COMPUTATION SHEET INGA CONSULTING ENGINEERS		Made by	T.I.
		Date	5/18/2021
Subject SITE DEVELOPMENT PRE/POST FLOWS 239 Cchristian Lane,Berlin CT		Checked by	
		Date	

SYSTEM -REACH TO STREET

STORM YEAR	PRE- FLOW CFS	POST- FLOW CFS	NET FLOW CFS	REAR STORAGE CF	FRONT STORAGE CF
2	0.26	0.07	-0.19	5	2
5	0.55	0.1	-0.45	7	2
10	0.86	0.13	-0.73	8	3
25	1.43	0.18	-1.25	218	5
50	2.01	0.23	-1.78	518	147
100	2.75	0.29	-2.46	1154	402

REAR STORAGE 1209 CF
FRONT STORAGE 1044 CF

INGA CONSULTING ENGINEERS
Architectural/Structural/Civil Consultants, Engineers
(860) 233-4991
139 WHITNEY STREET
HARTFORD, CT 06105

239 Christian Lane – Drainage Design Narrative.

The project designed intent is a determination to construct a 10,000 square foot building and accompanying parking spaces as required by zoning to accommodate the new use of the lot as shown of the proposed plans.
There are no known wetlands, watercourses, floodplains on the site. The lot is a vacant lot in an industrial area of warehouses. There is a short paved driveway and a gravel extension.

The SCS TR-20 method is used for the study of this development

The existing area is almost overgrown grass, with a few trees and maintained lawn in the front, with an average slope of about 3.6% from the tip of the lot on the west side to the east edge of the lot with flow length of 219 feet labeled 2E. A second area of similar grade of about 3.2% on the average, with a flow length of 100 feet labeled 3E flowing from the tip of the gravel at the southeast area of the lot to the street. Right next to the gravel area is a short paved driveway labeled 1E with a slope of 2.5% with a flow length of 61 feet also flowing into the street.

The existing area as described in 3E is a gravel area, and is considered to have a runoff curve number of 85 for a gravel. It is anticipated that the area once developed, it will change some of the areas to a curve number of 61 for grass area. The existing area as described in 1E is a paved driveway, and is considered to have a runoff curve number of 98 for a paved area. It is anticipated that the area once developed, it will change some of the areas to a curve number of 61 for grass area. Finally, the area described in 2E is the predominate area of the lot, and is with a runoff curve of 61. This area when developed will become the building and parking area, attracting a curve number of 98

The site soil as defined by the USDA soil survey is urban with Udorthents wet substrate at levels below 6'. The material varies from loam at the top to very gravely sandy loam at the bottom. According to the type of soil without a infiltration test on the site, the infiltration rate has been conservatory pegged at 1.25in/hr, or 0.004fps, and is used for this report.

There are no known sources of pollutants or sediment loading for the site, no known critical areas, buffers, setbacks established by the town of federal regulatory authorities.

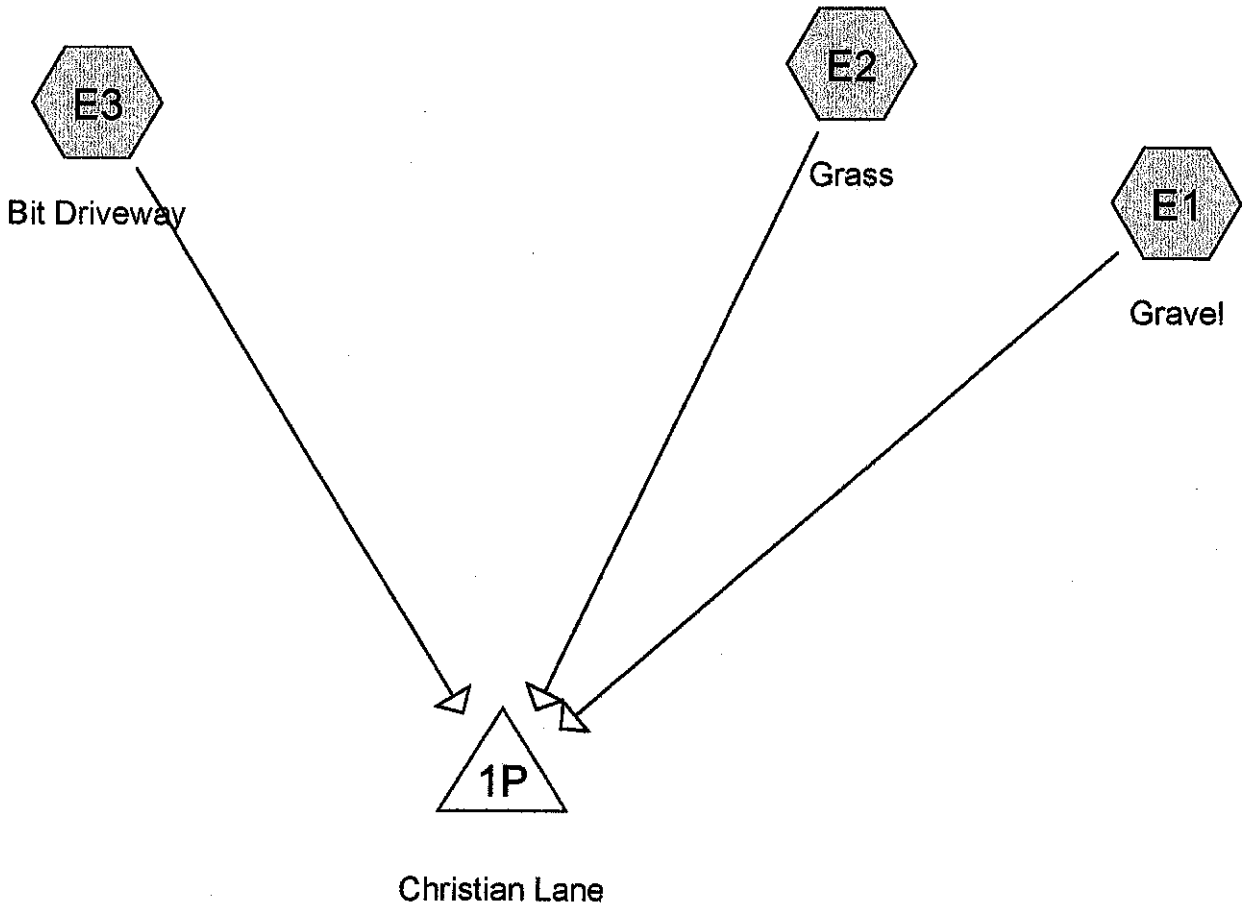
The flow calculations for pre and post development are included with this narrative. A total volume of 2.75 cfs reaches the street for a hundred year storm based on the existing land use.

The post development areas are divided essentially into six areas. The rear parking lot is labeled P1, the building roof is labeled P2, the drive way is labeled P3, areas P4 and P5 are grass areas north and south respectively. The final area is the front parking area labeled P6. The area previously labeled 1E and 3E are transformed into P5. Most of existing 2E has now been transformed into P1,P2,P3, and P6. To stop the nee runoff water from reaching the street, two storage areas are created on site to store the extra runoff generated from post development.

A total volume of 0.20 cfs reaches the street for a 100 year storm. A total reduction of 2.55 cfs for a 100 year storm from pre development. All of this diverted water is stored in the two on site storage area. The total available storage area is 1209cf for the rear storage, and 715cf for the front storage.

The storm water treatment selected for this site is to avoid any runoff that will impact the neighboring properties, and reduce any excess water reaching Christian Lane at the appropriate storms.

Inga Consulting Engineers



Subcat Reach Pond Link

Routing Diagram for 239 Christian LanetBerlin Pre
Prepared by Inga Consulting Engineers, Printed 6/11/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.023	85	Gravel roads, HSG B (E1)
0.872	61	Pasture/grassland/range, Good, HSG B (E2)
0.022	98	Paved parking, HSG B (E3)
0.917	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.917	HSG B	E1, E2, E3
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.917		**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	0.023	0.000	0.000	0.000	0.023	Gravel roads	E1
0.000	0.872	0.000	0.000	0.000	0.872	Pasture/grassland/range, Good	E2
0.000	0.022	0.000	0.000	0.000	0.022	Paved parking	E3
0.000	**0.917**	**0.000**	**0.000**	**0.000**	**0.917**	**TOTAL AREA**	

Land-Use Listing (all nodes)

Area (acres)	Land Use	Subcatchment Numbers
0.045	Pavement	E1, E3
0.872	Residential	E2
0.917	**TOTAL**	

Time span=0.00-24.00 hrs, dt=0.33 hrs, 74 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Gravel Runoff Area=1,010 sf 0.00% Impervious Runoff Depth>1.81"
Flow Length=100' Slope=0.0250 '/' Tc=5.0 min CN=85 Runoff=0.03 cfs 0.003 af

SubcatchmentE2: Grass Runoff Area=38,006 sf 0.00% Impervious Runoff Depth>0.47"
Flow Length=219' Slope=0.0360 '/' Tc=14.4 min CN=61 Runoff=0.20 cfs 0.034 af

SubcatchmentE3: Bit Driveway Runoff Area=937 sf 100.00% Impervious Runoff Depth>3.03"
Flow Length=61' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.04 cfs 0.005 af

Pond 1P: Christian Lane Inflow=0.26 cfs 0.043 af
Primary=0.26 cfs 0.043 af

Total Runoff Area = 0.917 ac Runoff Volume = 0.043 af Average Runoff Depth = 0.56"
97.65% Pervious = 0.896 ac 2.35% Impervious = 0.022 ac

Summary for Subcatchment E1: Gravel

[49] Hint: Tc<2dt may require smaller dt

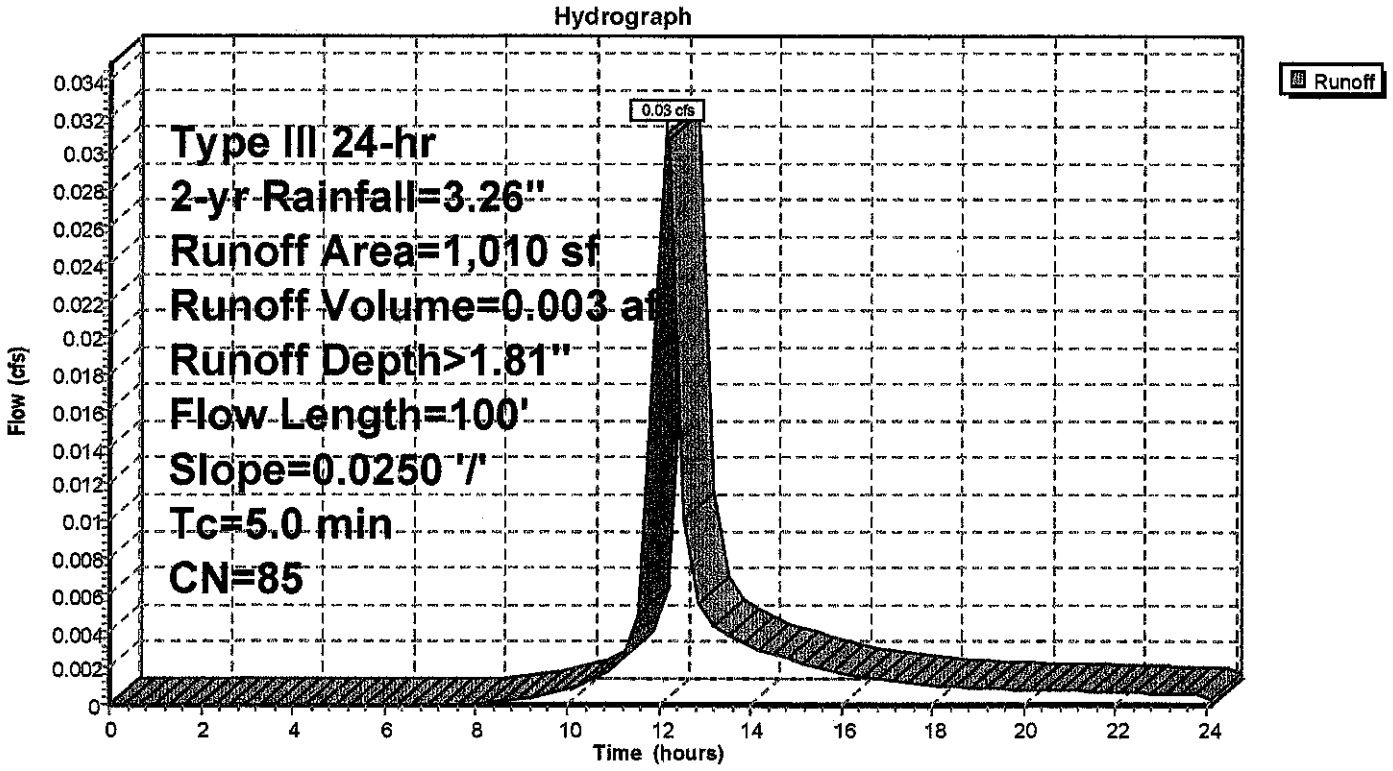
Runoff = 0.03 cfs @ 12.16 hrs, Volume= 0.003 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
1,010	85	Gravel roads, HSG B	Pavement
1,010		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0250	1.52		**Sheet Flow, Gravel Road** Smooth surfaces n= 0.011 P2= 3.26"
1.1	100	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E1: Gravel



Summary for Subcatchment E2: Grass

[49] Hint: Tc<2dt may require smaller dt

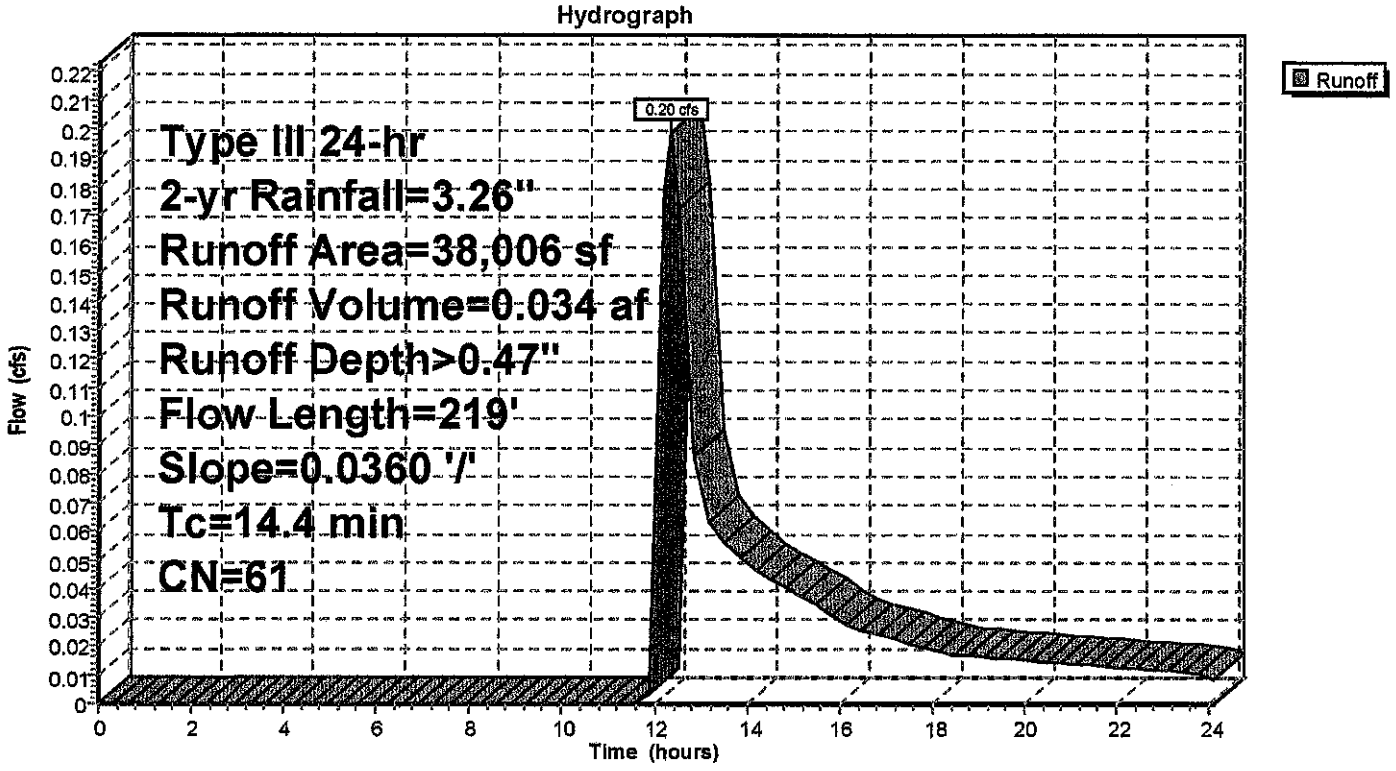
Runoff = 0.20 cfs @ 12.36 hrs, Volume= 0.034 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
38,006	61	Pasture/grassland/range, Good, HSG B	Residential
38,006		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	219	0.0360	0.25		**Sheet Flow, Short Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment E2: Grass



Summary for Subcatchment E3: Bit Driveway

[49] Hint: Tc<2dt may require smaller dt

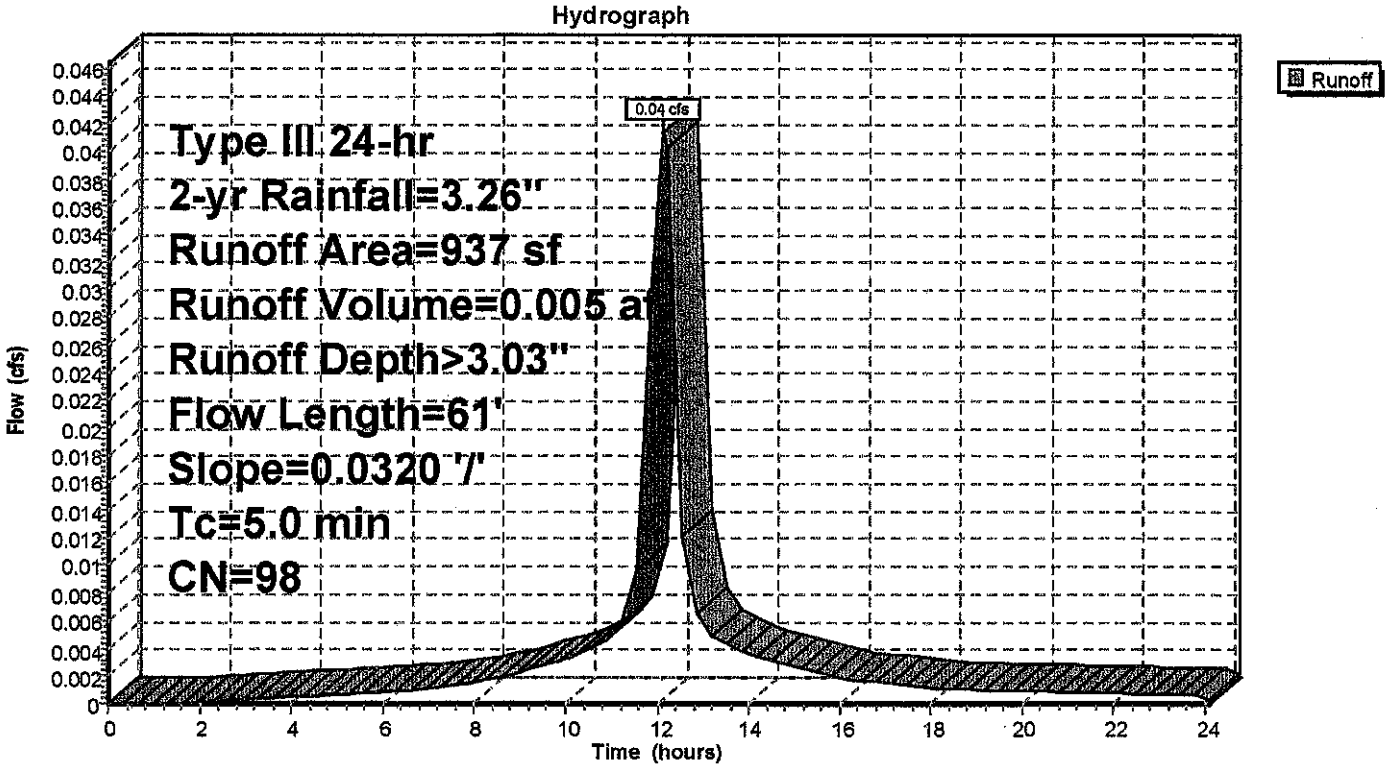
Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.005 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
937	98	Paved parking, HSG B	Pavement
937		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	61	0.0320	1.52		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.7	61	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E3: Bit Driveway



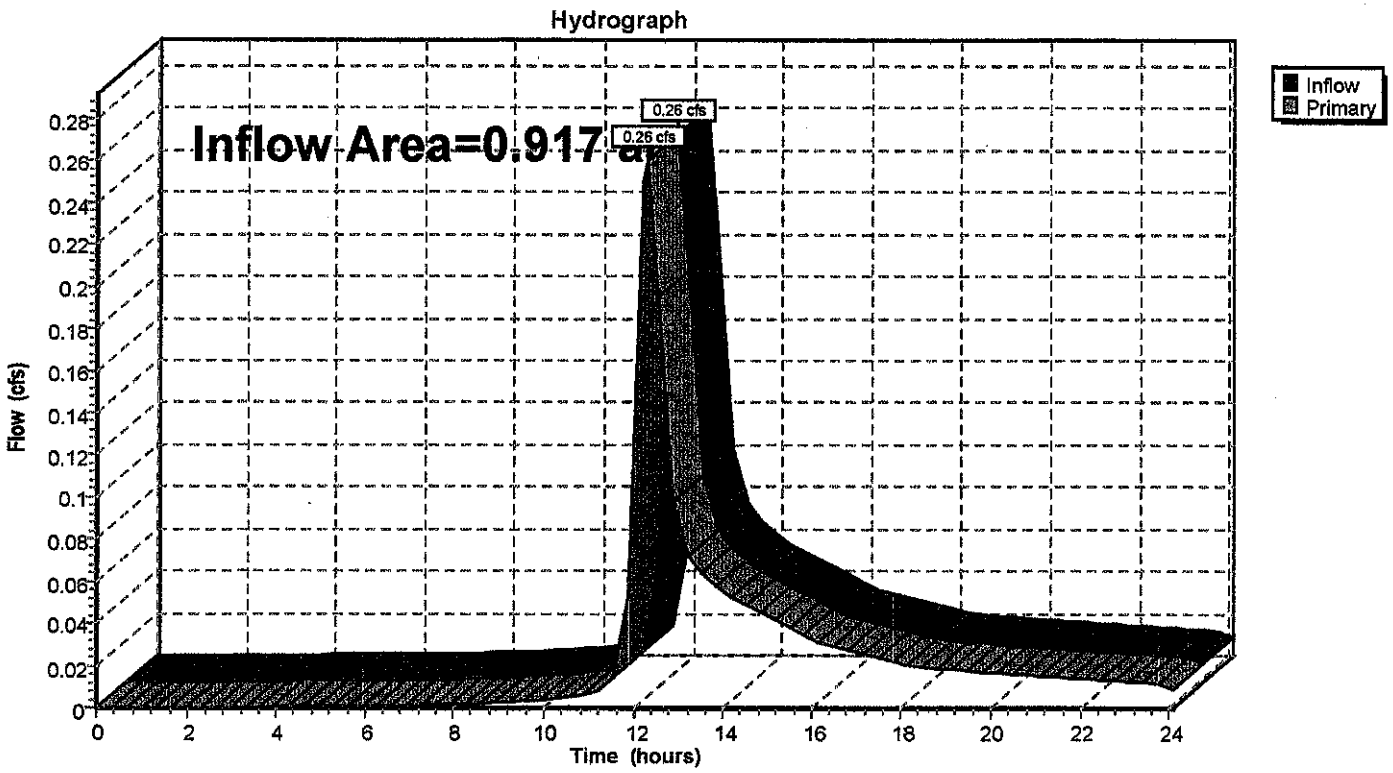
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.917 ac, 2.35% Impervious, Inflow Depth > 0.56" for 2-yr event
Inflow = 0.26 cfs @ 12.30 hrs, Volume= 0.043 af
Primary = 0.26 cfs @ 12.30 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs

Pond 1P: Christian Lane



Time span=0.00-24.00 hrs, dt=0.33 hrs, 74 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Gravel Runoff Area=1,010 sf 0.00% Impervious Runoff Depth>2.53"
Flow Length=100' Slope=0.0250 '/' Tc=5.0 min CN=85 Runoff=0.04 cfs 0.005 af

SubcatchmentE2: Grass Runoff Area=38,006 sf 0.00% Impervious Runoff Depth>0.85"
Flow Length=219' Slope=0.0360 '/' Tc=14.4 min CN=61 Runoff=0.46 cfs 0.062 af

SubcatchmentE3: Bit Driveway Runoff Area=937 sf 100.00% Impervious Runoff Depth>3.84"
Flow Length=61' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.05 cfs 0.007 af

Pond 1P: Christian Lane Inflow=0.55 cfs 0.074 af
Primary=0.55 cfs 0.074 af

Total Runoff Area = 0.917 ac Runoff Volume = 0.074 af Average Runoff Depth = 0.97"
97.65% Pervious = 0.896 ac 2.35% Impervious = 0.022 ac

Summary for Subcatchment E1: Gravel

[49] Hint: Tc<2dt may require smaller dt

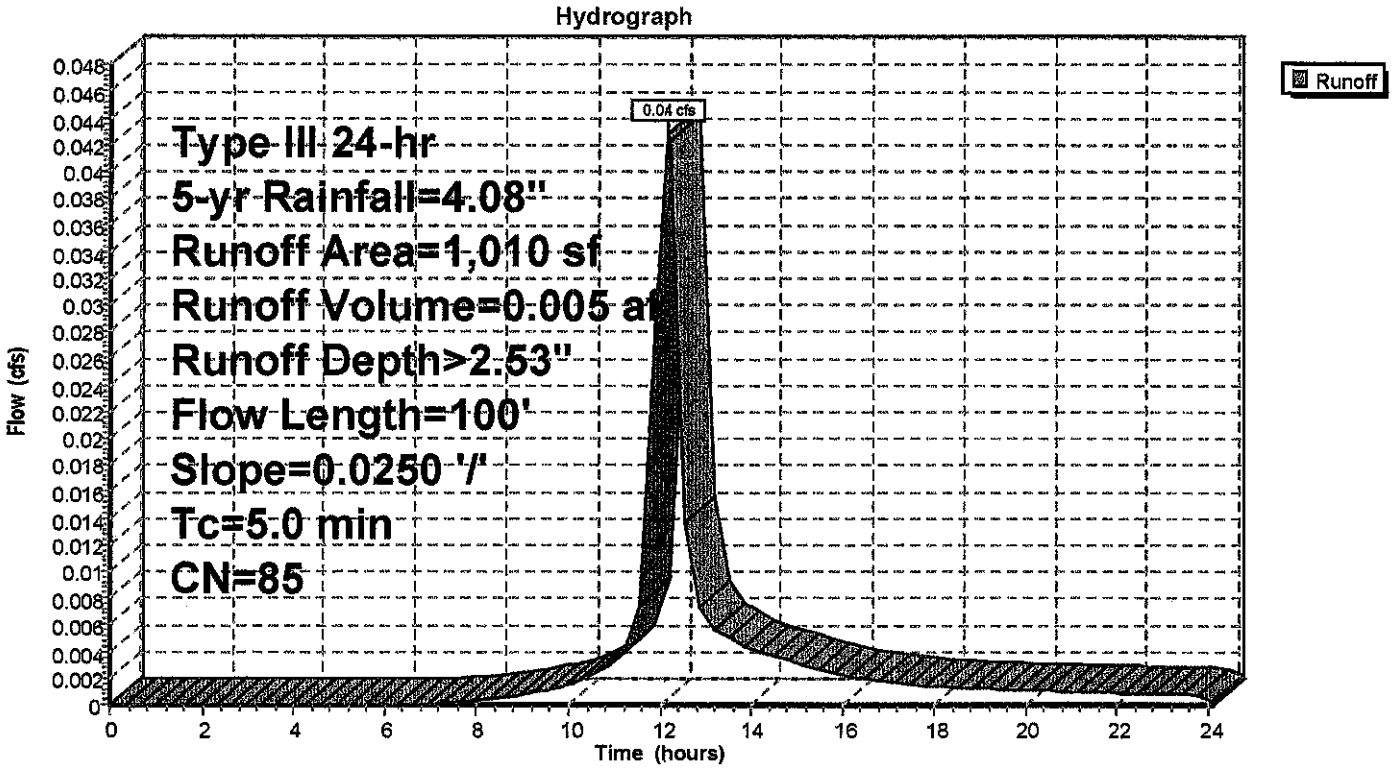
Runoff = 0.04 cfs @ 12.16 hrs, Volume= 0.005 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
1,010	85	Gravel roads, HSG B	Pavement
1,010		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0250	1.52		**Sheet Flow, Gravel Road** Smooth surfaces n= 0.011 P2= 3.26"
1.1	100	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E1: Gravel



Summary for Subcatchment E2: Grass

[49] Hint: Tc<2dt may require smaller dt

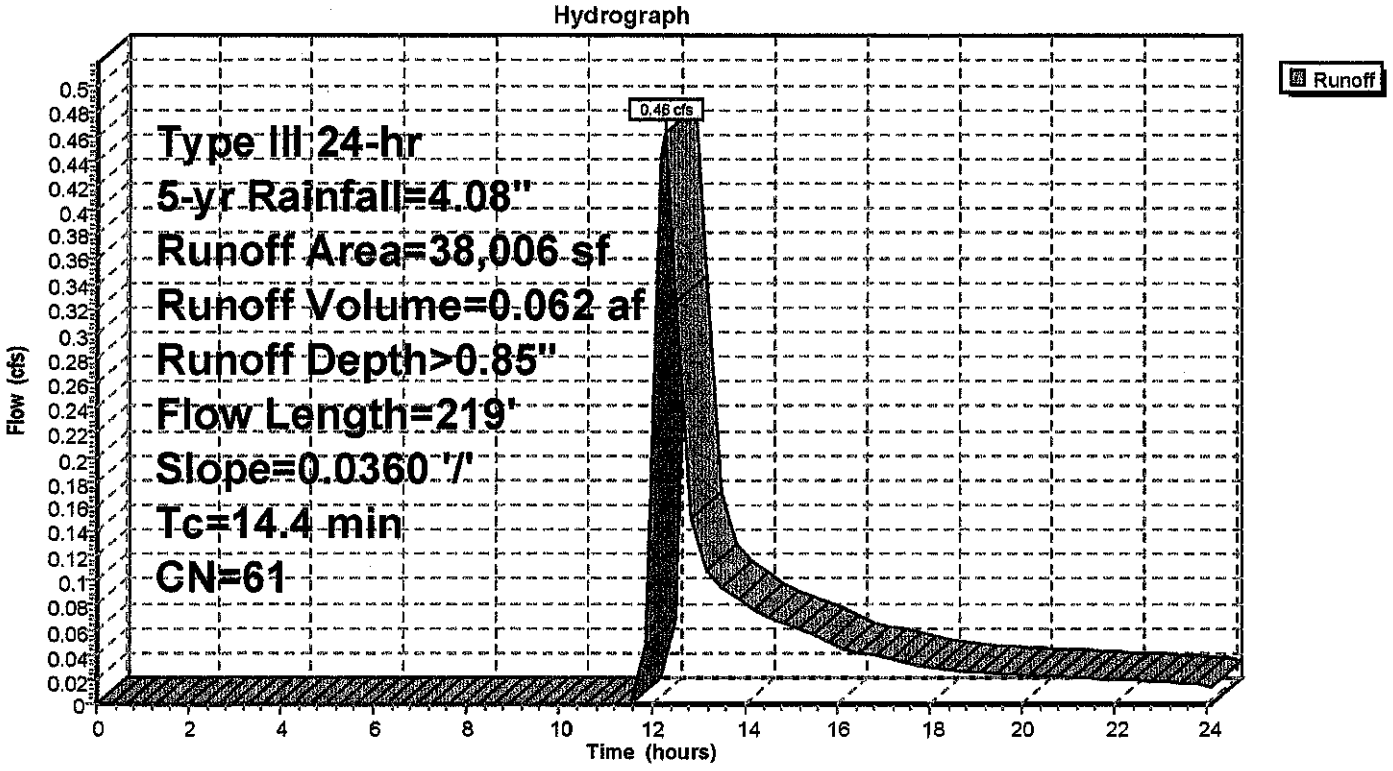
Runoff = 0.46 cfs @ 12.30 hrs, Volume= 0.062 af, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
38,006	61	Pasture/grassland/range, Good, HSG B	Residential
38,006		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	219	0.0360	0.25		**Sheet Flow, Short Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment E2: Grass



Summary for Subcatchment E3: Bit Driveway

[49] Hint: Tc<2dt may require smaller dt

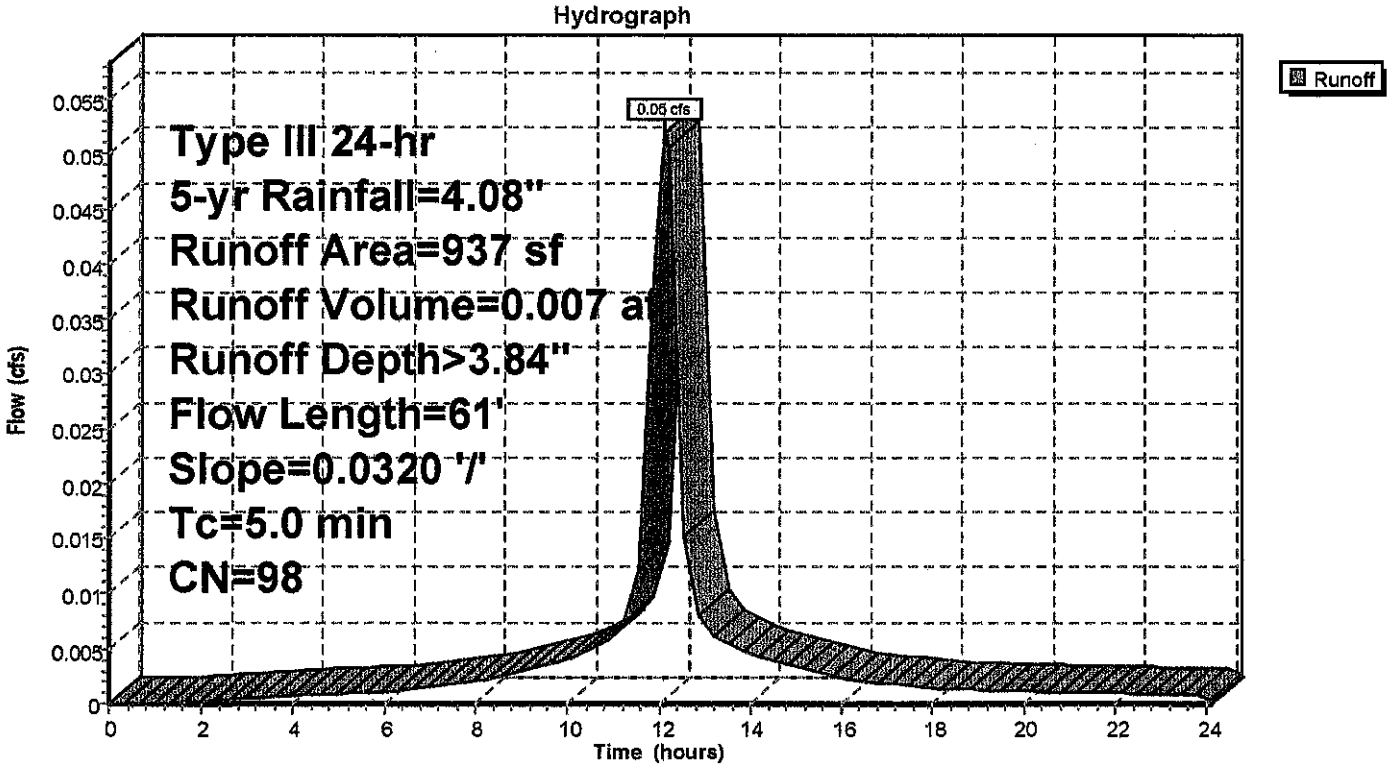
Runoff = 0.05 cfs @ 12.13 hrs, Volume= 0.007 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
937	98	Paved parking, HSG B	Pavement
937		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	61	0.0320	1.52		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.7	61	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E3: Bit Driveway



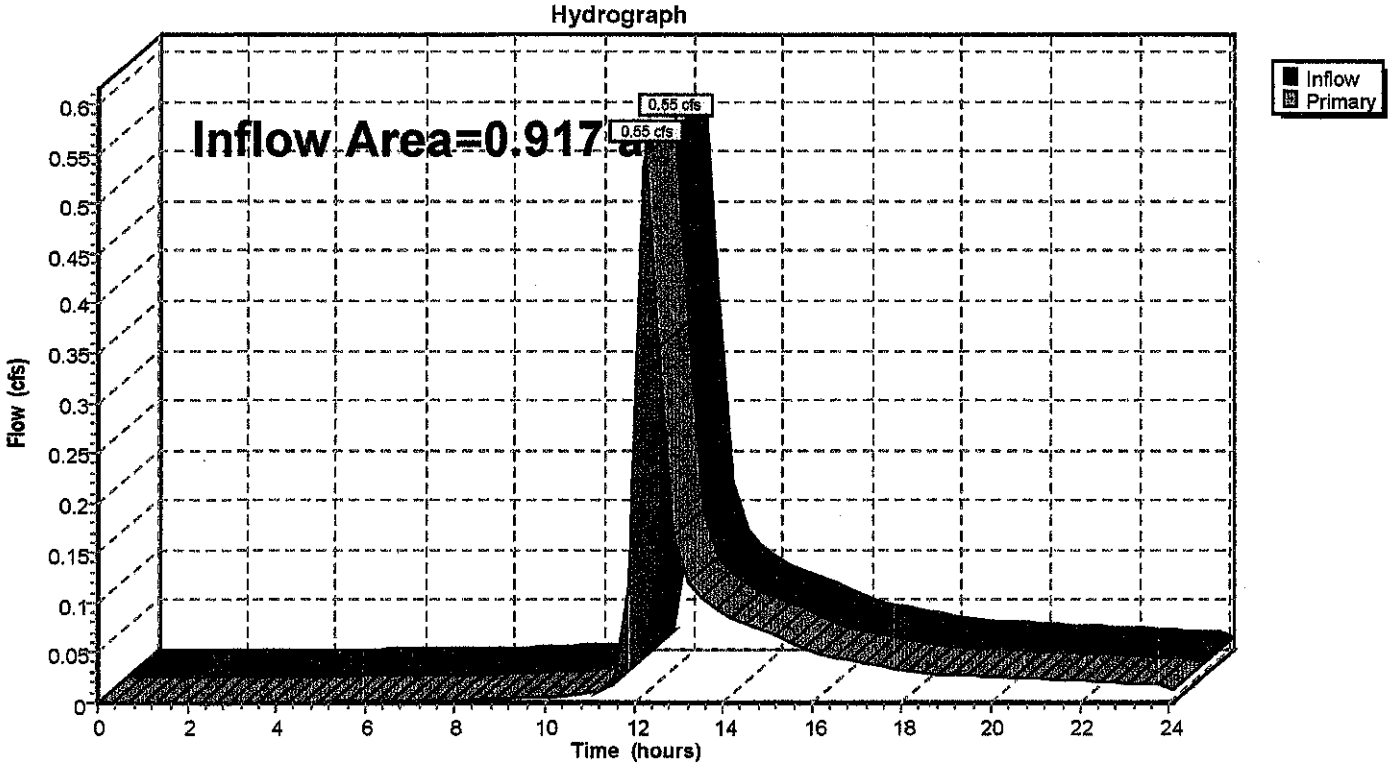
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.917 ac, 2.35% Impervious, Inflow Depth > 0.97" for 5-yr event
Inflow = 0.55 cfs @ 12.28 hrs, Volume= 0.074 af
Primary = 0.55 cfs @ 12.28 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs

Pond 1P: Christian Lane



Time span=0.00-24.00 hrs, dt=0.33 hrs, 74 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Gravel Runoff Area=1,010 sf 0.00% Impervious Runoff Depth>3.22"
Flow Length=100' Slope=0.0250 '/' Tc=5.0 min CN=85 Runoff=0.05 cfs 0.006 af

SubcatchmentE2: Grass Runoff Area=38,006 sf 0.00% Impervious Runoff Depth>1.27"
Flow Length=219' Slope=0.0360 '/' Tc=14.4 min CN=61 Runoff=0.75 cfs 0.093 af

SubcatchmentE3: Bit Driveway Runoff Area=937 sf 100.00% Impervious Runoff Depth>4.60"
Flow Length=61' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.06 cfs 0.008 af

Pond 1P: Christian Lane Inflow=0.86 cfs 0.107 af
Primary=0.86 cfs 0.107 af

Total Runoff Area = 0.917 ac Runoff Volume = 0.107 af Average Runoff Depth = 1.40"
97.65% Pervious = 0.896 ac 2.35% Impervious = 0.022 ac

