STORMWATER MANAGEMENT REPORT

Park Place Way

218-220 Main Street
Medway, Massachusetts

Prepared for:
New Generation Custom Homes
5 Exchange Street, Suite 4
Milford, MA 01757

Prepared by:
MERIDIAN ASSOCIATES, INC.
69 Milk Street, Suite 302
Westborough, Massachusetts 01581

June 10, 2020

MERIDIAN ASSOCIATES

TABLE OF CONTENTS

REPORT SUMMARY:

Calculation Objectives:

The objective of these calculations is to demonstrate design compliance of the proposed development at 218-220 Main Street in Medway, Massachusetts for water quantity and water quality objectives of the DEP's Stormwater Management Regulations, the Massachusetts Stormwater Handbook, and Medway's Stormwater Management and Land Disturbance Bylaw. Portions of the Project can be considered as redevelopment. The proposed development will fully comply with the ten (10) standards of the MADEP Stormwater Regulations as well as Medway's Stormwater Management and Land Disturbance Bylaw.

Subcatchment Area Plans have been incorporated into this report to depict existing and proposed watershed areas.

Calculation Methods:

- TR55/TR20 methodology utilizing HydroCAD software by Applied Microcomputer Systems.
- MADEP Stormwater Management Handbook for Water Quality Calculations / TSS Removal.

Sources of Data:

- Technical Report No. 20 & No. 55
- Technical Paper No. 40
- NOAA Atlas 14, September 2015
- Existing Conditions Field Survey by Meridian Associates, Inc. in July 2019
- Web Soil Survey of Norfolk County Massachusetts by the USDA Natural Resources Conservation Service (NRCS)
- Soil Testing performed by Janice Weldon, SE of Meridian Associates, Inc. on April 27, 2020
- "Stormwater Management – Stormwater Policy Handbook and Stormwater Technical Handbook" by the Massachusetts DEP – February 2008

Soil Descriptions:

Existing soil conditions have been characterized by the Norfolk County Soil Survey Report. The soils have been assigned a Hydrologic Soil Grouping (HSG) by NRCS. According to NRCS, the site consists of the following soils:

Hydrologic Soil Group (HSG) Rating	NRCS Soil Map Unit Name
B	Charlton-Hollis-Rock outcrop complex, 8-15% slopes
B	Canton fine sandy loam, 0-8% slopes, extremely stony

As required by Volume 3: Documenting Compliance with the Massachusetts Stormwater Management Standards, an on-site soil evaluation was undertaken on April 27, 2020 to confirm the NRCS soil survey by Janice Weldon, a licensed soil evaluator with MAI.

The observed soil type was documented, mapped and is included in this report. The observed soils were found to be primarily sand and loamy sand, with an Estimated Seasonal High Groundwater elevation varying from 226.0 to 233.5. This variation is likely due to the presence of ledge.

Due to the soil type, design of the infiltration chambers, as well as dewatering and mounding calculations are based on a loamy sand Rawls Infiltration rate of 2.41 in/hr, as the chambers will be draining into this layer. The detention basin was modelled with a more conservative Rawls Infiltration rate of 1.02 in/hr since the basin will dewater into the sandy loam. Mounding and dewatering calculations were also performed with this lower Rawls Rate.

Selection of Storm Events:

The storm events have been compiled from the National Oceanic and Atmospheric Administration (NOAA)'s Atlas 14. The 2-year, 10-year, and 100-year storm events have been utilized for hydrology calculations. The rainfall data for the Type III, 24-hour storm events follow:

Frequency (Years)	Rainfall (Inches/Hour)
2	3.37
10	5.26
100	8.26

Existing Conditions Overview:

The Site is a 1.22 acre parcel located on Main Street in southern Medway. There are currently two single family homes on the site as well as a shed and a pool. Stormwater on the site drains naturally to the abutting property to the west or overland to the municipal storm drain system on Main Street. Some of the runoff which drains to Main Street is captured in a manmade pond and/or a natural depression, however there are no true stormwater management devices on the property.

Existing conditions on the site have been modelled using four subcatchment areas. A summary of existing subcatchments and natural drainage devices can be found below.

Description	Comments
SC-E1 (DP-1)	Developed area of site, flows directly overland to Main Street
SC-E2 (DP-1)	Existing pervious area, flows to man-made pond
SC-E3 (DP-1)	Overland flow to existing depression
SC-E4 (DP-2)	Overland flow to western abutters
EP-1	Man-made lined pond, no exfiltration
EP-2	Existing depression in southwest corner of site
DP-1	Main Street municipal storm drain system
DP-2	224 Main Street (Western abutters)

Proposed Conditions Overview:

New Generation Custom Homes is proposing to construct five additional residential units on the site. The units will be divided among two buildings, one with three units and one with two units. The driveway will be extended to service the new buildings. The existing pool and shed will be demolished. Development will add approximately 15,206 sf of new impervious to the site in the form of driveways and buildings.

Increases in stormwater runoff rates and volumes will be mitigated through the installation of four subsurface infiltration systems which will serve as drywells for all four buildings on site. The drywells have been sized to contain the 100-year storm event, and roof drains on all buildings will be fitted with overflows to allow for bypass in larger storm events. Stormwater from driveways and front yards will be directed to a detention basin with a forebay via deep sump catch basins.

The following is a summary of post-development subcatchment watershed areas from the site:

Description	Comments
SC P-1 (DP-2)	Overland flow to 244 Main Street
SC P-2 (DP-1)	Proposed development driveways and central yard area to PP-1
SC P-3 (DP-1)	Overland flow directly to PP-1
SC P-4 (DP-1)	Overland flow to Main Street
PP-1	Proposed Detention Basin
DP-1	Main Street municipal storm drain system
DP-2	224 Main Street (Western Abutters)

Summary of Flows at Design Point 1

	Existing Conditions (Pre)		Proposed Conditions (Post)	
Storm Event	Peak Flow (CFS)	Runoff Volume (CF)	Peak Flow (CFS)	Runoff Volume (CF)
2-Year (3.37 in./hr.)	0.55	2,284	0.16	525
10-Year (5.26 in./hr.)	1.38	5,385	0.38	2,380
100-Year (8.26 in./hr.)	2.93	11,179	2.63	8,488

Summary of Flows at Design Point 2

	Existing Conditions (Pre)		Proposed Conditions (Post)	
Storm Event	**Peak Flow (CFS)**	**Runoff Volume (CF)**	**Peak Flow (CFS)**	**Runoff Volume (CF)**
2-Year (3.37 in./hr.)	0.14	757	0.07	300
10-Year (5.26 in./hr.)	0.55	2,244	0.26	891
100-Year (8.26 in./hr.)	1.42	5,353	0.67	2,124

Erosion Control Discussion:
The project is not subject to the NPDES Construction General Permit requirements, so a comprehensive Stormwater Pollution Prevention Plan (SWPPP) will not be required prior to construction. That being said, erosion control measures have been depicted on the plans and are further outlined in the Operation and Maintenance Plan found in this Report. Inlet protection shall be provided on all catch basins and storm drain inlets within the limit of work. In addition, the Project area will be surrounded by a compost sock or sediment control barrier for the duration of construction. An Operation and Maintenance Exhibit is also included as part of this submission.

Conclusion:
The calculations performed for all design storm events indicate that neither peak flow rates nor volumes will exceed those of existing conditions with implementation of the stormwater management system as proposed for the 2, 10 and 100-year storm events.

An Operation and Maintenance Plan for stormwater systems is included herein.

With implementation of the stormwater management system as designed, full compliance with the MADEP Stormwater Management regulations as well as the Town of Medway Stormwater Management and Land Disturbance Bylaw.

SOILS INFORMATION

Soil Map—Norfolk and Suffolk Counties, Massachusetts

Map Scale: 1:788 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 14, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

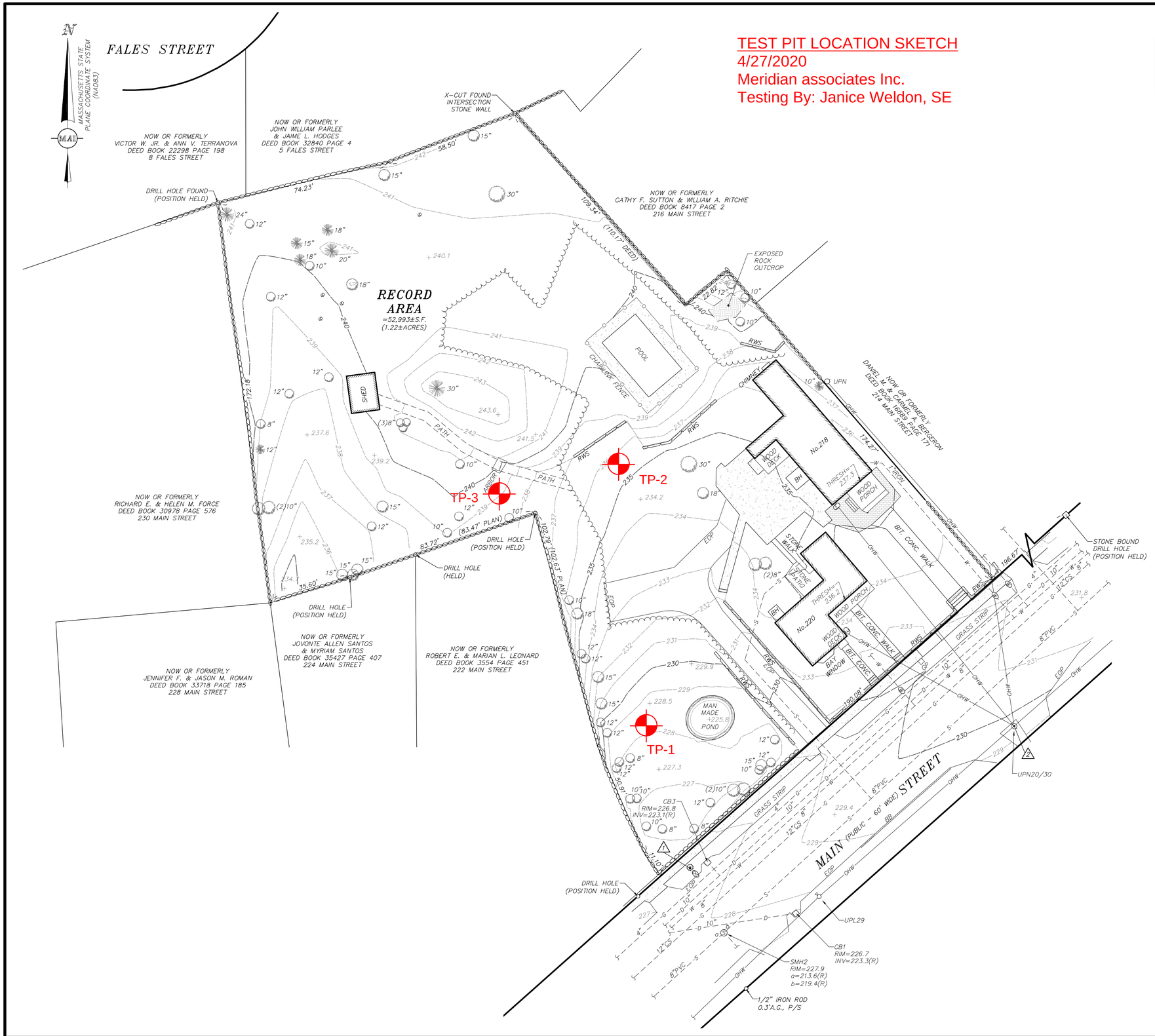
Date(s) aerial images were photographed: May 14, 2010—Apr 1, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	0.8	65.7%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	0.4	34.3%
Totals for Area of Interest		**1.2**	**100.0%**

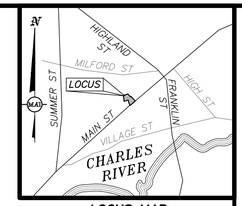
TEST PIT LOCATION SKETCH
4/27/2020
Meridian associates Inc.
Testing By: Janice Weldon, SE



TEMPORARY BENCHMARK CHART:

T.B.M.#	DESCRIPTION	ELEVATION
1	X-CUT HYDRANT FRONT CAP BOLT	229.17
2	CUT SPIKE IN UTILITY POLE 20/30, 1.0' A.G.	230.91

(SEE NOTE 6)



LOCUS MAP:
(1"=2000')

LEGEND:

234	ONE FOOT CONTOUR
235	FIVE FOOT CONTOUR
+234.5	SPOT ELEVATION
	BITUMINOUS BERM
	TREELINE
-O-O-	CHAINLINK FENCE
	STONEWALL
	STONE RETAINING WALL
	EXPOSED ROCK OUTCROP
	CONCRETE
	BRICK
	DECIDUOUS TREE
	CONIFEROUS TREE
	BOULDER
OHW	OVERHEAD WIRES
	UTILITY POLE
	UTILITY POLE WITH LIGHT
	ELECTRIC METER
-D-	COMPILED DRAIN LINE
	CATCH BASIN
-W-	COMPILED WATER LINE
	WATER GATE
	HYDRANT
	WATER SERVICE
-S-	COMPILED SEWER LINE
	SEWER MANHOLE
-G-	COMPILED GAS LINE
	TERMINUS UNKNOWN
A.G.	ABOVE GROUND
BB	BITUMINOUS BERM
BH	BULKHEAD
BIT. CONC.	BITUMINOUS CONCRETE
CS	CORRUGATED STEEL
EOP	EDGE OF PAVEMENT
GP	GRANITE POST
INV.	INVERT
PVC	POLYVINYL CHLORIDE
(R)	RECORD
RWS	STONE RETAINING WALL
S.F.	SQUARE FEET
THRESH	THRESHOLD

NOTES:

1. THE TOPOGRAPHY, SITE DETAIL & SURFACE IMPROVEMENTS DEPICTED HEREON WERE OBTAINED FROM AN INSTRUMENT SURVEY CONDUCTED ON THE GROUND BY MERIDIAN ASSOCIATES, INC. (MAI) ON JULY 11-16, 2019.
2. THE SUBJECT PROPERTY IS LOCATED IN AGRICULTURAL RESIDENTIAL II (AR-II) ZONING DISTRICT AND THE MULTIFAMILY HOUSING OVERLAY DISTRICT (MHOD).
3. THE SUBJECT PROPERTY IS DEPICTED AS LOT 44 ON TOWN OF MEDWAY ASSESSOR'S MAP 57.
4. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND ARE BASED UPON A PARTIAL FIELD SURVEY AND COMPILATION OF PLANS OF RECORD. MERIDIAN ASSOCIATES, INC. DOES NOT WARRANTY NOR GUARANTEE THE LOCATION OF ALL UTILITIES DEPICTED OR NOT DEPICTED. THE CONTRACTOR, PRIOR TO COMMENCEMENT OF CONSTRUCTION, SHALL VERIFY THE LOCATION OF ALL UTILITIES AND CONTACT DIG SAFE AT 811.
5. THIS PLAN DOES NOT SHOW ANY UNRECORDED OR UNWRITTEN EASEMENTS WHICH MAY EXIST. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY APPARENT, VISIBLE USES OF THE LAND; HOWEVER, THIS DOES NOT CONSTITUTE A GUARANTEE THAT NO SUCH EASEMENTS EXIST.
6. THE ELEVATIONS DEPICTED HEREON WERE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), AS DERIVED FROM GPS OBSERVATIONS.
7. PROPERTY LINES DEPICTED HEREON ARE BASED ON COMPILED DEEDS AND PLANS OF RECORD. THIS PLAN IS NOT TO BE USED FOR THE RECONSTRUCTION OF BOUNDARY LINES OR FOR TITLE INSURANCE PURPOSES. ALL BOUNDARY LINES DEPICTED ARE APPROXIMATE ONLY. MAI DID NOT PERFORM A BOUNDARY RETRACEMENT SURVEY.
8. THE SUBJECT PREMISES IS LOCATED IN FLOOD ZONE X (UNSHADED), AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FEMA FLOOD INSURANCE RATE MAP NUMBER 25021C0143E DATED JULY 17, 2012.

ALL UNDERGROUND UTILITY DATA REPRESENTS RECORD INFORMATION RECOVERED THROUGH RESEARCH WITHOUT SURFACE DEMARCATION NOR SUBSURFACE VERIFICATION

RECORD OWNER:

ELLIOTT F. EDWARDS
& LINDA S. RESNER
218 MAIN STREET
MEDWAY, MASSACHUSETTS 02053

- DEED BOOK 14714 PAGE 086

REFERENCES:

- PLAN BOOK 454 PLAN 118

DOCUMENTS ON RECORD AT THE NORFOLK DISTRICT REGISTRY OF DEEDS.

GRAPHIC SCALE
SCALE: 1"= 20'
10 0 10 20 40 80

BK. #615, PG. #64
DWG. No. 8521_BASE.DWG

REVISIONS	DESCRIPTION	BY	DATE

218-220 MAIN STREET
RECORD CONDITIONS PLAN OF LAND
LOCATED IN
MEDWAY, MASSACHUSETTS
(NORFOLK COUNTY)
PREPARED FOR
NEW GENERATION CUSTOM HOMES

MERIDIAN ASSOCIATES
500 CUMMINGS CENTER, SUITE 5950
BEVERLY, MASSACHUSETTS 01915
TELEPHONE: (978) 299-0447
69 MILLS STREET, SUITE 202
WESTBOROUGH, MASSACHUSETTS 01581
TELEPHONE: (508) 871-7030
WWW.MERIDIANASSOC.COM

DESIGNED BY:
CHECKED BY:

DATE: JULY 18, 2019
SCALE: 1"=20'
SHEET No. 1 OF 1
PROJECT No. 8521

April 27, 2020

Soil Testing Summary
New Generation Homes Multifamily Development
218-220 Main Street, Medway, MA

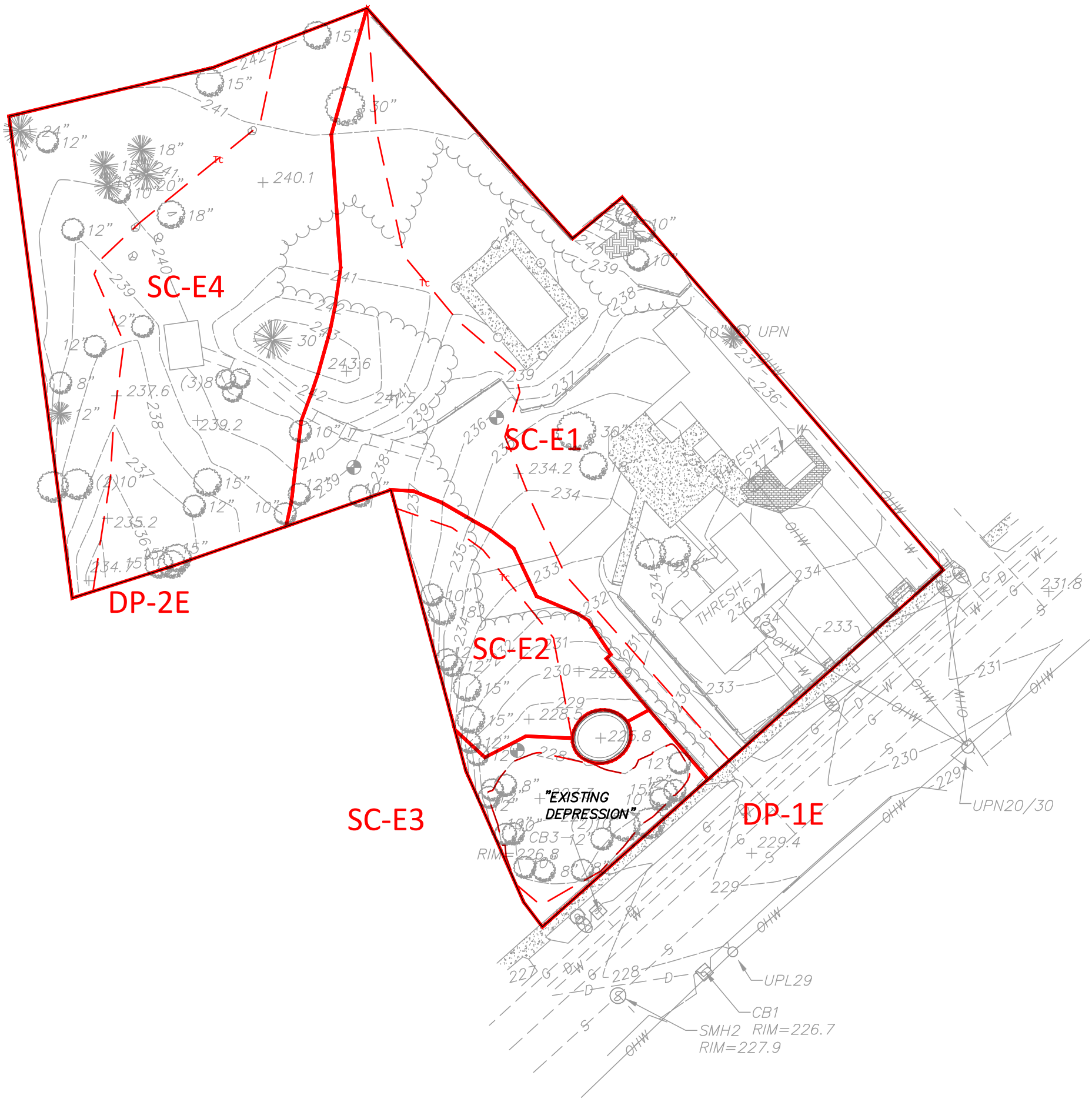
The following test pits were evaluated on this date by Soil Evaluator Janice Weldon

TP-1
Surface elevation (existing)=228.5
0-10" Ap Sandy Loam
10"-24" Bw Fine Sandy Loam
24"-41" C1 Stony Fine Loamy Sand
41"-90"+ C2 Extremely Stony Loamy Sand
Roots to 36"
ESHGW Elev. 226.0
Refusal at Elev. 221.0

TP-2
Surface Elevation (existing) = 235.5
0-10" Ap, Fine Sandy Loam
10"-14" Bw1, Stony Fine Sandy Loam
14"-31" Bw2, Stony Fine Loamy Sand
31"-46" C1, Stony Fine Sand
46"-81" C2, Extremely Stony Sand
ESHGW Elev. 232.7
Refusal at Elev. 228.75

TP-3
Surface elevation (existing) = 239.0
0-10" Ap, Fine Sandy Loam
10"-27" Fill (10"-48" on south pit face)
27"-57" Bw Stony Fine Sandy Loam
57"-93"+ C, Fine Loamy Sand
Cobbles beginning at 10"
Large rocks and boulders at 57"
Roots to 60"
ESHGW Elev. 233.5
Refusal at Elev. 231.3

HYDROLOGICAL ANALYSIS



SCALE: 1"=40'

40' 20' 0 40'

Prepared For:
New Generation Homes
Milford, Massachusetts

Prepared By:
MERIDIAN ASSOCIATES

69 MILK STREET, SUITE 208, WESTBOROUGH, MA 01580 | 508.871.7030
500 CUMMINGS CENTER, SUITE 5950 BEVERLY, MA 01915 | 978.299.0447
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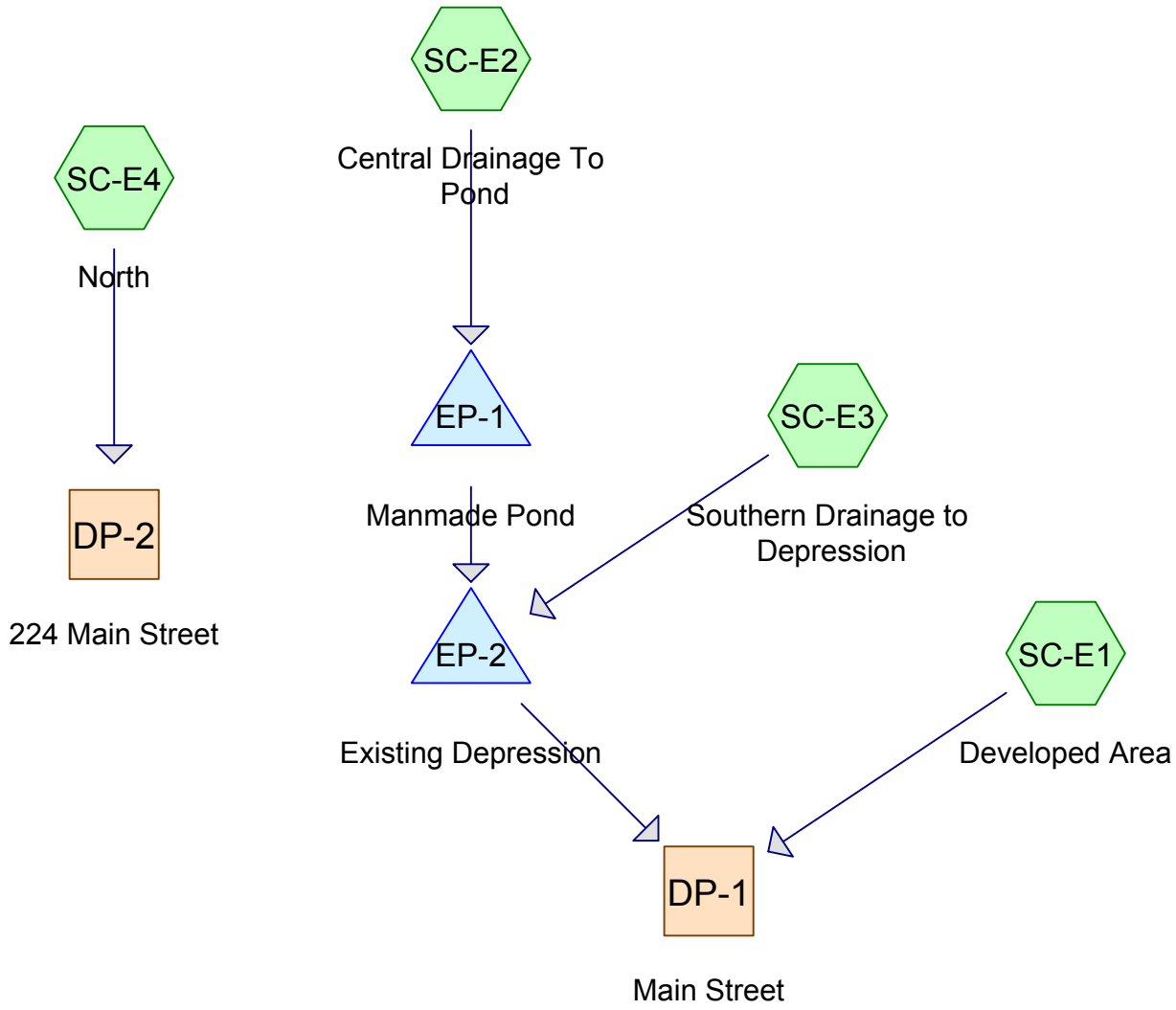
Existing Conditions Subcatchment Areas Exhibit

PARK PLACE WAY
MEDWAY, MA

Scale: 1"=40'
Project No. 8521

Date: March 21, 2020
Dwg No. 8521 Existing Subcatchments.dwg
Sheet 1 of 2



Subcat Reach Pond Link

Routing Diagram for 8521_Existing
Prepared by Meridian Associates, Inc., Printed 6/10/2020

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
28,078	60	Woods, Fair, HSG B (SC-E1, SC-E2, SC-E3, SC-E4)
14,021	61	>75% Grass cover, Good, HSG B (SC-E1, SC-E4)
119	79	<50% Grass cover, Poor, HSG B (SC-E2)
366	82	Gravel path (SC-E1, SC-E4)
1,671	98	218 and patio (SC-E1)
1,126	98	220 and patio (SC-E1)
347	98	Paved parking, HSG B (SC-E2)
1,165	98	Pool (SC-E1)
196	98	Shed (SC-E4)
1,774	98	concrete (SC-E1)
1,499	98	pavement (SC-E1)
298	98	retaining walls (SC-E1)
27	98	stone walkway (SC-E1)
50,687	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
42,565	HSG B	SC-E1, SC-E2, SC-E3, SC-E4
0	HSG C	
0	HSG D	
8,122	Other	SC-E1, SC-E4
50,687		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	0	0	1,671	1,671	218 and patio	
0	0	0	0	1,126	1,126	220 and patio	
0	0	0	0	366	366	Gravel path	
0	0	0	0	1,165	1,165	Pool	
0	0	0	0	196	196	Shed	
0	0	0	0	1,774	1,774	concrete	
0	0	0	0	1,499	1,499	pavement	
0	0	0	0	298	298	retaining walls	
0	0	0	0	27	27	stone walkway	
0	119	0	0	0	119	<50% Grass cover, Poor	
0	14,021	0	0	0	14,021	>75% Grass cover, Good	
0	347	0	0	0	347	Paved parking	
0	28,078	0	0	0	28,078	Woods, Fair	
0	**42,565**	**0**	**0**	**8,122**	**50,687**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-E1: Developed Area Runoff Area=27,913 sf 27.08% Impervious Runoff Depth=0.98"
Flow Length=311' Tc=12.2 min CN=71 Runoff=0.55 cfs 2,284 cf

Subcatchment SC-E2: Central Drainage To Runoff Area=4,148 sf 8.37% Impervious Runoff Depth=0.64"
Flow Length=109' Tc=6.9 min CN=64 Runoff=0.05 cfs 221 cf

Subcatchment SC-E3: Southern Drainage to Runoff Area=1,000 sf 0.00% Impervious Runoff Depth=0.48"
Tc=6.0 min CN=60 Runoff=0.01 cfs 40 cf

Subcatchment SC-E4: North Runoff Area=17,626 sf 1.11% Impervious Runoff Depth=0.52"
Flow Length=223' Tc=11.3 min CN=61 Runoff=0.14 cfs 757 cf

Reach DP-1: Main Street Inflow=0.55 cfs 2,284 cf
Outflow=0.55 cfs 2,284 cf

Reach DP-2: 224 Main Street Inflow=0.14 cfs 757 cf
Outflow=0.14 cfs 757 cf

Pond EP-1: Manmade Pond Peak Elev=227.96' Storage=221 cf Inflow=0.05 cfs 221 cf
Outflow=0.00 cfs 0 cf

Pond EP-2: Existing Depression Peak Elev=227.00' Storage=2 cf Inflow=0.01 cfs 40 cf
Discarded=0.01 cfs 40 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 40 cf

Total Runoff Area = 50,687 sf Runoff Volume = 3,302 cf Average Runoff Depth = 0.78"
84.01% Pervious = 42,584 sf 15.99% Impervious = 8,103 sf

Summary for Subcatchment SC-E1: Developed Area

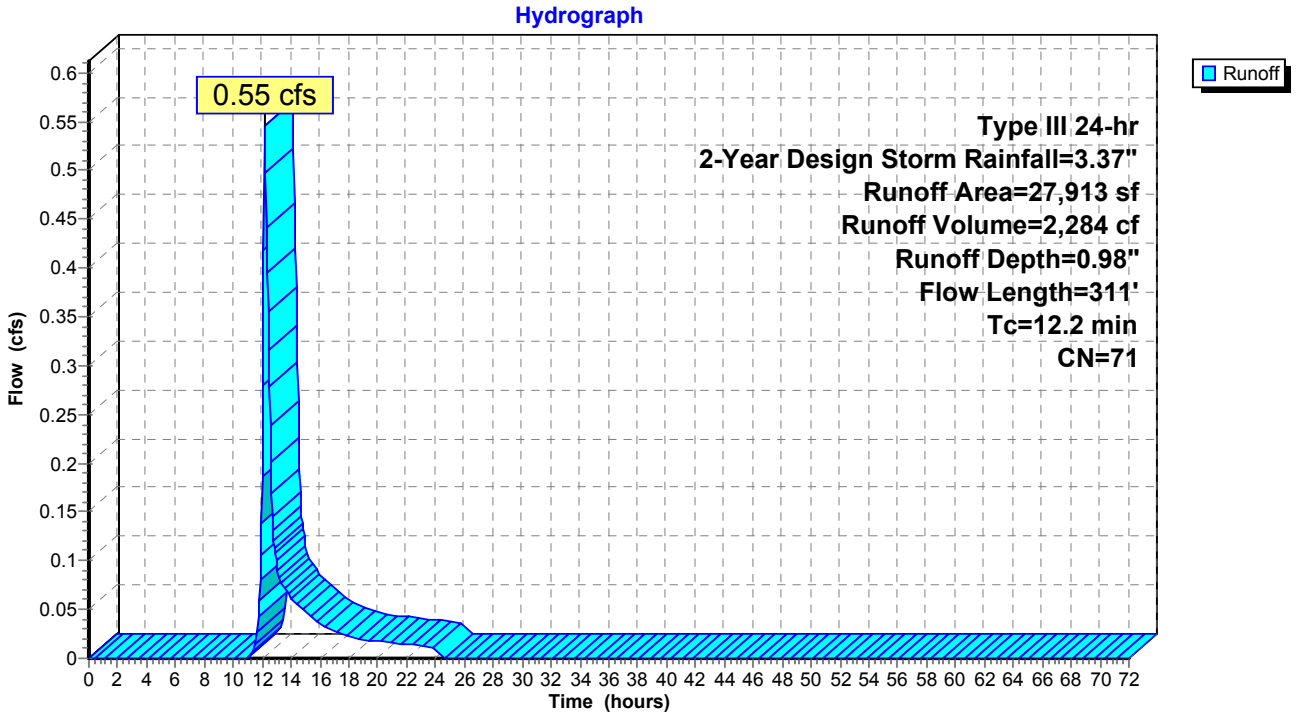
Runoff = 0.55 cfs @ 12.19 hrs, Volume= 2,284 cf, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

	Area (sf)	CN	Description
*	1,165	98	Pool
*	1,671	98	218 and patio
*	1,126	98	220 and patio
*	1,774	98	concrete
*	27	98	stone walkway
*	298	98	retaining walls
*	1,499	98	pavement
	6,231	60	Woods, Fair, HSG B
*	197	82	Gravel path
	13,925	61	>75% Grass cover, Good, HSG B
	27,913	71	Weighted Average
	20,353		72.92% Pervious Area
	7,560		27.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	43	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.6	7	0.0200	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	31	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	66	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.3100	3.90		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	95	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.2	311	Total			

Subcatchment SC-E1: Developed Area



Summary for Subcatchment SC-E2: Central Drainage To Pond

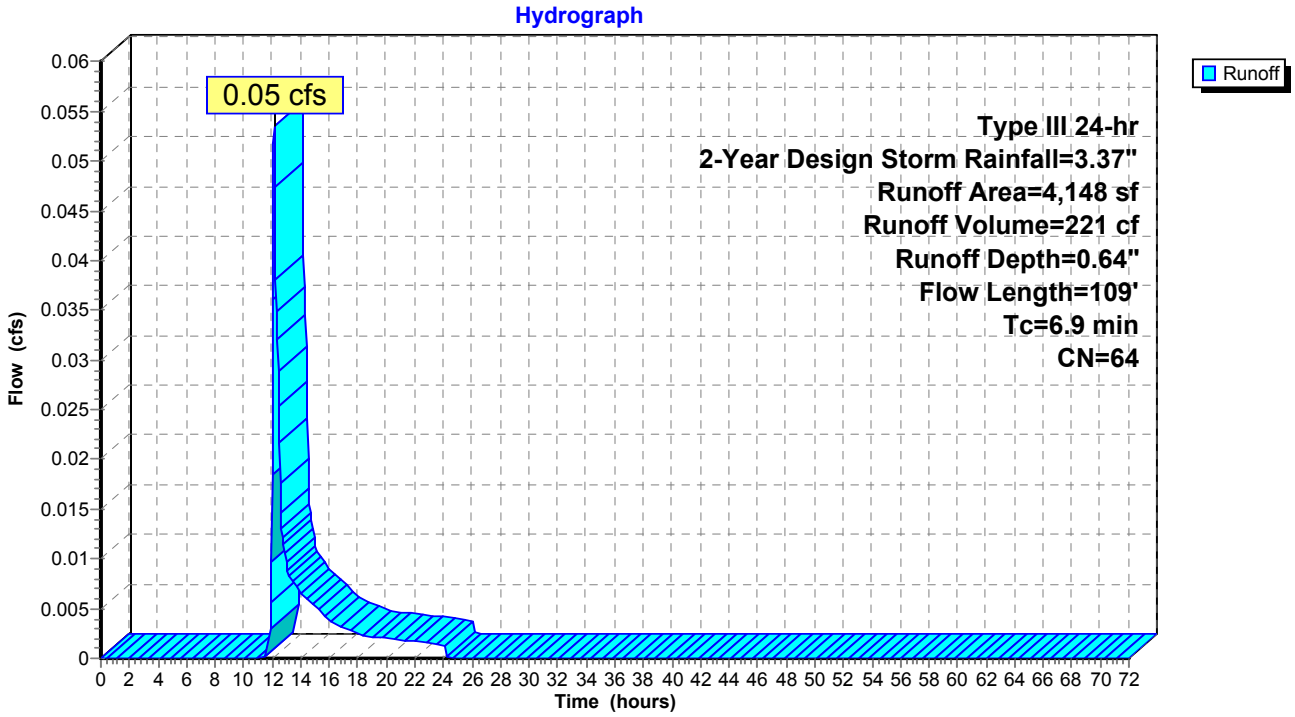
Runoff = 0.05 cfs @ 12.12 hrs, Volume= 221 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

