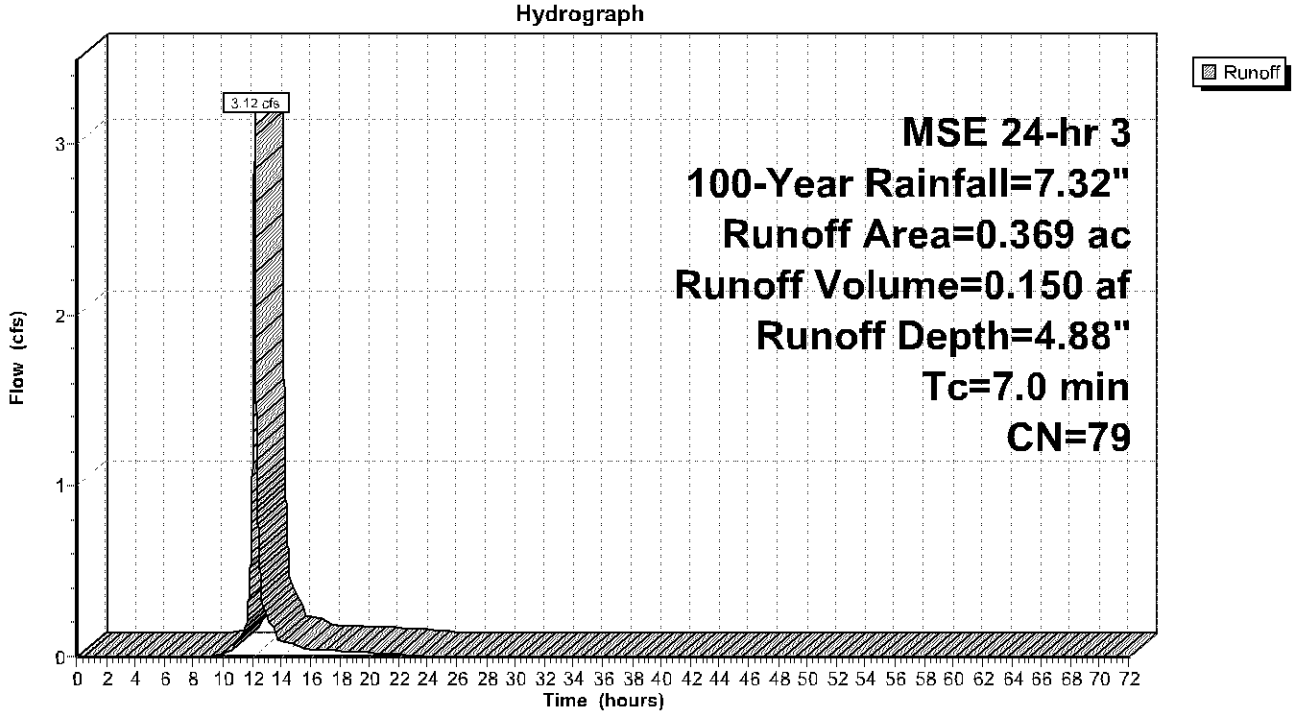
Runoff = 3.12 cfs @ 12.14 hrs, Volume= 0.150 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.079	98	Paved parking, HSG C
0.290	74	>75% Grass cover, Good, HSG C
0.369	79	Weighted Average
0.290		78.59% Pervious Area
0.079		21.41% Impervious Area

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

Subcatchment DA-8P:



Summary for Subcatchment DA-9P:

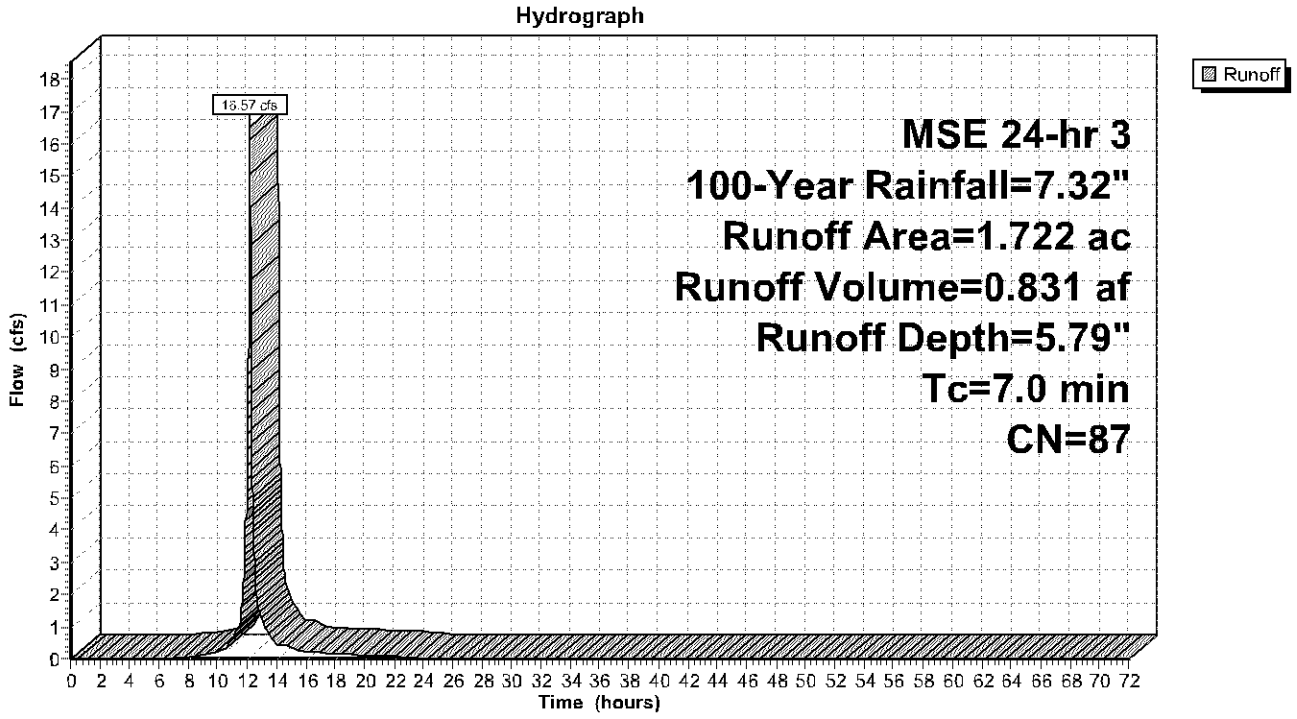
Runoff = 16.57 cfs @ 12.14 hrs, Volume= 0.831 af, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.901	98	Paved parking, HSG C
0.821	74	>75% Grass cover, Good, HSG C
1.722	87	Weighted Average
0.821		47.68% Pervious Area
0.901		52.32% Impervious Area

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

Subcatchment DA-9P:



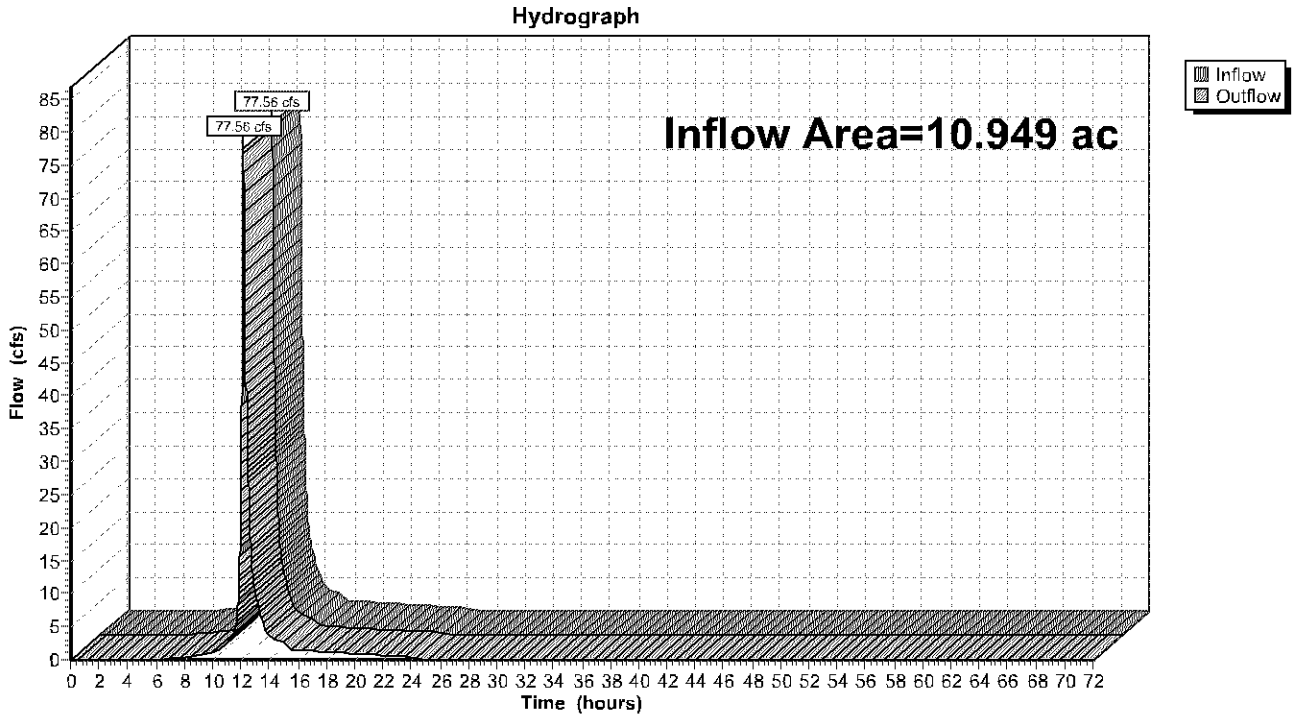
Summary for Reach 3R: total

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

Inflow Area = 10.949 ac, 72.11% Impervious, Inflow Depth = 5.43" for 100-Year event
Inflow = 77.56 cfs @ 12.15 hrs, Volume= 4.953 af
Outflow = 77.56 cfs @ 12.15 hrs, Volume= 4.953 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 3R: total



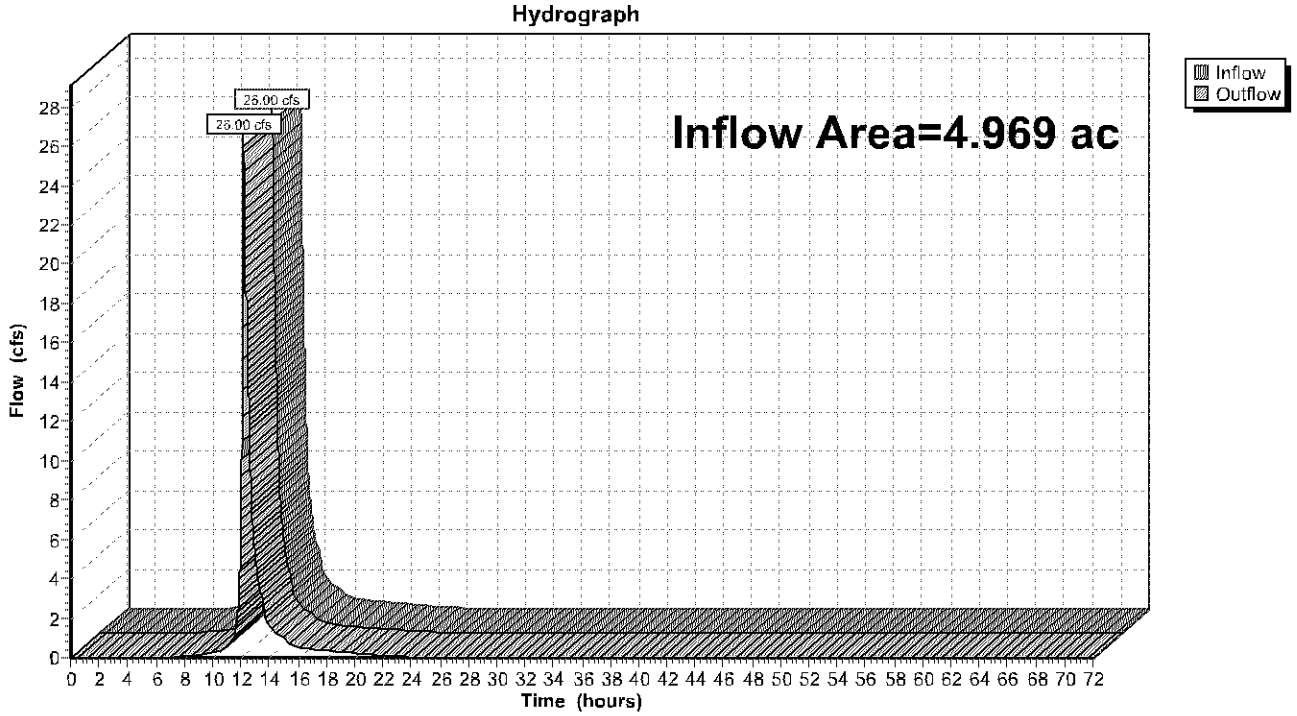
Summary for Reach 9R: EXISTING SOUTH DRAINAGE DITCH

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

Inflow Area = 4.969 ac, 68.54% Impervious, Inflow Depth = 4.39" for 100-Year event
Inflow = 26.00 cfs @ 12.17 hrs, Volume= 1.819 af
Outflow = 26.00 cfs @ 12.17 hrs, Volume= 1.819 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: EXISTING SOUTH DRAINAGE DITCH