Summary for Subcatchment E1: Gravel

[49] Hint: Tc<2dt may require smaller dt

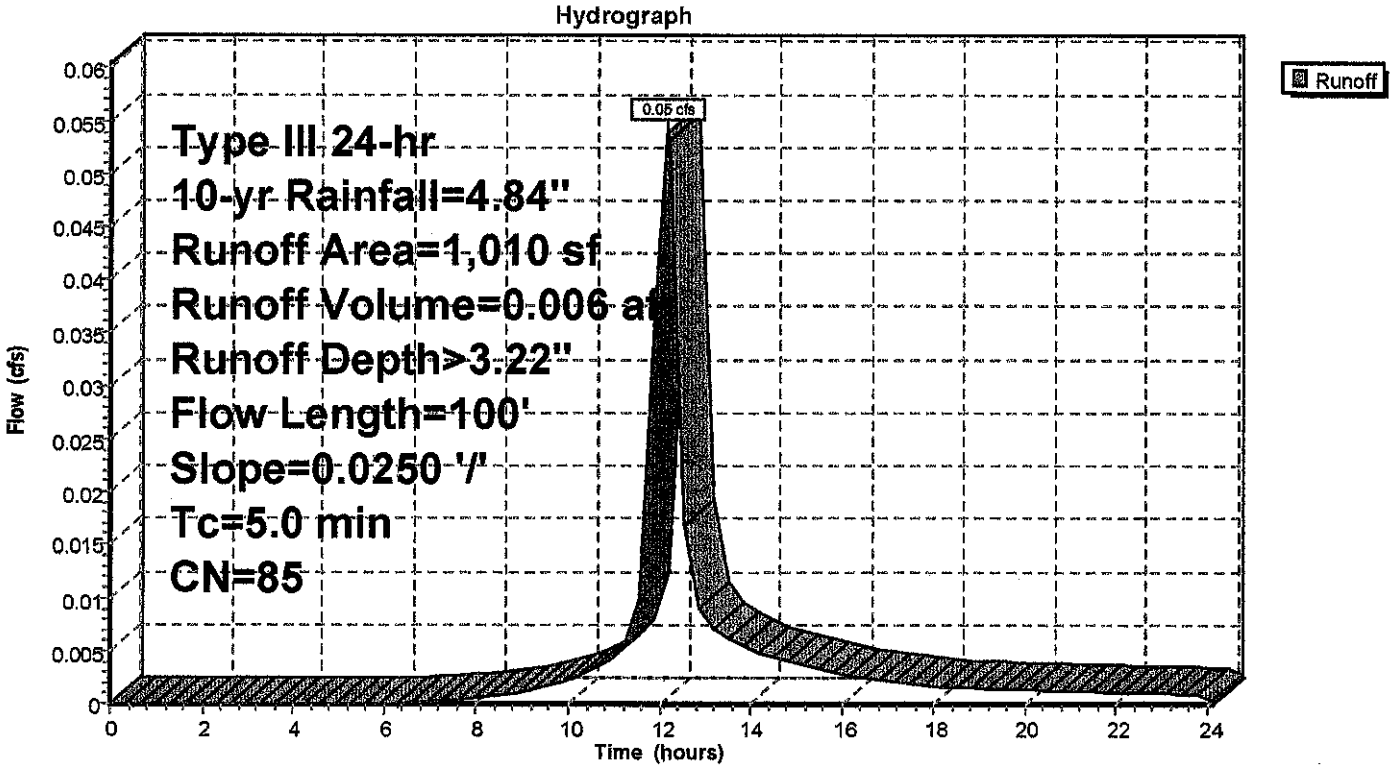
Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.006 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
1,010	85	Gravel roads, HSG B	Pavement
1,010		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0250	1.52		**Sheet Flow, Gravel Road** Smooth surfaces n= 0.011 P2= 3.26"
1.1	100	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E1: Gravel



Summary for Subcatchment E2: Grass

[49] Hint: Tc<2dt may require smaller dt

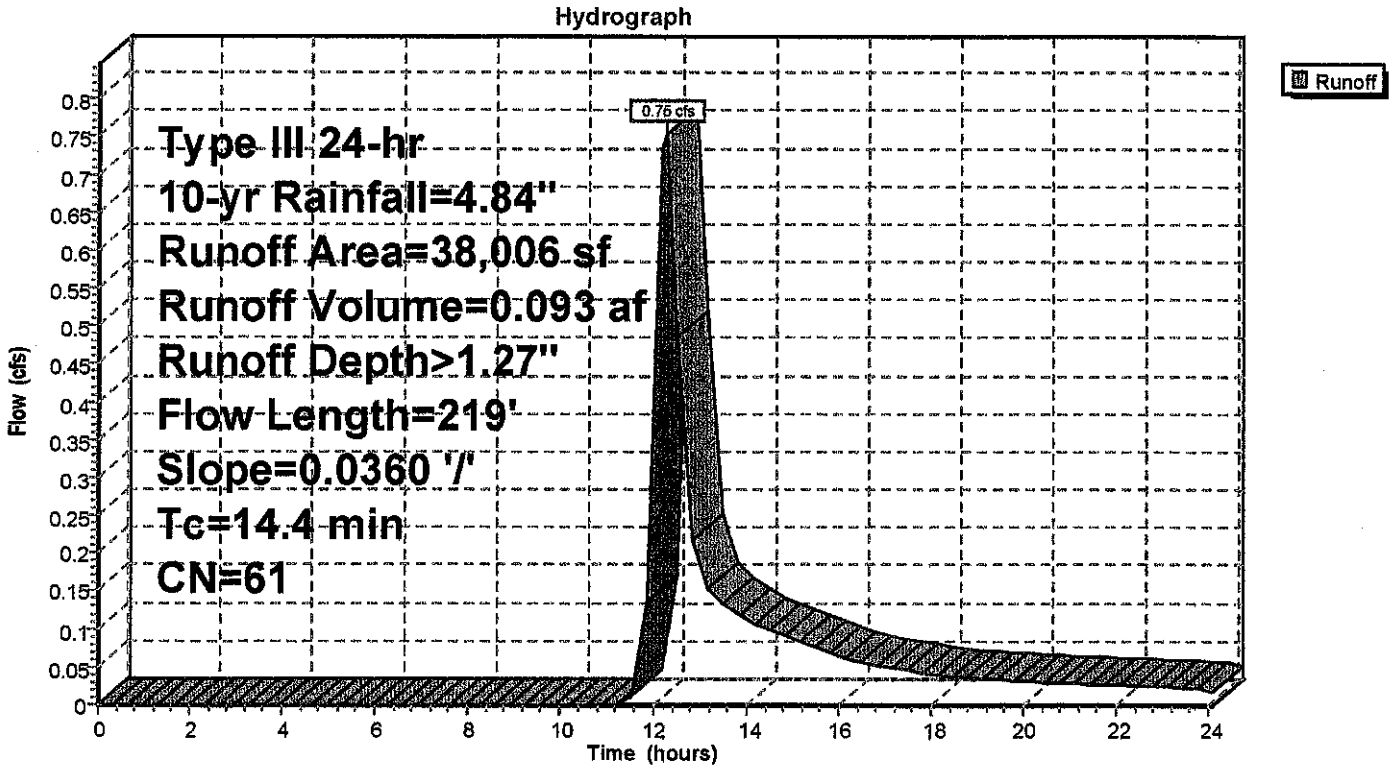
Runoff = 0.75 cfs @ 12.28 hrs, Volume= 0.093 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
38,006	61	Pasture/grassland/range, Good, HSG B	Residential
38,006		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	219	0.0360	0.25		**Sheet Flow, Short Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment E2: Grass



Summary for Subcatchment E3: Bit Driveway

[49] Hint: Tc<2dt may require smaller dt

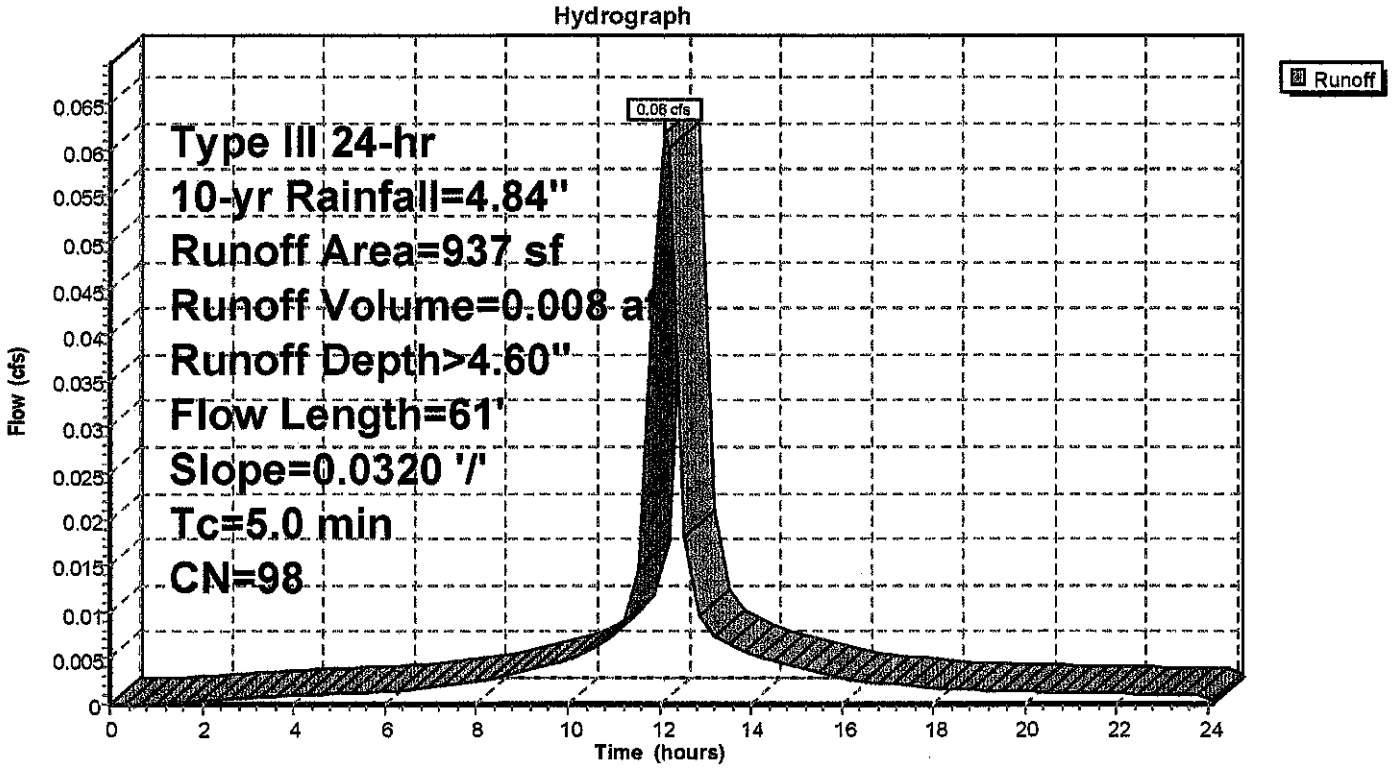
Runoff = 0.06 cfs @ 12.13 hrs, Volume= 0.008 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
937	98	Paved parking, HSG B	Pavement
937		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	61	0.0320	1.52		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.7	61	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E3: Bit Driveway



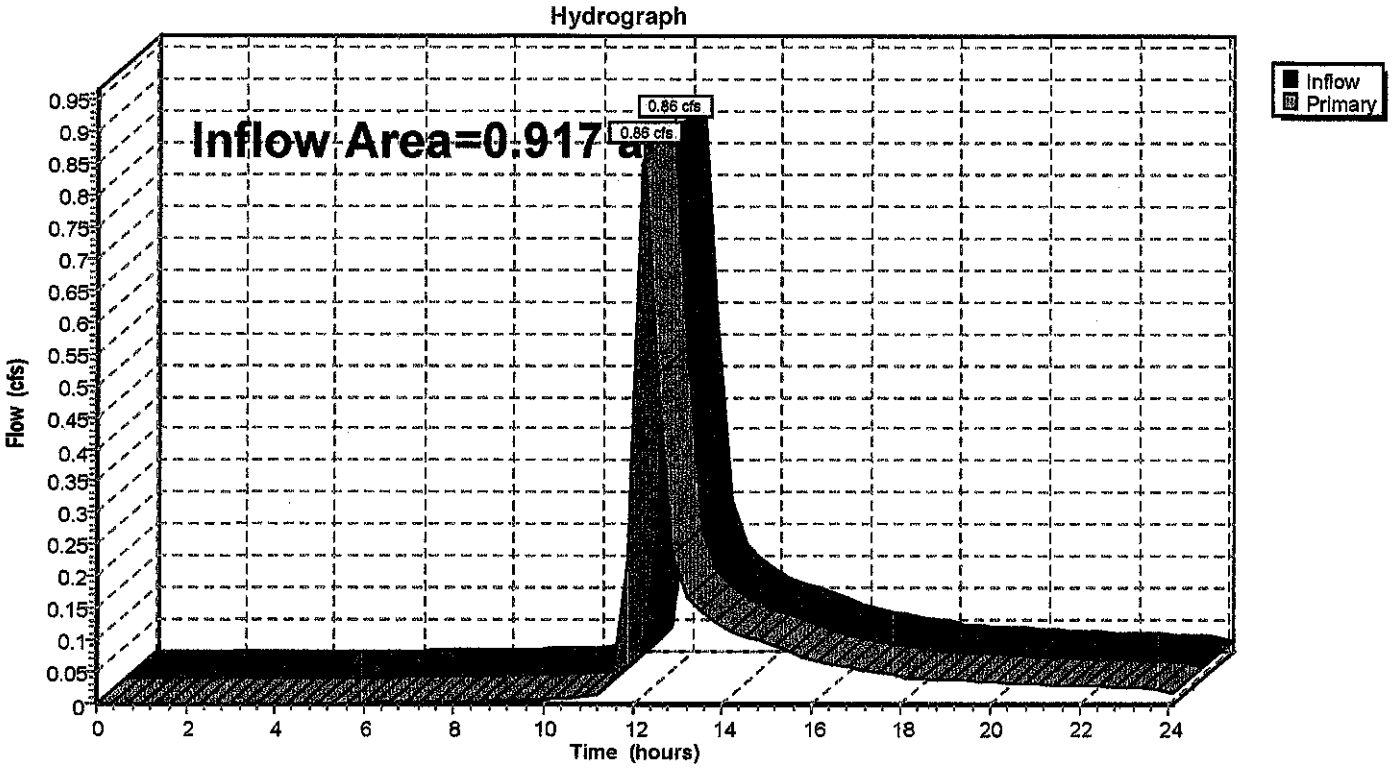
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.917 ac, 2.35% Impervious, Inflow Depth > 1.40" for 10-yr event
Inflow = 0.86 cfs @ 12.26 hrs, Volume= 0.107 af
Primary = 0.86 cfs @ 12.26 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs

Pond 1P: Christian Lane



Time span=0.00-24.00 hrs, dt=0.33 hrs, 74 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Gravel Runoff Area=1,010 sf 0.00% Impervious Runoff Depth>4.37"
Flow Length=100' Slope=0.0250 '/' Tc=5.0 min CN=85 Runoff=0.07 cfs 0.008 af

SubcatchmentE2: Grass Runoff Area=38,006 sf 0.00% Impervious Runoff Depth>2.05"
Flow Length=219' Slope=0.0360 '/' Tc=14.4 min CN=61 Runoff=1.29 cfs 0.149 af

SubcatchmentE3: Bit Driveway Runoff Area=937 sf 100.00% Impervious Runoff Depth>5.83"
Flow Length=61' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.08 cfs 0.010 af

Pond 1P: Christian Lane Inflow=1.43 cfs 0.168 af
Primary=1.43 cfs 0.168 af

Total Runoff Area = 0.917 ac Runoff Volume = 0.168 af Average Runoff Depth = 2.20"
97.65% Pervious = 0.896 ac 2.35% Impervious = 0.022 ac

Summary for Subcatchment E1: Gravel

[49] Hint: Tc<2dt may require smaller dt

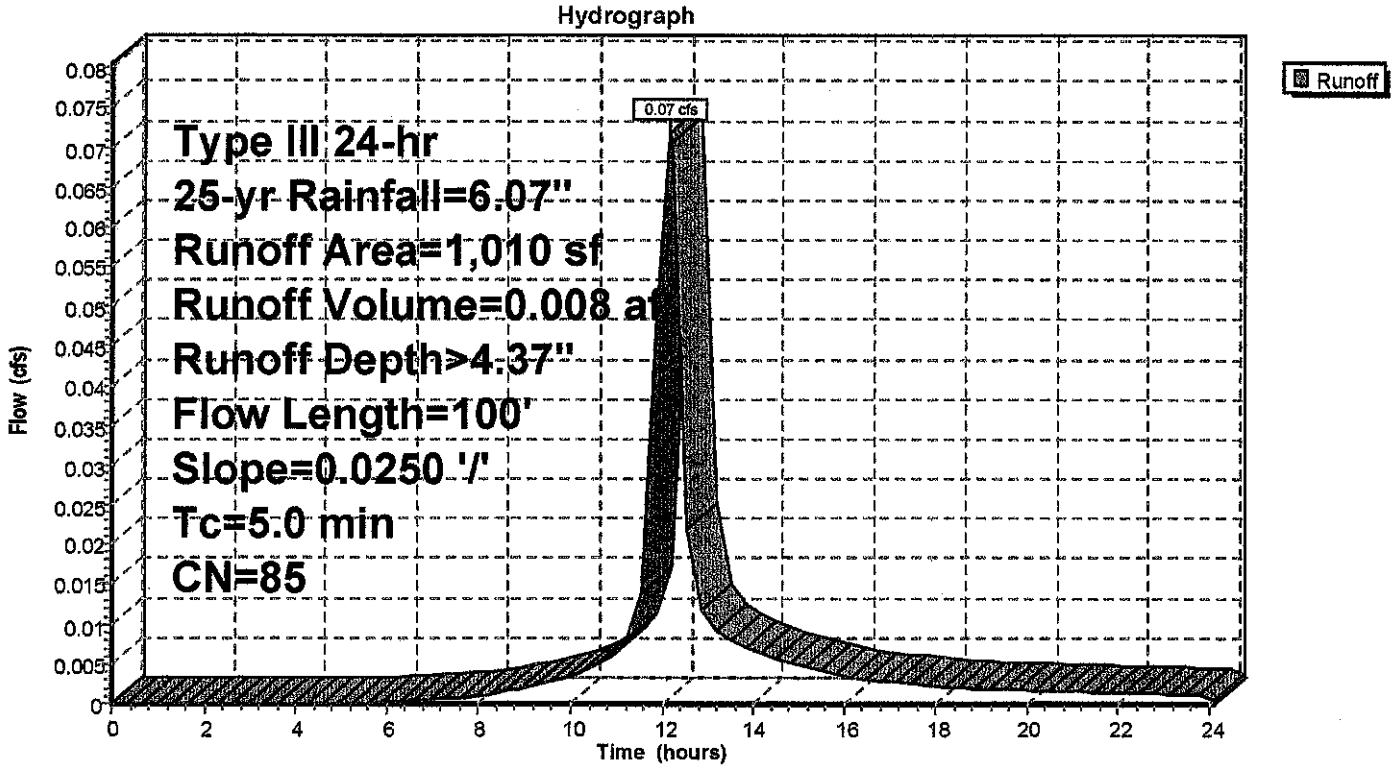
Runoff = 0.07 cfs @ 12.15 hrs, Volume= 0.008 af, Depth> 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
1,010	85	Gravel roads, HSG B	Pavement
1,010		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0250	1.52		**Sheet Flow, Gravel Road** Smooth surfaces n= 0.011 P2= 3.26"
1.1	100	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E1: Gravel



Summary for Subcatchment E2: Grass

[49] Hint: Tc<2dt may require smaller dt

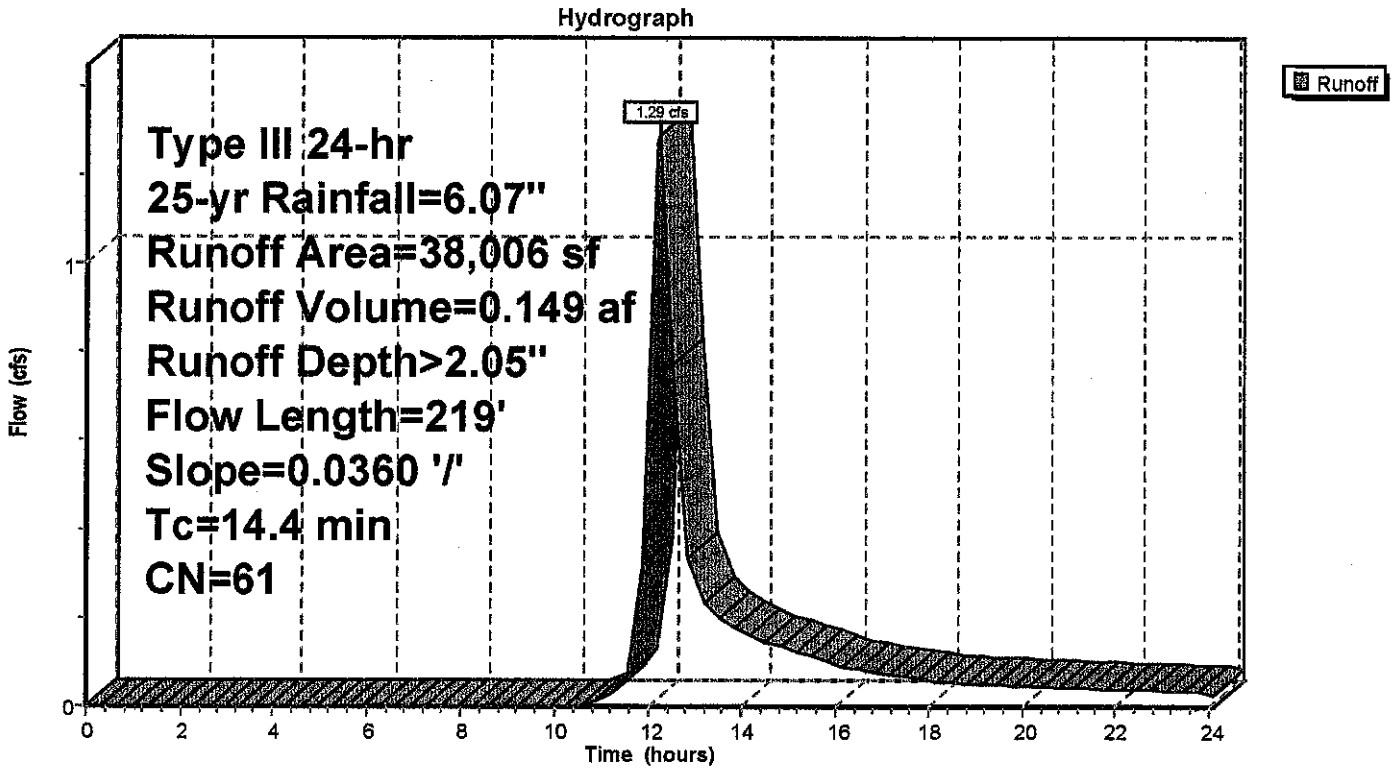
Runoff = 1.29 cfs @ 12.26 hrs, Volume= 0.149 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
38,006	61	Pasture/grassland/range, Good, HSG B	Residential
38,006		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	219	0.0360	0.25		**Sheet Flow, Short Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment E2: Grass



Summary for Subcatchment E3: Bit Driveway

[49] Hint: Tc<2dt may require smaller dt

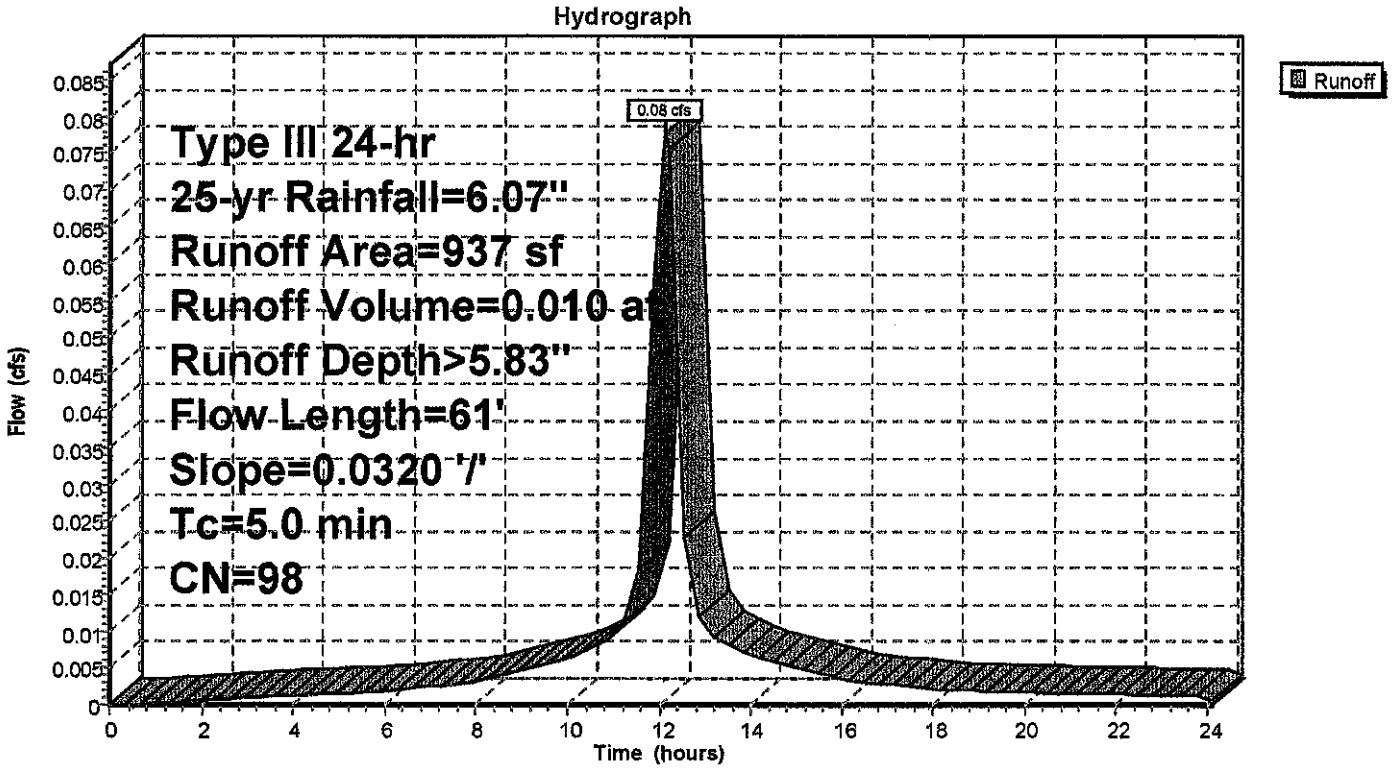
Runoff = 0.08 cfs @ 12.13 hrs, Volume= 0.010 af, Depth> 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
937	98	Paved parking, HSG B	Pavement
937		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	61	0.0320	1.52		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.7	61	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E3: Bit Driveway



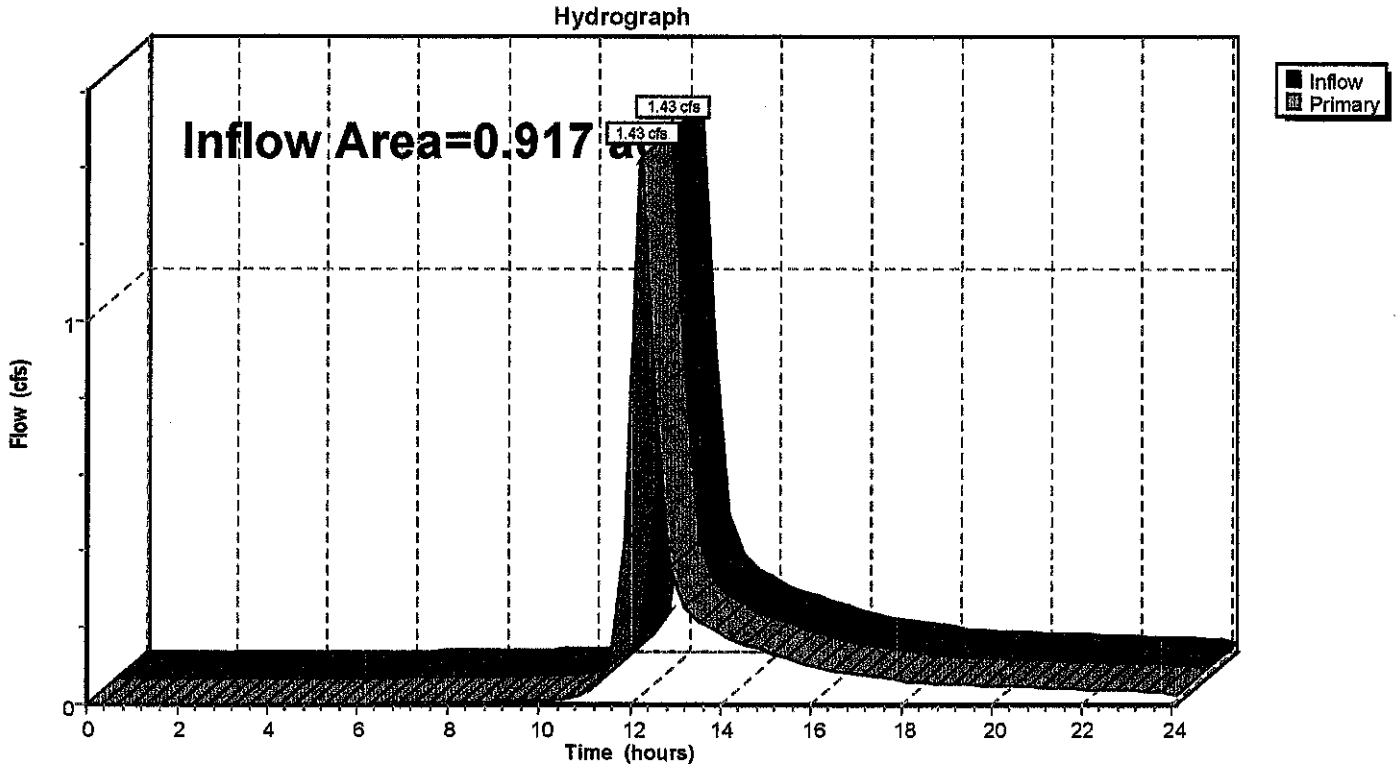
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.917 ac, 2.35% Impervious, Inflow Depth > 2.20" for 25-yr event
Inflow = 1.43 cfs @ 12.25 hrs, Volume= 0.168 af
Primary = 1.43 cfs @ 12.25 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs

Pond 1P: Christian Lane



Time span=0.00-24.00 hrs, dt=0.33 hrs, 74 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Gravel Runoff Area=1,010 sf 0.00% Impervious Runoff Depth>5.44"
Flow Length=100' Slope=0.0250 '/' Tc=5.0 min CN=85 Runoff=0.09 cfs 0.011 af

SubcatchmentE2: Grass Runoff Area=38,006 sf 0.00% Impervious Runoff Depth>2.85"
Flow Length=219' Slope=0.0360 '/' Tc=14.4 min CN=61 Runoff=1.84 cfs 0.207 af

SubcatchmentE3: Bit Driveway Runoff Area=937 sf 100.00% Impervious Runoff Depth>6.96"
Flow Length=61' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.09 cfs 0.012 af

Pond 1P: Christian Lane Inflow=2.01 cfs 0.230 af
Primary=2.01 cfs 0.230 af

Total Runoff Area = 0.917 ac Runoff Volume = 0.230 af Average Runoff Depth = 3.01"
97.65% Pervious = 0.896 ac 2.35% Impervious = 0.022 ac

Summary for Subcatchment E1: Gravel

[49] Hint: Tc<2dt may require smaller dt

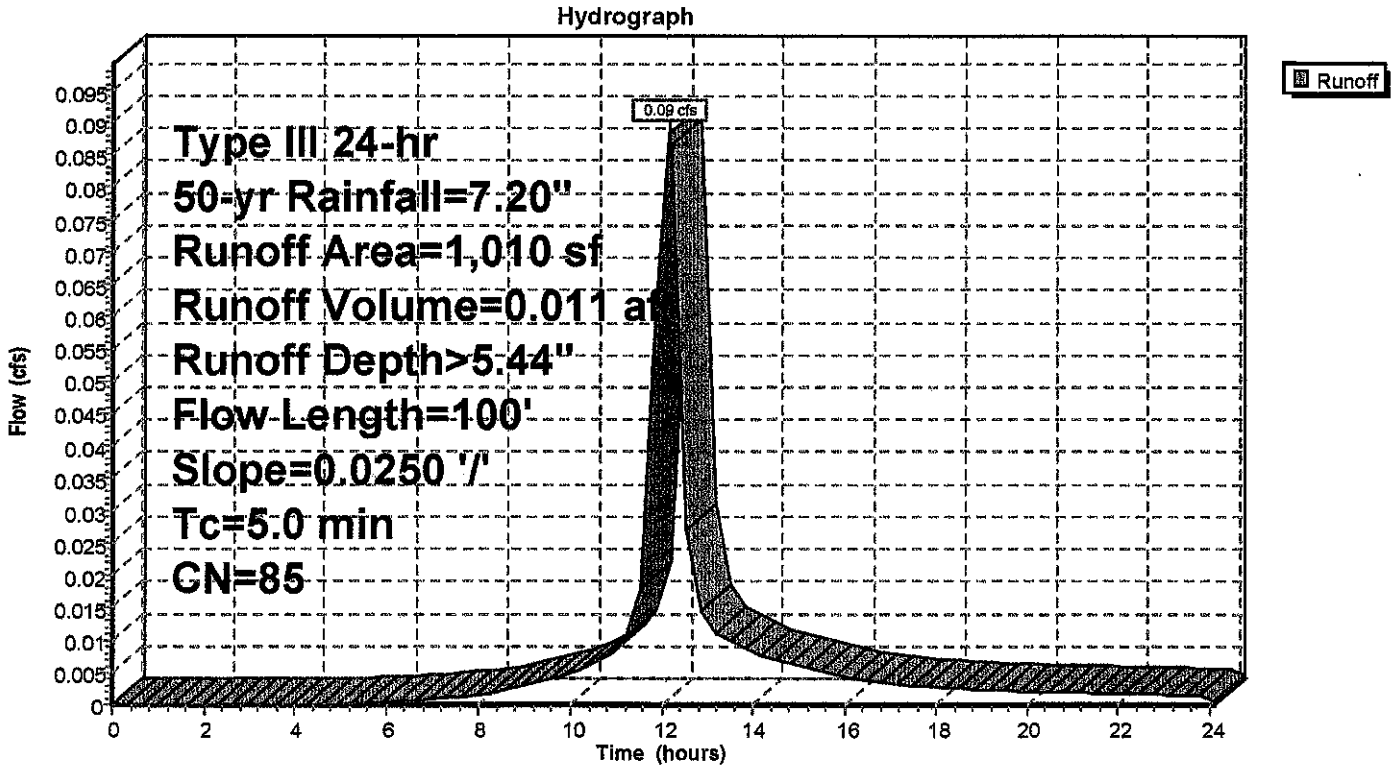
Runoff = 0.09 cfs @ 12.14 hrs, Volume= 0.011 af, Depth> 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
1,010	85	Gravel roads, HSG B	Pavement
1,010		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0250	1.52		**Sheet Flow, Gravel Road** Smooth surfaces n= 0.011 P2= 3.26"
1.1	100	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E1: Gravel



Summary for Subcatchment E2: Grass

[49] Hint: Tc<2dt may require smaller dt

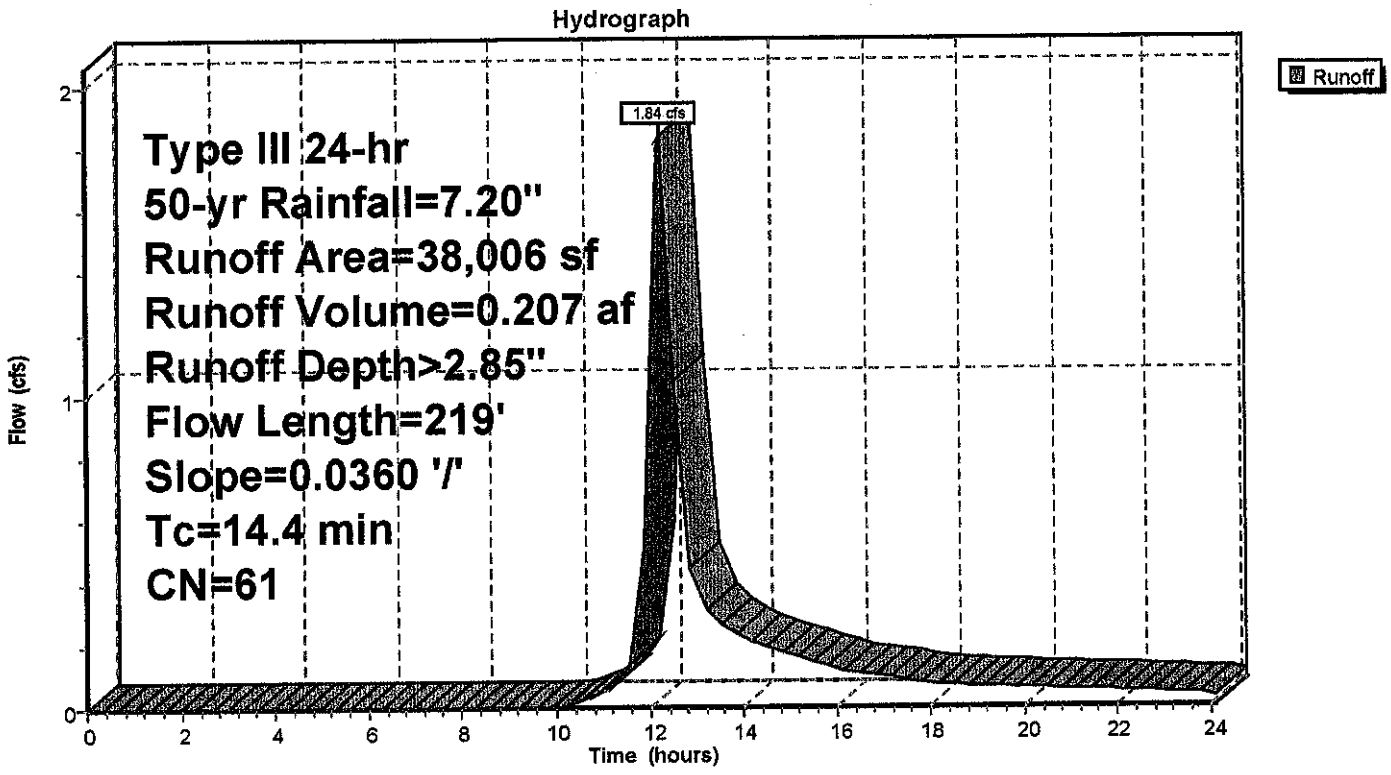
Runoff = 1.84 cfs @ 12.25 hrs, Volume= 0.207 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
38,006	61	Pasture/grassland/range, Good, HSG B	Residential
38,006		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	219	0.0360	0.25		**Sheet Flow, Short Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment E2: Grass



Summary for Subcatchment E3: Bit Driveway

[49] Hint: Tc<2dt may require smaller dt

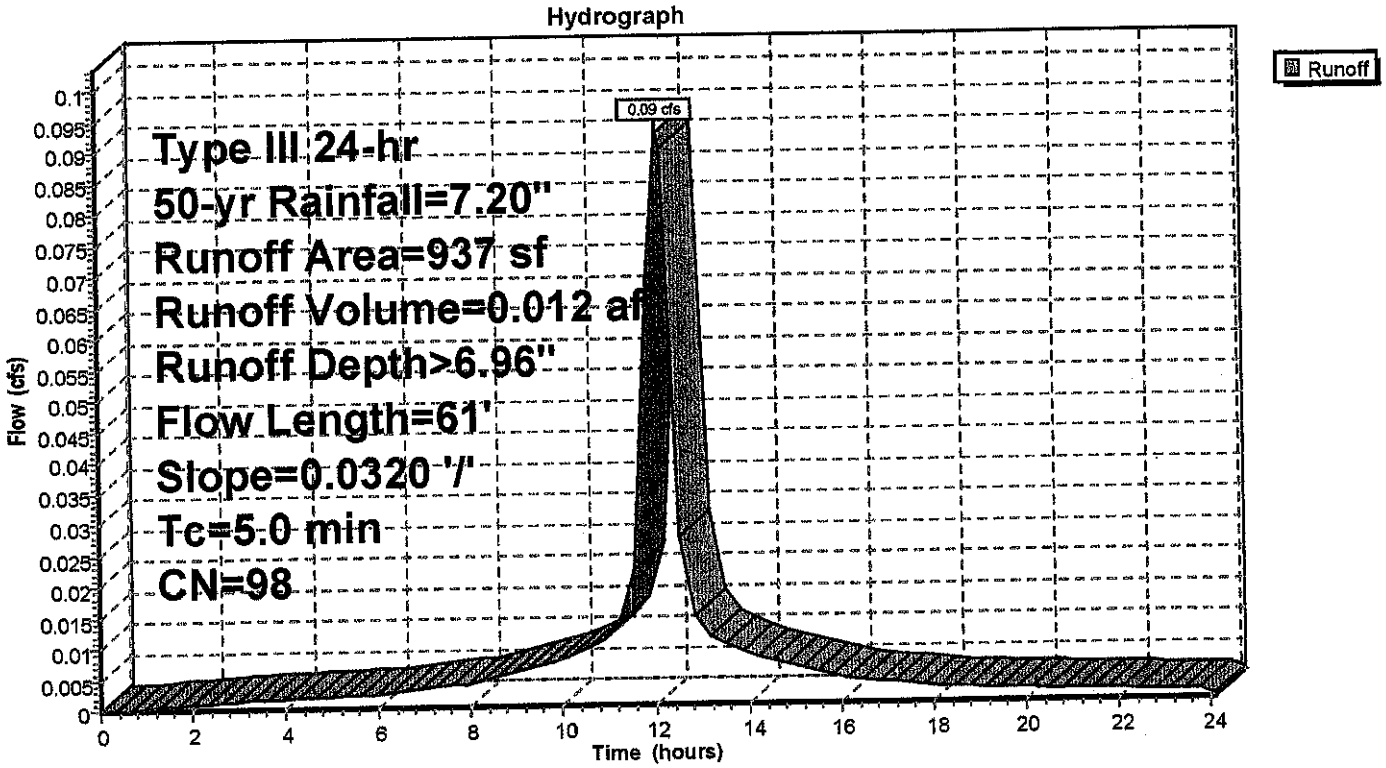
Runoff = 0.09 cfs @ 12.13 hrs, Volume= 0.012 af, Depth> 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
937	98	Paved parking, HSG B	Pavement
937		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	61	0.0320	1.52		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.7	61	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E3: Bit Driveway