Area (sf)	CN	Description
347	98	Paved parking, HSG B
119	79	<50% Grass cover, Poor, HSG B
3,682	60	Woods, Fair, HSG B
4,148	64	Weighted Average
3,801		91.63% Pervious Area
347		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	20	0.0900	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.7	9	0.1000	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	4	0.1400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.0	9	0.0500	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	7	0.0540	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.0	12	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	3	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	45	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	109	Total			

Subcatchment SC-E2: Central Drainage To Pond



Summary for Subcatchment SC-E3: Southern Drainage to Depression

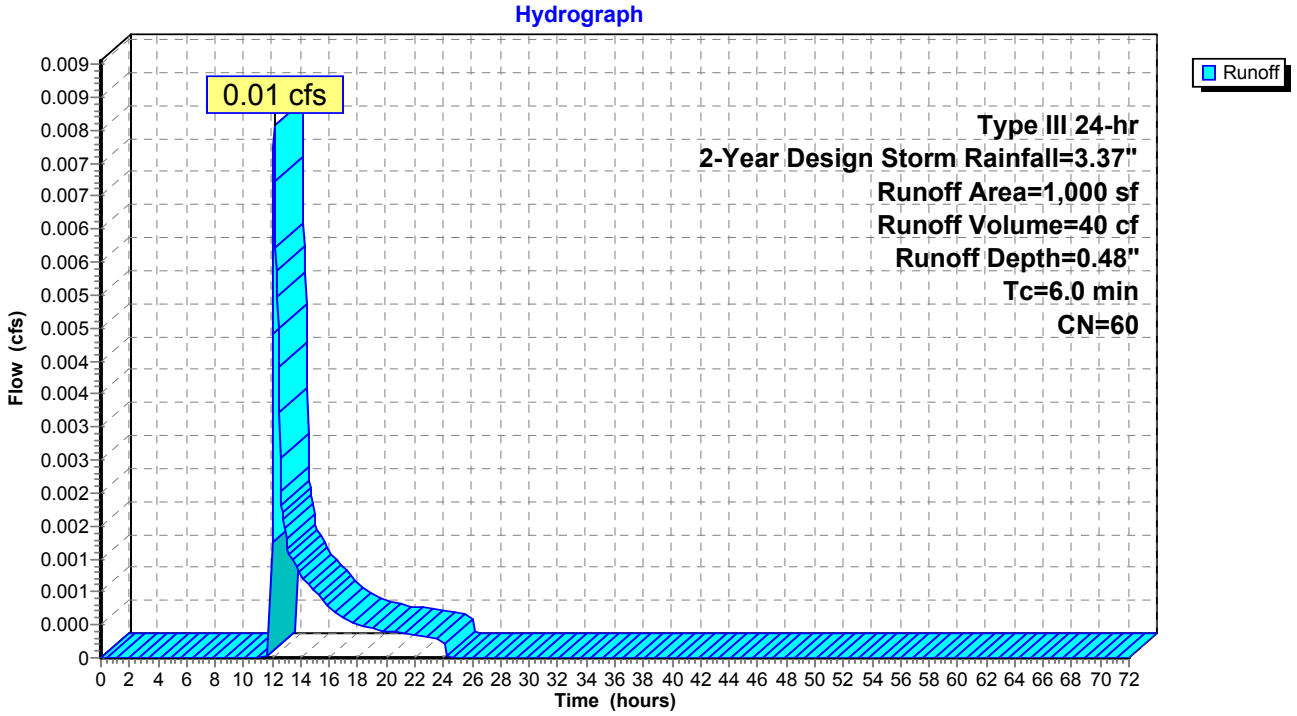
Runoff = 0.01 cfs @ 12.12 hrs, Volume= 40 cf, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

Area (sf)	CN	Description
1,000	60	Woods, Fair, HSG B
1,000		100.00% Pervious Area

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

Subcatchment SC-E3: Southern Drainage to Depression



Summary for Subcatchment SC-E4: North

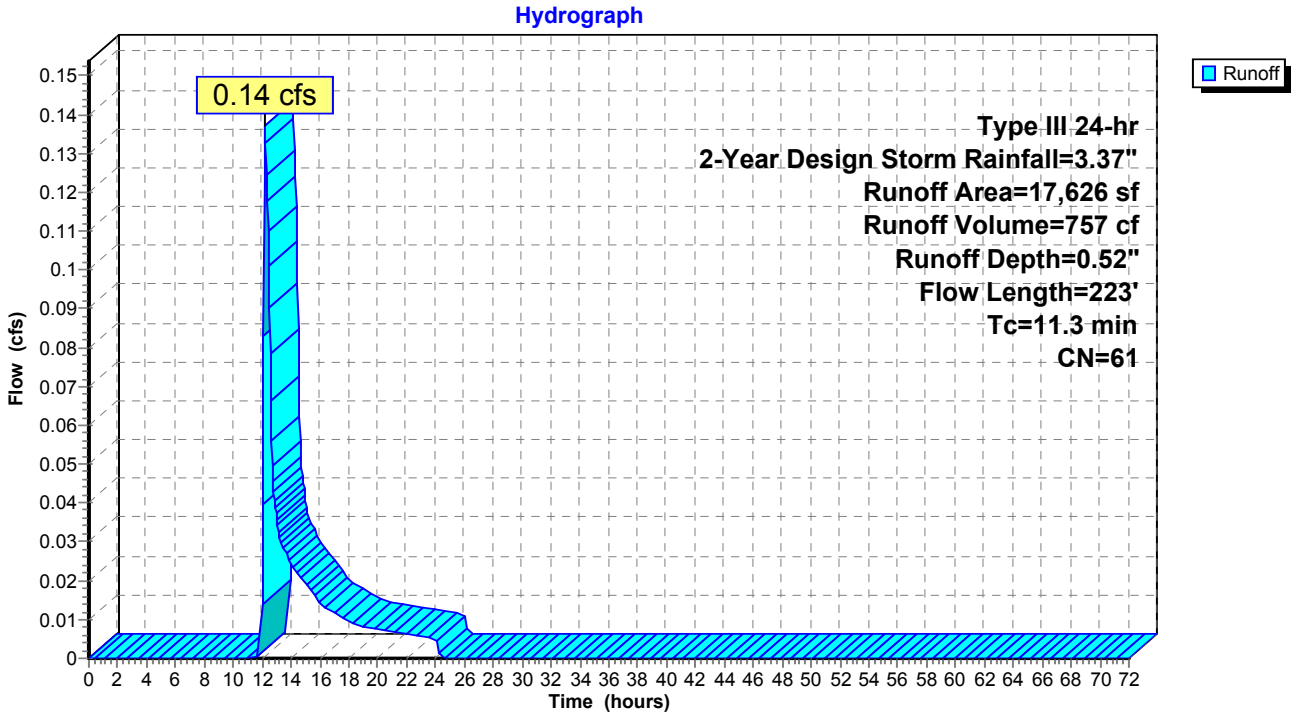
Runoff = 0.14 cfs @ 12.21 hrs, Volume= 757 cf, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

	Area (sf)	CN	Description
*	196	98	Shed
	96	61	>75% Grass cover, Good, HSG B
*	169	82	Gravel path
	17,165	60	Woods, Fair, HSG B
	17,626	61	Weighted Average
	17,430		98.89% Pervious Area
	196		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	28	0.0350	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.6	22	0.1900	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	53	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	61	0.3200	2.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	59	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.3	223	Total			

Subcatchment SC-E4: North



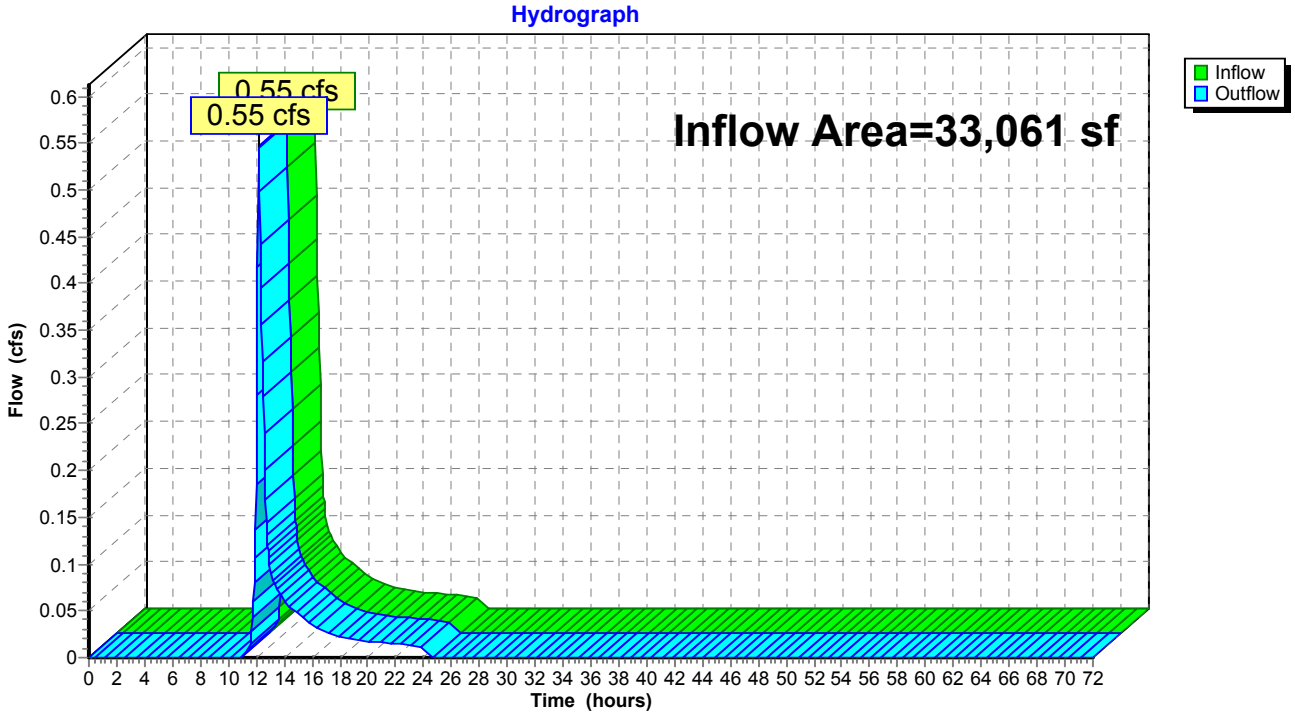
Summary for Reach DP-1: Main Street

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

Inflow Area = 33,061 sf, 23.92% Impervious, Inflow Depth = 0.83" for 2-Year Design Storm event
Inflow = 0.55 cfs @ 12.19 hrs, Volume= 2,284 cf
Outflow = 0.55 cfs @ 12.19 hrs, Volume= 2,284 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Main Street



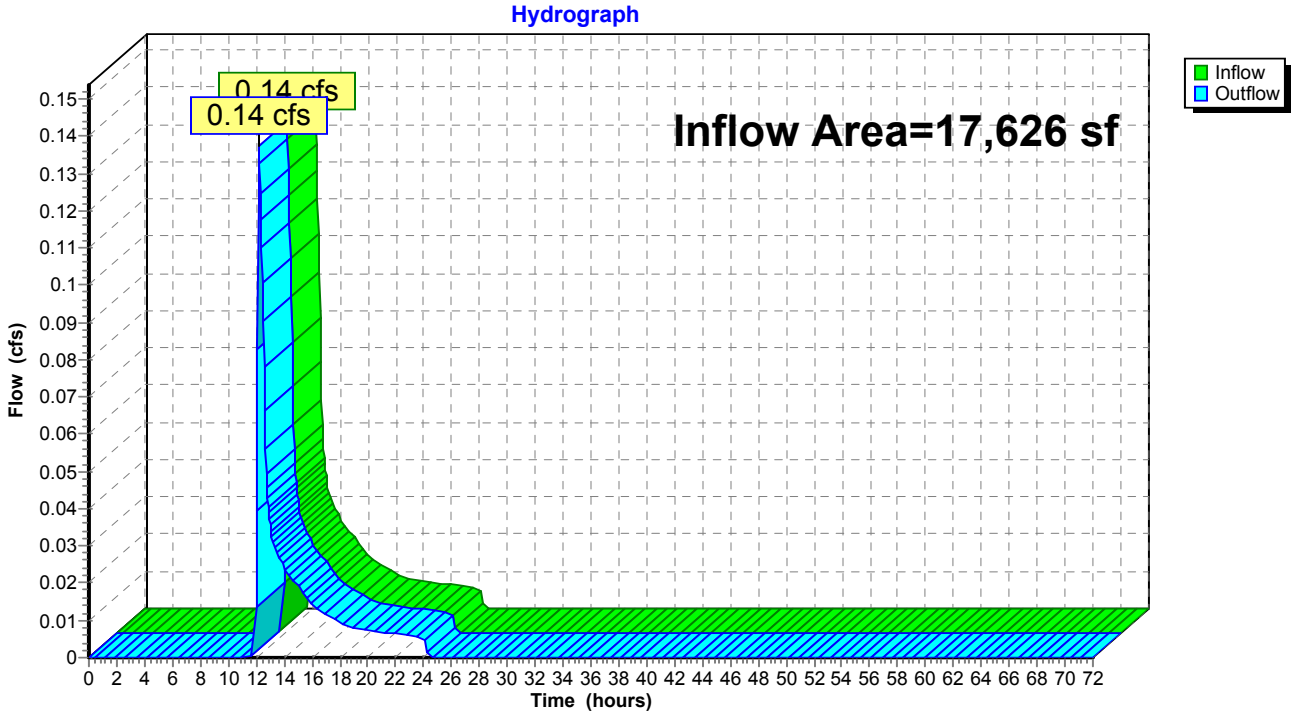
Summary for Reach DP-2: 224 Main Street

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

Inflow Area = 17,626 sf, 1.11% Impervious, Inflow Depth = 0.52" for 2-Year Design Storm event
Inflow = 0.14 cfs @ 12.21 hrs, Volume= 757 cf
Outflow = 0.14 cfs @ 12.21 hrs, Volume= 757 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: 224 Main Street



Summary for Pond EP-1: Manmade Pond

Inflow Area = 4,148 sf, 8.37% Impervious, Inflow Depth = 0.64" for 2-Year Design Storm event
Inflow = 0.05 cfs @ 12.12 hrs, Volume= 221 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 127.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 227.96' @ 24.45 hrs Surf.Area= 267 sf Storage= 221 cf
Flood Elev= 228.50' Surf.Area= 311 sf Storage= 379 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

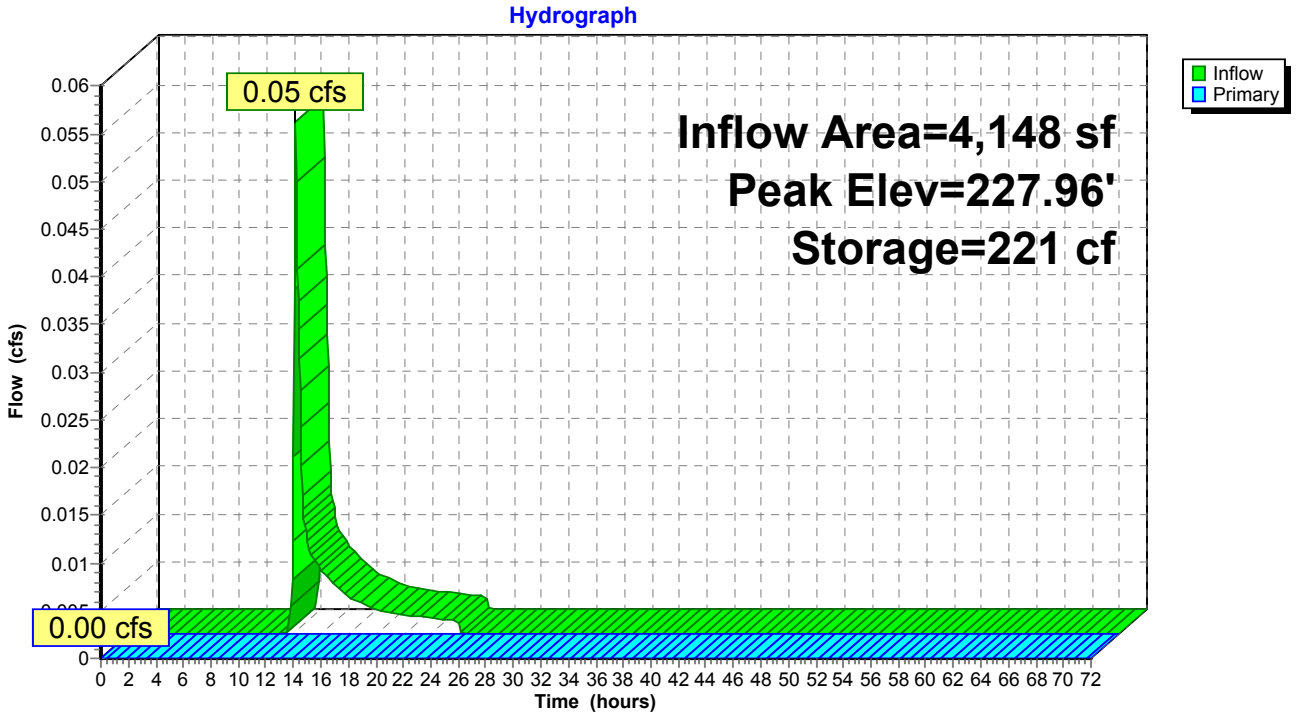
Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	379 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	198	50.1	0	0	198
228.50	311	62.7	379	379	339

Device	Routing	Invert	Outlet Devices
#1	Primary	228.49'	**2.7' long x 18.8' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond EP-1: Manmade Pond



Summary for Pond EP-2: Existing Depression

[58] Hint: Peaked 99.00' above defined flood level

Inflow Area = 5,148 sf, 6.74% Impervious, Inflow Depth = 0.09" for 2-Year Design Storm event
Inflow = 0.01 cfs @ 12.12 hrs, Volume= 40 cf
Outflow = 0.01 cfs @ 12.29 hrs, Volume= 40 cf, Atten= 26%, Lag= 9.8 min
Discarded = 0.01 cfs @ 12.29 hrs, Volume= 40 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.00' @ 12.29 hrs Surf.Area= 663 sf Storage= 2 cf
Flood Elev= 128.00' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= 7.0 min calculated for 40 cf (100% of inflow)
Center-of-Mass det. time= 7.0 min (920.5 - 913.5)

Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	1,285 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

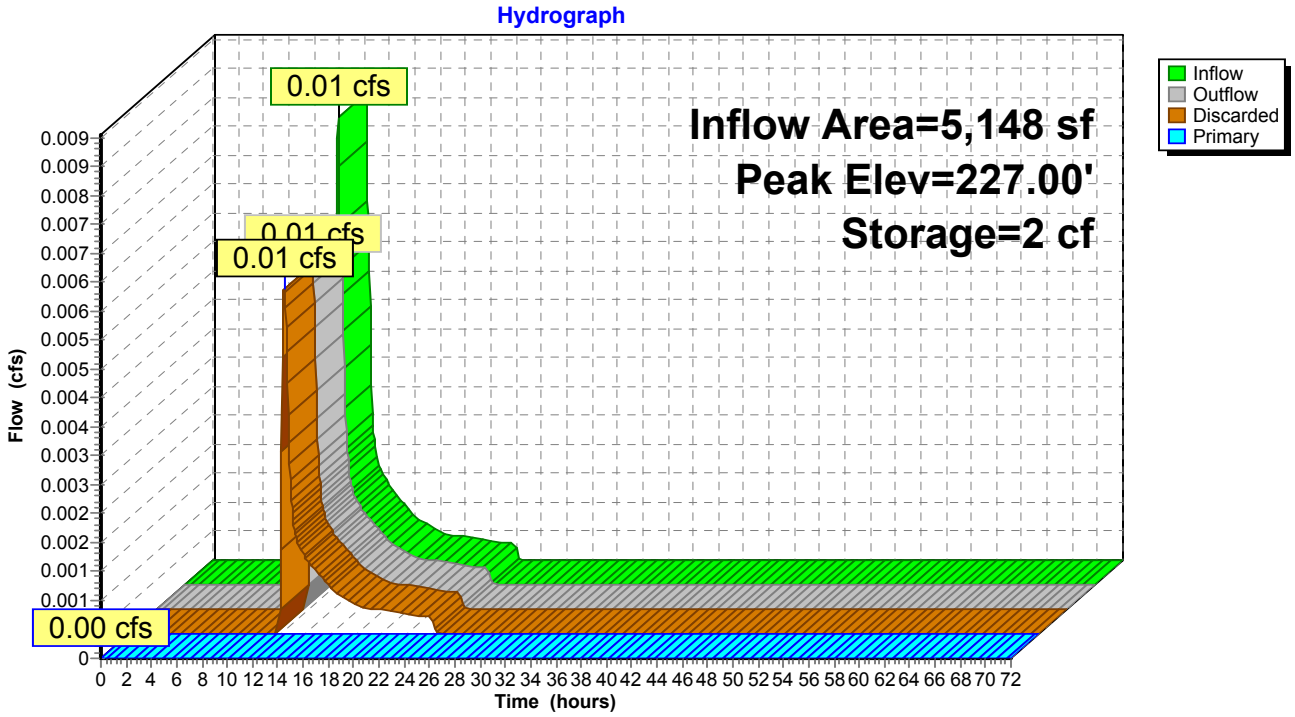
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	659	112.5	0	0	659
228.00	2,038	207.9	1,285	1,285	3,097

Device	Routing	Invert	Outlet Devices
#1	Primary	227.90'	**83.7' long x 2.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.46 2.59 2.63 2.63 2.64 2.65 2.66 2.72 2.72 2.74 2.86 3.00 3.10 3.22 3.32
#2	Discarded	227.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.02 cfs @ 12.29 hrs HW=227.00' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EP-2: Existing Depression



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-E1: Developed Area Runoff Area=27,913 sf 27.08% Impervious Runoff Depth=2.31"
Flow Length=311' Tc=12.2 min CN=71 Runoff=1.38 cfs 5,385 cf

Subcatchment SC-E2: Central Drainage To Runoff Area=4,148 sf 8.37% Impervious Runoff Depth=1.75"
Flow Length=109' Tc=6.9 min CN=64 Runoff=0.18 cfs 606 cf

Subcatchment SC-E3: Southern Drainage to Runoff Area=1,000 sf 0.00% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=60 Runoff=0.04 cfs 121 cf

Subcatchment SC-E4: North Runoff Area=17,626 sf 1.11% Impervious Runoff Depth=1.53"
Flow Length=223' Tc=11.3 min CN=61 Runoff=0.55 cfs 2,244 cf

Reach DP-1: Main Street Inflow=1.38 cfs 5,385 cf
Outflow=1.38 cfs 5,385 cf

Reach DP-2: 224 Main Street Inflow=0.55 cfs 2,244 cf
Outflow=0.55 cfs 2,244 cf

Pond EP-1: Manmade Pond Peak Elev=228.51' Storage=379 cf Inflow=0.18 cfs 606 cf
Outflow=0.02 cfs 247 cf

Pond EP-2: Existing Depression Peak Elev=227.02' Storage=16 cf Inflow=0.04 cfs 368 cf
Discarded=0.02 cfs 368 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 368 cf

Total Runoff Area = 50,687 sf Runoff Volume = 8,356 cf Average Runoff Depth = 1.98"
84.01% Pervious = 42,584 sf 15.99% Impervious = 8,103 sf

Summary for Subcatchment SC-E1: Developed Area

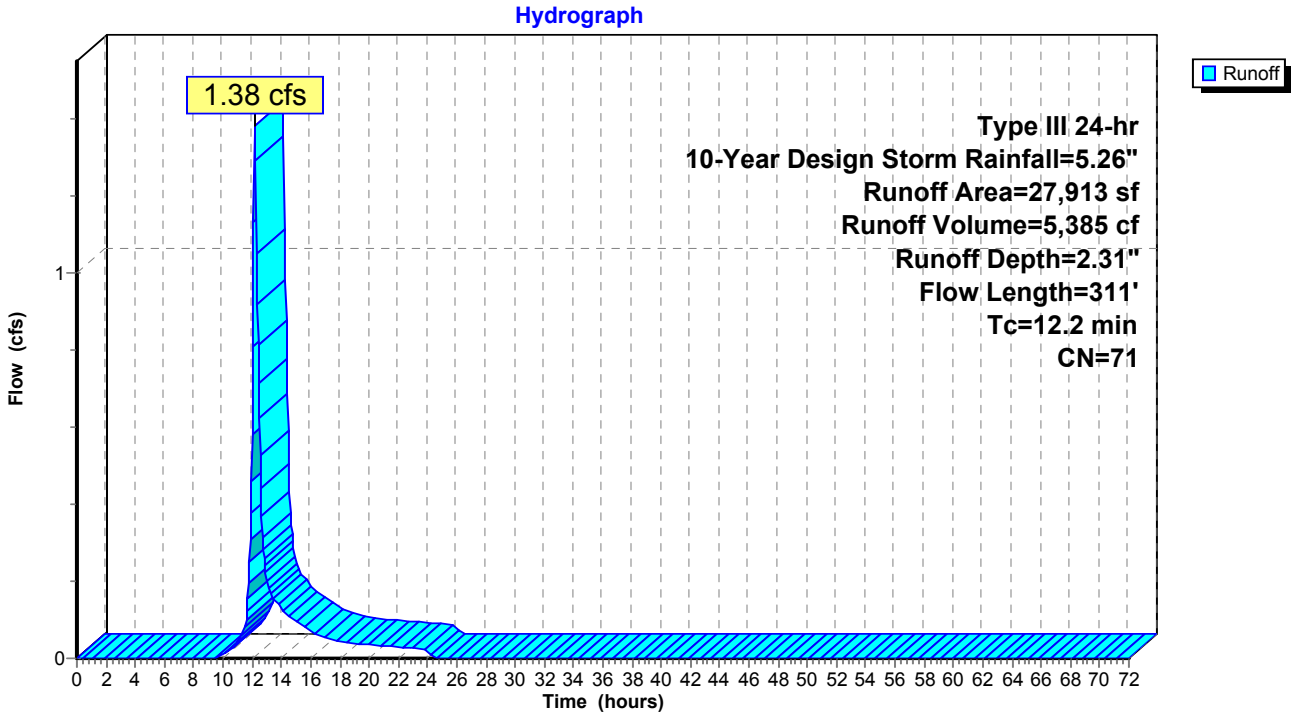
Runoff = 1.38 cfs @ 12.18 hrs, Volume= 5,385 cf, Depth= 2.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

	Area (sf)	CN	Description
*	1,165	98	Pool
*	1,671	98	218 and patio
*	1,126	98	220 and patio
*	1,774	98	concrete
*	27	98	stone walkway
*	298	98	retaining walls
*	1,499	98	pavement
	6,231	60	Woods, Fair, HSG B
*	197	82	Gravel path
	13,925	61	>75% Grass cover, Good, HSG B
	27,913	71	Weighted Average
	20,353		72.92% Pervious Area
	7,560		27.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	43	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.6	7	0.0200	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	31	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	66	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.3100	3.90		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	95	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.2	311	Total			

Subcatchment SC-E1: Developed Area



Summary for Subcatchment SC-E2: Central Drainage To Pond

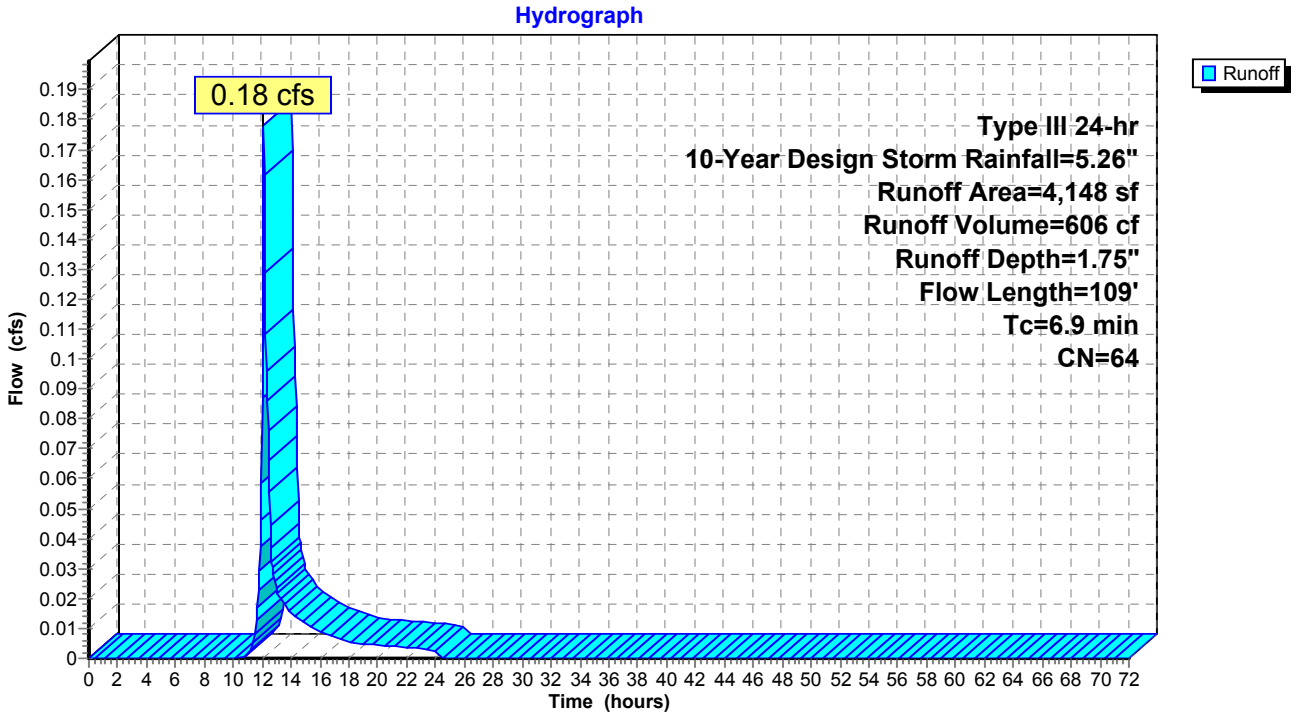
Runoff = 0.18 cfs @ 12.11 hrs, Volume= 606 cf, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

Area (sf)	CN	Description
347	98	Paved parking, HSG B
119	79	<50% Grass cover, Poor, HSG B
3,682	60	Woods, Fair, HSG B
4,148	64	Weighted Average
3,801		91.63% Pervious Area
347		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	20	0.0900	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.7	9	0.1000	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	4	0.1400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.0	9	0.0500	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	7	0.0540	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.0	12	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	3	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	45	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	109	Total			

Subcatchment SC-E2: Central Drainage To Pond



Summary for Subcatchment SC-E3: Southern Drainage to Depression

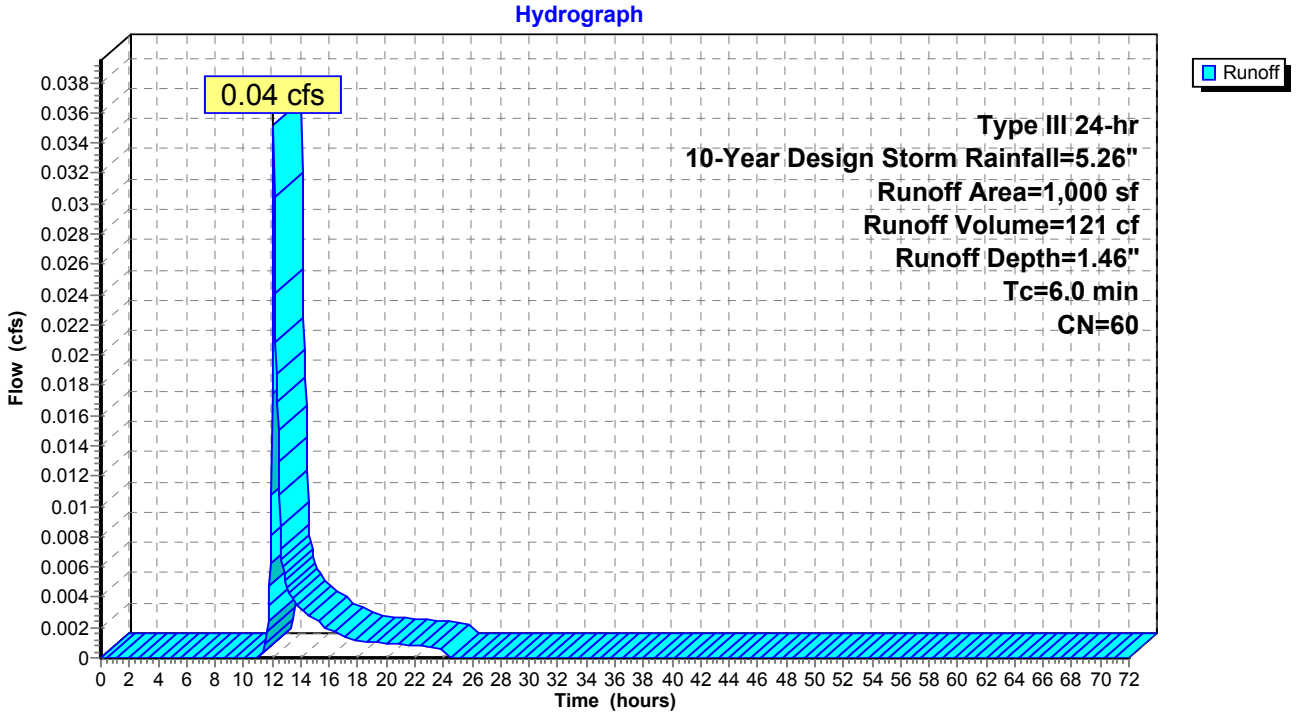
Runoff = 0.04 cfs @ 12.10 hrs, Volume= 121 cf, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

Area (sf)	CN	Description
1,000	60	Woods, Fair, HSG B
1,000		100.00% Pervious Area

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

Subcatchment SC-E3: Southern Drainage to Depression



Summary for Subcatchment SC-E4: North

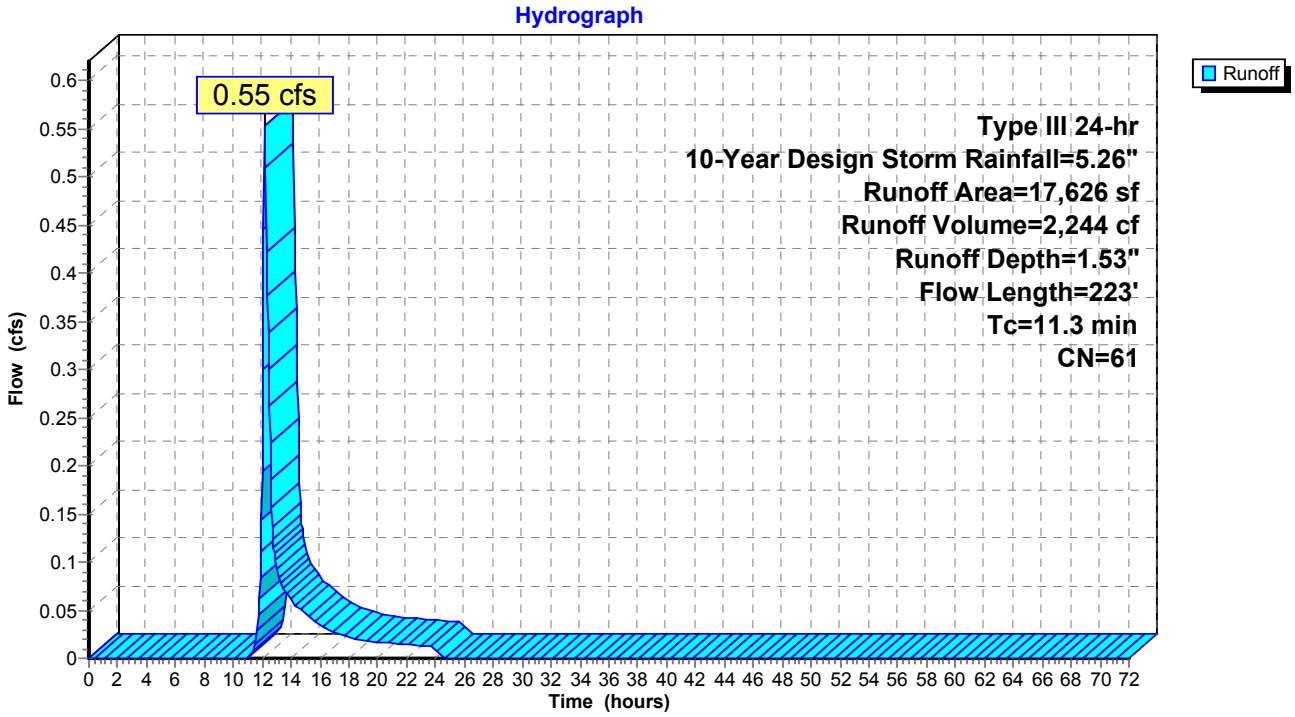
Runoff = 0.55 cfs @ 12.17 hrs, Volume= 2,244 cf, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