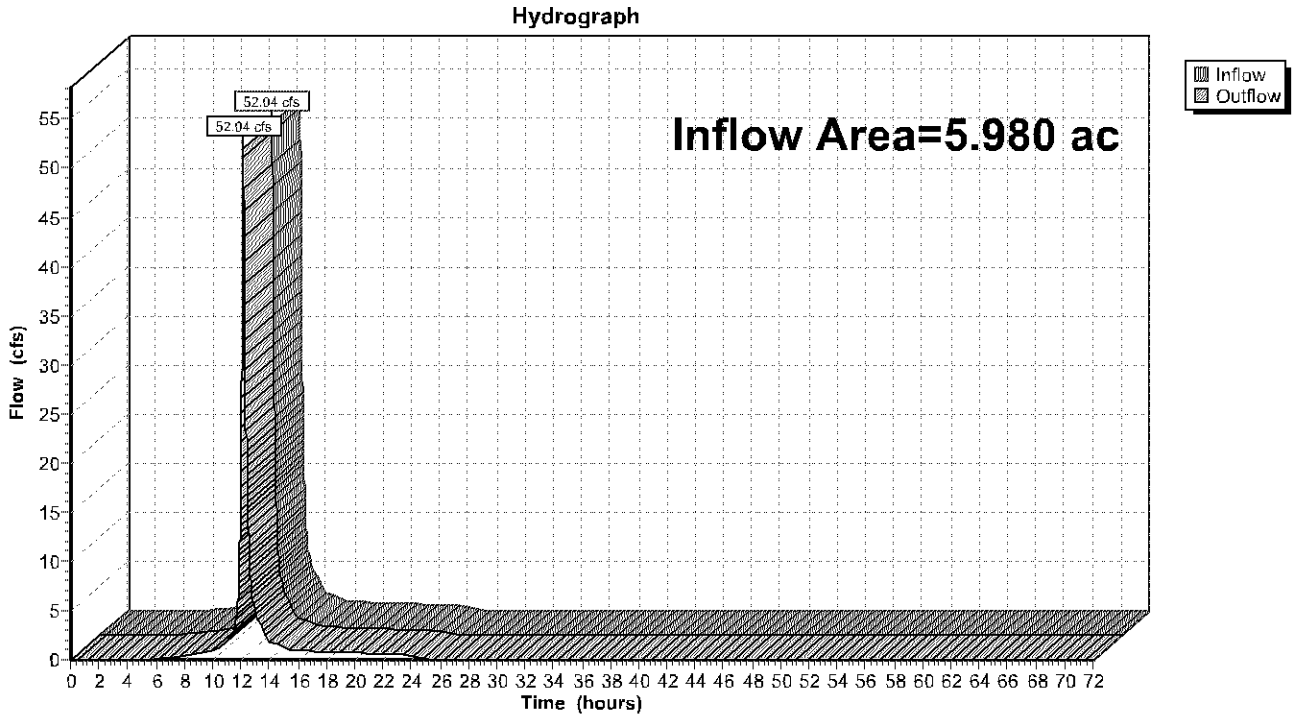
Summary for Reach 10R: COMPUTER AVE

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

Inflow Area = 5.980 ac, 75.07% Impervious, Inflow Depth = 6.29" for 100-Year event
Inflow = 52.04 cfs @ 12.15 hrs, Volume= 3.134 af
Outflow = 52.04 cfs @ 12.15 hrs, Volume= 3.134 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 10R: COMPUTER AVE



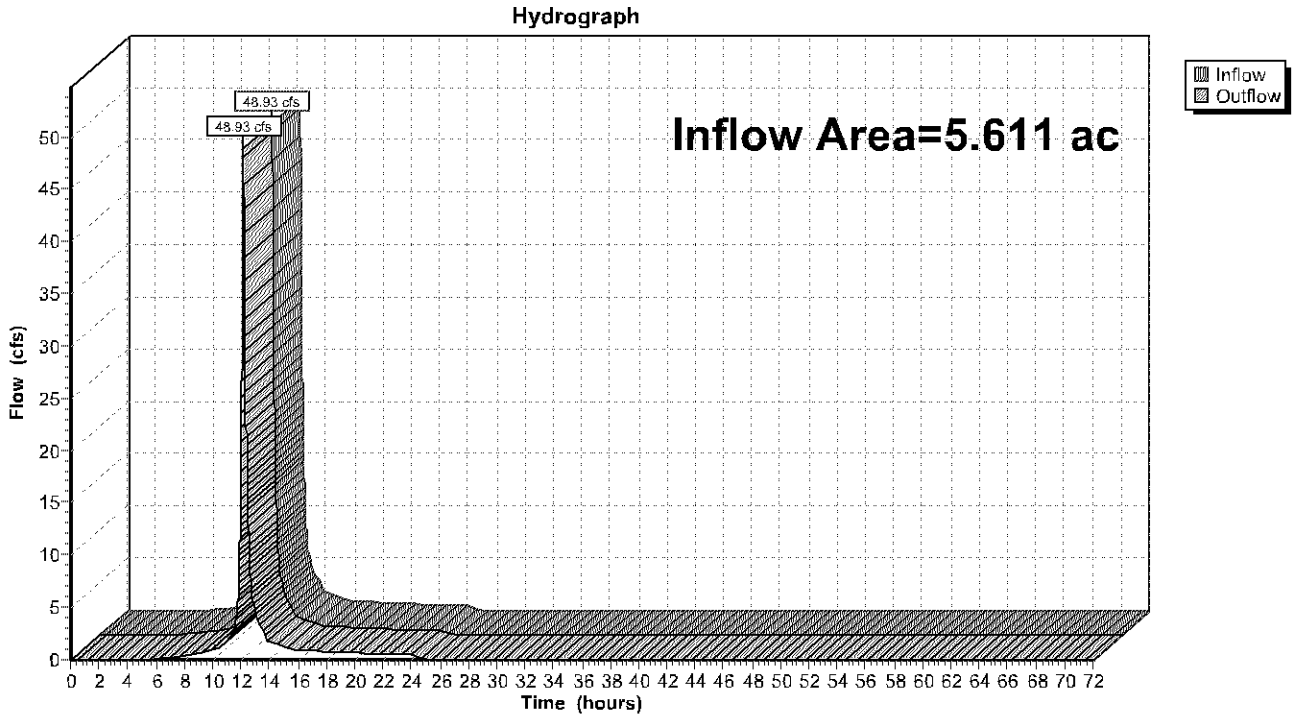
Summary for Reach 11R: EXISTING POND

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

Inflow Area = 5.611 ac, 78.60% Impervious, Inflow Depth = 6.38" for 100-Year event
Inflow = 48.93 cfs @ 12.15 hrs, Volume= 2.984 af
Outflow = 48.93 cfs @ 12.15 hrs, Volume= 2.984 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 11R: EXISTING POND



Summary for Pond FIL1:

Inflow Area = 2.186 ac, 95.20% Impervious, Inflow Depth = 6.95" for 100-Year event
Inflow = 22.88 cfs @ 12.14 hrs, Volume= 1.266 af
Outflow = 16.87 cfs @ 12.20 hrs, Volume= 1.231 af, Atten= 26%, Lag= 3.4 min
Primary = 16.87 cfs @ 12.20 hrs, Volume= 1.231 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 818.54' @ 12.20 hrs Surf.Area= 9,750 sf Storage= 17,038 cf

Plug-Flow detention time= 127.5 min calculated for 1.231 af (97% of inflow)
Center-of-Mass det. time= 111.9 min (857.9 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	815.00'	8,836 cf	**21.67'W x 450.00'L x 4.00'H Field A** 39,000 cf Overall - 9,547 cf Embedded = 29,453 cf x 30.0% Voids
#2A	815.50'	9,547 cf	**CMP Round 36** x 66 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L Row Length Adjustment= +5.00' x 7.07 sf x 3 rows 15.67' Header x 7.07 sf x 1 = 110.7 cf Inside
		18,383 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	**24.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 815.50' / 815.45' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	815.50'	**8.0" Round Culvert X 6.00** L= 220.0' Ke= 0.500 Inlet / Outlet Invert= 815.50' / 815.50' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	815.00'	**1.630 in/hr Exfiltration over Surface area**
#4	Device 1	816.85'	**18.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=16.85 cfs @ 12.20 hrs HW=818.54' (Free Discharge)
└─**1=Culvert** (Passes 16.85 cfs of 21.10 cfs potential flow)
  └─**2=Culvert** (Passes 0.37 cfs of 8.87 cfs potential flow)
    └─**3=Exfiltration** (Exfiltration Controls 0.37 cfs)
  └─**4=Orifice/Grate** (Orifice Controls 16.48 cfs @ 4.66 fps)

Pond FIL1: - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L
Row Length Adjustment= +5.00' x 7.07 sf x 3 rows

36.0" Wide + 40.0" Spacing = 76.0" C-C Row Spacing

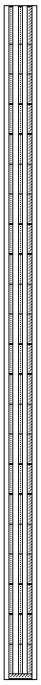
22 Chambers/Row x 20.00' Long +5.00' Row Adjustment +3.00' Header x 1 = 448.00' Row Length +12.0" End Stone x 2 = 450.00' Base Length
3 Rows x 36.0" Wide + 40.0" Spacing x 2 + 36.0" Side Stone x 2 = 21.67' Base Width
6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

66 Chambers x 141.4 cf +5.00' Row Adjustment x 7.07 sf x 3 Rows + 15.67' Header x 7.07 sf = 9,547.3 cf Chamber Storage

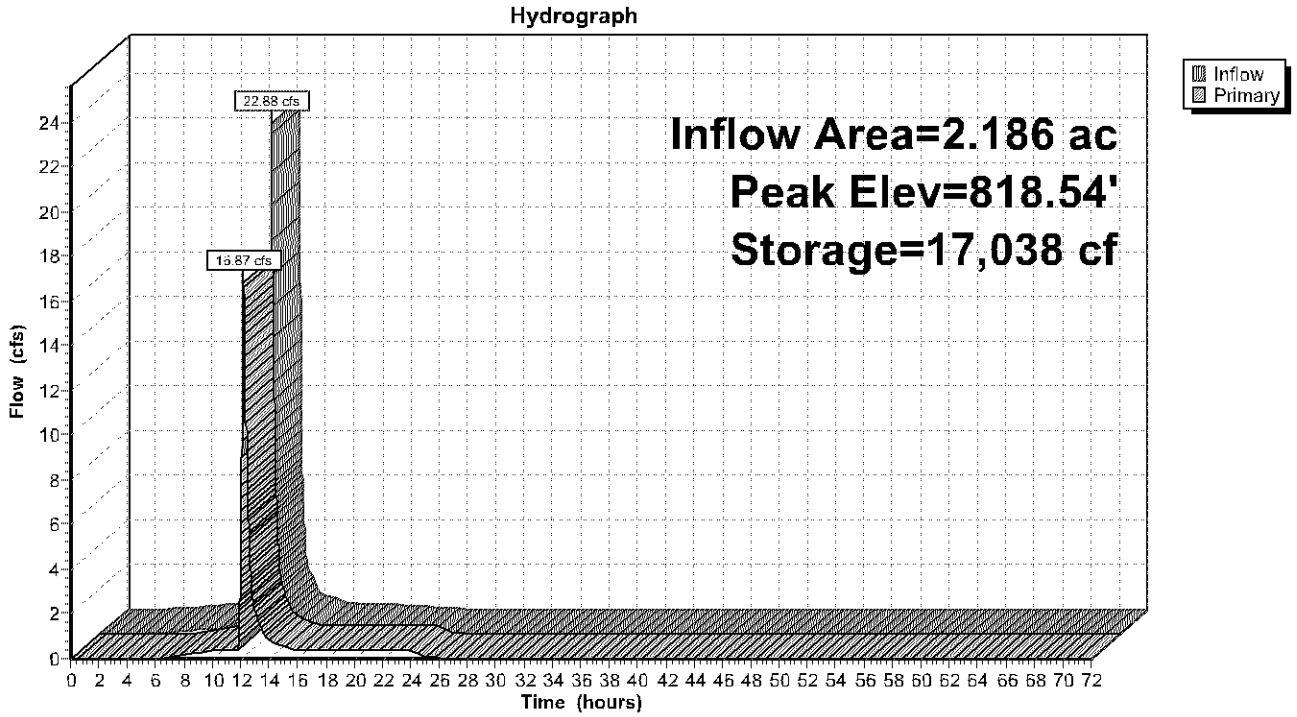
39,000.0 cf Field - 9,547.3 cf Chambers = 29,452.7 cf Stone x 30.0% Voids = 8,835.8 cf Stone Storage

Chamber Storage + Stone Storage = 18,383.1 cf = 0.422 af
Overall Storage Efficiency = 47.1%
Overall System Size = 450.00' x 21.67' x 4.00'

66 Chambers
1,444.4 cy Field
1,090.8 cy Stone



Pond FIL1:


Hydrograph
Inflow
Primary
22.88 cfs
15.87 cfs
Inflow Area=2.186 ac
Peak Elev=818.54'
Storage=17,038 cf
Flow (cfs)
0 2 4 6 8 10 12 14 16 18 20 22 24
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond INF1:

Inflow Area = 3.247 ac, 77.15% Impervious, Inflow Depth = 6.42" for 100-Year event
Inflow = 32.59 cfs @ 12.14 hrs, Volume= 1.737 af
Outflow = 14.32 cfs @ 12.26 hrs, Volume= 1.737 af, Atten= 56%, Lag= 7.1 min
Discarded = 0.22 cfs @ 12.26 hrs, Volume= 0.748 af
Primary = 14.10 cfs @ 12.26 hrs, Volume= 0.989 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 821.22' @ 12.26 hrs Surf.Area= 21,162 sf Storage= 33,885 cf