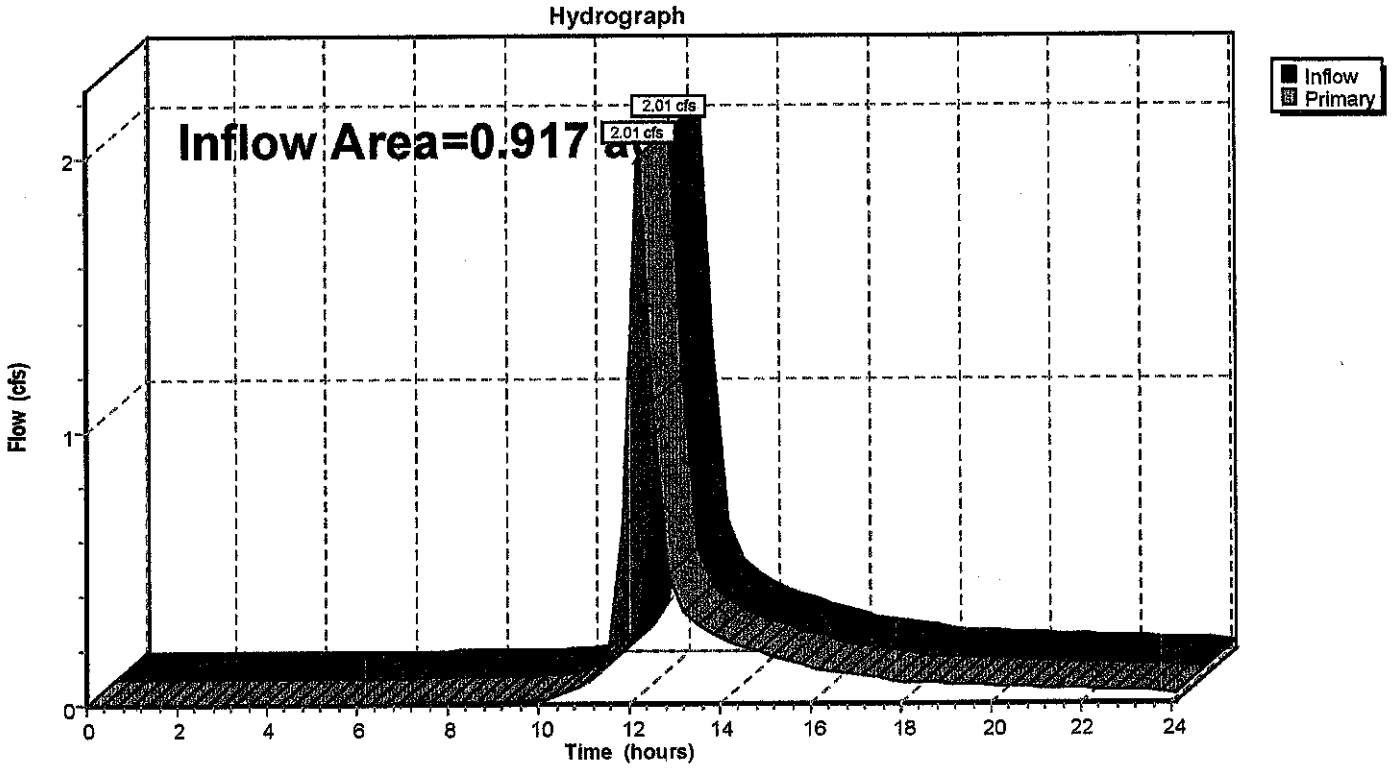
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.917 ac, 2.35% Impervious, Inflow Depth > 3.01" for 50-yr event
Inflow = 2.01 cfs @ 12.24 hrs, Volume= 0.230 af
Primary = 2.01 cfs @ 12.24 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs

Pond 1P: Christian Lane



Time span=0.00-24.00 hrs, dt=0.33 hrs, 74 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Gravel Runoff Area=1,010 sf 0.00% Impervious Runoff Depth>6.75"
Flow Length=100' Slope=0.0250 '/' Tc=5.0 min CN=85 Runoff=0.11 cfs 0.013 af

SubcatchmentE2: Grass Runoff Area=38,006 sf 0.00% Impervious Runoff Depth>3.88"
Flow Length=219' Slope=0.0360 '/' Tc=14.4 min CN=61 Runoff=2.54 cfs 0.282 af

SubcatchmentE3: Bit Driveway Runoff Area=937 sf 100.00% Impervious Runoff Depth>8.32"
Flow Length=61' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.11 cfs 0.015 af

Pond 1P: Christian Lane Inflow=2.75 cfs 0.310 af
Primary=2.75 cfs 0.310 af

Total Runoff Area = 0.917 ac Runoff Volume = 0.310 af Average Runoff Depth = 4.05"
97.65% Pervious = 0.896 ac 2.35% Impervious = 0.022 ac

Summary for Subcatchment E1: Gravel

[49] Hint: Tc<2dt may require smaller dt

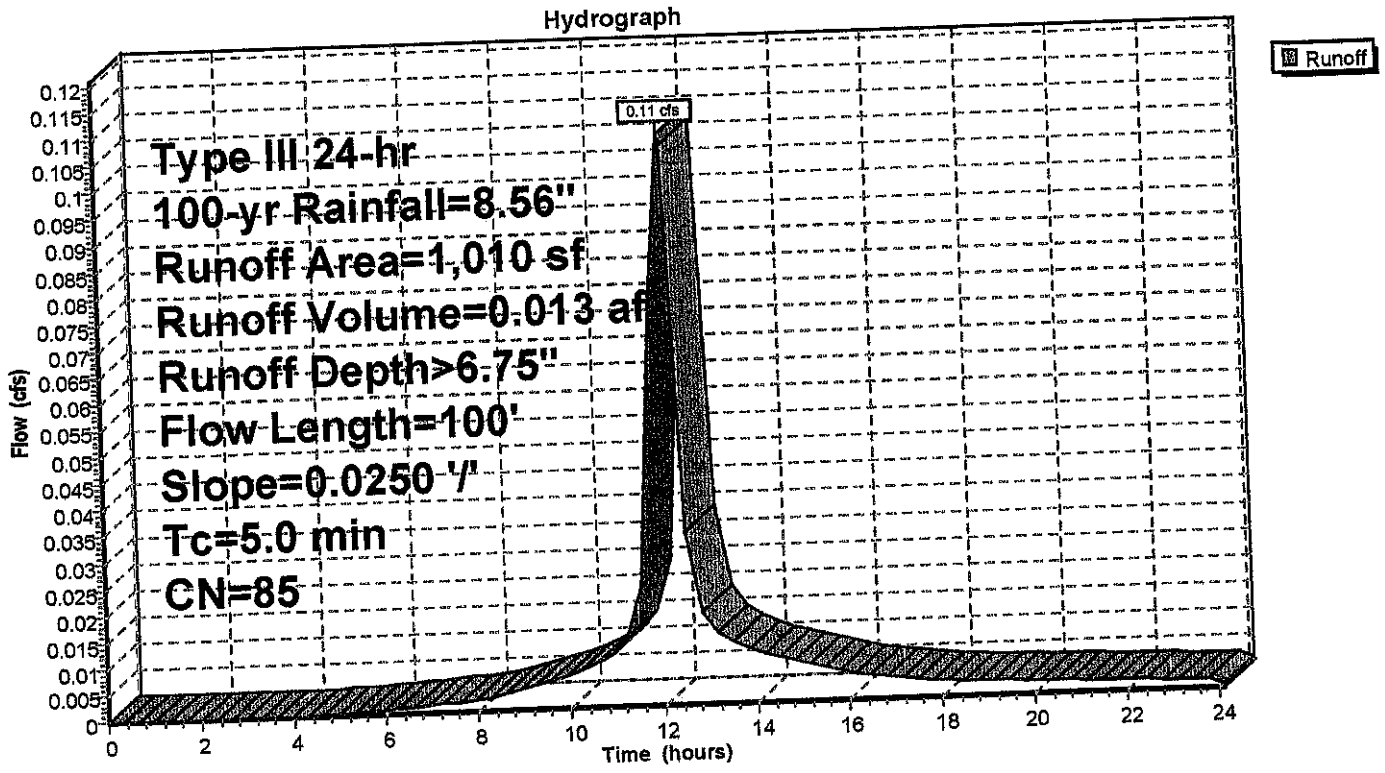
Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
1,010	85	Gravel roads, HSG B	Pavement
1,010		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0250	1.52		**Sheet Flow, Gravel Road** Smooth surfaces n= 0.011 P2= 3.26"
1.1	100	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E1: Gravel



Summary for Subcatchment E2: Grass

[49] Hint: Tc<2dt may require smaller dt

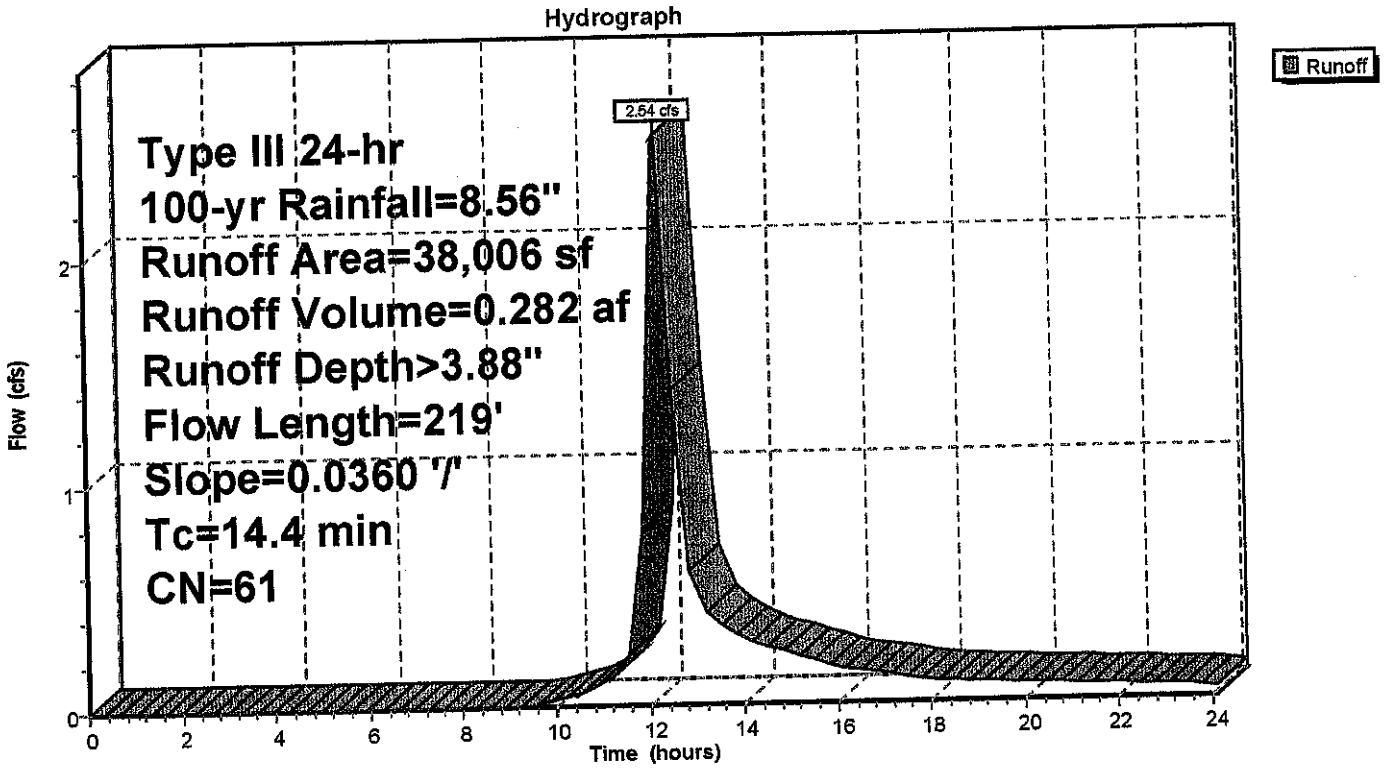
Runoff = 2.54 cfs @ 12.25 hrs, Volume= 0.282 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
38,006	61	Pasture/grassland/range, Good, HSG B	Residential
38,006		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	219	0.0360	0.25		**Sheet Flow, Short Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment E2: Grass



Summary for Subcatchment E3: Bit Driveway

[49] Hint: Tc<2dt may require smaller dt

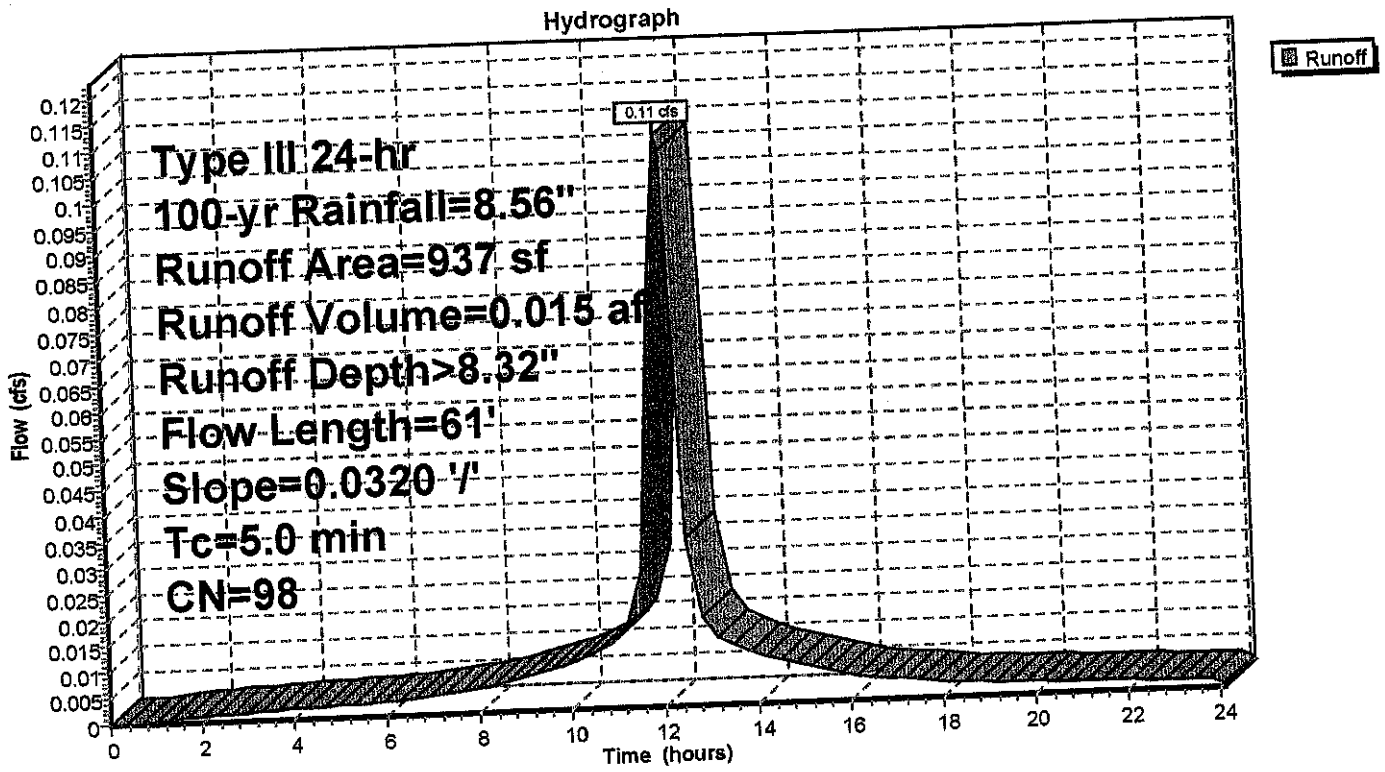
Runoff = 0.11 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
937	98	Paved parking, HSG B	Pavement
937		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	61	0.0320	1.52		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.7	61	Total, Increased to minimum Tc = 5.0 min			

Subcatchment E3: Bit Driveway



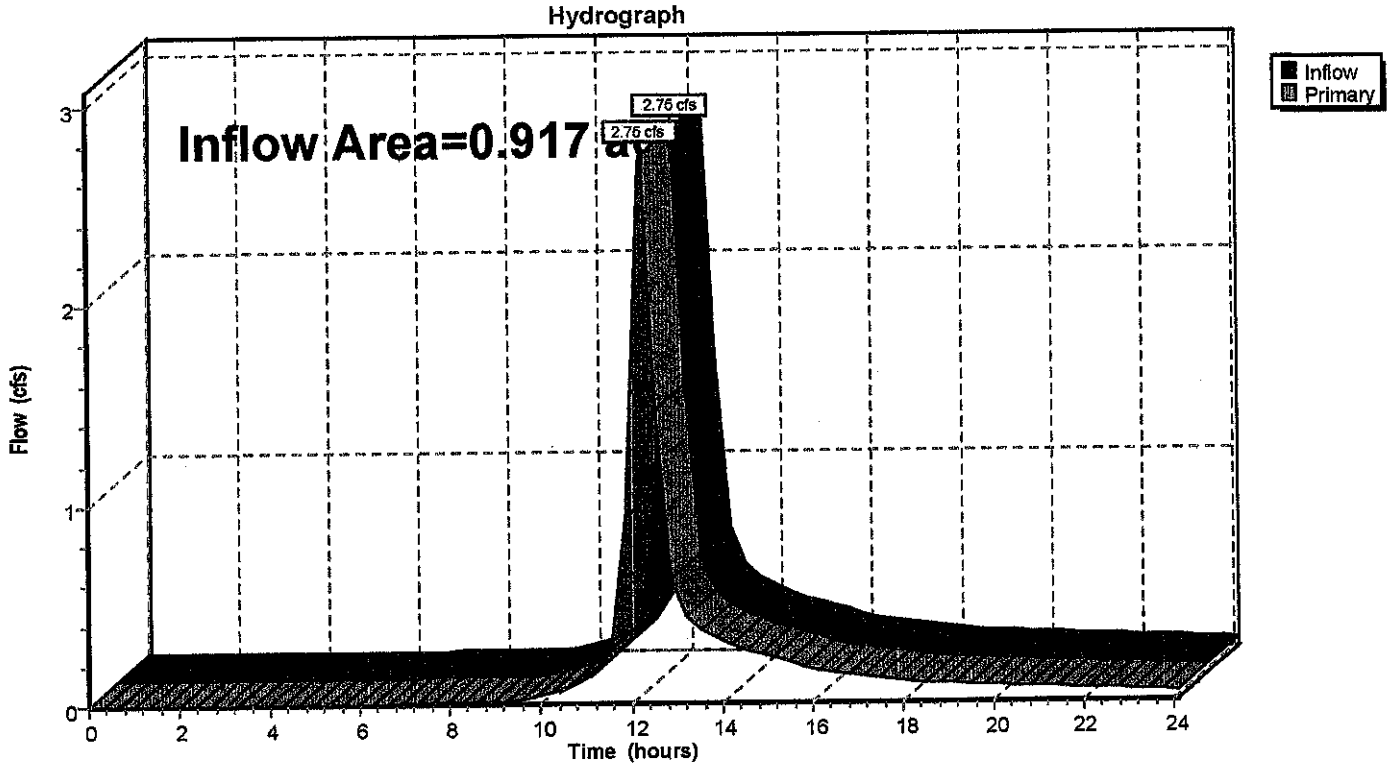
Summary for Pond 1P: Christian Lane

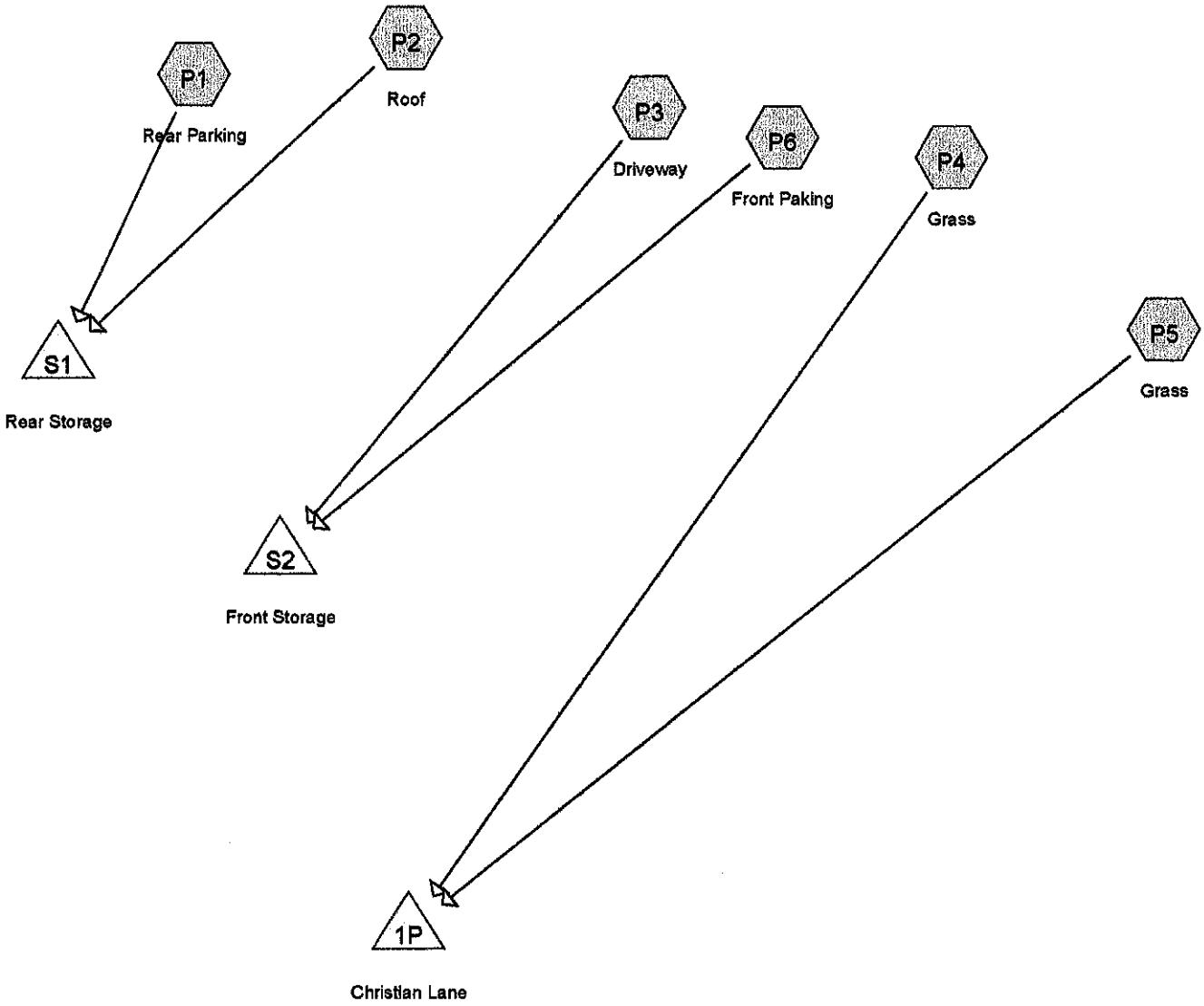
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	0.917 ac,	2.35% Impervious,	Inflow Depth >	4.05"	for 100-yr event
Inflow =	2.75 cfs @	12.24 hrs, Volume=	0.310 af		
Primary =	2.75 cfs @	12.24 hrs, Volume=	0.310 af,	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.09 hrs, dt= 0.33 hrs

Pond 1P: Christian Lane





Town of Berlin
Received
JUN 14 2021
Planning & Zoning Department
Berlin, Connecticut

Subcat Reach Pond Link

Routing Diagram for 239 Chritian Lane Berlin Post
Prepared by Inga Consulting Engineers, Printed 6/11/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.095	61	>75% Grass cover, Good, HSG B (P4, P5)
0.256	98	Paved parking, HSG B (P1, P3)
0.291	98	Paved roads w/curbs & sewers, HSG B (P6)
0.230	98	Roofs, HSG B (P2)
0.872	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.872	HSG B	P1, P2, P3, P4, P5, P6
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.872		**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	0.095	0.000	0.000	0.000	0.095	>75% Grass cover, Good	P4, P5
0.000	0.256	0.000	0.000	0.000	0.256	Paved parking	P1, P3
0.000	0.291	0.000	0.000	0.000	0.291	Paved roads w/curbs & sewers	P6
0.000	0.230	0.000	0.000	0.000	0.230	Roofs	P2
0.000	**0.872**	**0.000**	**0.000**	**0.000**	**0.872**	**TOTAL AREA**	

Land-Use Listing (all nodes)

Area (acres)	Land Use	Subcatchment Numbers
0.297	Pavement	P1, P4, P5
0.054	Residential	P3
0.291	Roadway	P6
0.230	Roofs	P2
0.872	**TOTAL**	

Time span=0.00-24.00 hrs, dt=0.50 hrs, 49 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Rear Parking Runoff Area=8,817 sf 100.00% Impervious Runoff Depth>3.03"
Flow Length=85' Slope=0.0700 '/' Tc=5.0 min CN=98 Runoff=0.37 cfs 0.051 af

SubcatchmentP2: Roof Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>3.03"
Flow Length=141' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.42 cfs 0.058 af

SubcatchmentP3: Driveway Runoff Area=2,338 sf 100.00% Impervious Runoff Depth>3.03"
Flow Length=151' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.10 cfs 0.014 af

SubcatchmentP4: Grass Runoff Area=2,528 sf 0.00% Impervious Runoff Depth>0.47"
Flow Length=209' Slope=0.0380 '/' Tc=13.5 min CN=61 Runoff=0.01 cfs 0.002 af

SubcatchmentP5: Grass Runoff Area=1,594 sf 0.00% Impervious Runoff Depth>0.47"
Flow Length=300' Slope=0.0190 '/' Tc=5.0 min CN=61 Runoff=0.01 cfs 0.001 af

SubcatchmentP6: Front Paking Runoff Area=12,687 sf 100.00% Impervious Runoff Depth>3.03"
Flow Length=31' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.53 cfs 0.073 af

Pond 1P: Christian Lane Inflow=0.02 cfs 0.004 af
Primary=0.02 cfs 0.004 af

Pond S1: Rear Storage Peak Elev=61.02' Storage=5 cf Inflow=0.79 cfs 0.109 af
Outflow=0.79 cfs 0.109 af

Pond S2: Front Storage Peak Elev=59.02' Storage=2 cf Inflow=0.63 cfs 0.087 af
Outflow=0.63 cfs 0.087 af

Total Runoff Area = 0.872 ac Runoff Volume = 0.200 af Average Runoff Depth = 2.75"
10.86% Pervious = 0.095 ac 89.14% Impervious = 0.777 ac

Summary for Subcatchment P1: Rear Parking

[49] Hint: Tc<2dt may require smaller dt

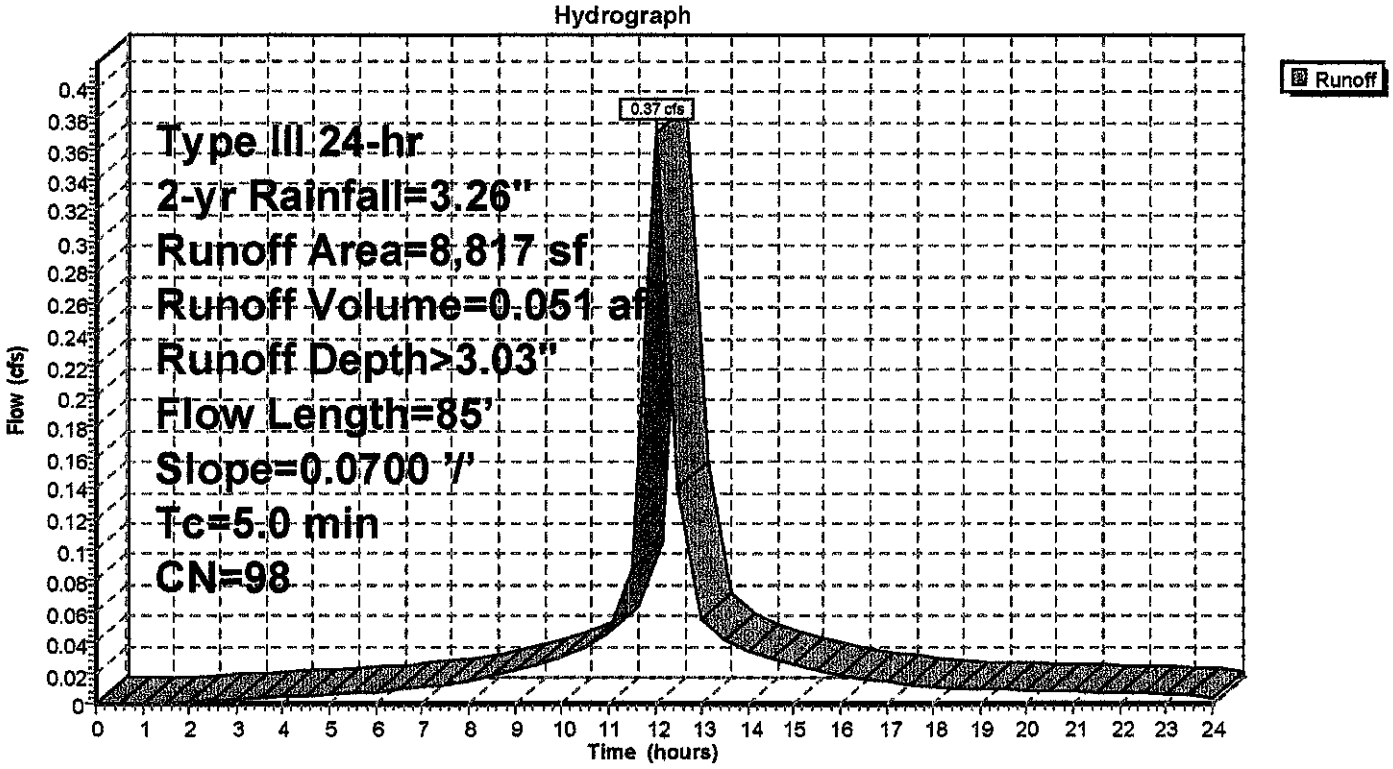
Runoff = 0.37 cfs @ 12.03 hrs, Volume= 0.051 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
8,817	98	Paved parking, HSG B	Pavement
8,817		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	85	0.0700	2.22		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.6	85	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P1: Rear Parking



Summary for Subcatchment P2: Roof

[49] Hint: Tc<2dt may require smaller dt

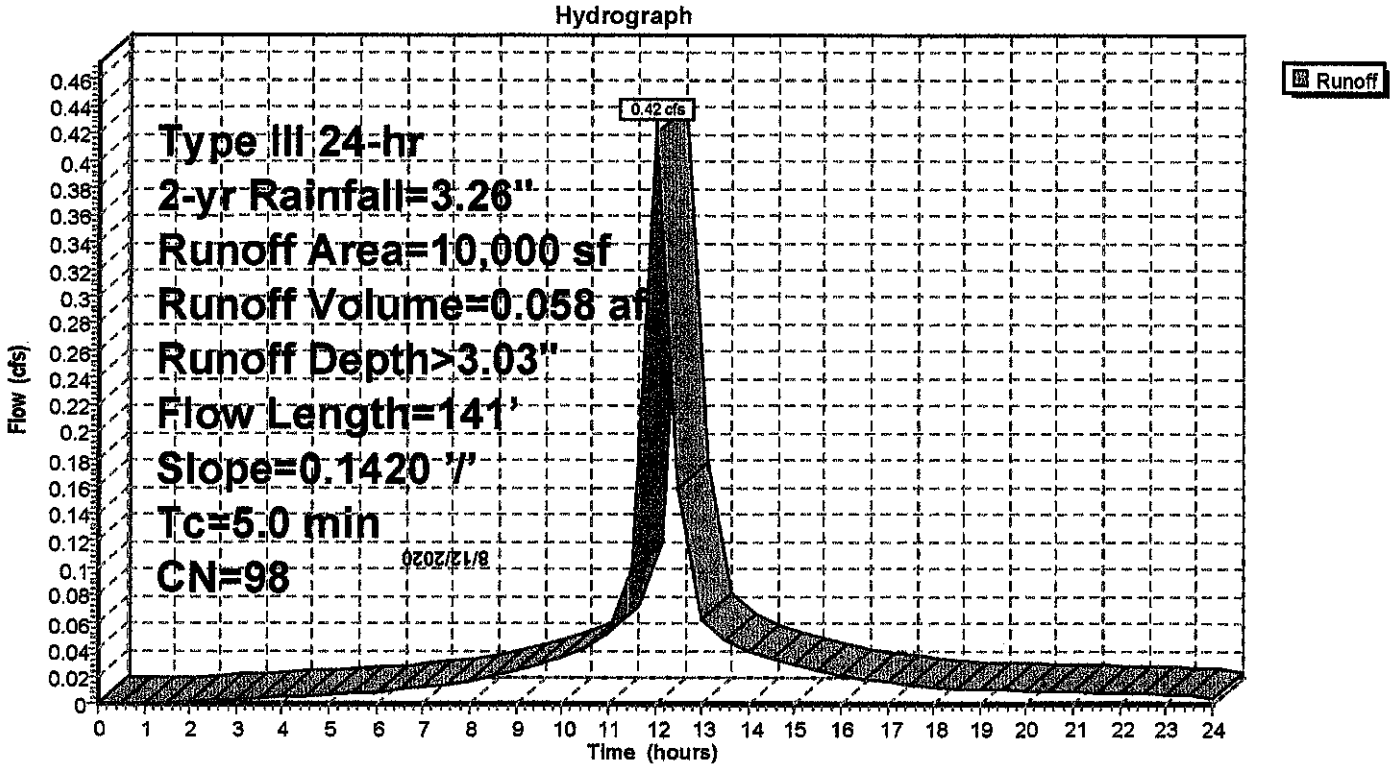
Runoff = 0.42 cfs @ 12.03 hrs, Volume= 0.058 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
10,000	98	Roofs, HSG B	Roofs
10,000		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	141	0.1420	3.26		**Sheet Flow, Top of Roof** Smooth surfaces n= 0.011 P2= 3.26"
0.7	141	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P2: Roof



Summary for Subcatchment P3: Driveway

[49] Hint: Tc<2dt may require smaller dt

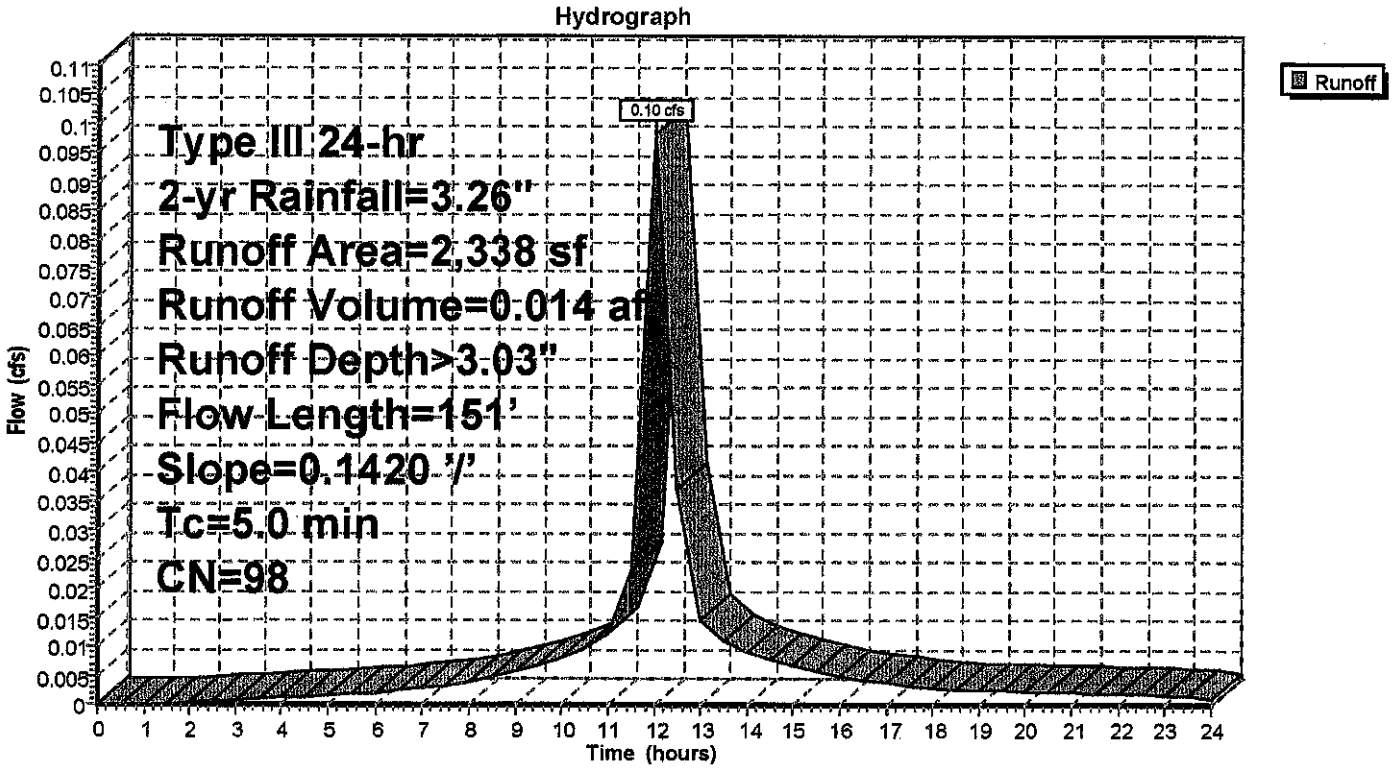
Runoff = 0.10 cfs @ 12.03 hrs, Volume= 0.014 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
2,338	98	Paved parking, HSG B	Residential
2,338		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	151	0.1420	3.30		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.26"
0.8	151	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P3: Driveway



Summary for Subcatchment P4: Grass

[49] Hint: Tc<2dt may require smaller dt

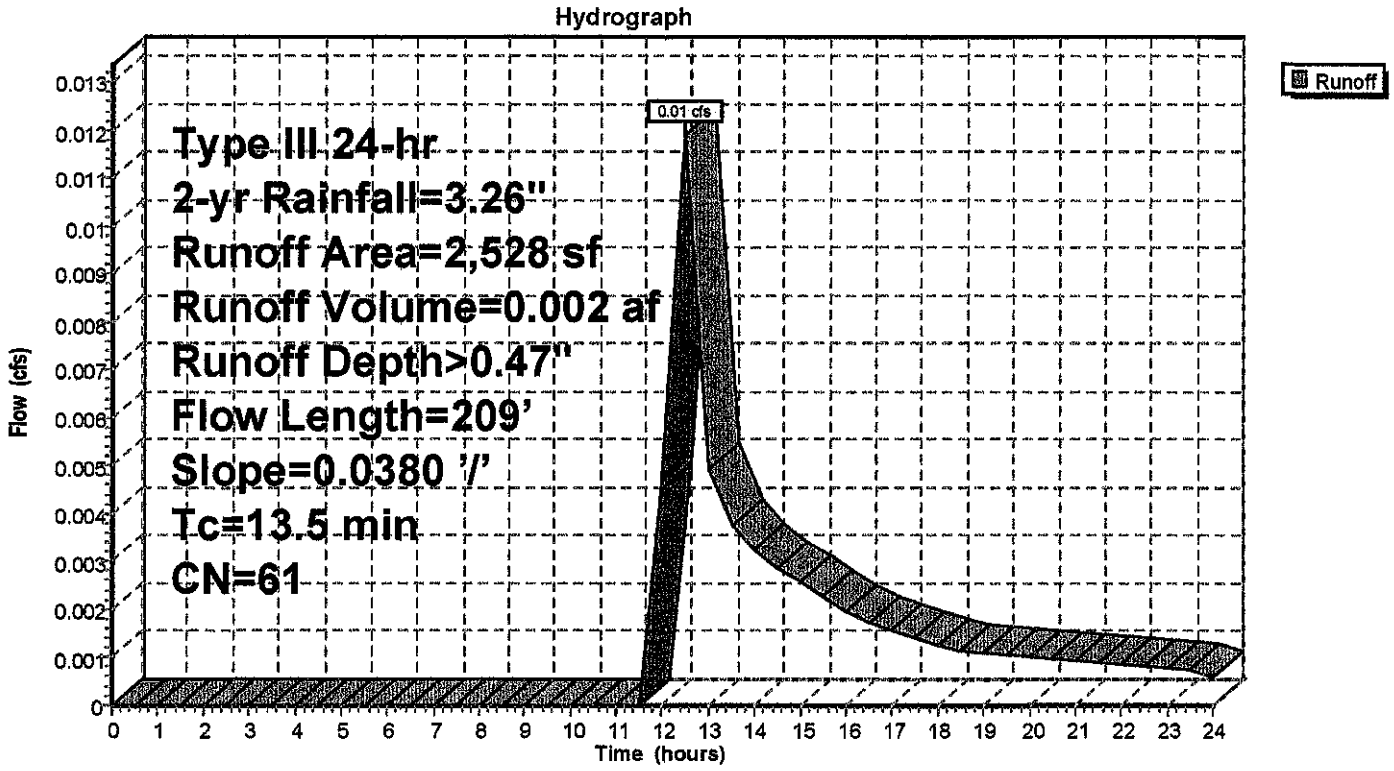
Runoff = 0.01 cfs @ 12.51 hrs, Volume= 0.002 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
2,528	61	>75% Grass cover, Good, HSG B	Pavement
2,528		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	209	0.0380	0.26		**Sheet Flow, Right Side Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment P4: Grass