	Area (sf)	CN	Description
*	196	98	Shed
	96	61	>75% Grass cover, Good, HSG B
*	169	82	Gravel path
	17,165	60	Woods, Fair, HSG B
	17,626	61	Weighted Average
	17,430		98.89% Pervious Area
	196		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	28	0.0350	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.6	22	0.1900	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	53	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	61	0.3200	2.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	59	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.3	223	Total			

Subcatchment SC-E4: North



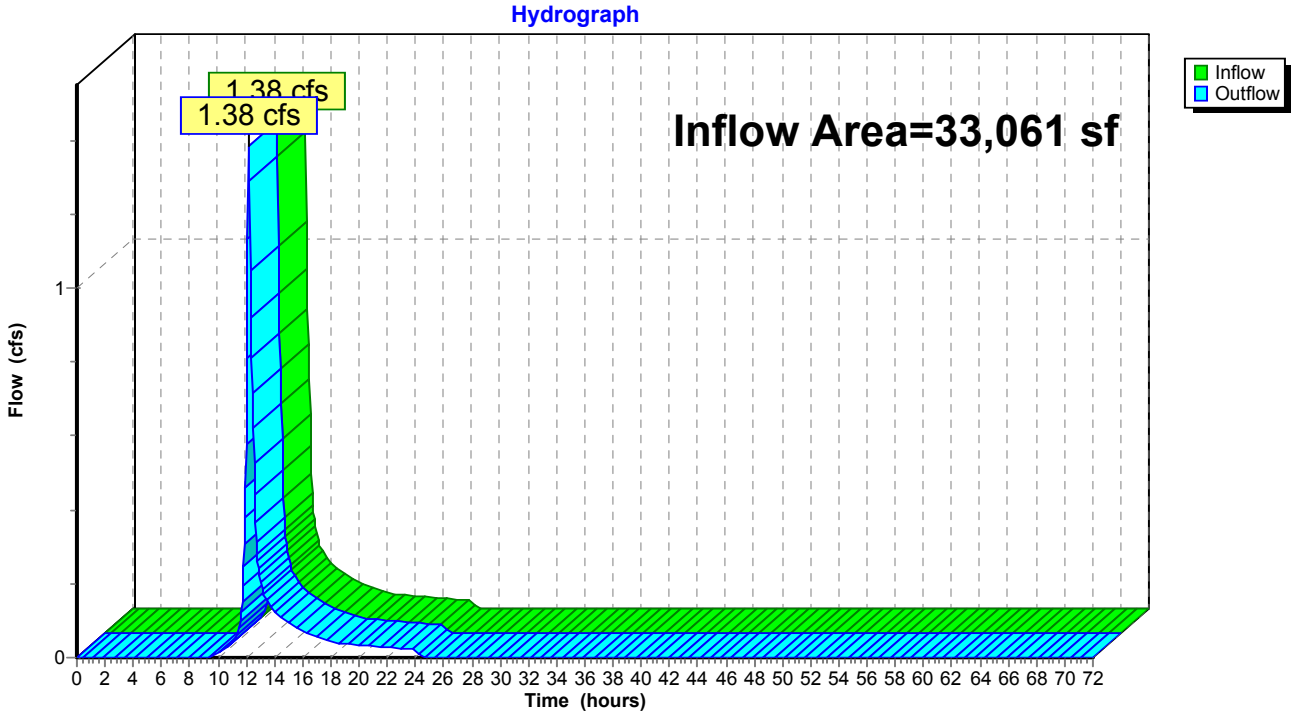
Summary for Reach DP-1: Main Street

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

Inflow Area = 33,061 sf, 23.92% Impervious, Inflow Depth = 1.95" for 10-Year Design Storm event
Inflow = 1.38 cfs @ 12.18 hrs, Volume= 5,385 cf
Outflow = 1.38 cfs @ 12.18 hrs, Volume= 5,385 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Main Street



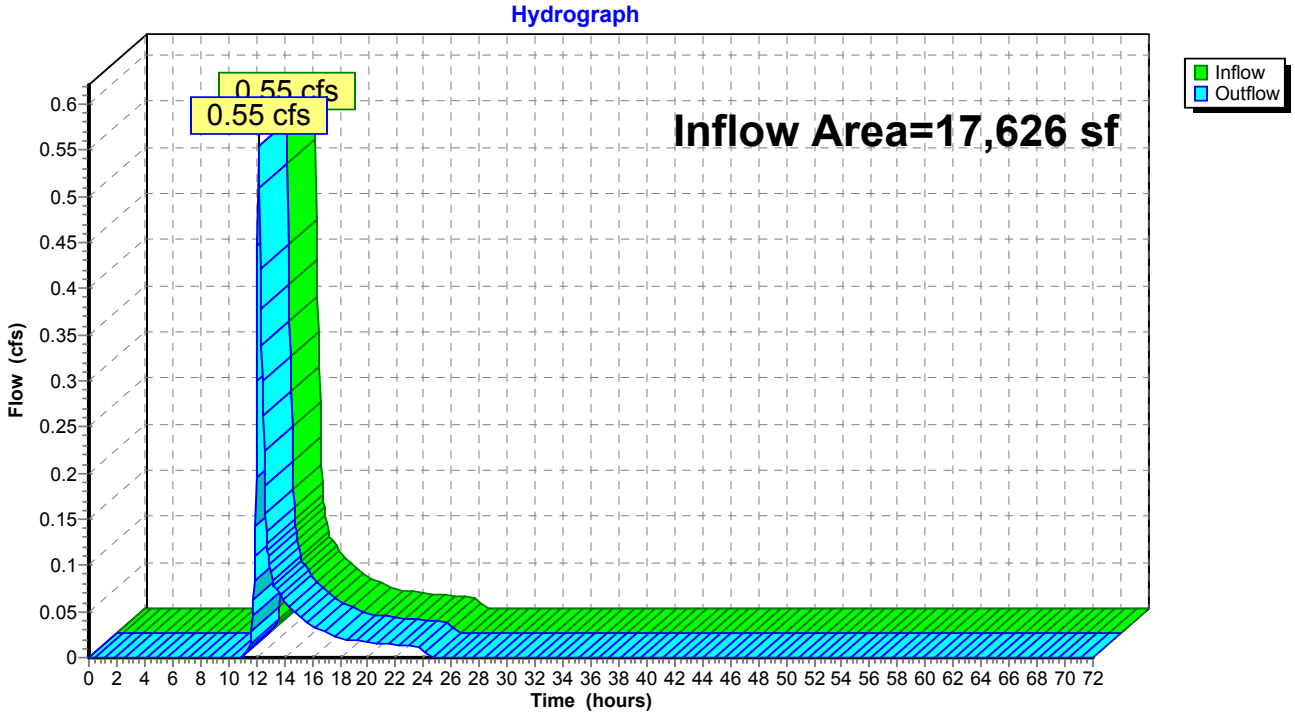
Summary for Reach DP-2: 224 Main Street

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

Inflow Area = 17,626 sf, 1.11% Impervious, Inflow Depth = 1.53" for 10-Year Design Storm event
Inflow = 0.55 cfs @ 12.17 hrs, Volume= 2,244 cf
Outflow = 0.55 cfs @ 12.17 hrs, Volume= 2,244 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: 224 Main Street



Summary for Pond EP-1: Manmade Pond

[93] Warning: Storage range exceeded by 0.01'
[58] Hint: Peaked 0.01' above defined flood level

Inflow Area = 4,148 sf, 8.37% Impervious, Inflow Depth = 1.75" for 10-Year Design Storm event
Inflow = 0.18 cfs @ 12.11 hrs, Volume= 606 cf
Outflow = 0.02 cfs @ 13.95 hrs, Volume= 247 cf, Atten= 90%, Lag= 110.4 min
Primary = 0.02 cfs @ 13.95 hrs, Volume= 247 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 127.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 228.51' @ 13.95 hrs Surf.Area= 311 sf Storage= 379 cf
Flood Elev= 228.50' Surf.Area= 311 sf Storage= 379 cf

Plug-Flow detention time= 323.3 min calculated for 247 cf (41% of inflow)
Center-of-Mass det. time= 186.6 min (1,047.8 - 861.3)

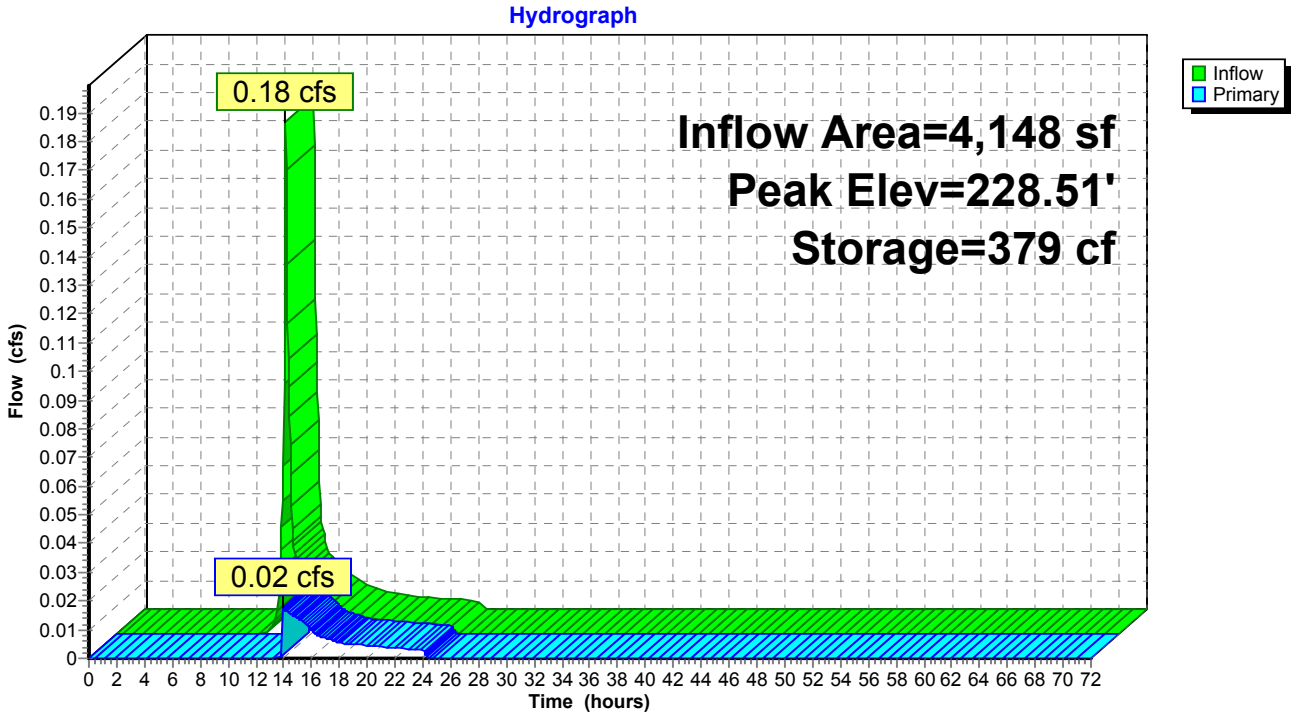
Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	379 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	198	50.1	0	0	198
228.50	311	62.7	379	379	339

Device	Routing	Invert	Outlet Devices
#1	Primary	228.49'	**2.7' long x 18.8' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.02 cfs @ 13.95 hrs HW=228.51' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.02 cfs @ 0.35 fps)

Pond EP-1: Manmade Pond



Summary for Pond EP-2: Existing Depression

[58] Hint: Peaked 99.02' above defined flood level

Inflow Area = 5,148 sf, 6.74% Impervious, Inflow Depth = 0.86" for 10-Year Design Storm event
Inflow = 0.04 cfs @ 12.10 hrs, Volume= 368 cf
Outflow = 0.02 cfs @ 12.37 hrs, Volume= 368 cf, Atten= 54%, Lag= 16.0 min
Discarded = 0.02 cfs @ 12.37 hrs, Volume= 368 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.02' @ 12.37 hrs Surf.Area= 683 sf Storage= 16 cf
Flood Elev= 128.00' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.4 min (999.2 - 989.8)

Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	1,285 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

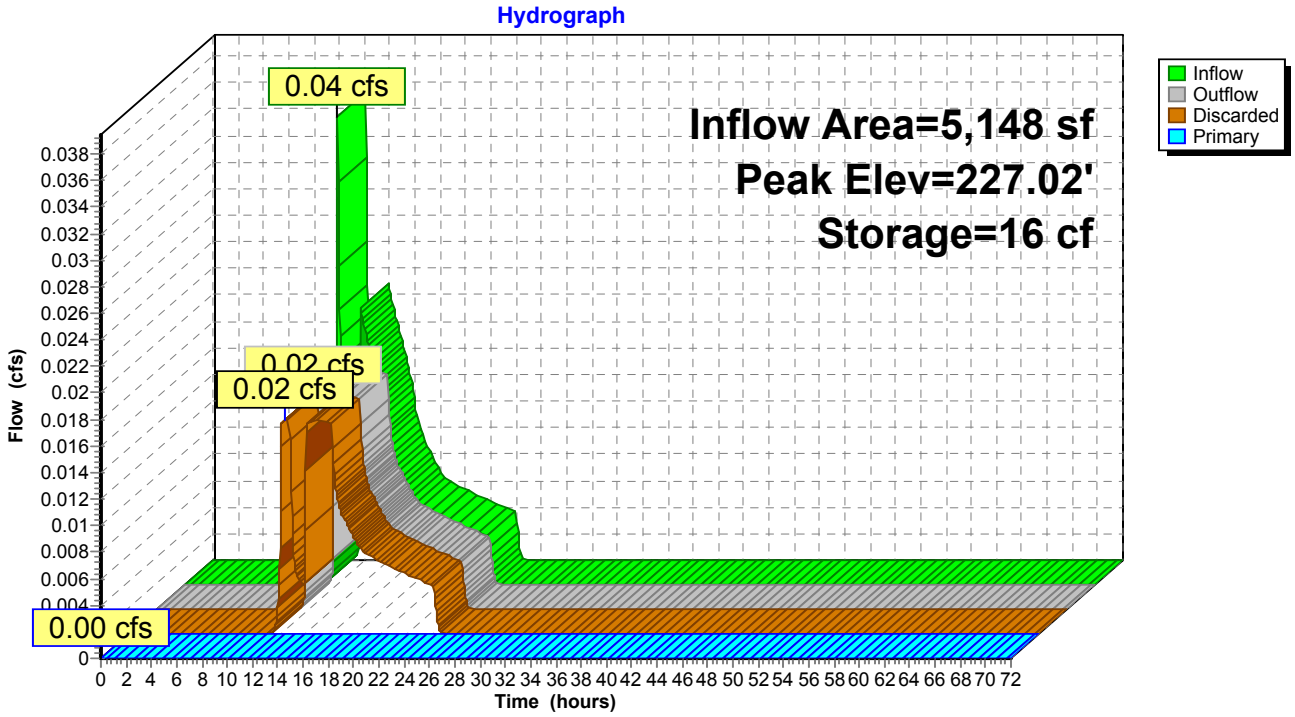
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	659	112.5	0	0	659
228.00	2,038	207.9	1,285	1,285	3,097

Device	Routing	Invert	Outlet Devices
#1	Primary	227.90'	**83.7' long x 2.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.46 2.59 2.63 2.63 2.64 2.65 2.66 2.72 2.72 2.74 2.86 3.00 3.10 3.22 3.32
#2	Discarded	227.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.02 cfs @ 12.37 hrs HW=227.02' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EP-2: Existing Depression



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-E1: Developed Area Runoff Area=27,913 sf 27.08% Impervious Runoff Depth=4.81"
Flow Length=311' Tc=12.2 min CN=71 Runoff=2.93 cfs 11,179 cf

Subcatchment SC-E2: Central Drainage To Runoff Area=4,148 sf 8.37% Impervious Runoff Depth=3.99"
Flow Length=109' Tc=6.9 min CN=64 Runoff=0.42 cfs 1,379 cf

Subcatchment SC-E3: Southern Drainage to Runoff Area=1,000 sf 0.00% Impervious Runoff Depth=3.53"
Tc=6.0 min CN=60 Runoff=0.09 cfs 294 cf

Subcatchment SC-E4: North Runoff Area=17,626 sf 1.11% Impervious Runoff Depth=3.64"
Flow Length=223' Tc=11.3 min CN=61 Runoff=1.42 cfs 5,353 cf

Reach DP-1: Main Street Inflow=2.93 cfs 11,179 cf
Outflow=2.93 cfs 11,179 cf

Reach DP-2: 224 Main Street Inflow=1.42 cfs 5,353 cf
Outflow=1.42 cfs 5,353 cf

Pond EP-1: Manmade Pond Peak Elev=228.65' Storage=379 cf Inflow=0.42 cfs 1,379 cf
Outflow=0.43 cfs 1,358 cf

Pond EP-2: Existing Depression Peak Elev=227.71' Storage=763 cf Inflow=0.50 cfs 1,652 cf
Discarded=0.04 cfs 1,652 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,652 cf

Total Runoff Area = 50,687 sf Runoff Volume = 18,205 cf Average Runoff Depth = 4.31"
84.01% Pervious = 42,584 sf 15.99% Impervious = 8,103 sf

Summary for Subcatchment SC-E1: Developed Area

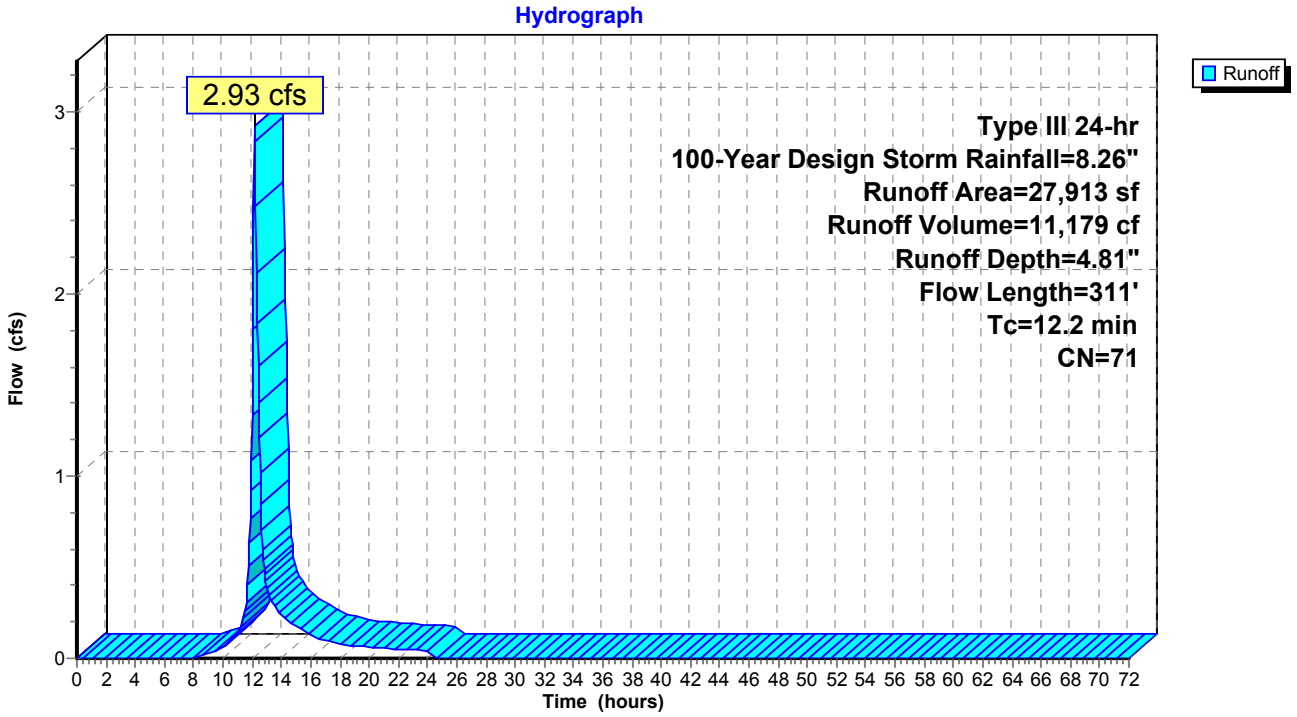
Runoff = 2.93 cfs @ 12.17 hrs, Volume= 11,179 cf, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

	Area (sf)	CN	Description
*	1,165	98	Pool
*	1,671	98	218 and patio
*	1,126	98	220 and patio
*	1,774	98	concrete
*	27	98	stone walkway
*	298	98	retaining walls
*	1,499	98	pavement
	6,231	60	Woods, Fair, HSG B
*	197	82	Gravel path
	13,925	61	>75% Grass cover, Good, HSG B
	27,913	71	Weighted Average
	20,353		72.92% Pervious Area
	7,560		27.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	43	0.0700	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.6	7	0.0200	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	31	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	66	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	10	0.3100	3.90		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	95	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.2	311	Total			

Subcatchment SC-E1: Developed Area



Summary for Subcatchment SC-E2: Central Drainage To Pond

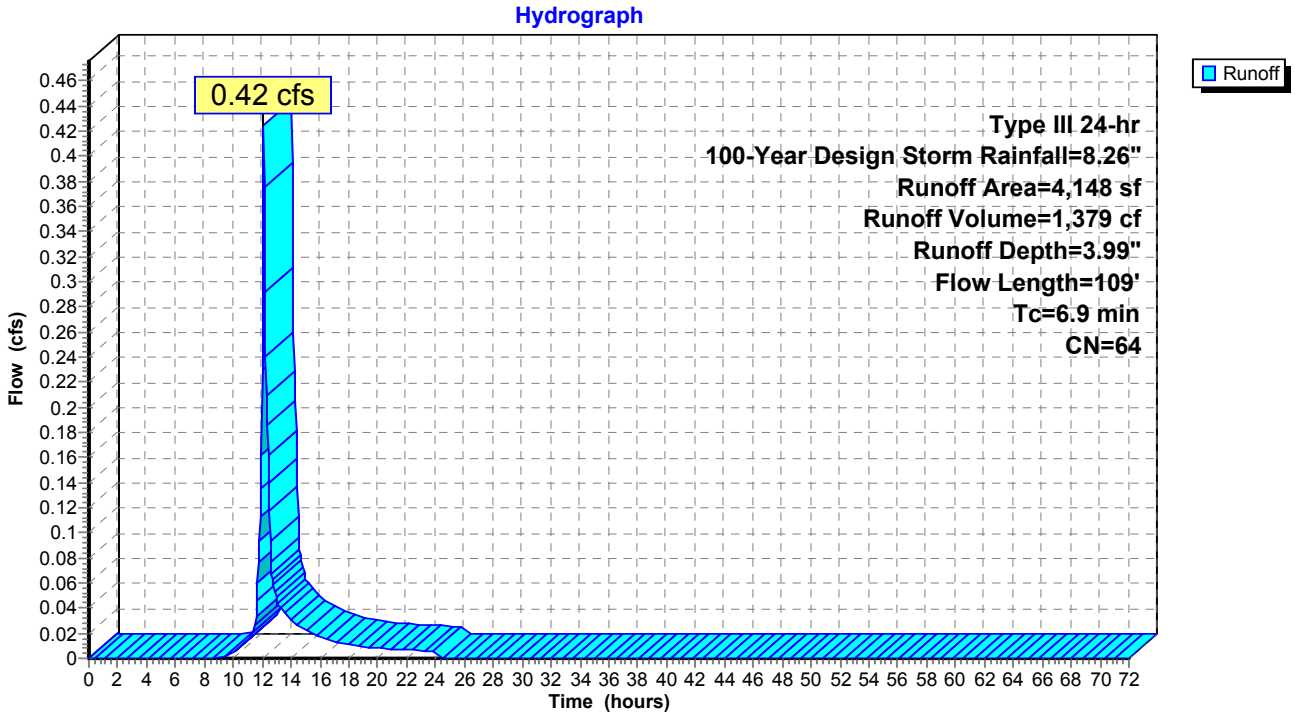
Runoff = 0.42 cfs @ 12.10 hrs, Volume= 1,379 cf, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

Area (sf)	CN	Description
347	98	Paved parking, HSG B
119	79	<50% Grass cover, Poor, HSG B
3,682	60	Woods, Fair, HSG B
4,148	64	Weighted Average
3,801		91.63% Pervious Area
347		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	20	0.0900	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.7	9	0.1000	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.3	4	0.1400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.0	9	0.0500	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.1	7	0.0540	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.0	12	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	3	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	45	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	109	Total			

Subcatchment SC-E2: Central Drainage To Pond



Summary for Subcatchment SC-E3: Southern Drainage to Depression

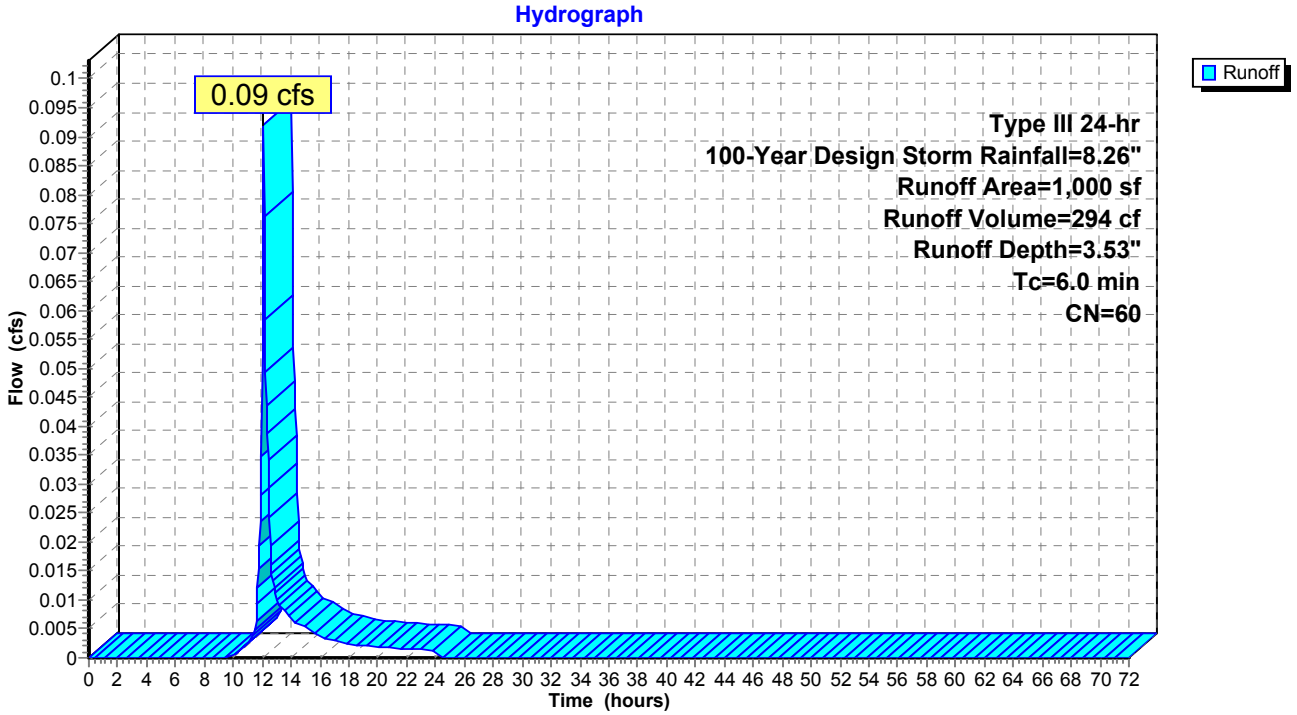
Runoff = 0.09 cfs @ 12.10 hrs, Volume= 294 cf, Depth= 3.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

Area (sf)	CN	Description
1,000	60	Woods, Fair, HSG B
1,000		100.00% Pervious Area

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

Subcatchment SC-E3: Southern Drainage to Depression



Summary for Subcatchment SC-E4: North

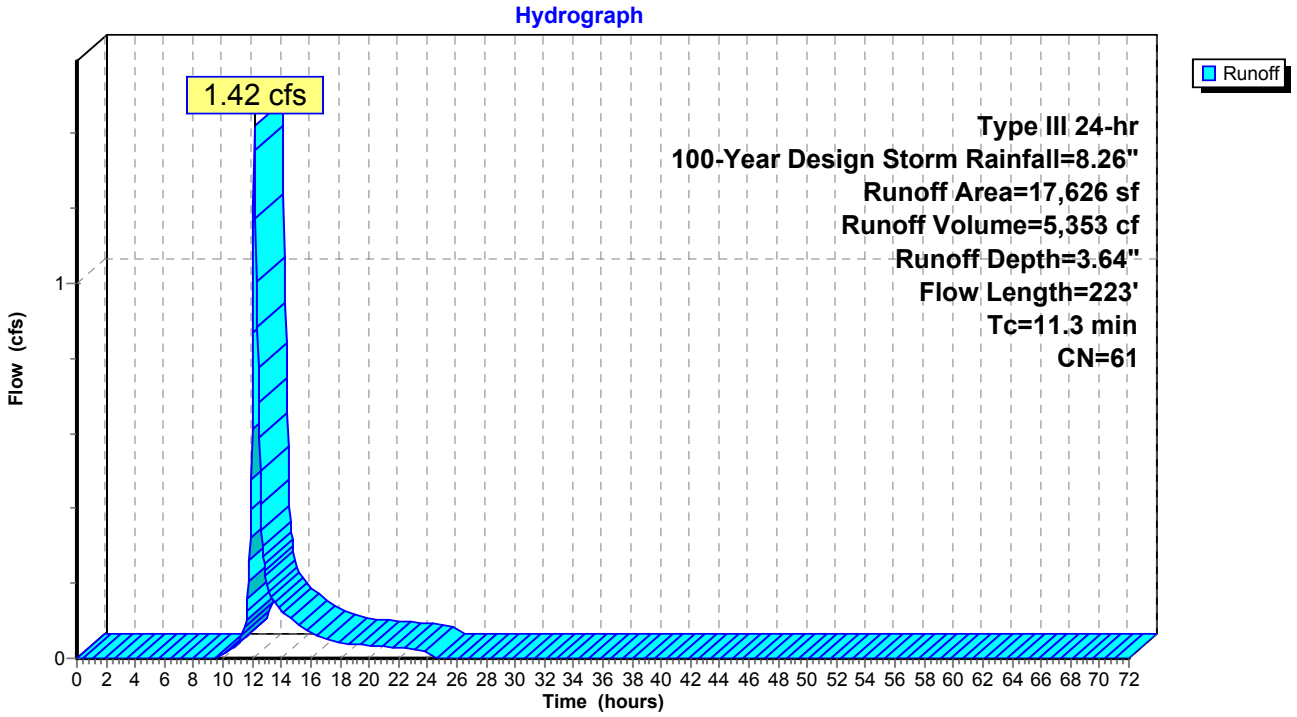
Runoff = 1.42 cfs @ 12.16 hrs, Volume= 5,353 cf, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

	Area (sf)	CN	Description
*	196	98	Shed
	96	61	>75% Grass cover, Good, HSG B
*	169	82	Gravel path
	17,165	60	Woods, Fair, HSG B
	17,626	61	Weighted Average
	17,430		98.89% Pervious Area
	196		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	28	0.0350	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.6	22	0.1900	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	53	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	61	0.3200	2.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	59	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.3	223	Total			

Subcatchment SC-E4: North



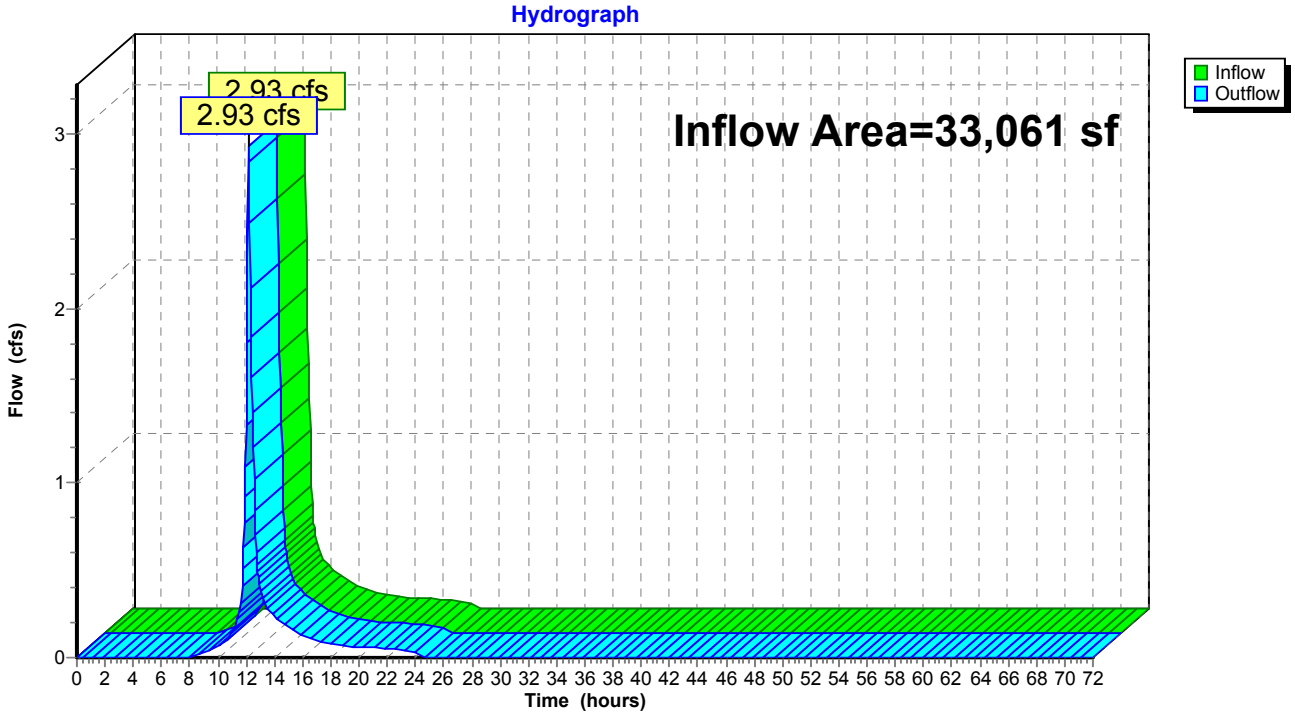
Summary for Reach DP-1: Main Street

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

Inflow Area = 33,061 sf, 23.92% Impervious, Inflow Depth = 4.06" for 100-Year Design Storm event
Inflow = 2.93 cfs @ 12.17 hrs, Volume= 11,179 cf
Outflow = 2.93 cfs @ 12.17 hrs, Volume= 11,179 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Main Street