Plug-Flow detention time= 398.0 min calculated for 1.736 af (100% of inflow)
Center-of-Mass det. time= 398.2 min (1,155.1 - 756.9)

Volume	Invert	Avail.Storage	Storage Description
#1	819.50'	39,895 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

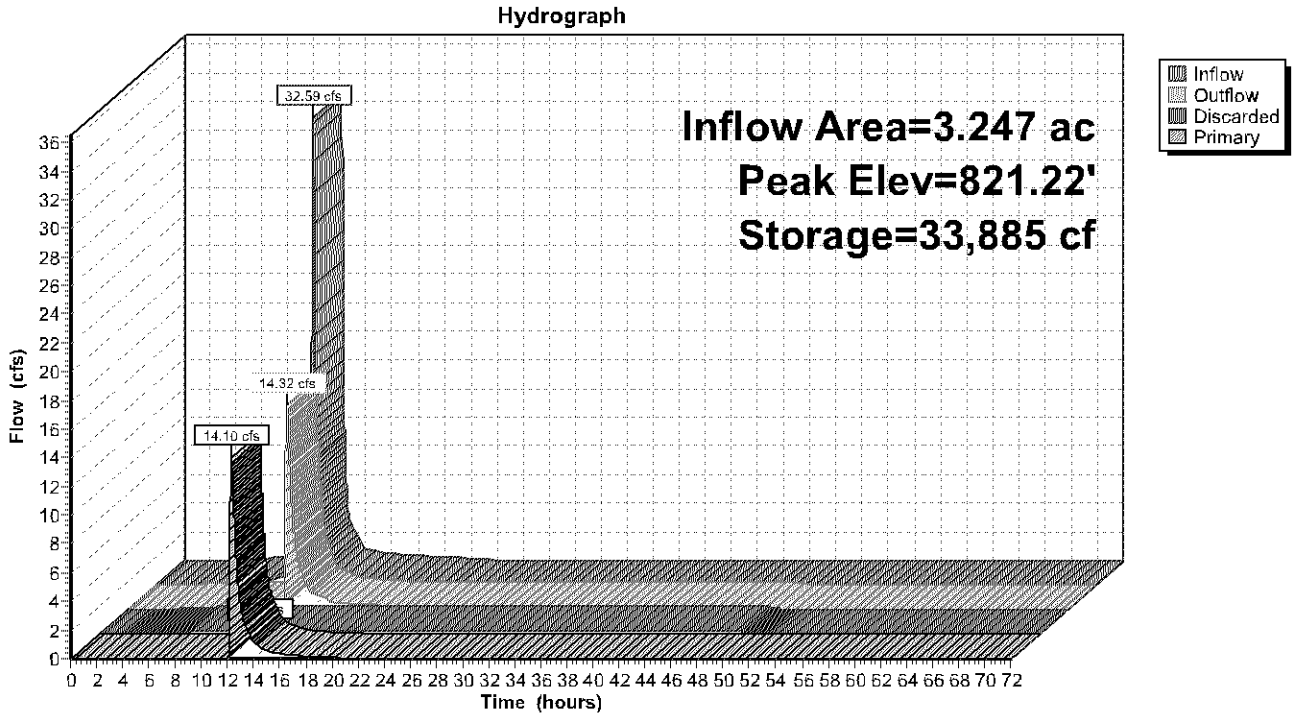
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
819.50	18,279	0	0
820.00	19,100	9,345	9,345
821.00	20,784	19,942	29,287
821.50	21,647	10,608	39,895

Device	Routing	Invert	Outlet Devices
#1	Discarded	819.50'	**0.450 in/hr Exfiltration over Surface area**
#2	Device 3	820.50'	**27.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	817.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 817.00' / 816.00' S= 0.0179 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Discarded OutFlow Max=0.22 cfs @ 12.26 hrs HW=821.22' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=14.09 cfs @ 12.26 hrs HW=821.22' (Free Discharge)
↑—**3=Culvert** (Passes 14.09 cfs of 27.14 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 14.09 cfs @ 2.77 fps)

Pond INF1:


Hydrograph
Inflow Area=3.247 ac
Peak Elev=821.22'
Storage=33,885 cf
32.59 cfs
14.32 cfs
14.10 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Appendix C

MIDS Report

CASE #PL2020-112

Project Information

Calculator Version:	Version 3: January 2017
Project Name:	Seagate
User Name / Company Name:	
Date:	
Project Description:	
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55435
Annual Rainfall (inches):	31.1
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			0.847		0.847
				Impervious Area (acres)	4.586
				Total Area (acres)	5.433

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			0.847		0.847
				Impervious Area (acres)	4.586
				Total Area (acres)	5.433

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	18312	ft3
Volume removed by BMPs towards performance goal:	10002	ft^3
Percent volume removed towards performance goal	**55**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	10.5966	acre-ft
Annual runoff volume removed by BMPs:	5.8427	acre-ft
Percent annual runoff volume removed:	**55**	**%**
Post development annual particulate P load:	4.756	lbs
Annual particulate P removed by BMPs:	4.402	lbs
Post development annual dissolved P load:	3.891	lbs
Annual dissolved P removed by BMPs:	2.146	lbs
Percent annual total phosphorus removed:	**76**	**%**
Post development annual TSS load:	1570.8	lbs
Annual TSS removed by BMPs:	1454	lbs
Percent annual TSS removed:	**93**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
INF1 - Infiltration Basin	19110	10002	10002	0	100
FIL1 - Underground Filtration System	0	8309	0	8309	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
INF1 - Infiltration Basin	5.9315	0	5.8427	0.0888	99
FIL1 - Underground Filtration System	4.6651	0	0	4.6651	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
INF1 - Infiltration Basin	2.6621	0	2.6222	0.0399	99
FIL1 - Underground Filtration System	2.0937	0	1.7796	0.3141	85