Summary for Subcatchment P5: Grass

[49] Hint: Tc<2dt may require smaller dt

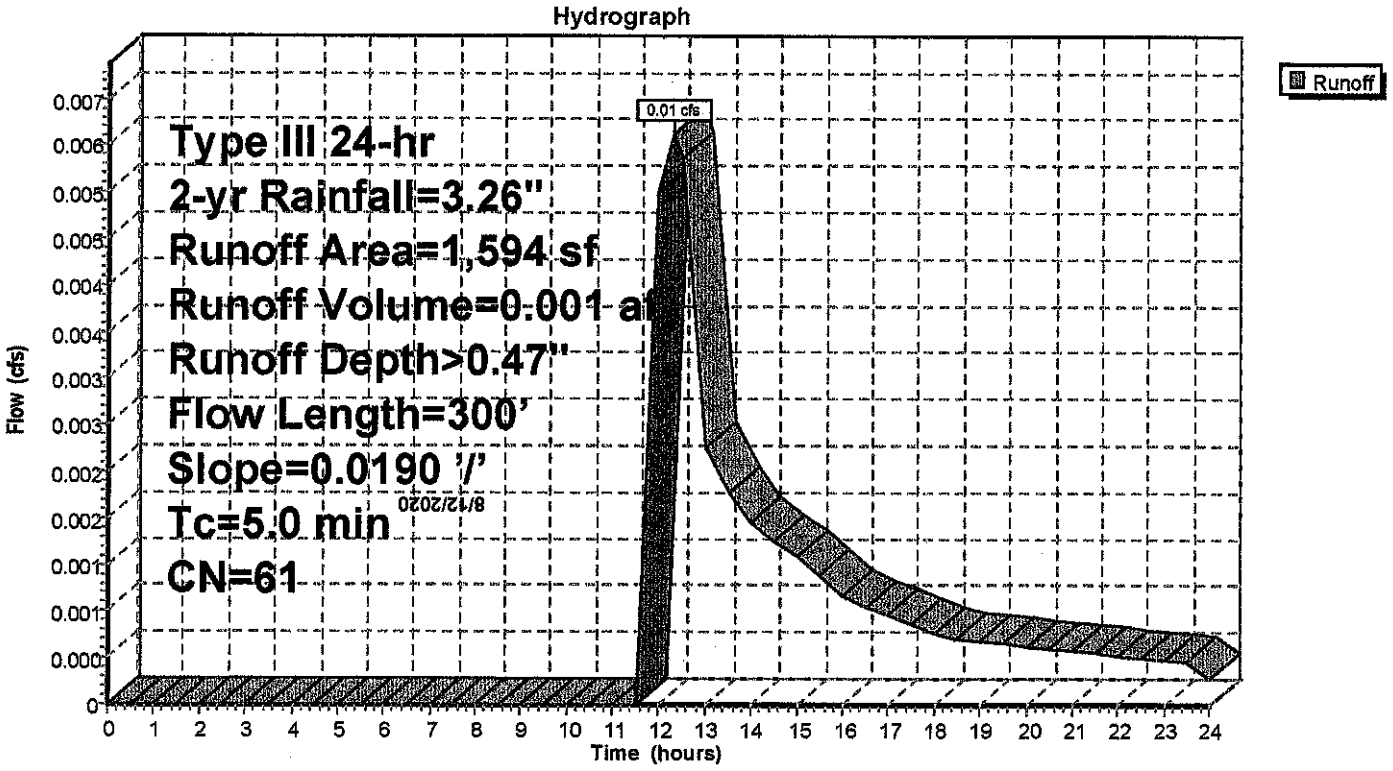
Runoff = 0.01 cfs @ 12.30 hrs, Volume= 0.001 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
1,594	61	>75% Grass cover, Good, HSG B	Pavement
1,594		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	300	0.0190	1.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.26"
3.0	300	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P5: Grass



Summary for Subcatchment P6: Front Paking

[49] Hint: Tc<2dt may require smaller dt

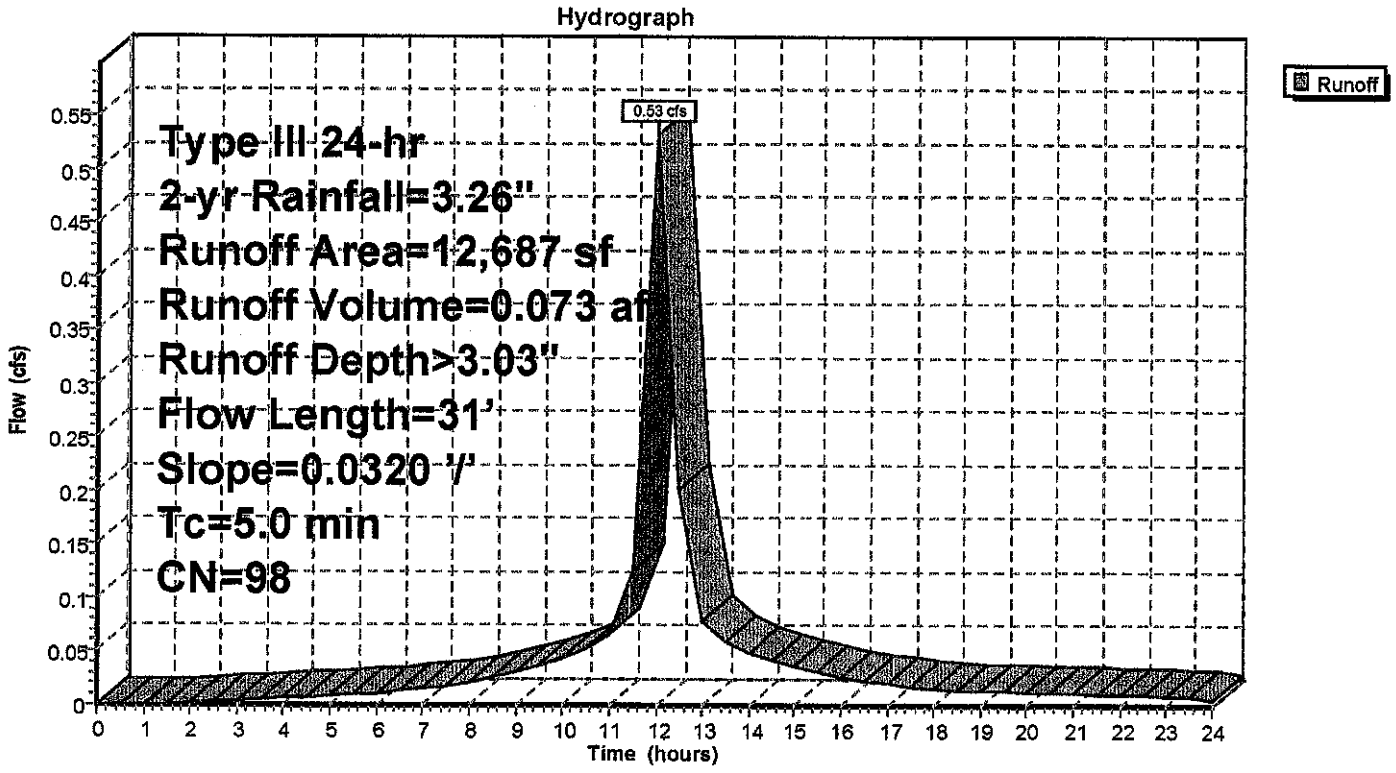
Runoff = 0.53 cfs @ 12.03 hrs, Volume= 0.073 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description	Land Use
12,687	98	Paved roads w/curbs & sewers, HSG B	Roadway
12,687		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0320	1.33		**Sheet Flow, Front Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.4	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P6: Front Paking



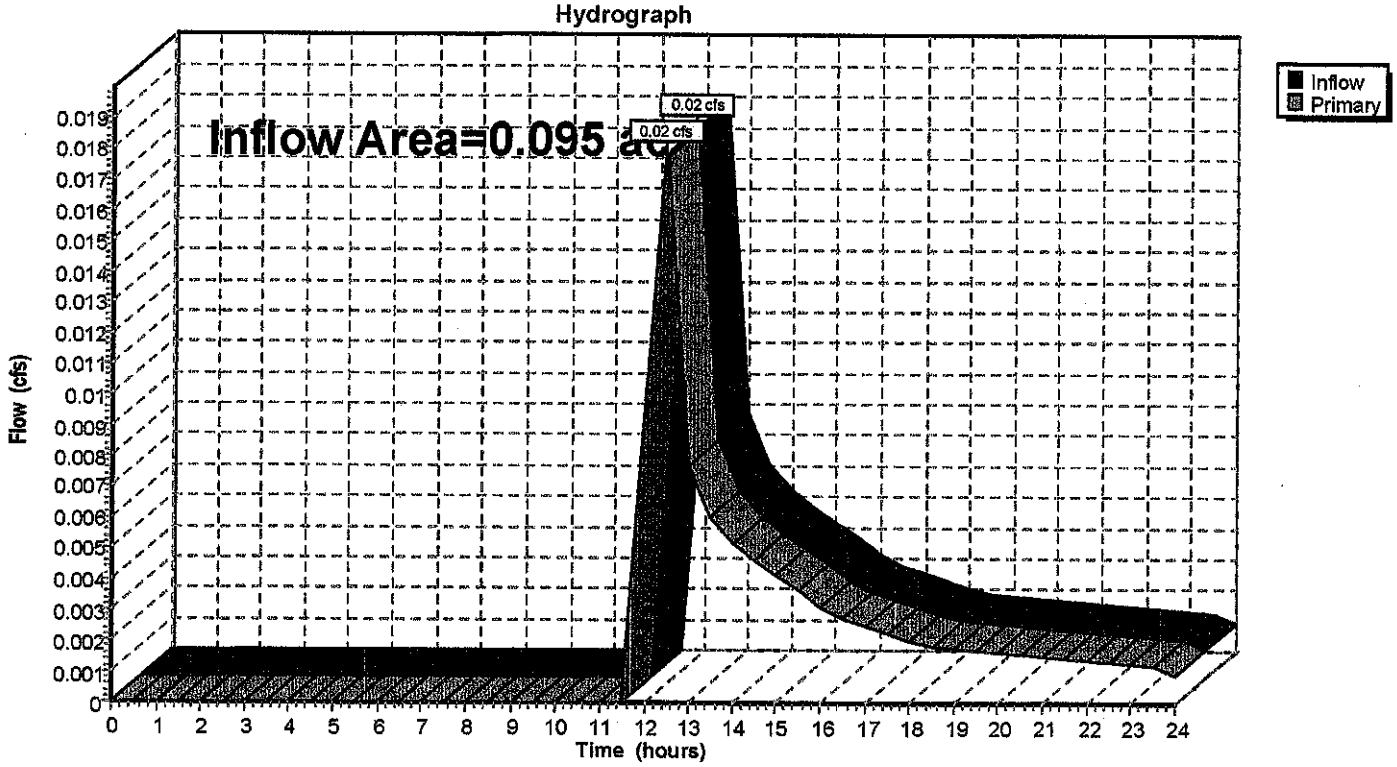
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.095 ac, 0.00% Impervious, Inflow Depth > 0.47" for 2-yr event
Inflow = 0.02 cfs @ 12.47 hrs, Volume= 0.004 af
Primary = 0.02 cfs @ 12.47 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs

Pond 1P: Christian Lane



Summary for Pond S1: Rear Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)

Inflow Area = 0.432 ac,100.00% Impervious, Inflow Depth > 3.03" for 2-yr event
Inflow = 0.79 cfs @ 12.03 hrs, Volume= 0.109 af
Outflow = 0.79 cfs @ 12.03 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.79 cfs @ 12.03 hrs, Volume= 0.109 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 61.02' @ 12.03 hrs Surf.Area= 588 sf Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	61.00'	566 cf	**11.00'W x 53.46'L x 3.50'H Field A** 2,058 cf Overall - 643 cf Embedded = 1,415 cf x 40.0% Voids
#2A	61.50'	643 cf	**ADS_StormTech SC-740 +Capx** 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 7 Chambers
		1,209 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=61.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

8/12/2020

Pond S1: Rear Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

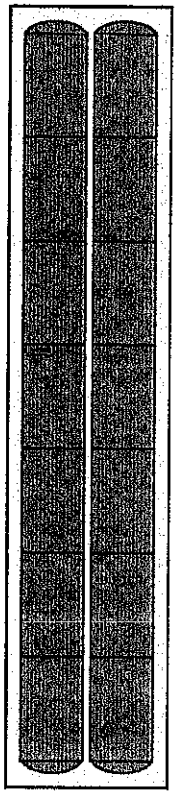
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf = 643.2 cf Chamber Storage

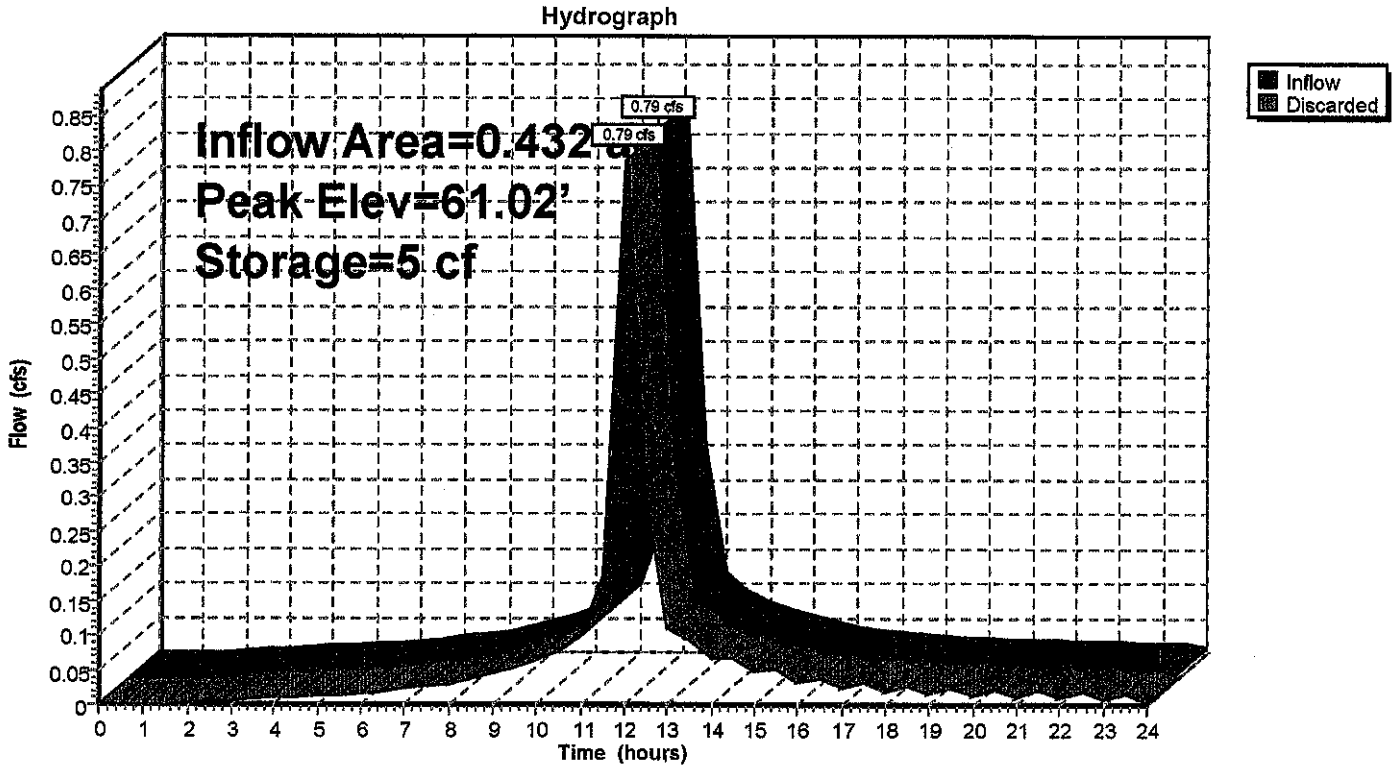
2,058.1 cf Field - 643.2 cf Chambers = 1,414.9 cf Stone x 40.0% Voids = 566.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,209.1 cf = 0.028 af
Overall Storage Efficiency = 58.8%
Overall System Size = 53.46' x 11.00' x 3.50'

14 Chambers
76.2 cy Field
52.4 cy Stone



Pond S1: Rear Storage



Summary for Pond S2: Front Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area = 0.345 ac,100.00% Impervious, Inflow Depth > 3.03" for 2-yr event
Inflow = 0.63 cfs @ 12.03 hrs, Volume= 0.087 af
Outflow = 0.63 cfs @ 12.03 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.63 cfs @ 12.03 hrs, Volume= 0.087 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 59.02' @ 12.03 hrs Surf.Area= 353 sf Storage= 2 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.00'	347 cf	**11.00'W x 32.10'L x 3.50'H Field A** 1,236 cf Overall - 368 cf Embedded = 868 cf x 40.0% Voids
#2A	59.50'	368 cf	**ADS_StormTech SC-740 +Cap**x 8 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		715 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	59.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=59.02' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

8/12/2020

Pond S2: Front Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

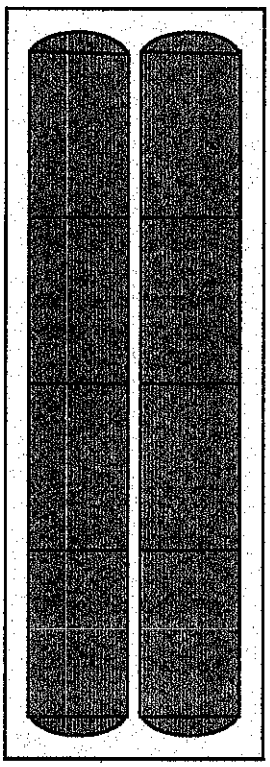
4 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 30.10' Row Length +12.0" End Stone x 2 = 32.10' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

8 Chambers x 45.9 cf = 367.5 cf Chamber Storage

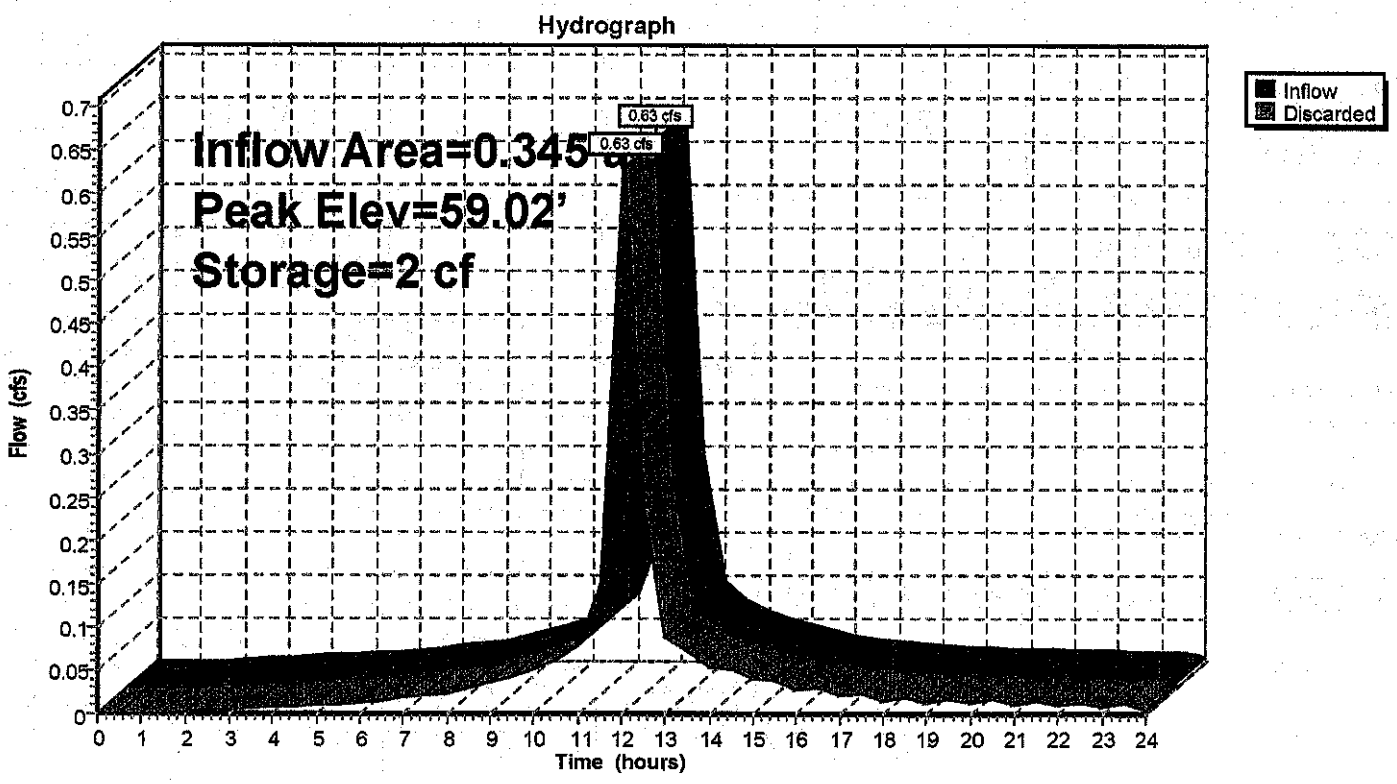
1,235.7 cf Field - 367.5 cf Chambers = 868.2 cf Stone x 40.0% Voids = 347.3 cf Stone Storage

Chamber Storage + Stone Storage = 714.8 cf = 0.016 af
Overall Storage Efficiency = 57.8%
Overall System Size = 32.10' x 11.00' x 3.50'

8 Chambers
45.8 cy Field
32.2 cy Stone



Pond S2: Front Storage



Time span=0.00-24.00 hrs, dt=0.50 hrs, 49 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Rear Parking Runoff Area=8,817 sf 100.00% Impervious Runoff Depth>3.84"
Flow Length=85' Slope=0.0700 '/' Tc=5.0 min CN=98 Runoff=0.47 cfs 0.065 af

SubcatchmentP2: Roof Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>3.84"
Flow Length=141' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.53 cfs 0.074 af

SubcatchmentP3: Driveway Runoff Area=2,338 sf 100.00% Impervious Runoff Depth>3.84"
Flow Length=151' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.12 cfs 0.017 af

SubcatchmentP4: Grass Runoff Area=2,528 sf 0.00% Impervious Runoff Depth>0.85"
Flow Length=209' Slope=0.0380 '/' Tc=13.5 min CN=61 Runoff=0.02 cfs 0.004 af

SubcatchmentP5: Grass Runoff Area=1,594 sf 0.00% Impervious Runoff Depth>0.85"
Flow Length=300' Slope=0.0190 '/' Tc=5.0 min CN=61 Runoff=0.02 cfs 0.003 af

SubcatchmentP6: Front Paking Runoff Area=12,687 sf 100.00% Impervious Runoff Depth>3.84"
Flow Length=31' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.67 cfs 0.093 af

Pond 1P: Christian Lane Inflow=0.04 cfs 0.007 af
Primary=0.04 cfs 0.007 af

Pond S1: Rear Storage Peak Elev=61.03' Storage=7 cf Inflow=1.00 cfs 0.138 af
Outflow=0.99 cfs 0.138 af

Pond S2: Front Storage Peak Elev=59.02' Storage=3 cf Inflow=0.80 cfs 0.111 af
Outflow=0.79 cfs 0.110 af

Total Runoff Area = 0.872 ac Runoff Volume = 0.256 af Average Runoff Depth = 3.52"
10.86% Pervious = 0.095 ac 89.14% Impervious = 0.777 ac

Summary for Subcatchment P1: Rear Parking

[49] Hint: Tc<2dt may require smaller dt

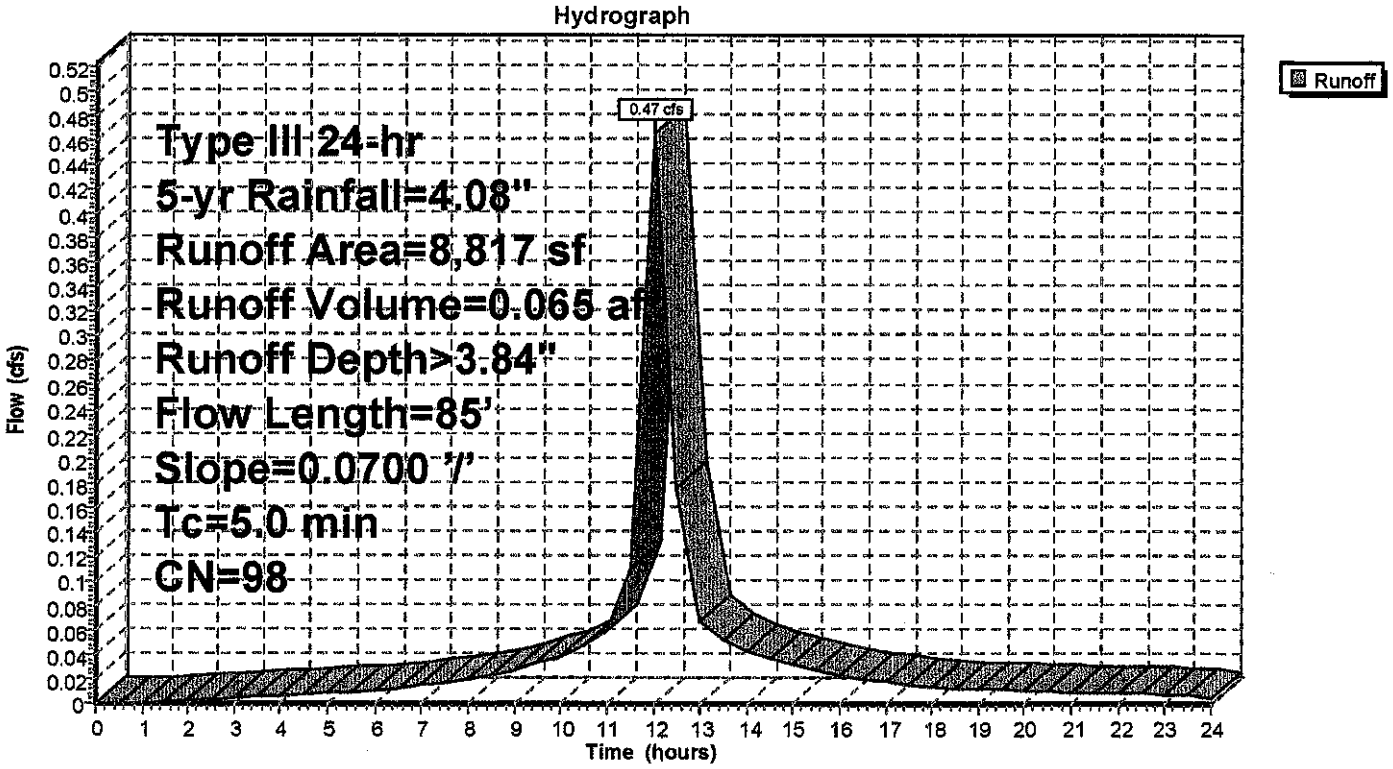
Runoff = 0.47 cfs @ 12.03 hrs, Volume= 0.065 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
8,817	98	Paved parking, HSG B	Pavement
8,817		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	85	0.0700	2.22		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.6	85	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P1: Rear Parking



Summary for Subcatchment P2: Roof

[49] Hint: Tc<2dt may require smaller dt

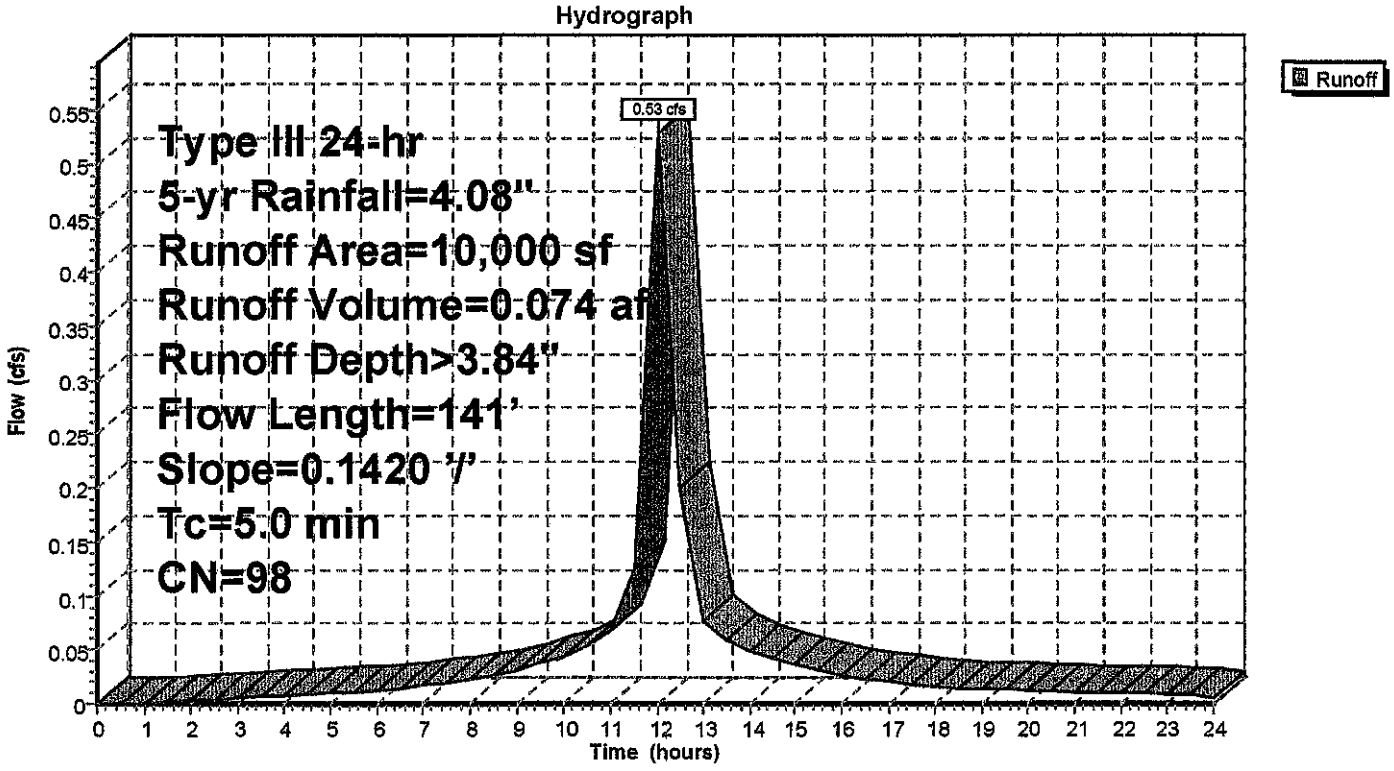
Runoff = 0.53 cfs @ 12.03 hrs, Volume= 0.074 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
10,000	98	Roofs, HSG B	Roofs
10,000		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	141	0.1420	3.26		**Sheet Flow, Top of Roof** Smooth surfaces n= 0.011 P2= 3.26"
0.7	141	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P2: Roof



Summary for Subcatchment P3: Driveway

[49] Hint: Tc<2dt may require smaller dt

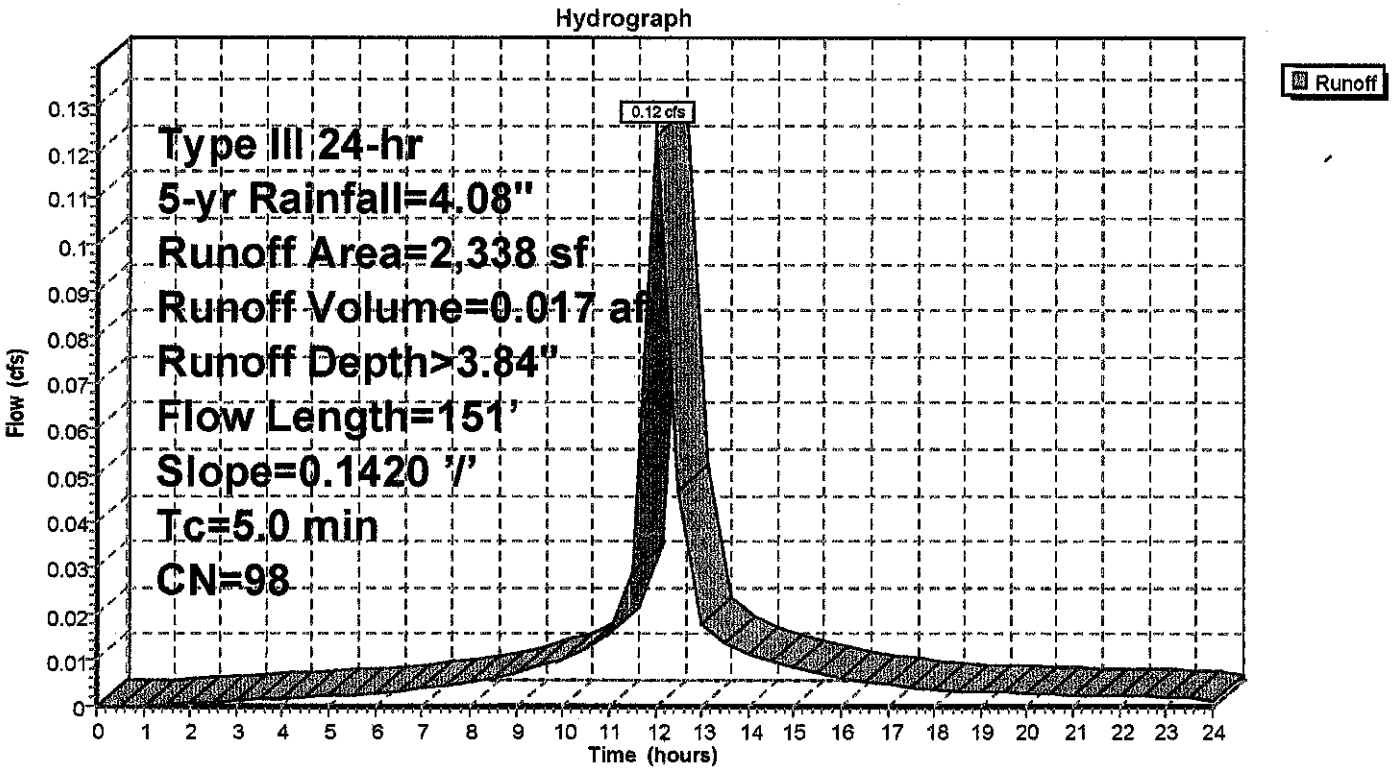
Runoff = 0.12 cfs @ 12.03 hrs, Volume= 0.017 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
2,338	98	Paved parking, HSG B	Residential
2,338		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	151	0.1420	3.30		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.26"
0.8	151	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P3: Driveway



Summary for Subcatchment P4: Grass

[49] Hint: Tc<2dt may require smaller dt

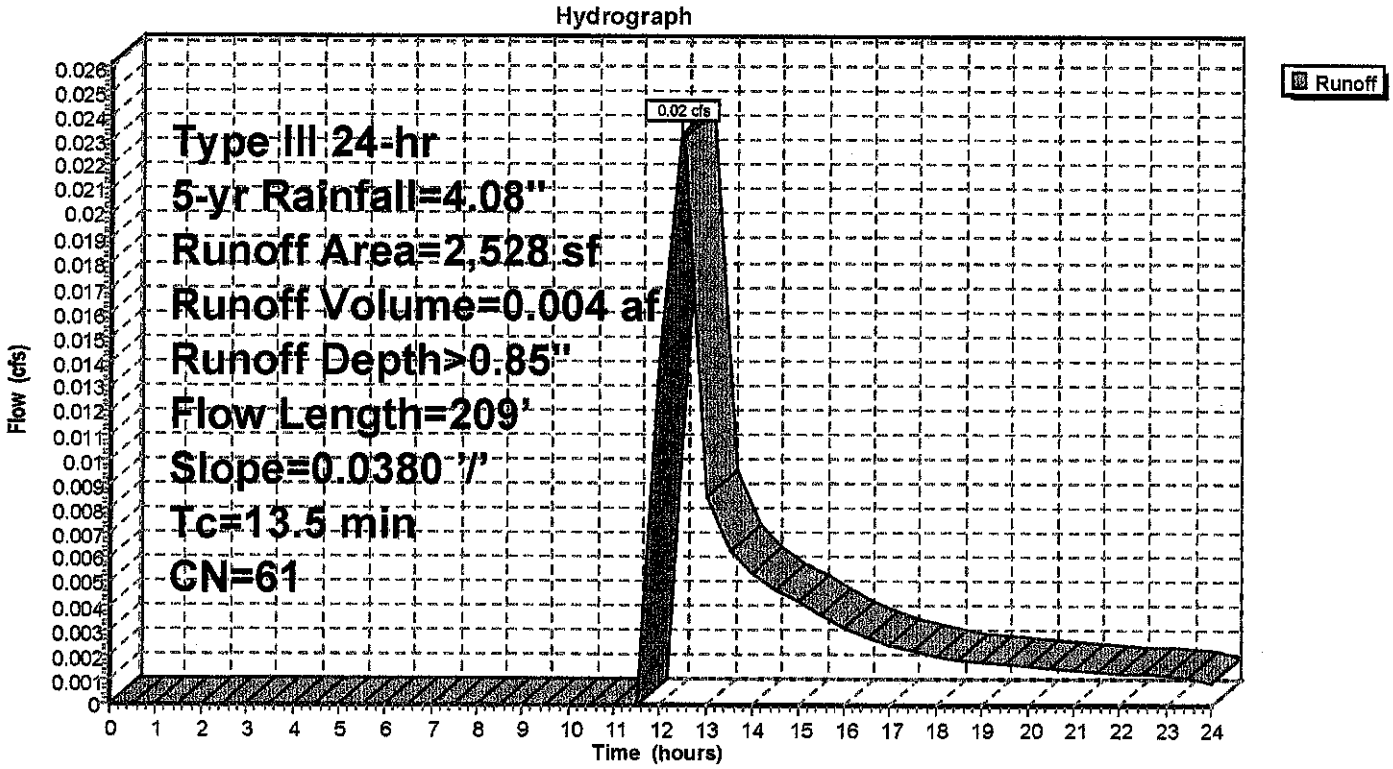
Runoff = 0.02 cfs @ 12.44 hrs, Volume= 0.004 af, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
2,528	61	>75% Grass cover, Good, HSG B	Pavement
2,528		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	209	0.0380	0.26		**Sheet Flow, Right Side Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment P4: Grass



Summary for Subcatchment P5: Grass

[49] Hint: Tc<2dt may require smaller dt

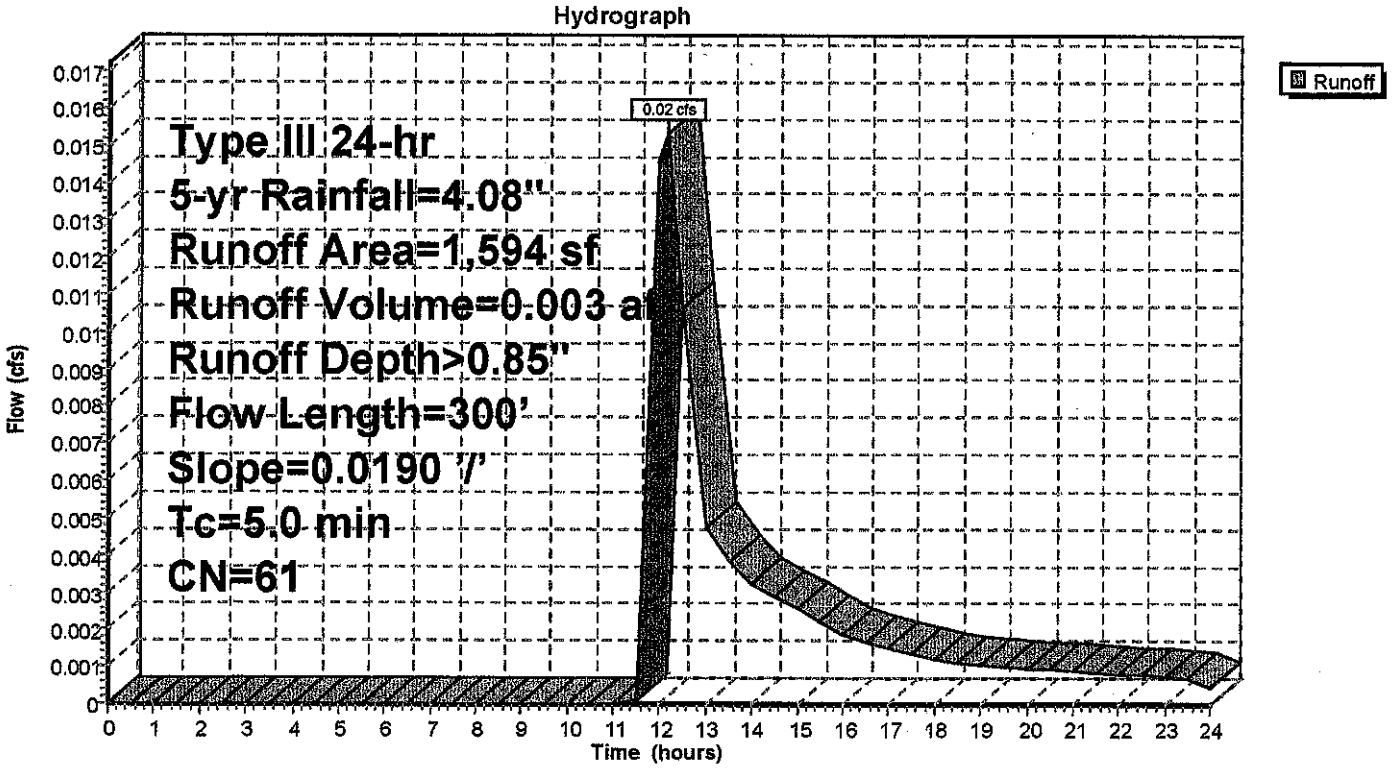
Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.003 af, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
1,594	61	>75% Grass cover, Good, HSG B	Pavement
1,594		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	300	0.0190	1.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.26"
3.0	300	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P5: Grass