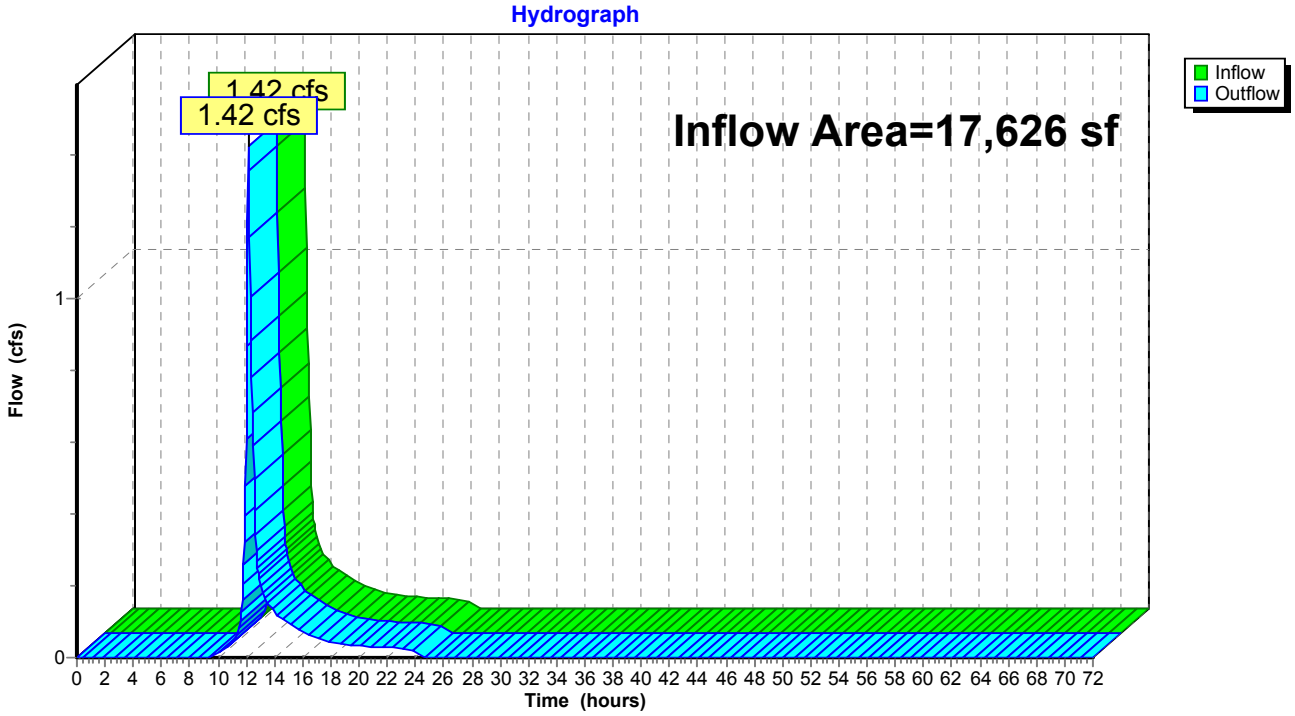
Summary for Reach DP-2: 224 Main Street

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

Inflow Area = 17,626 sf, 1.11% Impervious, Inflow Depth = 3.64" for 100-Year Design Storm event
Inflow = 1.42 cfs @ 12.16 hrs, Volume= 5,353 cf
Outflow = 1.42 cfs @ 12.16 hrs, Volume= 5,353 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: 224 Main Street



Summary for Pond EP-1: Manmade Pond

[93] Warning: Storage range exceeded by 0.15'
[58] Hint: Peaked 0.15' above defined flood level
[88] Warning: Qout>Qin may require Finer Routing>1

Inflow Area = 4,148 sf, 8.37% Impervious, Inflow Depth = 3.99" for 100-Year Design Storm event
Inflow = 0.42 cfs @ 12.10 hrs, Volume= 1,379 cf
Outflow = 0.43 cfs @ 12.17 hrs, Volume= 1,358 cf, Atten= 0%, Lag= 3.7 min
Primary = 0.43 cfs @ 12.17 hrs, Volume= 1,358 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 127.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 228.65' @ 12.17 hrs Surf.Area= 311 sf Storage= 379 cf
Flood Elev= 228.50' Surf.Area= 311 sf Storage= 379 cf

Plug-Flow detention time= 55.6 min calculated for 1,357 cf (98% of inflow)
Center-of-Mass det. time= 46.6 min (883.3 - 836.7)

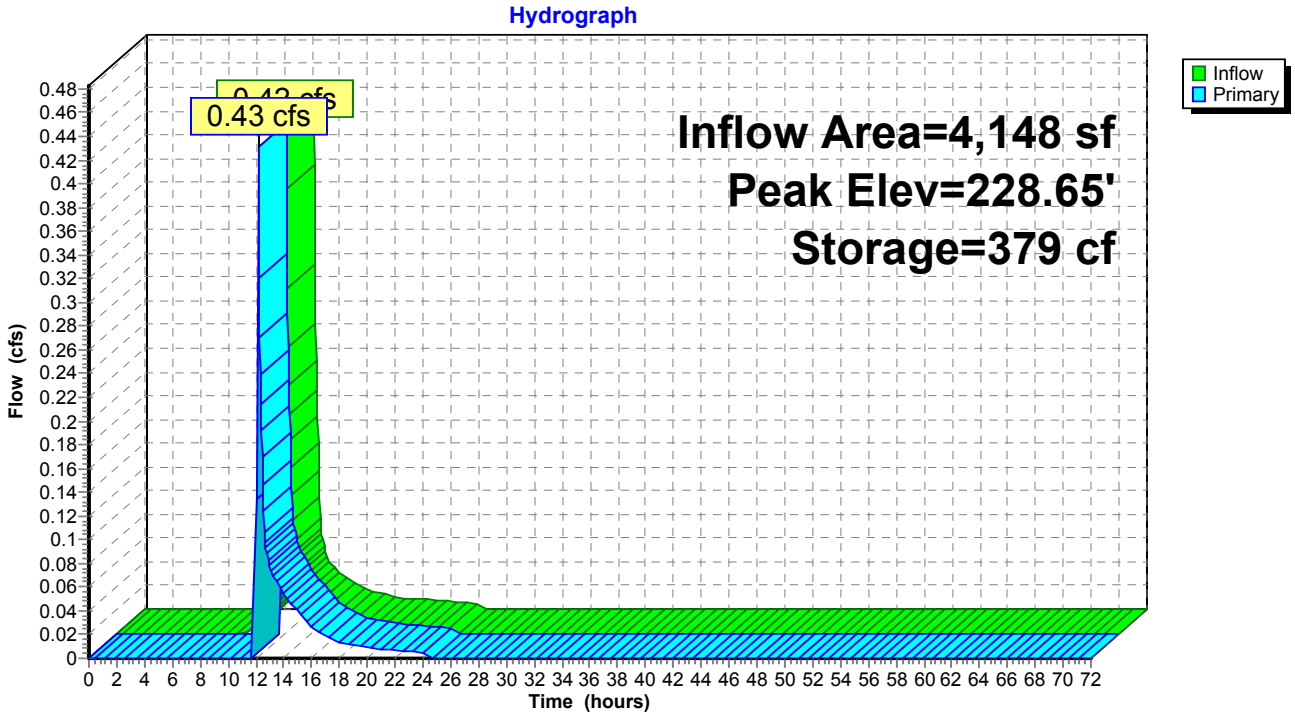
Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	379 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	198	50.1	0	0	198
228.50	311	62.7	379	379	339

Device	Routing	Invert	Outlet Devices
#1	Primary	228.49'	**2.7' long x 18.8' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.38 cfs @ 12.17 hrs HW=228.63' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.38 cfs @ 1.00 fps)

Pond EP-1: Manmade Pond



Summary for Pond EP-2: Existing Depression

[58] Hint: Peaked 99.71' above defined flood level

Inflow Area = 5,148 sf, 6.74% Impervious, Inflow Depth = 3.85" for 100-Year Design Storm event
Inflow = 0.50 cfs @ 12.16 hrs, Volume= 1,652 cf
Outflow = 0.04 cfs @ 15.54 hrs, Volume= 1,652 cf, Atten= 93%, Lag= 202.4 min
Discarded = 0.04 cfs @ 15.54 hrs, Volume= 1,652 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 227.71' @ 15.54 hrs Surf.Area= 1,558 sf Storage= 763 cf
Flood Elev= 128.00' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= 256.9 min calculated for 1,651 cf (100% of inflow)
Center-of-Mass det. time= 256.9 min (1,133.3 - 876.4)

Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	1,285 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

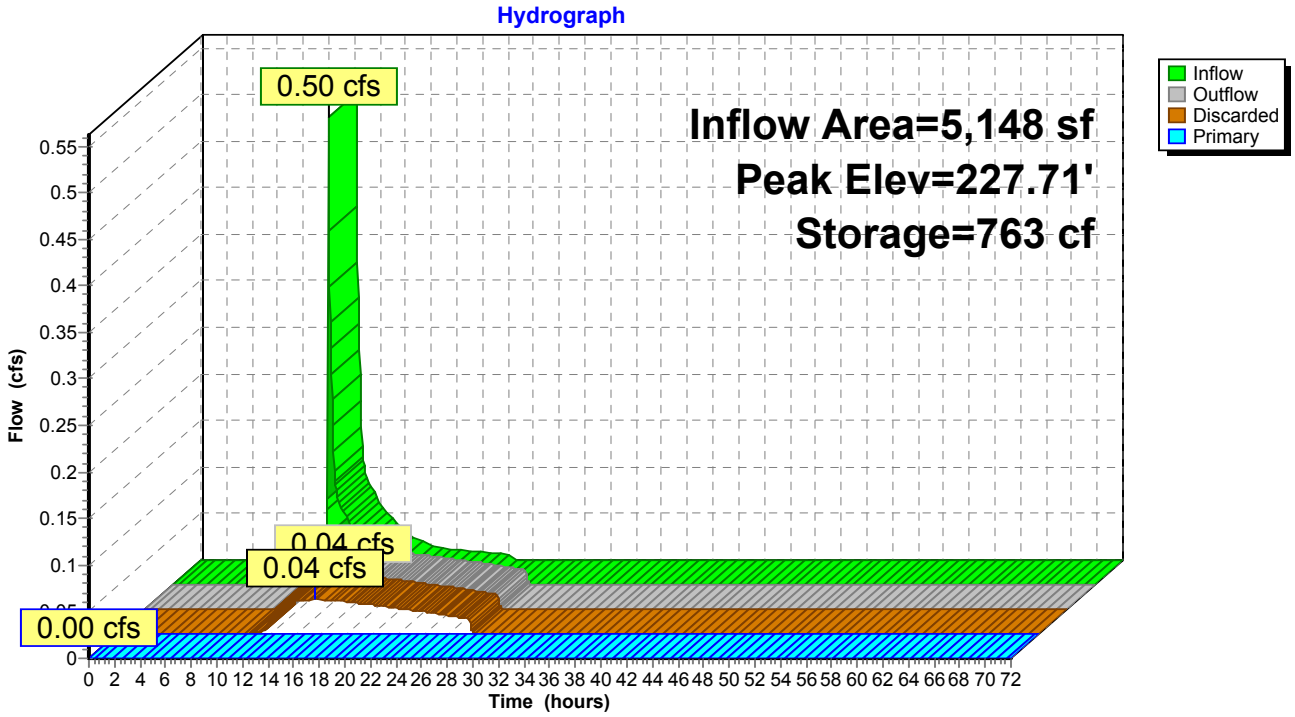
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	659	112.5	0	0	659
228.00	2,038	207.9	1,285	1,285	3,097

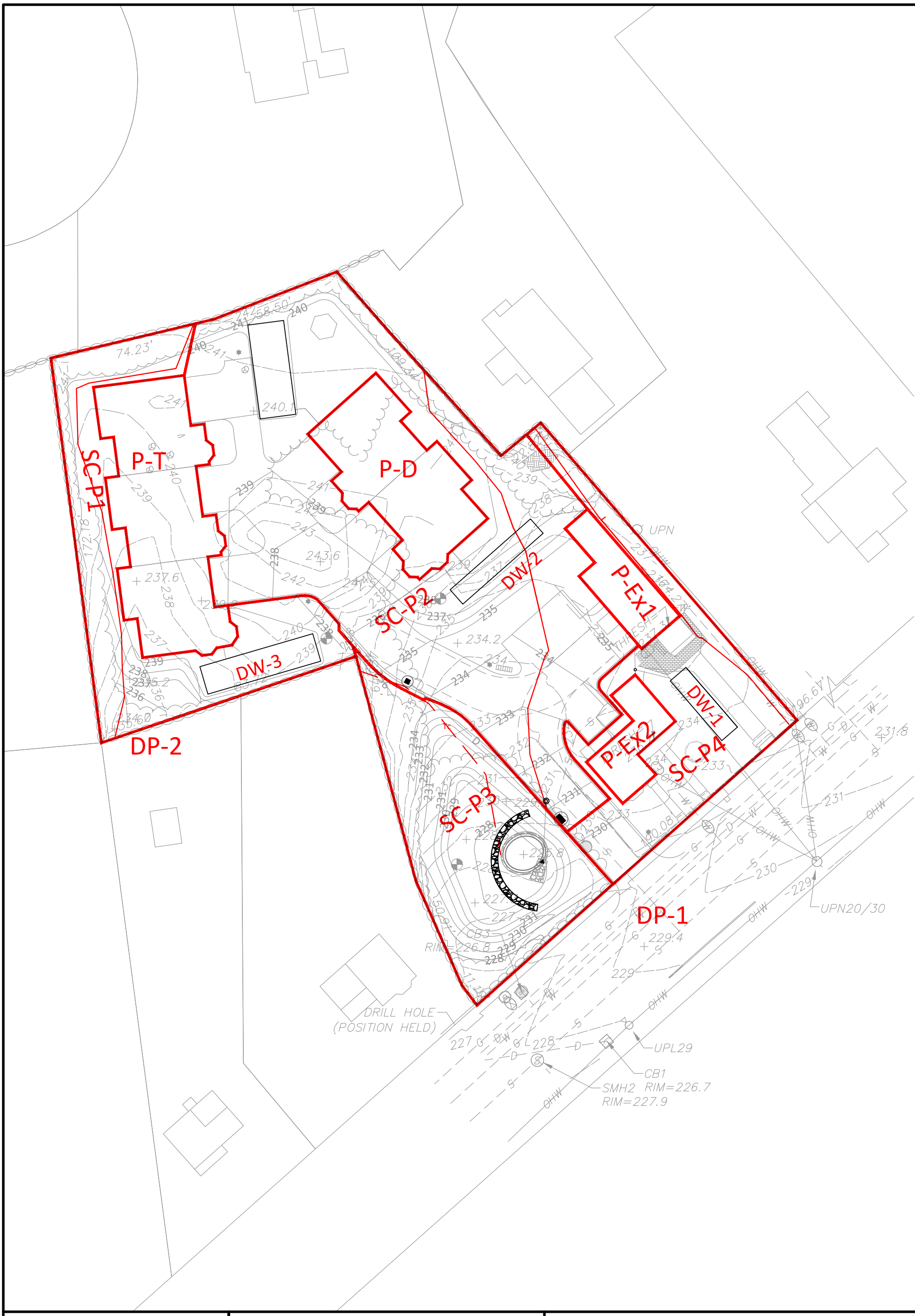
Device	Routing	Invert	Outlet Devices
#1	Primary	227.90'	**83.7' long x 2.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.46 2.59 2.63 2.63 2.64 2.65 2.66 2.72 2.72 2.74 2.86 3.00 3.10 3.22 3.32
#2	Discarded	227.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.04 cfs @ 15.54 hrs HW=227.71' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EP-2: Existing Depression





SCALE: 1"=40'

40' 20' 0 40'

Prepared For:
New Generation Homes
Milford, Massachusetts

Prepared By:
MERIDIAN ASSOCIATES

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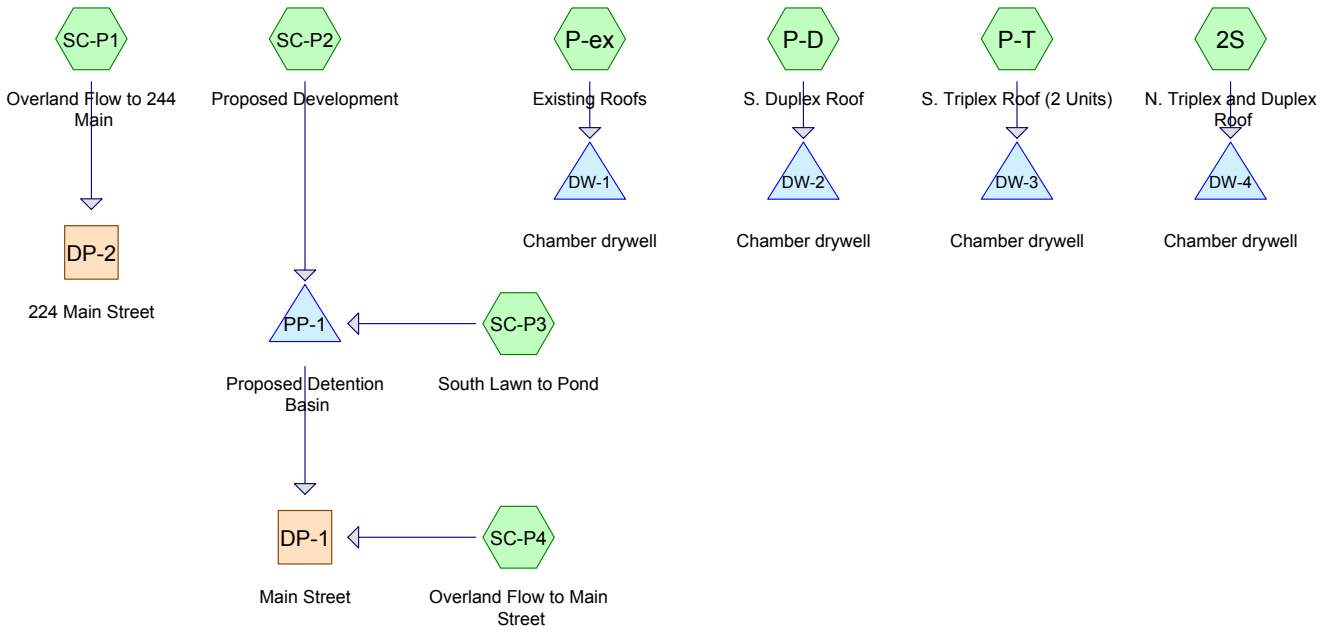
Proposed Conditions Subcatchment Areas Exhibit

PARK PLACE WAY
MEDWAY, MA

Scale: 1"=40'
Project No. 8521

Date: March 21, 2020
Dwg No. 8521 Proposed Subcatchments.dwg
Sheet 2 of 2



Subcat Reach Pond Link

Routing Diagram for 8521_Proposed
Prepared by Meridian Associates, Inc., Printed 6/10/2020

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
29,322	61	>75% Grass cover, Good, HSG B (SC-P1, SC-P2, SC-P3, SC-P4)
1,776	98	(SC-P4)
10,996	98	Driveways, patio (SC-P2)
10,548	98	Roofs, HSG B (2S, P-D, P-ex, P-T)
52,642	**77**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
39,870	HSG B	2S, P-D, P-ex, P-T, SC-P1, SC-P2, SC-P3, SC-P4
0	HSG C	
0	HSG D	
12,772	Other	SC-P2, SC-P4
52,642		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	0	0	1,776	1,776		
0	29,322	0	0	0	29,322	>75% Grass cover, Good	
0	0	0	0	10,996	10,996	Driveways, patio	
0	10,548	0	0	0	10,548	Roofs	
0	**39,870**	**0**	**0**	**12,772**	**52,642**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	PP-1	228.00	227.10	15.0	0.0600	0.013	12.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: N. Triplex and Duplex Runoff Area=3,336 sf 100.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=98 Runoff=0.24 cfs 872 cf

Subcatchment P-D: S. Duplex Roof Runoff Area=1,685 sf 100.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=98 Runoff=0.12 cfs 440 cf

Subcatchment P-ex: Existing Roofs Runoff Area=2,174 sf 100.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=98 Runoff=0.16 cfs 568 cf

Subcatchment P-T: S. Triplex Roof (2 Units) Runoff Area=3,353 sf 100.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=98 Runoff=0.25 cfs 876 cf

Subcatchment SC-P1: Overland Flow to 244 Runoff Area=6,995 sf 0.00% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=61 Runoff=0.07 cfs 300 cf

Subcatchment SC-P2: Proposed Runoff Area=22,026 sf 49.92% Impervious Runoff Depth=1.47"
Flow Length=214' Tc=7.3 min CN=79 Runoff=0.81 cfs 2,690 cf

Subcatchment SC-P3: South Lawn to Pond Runoff Area=6,998 sf 0.00% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=61 Runoff=0.07 cfs 301 cf

Subcatchment SC-P4: Overland Flow to Runoff Area=6,075 sf 29.23% Impervious Runoff Depth=1.04"
Tc=6.0 min CN=72 Runoff=0.16 cfs 525 cf

Reach DP-1: Main Street Inflow=0.16 cfs 525 cf
Outflow=0.16 cfs 525 cf

Reach DP-2: 224 Main Street Inflow=0.07 cfs 300 cf
Outflow=0.07 cfs 300 cf

Pond DW-1: Chamber drywell Peak Elev=229.82' Storage=162 cf Inflow=0.16 cfs 568 cf
Outflow=0.02 cfs 568 cf

Pond DW-2: Chamber drywell Peak Elev=235.30' Storage=111 cf Inflow=0.12 cfs 440 cf
Outflow=0.02 cfs 440 cf

Pond DW-3: Chamber drywell Peak Elev=236.20' Storage=247 cf Inflow=0.25 cfs 876 cf
Outflow=0.04 cfs 876 cf

Pond DW-4: Chamber drywell Peak Elev=237.09' Storage=221 cf Inflow=0.24 cfs 872 cf
Outflow=0.04 cfs 872 cf

Pond PP-1: Proposed Detention Basin Peak Elev=229.12' Storage=1,600 cf Inflow=0.88 cfs 2,991 cf
Discarded=0.05 cfs 2,991 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 2,991 cf

Total Runoff Area = 52,642 sf Runoff Volume = 6,574 cf Average Runoff Depth = 1.50"
55.70% Pervious = 29,322 sf 44.30% Impervious = 23,320 sf

Summary for Subcatchment 2S: N. Triplex and Duplex Roof

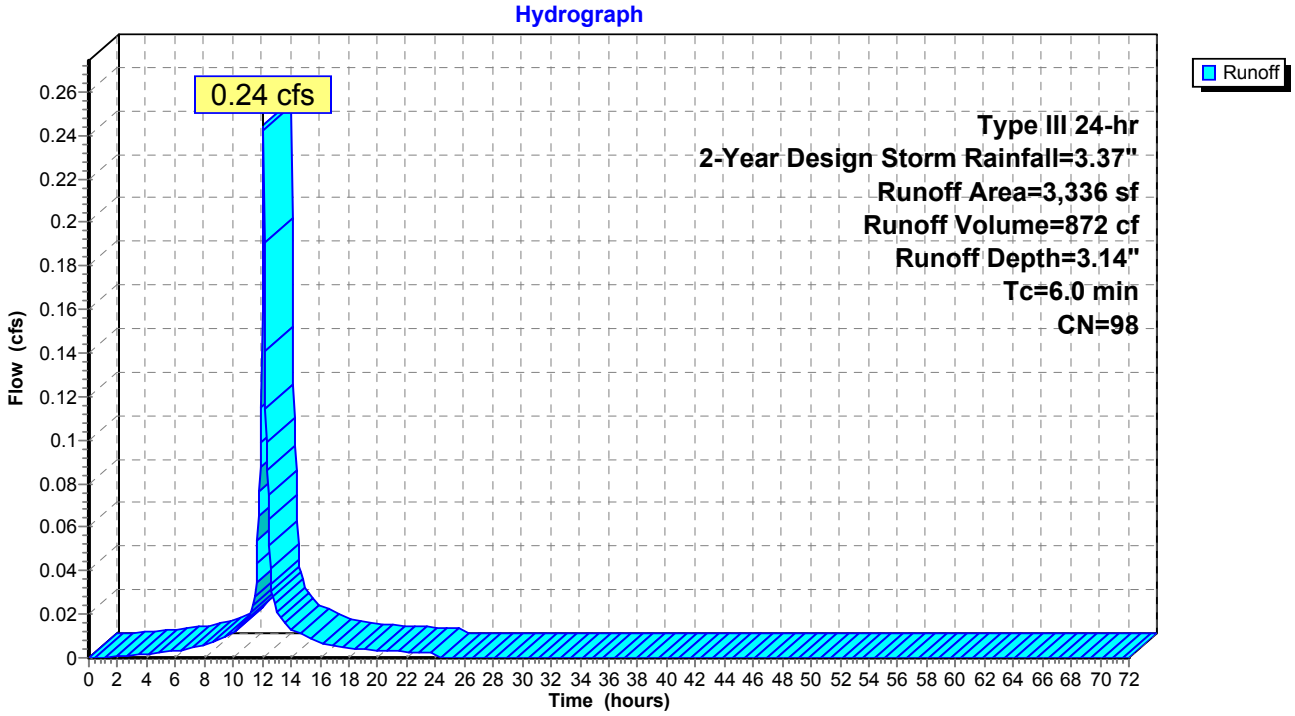
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 872 cf, Depth= 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

	Area (sf)	CN	Description
*	3,336	98	Roofs, HSG B
	3,336		100.00% Impervious Area

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

Subcatchment 2S: N. Triplex and Duplex Roof



Summary for Subcatchment P-D: S. Duplex Roof

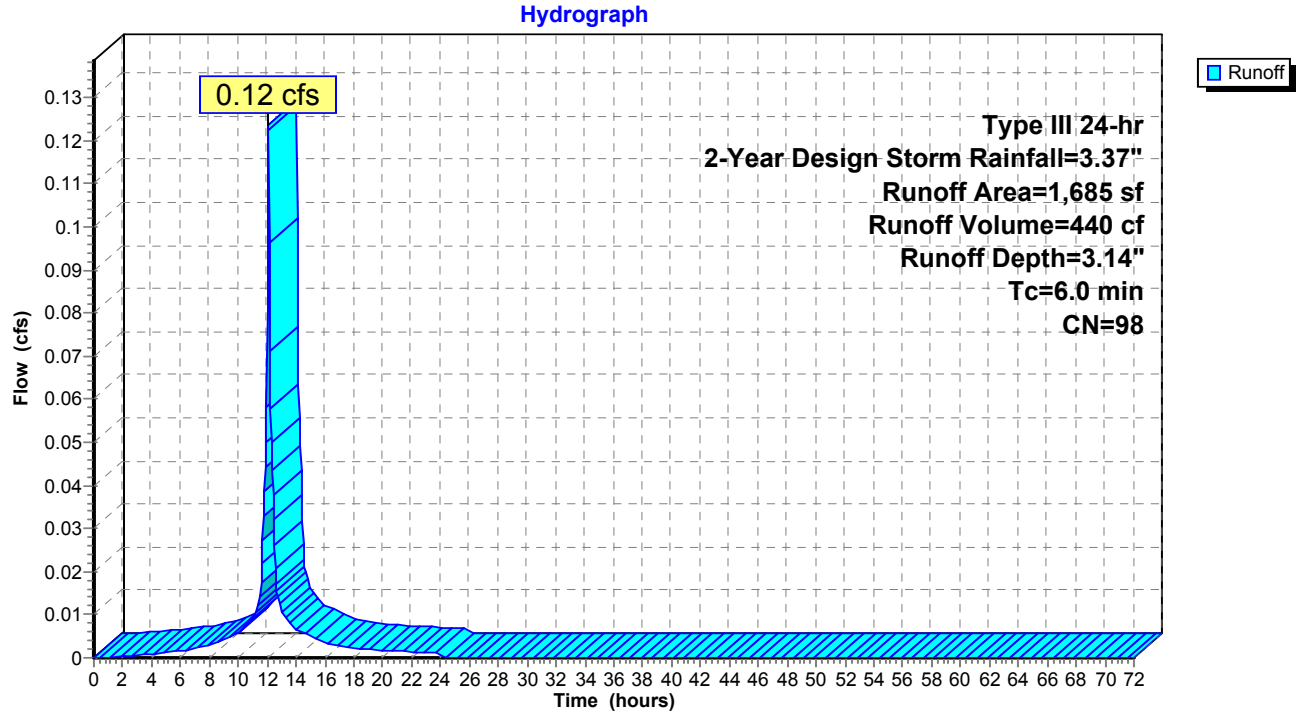
Runoff = 0.12 cfs @ 12.09 hrs, Volume= 440 cf, Depth= 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

Area (sf)	CN	Description
1,685	98	Roofs, HSG B
1,685		100.00% Impervious Area

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

Subcatchment P-D: S. Duplex Roof



Summary for Subcatchment P-ex: Existing Roofs

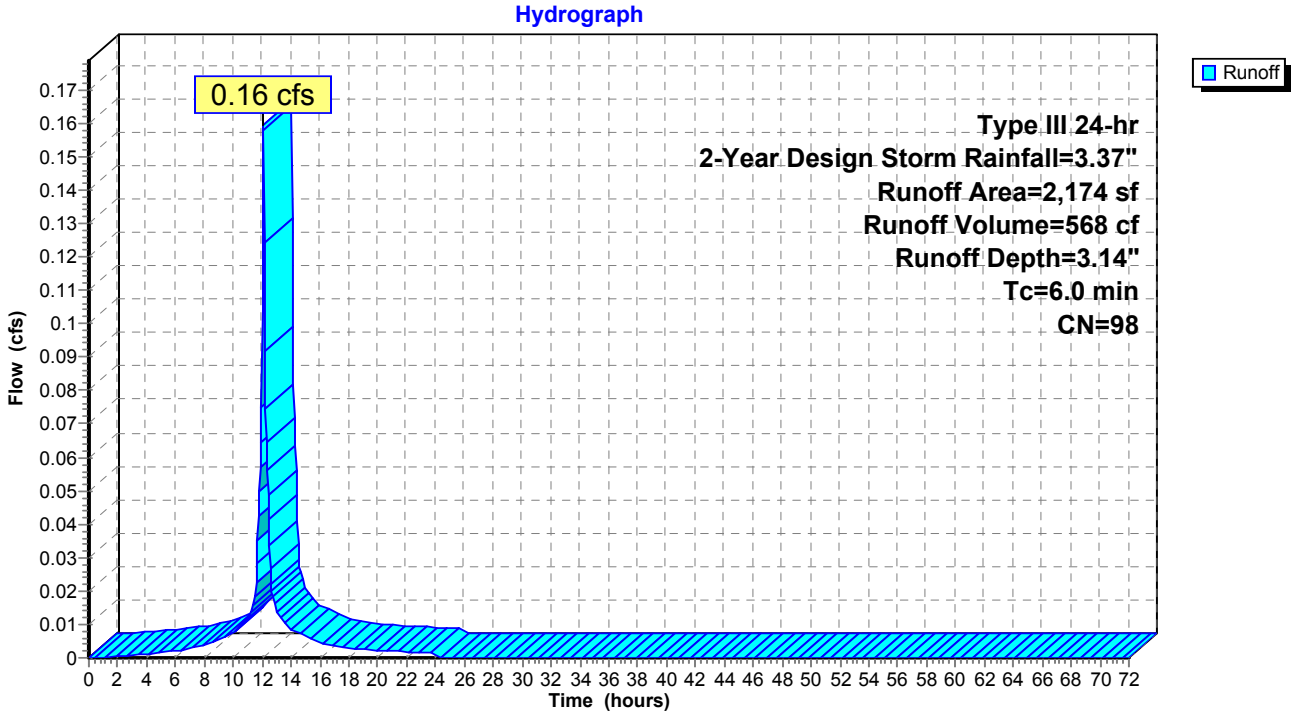
Runoff = 0.16 cfs @ 12.09 hrs, Volume= 568 cf, Depth= 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

Area (sf)	CN	Description
2,174	98	Roofs, HSG B
2,174		100.00% Impervious Area

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

Subcatchment P-ex: Existing Roofs



Summary for Subcatchment P-T: S. Triplex Roof (2 Units)

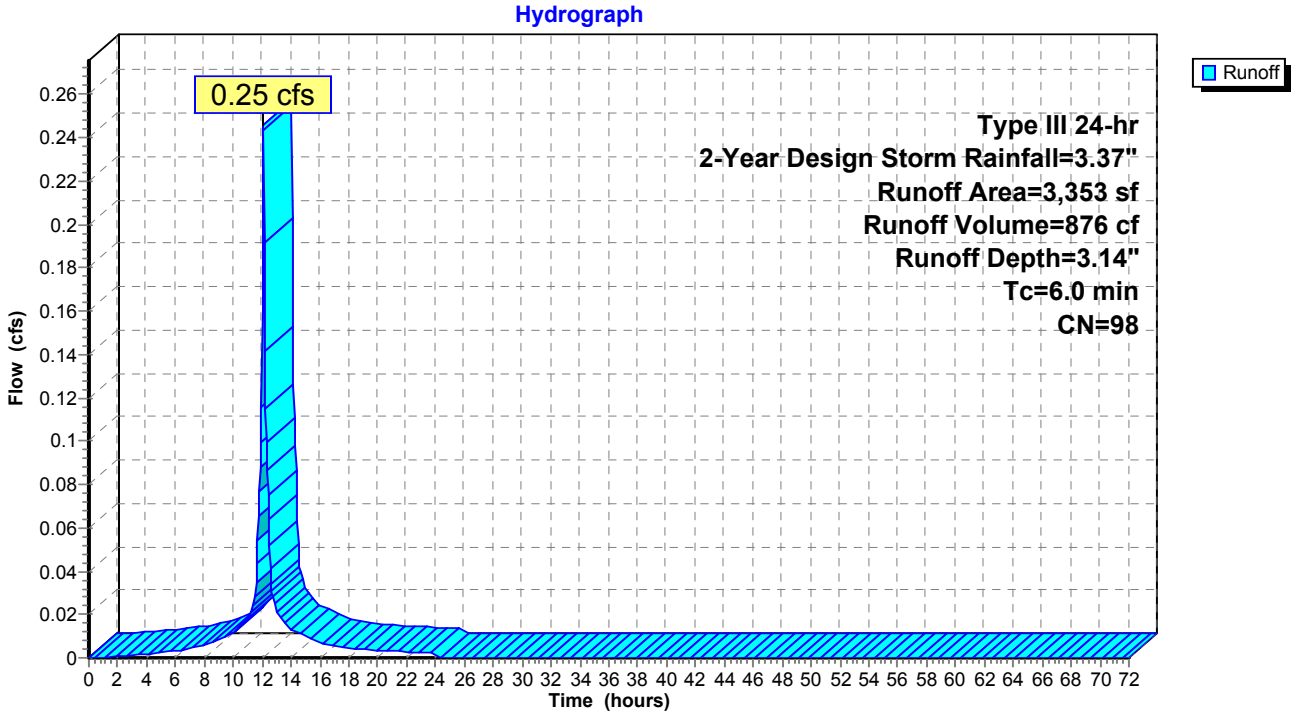
Runoff = 0.25 cfs @ 12.09 hrs, Volume= 876 cf, Depth= 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

	Area (sf)	CN	Description
*	3,353	98	Roofs, HSG B
	3,353		100.00% Impervious Area

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

Subcatchment P-T: S. Triplex Roof (2 Units)



Summary for Subcatchment SC-P1: Overland Flow to 244 Main

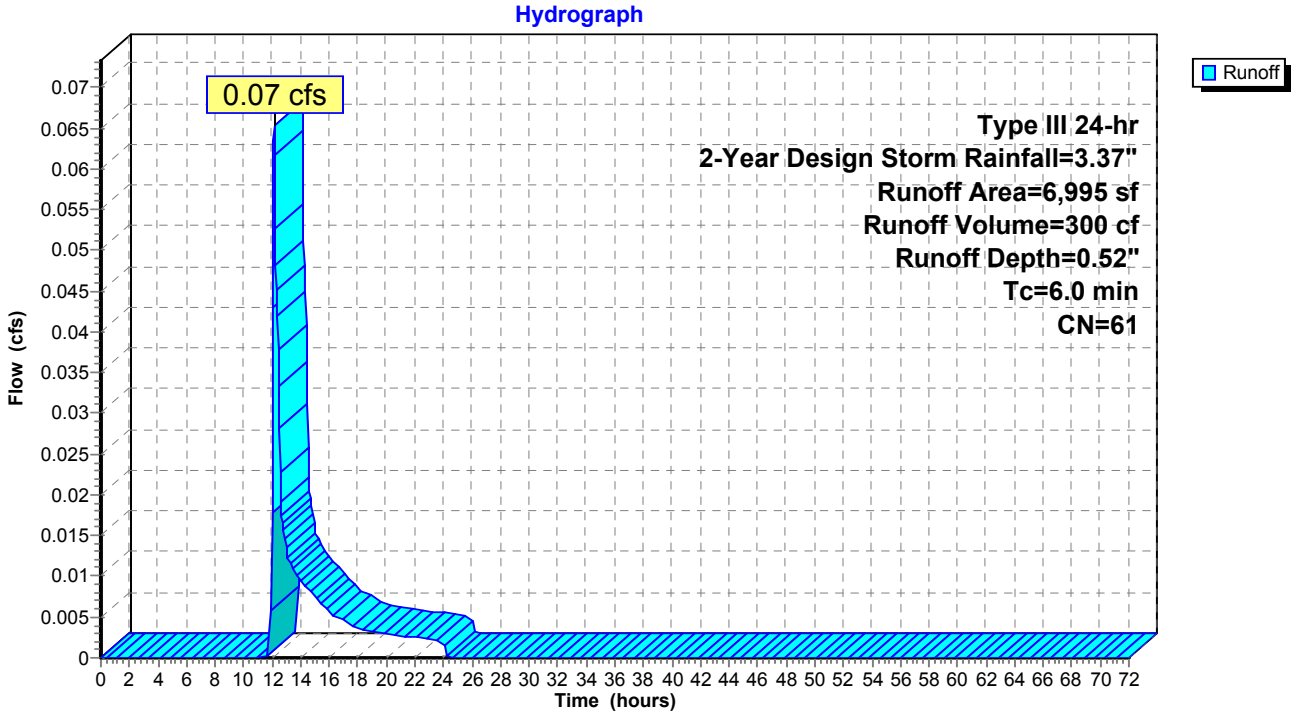
Runoff = 0.07 cfs @ 12.12 hrs, Volume= 300 cf, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