Dissolved Phosphorus Summary

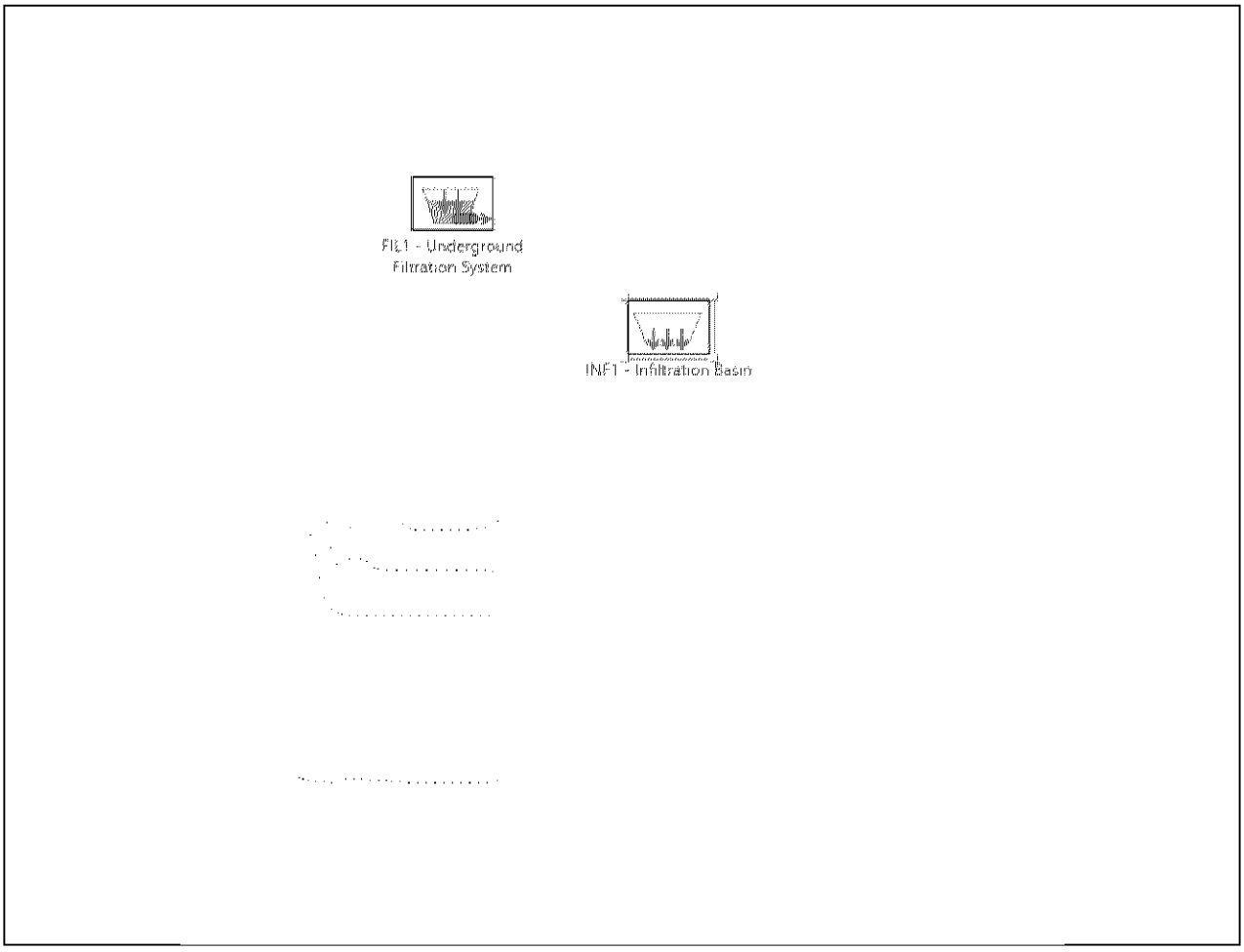
BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
INF1 - Infiltration Basin	2.1781	0	2.1455	0.0326	99
FIL1 - Underground Filtration System	1.713	0	0	1.713	0

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
INF1 - Infiltration Basin	879.29	0	866.12	13.17	99
FIL1 - Underground Filtration System	691.56	0	587.83	103.73	85

BMP Schematic

CASE #PL2020-112



Figures

Existing Drainage Exhibit
Proposed Drainage Exhibit
Existing Impervious Areas Exhibit
Proposed Impervious Areas Exhibit

CASE #PL2020-112

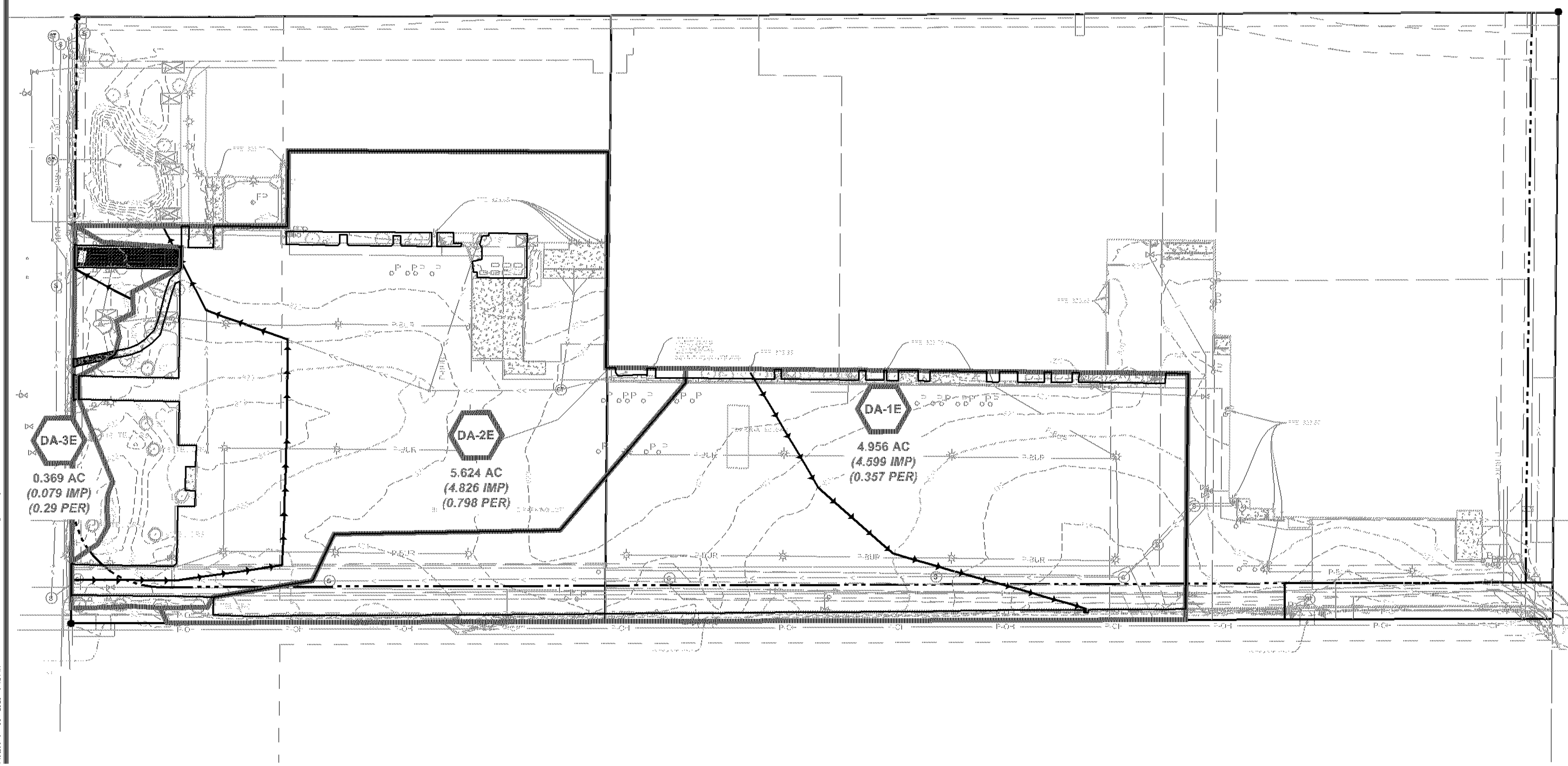
LEGEND

SUBCATCHMENT

BASIN

TIME OF CONCENTRATION PATH

NOTE:
EXISTING CONDITIONS INFORMATION SHOWN IS FROM A CERTIFICATE OF SURVEY TOPO PREPARED BY SEH, DATED JUNE 08, 2020.