Summary for Subcatchment P6: Front Paking

[49] Hint: Tc<2dt may require smaller dt

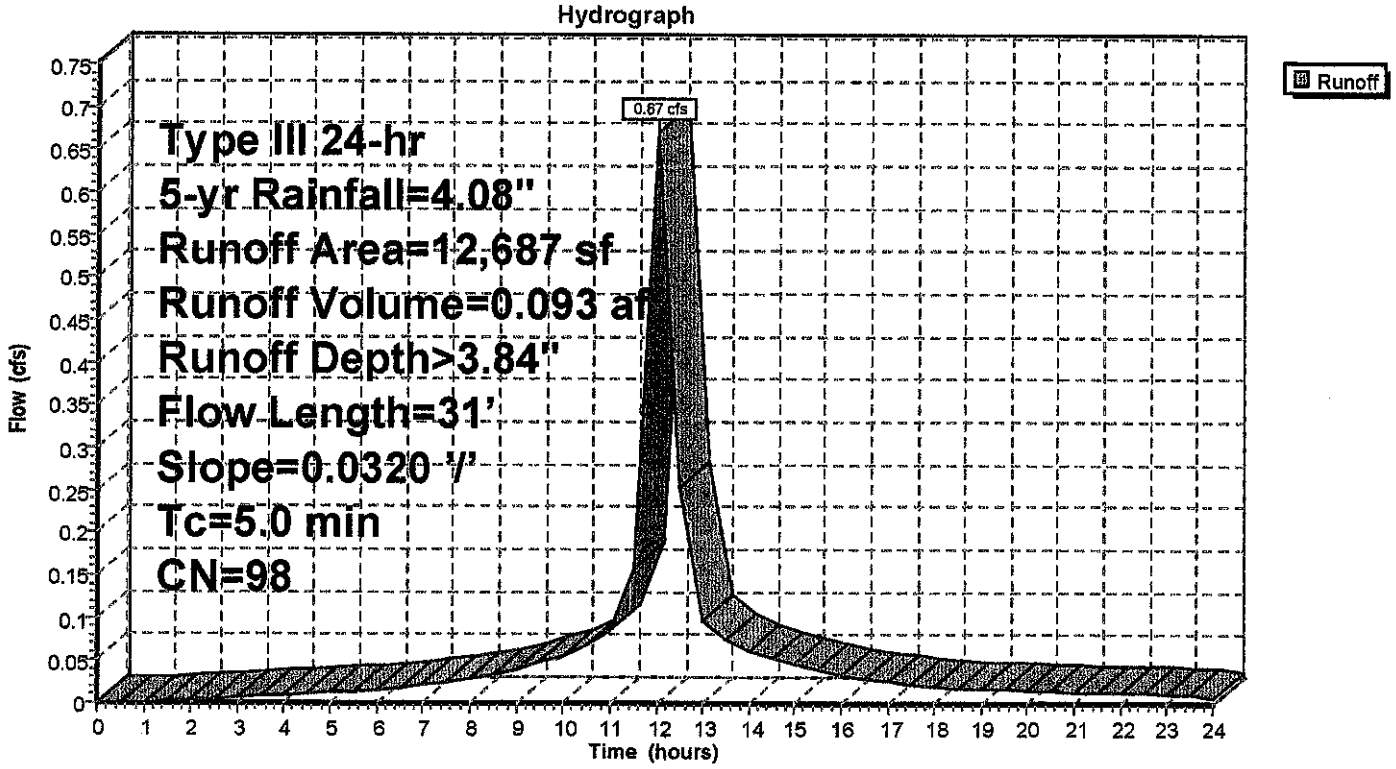
Runoff = 0.67 cfs @ 12.03 hrs, Volume= 0.093 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 5-yr Rainfall=4.08"

Area (sf)	CN	Description	Land Use
12,687	98	Paved roads w/curbs & sewers, HSG B	Roadway
12,687		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0320	1.33		**Sheet Flow, Front Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.4	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P6: Front Paking



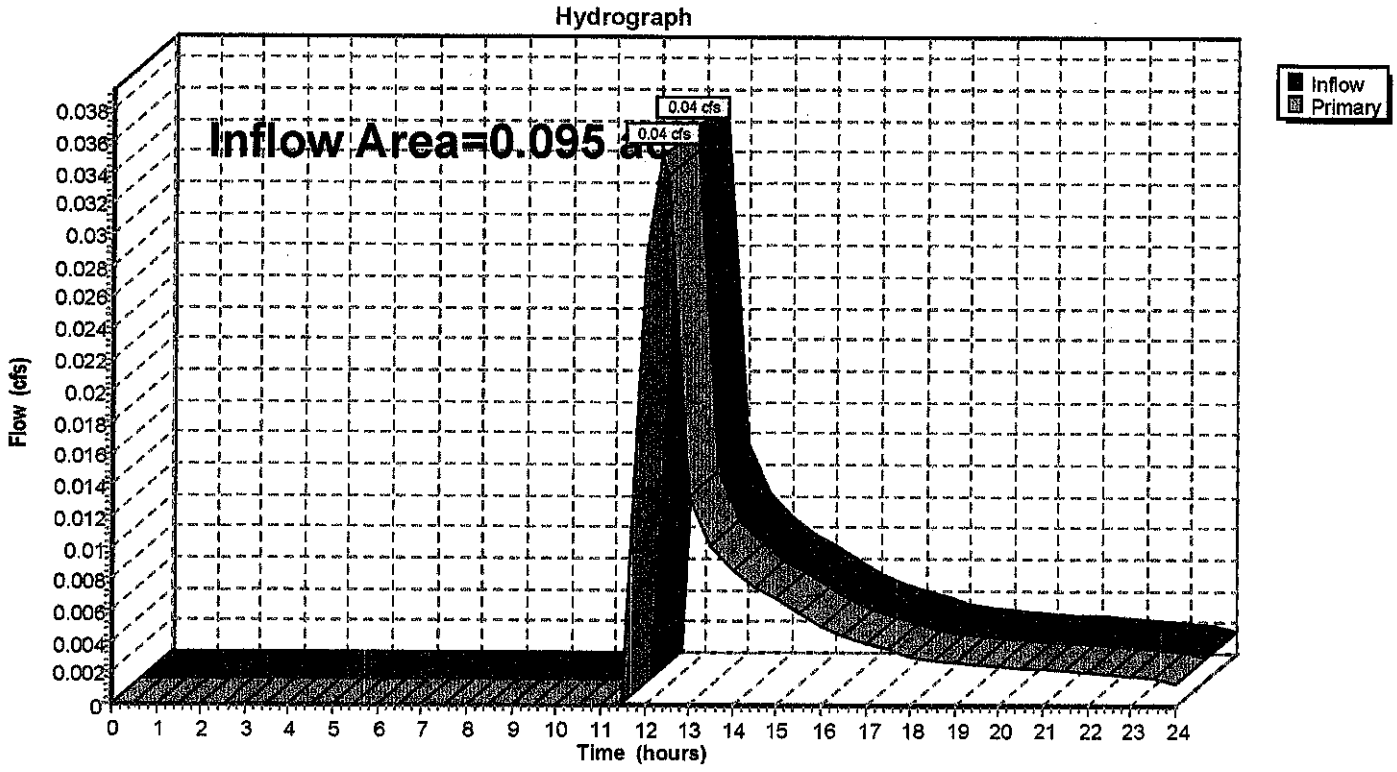
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.095 ac, 0.00% Impervious, Inflow Depth > 0.85" for 5-yr event
Inflow = 0.04 cfs @ 12.35 hrs, Volume= 0.007 af
Primary = 0.04 cfs @ 12.35 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs

Pond 1P: Christian Lane



Summary for Pond S1: Rear Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)

Inflow Area = 0.432 ac,100.00% Impervious, Inflow Depth > 3.84" for 5-yr event
Inflow = 1.00 cfs @ 12.03 hrs, Volume= 0.138 af
Outflow = 0.99 cfs @ 12.03 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.99 cfs @ 12.03 hrs, Volume= 0.138 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 61.03' @ 12.03 hrs Surf.Area= 588 sf Storage= 7 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	61.00'	566 cf	**11.00'W x 53.46'L x 3.50'H Field A** 2,058 cf Overall - 643 cf Embedded = 1,415 cf x 40.0% Voids
#2A	61.50'	643 cf	**ADS_StormTech SC-740 +Capx** 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 7 Chambers
		1,209 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=61.03' (Free Discharge)
1=Exfiltration (Exfiltration Controls 1.25 cfs)

Pond S1: Rear Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

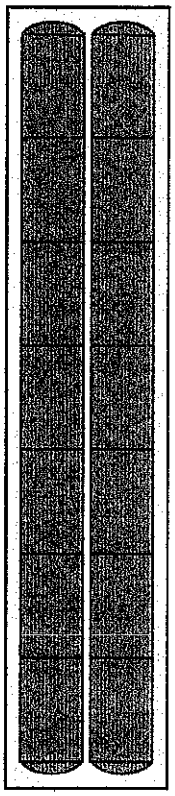
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf = 643.2 cf Chamber Storage

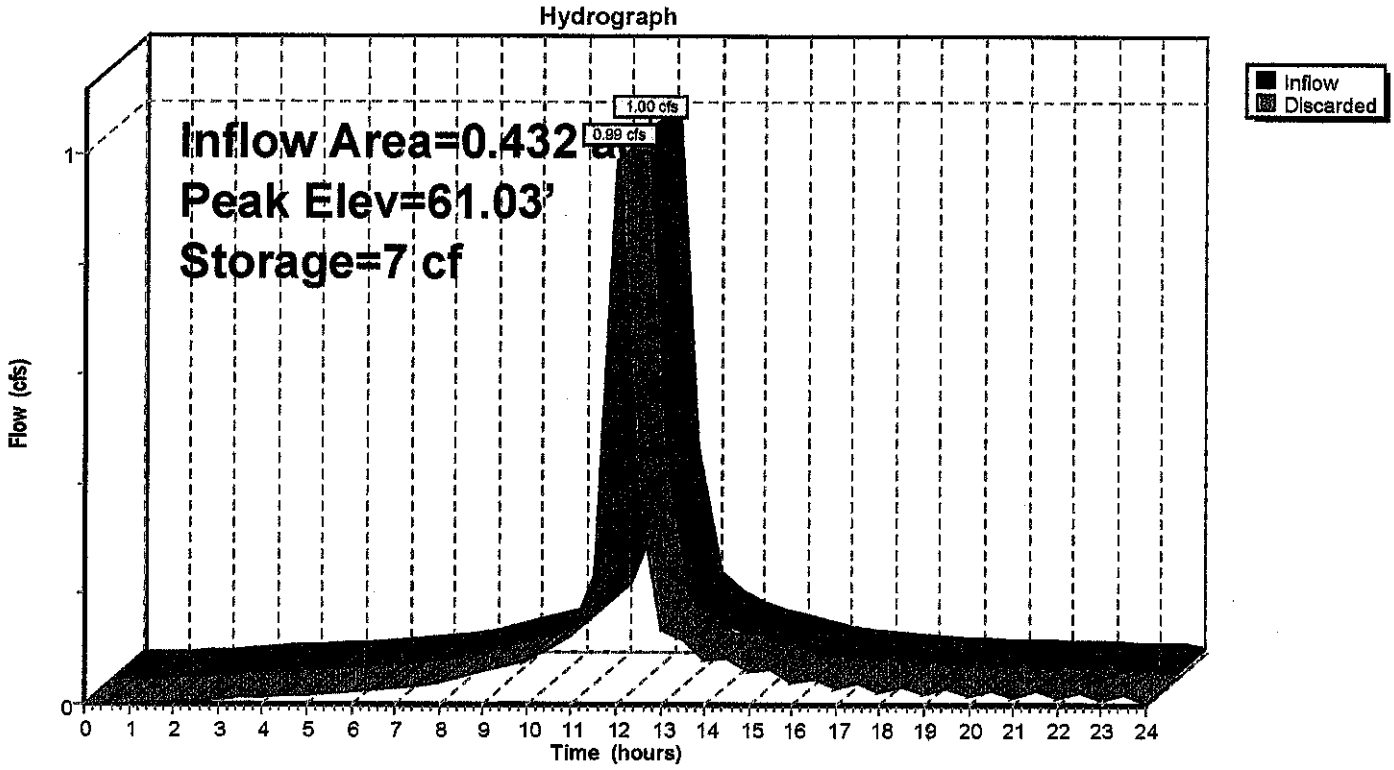
2,058.1 cf Field - 643.2 cf Chambers = 1,414.9 cf Stone x 40.0% Voids = 566.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,209.1 cf = 0.028 af
Overall Storage Efficiency = 58.8%
Overall System Size = 53.46' x 11.00' x 3.50'

14 Chambers
76.2 cy Field
52.4 cy Stone



Pond S1: Rear Storage



Summary for Pond S2: Front Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area = 0.345 ac,100.00% Impervious, Inflow Depth > 3.84" for 5-yr event
Inflow = 0.80 cfs @ 12.03 hrs, Volume= 0.111 af
Outflow = 0.79 cfs @ 12.03 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.79 cfs @ 12.03 hrs, Volume= 0.110 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 59.02' @ 12.03 hrs Surf.Area= 353 sf Storage= 3 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.00'	347 cf	**11.00'W x 32.10'L x 3.50'H Field A** 1,236 cf Overall - 368 cf Embedded = 868 cf x 40.0% Voids
#2A	59.50'	368 cf	**ADS_StormTech SC-740 +Capx** 8 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		715 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	59.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=59.02' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S2: Front Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

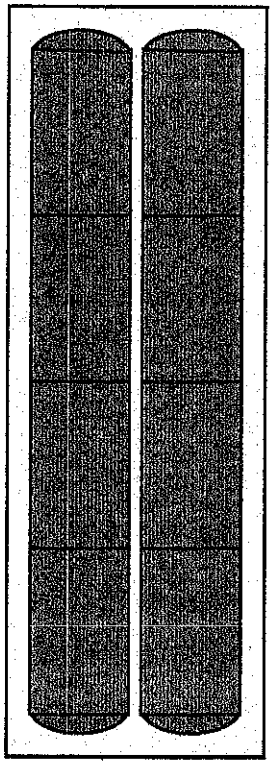
4 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 30.10' Row Length +12.0" End Stone x 2 = 32.10' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

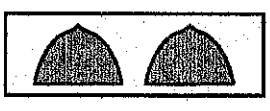
8 Chambers x 45.9 cf = 367.5 cf Chamber Storage

1,235.7 cf Field - 367.5 cf Chambers = 868.2 cf Stone x 40.0% Voids = 347.3 cf Stone Storage

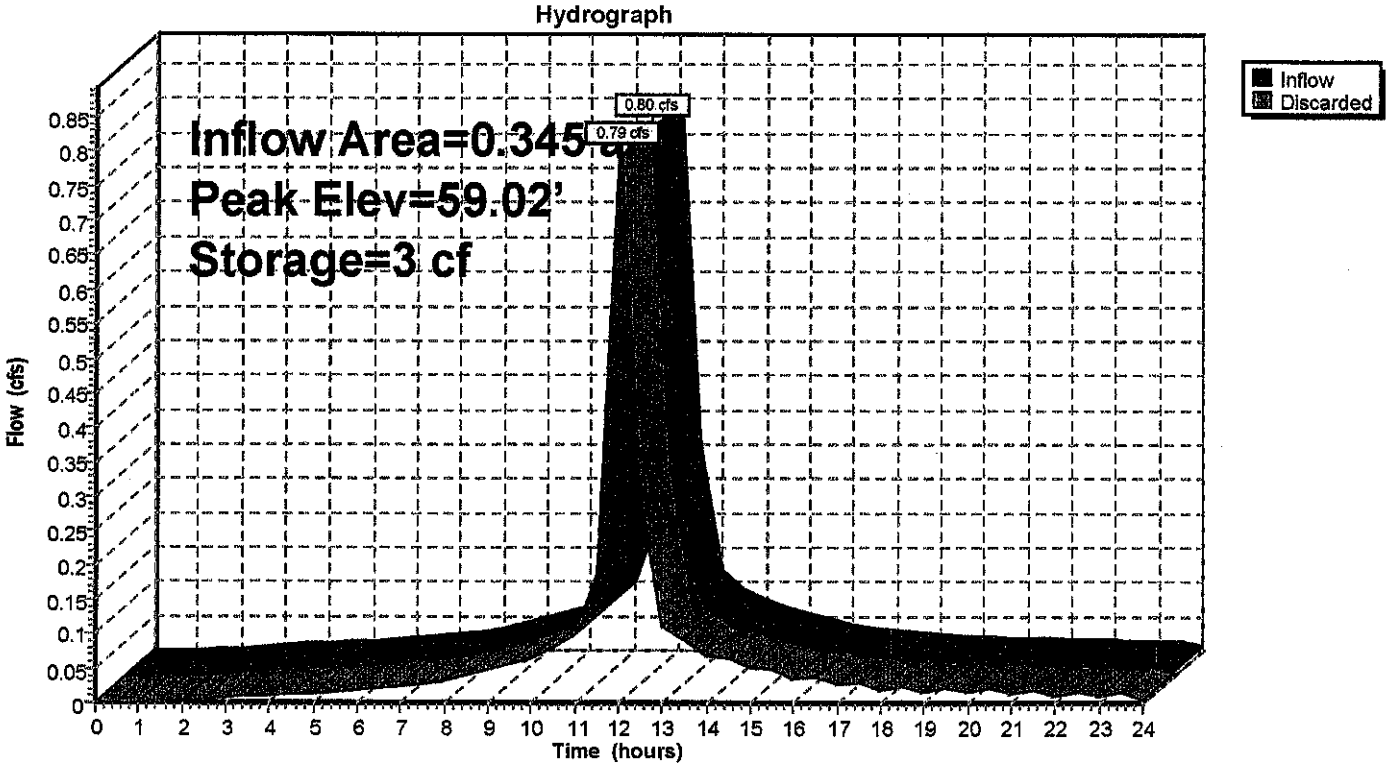
Chamber Storage + Stone Storage = 714.8 cf = 0.016 af
Overall Storage Efficiency = 57.8%
Overall System Size = 32.10' x 11.00' x 3.50'

8 Chambers
45.8 cy Field
32.2 cy Stone





Pond S2: Front Storage



Time span=0.00-24.00 hrs, dt=0.50 hrs, 49 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Rear Parking Runoff Area=8,817 sf 100.00% Impervious Runoff Depth>4.60"
Flow Length=85' Slope=0.0700 '/' Tc=5.0 min CN=98 Runoff=0.56 cfs 0.078 af

SubcatchmentP2: Roof Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>4.60"
Flow Length=141' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.63 cfs 0.088 af

SubcatchmentP3: Driveway Runoff Area=2,338 sf 100.00% Impervious Runoff Depth>4.60"
Flow Length=151' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.15 cfs 0.021 af

SubcatchmentP4: Grass Runoff Area=2,528 sf 0.00% Impervious Runoff Depth>1.27"
Flow Length=209' Slope=0.0380 '/' Tc=13.5 min CN=61 Runoff=0.04 cfs 0.006 af

SubcatchmentP5: Grass Runoff Area=1,594 sf 0.00% Impervious Runoff Depth>1.27"
Flow Length=300' Slope=0.0190 '/' Tc=5.0 min CN=61 Runoff=0.03 cfs 0.004 af

SubcatchmentP6: Front Paking Runoff Area=12,687 sf 100.00% Impervious Runoff Depth>4.60"
Flow Length=31' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=0.80 cfs 0.112 af

Pond 1P: Christian Lane Inflow=0.06 cfs 0.010 af
Primary=0.06 cfs 0.010 af

Pond S1: Rear Storage Peak Elev=61.03' Storage=8 cf Inflow=1.19 cfs 0.166 af
Outflow=1.18 cfs 0.166 af

Pond S2: Front Storage Peak Elev=59.03' Storage=4 cf Inflow=0.95 cfs 0.132 af
Outflow=0.94 cfs 0.132 af

Total Runoff Area = 0.872 ac Runoff Volume = 0.308 af Average Runoff Depth = 4.24"
10.86% Pervious = 0.095 ac 89.14% Impervious = 0.777 ac

Summary for Subcatchment P1: Rear Parking

[49] Hint: Tc<2dt may require smaller dt

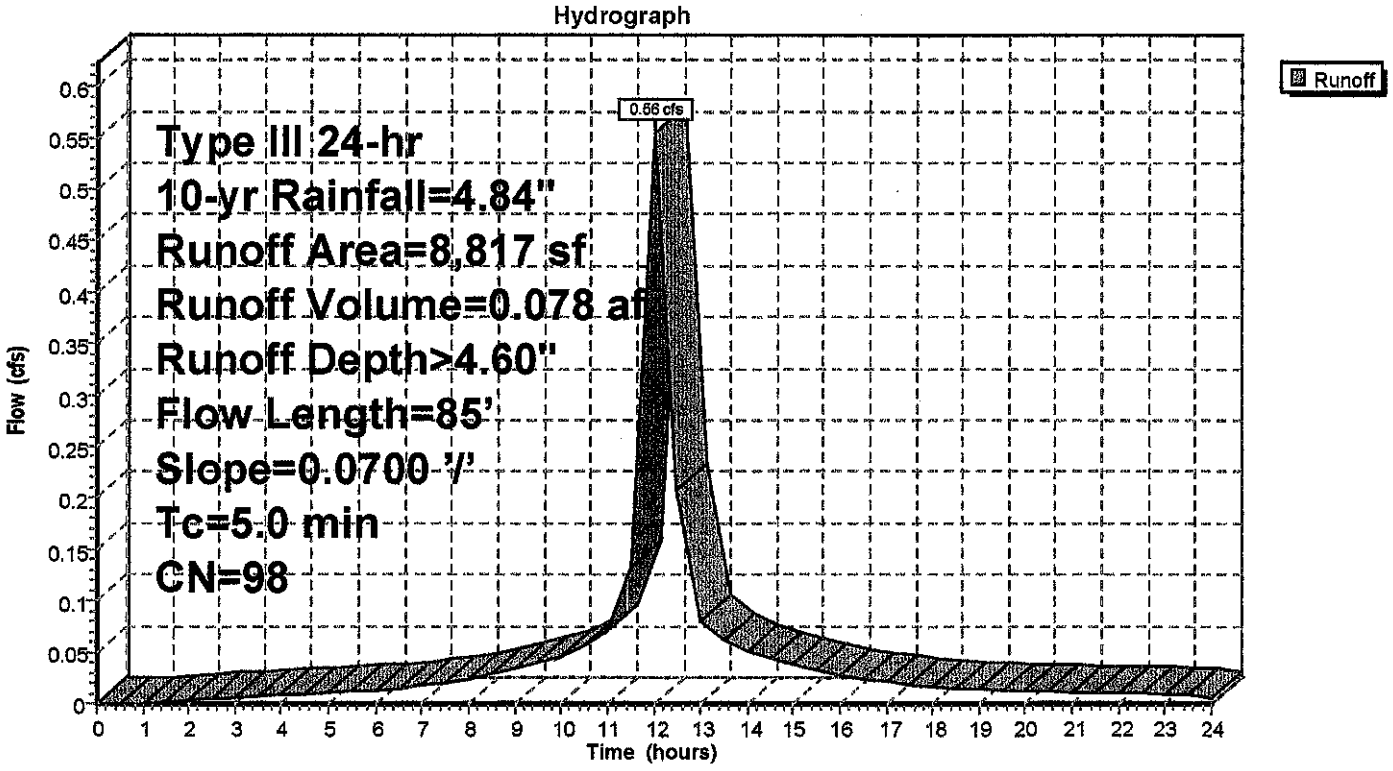
Runoff = 0.56 cfs @ 12.02 hrs, Volume= 0.078 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
8,817	98	Paved parking, HSG B	Pavement
8,817		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	85	0.0700	2.22		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.6	85	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P1: Rear Parking



Summary for Subcatchment P2: Roof

[49] Hint: Tc<2dt may require smaller dt

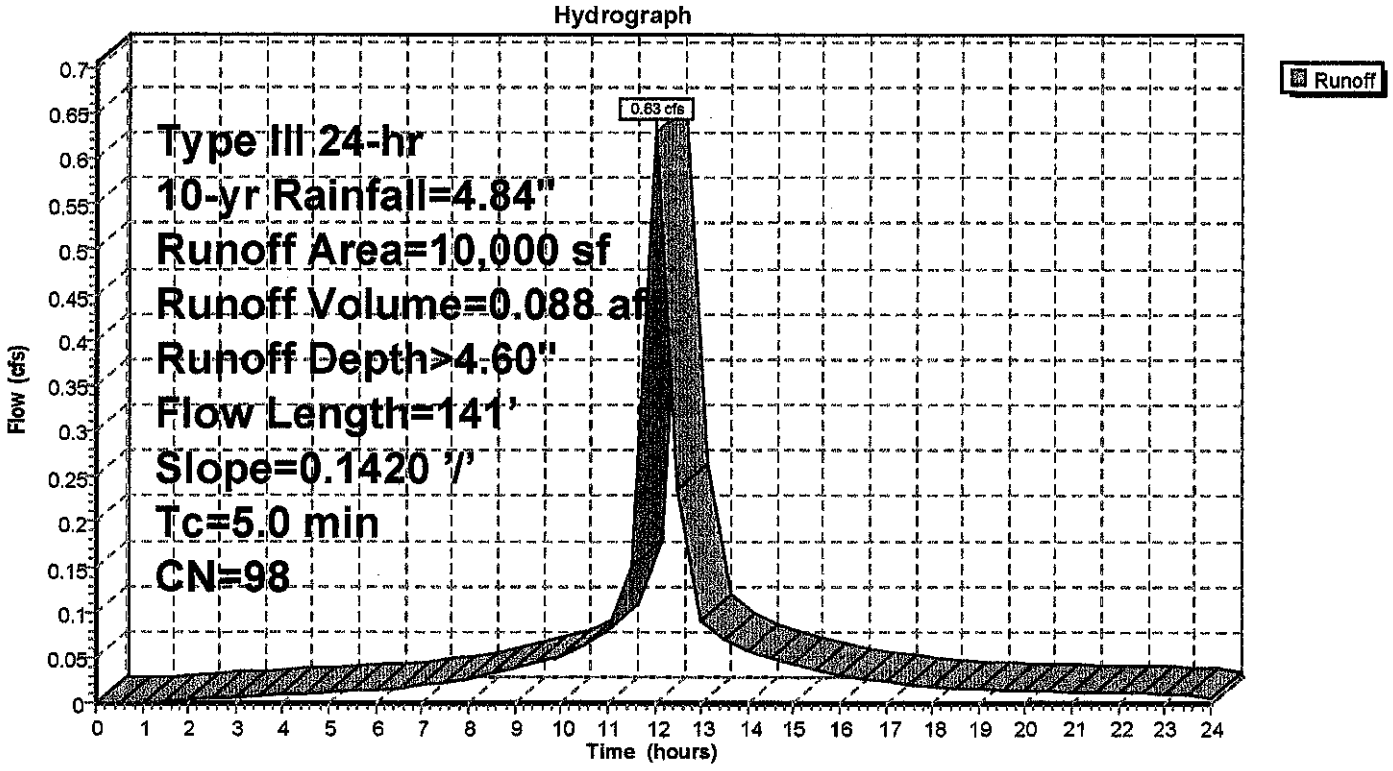
Runoff = 0.63 cfs @ 12.02 hrs, Volume= 0.088 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
10,000	98	Roofs, HSG B	Roofs
10,000		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	141	0.1420	3.26		**Sheet Flow, Top of Roof** Smooth surfaces n= 0.011 P2= 3.26"
0.7	141	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P2: Roof



Summary for Subcatchment P3: Driveway

[49] Hint: Tc<2dt may require smaller dt

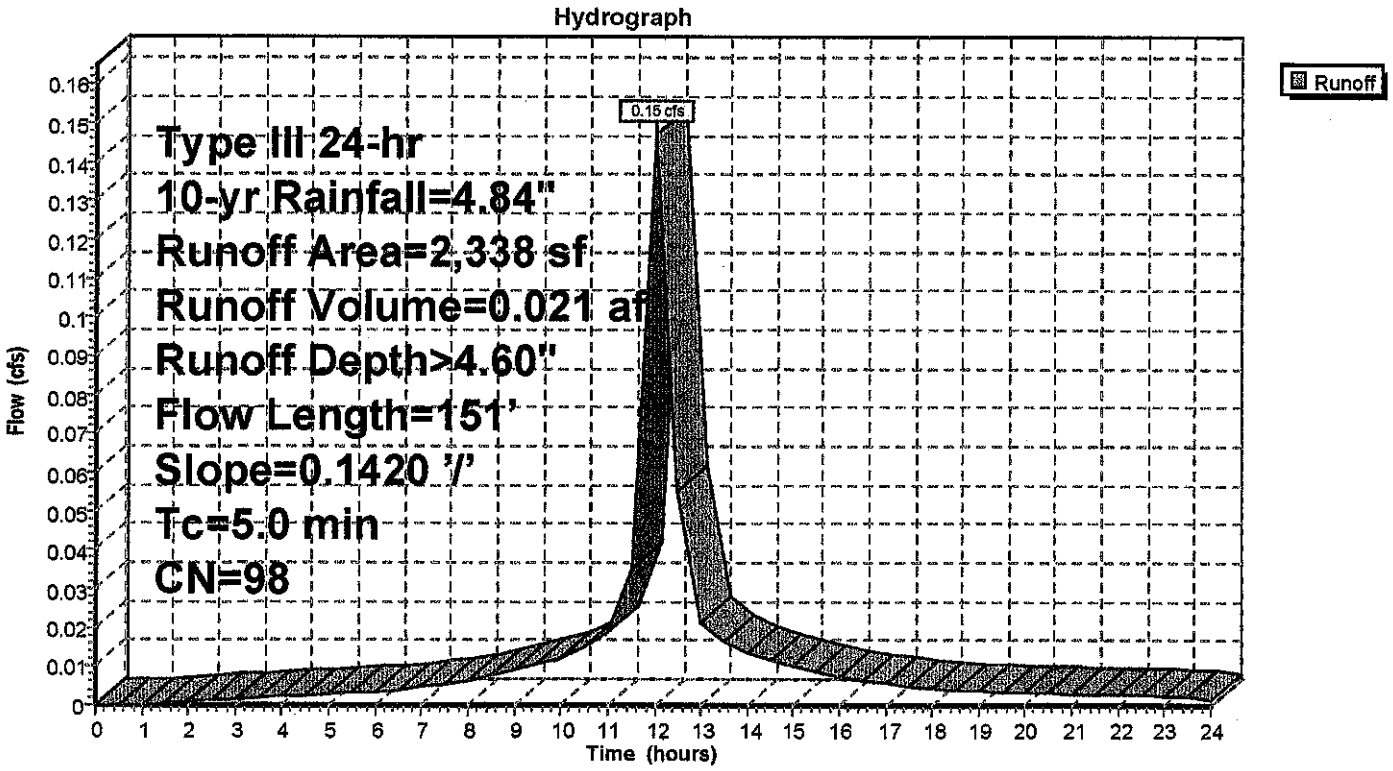
Runoff = 0.15 cfs @ 12.02 hrs, Volume= 0.021 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
2,338	98	Paved parking, HSG B	Residential
2,338		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	151	0.1420	3.30		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.26"
0.8	151	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P3: Driveway



Summary for Subcatchment P4: Grass

[49] Hint: Tc<2dt may require smaller dt

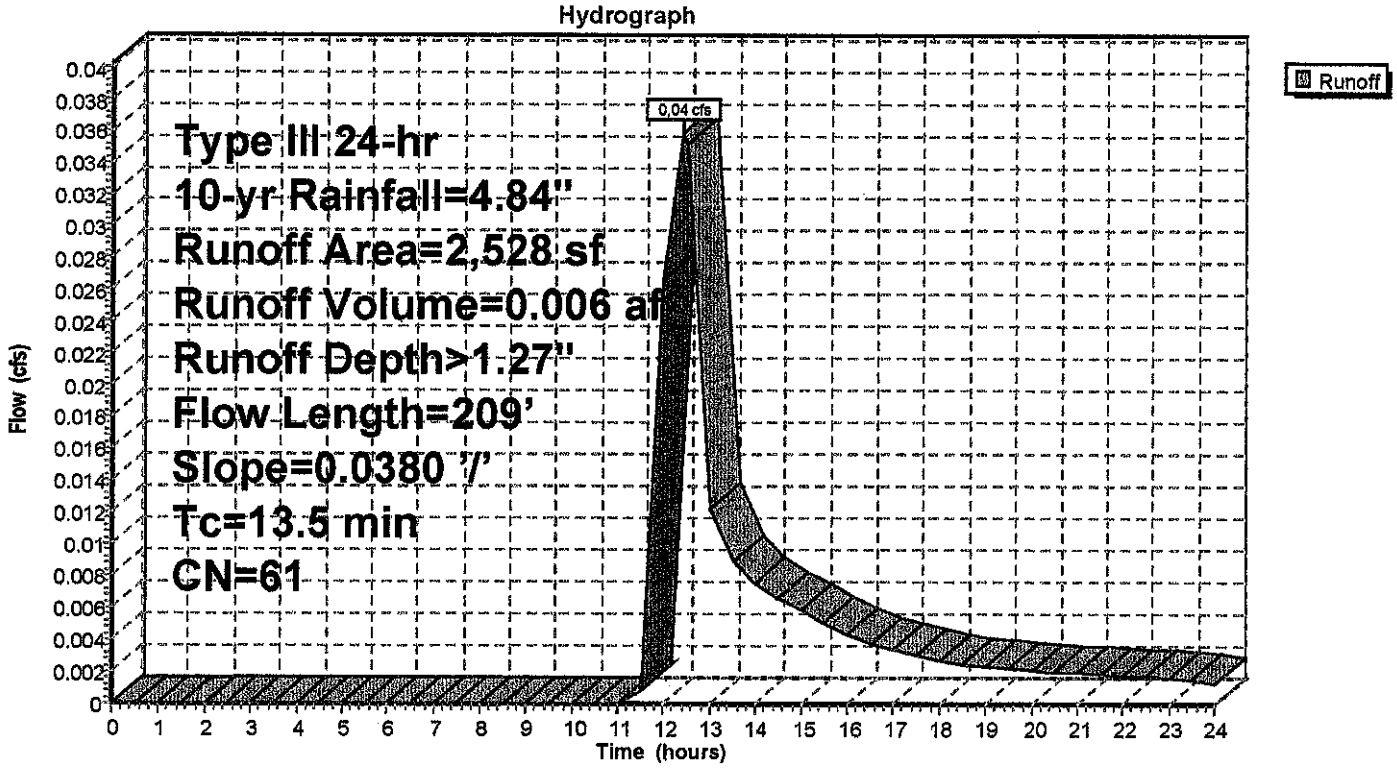
Runoff = 0.04 cfs @ 12.39 hrs, Volume= 0.006 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
2,528	61	>75% Grass cover, Good, HSG B	Pavement
2,528		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	209	0.0380	0.26		**Sheet Flow, Right Side Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment P4: Grass



Summary for Subcatchment P5: Grass

[49] Hint: Tc<2dt may require smaller dt

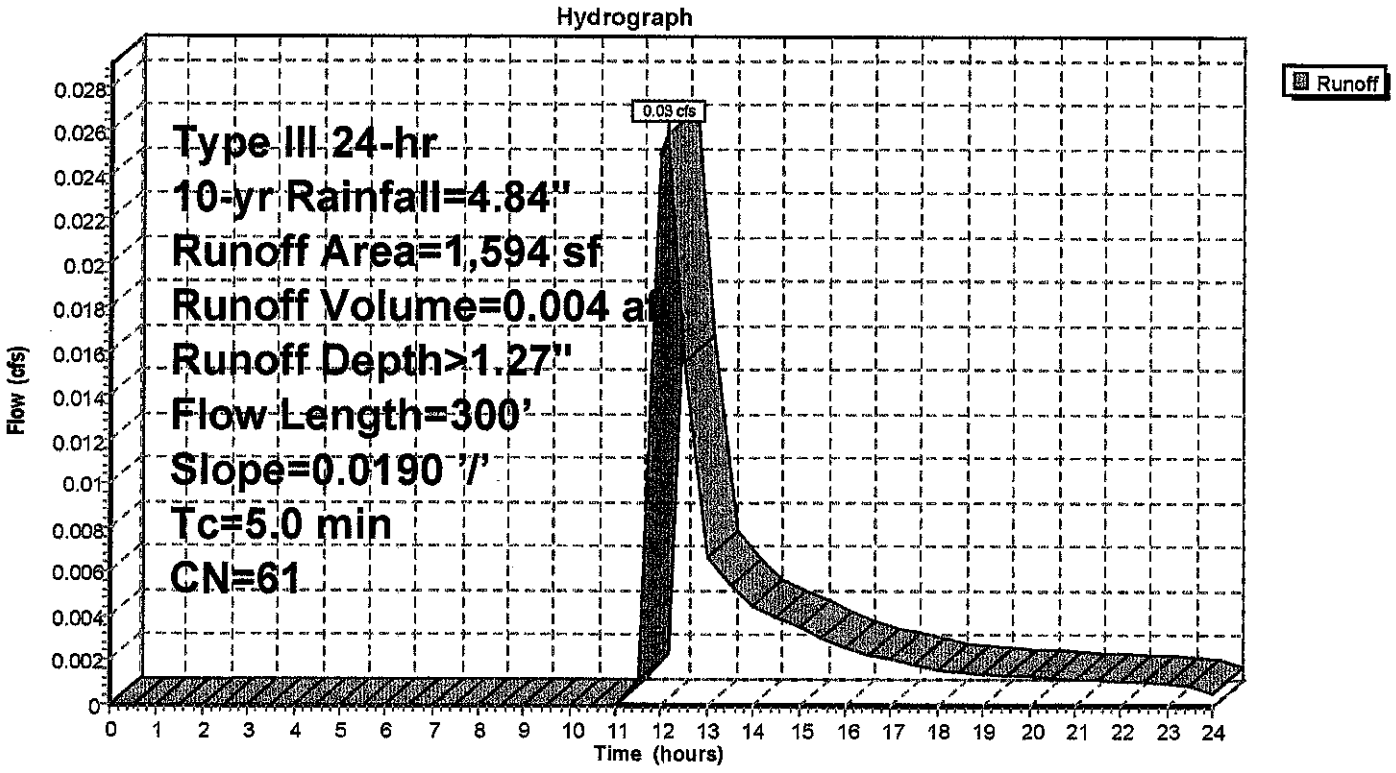
Runoff = 0.03 cfs @ 12.11 hrs, Volume= 0.004 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
1,594	61	>75% Grass cover, Good, HSG B	Pavement
1,594		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	300	0.0190	1.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.26"
3.0	300	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P5: Grass



Summary for Subcatchment P6: Front Paking

[49] Hint: Tc<2dt may require smaller dt

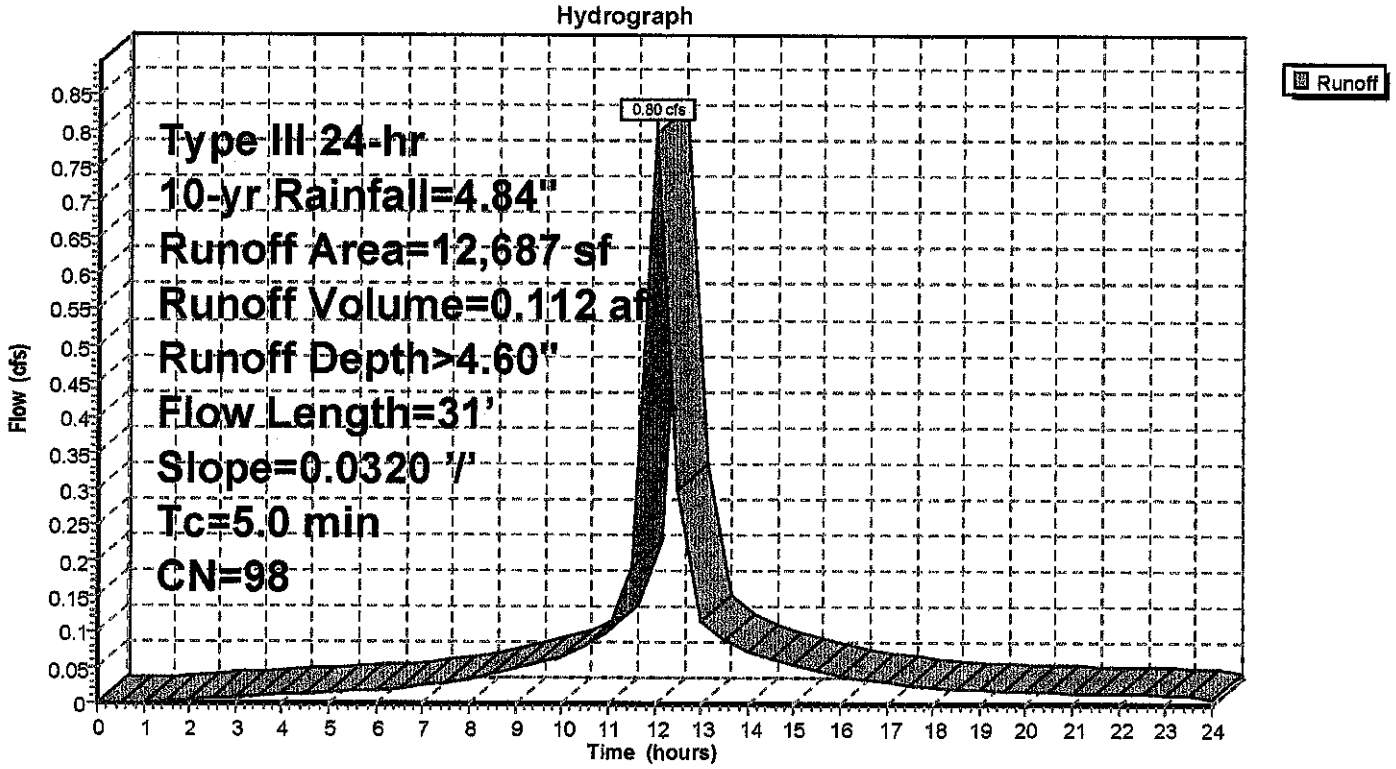
Runoff = 0.80 cfs @ 12.02 hrs, Volume= 0.112 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 10-yr Rainfall=4.84"

Area (sf)	CN	Description	Land Use
12,687	98	Paved roads w/curbs & sewers, HSG B	Roadway
12,687		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0320	1.33		**Sheet Flow, Front Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.4	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P6: Front Paking