Area (sf)	CN	Description
6,995	61	>75% Grass cover, Good, HSG B
6,995		100.00% Pervious Area

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

Subcatchment SC-P1: Overland Flow to 244 Main



Summary for Subcatchment SC-P2: Proposed Development

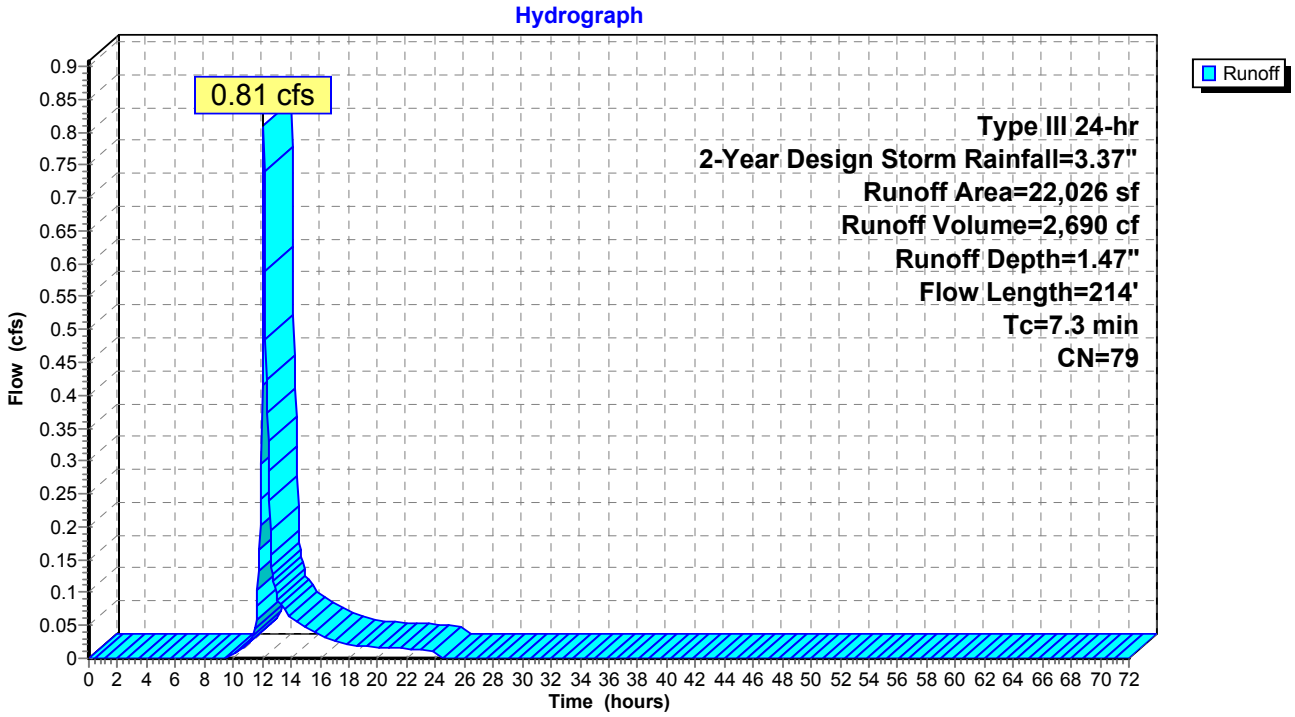
Runoff = 0.81 cfs @ 12.11 hrs, Volume= 2,690 cf, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

	Area (sf)	CN	Description
*	10,996	98	Driveways, patio
	11,030	61	>75% Grass cover, Good, HSG B
	22,026	79	Weighted Average
	11,030		50.08% Pervious Area
	10,996		49.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	18	0.0550	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.1	32	0.0340	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.0	7	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	16	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	49	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	92	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	214	Total			

Subcatchment SC-P2: Proposed Development



Summary for Subcatchment SC-P3: South Lawn to Pond

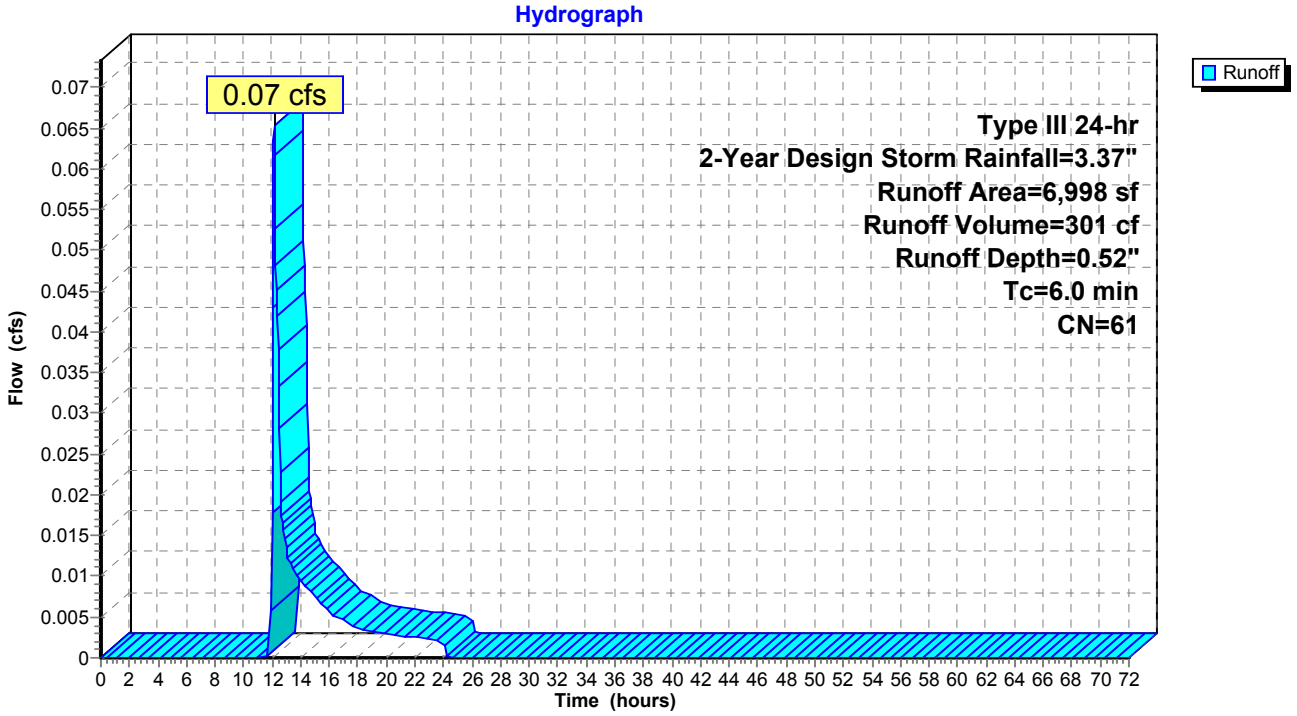
Runoff = 0.07 cfs @ 12.12 hrs, Volume= 301 cf, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

Area (sf)	CN	Description
6,998	61	>75% Grass cover, Good, HSG B
6,998		100.00% Pervious Area

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

Subcatchment SC-P3: South Lawn to Pond



Summary for Subcatchment SC-P4: Overland Flow to Main Street

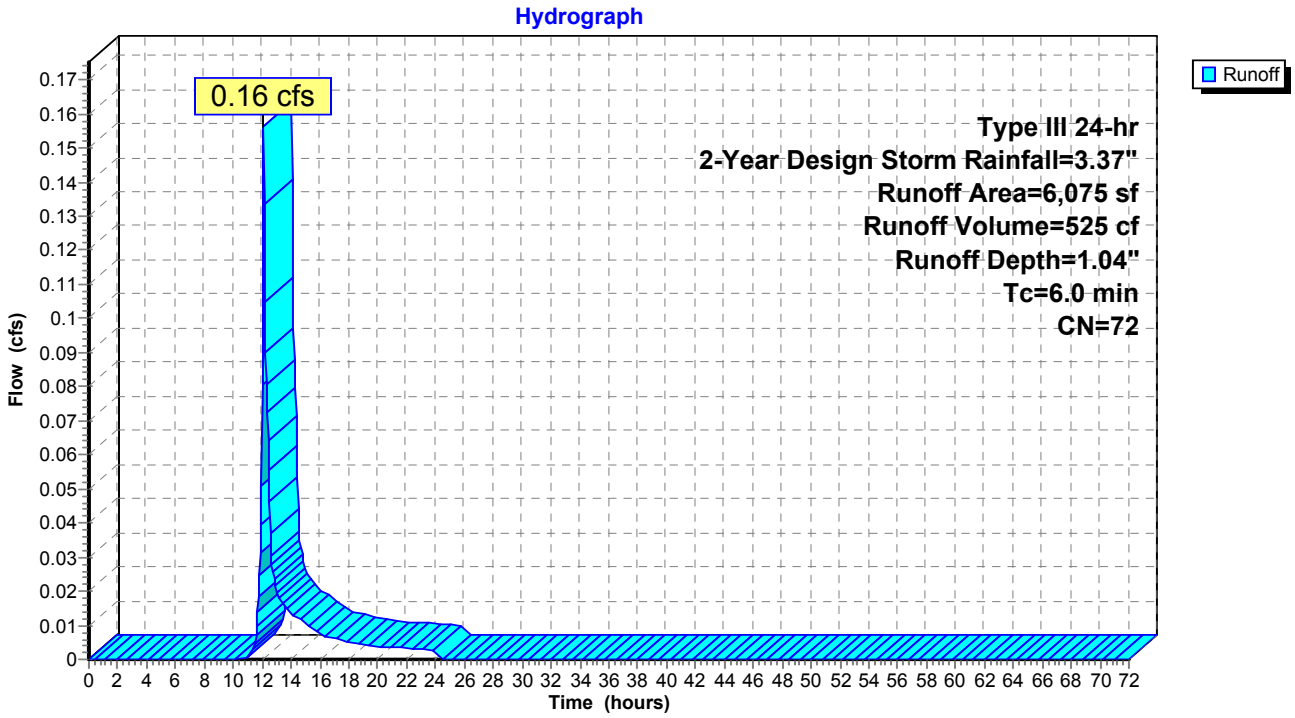
Runoff = 0.16 cfs @ 12.10 hrs, Volume= 525 cf, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Design Storm Rainfall=3.37"

	Area (sf)	CN	Description
*	1,776	98	
	4,299	61	>75% Grass cover, Good, HSG B
	6,075	72	Weighted Average
	4,299		70.77% Pervious Area
	1,776		29.23% Impervious Area

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

Subcatchment SC-P4: Overland Flow to Main Street



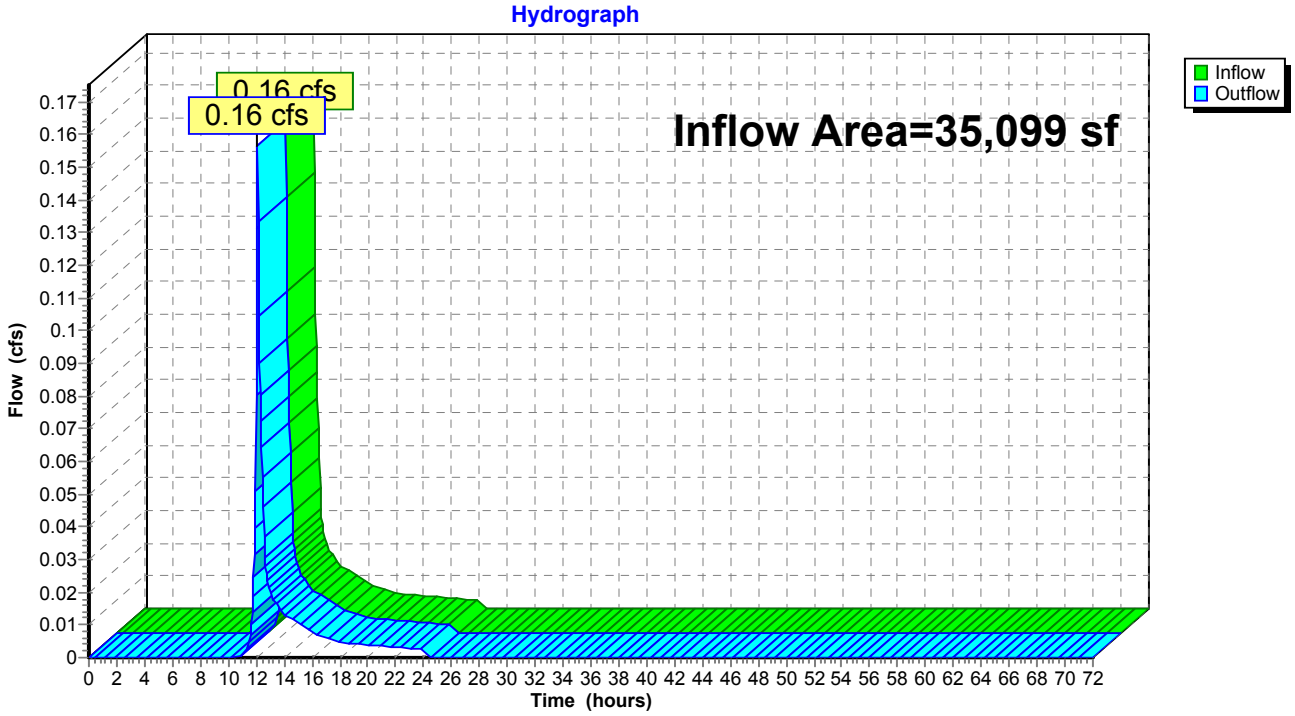
Summary for Reach DP-1: Main Street

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

Inflow Area = 35,099 sf, 36.39% Impervious, Inflow Depth = 0.18" for 2-Year Design Storm event
Inflow = 0.16 cfs @ 12.10 hrs, Volume= 525 cf
Outflow = 0.16 cfs @ 12.10 hrs, Volume= 525 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Main Street



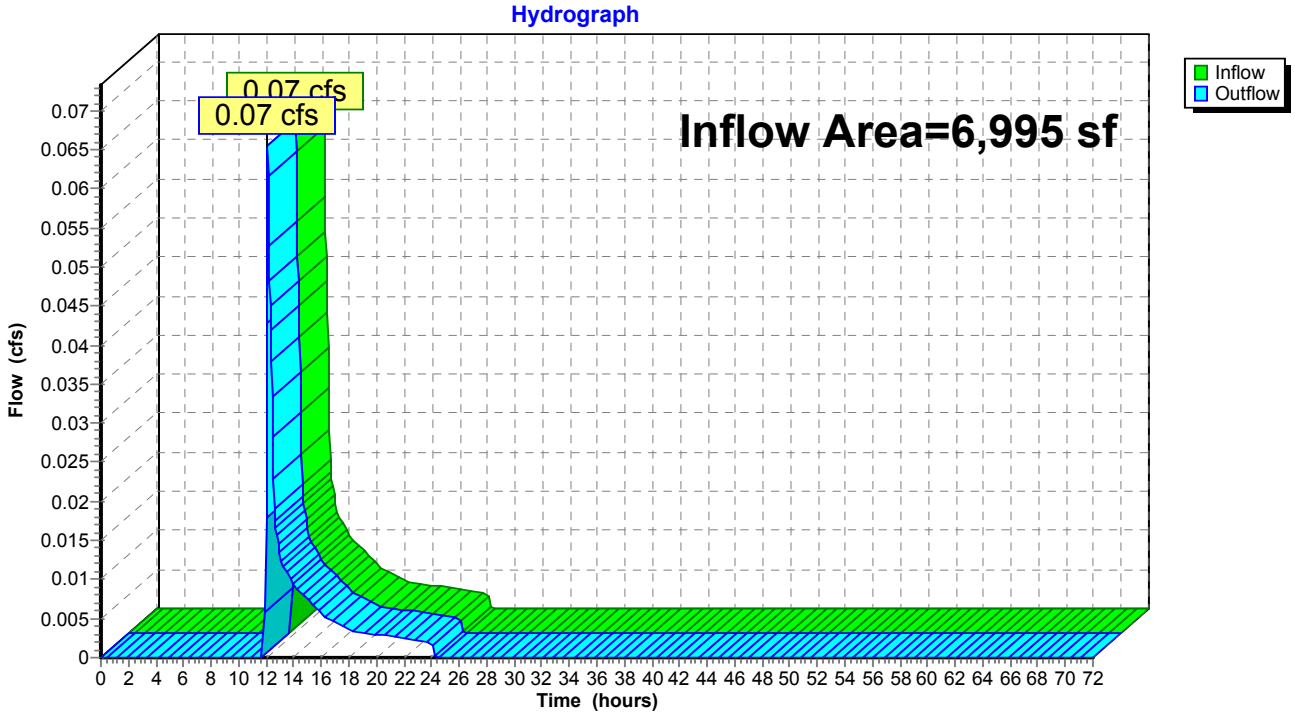
Summary for Reach DP-2: 224 Main Street

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

Inflow Area = 6,995 sf, 0.00% Impervious, Inflow Depth = 0.52" for 2-Year Design Storm event
Inflow = 0.07 cfs @ 12.12 hrs, Volume= 300 cf
Outflow = 0.07 cfs @ 12.12 hrs, Volume= 300 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: 224 Main Street



Summary for Pond DW-1: Chamber drywell

Inflow Area = 2,174 sf,100.00% Impervious, Inflow Depth = 3.14" for 2-Year Design Storm event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 568 cf
Outflow = 0.02 cfs @ 11.70 hrs, Volume= 568 cf, Atten= 85%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.70 hrs, Volume= 568 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 229.82' @ 12.58 hrs Surf.Area= 430 sf Storage= 162 cf

Plug-Flow detention time= 40.4 min calculated for 568 cf (100% of inflow)
Center-of-Mass det. time= 40.4 min (795.7 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	229.10'	391 cf	**11.17'W x 38.50'L x 3.54'H Field A** 1,523 cf Overall - 544 cf Embedded = 979 cf x 40.0% Voids
#2A	229.60'	544 cf	**Cultec R-330XL** x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		935 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	229.10'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.70 hrs HW=229.14' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond DW-1: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 2 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

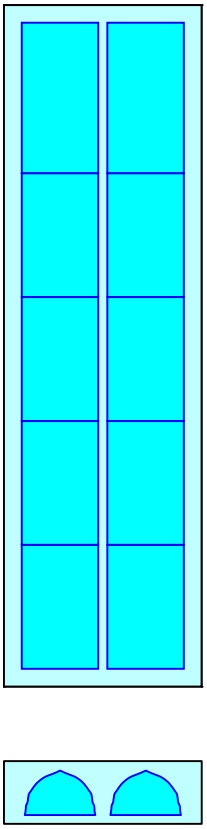
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

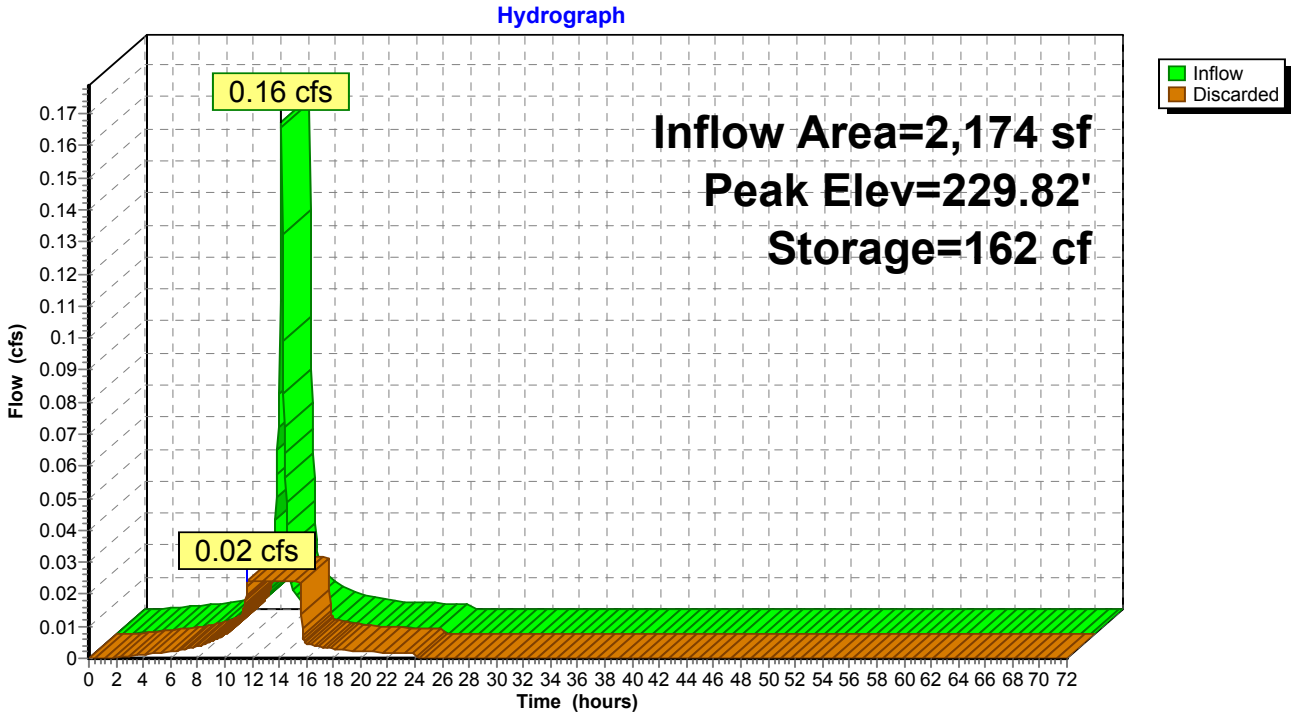
1,522.6 cf Field - 543.9 cf Chambers = 978.7 cf Stone x 40.0% Voids = 391.5 cf Stone Storage

Stone + Chamber Storage = 935.4 cf = 0.021 af
Overall Storage Efficiency = 61.4%

10 Chambers
56.4 cy Field
36.2 cy Stone



Pond DW-1: Chamber drywell



Summary for Pond DW-2: Chamber drywell

Inflow Area = 1,685 sf,100.00% Impervious, Inflow Depth = 3.14" for 2-Year Design Storm event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 440 cf
Outflow = 0.02 cfs @ 11.70 hrs, Volume= 440 cf, Atten= 82%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.70 hrs, Volume= 440 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 235.30' @ 12.53 hrs Surf.Area= 404 sf Storage= 111 cf

Plug-Flow detention time= 26.9 min calculated for 440 cf (100% of inflow)
Center-of-Mass det. time= 26.9 min (782.2 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	234.70'	262 cf	**8.50'W x 47.50'L x 2.04'H Field A** 824 cf Overall - 169 cf Embedded = 655 cf x 40.0% Voids
#2A	235.20'	169 cf	**Cultec C-100** x 12 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		431 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	234.70'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.70 hrs HW=234.72' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond DW-2: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec C-100
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

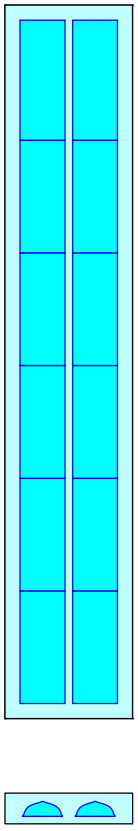
6 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 45.50' Row Length +12.0" End Stone x 2 = 47.50' Base Length
2 Rows x 36.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.50' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

12 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 169.4 cf Chamber Storage

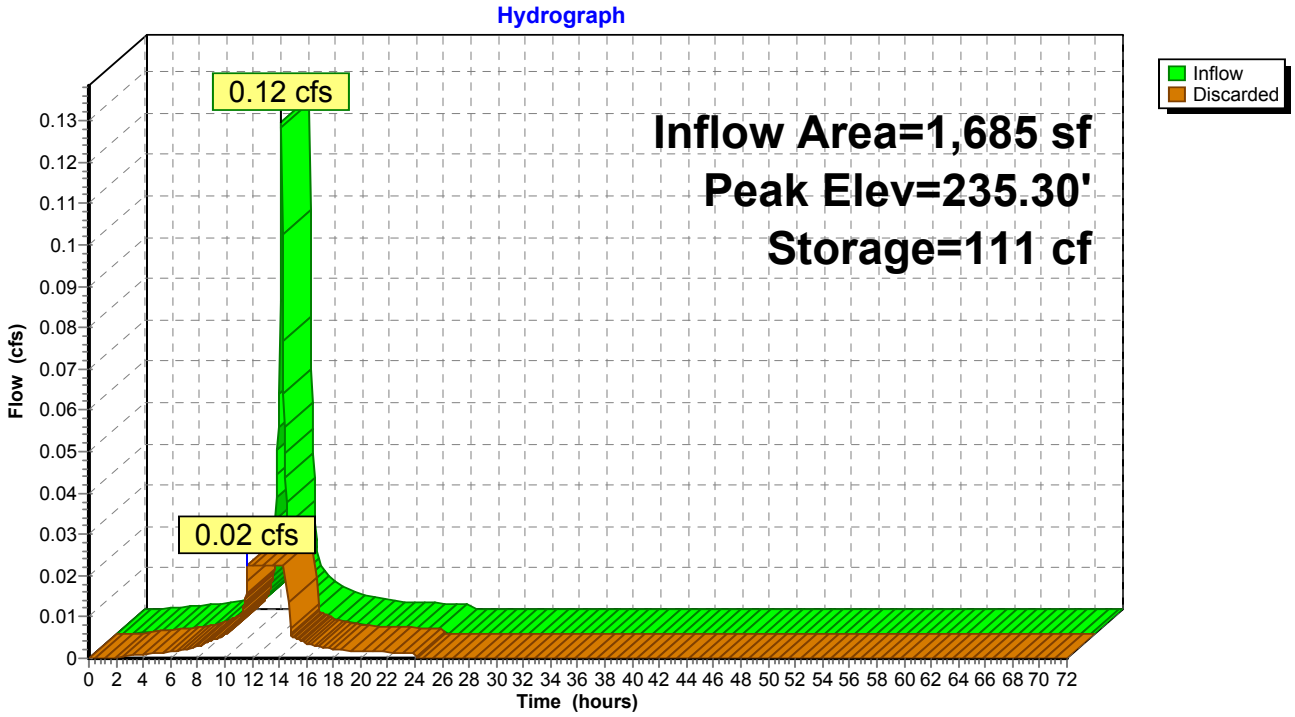
824.3 cf Field - 169.4 cf Chambers = 654.9 cf Stone x 40.0% Voids = 262.0 cf Stone Storage

Stone + Chamber Storage = 431.4 cf = 0.010 af
Overall Storage Efficiency = 52.3%

12 Chambers
30.5 cy Field
24.3 cy Stone



Pond DW-2: Chamber drywell



Summary for Pond DW-3: Chamber drywell

Inflow Area = 3,353 sf,100.00% Impervious, Inflow Depth = 3.14" for 2-Year Design Storm event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 876 cf
Outflow = 0.04 cfs @ 11.70 hrs, Volume= 876 cf, Atten= 85%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.70 hrs, Volume= 876 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 236.20' @ 12.58 hrs Surf.Area= 661 sf Storage= 247 cf

Plug-Flow detention time= 39.5 min calculated for 876 cf (100% of inflow)
Center-of-Mass det. time= 39.5 min (794.8 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.50'	451 cf	**12.67'W x 52.17'L x 2.54'H Field A** 1,679 cf Overall - 551 cf Embedded = 1,128 cf x 40.0% Voids
#2A	236.00'	551 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		1,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.70 hrs HW=235.53' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond DW-3: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

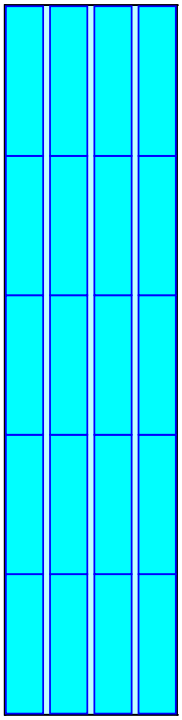
5 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 52.00' Row Length +1.0" End Stone x 2 = 52.17' Base Length
4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 1.0" Side Stone x 2 = 12.67' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

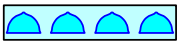
20 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 551.0 cf Chamber Storage

1,679.5 cf Field - 551.0 cf Chambers = 1,128.5 cf Stone x 40.0% Voids = 451.4 cf Stone Storage

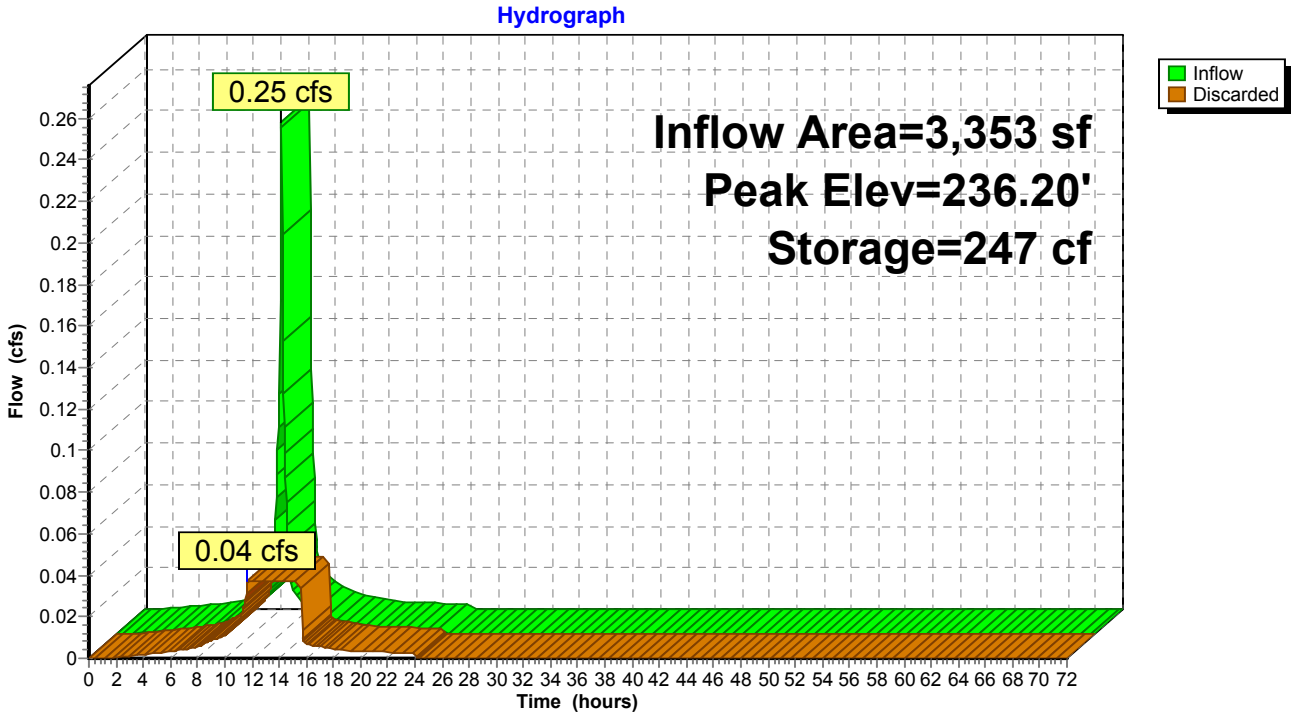
Stone + Chamber Storage = 1,002.4 cf = 0.023 af
Overall Storage Efficiency = 59.7%

20 Chambers
62.2 cy Field
41.8 cy Stone





Pond DW-3: Chamber drywell



Summary for Pond DW-4: Chamber drywell

Inflow Area = 3,336 sf,100.00% Impervious, Inflow Depth = 3.14" for 2-Year Design Storm event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 872 cf
Outflow = 0.04 cfs @ 11.75 hrs, Volume= 872 cf, Atten= 82%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.75 hrs, Volume= 872 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 237.09' @ 12.53 hrs Surf.Area= 803 sf Storage= 221 cf

Plug-Flow detention time= 27.2 min calculated for 872 cf (100% of inflow)
Center-of-Mass det. time= 27.1 min (782.5 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.50'	551 cf	**19.17'W x 41.92'L x 2.54'H Field A** 2,042 cf Overall - 664 cf Embedded = 1,378 cf x 40.0% Voids
#2A	237.00'	664 cf	**Cultec R-150XLHD** x 24 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		1,215 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	236.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.75 hrs HW=236.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond DW-4: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 6 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

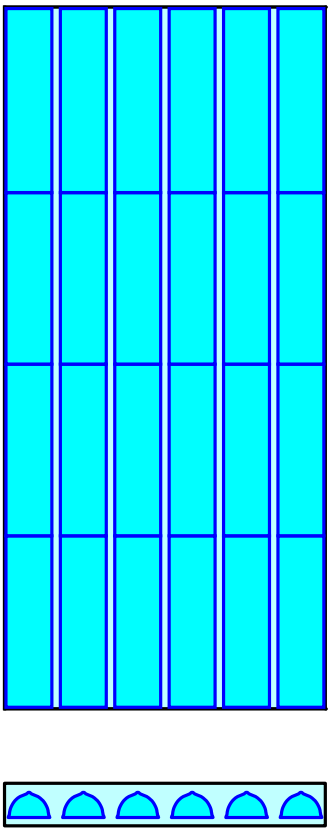
4 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 41.75' Row Length +1.0" End Stone x 2 = 41.92' Base Length
6 Rows x 33.0" Wide + 6.0" Spacing x 5 + 1.0" Side Stone x 2 = 19.17' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

24 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 6 Rows = 663.6 cf Chamber Storage

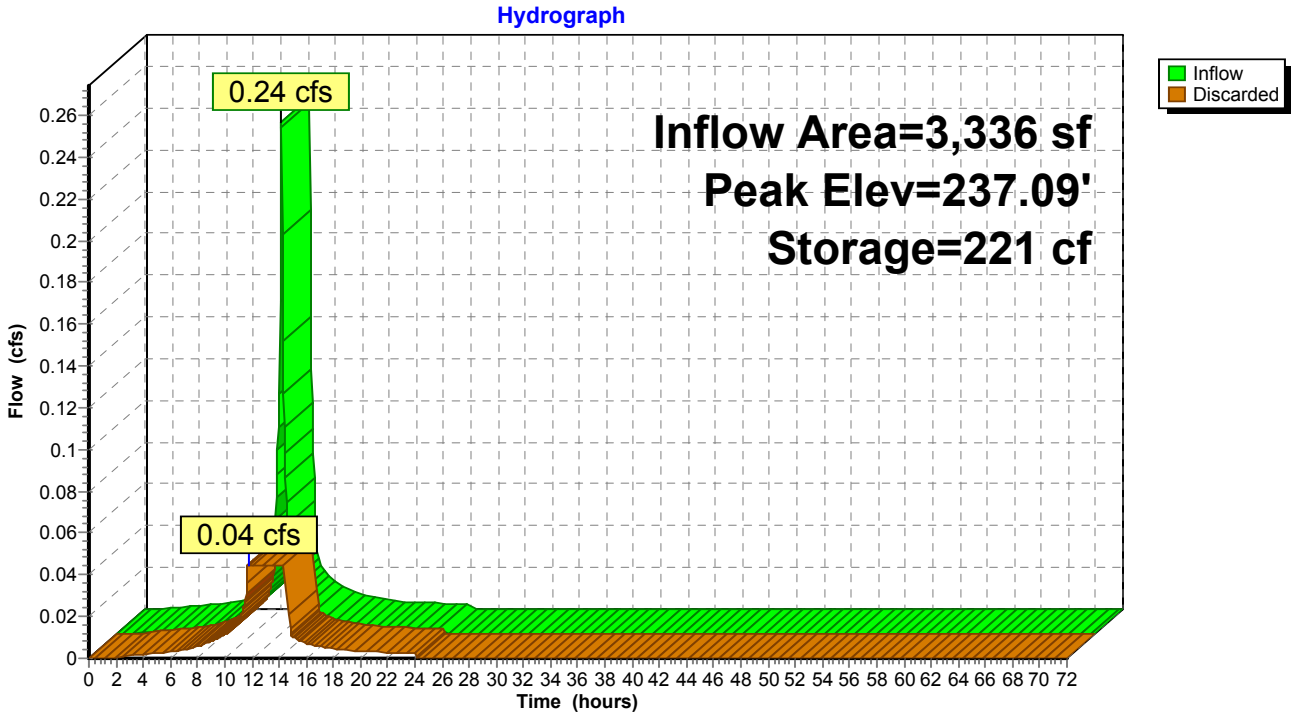
2,042.0 cf Field - 663.6 cf Chambers = 1,378.4 cf Stone x 40.0% Voids = 551.4 cf Stone Storage

Stone + Chamber Storage = 1,214.9 cf = 0.028 af
Overall Storage Efficiency = 59.5%