SEAGATE WAFER ADDITION

BLOOMINGTON, MN

LOUCKS

PLANNING
CIVIL ENGINEERING
LAND SURVEYING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL

7200 Hemlock Lane, Suite 300
Maple Grove, MN 55369
763.424.5505
www.loucksinc.com

CADD QUALIFICATION

SUBMITTAL/REVISIONS

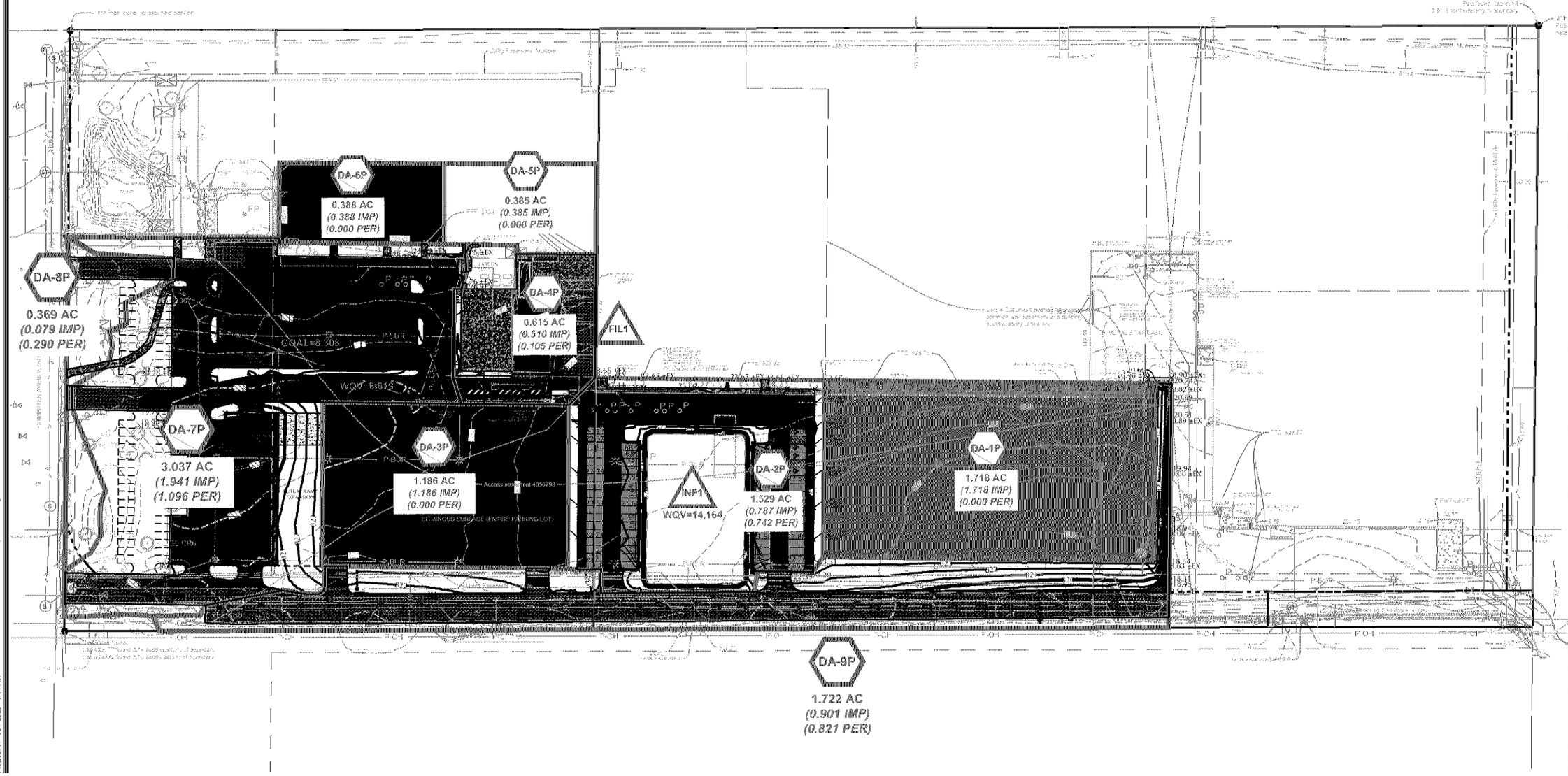
PROFESSIONAL SIGNATURE

QUALITY CONTROL

EXISTING DRAINAGE AREAS

H-1

CASE #PL2020-112



NOTE:
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CADD QUALIFICATION

SUBMITTAL/REVISIONS

PROFESSIONAL SIGNATURE

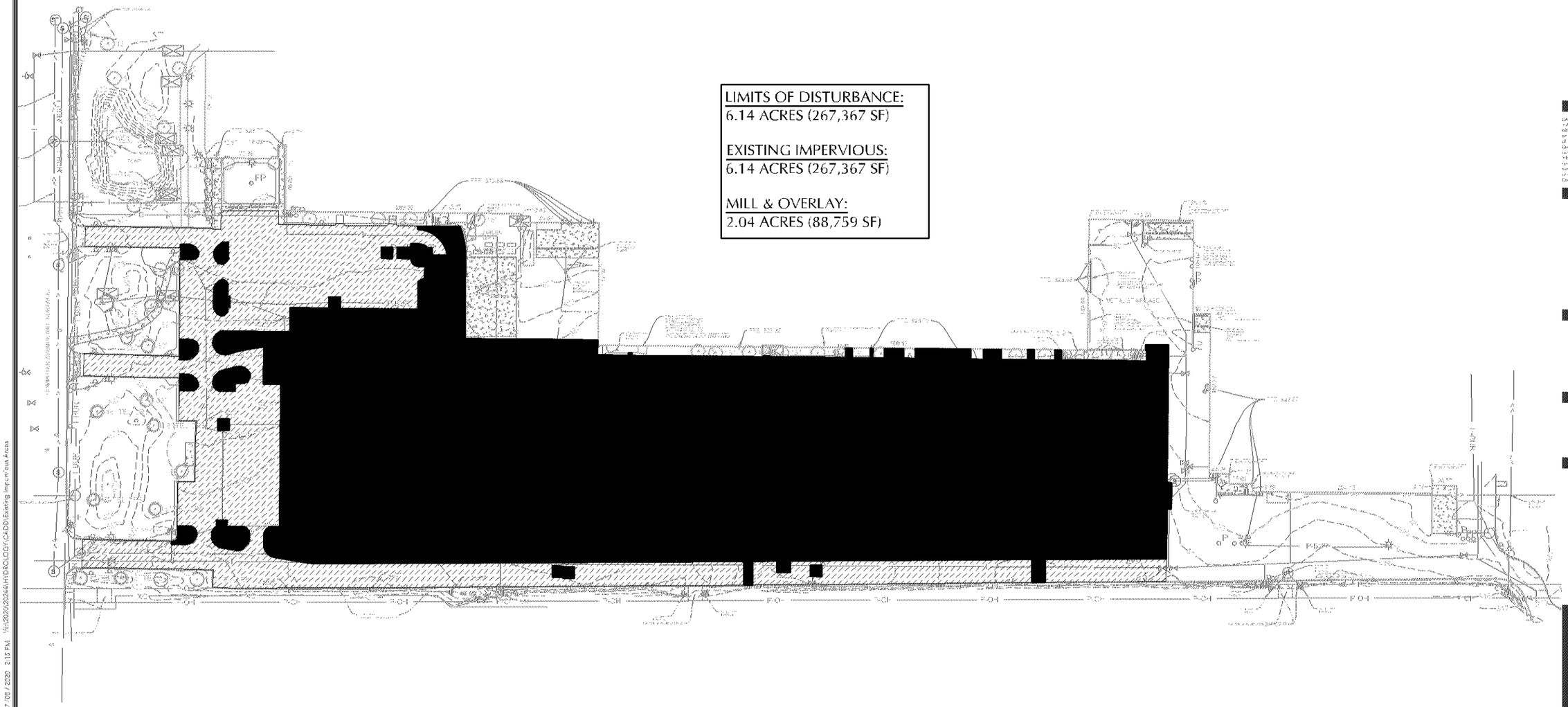
QUALITY CONTROL

PROPOSED DRAINAGE AREAS

H-2

Plotted: 07/07/2020 4:44 PM W:\2020\2020464\HYDROLOGY\CADD\Proposed Drainage Areas

CASE #PL2020-112



NOTE:
EXISTING CONDITIONS INFORMATION SHOWN IS FROM A CERTIFICATE OF SURVEY TOPO PREPARED BY SEH, DATED JUNE 08, 2020.

LIMITS OF DISTURBANCE:
6.14 ACRES (267,367 SF)

EXISTING IMPERVIOUS:
6.14 ACRES (267,367 SF)

MILL & OVERLAY:
2.04 ACRES (88,759 SF)

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PROFESSIONAL SIGNATURE

QUALITY CONTROL

EXISTING IMPERVIOUS AREAS

H-3

Plotted: 07/08/2020 2:15 PM W:\2020\20024\H\DRG\LOGY\CADD\Existing Impervious Areas

CASE #PL2020-112

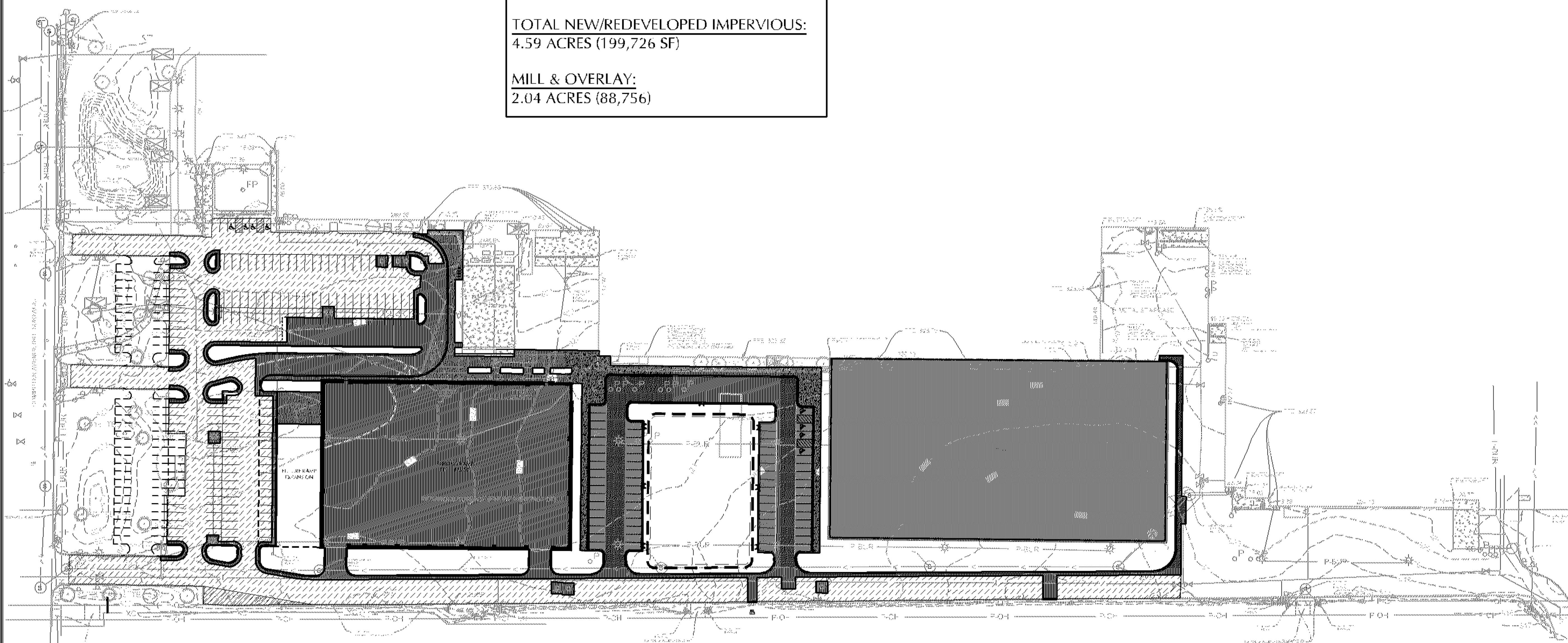
SCALE IN FEET (0, 60, 120)

NOTE:
EXISTING CONDITIONS INFORMATION SHOWN IS FROM A CERTIFICATE OF SURVEY TOPO PREPARED BY SEH, DATED JUNE 08, 2020.

LIMITS OF DISTURBANCE:
6.14 ACRES (267,367 SF)

TOTAL NEW/REDEVELOPED IMPERVIOUS:
4.59 ACRES (199,726 SF)

MILL & OVERLAY:
2.04 ACRES (88,756)



SEAGATE WAFER ADDITION

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CADD QUALIFICATION

SUBMITTAL/REVISIONS

PROFESSIONAL SIGNATURE

QUALITY CONTROL

PROPOSED IMPERVIOUS AREAS

H-4