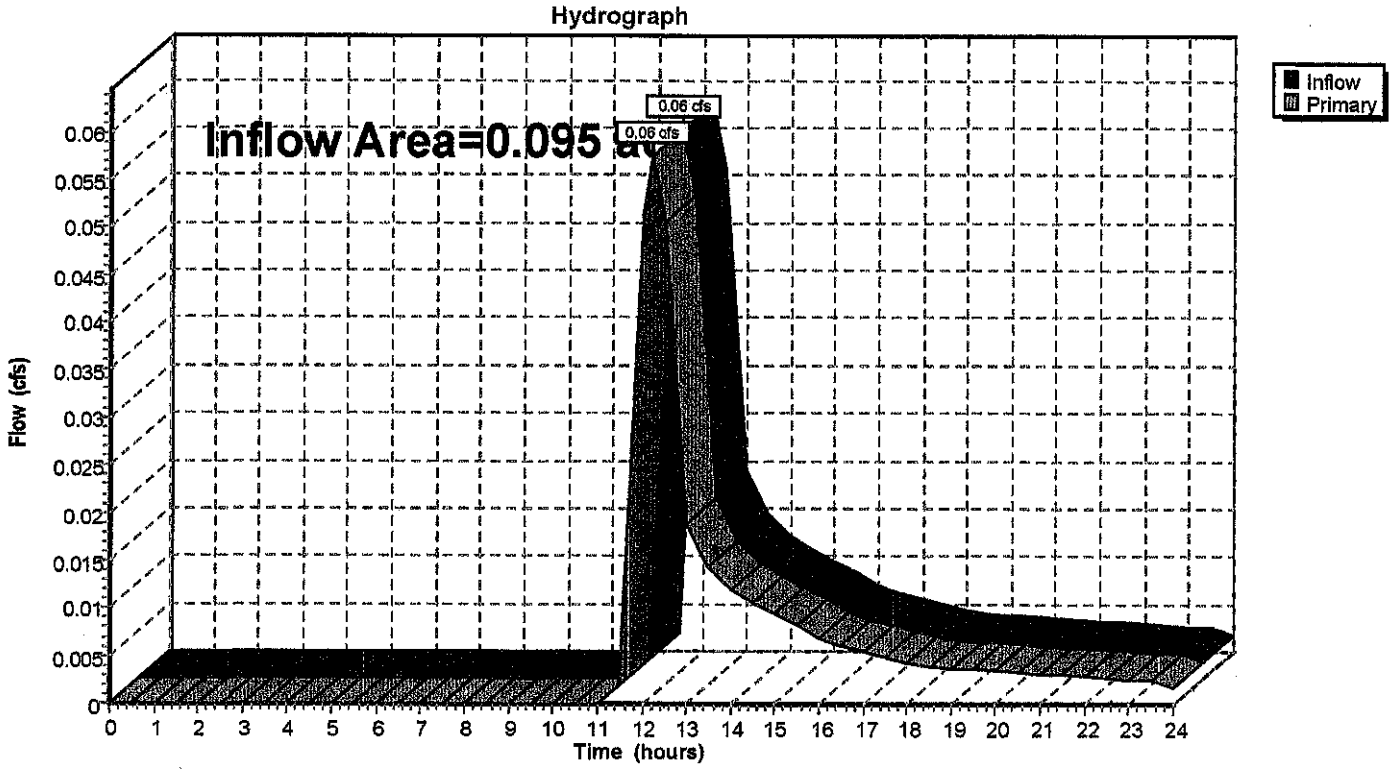
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.095 ac, 0.00% Impervious, Inflow Depth > 1.27" for 10-yr event
Inflow = 0.06 cfs @ 12.24 hrs, Volume= 0.010 af
Primary = 0.06 cfs @ 12.24 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs

Pond 1P: Christian Lane



Summary for Pond S1: Rear Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)

Inflow Area = 0.432 ac,100.00% Impervious, Inflow Depth > 4.60" for 10-yr event
Inflow = 1.19 cfs @ 12.02 hrs, Volume= 0.166 af
Outflow = 1.18 cfs @ 12.03 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.1 min
Discarded = 1.18 cfs @ 12.03 hrs, Volume= 0.166 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 61.03' @ 12.03 hrs Surf.Area= 588 sf Storage= 8 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	61.00'	566 cf	**11.00'W x 53.46'L x 3.50'H Field A** 2,058 cf Overall - 643 cf Embedded = 1,415 cf x 40.0% Voids
#2A	61.50'	643 cf	**ADS_StormTech SC-740 +Cap**x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 7 Chambers
		1,209 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=61.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S1: Rear Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

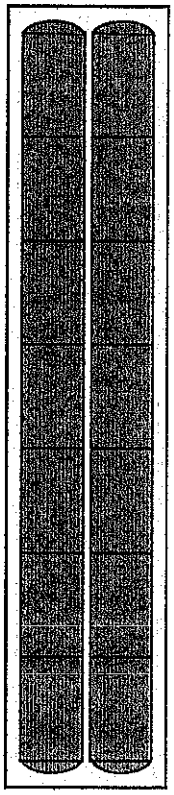
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf = 643.2 cf Chamber Storage

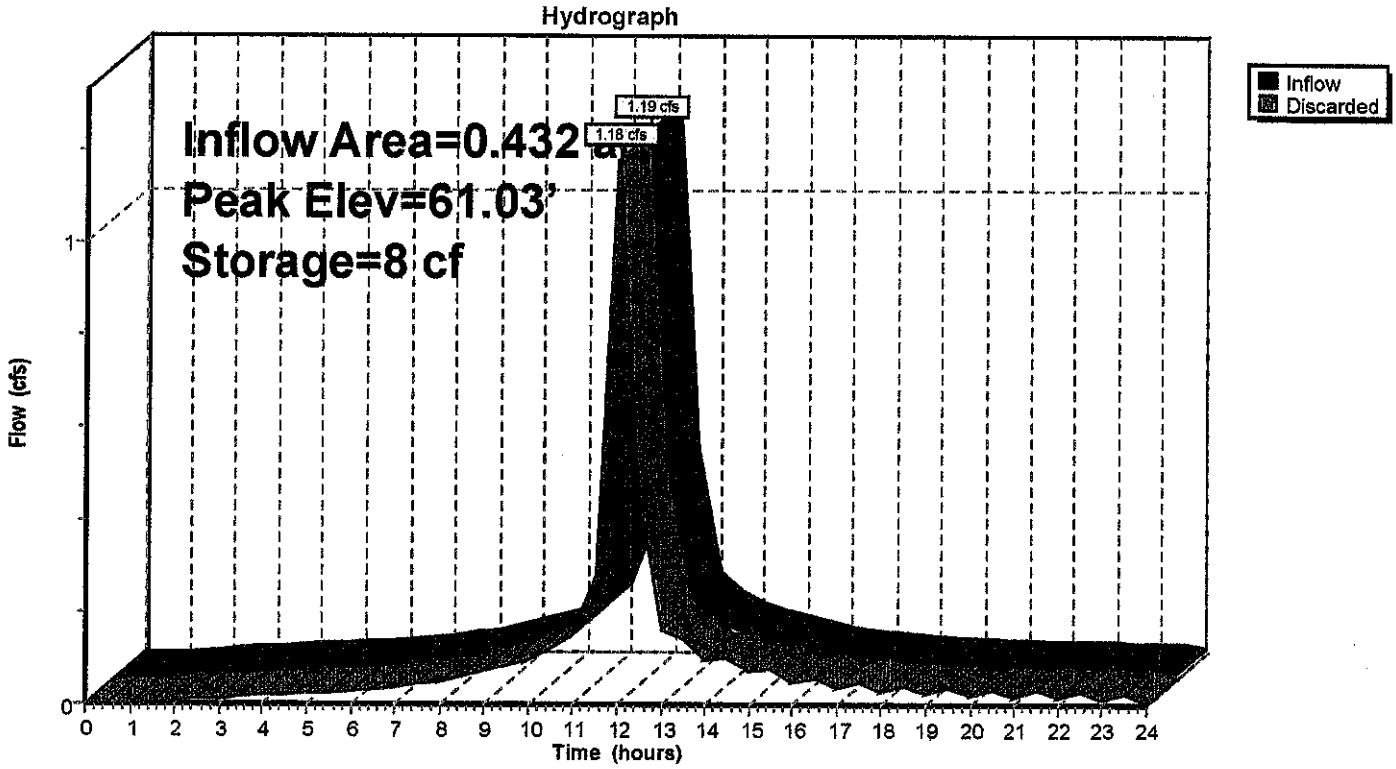
2,058.1 cf Field - 643.2 cf Chambers = 1,414.9 cf Stone x 40.0% Voids = 566.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,209.1 cf = 0.028 af
Overall Storage Efficiency = 58.8%
Overall System Size = 53.46' x 11.00' x 3.50'

14 Chambers
76.2 cy Field
52.4 cy Stone



Pond S1: Rear Storage



Summary for Pond S2: Front Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area = 0.345 ac,100.00% Impervious, Inflow Depth > 4.60" for 10-yr event
Inflow = 0.95 cfs @ 12.02 hrs, Volume= 0.132 af
Outflow = 0.94 cfs @ 12.03 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.94 cfs @ 12.03 hrs, Volume= 0.132 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 59.03' @ 12.03 hrs Surf.Area= 353 sf Storage= 4 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.00'	347 cf	**11.00'W x 32.10'L x 3.50'H Field A** 1,236 cf Overall - 368 cf Embedded = 868 cf x 40.0% Voids
#2A	59.50'	368 cf	**ADS_StormTech SC-740 +Capx** 8 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		715 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	59.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=59.03' (Free Discharge)
1=Exfiltration (Exfiltration Controls 1.25 cfs)

Pond S2: Front Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

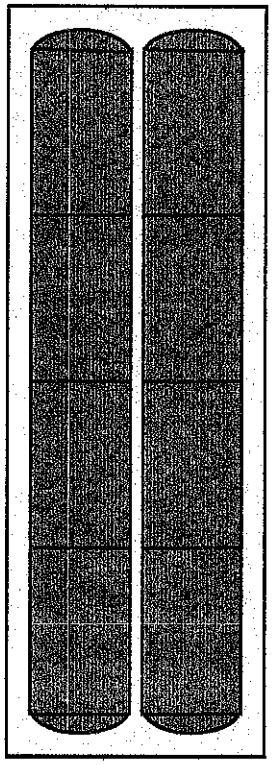
4 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 30.10' Row Length +12.0" End Stone x 2 = 32.10' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

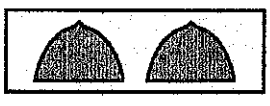
8 Chambers x 45.9 cf = 367.5 cf Chamber Storage

1,235.7 cf Field - 367.5 cf Chambers = 868.2 cf Stone x 40.0% Voids = 347.3 cf Stone Storage

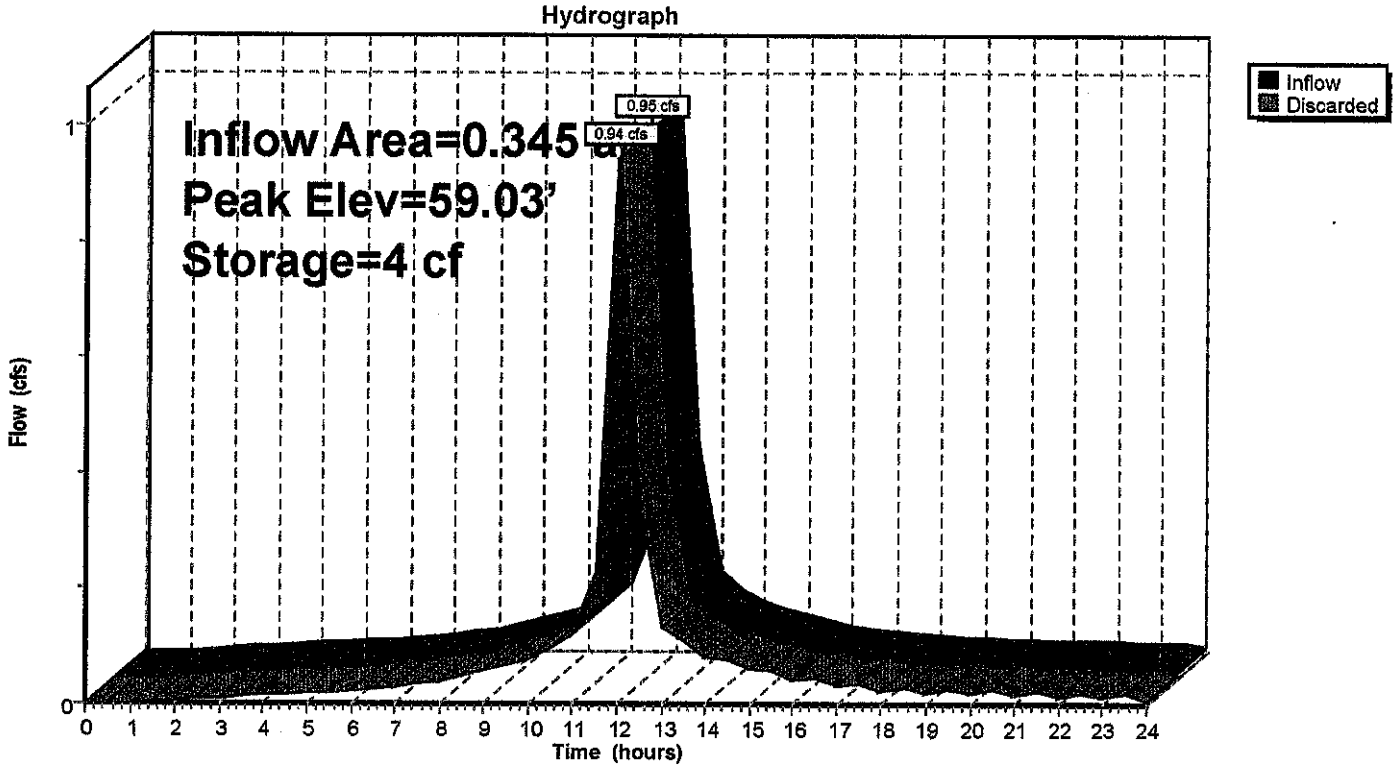
Chamber Storage + Stone Storage = 714.8 cf = 0.016 af
Overall Storage Efficiency = 57.8%
Overall System Size = 32.10' x 11.00' x 3.50'

8 Chambers
45.8 cy Field
32.2 cy Stone





Pond S2: Front Storage



Time span=0.00-24.00 hrs, dt=0.50 hrs, 49 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Rear Parking Runoff Area=8,817 sf 100.00% Impervious Runoff Depth>5.83"
Flow Length=85' Slope=0.0700 '/' Tc=5.0 min CN=98 Runoff=0.70 cfs 0.098 af

SubcatchmentP2: Roof Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>5.83"
Flow Length=141' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.79 cfs 0.112 af

SubcatchmentP3: Driveway Runoff Area=2,338 sf 100.00% Impervious Runoff Depth>5.83"
Flow Length=151' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.19 cfs 0.026 af

SubcatchmentP4: Grass Runoff Area=2,528 sf 0.00% Impervious Runoff Depth>2.05"
Flow Length=209' Slope=0.0380 '/' Tc=13.5 min CN=61 Runoff=0.06 cfs 0.010 af

SubcatchmentP5: Grass Runoff Area=1,594 sf 0.00% Impervious Runoff Depth>2.05"
Flow Length=300' Slope=0.0190 '/' Tc=5.0 min CN=61 Runoff=0.05 cfs 0.006 af

SubcatchmentP6: Front Paking Runoff Area=12,687 sf 100.00% Impervious Runoff Depth>5.83"
Flow Length=31' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=1.00 cfs 0.142 af

Pond 1P: Christian Lane Inflow=0.10 cfs 0.016 af
Primary=0.10 cfs 0.016 af

Pond S1: Rear Storage Peak Elev=61.72' Storage=218 cf Inflow=1.49 cfs 0.210 af
Outflow=1.30 cfs 0.218 af

Pond S2: Front Storage Peak Elev=59.03' Storage=5 cf Inflow=1.19 cfs 0.168 af
Outflow=1.19 cfs 0.168 af

Total Runoff Area = 0.872 ac Runoff Volume = 0.394 af Average Runoff Depth = 5.42"
10.86% Pervious = 0.095 ac 89.14% Impervious = 0.777 ac

Summary for Subcatchment P1: Rear Parking

[49] Hint: Tc<2dt may require smaller dt

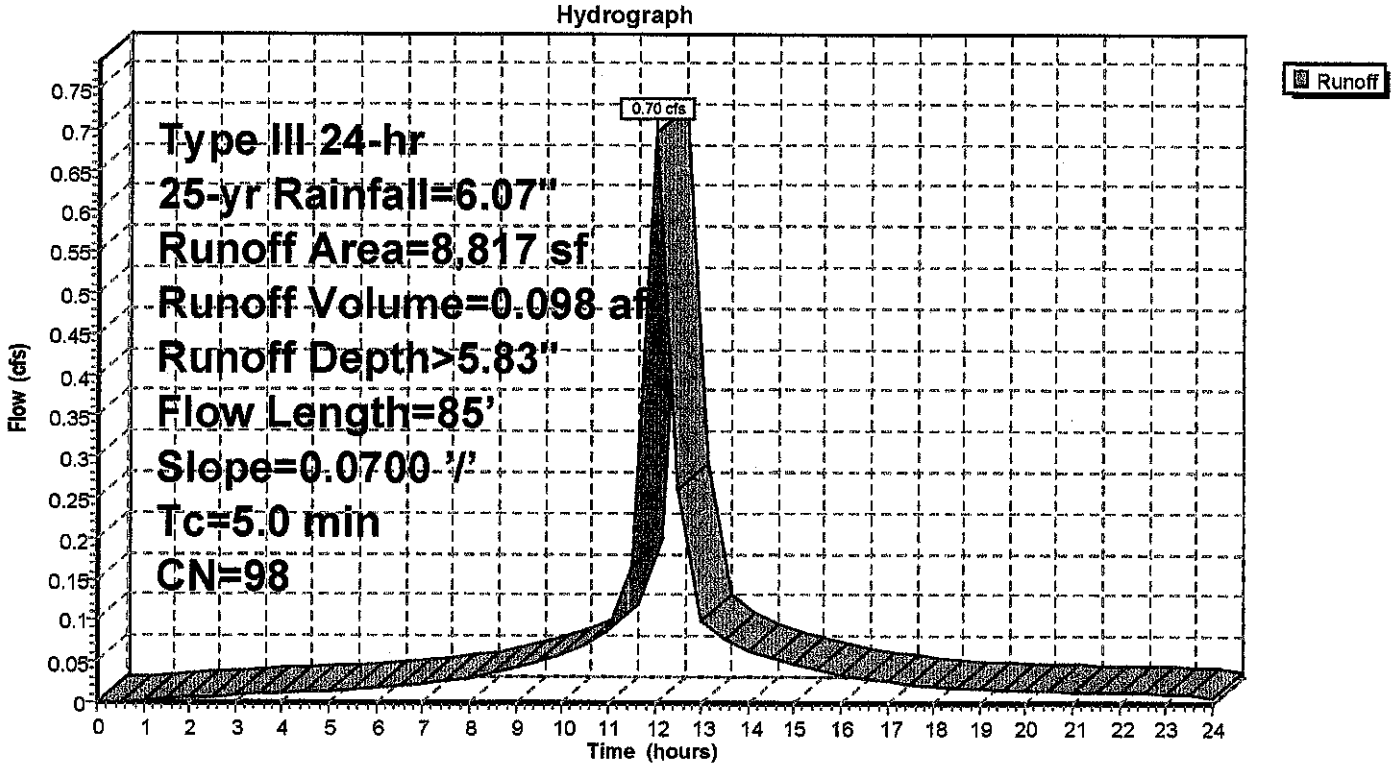
Runoff = 0.70 cfs @ 12.02 hrs, Volume= 0.098 af, Depth> 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
8,817	98	Paved parking, HSG B	Pavement
8,817		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	85	0.0700	2.22		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.6	85	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P1: Rear Parking



Summary for Subcatchment P2: Roof

[49] Hint: Tc<2dt may require smaller dt

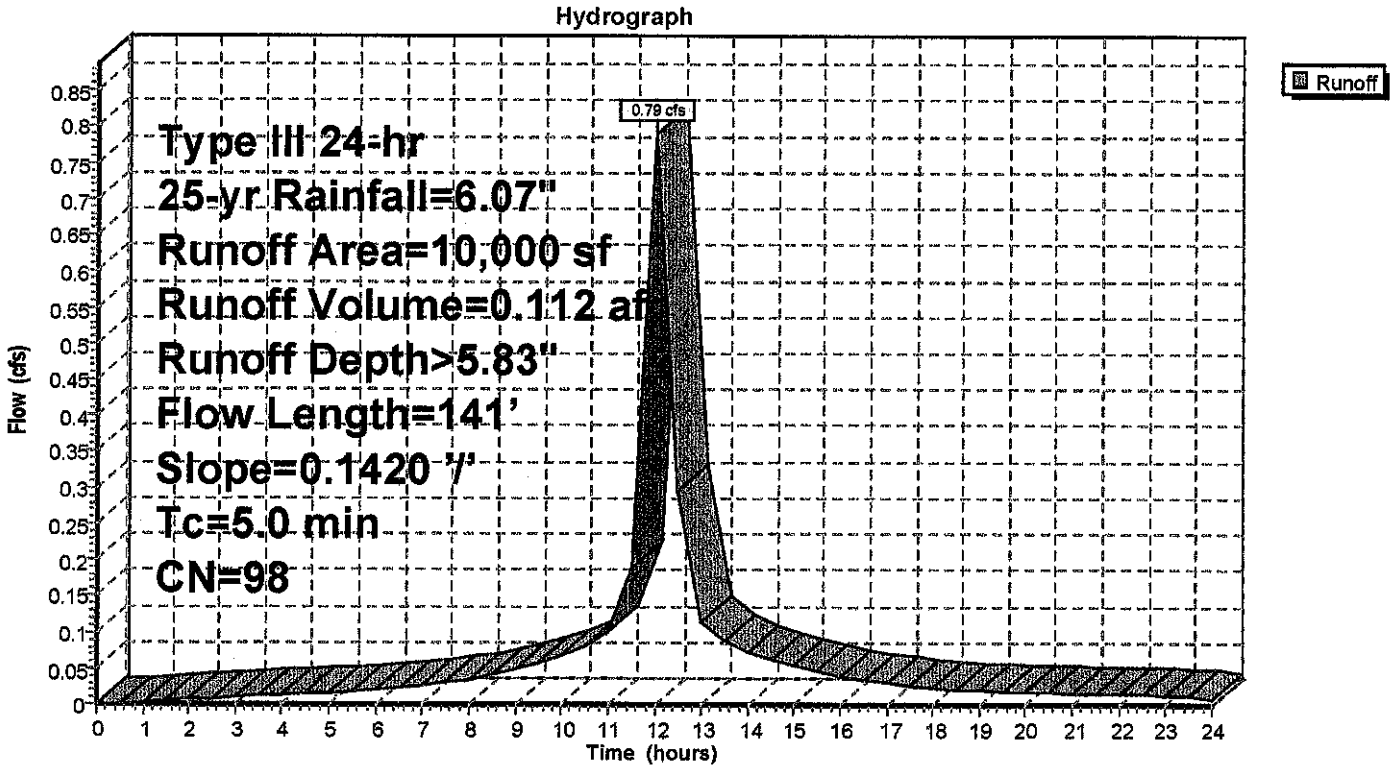
Runoff = 0.79 cfs @ 12.02 hrs, Volume= 0.112 af, Depth> 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
10,000	98	Roofs, HSG B	Roofs
10,000		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	141	0.1420	3.26		**Sheet Flow, Top of Roof** Smooth surfaces n= 0.011 P2= 3.26"
0.7	141	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P2: Roof



Summary for Subcatchment P3: Driveway

[49] Hint: Tc<2dt may require smaller dt

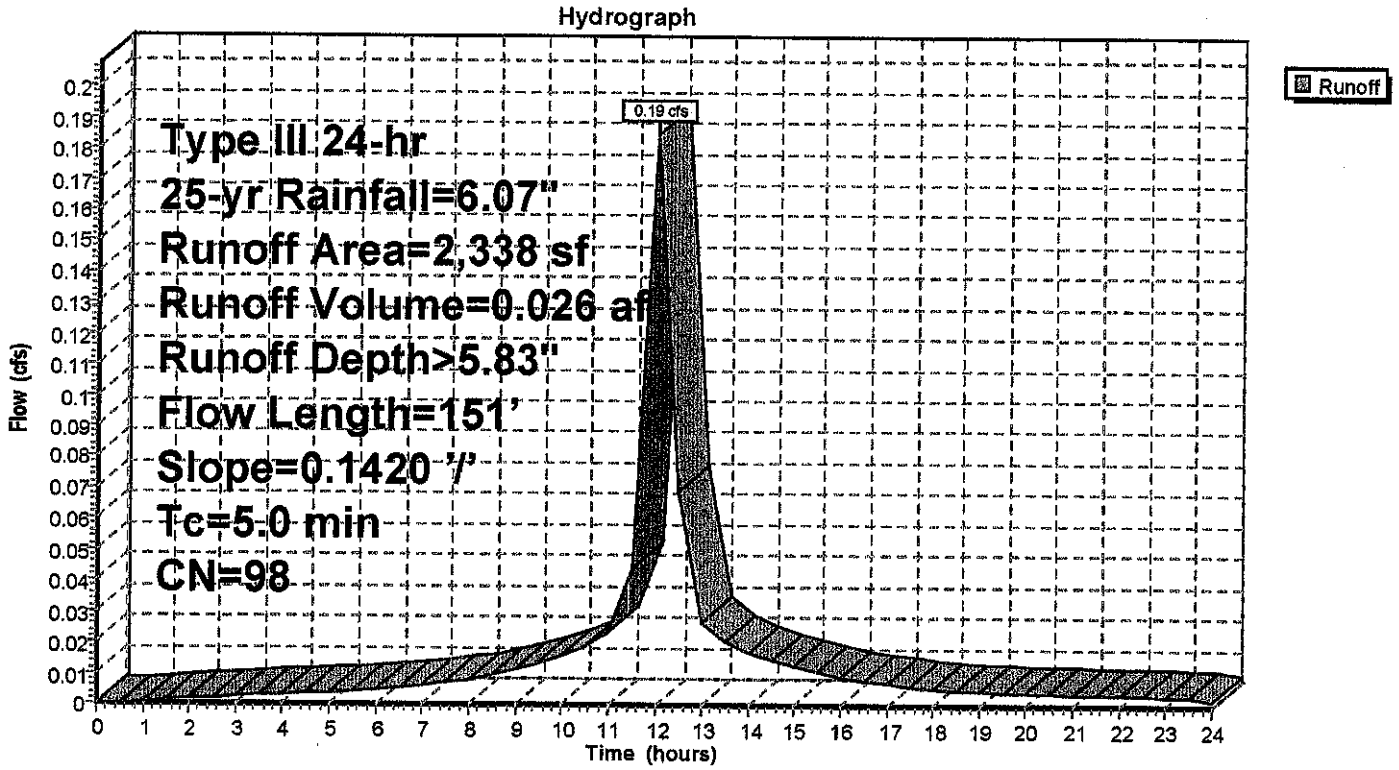
Runoff = 0.19 cfs @ 12.02 hrs, Volume= 0.026 af, Depth> 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
2,338	98	Paved parking, HSG B	Residential
2,338		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	151	0.1420	3.30		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.26"
0.8	151	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P3: Driveway



Summary for Subcatchment P4: Grass

[49] Hint: Tc<2dt may require smaller dt

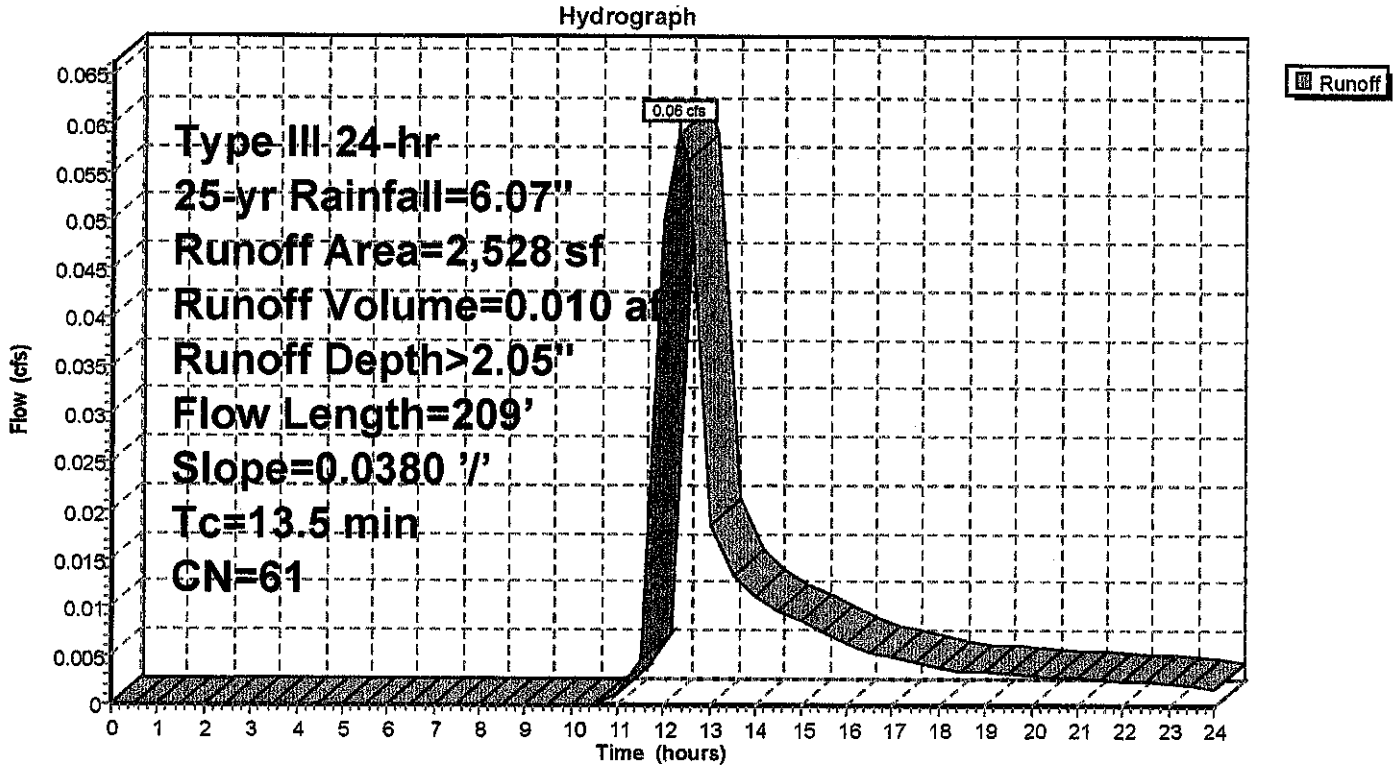
Runoff = 0.06 cfs @ 12.32 hrs, Volume= 0.010 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
2,528	61	>75% Grass cover, Good, HSG B	Pavement
2,528		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	209	0.0380	0.26		**Sheet Flow, Right Side Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment P4: Grass



Summary for Subcatchment P5: Grass

[49] Hint: Tc<2dt may require smaller dt

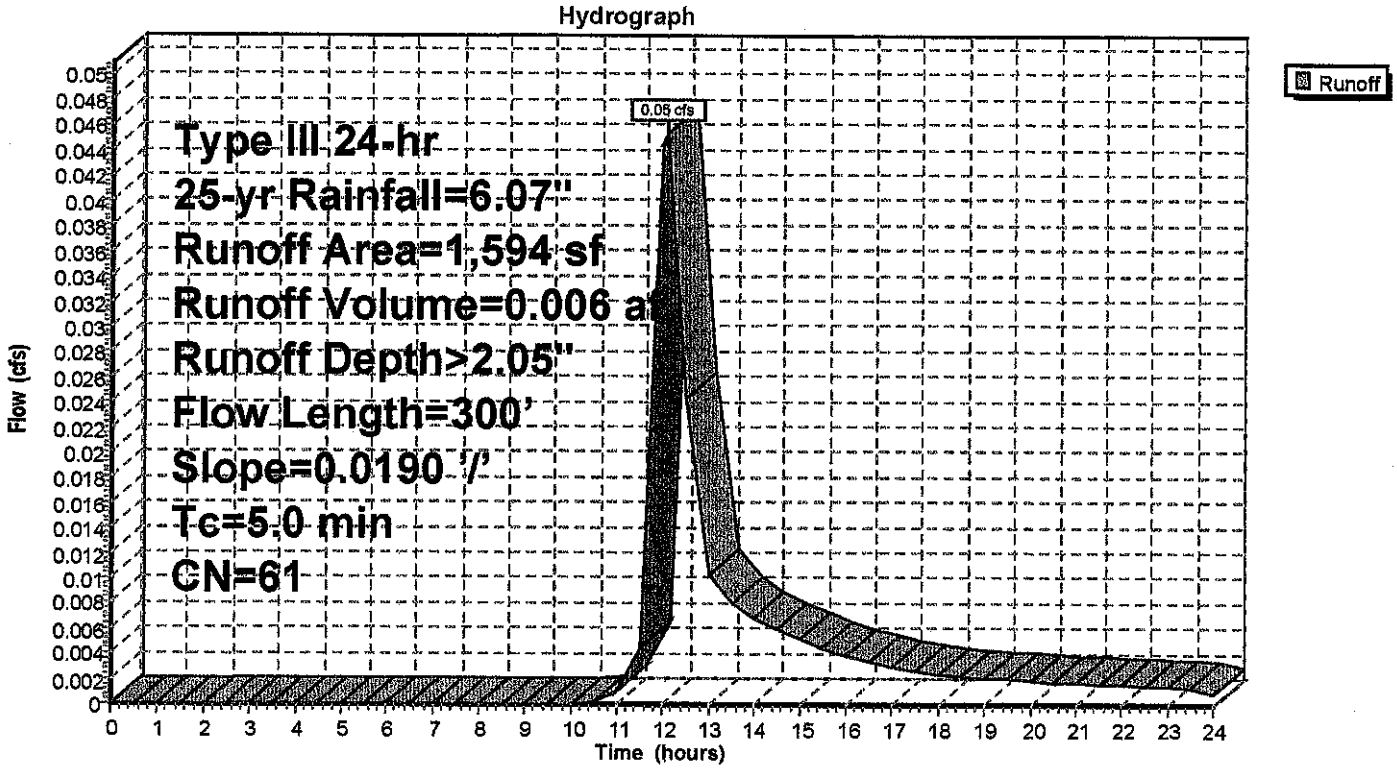
Runoff = 0.05 cfs @ 12.08 hrs, Volume= 0.006 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
1,594	61	>75% Grass cover, Good, HSG B	Pavement
1,594		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	300	0.0190	1.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.26"
3.0	300	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P5: Grass



Summary for Subcatchment P6: Front Paking

[49] Hint: Tc<2dt may require smaller dt

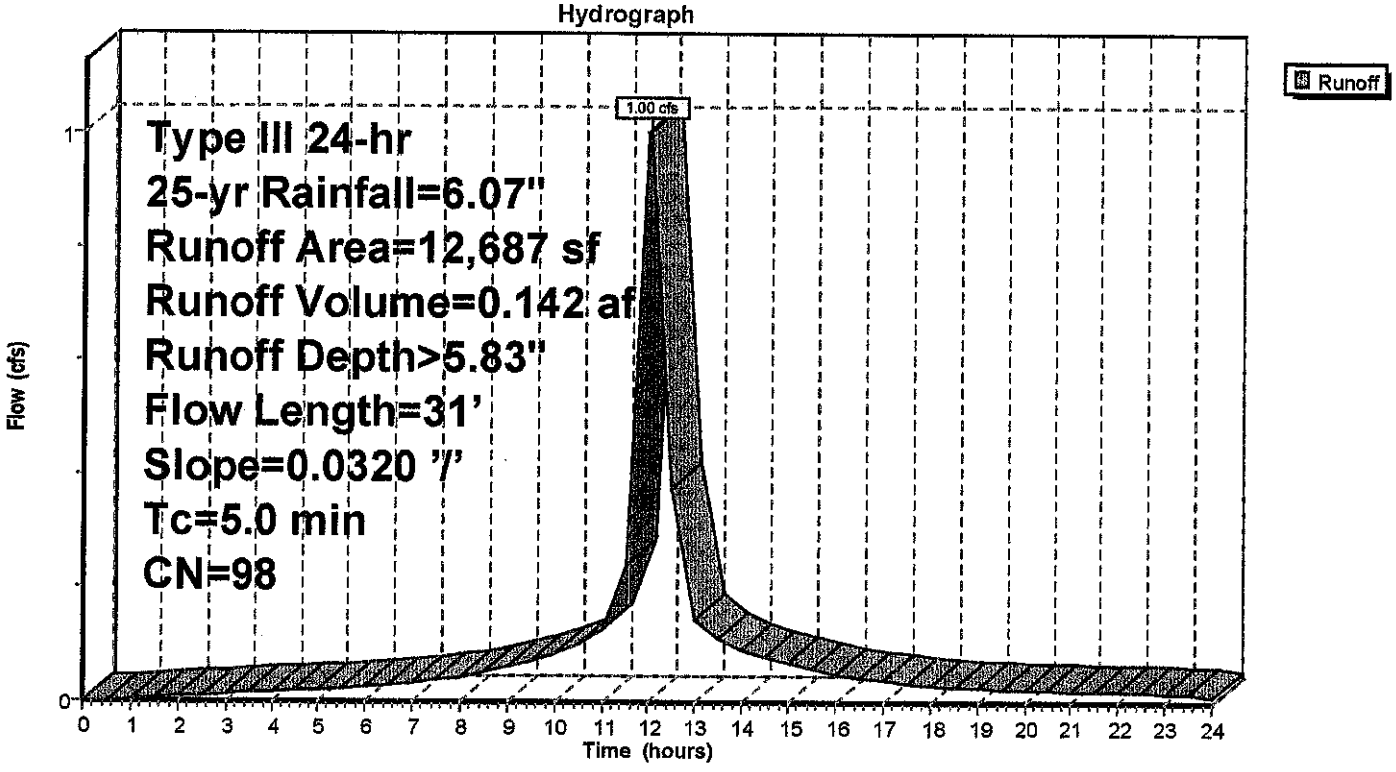
Runoff = 1.00 cfs @ 12.02 hrs, Volume= 0.142 af, Depth> 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 25-yr Rainfall=6.07"

Area (sf)	CN	Description	Land Use
12,687	98	Paved roads w/curbs & sewers, HSG B	Roadway
12,687		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0320	1.33		**Sheet Flow, Front Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.4	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P6: Front Paking



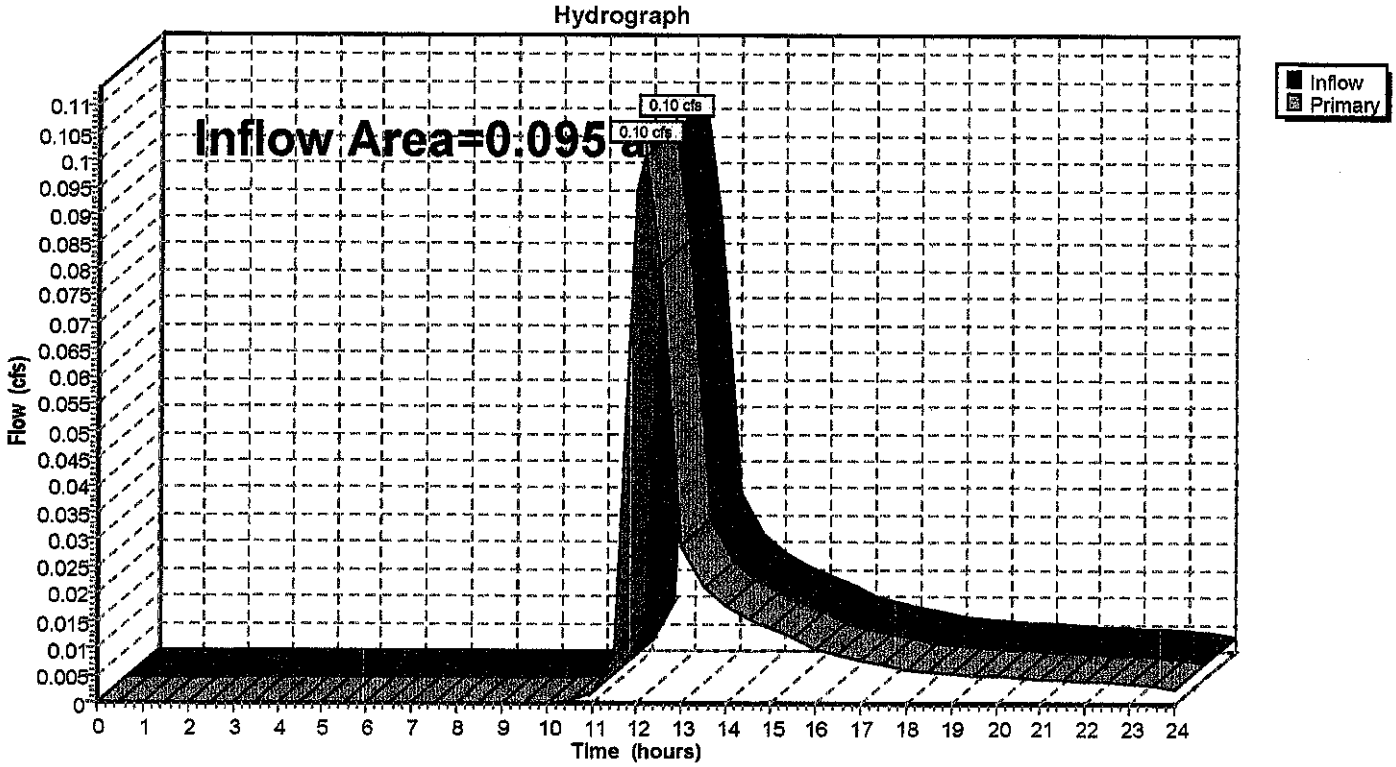
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.095 ac, 0.00% Impervious, Inflow Depth > 2.05" for 25-yr event
Inflow = 0.10 cfs @ 12.18 hrs, Volume= 0.016 af
Primary = 0.10 cfs @ 12.18 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs

Pond 1P: Christian Lane



Summary for Pond S1: Rear Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area = 0.432 ac,100.00% Impervious, Inflow Depth > 5.83" for 25-yr event
Inflow = 1.49 cfs @ 12.02 hrs, Volume= 0.210 af
Outflow = 1.30 cfs @ 12.15 hrs, Volume= 0.218 af, Atten= 13%, Lag= 7.6 min
Discarded = 1.30 cfs @ 12.15 hrs, Volume= 0.218 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 61.72' @ 12.00 hrs Surf.Area= 588 sf Storage= 218 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.7 min (747.4 - 743.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	61.00'	566 cf	**11.00'W x 53.46'L x 3.50'H Field A** 2,058 cf Overall - 643 cf Embedded = 1,415 cf x 40.0% Voids
#2A	61.50'	643 cf	**ADS_StormTech SC-740 +Cap**x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 7 Chambers
		1,209 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.15 hrs HW=61.51' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S1: Rear Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