24 Chambers
75.6 cy Field
51.1 cy Stone



Pond DW-4: Chamber drywell



Summary for Pond PP-1: Proposed Detention Basin

Inflow Area = 29,024 sf, 37.89% Impervious, Inflow Depth = 1.24" for 2-Year Design Storm event
Inflow = 0.88 cfs @ 12.11 hrs, Volume= 2,991 cf
Outflow = 0.05 cfs @ 15.55 hrs, Volume= 2,991 cf, Atten= 95%, Lag= 206.6 min
Discarded = 0.05 cfs @ 15.55 hrs, Volume= 2,991 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 229.12' @ 15.55 hrs Surf.Area= 1,975 sf Storage= 1,600 cf
Flood Elev= 230.00' Surf.Area= 2,461 sf Storage= 3,557 cf

Plug-Flow detention time= 404.6 min calculated for 2,989 cf (100% of inflow)
Center-of-Mass det. time= 404.7 min (1,255.6 - 850.9)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	3,557 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

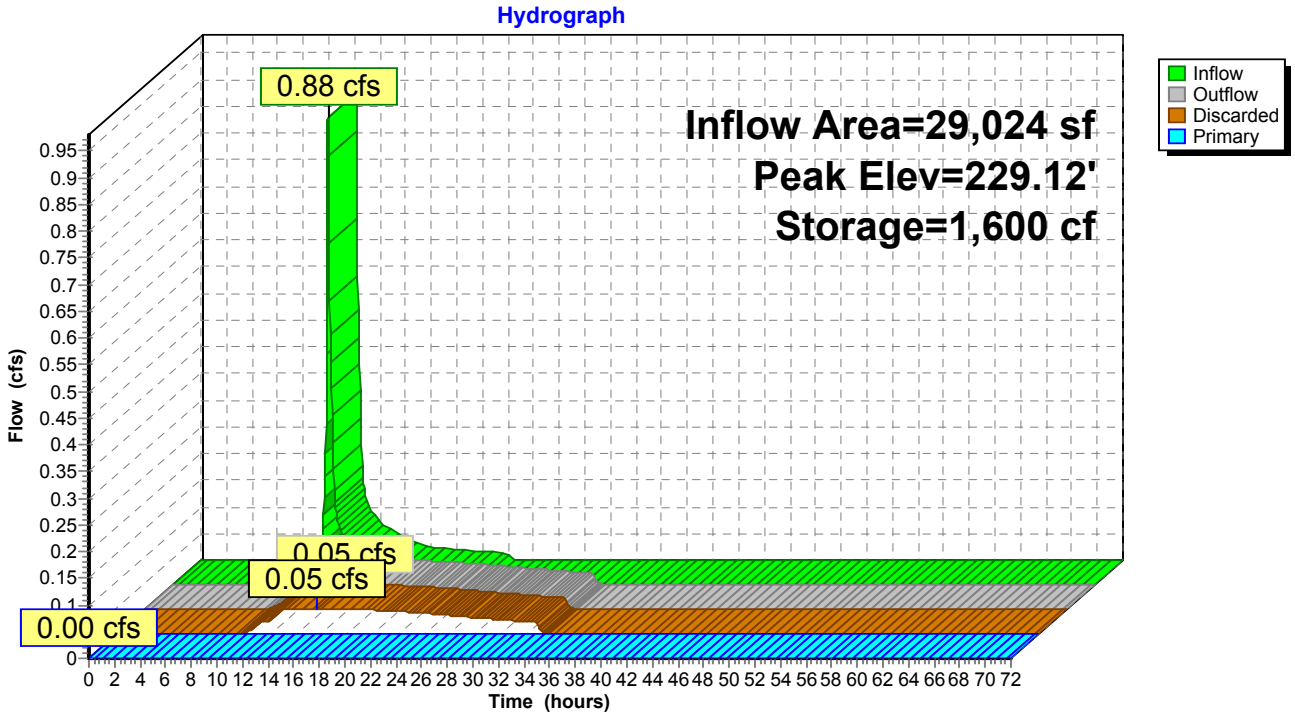
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	897	110.5	0	0	897
229.00	1,915	172.5	1,374	1,374	2,300
230.00	2,461	191.4	2,182	3,557	2,877

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	229.80'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	228.00'	**12.0" Round Culvert** L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 228.00' / 227.10' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.05 cfs @ 15.55 hrs HW=229.12' (Free Discharge)
↑**1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=228.00' (Free Discharge)
↑**2=Orifice/Grate** (Controls 0.00 cfs)
↑**3=Culvert** (Controls 0.00 cfs)

Pond PP-1: Proposed Detention Basin



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: N. Triplex and Duplex Runoff Area=3,336 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=98 Runoff=0.39 cfs 1,396 cf

Subcatchment P-D: S. Duplex Roof Runoff Area=1,685 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=98 Runoff=0.19 cfs 705 cf

Subcatchment P-ex: Existing Roofs Runoff Area=2,174 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=98 Runoff=0.25 cfs 910 cf

Subcatchment P-T: S. Triplex Roof (2 Units) Runoff Area=3,353 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=98 Runoff=0.39 cfs 1,403 cf

Subcatchment SC-P1: Overland Flow to 244 Runoff Area=6,995 sf 0.00% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=61 Runoff=0.26 cfs 891 cf

Subcatchment SC-P2: Proposed Runoff Area=22,026 sf 49.92% Impervious Runoff Depth=3.03"
Flow Length=214' Tc=7.3 min CN=79 Runoff=1.69 cfs 5,556 cf

Subcatchment SC-P3: South Lawn to Pond Runoff Area=6,998 sf 0.00% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=61 Runoff=0.26 cfs 891 cf

Subcatchment SC-P4: Overland Flow to Runoff Area=6,075 sf 29.23% Impervious Runoff Depth=2.40"
Tc=6.0 min CN=72 Runoff=0.38 cfs 1,215 cf

Reach DP-1: Main Street Inflow=0.38 cfs 2,380 cf
Outflow=0.38 cfs 2,380 cf

Reach DP-2: 224 Main Street Inflow=0.26 cfs 891 cf
Outflow=0.26 cfs 891 cf

Pond DW-1: Chamber drywell Peak Elev=230.25' Storage=310 cf Inflow=0.25 cfs 910 cf
Outflow=0.02 cfs 910 cf

Pond DW-2: Chamber drywell Peak Elev=235.67' Storage=219 cf Inflow=0.19 cfs 705 cf
Outflow=0.02 cfs 705 cf

Pond DW-3: Chamber drywell Peak Elev=236.62' Storage=476 cf Inflow=0.39 cfs 1,403 cf
Outflow=0.04 cfs 1,403 cf

Pond DW-4: Chamber drywell Peak Elev=237.40' Storage=434 cf Inflow=0.39 cfs 1,396 cf
Outflow=0.04 cfs 1,396 cf

Pond PP-1: Proposed Detention Basin Peak Elev=229.84' Storage=3,170 cf Inflow=1.96 cfs 6,447 cf
Discarded=0.06 cfs 5,281 cf Primary=0.21 cfs 1,165 cf Outflow=0.27 cfs 6,446 cf

Total Runoff Area = 52,642 sf Runoff Volume = 12,967 cf Average Runoff Depth = 2.96"
55.70% Pervious = 29,322 sf 44.30% Impervious = 23,320 sf

Summary for Subcatchment 2S: N. Triplex and Duplex Roof

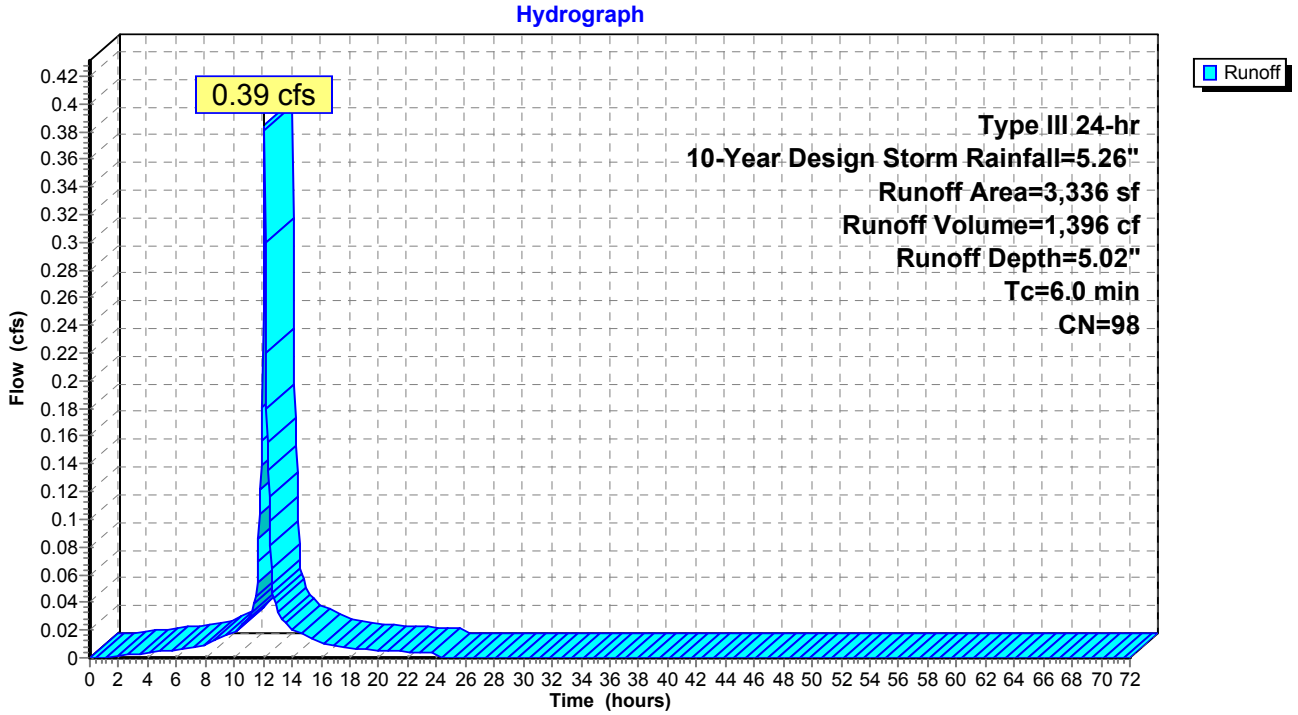
Runoff = 0.39 cfs @ 12.09 hrs, Volume= 1,396 cf, Depth= 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

	Area (sf)	CN	Description
*	3,336	98	Roofs, HSG B
	3,336		100.00% Impervious Area

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

Subcatchment 2S: N. Triplex and Duplex Roof



Summary for Subcatchment P-D: S. Duplex Roof

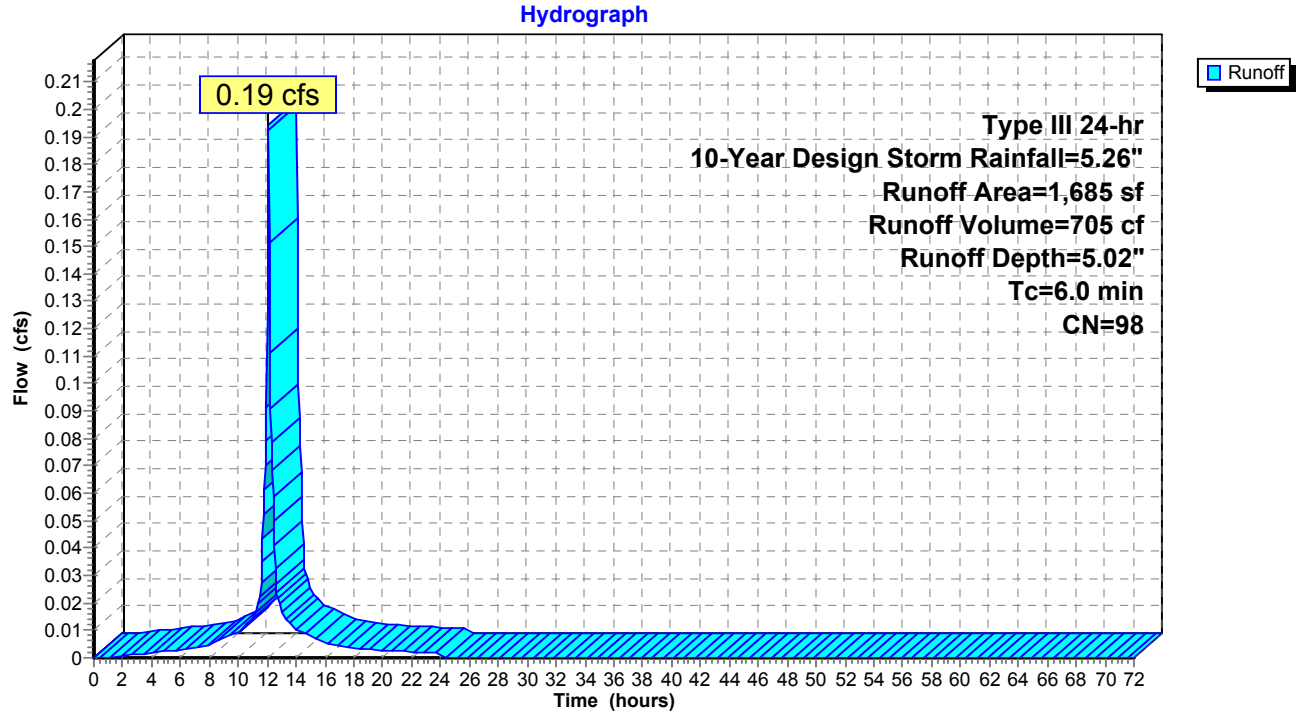
Runoff = 0.19 cfs @ 12.09 hrs, Volume= 705 cf, Depth= 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

Area (sf)	CN	Description
1,685	98	Roofs, HSG B
1,685		100.00% Impervious Area

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

Subcatchment P-D: S. Duplex Roof



Summary for Subcatchment P-ex: Existing Roofs

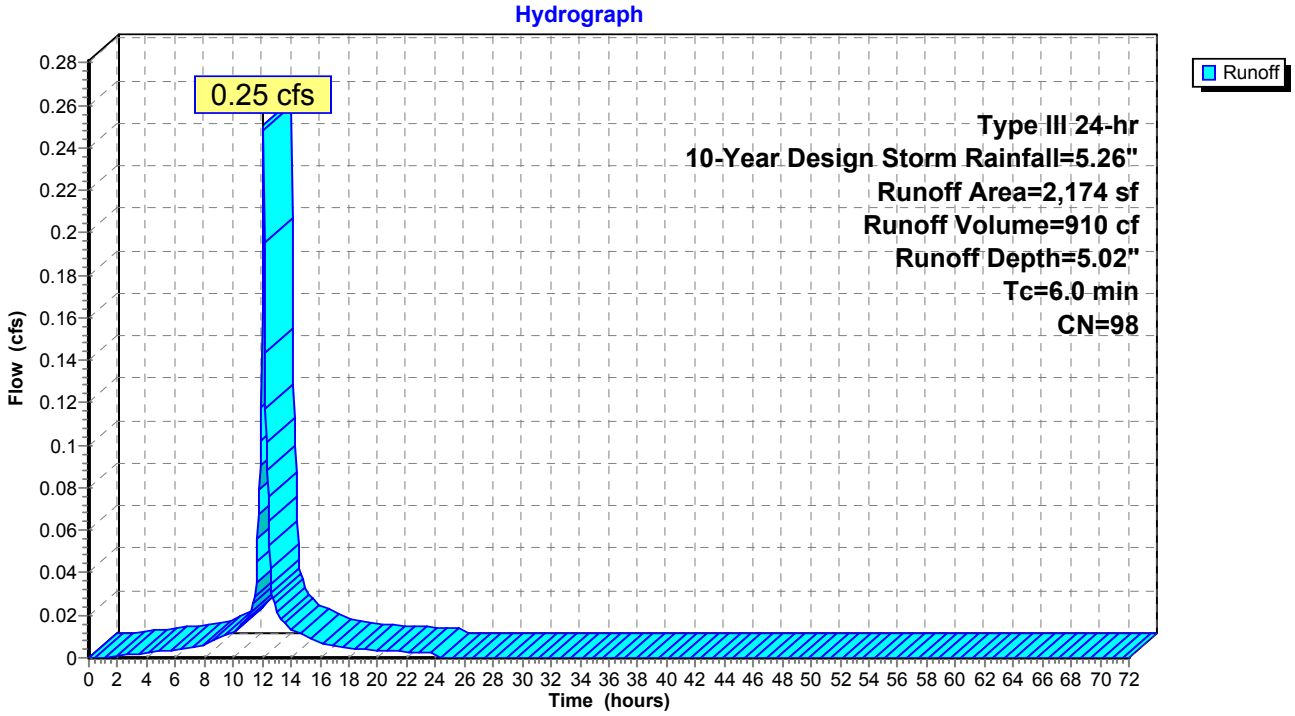
Runoff = 0.25 cfs @ 12.09 hrs, Volume= 910 cf, Depth= 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

Area (sf)	CN	Description
2,174	98	Roofs, HSG B
2,174		100.00% Impervious Area

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

Subcatchment P-ex: Existing Roofs



Summary for Subcatchment P-T: S. Triplex Roof (2 Units)

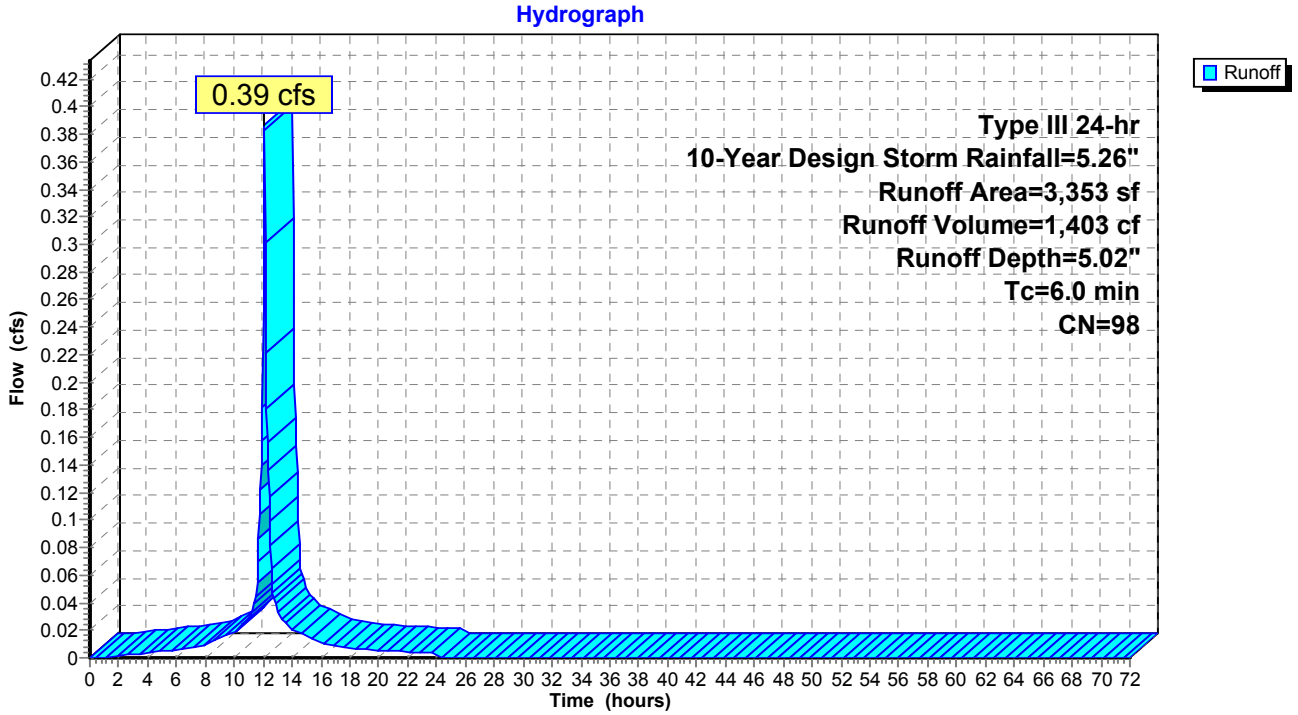
Runoff = 0.39 cfs @ 12.09 hrs, Volume= 1,403 cf, Depth= 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

	Area (sf)	CN	Description
*	3,353	98	Roofs, HSG B
	3,353		100.00% Impervious Area

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

Subcatchment P-T: S. Triplex Roof (2 Units)



Summary for Subcatchment SC-P1: Overland Flow to 244 Main

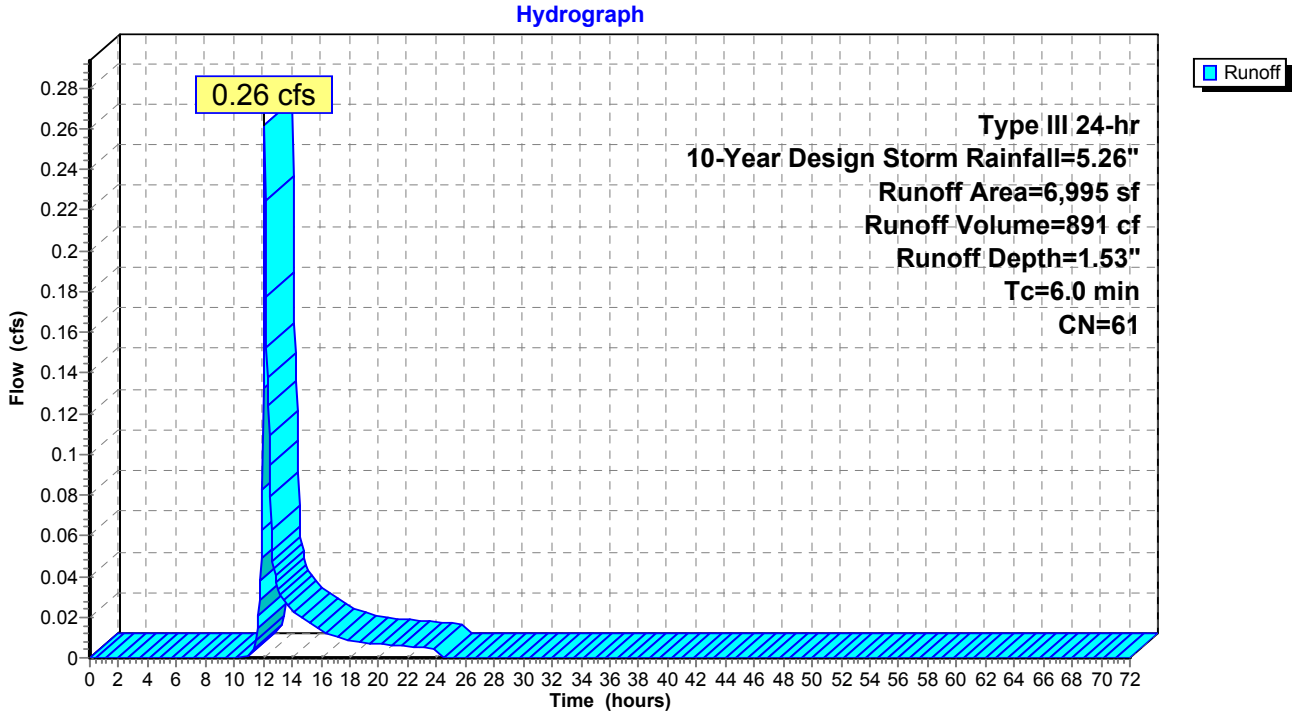
Runoff = 0.26 cfs @ 12.10 hrs, Volume= 891 cf, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

Area (sf)	CN	Description
6,995	61	>75% Grass cover, Good, HSG B
6,995		100.00% Pervious Area

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

Subcatchment SC-P1: Overland Flow to 244 Main



Summary for Subcatchment SC-P2: Proposed Development

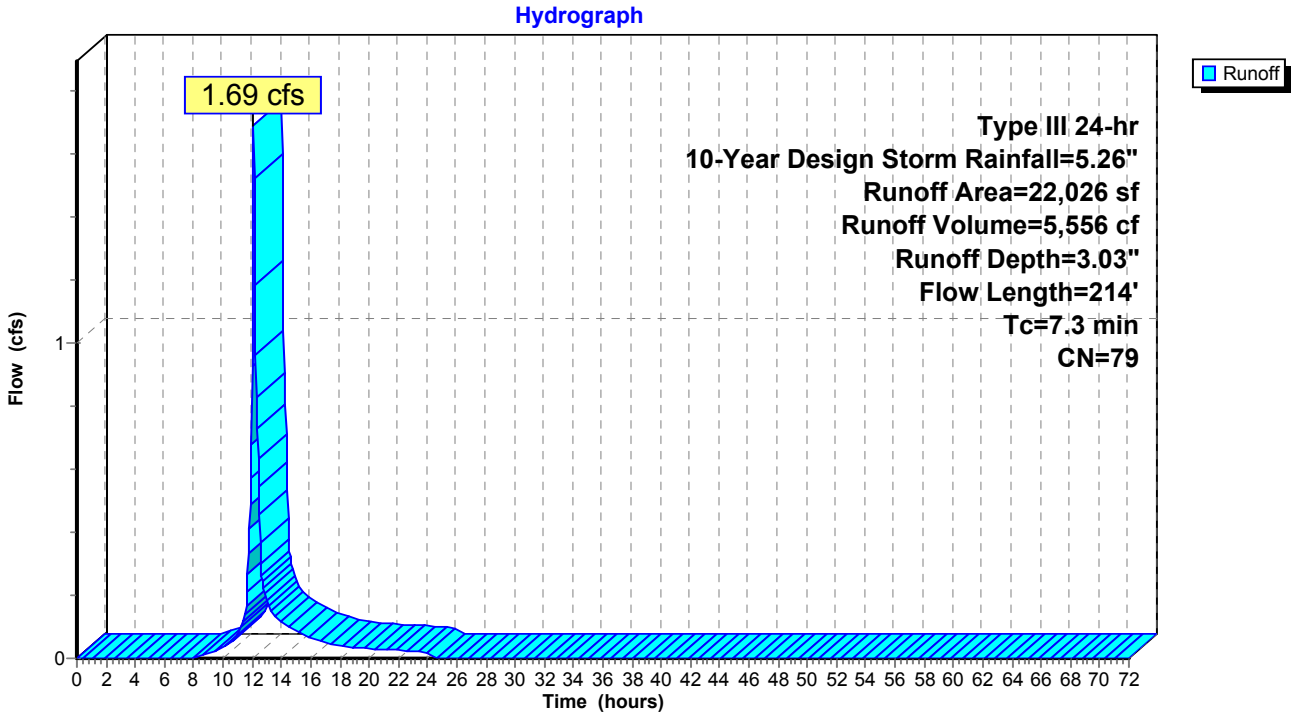
Runoff = 1.69 cfs @ 12.11 hrs, Volume= 5,556 cf, Depth= 3.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

	Area (sf)	CN	Description
*	10,996	98	Driveways, patio
	11,030	61	>75% Grass cover, Good, HSG B
	22,026	79	Weighted Average
	11,030		50.08% Pervious Area
	10,996		49.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	18	0.0550	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.1	32	0.0340	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.0	7	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	16	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	49	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	92	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	214	Total			

Subcatchment SC-P2: Proposed Development



Summary for Subcatchment SC-P3: South Lawn to Pond

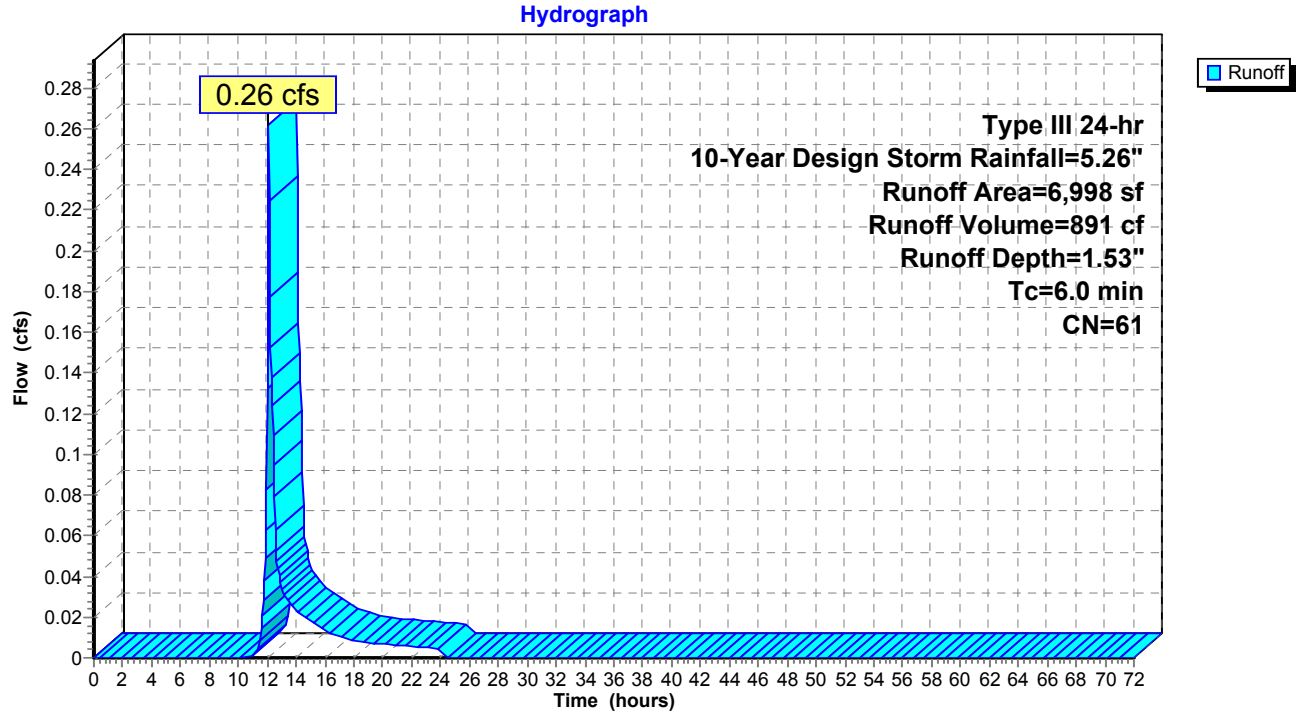
Runoff = 0.26 cfs @ 12.10 hrs, Volume= 891 cf, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

Area (sf)	CN	Description
6,998	61	>75% Grass cover, Good, HSG B
6,998		100.00% Pervious Area

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

Subcatchment SC-P3: South Lawn to Pond



Summary for Subcatchment SC-P4: Overland Flow to Main Street

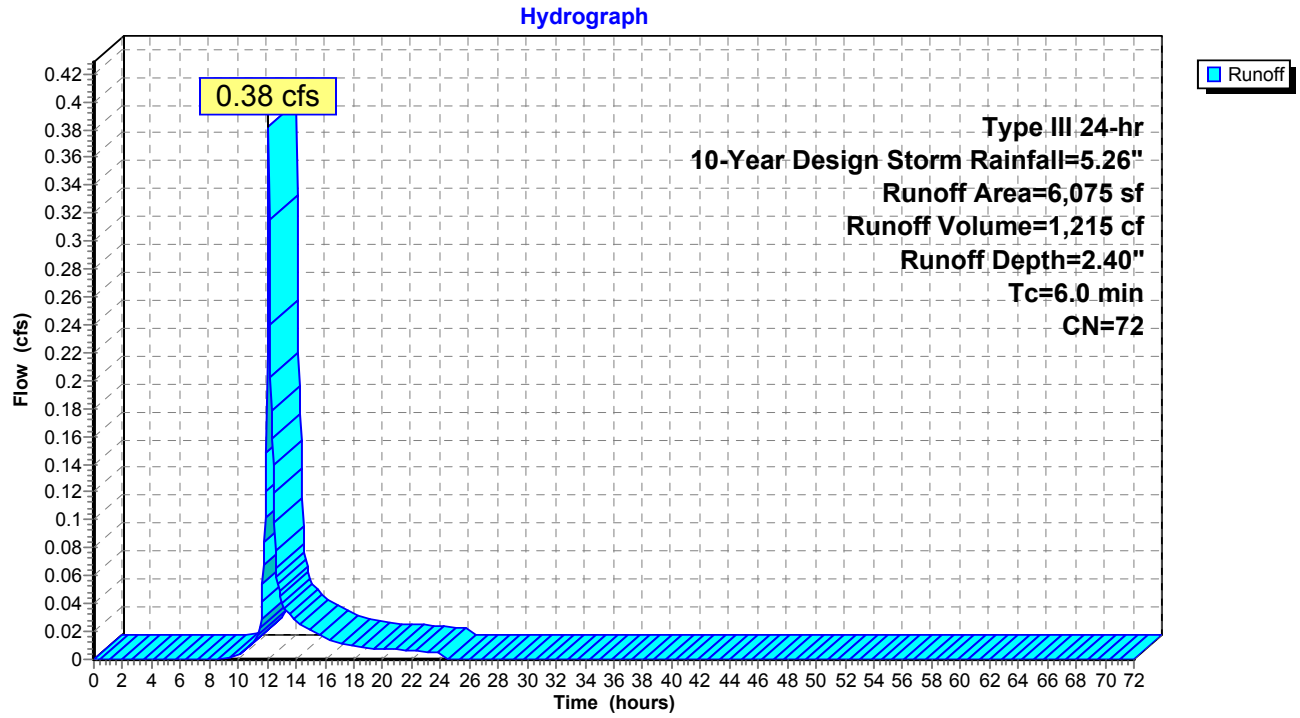
Runoff = 0.38 cfs @ 12.10 hrs, Volume= 1,215 cf, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Design Storm Rainfall=5.26"

	Area (sf)	CN	Description
*	1,776	98	
	4,299	61	>75% Grass cover, Good, HSG B
	6,075	72	Weighted Average
	4,299		70.77% Pervious Area
	1,776		29.23% Impervious Area

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

Subcatchment SC-P4: Overland Flow to Main Street



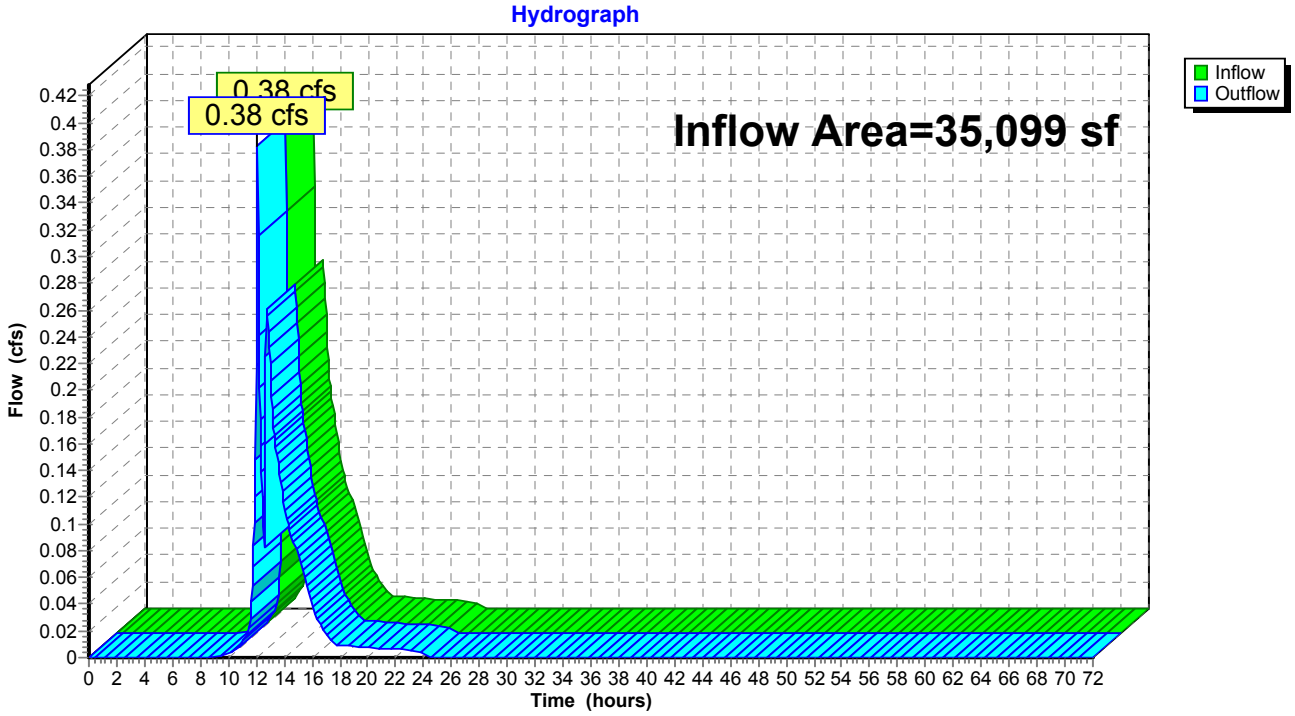
Summary for Reach DP-1: Main Street

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

Inflow Area = 35,099 sf, 36.39% Impervious, Inflow Depth = 0.81" for 10-Year Design Storm event
Inflow = 0.38 cfs @ 12.10 hrs, Volume= 2,380 cf
Outflow = 0.38 cfs @ 12.10 hrs, Volume= 2,380 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Main Street