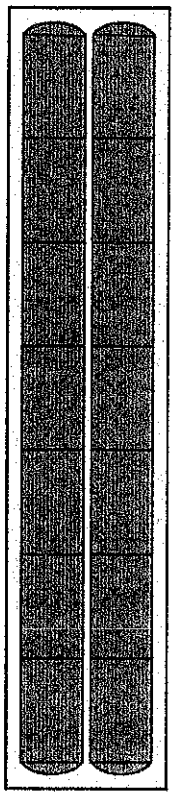
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf = 643.2 cf Chamber Storage

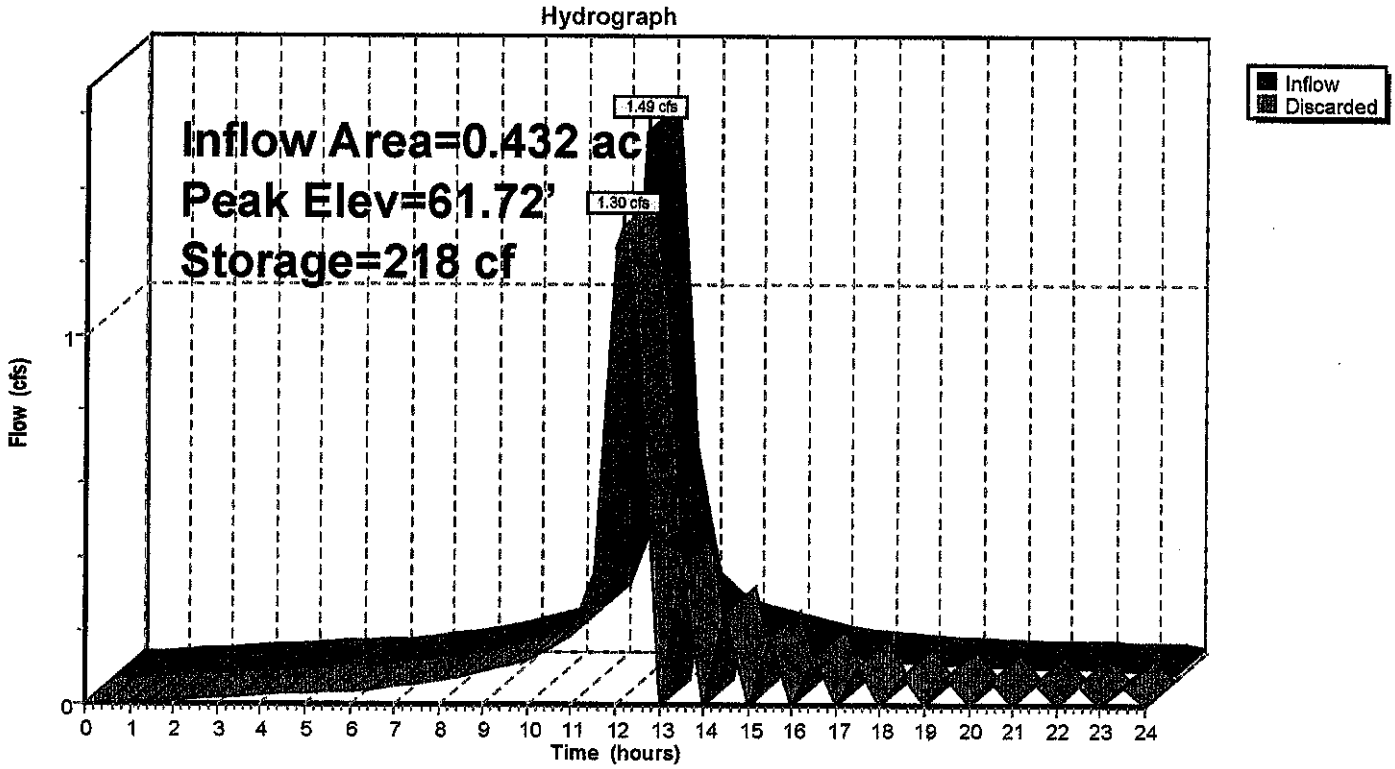
2,058.1 cf Field - 643.2 cf Chambers = 1,414.9 cf Stone x 40.0% Voids = 566.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,209.1 cf = 0.028 af
Overall Storage Efficiency = 58.8%
Overall System Size = 53.46' x 11.00' x 3.50'

14 Chambers
76.2 cy Field
52.4 cy Stone



Pond S1: Rear Storage



Summary for Pond S2: Front Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area = 0.345 ac,100.00% Impervious, Inflow Depth > 5.83" for 25-yr event
Inflow = 1.19 cfs @ 12.02 hrs, Volume= 0.168 af
Outflow = 1.19 cfs @ 12.03 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.1 min
Discarded = 1.19 cfs @ 12.03 hrs, Volume= 0.168 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 59.03' @ 12.03 hrs Surf.Area= 353 sf Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.00'	347 cf	**11.00'W x 32.10'L x 3.50'H Field A** 1,236 cf Overall - 368 cf Embedded = 868 cf x 40.0% Voids
#2A	59.50'	368 cf	**ADS_StormTech SC-740 +Capx** 8 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		715 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	59.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.03 hrs HW=59.03' (Free Discharge)
1=Exfiltration (Exfiltration Controls 1.25 cfs)

Pond S2: Front Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

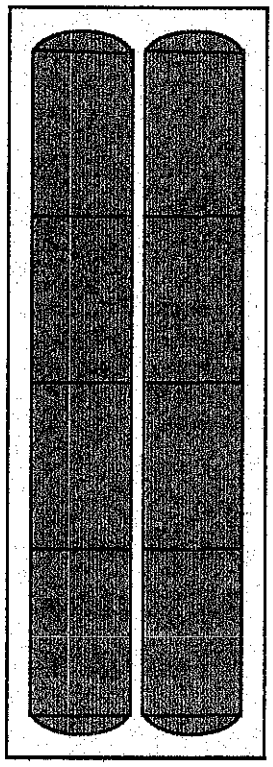
4 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 30.10' Row Length +12.0" End Stone x 2 = 32.10' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

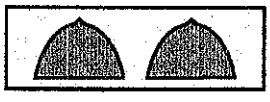
8 Chambers x 45.9 cf = 367.5 cf Chamber Storage

1,235.7 cf Field - 367.5 cf Chambers = 868.2 cf Stone x 40.0% Voids = 347.3 cf Stone Storage

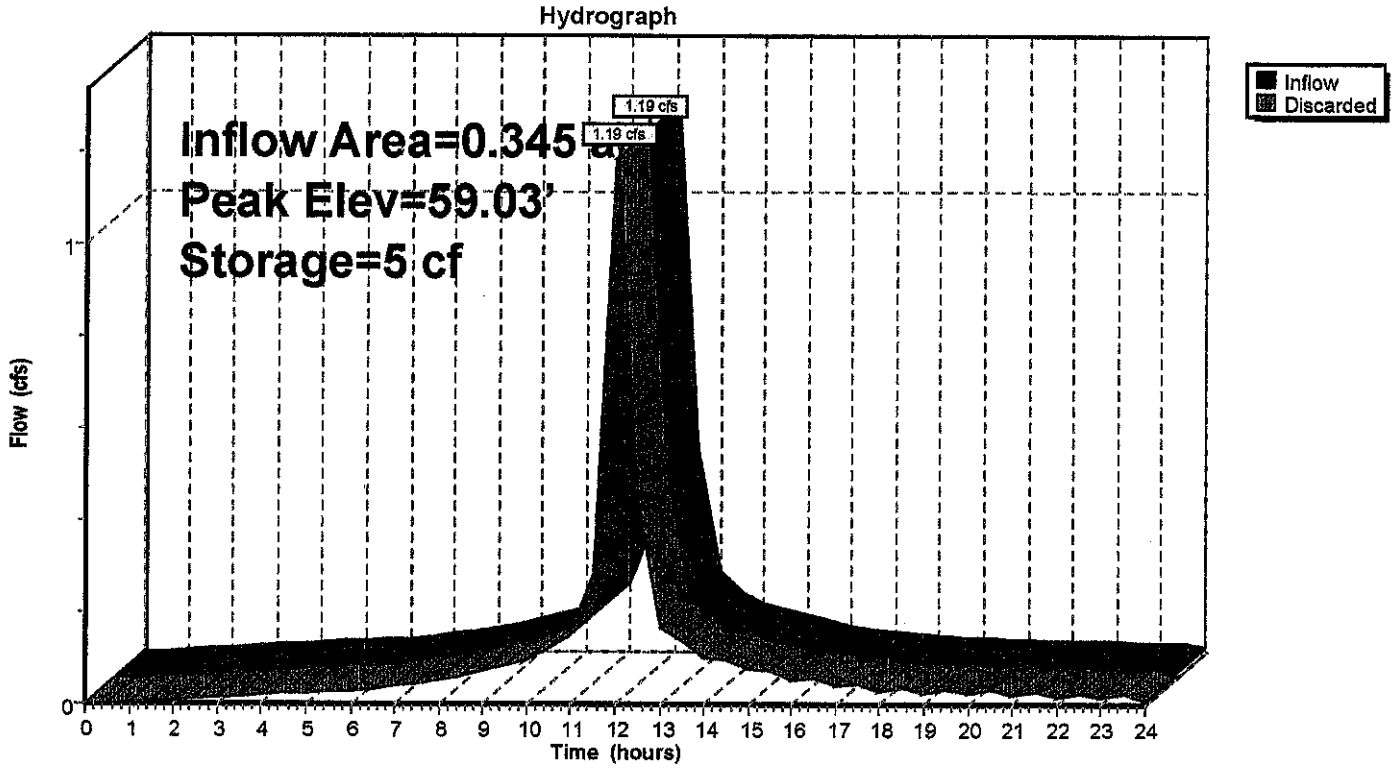
Chamber Storage + Stone Storage = 714.8 cf = 0.016 af
Overall Storage Efficiency = 57.8%
Overall System Size = 32.10' x 11.00' x 3.50'

8 Chambers
45.8 cy Field
32.2 cy Stone





Pond S2: Front Storage



Time span=0.00-24.00 hrs, dt=0.50 hrs, 49 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Rear Parking Runoff Area=8,817 sf 100.00% Impervious Runoff Depth>6.96"
Flow Length=85' Slope=0.0700 '/' Tc=5.0 min CN=98 Runoff=0.83 cfs 0.117 af

SubcatchmentP2: Roof Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>6.96"
Flow Length=141' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.94 cfs 0.133 af

SubcatchmentP3: Driveway Runoff Area=2,338 sf 100.00% Impervious Runoff Depth>6.96"
Flow Length=151' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.22 cfs 0.031 af

SubcatchmentP4: Grass Runoff Area=2,528 sf 0.00% Impervious Runoff Depth>2.85"
Flow Length=209' Slope=0.0380 '/' Tc=13.5 min CN=61 Runoff=0.08 cfs 0.014 af

SubcatchmentP5: Grass Runoff Area=1,594 sf 0.00% Impervious Runoff Depth>2.85"
Flow Length=300' Slope=0.0190 '/' Tc=5.0 min CN=61 Runoff=0.07 cfs 0.009 af

SubcatchmentP6: Front Paking Runoff Area=12,687 sf 100.00% Impervious Runoff Depth>6.96"
Flow Length=31' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=1.19 cfs 0.169 af

Pond 1P: Christian Lane Inflow=0.15 cfs 0.022 af
Primary=0.15 cfs 0.022 af

Pond S1: Rear Storage Peak Elev=62.40' Storage=518 cf Inflow=1.77 cfs 0.251 af
Outflow=1.35 cfs 0.252 af

Pond S2: Front Storage Peak Elev=59.79' Storage=147 cf Inflow=1.41 cfs 0.200 af
Outflow=1.28 cfs 0.206 af

Total Runoff Area = 0.872 ac Runoff Volume = 0.473 af Average Runoff Depth = 6.51"
10.86% Pervious = 0.095 ac 89.14% Impervious = 0.777 ac

Summary for Subcatchment P1: Rear Parking

[49] Hint: Tc<2dt may require smaller dt

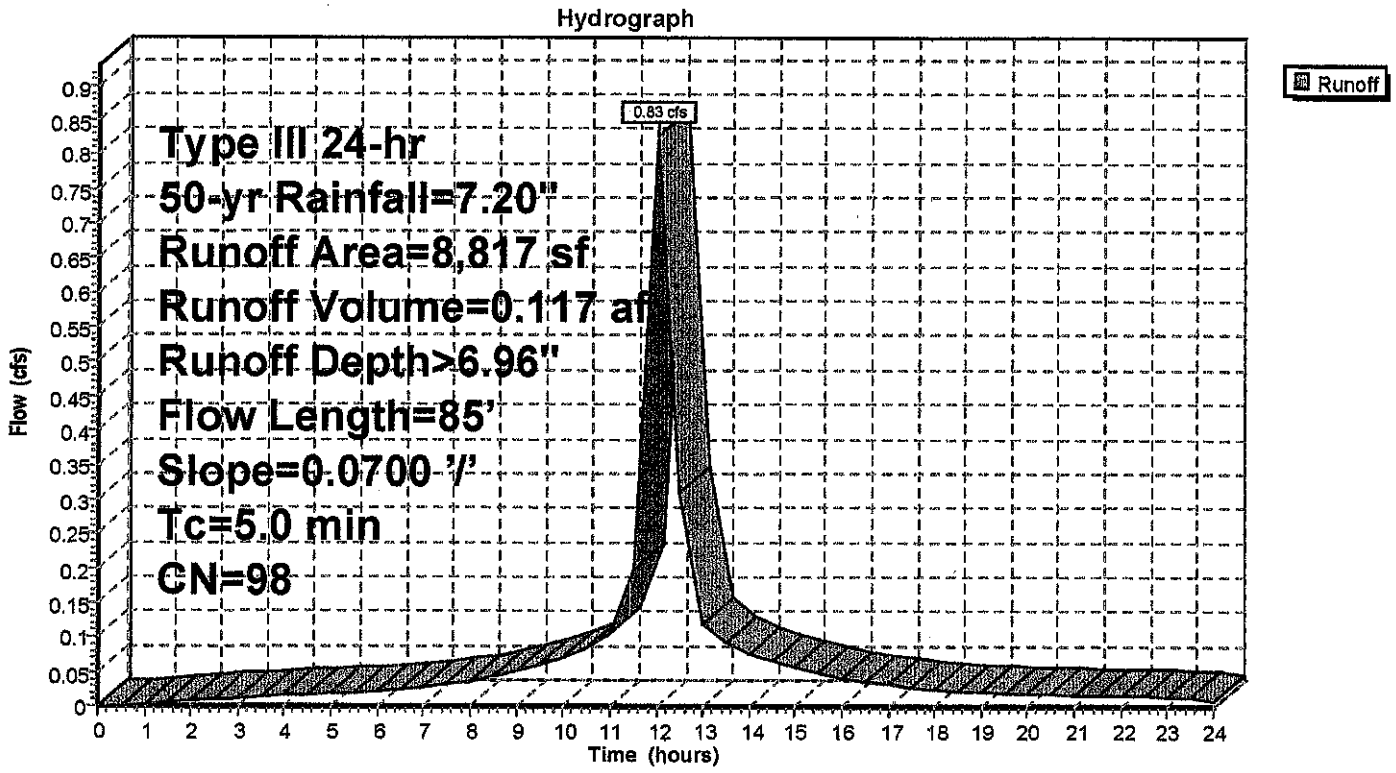
Runoff = 0.83 cfs @ 12.02 hrs, Volume= 0.117 af, Depth> 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
8,817	98	Paved parking, HSG B	Pavement
8,817		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	85	0.0700	2.22		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.6	85	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P1: Rear Parking



Summary for Subcatchment P2: Roof

[49] Hint: Tc<2dt may require smaller dt

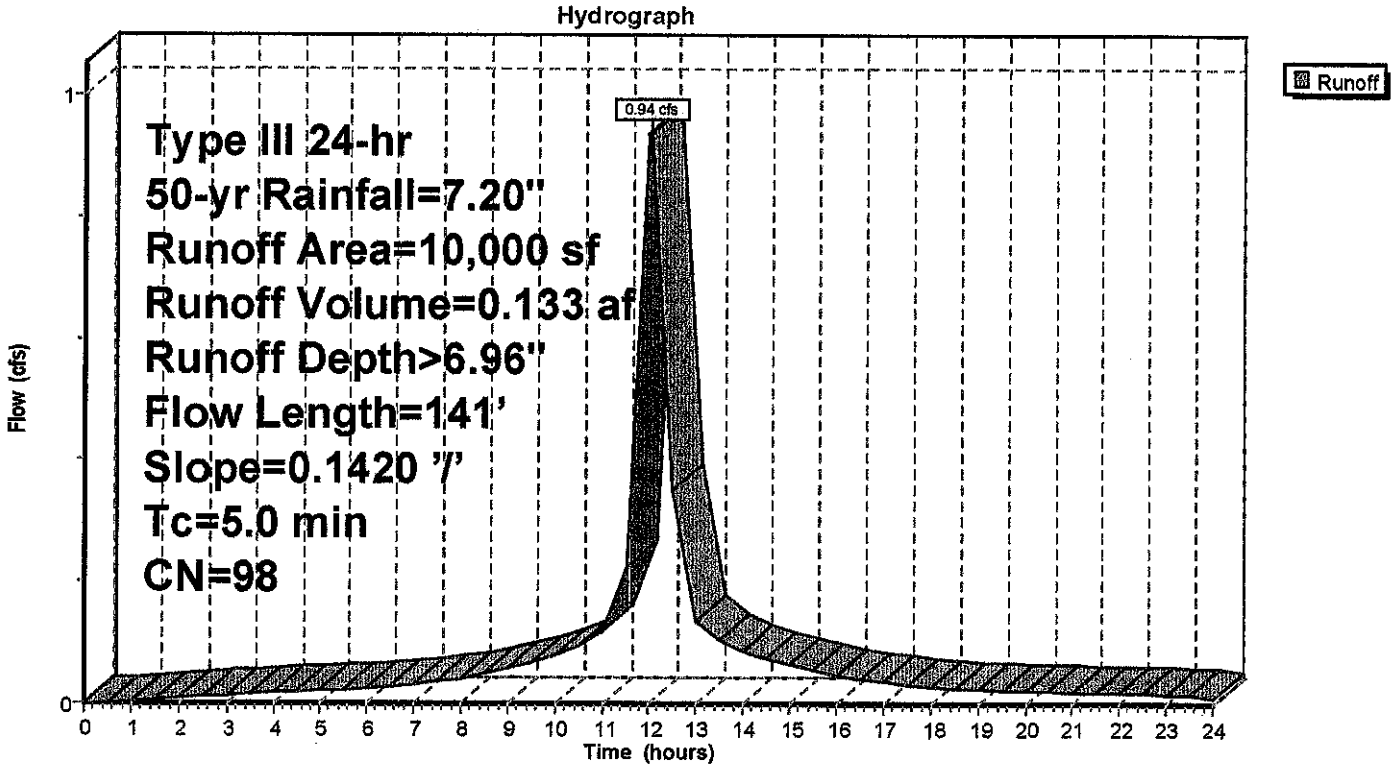
Runoff = 0.94 cfs @ 12.02 hrs, Volume= 0.133 af, Depth> 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
10,000	98	Roofs, HSG B	Roofs
10,000		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	141	0.1420	3.26		**Sheet Flow, Top of Roof** Smooth surfaces n= 0.011 P2= 3.26"
0.7	141	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P2: Roof



Summary for Subcatchment P3: Driveway

[49] Hint: Tc<2dt may require smaller dt

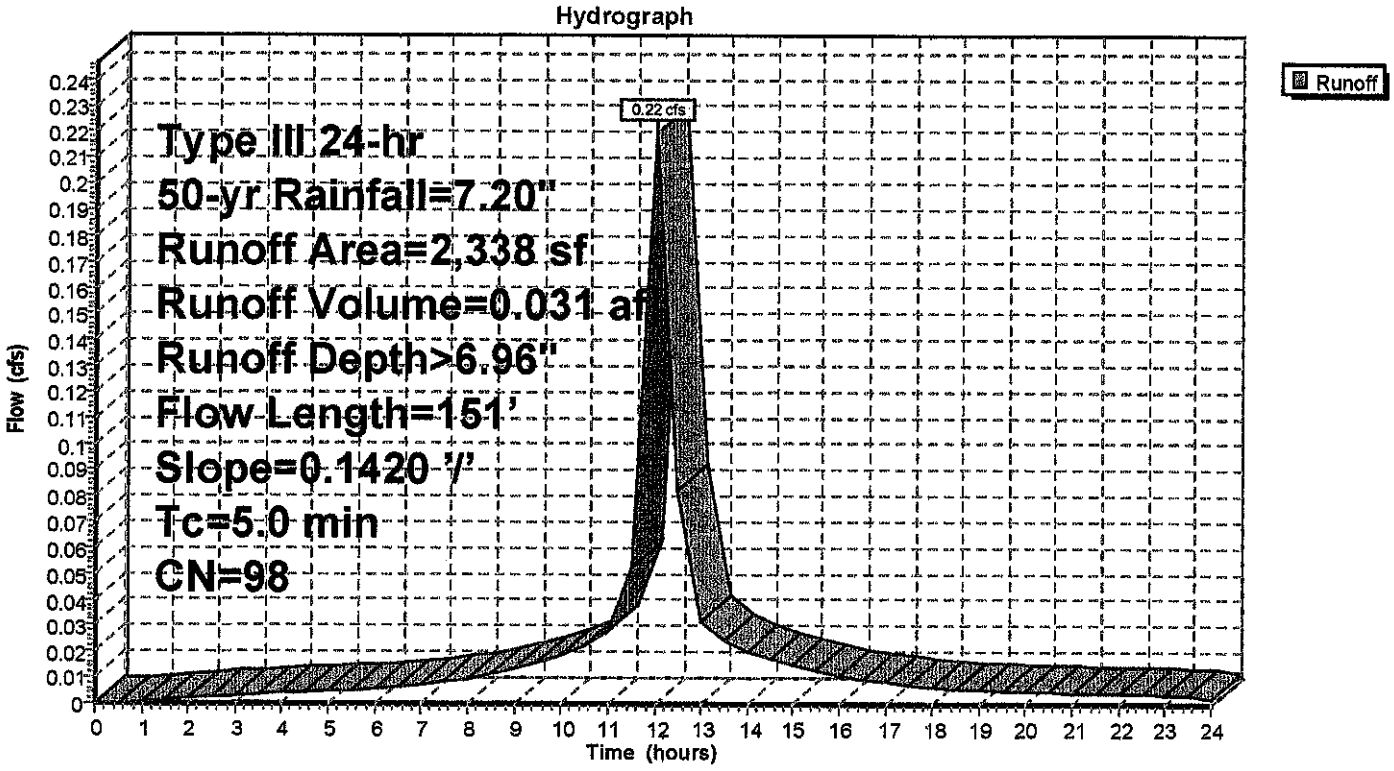
Runoff = 0.22 cfs @ 12.02 hrs, Volume= 0.031 af, Depth> 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
2,338	98	Paved parking, HSG B	Residential
2,338		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	151	0.1420	3.30		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.26"
0.8	151	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P3: Driveway



Summary for Subcatchment P4: Grass

[49] Hint: Tc<2dt may require smaller dt

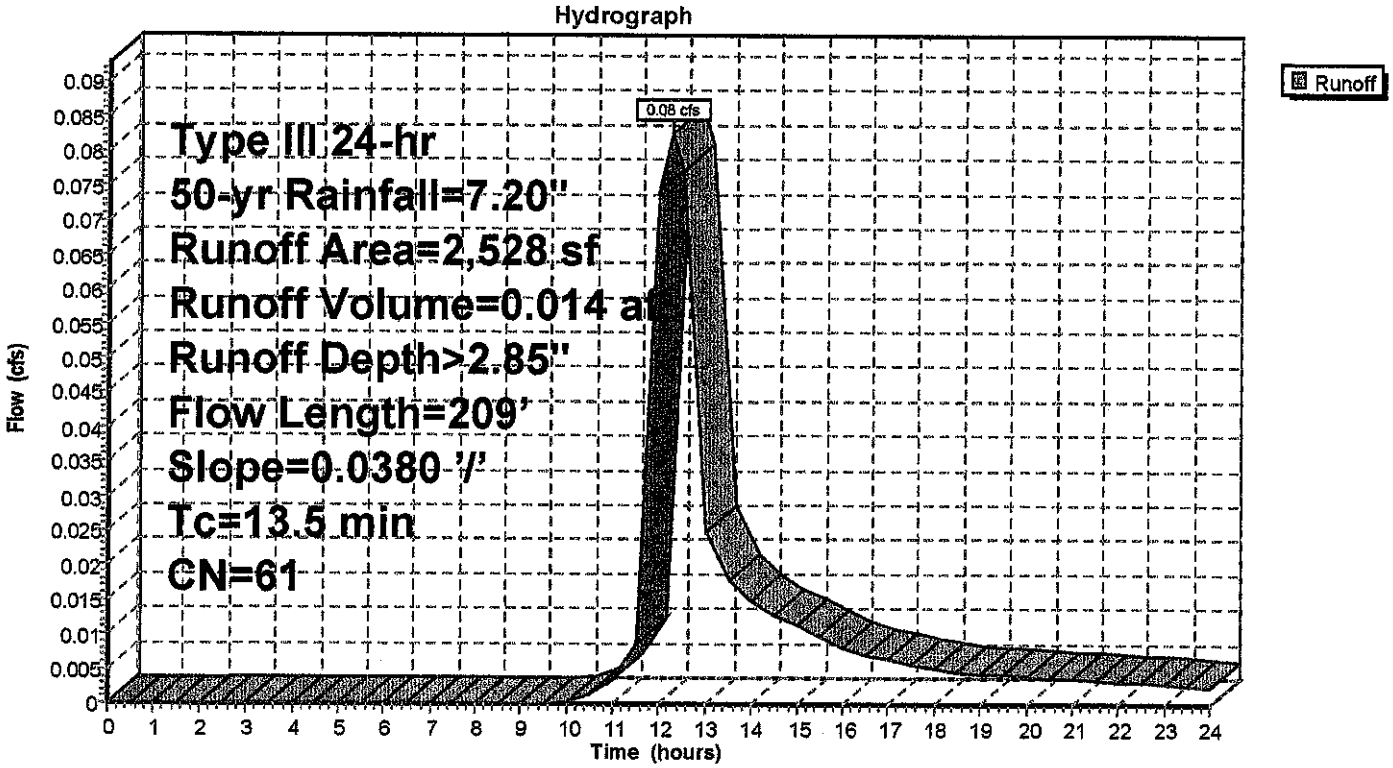
Runoff = 0.08 cfs @ 12.28 hrs, Volume= 0.014 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
2,528	61	>75% Grass cover, Good, HSG B	Pavement
2,528		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	209	0.0380	0.26		**Sheet Flow, Right Side Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment P4: Grass



Summary for Subcatchment P5: Grass

[49] Hint: Tc<2dt may require smaller dt

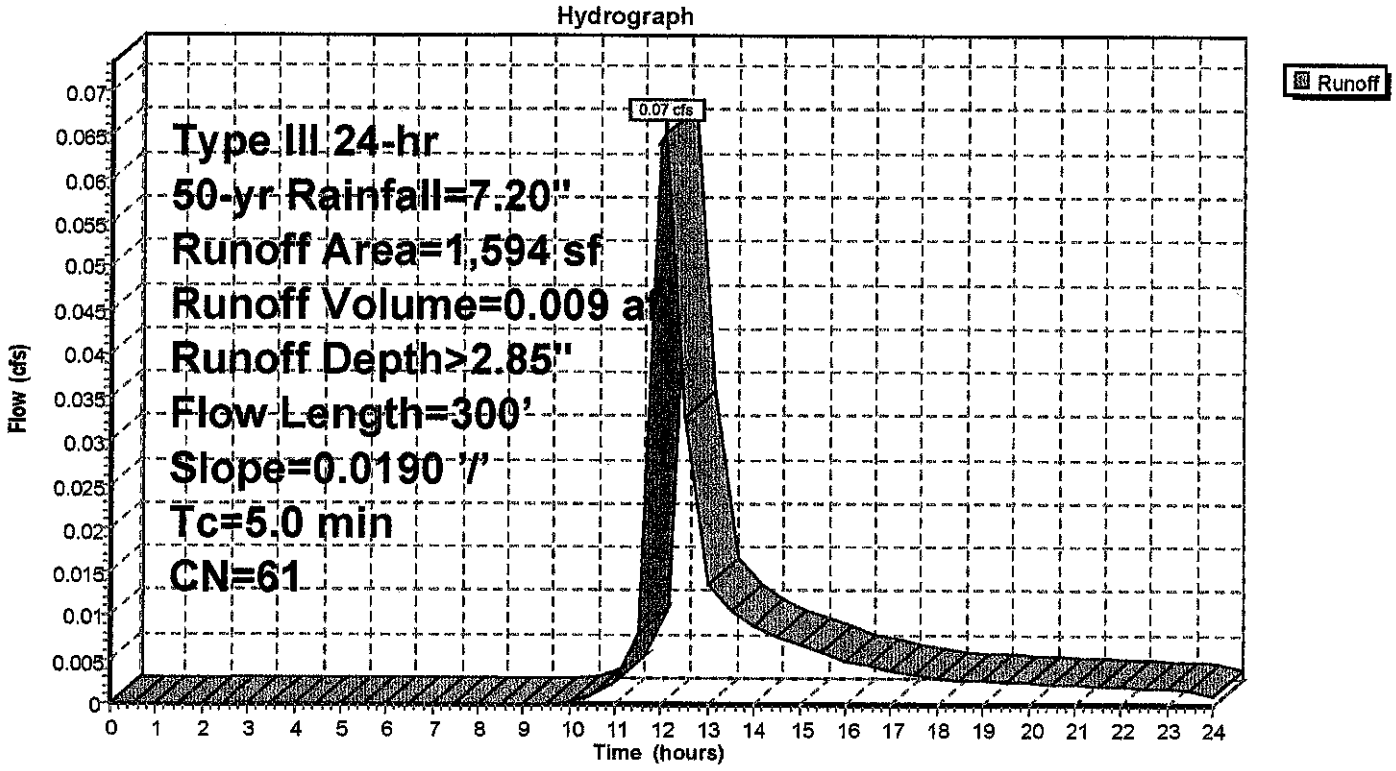
Runoff = 0.07 cfs @ 12.07 hrs, Volume= 0.009 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
1,594	61	>75% Grass cover, Good, HSG B	Pavement
1,594		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	300	0.0190	1.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.26"
3.0	300	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P5: Grass



Summary for Subcatchment P6: Front Paking

[49] Hint: Tc<2dt may require smaller dt

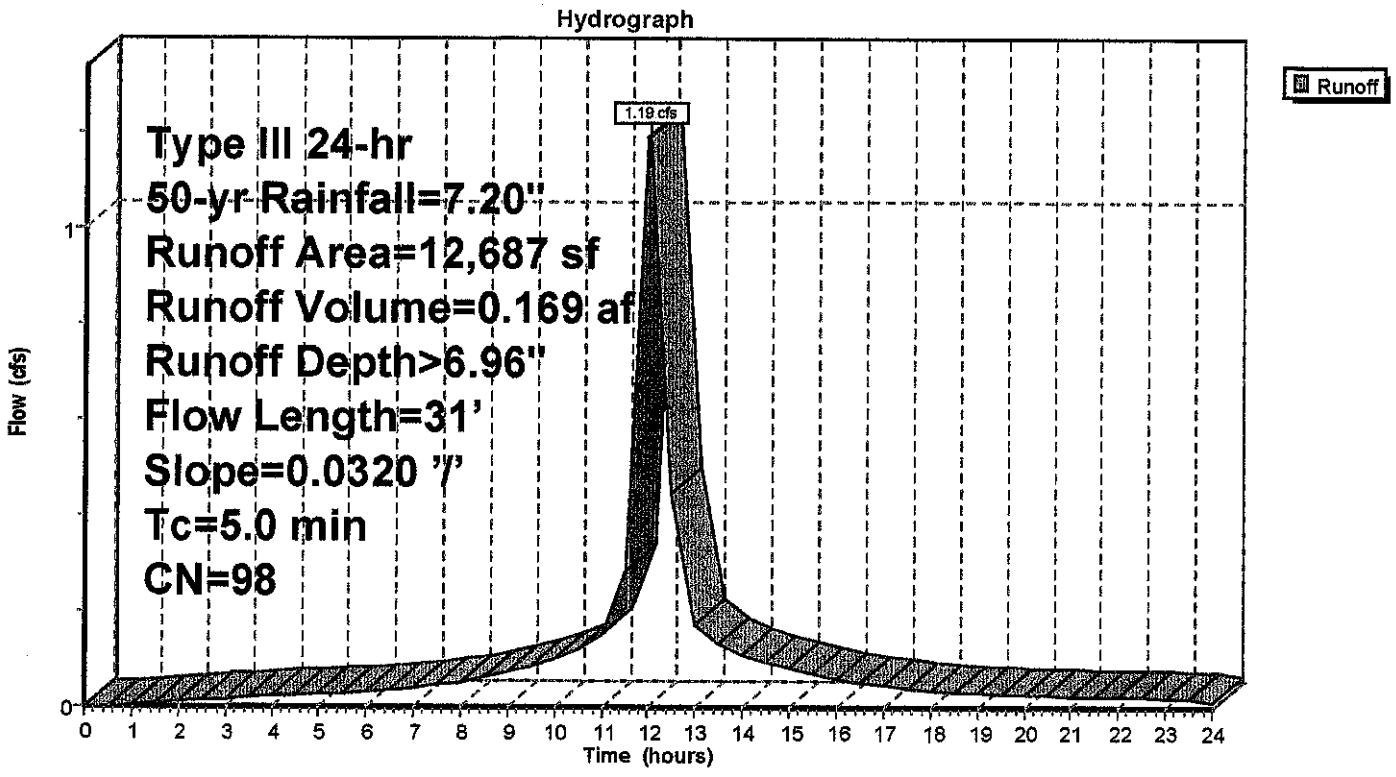
Runoff = 1.19 cfs @ 12.02 hrs, Volume= 0.169 af, Depth> 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 50-yr Rainfall=7.20"

Area (sf)	CN	Description	Land Use
12,687	98	Paved roads w/curbs & sewers, HSG B	Roadway
12,687		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0320	1.33		**Sheet Flow, Front Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.4	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P6: Front Paking



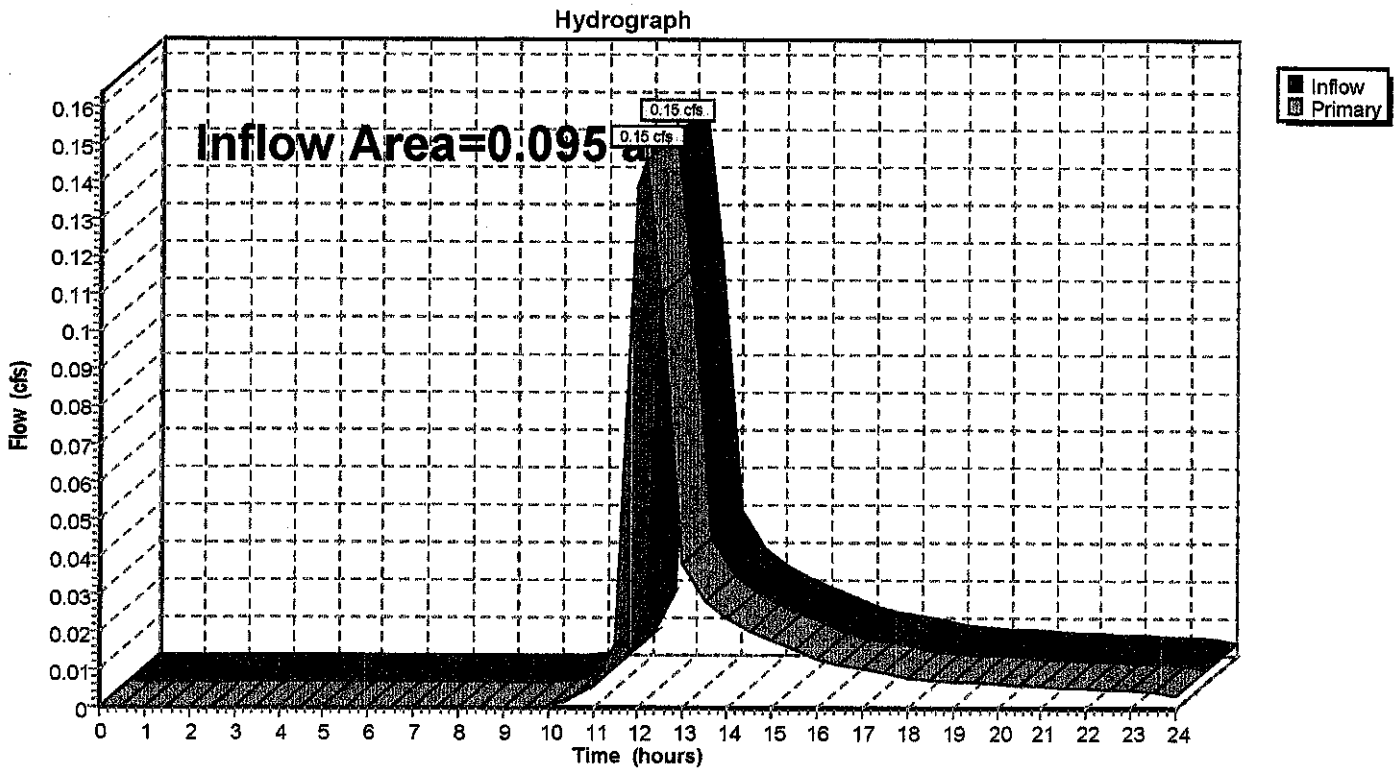
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.095 ac, 0.00% Impervious, Inflow Depth > 2.85" for 50-yr event
Inflow = 0.15 cfs @ 12.15 hrs, Volume= 0.022 af
Primary = 0.15 cfs @ 12.15 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs

Pond 1P: Christian Lane



Summary for Pond S1: Rear Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area = 0.432 ac,100.00% Impervious, Inflow Depth > 6.96" for 50-yr event
Inflow = 1.77 cfs @ 12.02 hrs, Volume= 0.251 af
Outflow = 1.35 cfs @ 12.25 hrs, Volume= 0.252 af, Atten= 24%, Lag= 13.5 min
Discarded = 1.35 cfs @ 12.25 hrs, Volume= 0.252 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 62.40' @ 12.20 hrs Surf.Area= 588 sf Storage= 518 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.0 min (745.3 - 741.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	61.00'	566 cf	**11.00'W x 53.46'L x 3.50'H Field A** 2,058 cf Overall - 643 cf Embedded = 1,415 cf x 40.0% Voids
#2A	61.50'	643 cf	**ADS_StormTech SC-740 +Cap**x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 7 Chambers
		1,209 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.25 hrs HW=62.21' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S1: Rear Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

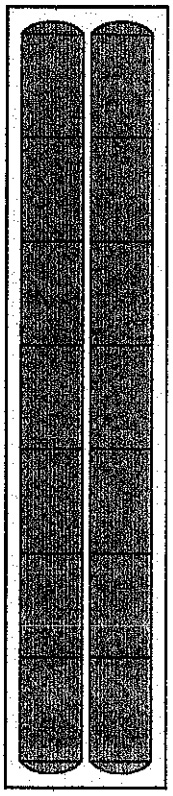
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf = 643.2 cf Chamber Storage

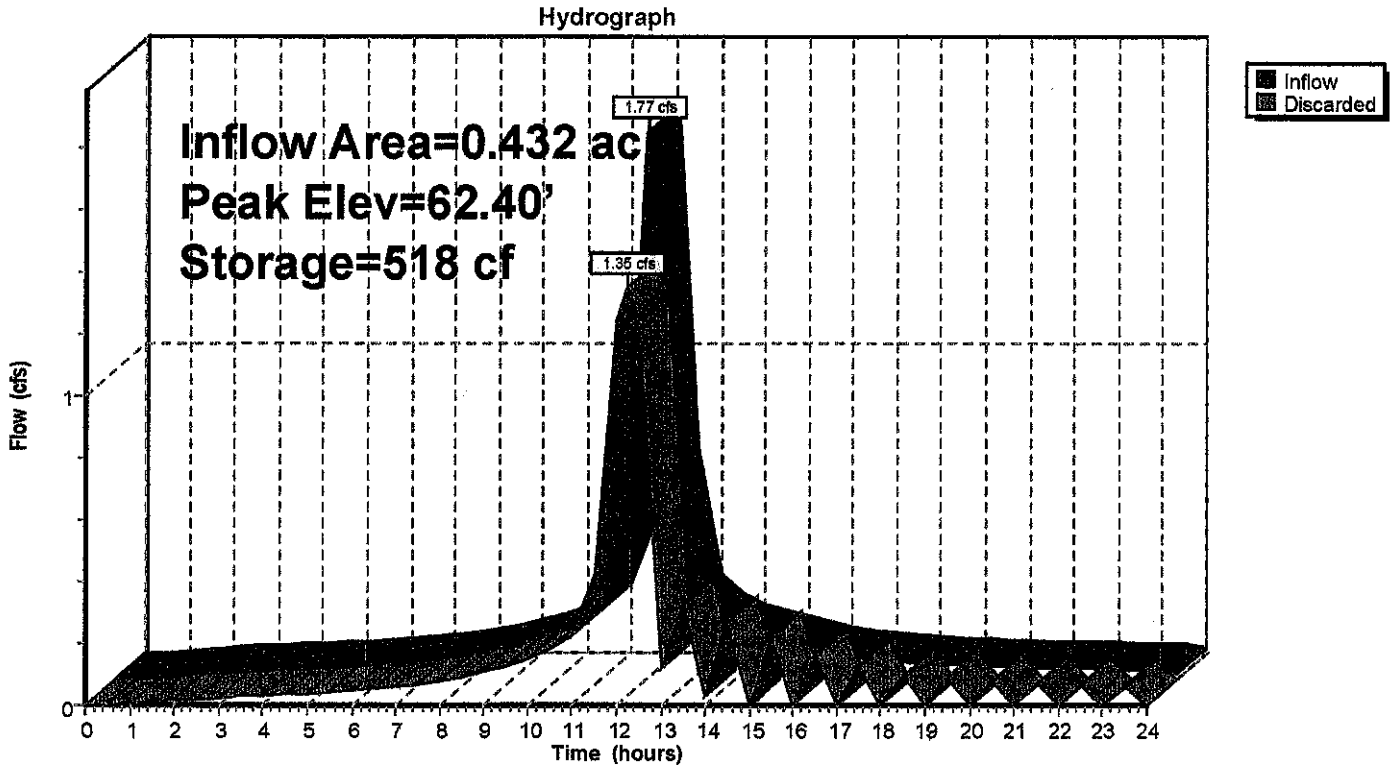
2,058.1 cf Field - 643.2 cf Chambers = 1,414.9 cf Stone x 40.0% Voids = 566.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,209.1 cf = 0.028 af
Overall Storage Efficiency = 58.8%
Overall System Size = 53.46' x 11.00' x 3.50'