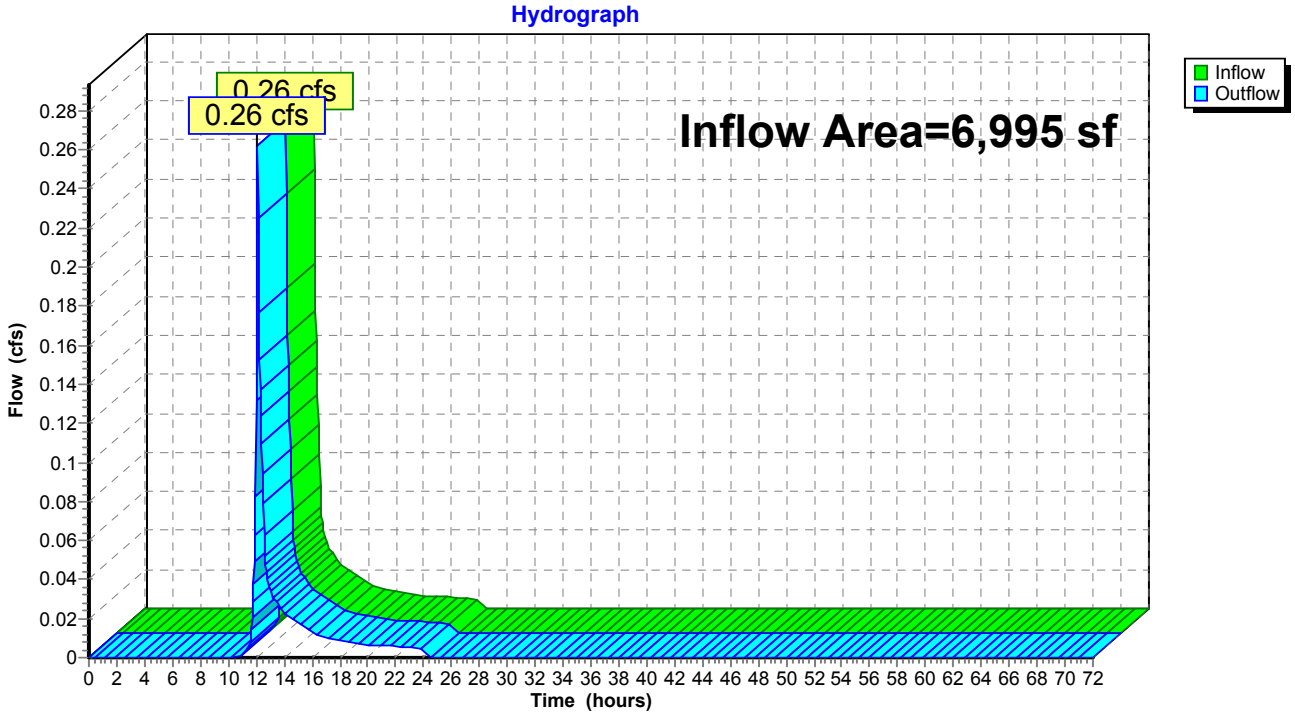
Summary for Reach DP-2: 224 Main Street

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

Inflow Area = 6,995 sf, 0.00% Impervious, Inflow Depth = 1.53" for 10-Year Design Storm event
Inflow = 0.26 cfs @ 12.10 hrs, Volume= 891 cf
Outflow = 0.26 cfs @ 12.10 hrs, Volume= 891 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: 224 Main Street



Summary for Pond DW-1: Chamber drywell

Inflow Area = 2,174 sf,100.00% Impervious, Inflow Depth = 5.02" for 10-Year Design Storm event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 910 cf
Outflow = 0.02 cfs @ 11.40 hrs, Volume= 910 cf, Atten= 90%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.40 hrs, Volume= 910 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 230.25' @ 12.90 hrs Surf.Area= 430 sf Storage= 310 cf

Plug-Flow detention time= 88.2 min calculated for 909 cf (100% of inflow)
Center-of-Mass det. time= 88.1 min (835.3 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	229.10'	391 cf	**11.17'W x 38.50'L x 3.54'H Field A** 1,523 cf Overall - 544 cf Embedded = 979 cf x 40.0% Voids
#2A	229.60'	544 cf	**Cultec R-330XL** x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		935 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	229.10'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.40 hrs HW=229.14' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Pond DW-1: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 2 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

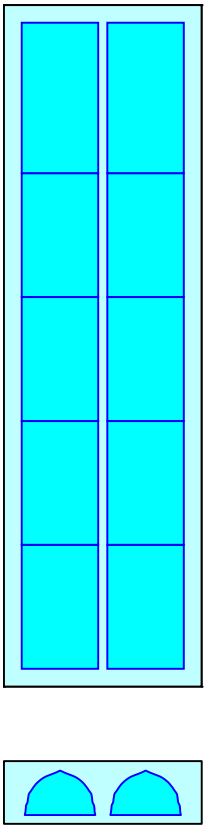
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

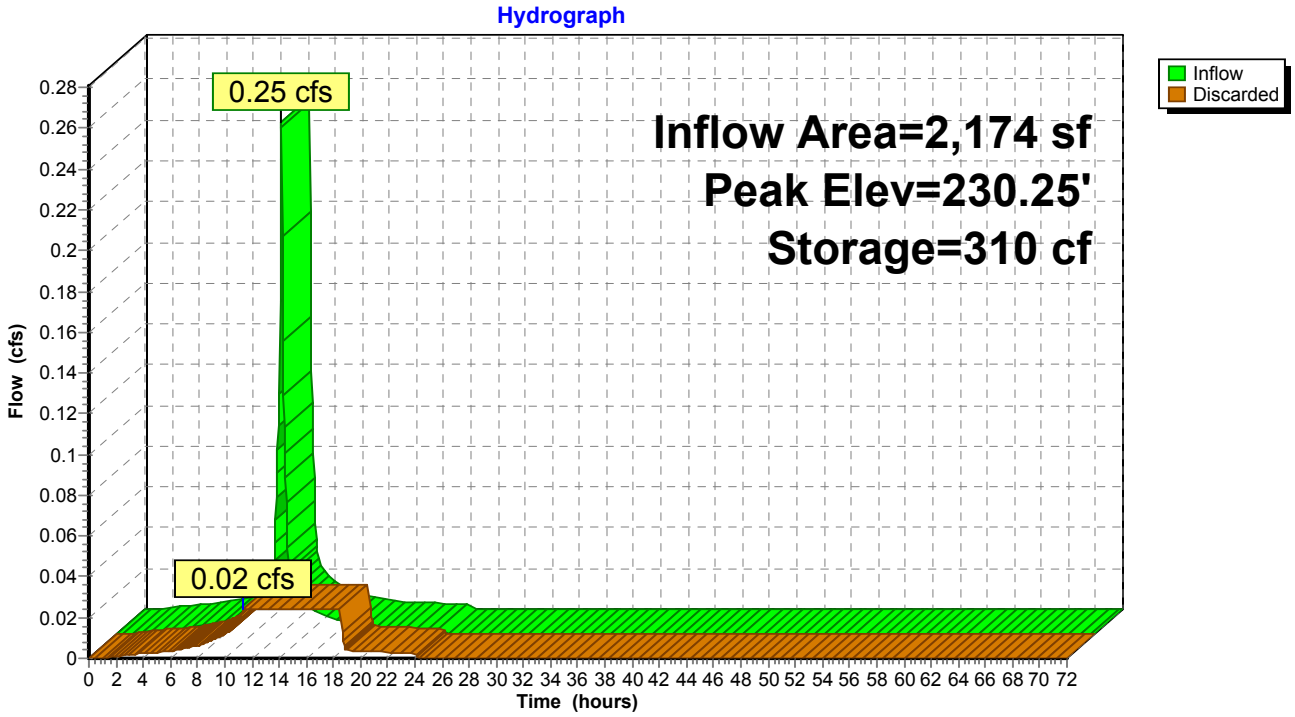
1,522.6 cf Field - 543.9 cf Chambers = 978.7 cf Stone x 40.0% Voids = 391.5 cf Stone Storage

Stone + Chamber Storage = 935.4 cf = 0.021 af
Overall Storage Efficiency = 61.4%

10 Chambers
56.4 cy Field
36.2 cy Stone



Pond DW-1: Chamber drywell



Summary for Pond DW-2: Chamber drywell

Inflow Area = 1,685 sf,100.00% Impervious, Inflow Depth = 5.02" for 10-Year Design Storm event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 705 cf
Outflow = 0.02 cfs @ 11.55 hrs, Volume= 705 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.55 hrs, Volume= 705 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 235.67' @ 12.70 hrs Surf.Area= 404 sf Storage= 219 cf

Plug-Flow detention time= 61.3 min calculated for 705 cf (100% of inflow)
Center-of-Mass det. time= 61.3 min (808.5 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	234.70'	262 cf	**8.50'W x 47.50'L x 2.04'H Field A** 824 cf Overall - 169 cf Embedded = 655 cf x 40.0% Voids
#2A	235.20'	169 cf	**Cultec C-100** x 12 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		431 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	234.70'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.55 hrs HW=234.72' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond DW-2: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec C-100
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

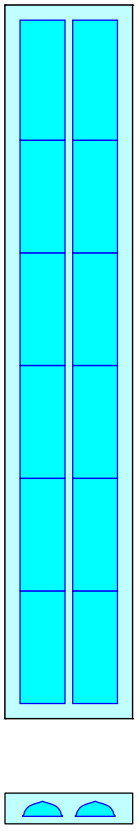
6 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 45.50' Row Length +12.0" End Stone x 2 = 47.50' Base Length
2 Rows x 36.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.50' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

12 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 169.4 cf Chamber Storage

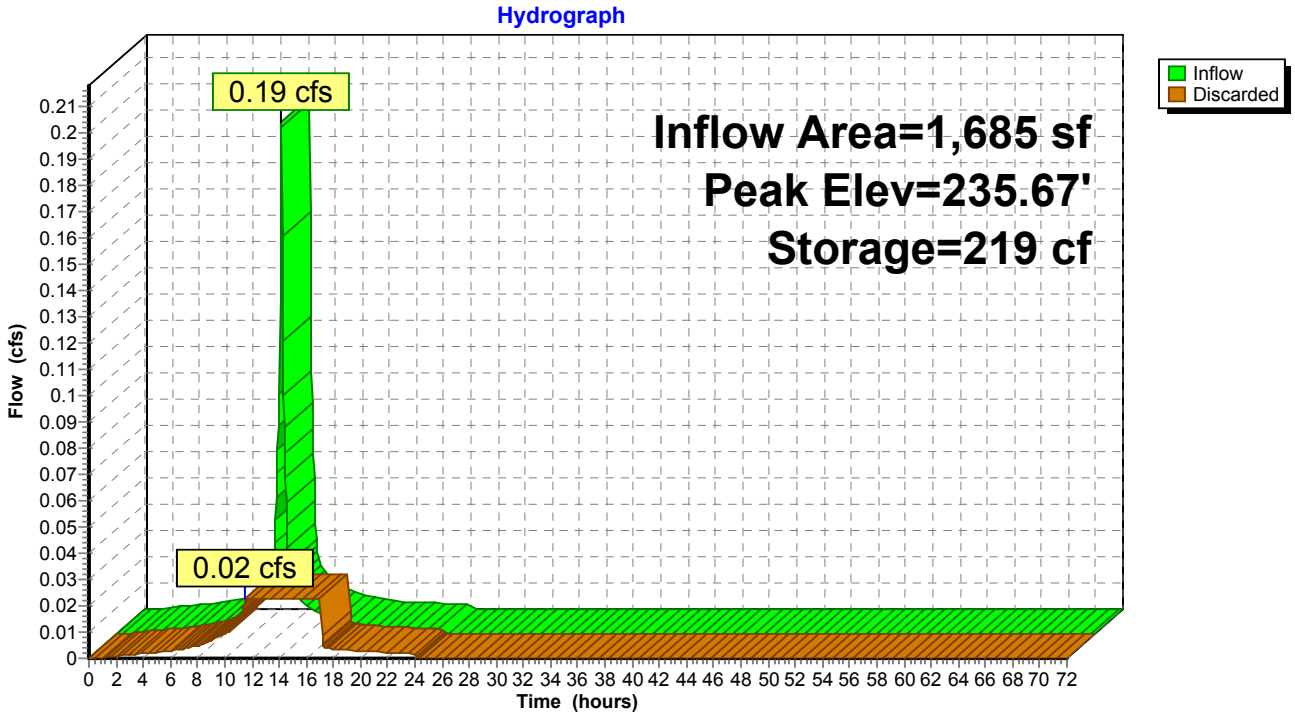
824.3 cf Field - 169.4 cf Chambers = 654.9 cf Stone x 40.0% Voids = 262.0 cf Stone Storage

Stone + Chamber Storage = 431.4 cf = 0.010 af
Overall Storage Efficiency = 52.3%

12 Chambers
30.5 cy Field
24.3 cy Stone



Pond DW-2: Chamber drywell



Summary for Pond DW-3: Chamber drywell

Inflow Area = 3,353 sf,100.00% Impervious, Inflow Depth = 5.02" for 10-Year Design Storm event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 1,403 cf
Outflow = 0.04 cfs @ 11.35 hrs, Volume= 1,403 cf, Atten= 90%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.35 hrs, Volume= 1,403 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 236.62' @ 12.90 hrs Surf.Area= 661 sf Storage= 476 cf

Plug-Flow detention time= 87.6 min calculated for 1,402 cf (100% of inflow)
Center-of-Mass det. time= 87.5 min (834.7 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.50'	451 cf	**12.67'W x 52.17'L x 2.54'H Field A** 1,679 cf Overall - 551 cf Embedded = 1,128 cf x 40.0% Voids
#2A	236.00'	551 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		1,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.35 hrs HW=235.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond DW-3: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

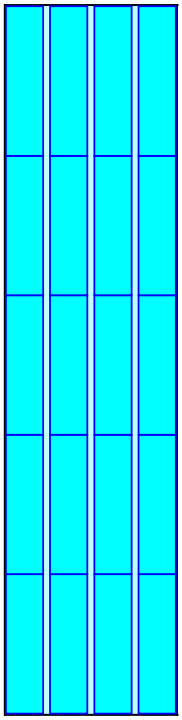
5 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 52.00' Row Length +1.0" End Stone x 2 = 52.17' Base Length
4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 1.0" Side Stone x 2 = 12.67' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

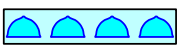
20 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 551.0 cf Chamber Storage

1,679.5 cf Field - 551.0 cf Chambers = 1,128.5 cf Stone x 40.0% Voids = 451.4 cf Stone Storage

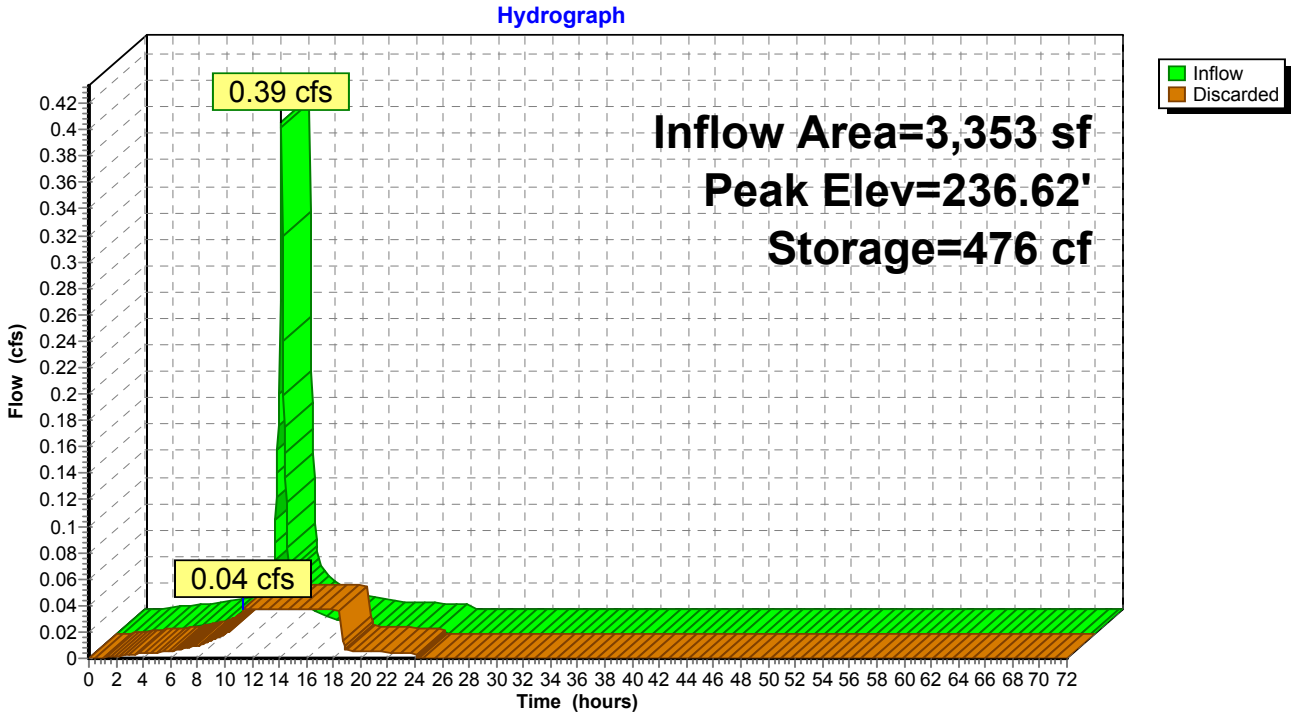
Stone + Chamber Storage = 1,002.4 cf = 0.023 af
Overall Storage Efficiency = 59.7%

20 Chambers
62.2 cy Field
41.8 cy Stone





Pond DW-3: Chamber drywell



Summary for Pond DW-4: Chamber drywell

Inflow Area = 3,336 sf,100.00% Impervious, Inflow Depth = 5.02" for 10-Year Design Storm event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 1,396 cf
Outflow = 0.04 cfs @ 11.60 hrs, Volume= 1,396 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.60 hrs, Volume= 1,396 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 237.40' @ 12.70 hrs Surf.Area= 803 sf Storage= 434 cf

Plug-Flow detention time= 61.3 min calculated for 1,395 cf (100% of inflow)
Center-of-Mass det. time= 61.3 min (808.5 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.50'	551 cf	**19.17'W x 41.92'L x 2.54'H Field A** 2,042 cf Overall - 664 cf Embedded = 1,378 cf x 40.0% Voids
#2A	237.00'	664 cf	**Cultec R-150XLHD** x 24 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		1,215 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	236.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.60 hrs HW=236.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond DW-4: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 6 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

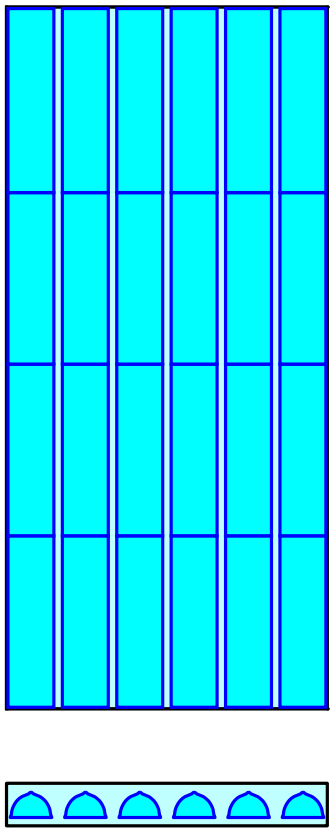
4 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 41.75' Row Length +1.0" End Stone x 2 = 41.92' Base Length
6 Rows x 33.0" Wide + 6.0" Spacing x 5 + 1.0" Side Stone x 2 = 19.17' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

24 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 6 Rows = 663.6 cf Chamber Storage

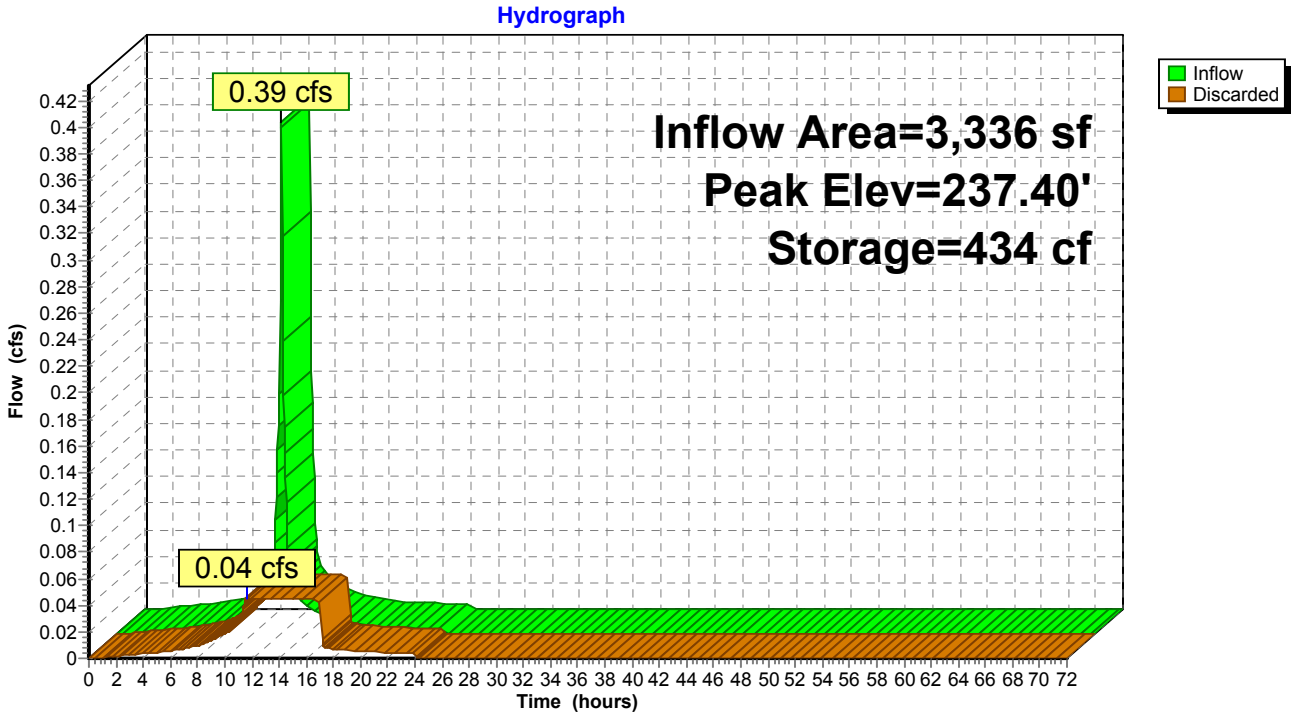
2,042.0 cf Field - 663.6 cf Chambers = 1,378.4 cf Stone x 40.0% Voids = 551.4 cf Stone Storage

Stone + Chamber Storage = 1,214.9 cf = 0.028 af
Overall Storage Efficiency = 59.5%

24 Chambers
75.6 cy Field
51.1 cy Stone



Pond DW-4: Chamber drywell



Summary for Pond PP-1: Proposed Detention Basin

Inflow Area = 29,024 sf, 37.89% Impervious, Inflow Depth = 2.67" for 10-Year Design Storm event
Inflow = 1.96 cfs @ 12.11 hrs, Volume= 6,447 cf
Outflow = 0.27 cfs @ 12.78 hrs, Volume= 6,446 cf, Atten= 86%, Lag= 40.5 min
Discarded = 0.06 cfs @ 12.78 hrs, Volume= 5,281 cf
Primary = 0.21 cfs @ 12.78 hrs, Volume= 1,165 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 229.84' @ 12.78 hrs Surf.Area= 2,369 sf Storage= 3,170 cf
Flood Elev= 230.00' Surf.Area= 2,461 sf Storage= 3,557 cf

Plug-Flow detention time= 531.8 min calculated for 6,441 cf (100% of inflow)
Center-of-Mass det. time= 532.1 min (1,361.8 - 829.7)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	3,557 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

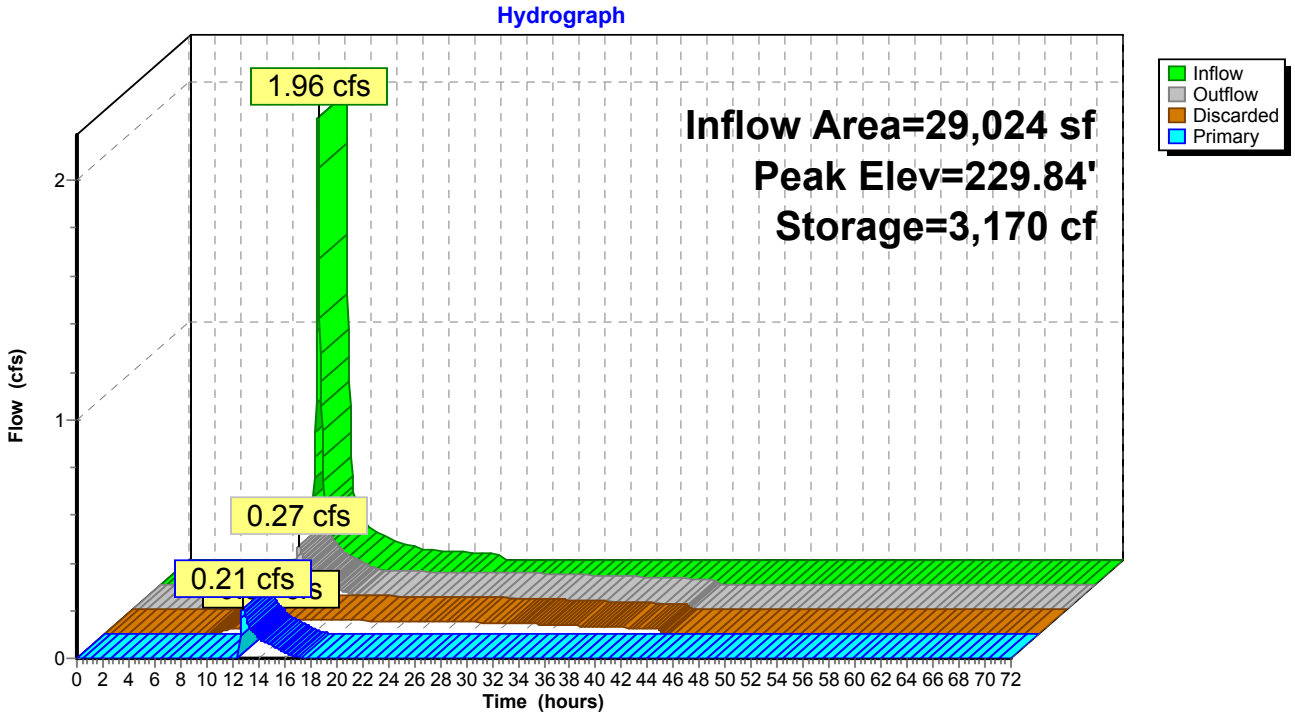
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	897	110.5	0	0	897
229.00	1,915	172.5	1,374	1,374	2,300
230.00	2,461	191.4	2,182	3,557	2,877

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	229.80'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	228.00'	**12.0" Round Culvert** L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 228.00' / 227.10' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.06 cfs @ 12.78 hrs HW=229.84' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.21 cfs @ 12.78 hrs HW=229.84' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.21 cfs @ 0.65 fps)
↑—**3=Culvert** (Passes 0.21 cfs of 0.75 cfs potential flow)

Pond PP-1: Proposed Detention Basin



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: N. Triplex and Duplex Runoff Area=3,336 sf 100.00% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=98 Runoff=0.61 cfs 2,230 cf

Subcatchment P-D: S. Duplex Roof Runoff Area=1,685 sf 100.00% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=98 Runoff=0.31 cfs 1,126 cf

Subcatchment P-ex: Existing Roofs Runoff Area=2,174 sf 100.00% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=98 Runoff=0.40 cfs 1,453 cf

Subcatchment P-T: S. Triplex Roof (2 Units) Runoff Area=3,353 sf 100.00% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=98 Runoff=0.61 cfs 2,241 cf

Subcatchment SC-P1: Overland Flow to 244 Runoff Area=6,995 sf 0.00% Impervious Runoff Depth=3.64"
Tc=6.0 min CN=61 Runoff=0.67 cfs 2,124 cf

Subcatchment SC-P2: Proposed Runoff Area=22,026 sf 49.92% Impervious Runoff Depth=5.75"
Flow Length=214' Tc=7.3 min CN=79 Runoff=3.17 cfs 10,555 cf

Subcatchment SC-P3: South Lawn to Pond Runoff Area=6,998 sf 0.00% Impervious Runoff Depth=3.64"
Tc=6.0 min CN=61 Runoff=0.67 cfs 2,125 cf

Subcatchment SC-P4: Overland Flow to Runoff Area=6,075 sf 29.23% Impervious Runoff Depth=4.92"
Tc=6.0 min CN=72 Runoff=0.79 cfs 2,492 cf

Reach DP-1: Main Street Inflow=2.63 cfs 8,488 cf
Outflow=2.63 cfs 8,488 cf

Reach DP-2: 224 Main Street Inflow=0.67 cfs 2,124 cf
Outflow=0.67 cfs 2,124 cf

Pond DW-1: Chamber drywell Peak Elev=231.13' Storage=593 cf Inflow=0.40 cfs 1,453 cf
Outflow=0.02 cfs 1,453 cf

Pond DW-2: Chamber drywell Peak Elev=236.67' Storage=420 cf Inflow=0.31 cfs 1,126 cf
Outflow=0.02 cfs 1,126 cf

Pond DW-3: Chamber drywell Peak Elev=237.71' Storage=914 cf Inflow=0.61 cfs 2,241 cf
Outflow=0.04 cfs 2,241 cf

Pond DW-4: Chamber drywell Peak Elev=238.04' Storage=831 cf Inflow=0.61 cfs 2,230 cf
Outflow=0.04 cfs 2,230 cf

Pond PP-1: Proposed Detention Basin Peak Elev=230.00' Storage=3,554 cf Inflow=3.84 cfs 12,680 cf
Discarded=0.06 cfs 5,953 cf Primary=1.69 cfs 5,996 cf Outflow=1.74 cfs 11,949 cf

Total Runoff Area = 52,642 sf Runoff Volume = 24,346 cf Average Runoff Depth = 5.55"
55.70% Pervious = 29,322 sf 44.30% Impervious = 23,320 sf

Summary for Subcatchment 2S: N. Triplex and Duplex Roof

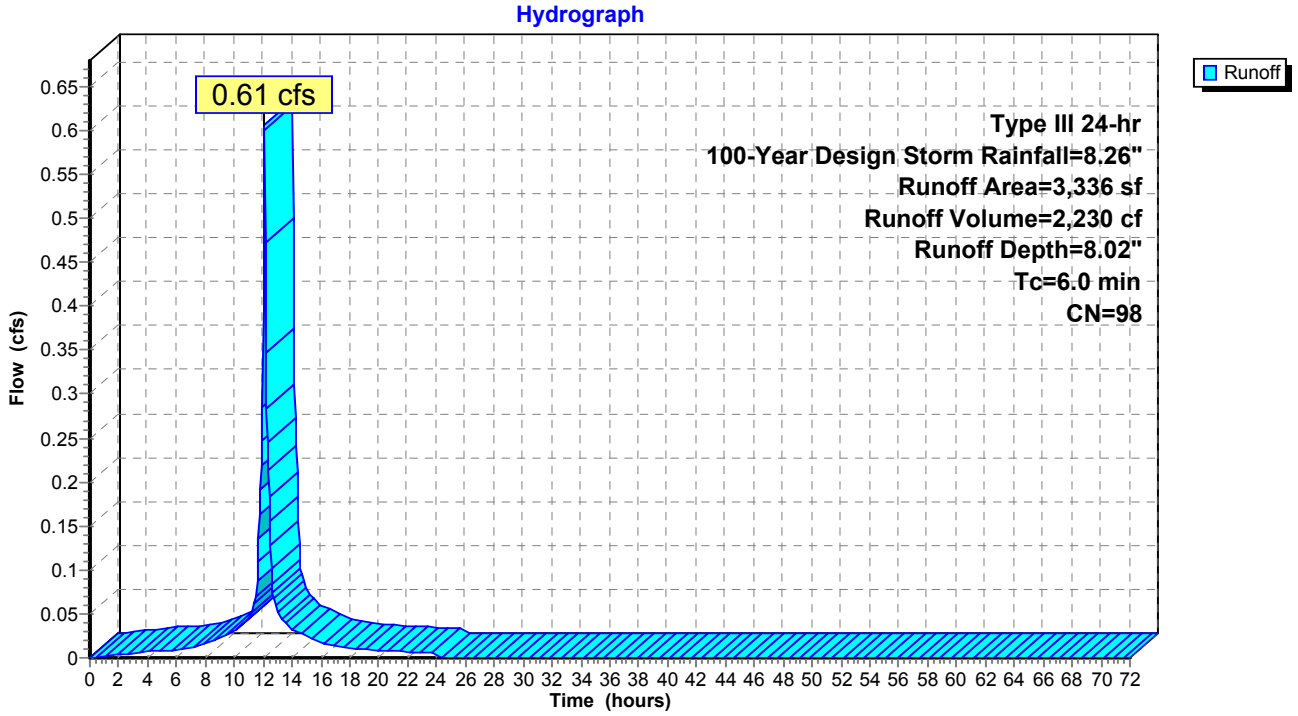
Runoff = 0.61 cfs @ 12.09 hrs, Volume= 2,230 cf, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

	Area (sf)	CN	Description
*	3,336	98	Roofs, HSG B
	3,336		100.00% Impervious Area

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

Subcatchment 2S: N. Triplex and Duplex Roof



Summary for Subcatchment P-D: S. Duplex Roof

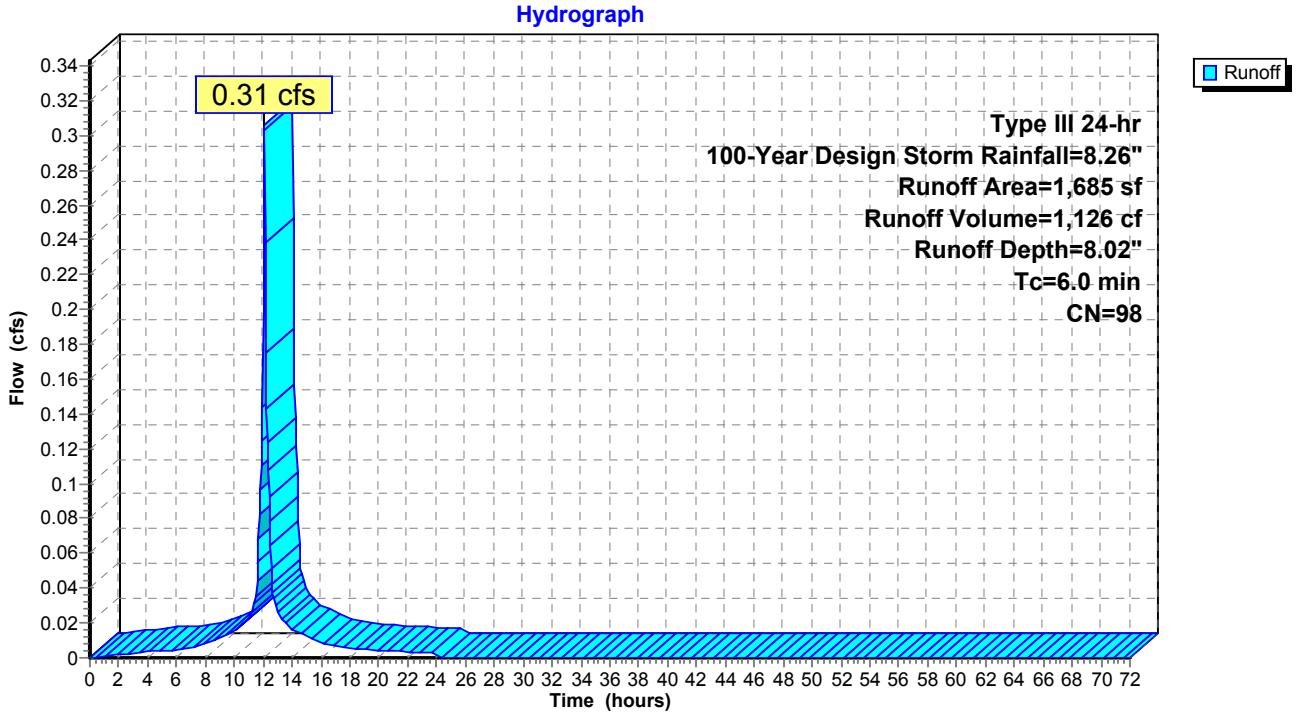
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 1,126 cf, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