14 Chambers
76.2 cy Field
52.4 cy Stone



Pond S1: Rear Storage



Summary for Pond S2: Front Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area = 0.345 ac,100.00% Impervious, Inflow Depth > 6.96" for 50-yr event
Inflow = 1.41 cfs @ 12.02 hrs, Volume= 0.200 af
Outflow = 1.28 cfs @ 12.10 hrs, Volume= 0.206 af, Atten= 10%, Lag= 4.4 min
Discarded = 1.28 cfs @ 12.10 hrs, Volume= 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 59.79' @ 12.00 hrs Surf.Area= 353 sf Storage= 147 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.5 min (744.8 - 741.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.00'	347 cf	**11.00'W x 32.10'L x 3.50'H Field A** 1,236 cf Overall - 368 cf Embedded = 868 cf x 40.0% Voids
#2A	59.50'	368 cf	**ADS_StormTech SC-740 +Cap**x 8 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		715 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	59.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.10 hrs HW=59.64' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S2: Front Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

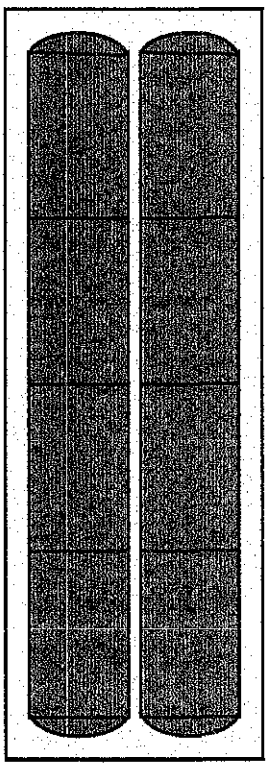
4 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 30.10' Row Length +12.0" End Stone x 2 = 32.10' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

8 Chambers x 45.9 cf = 367.5 cf Chamber Storage

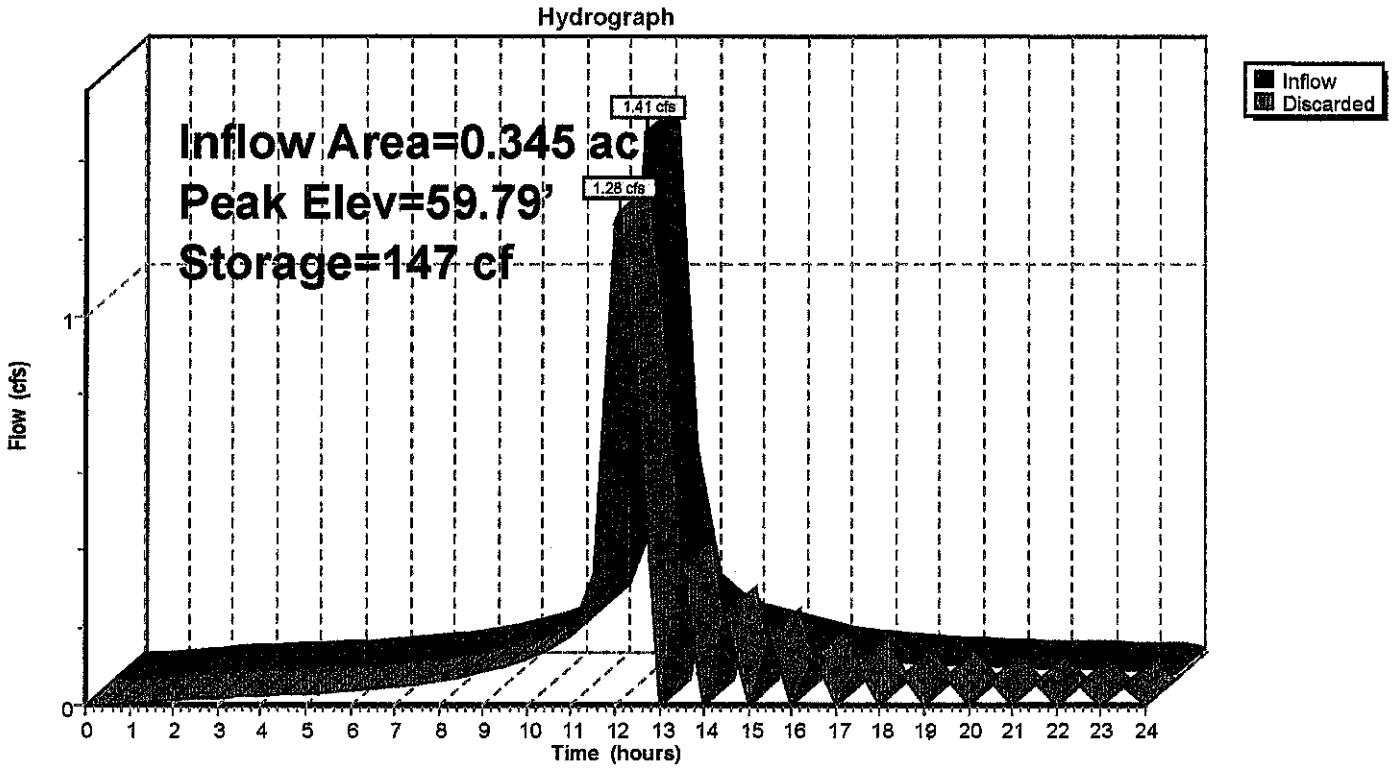
1,235.7 cf Field - 367.5 cf Chambers = 868.2 cf Stone x 40.0% Voids = 347.3 cf Stone Storage

Chamber Storage + Stone Storage = 714.8 cf = 0.016 af
Overall Storage Efficiency = 57.8%
Overall System Size = 32.10' x 11.00' x 3.50'

8 Chambers
45.8 cy Field
32.2 cy Stone



Pond S2: Front Storage



Time span=0.00-24.00 hrs, dt=0.50 hrs, 49 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Rear Parking Runoff Area=8,817 sf 100.00% Impervious Runoff Depth>8.32"
Flow Length=85' Slope=0.0700 '/' Tc=5.0 min CN=98 Runoff=0.99 cfs 0.140 af

SubcatchmentP2: Roof Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>8.32"
Flow Length=141' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=1.12 cfs 0.159 af

SubcatchmentP3: Driveway Runoff Area=2,338 sf 100.00% Impervious Runoff Depth>8.32"
Flow Length=151' Slope=0.1420 '/' Tc=5.0 min CN=98 Runoff=0.26 cfs 0.037 af

SubcatchmentP4: Grass Runoff Area=2,528 sf 0.00% Impervious Runoff Depth>3.88"
Flow Length=209' Slope=0.0380 '/' Tc=13.5 min CN=61 Runoff=0.12 cfs 0.019 af

SubcatchmentP5: Grass Runoff Area=1,594 sf 0.00% Impervious Runoff Depth>3.88"
Flow Length=300' Slope=0.0190 '/' Tc=5.0 min CN=61 Runoff=0.09 cfs 0.012 af

SubcatchmentP6: Front Paking Runoff Area=12,687 sf 100.00% Impervious Runoff Depth>8.32"
Flow Length=31' Slope=0.0320 '/' Tc=5.0 min CN=98 Runoff=1.42 cfs 0.202 af

Pond 1P: Christian Lane Inflow=0.20 cfs 0.031 af
Primary=0.20 cfs 0.031 af

Pond S1: Rear Storage Peak Elev=64.26' Storage=1,154 cf Inflow=2.11 cfs 0.300 af
Outflow=1.34 cfs 0.315 af

Pond S2: Front Storage Peak Elev=60.79' Storage=402 cf Inflow=1.68 cfs 0.239 af
Outflow=1.36 cfs 0.246 af

Total Runoff Area = 0.872 ac Runoff Volume = 0.569 af Average Runoff Depth = 7.84"
10.86% Pervious = 0.095 ac 89.14% Impervious = 0.777 ac

Summary for Subcatchment P1: Rear Parking

[49] Hint: Tc<2dt may require smaller dt

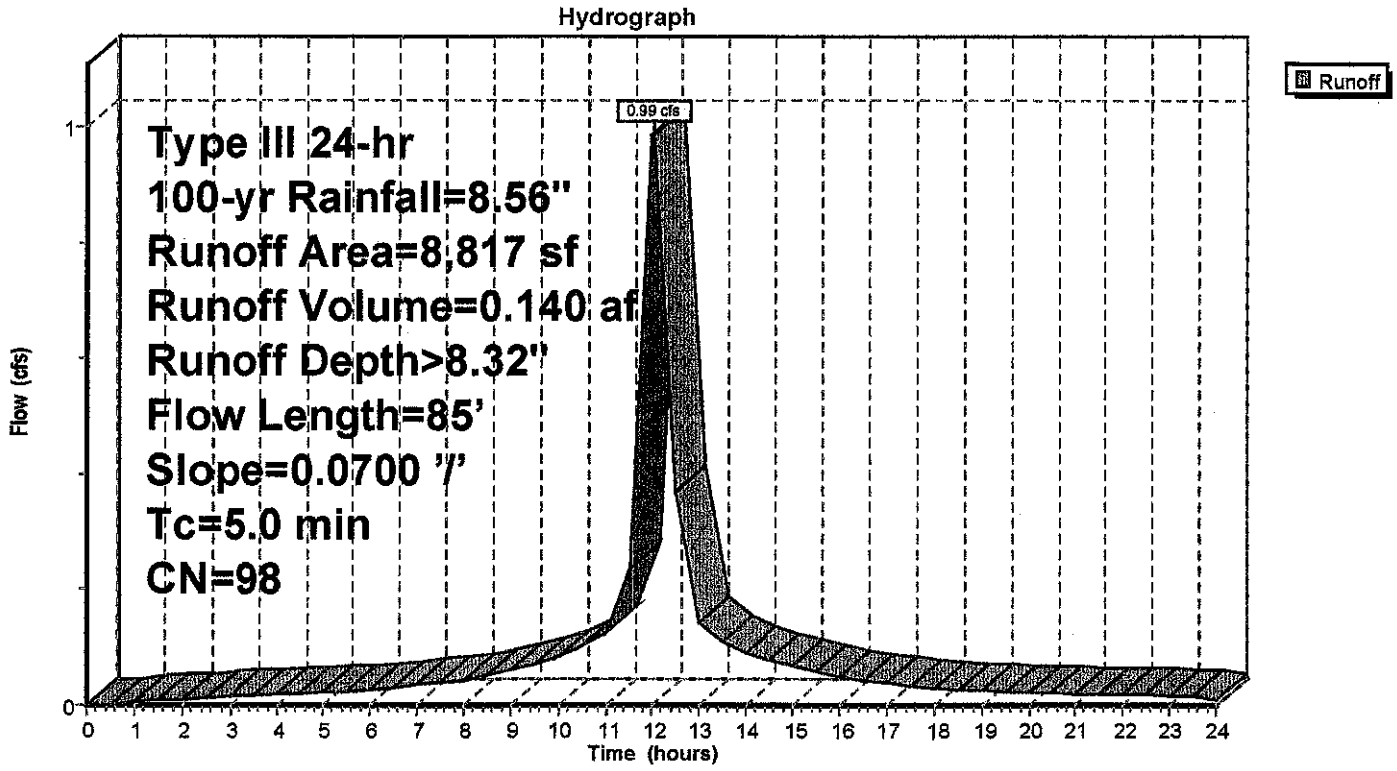
Runoff = 0.99 cfs @ 12.02 hrs, Volume= 0.140 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
8,817	98	Paved parking, HSG B	Pavement
8,817		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	85	0.0700	2.22		**Sheet Flow, Paved Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.6	85	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P1: Rear Parking



Summary for Subcatchment P2: Roof

[49] Hint: Tc<2dt may require smaller dt

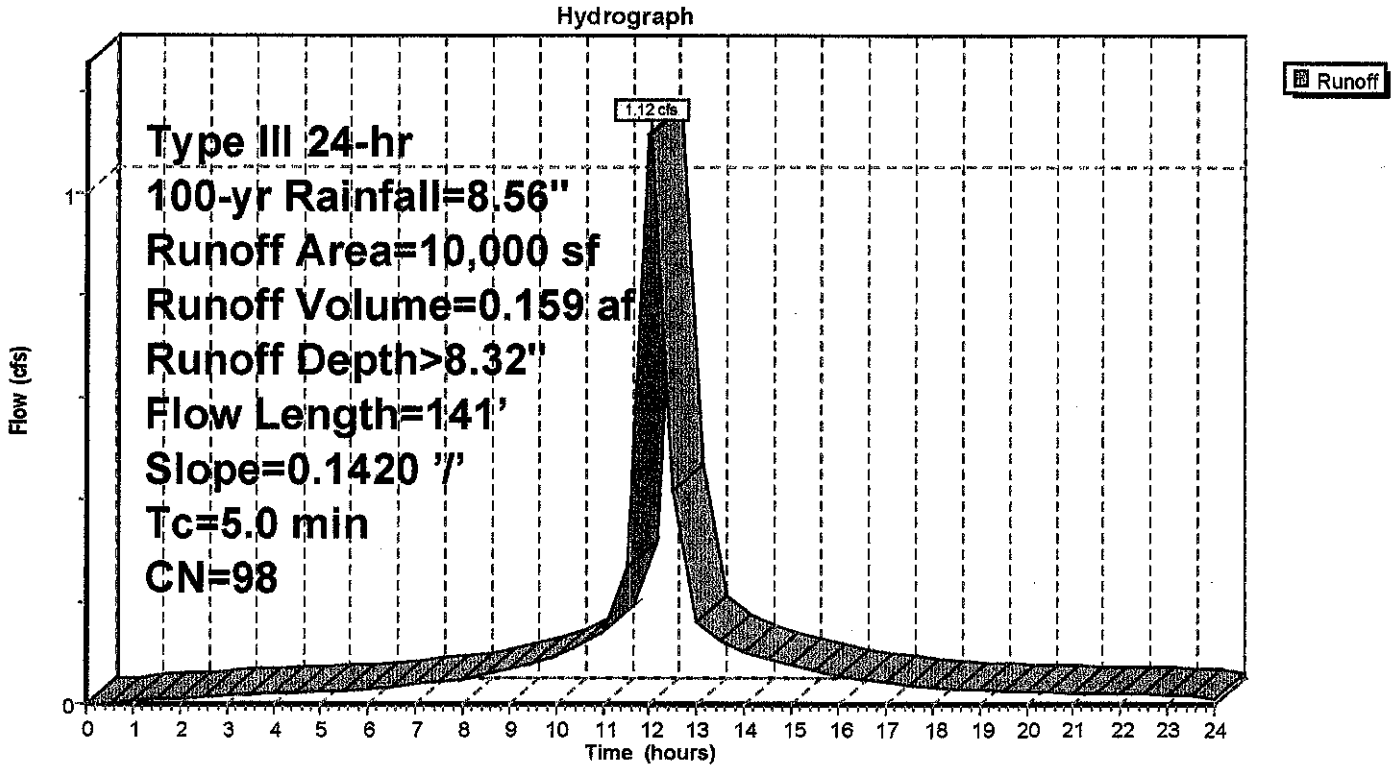
Runoff = 1.12 cfs @ 12.02 hrs, Volume= 0.159 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
10,000	98	Roofs, HSG B	Roofs
10,000		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	141	0.1420	3.26		**Sheet Flow, Top of Roof** Smooth surfaces n= 0.011 P2= 3.26"
0.7	141	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P2: Roof



Summary for Subcatchment P3: Driveway

[49] Hint: Tc<2dt may require smaller dt

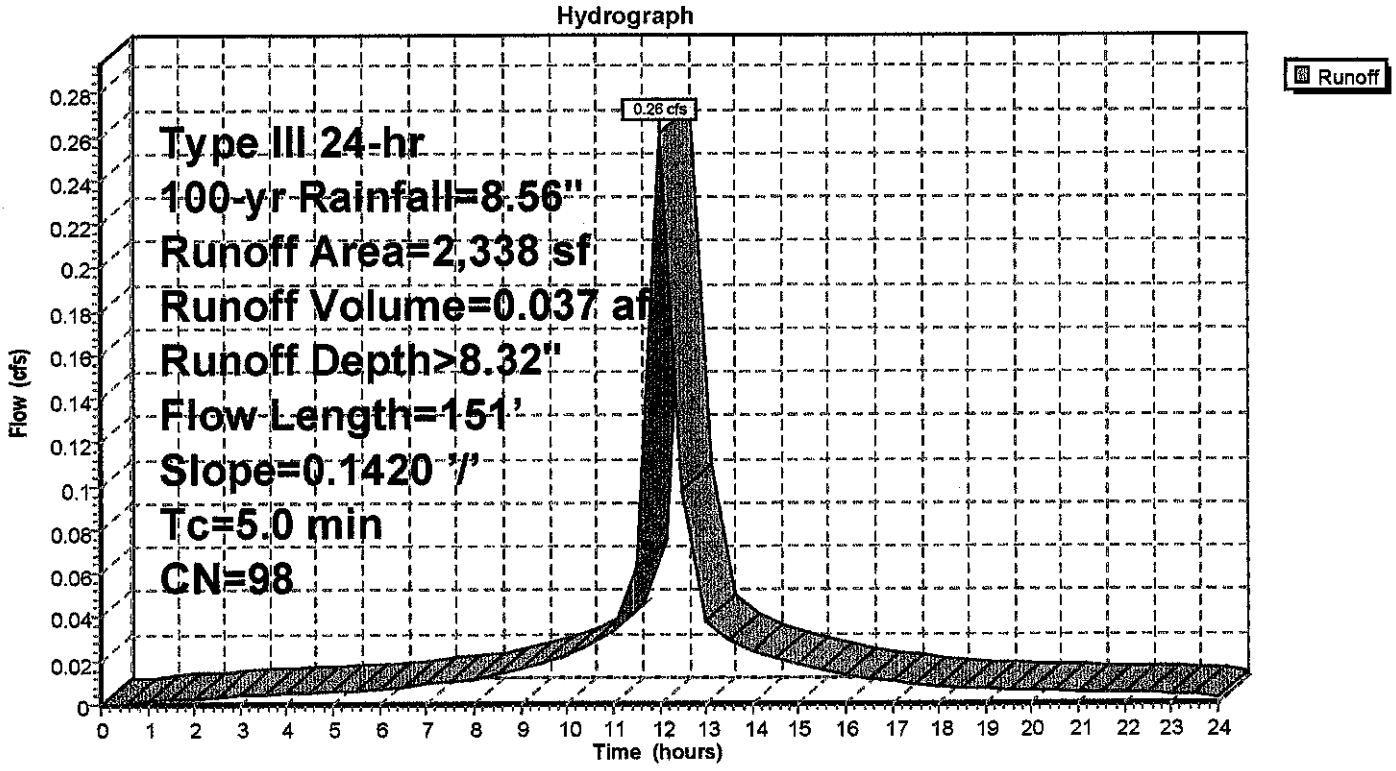
Runoff = 0.26 cfs @ 12.02 hrs, Volume= 0.037 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
2,338	98	Paved parking, HSG B	Residential
2,338		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	151	0.1420	3.30		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.26"
0.8	151	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P3: Driveway



Summary for Subcatchment P4: Grass

[49] Hint: Tc<2dt may require smaller dt

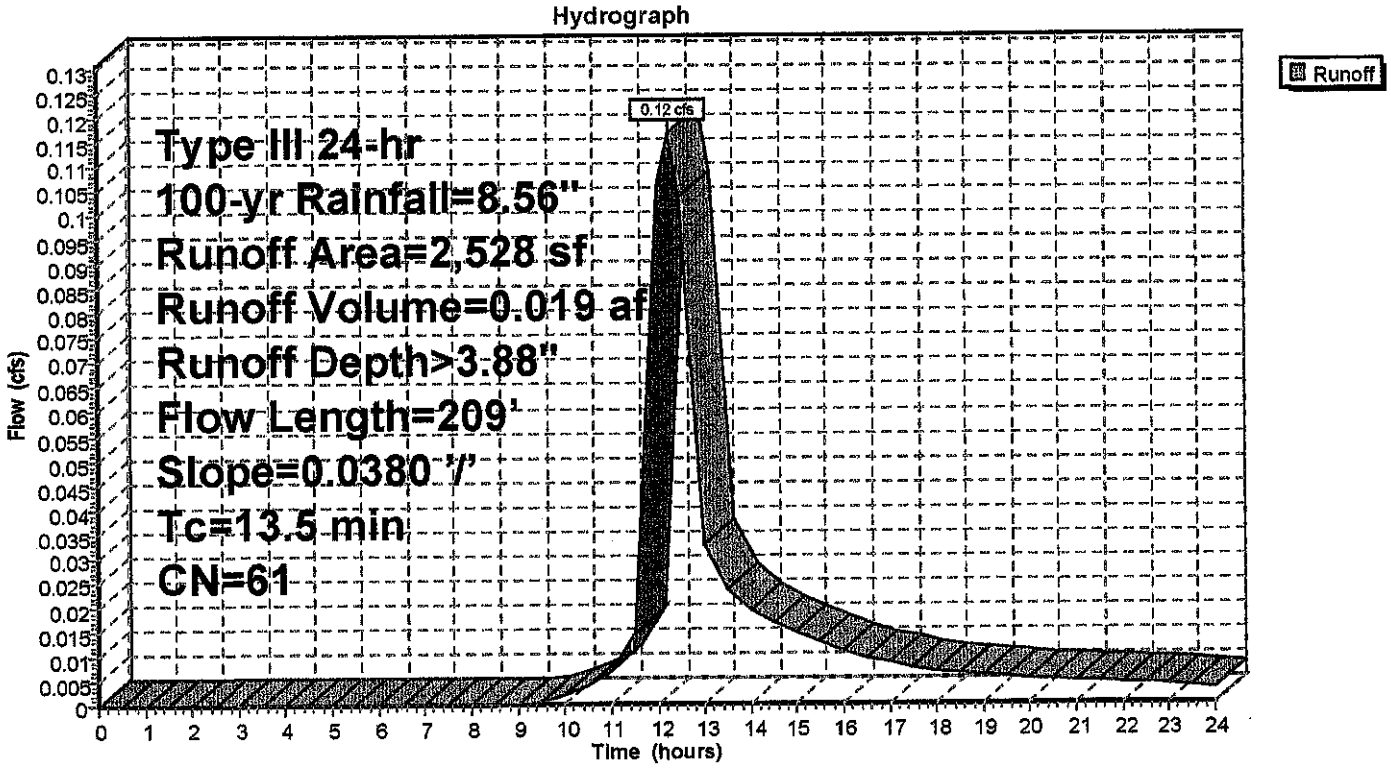
Runoff = 0.12 cfs @ 12.24 hrs, Volume= 0.019 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
2,528	61	>75% Grass cover, Good, HSG B	Pavement
2,528		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	209	0.0380	0.26		**Sheet Flow, Right Side Grass** Grass: Short n= 0.150 P2= 3.26"

Subcatchment P4: Grass



Summary for Subcatchment P5: Grass

[49] Hint: Tc<2dt may require smaller dt

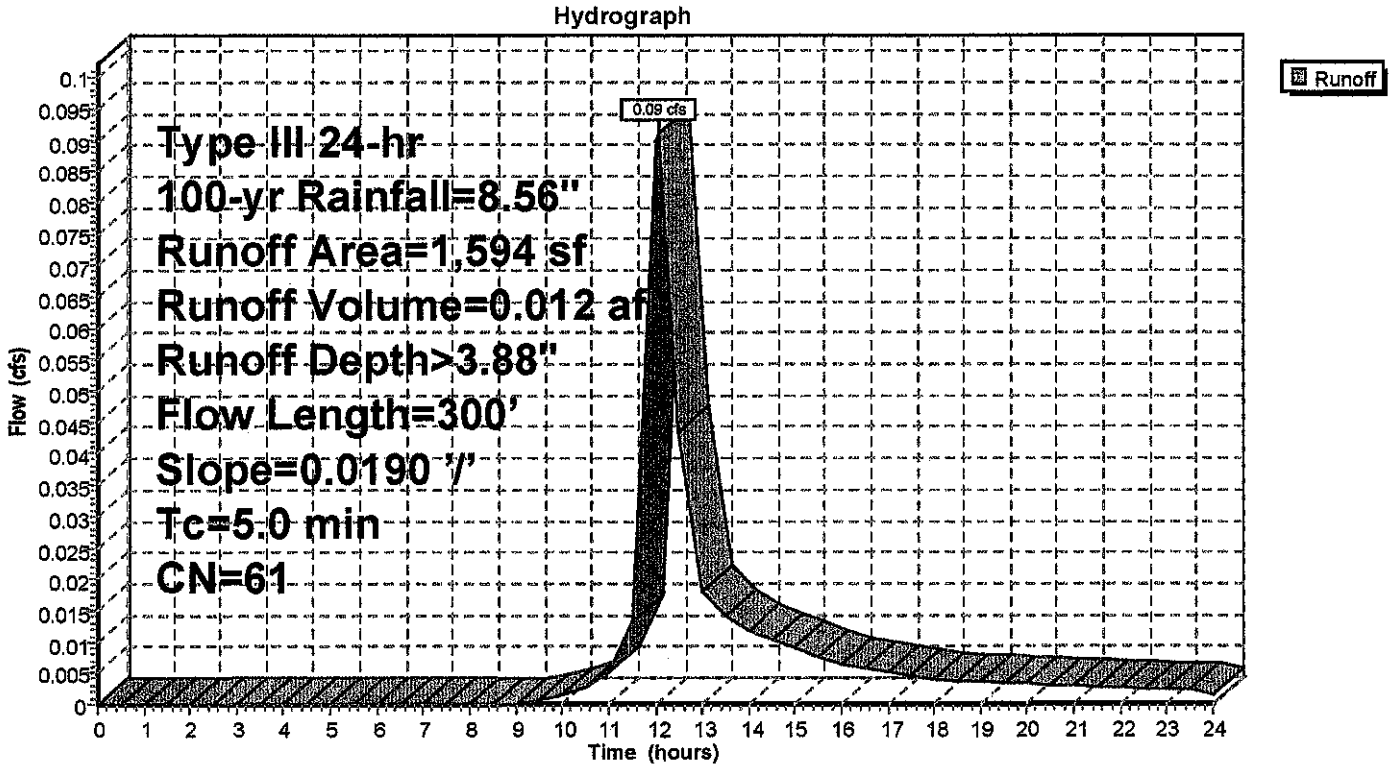
Runoff = 0.09 cfs @ 12.06 hrs, Volume= 0.012 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
1,594	61	>75% Grass cover, Good, HSG B	Pavement
1,594		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	300	0.0190	1.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.26"
3.0	300	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P5: Grass



Summary for Subcatchment P6: Front Paking

[49] Hint: Tc<2dt may require smaller dt

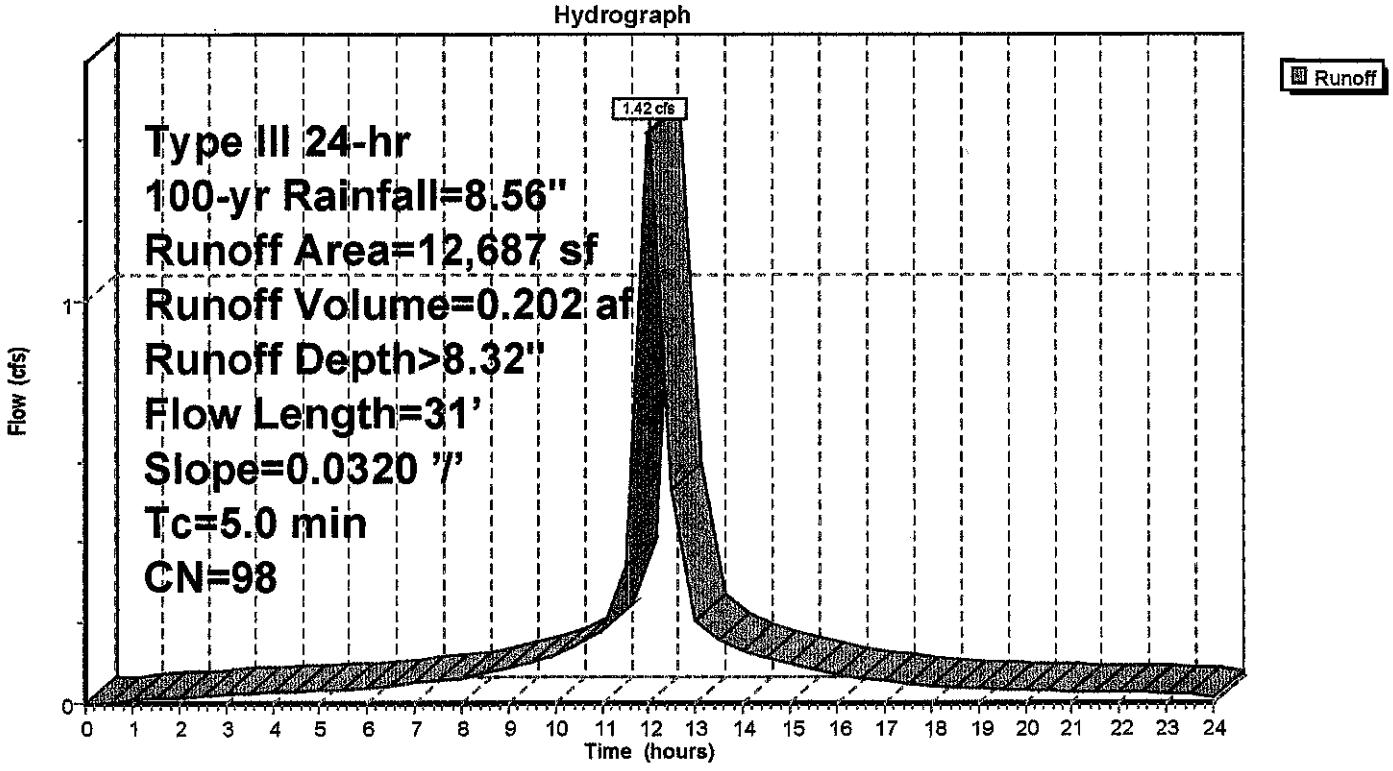
Runoff = 1.42 cfs @ 12.02 hrs, Volume= 0.202 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Type III 24-hr 100-yr Rainfall=8.56"

Area (sf)	CN	Description	Land Use
12,687	98	Paved roads w/curbs & sewers, HSG B	Roadway
12,687		100.00% Impervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0320	1.33		**Sheet Flow, Front Parking** Smooth surfaces n= 0.011 P2= 3.26"
0.4	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment P6: Front Paking



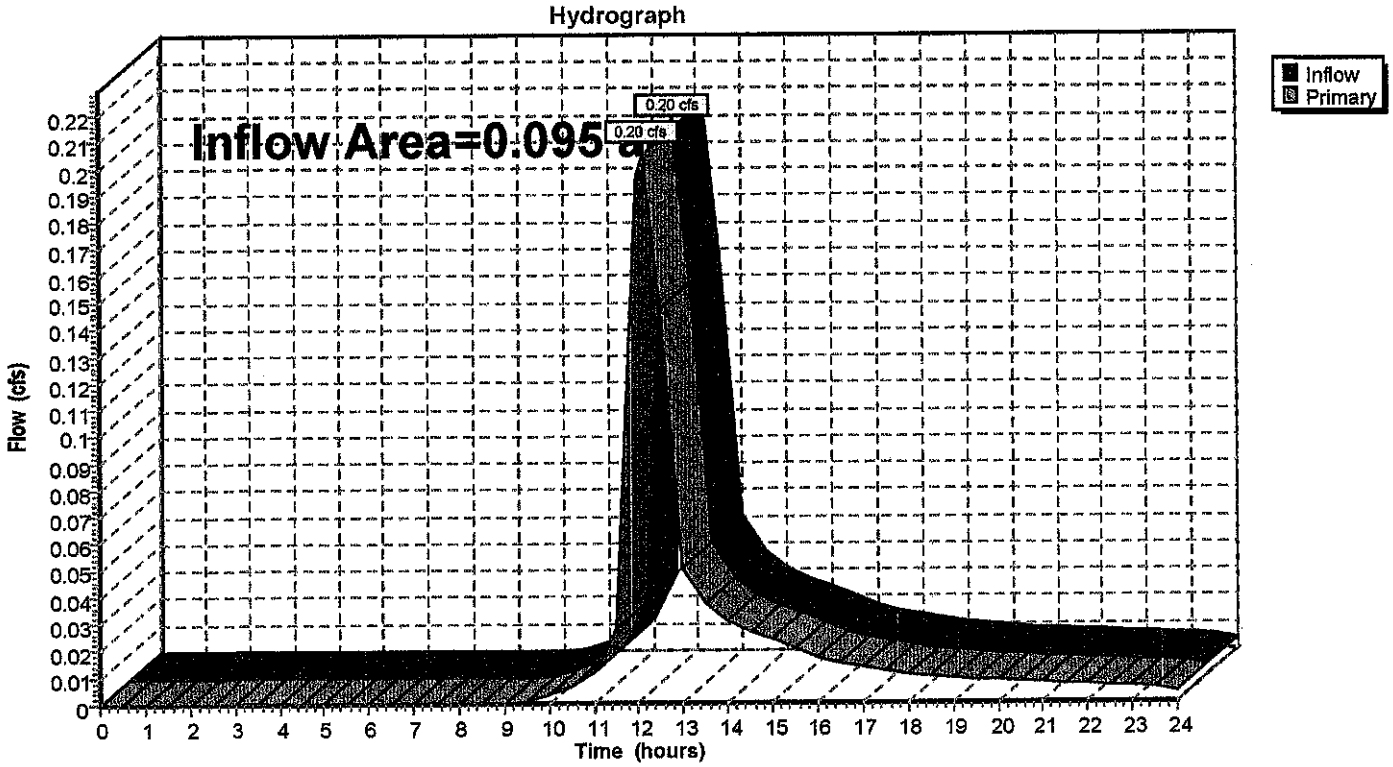
Summary for Pond 1P: Christian Lane

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

Inflow Area = 0.095 ac, 0.00% Impervious, Inflow Depth > 3.88" for 100-yr event
Inflow = 0.20 cfs @ 12.14 hrs, Volume= 0.031 af
Primary = 0.20 cfs @ 12.14 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs

Pond 1P: Christian Lane



Summary for Pond S1: Rear Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)

Inflow Area = 0.432 ac,100.00% Impervious, Inflow Depth > 8.32" for 100-yr event
Inflow = 2.11 cfs @ 12.02 hrs, Volume= 0.300 af
Outflow = 1.34 cfs @ 12.25 hrs, Volume= 0.315 af, Atten= 36%, Lag= 13.5 min
Discarded = 1.34 cfs @ 12.25 hrs, Volume= 0.315 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 64.26' @ 12.38 hrs Surf.Area= 588 sf Storage= 1,154 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.3 min (749.5 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	61.00'	566 cf	**11.00'W x 53.46'L x 3.50'H Field A** 2,058 cf Overall - 643 cf Embedded = 1,415 cf x 40.0% Voids
#2A	61.50'	643 cf	**ADS_StormTech SC-740 +Cap**x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 7 Chambers
		1,209 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.25 hrs HW=63.58' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S1: Rear Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

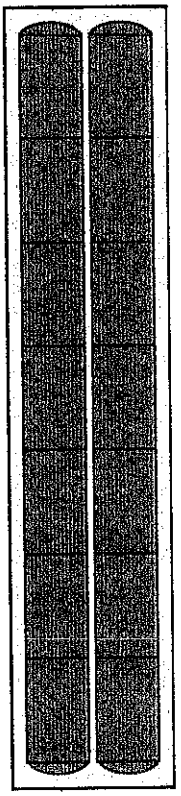
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf = 643.2 cf Chamber Storage

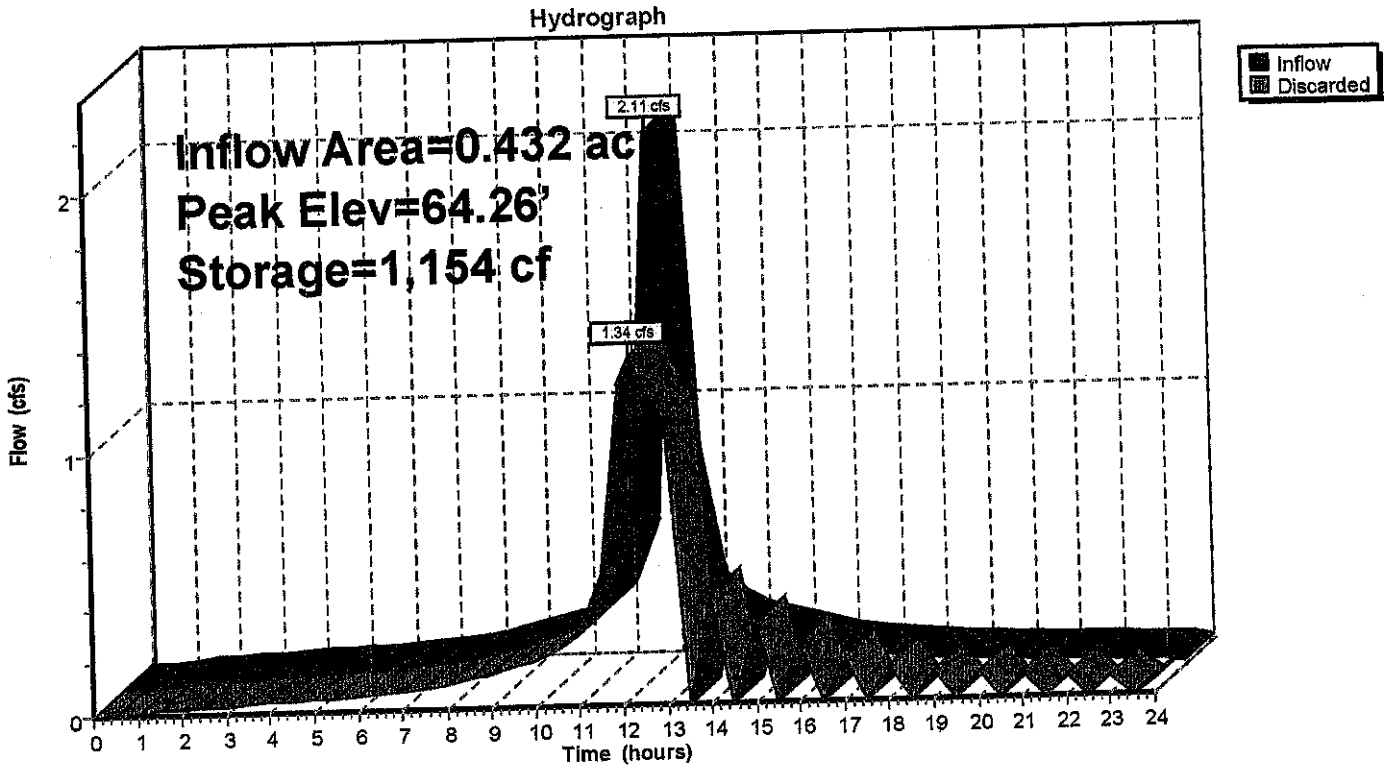
2,058.1 cf Field - 643.2 cf Chambers = 1,414.9 cf Stone x 40.0% Voids = 566.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,209.1 cf = 0.028 af
Overall Storage Efficiency = 58.8%
Overall System Size = 53.46' x 11.00' x 3.50'

14 Chambers
76.2 cy Field
52.4 cy Stone



Pond S1: Rear Storage



Summary for Pond S2: Front Storage

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area = 0.345 ac,100.00% Impervious, Inflow Depth > 8.32" for 100-yr event
Inflow = 1.68 cfs @ 12.02 hrs, Volume= 0.239 af
Outflow = 1.36 cfs @ 12.25 hrs, Volume= 0.246 af, Atten= 19%, Lag= 13.5 min
Discarded = 1.36 cfs @ 12.25 hrs, Volume= 0.246 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.50 hrs
Peak Elev= 60.79' @ 12.11 hrs Surf.Area= 353 sf Storage= 402 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.7 min (743.9 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.00'	347 cf	**11.00'W x 32.10'L x 3.50'H Field A** 1,236 cf Overall - 368 cf Embedded = 868 cf x 40.0% Voids
#2A	59.50'	368 cf	**ADS_StormTech SC-740 +Capx** 8 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		715 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	59.00'	**1.25 cfs Exfiltration at all elevations**

Discarded OutFlow Max=1.25 cfs @ 12.25 hrs HW=60.39' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.25 cfs)

Pond S2: Front Storage - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740+Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

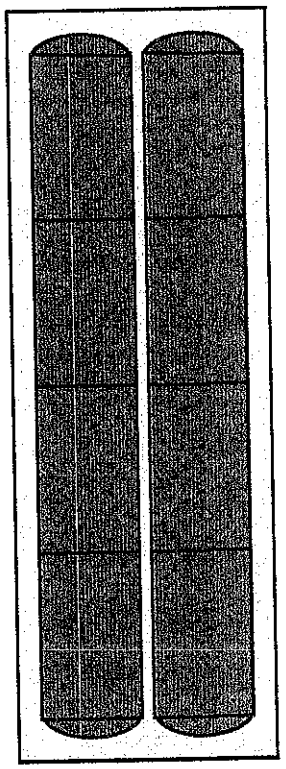
4 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 30.10' Row Length +12.0" End Stone x 2 = 32.10' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

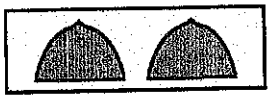
8 Chambers x 45.9 cf = 367.5 cf Chamber Storage

1,235.7 cf Field - 367.5 cf Chambers = 868.2 cf Stone x 40.0% Voids = 347.3 cf Stone Storage

Chamber Storage + Stone Storage = 714.8 cf = 0.016 af
Overall Storage Efficiency = 57.8%
Overall System Size = 32.10' x 11.00' x 3.50'

8 Chambers
45.8 cy Field
32.2 cy Stone





Pond S2: Front Storage