Area (sf)	CN	Description
1,685	98	Roofs, HSG B
1,685		100.00% Impervious Area

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

Subcatchment P-D: S. Duplex Roof



Summary for Subcatchment P-ex: Existing Roofs

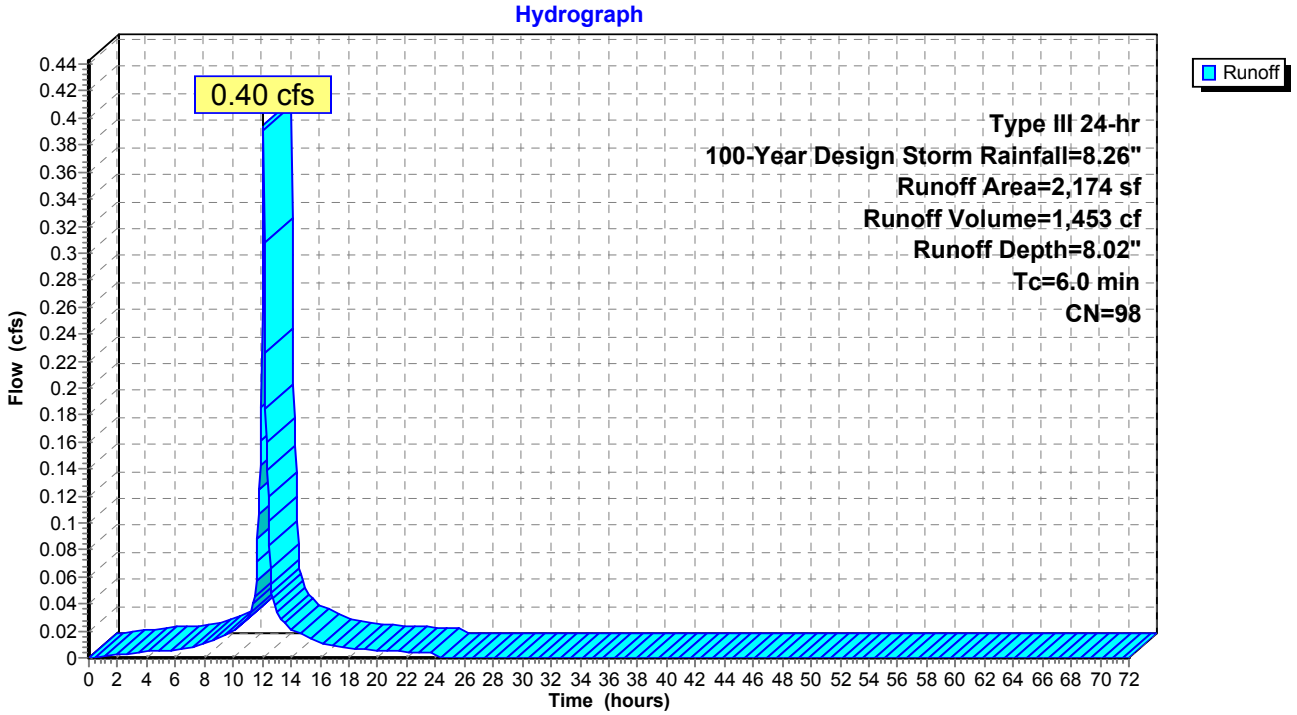
Runoff = 0.40 cfs @ 12.09 hrs, Volume= 1,453 cf, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

Area (sf)	CN	Description
2,174	98	Roofs, HSG B
2,174		100.00% Impervious Area

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

Subcatchment P-ex: Existing Roofs



Summary for Subcatchment P-T: S. Triplex Roof (2 Units)

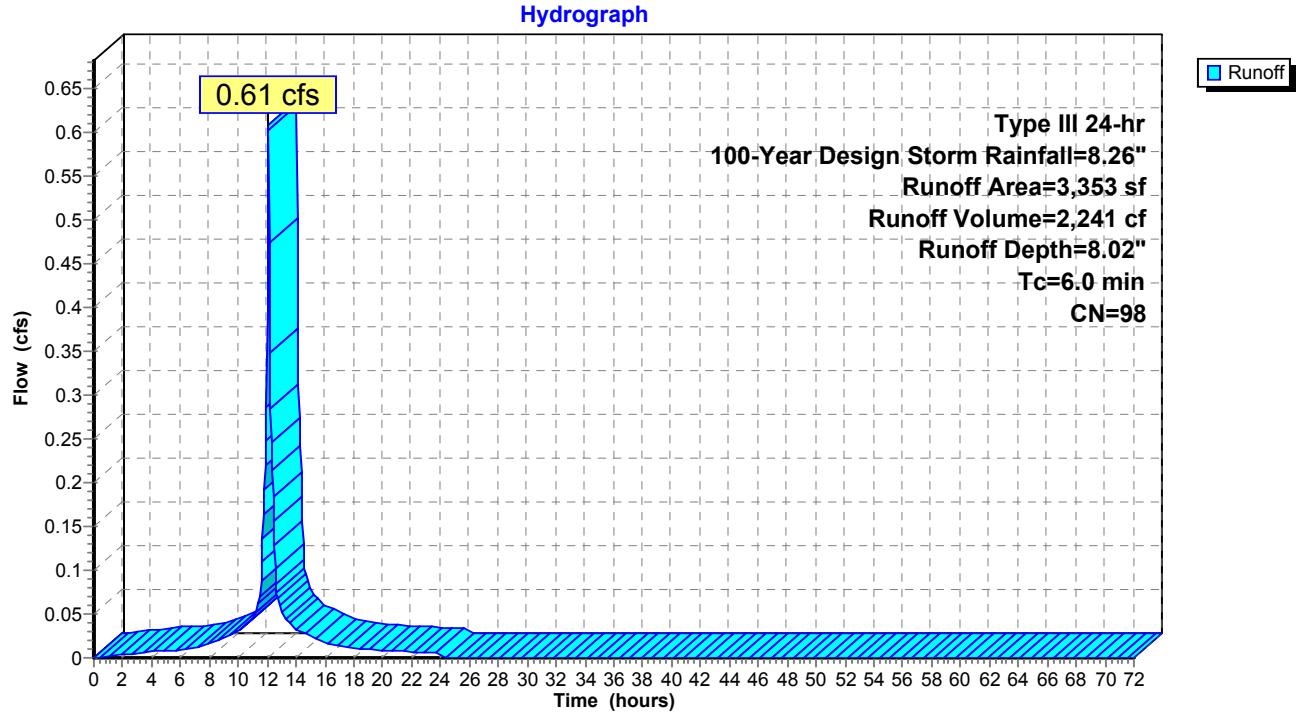
Runoff = 0.61 cfs @ 12.09 hrs, Volume= 2,241 cf, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

	Area (sf)	CN	Description
*	3,353	98	Roofs, HSG B
	3,353		100.00% Impervious Area

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

Subcatchment P-T: S. Triplex Roof (2 Units)



Summary for Subcatchment SC-P1: Overland Flow to 244 Main

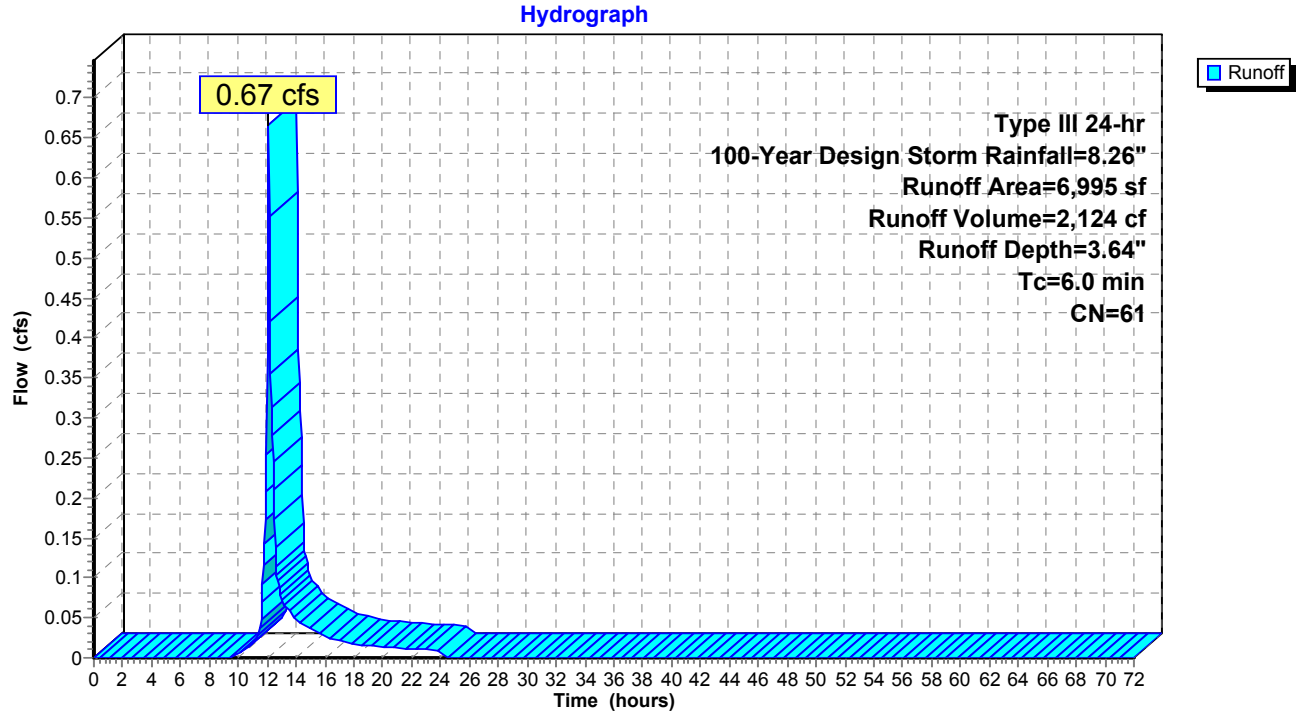
Runoff = 0.67 cfs @ 12.10 hrs, Volume= 2,124 cf, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

Area (sf)	CN	Description
6,995	61	>75% Grass cover, Good, HSG B
6,995		100.00% Pervious Area

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

Subcatchment SC-P1: Overland Flow to 244 Main



Summary for Subcatchment SC-P2: Proposed Development

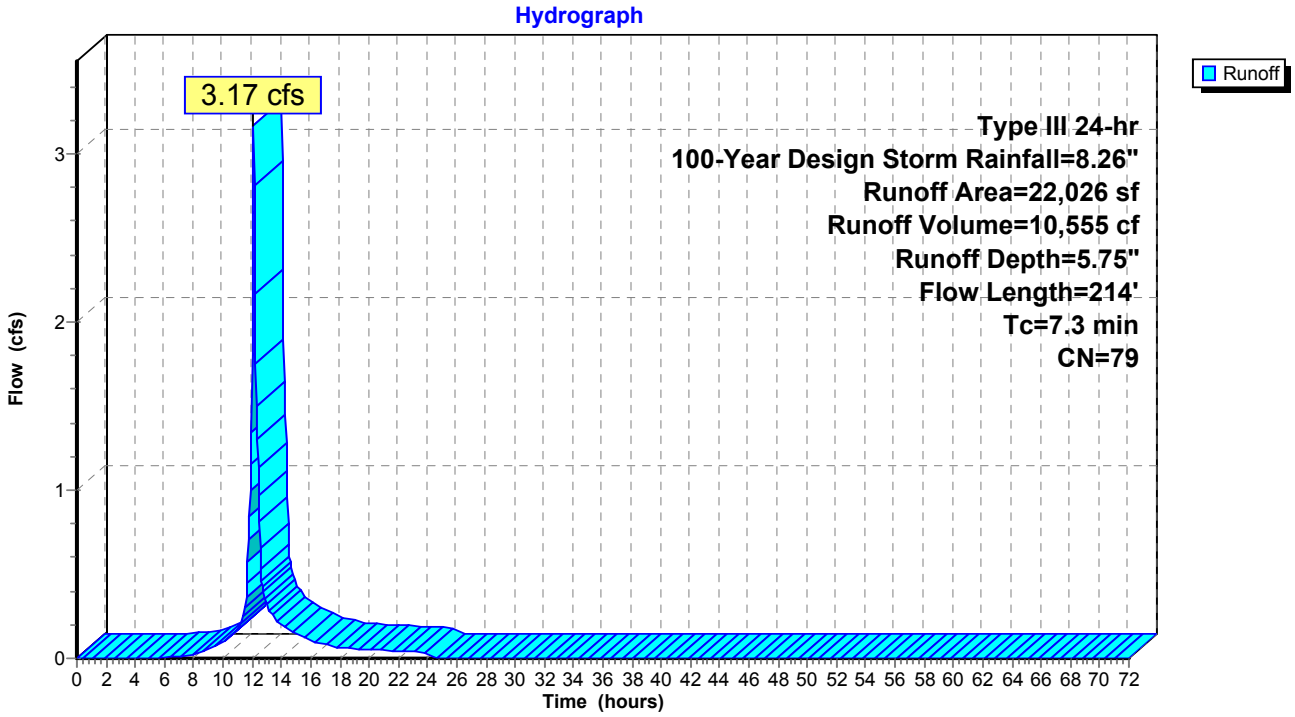
Runoff = 3.17 cfs @ 12.10 hrs, Volume= 10,555 cf, Depth= 5.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

	Area (sf)	CN	Description
*	10,996	98	Driveways, patio
	11,030	61	>75% Grass cover, Good, HSG B
	22,026	79	Weighted Average
	11,030		50.08% Pervious Area
	10,996		49.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	18	0.0550	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.1	32	0.0340	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.0	7	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	16	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	49	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	92	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.3	214	Total			

Subcatchment SC-P2: Proposed Development



Summary for Subcatchment SC-P3: South Lawn to Pond

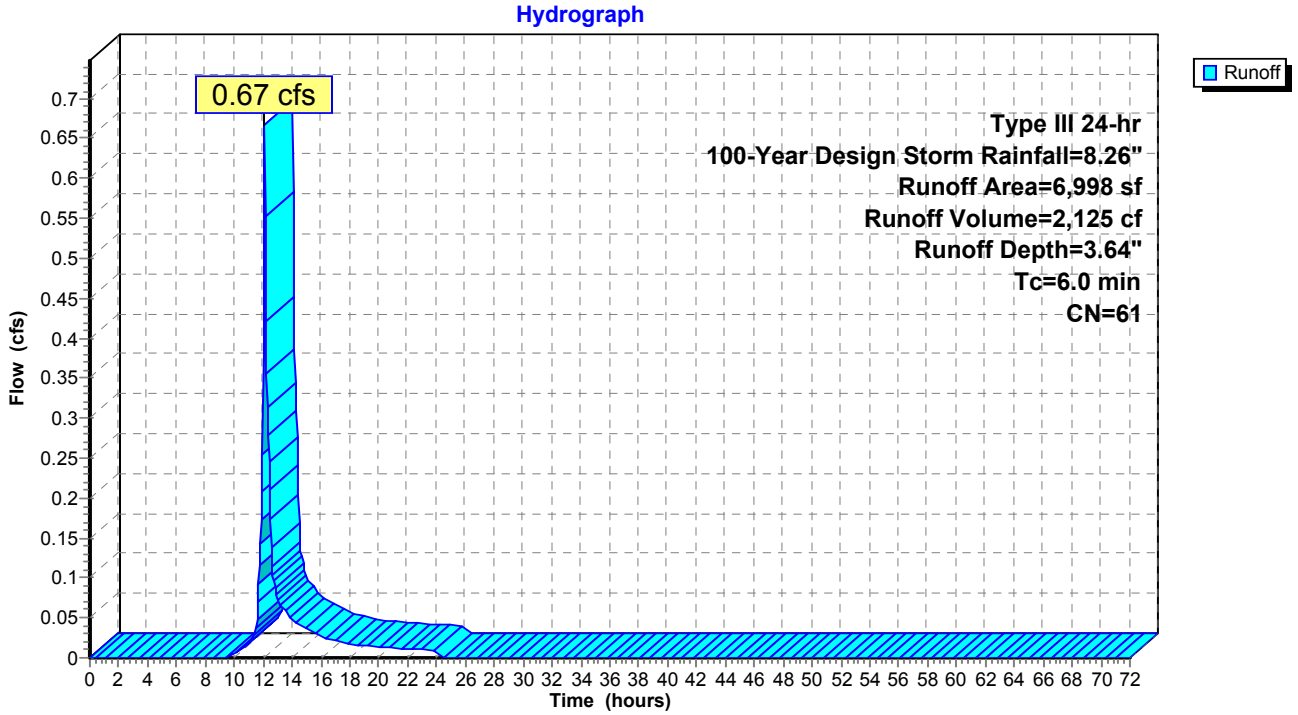
Runoff = 0.67 cfs @ 12.10 hrs, Volume= 2,125 cf, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

Area (sf)	CN	Description
6,998	61	>75% Grass cover, Good, HSG B
6,998		100.00% Pervious Area

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

Subcatchment SC-P3: South Lawn to Pond



Summary for Subcatchment SC-P4: Overland Flow to Main Street

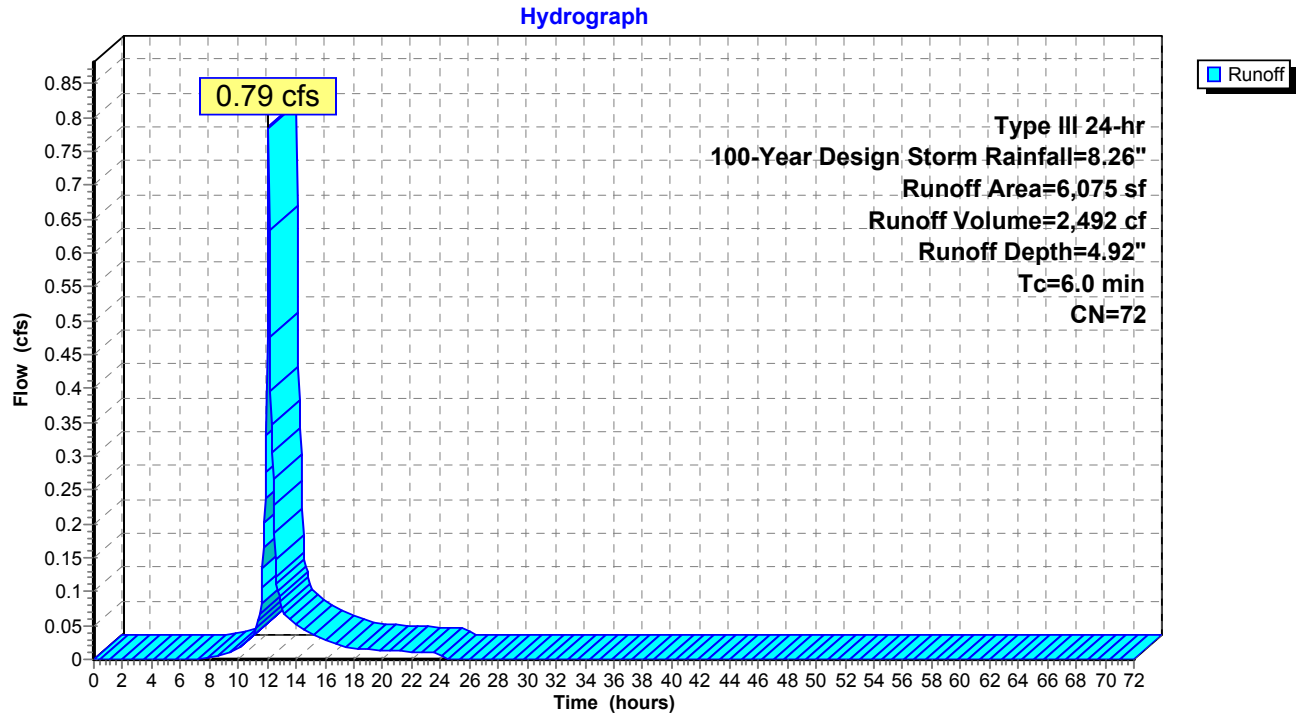
Runoff = 0.79 cfs @ 12.09 hrs, Volume= 2,492 cf, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Design Storm Rainfall=8.26"

	Area (sf)	CN	Description
*	1,776	98	
	4,299	61	>75% Grass cover, Good, HSG B
	6,075	72	Weighted Average
	4,299		70.77% Pervious Area
	1,776		29.23% Impervious Area

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

Subcatchment SC-P4: Overland Flow to Main Street



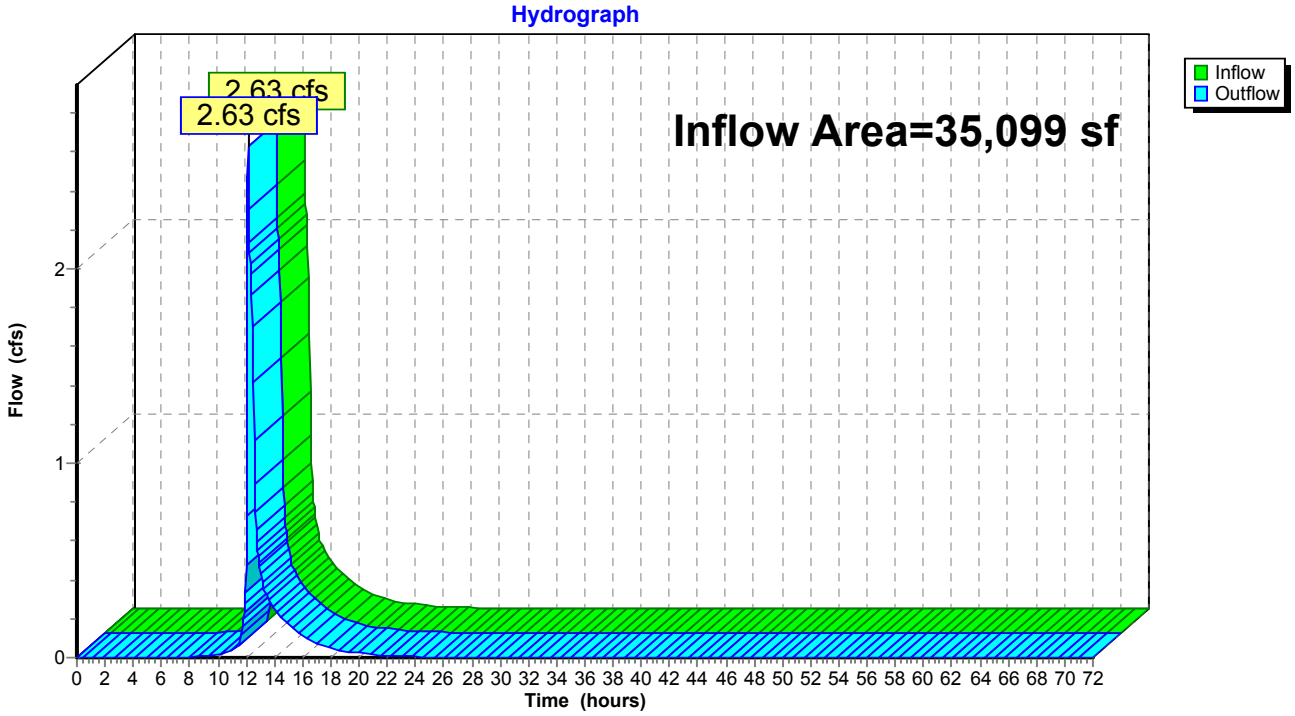
Summary for Reach DP-1: Main Street

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

Inflow Area = 35,099 sf, 36.39% Impervious, Inflow Depth = 2.90" for 100-Year Design Storm event
Inflow = 2.63 cfs @ 12.12 hrs, Volume= 8,488 cf
Outflow = 2.63 cfs @ 12.12 hrs, Volume= 8,488 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Main Street



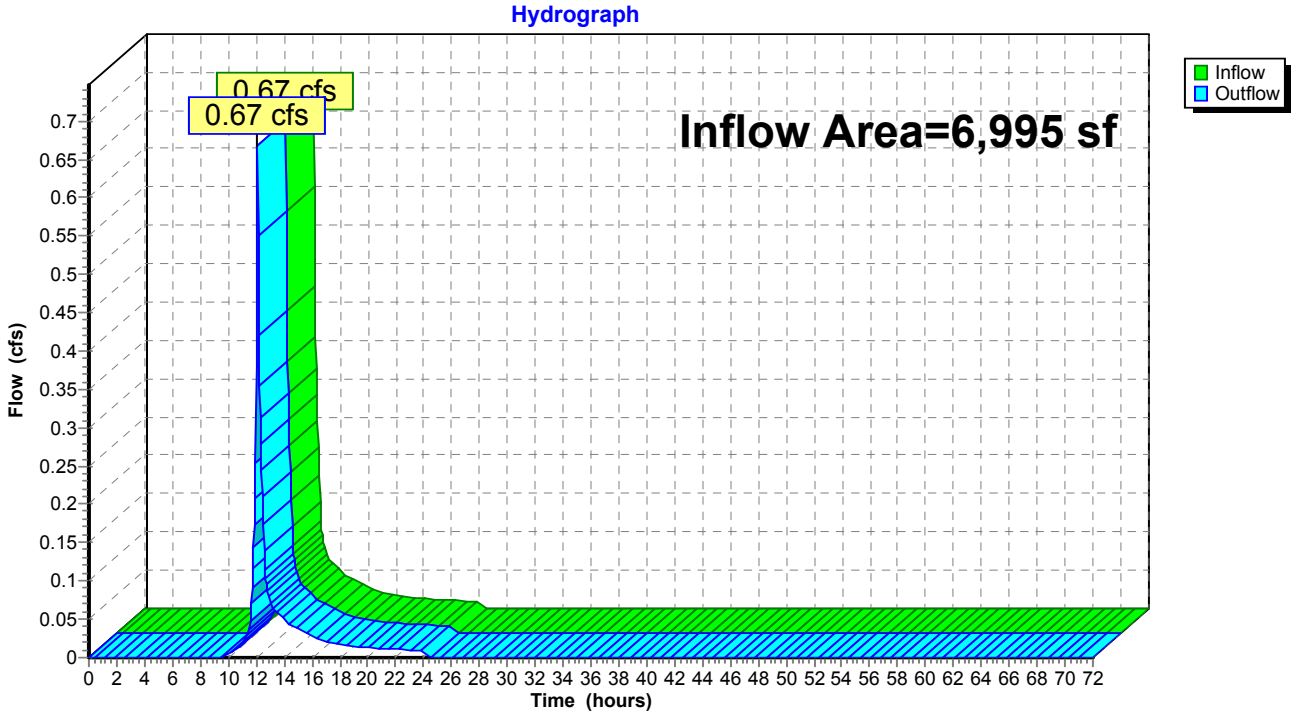
Summary for Reach DP-2: 224 Main Street

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

Inflow Area = 6,995 sf, 0.00% Impervious, Inflow Depth = 3.64" for 100-Year Design Storm event
Inflow = 0.67 cfs @ 12.10 hrs, Volume= 2,124 cf
Outflow = 0.67 cfs @ 12.10 hrs, Volume= 2,124 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: 224 Main Street



Summary for Pond DW-1: Chamber drywell

Inflow Area = 2,174 sf,100.00% Impervious, Inflow Depth = 8.02" for 100-Year Design Storm event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 1,453 cf
Outflow = 0.02 cfs @ 10.60 hrs, Volume= 1,453 cf, Atten= 94%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.60 hrs, Volume= 1,453 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 231.13' @ 13.73 hrs Surf.Area= 430 sf Storage= 593 cf

Plug-Flow detention time= 191.2 min calculated for 1,452 cf (100% of inflow)
Center-of-Mass det. time= 191.1 min (931.9 - 740.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	229.10'	391 cf	**11.17'W x 38.50'L x 3.54'H Field A** 1,523 cf Overall - 544 cf Embedded = 979 cf x 40.0% Voids
#2A	229.60'	544 cf	**Cultec R-330XL** x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		935 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	229.10'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 10.60 hrs HW=229.14' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Pond DW-1: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-330XL
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 2 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

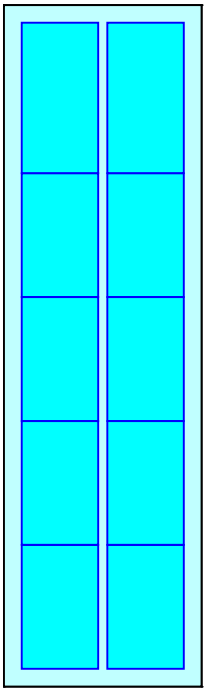
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

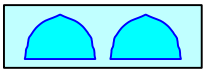
10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

1,522.6 cf Field - 543.9 cf Chambers = 978.7 cf Stone x 40.0% Voids = 391.5 cf Stone Storage

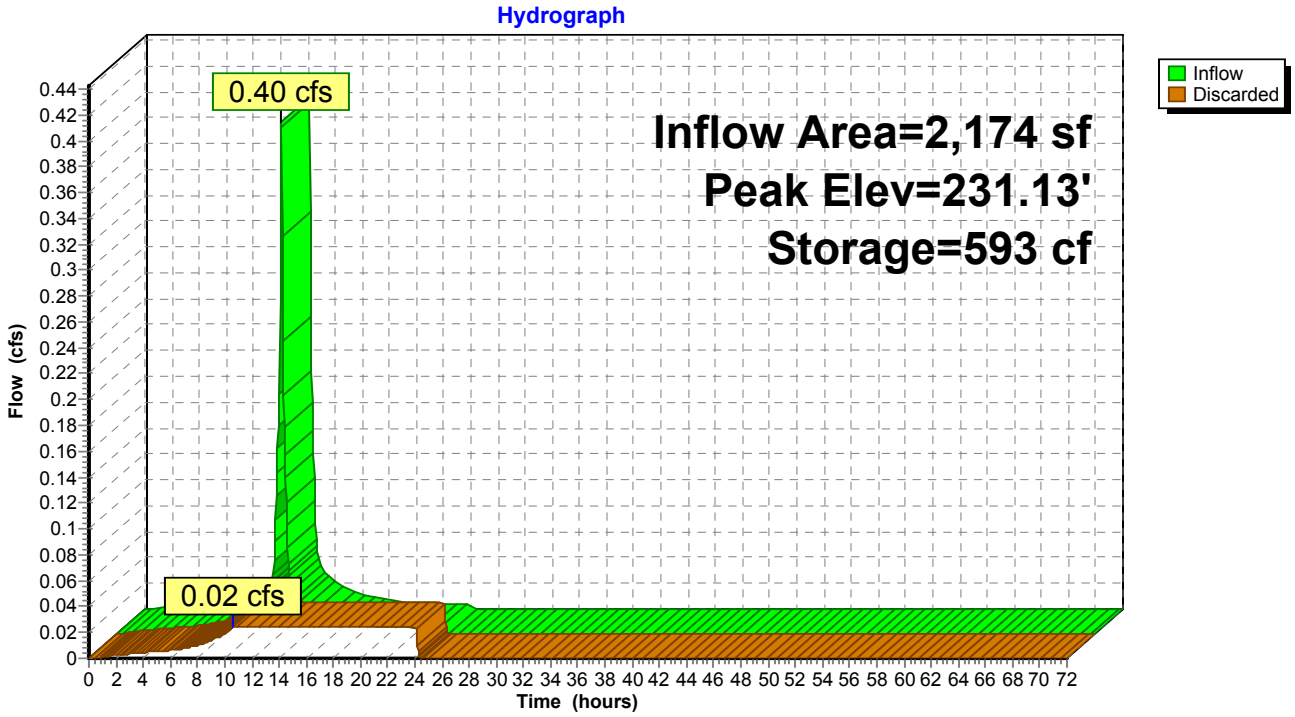
Stone + Chamber Storage = 935.4 cf = 0.021 af
Overall Storage Efficiency = 61.4%

10 Chambers
56.4 cy Field
36.2 cy Stone





Pond DW-1: Chamber drywell



Summary for Pond DW-2: Chamber drywell

Inflow Area = 1,685 sf,100.00% Impervious, Inflow Depth = 8.02" for 100-Year Design Storm event
Inflow = 0.31 cfs @ 12.09 hrs, Volume= 1,126 cf
Outflow = 0.02 cfs @ 11.05 hrs, Volume= 1,126 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.05 hrs, Volume= 1,126 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 236.67' @ 13.22 hrs Surf.Area= 404 sf Storage= 420 cf

Plug-Flow detention time= 135.2 min calculated for 1,125 cf (100% of inflow)
Center-of-Mass det. time= 135.1 min (876.0 - 740.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	234.70'	262 cf	**8.50'W x 47.50'L x 2.04'H Field A** 824 cf Overall - 169 cf Embedded = 655 cf x 40.0% Voids
#2A	235.20'	169 cf	**Cultec C-100** x 12 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		431 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	234.70'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.05 hrs HW=234.72' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Pond DW-2: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec C-100
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

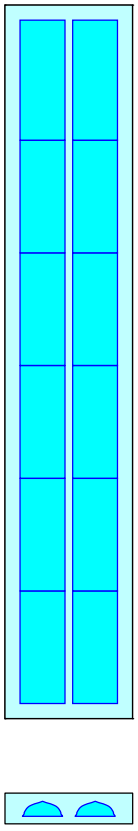
6 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 45.50' Row Length +12.0" End Stone x 2 = 47.50' Base Length
2 Rows x 36.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.50' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

12 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 169.4 cf Chamber Storage

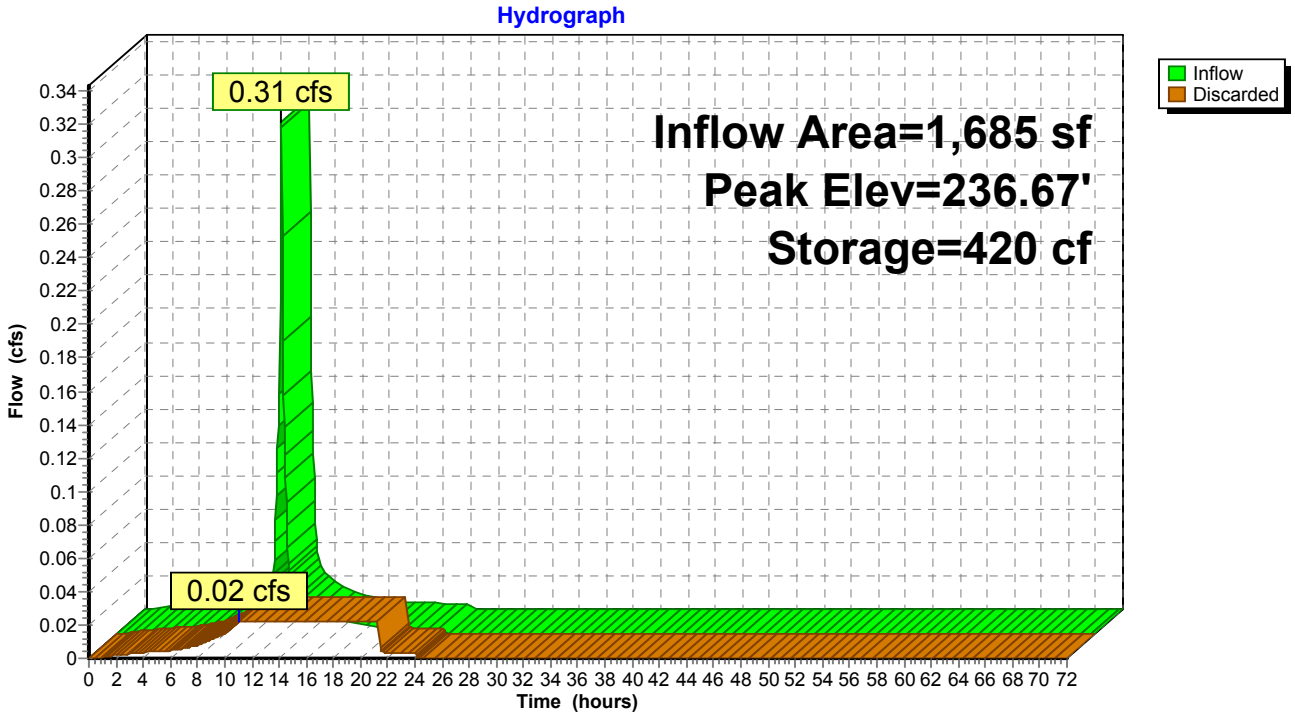
824.3 cf Field - 169.4 cf Chambers = 654.9 cf Stone x 40.0% Voids = 262.0 cf Stone Storage

Stone + Chamber Storage = 431.4 cf = 0.010 af
Overall Storage Efficiency = 52.3%

12 Chambers
30.5 cy Field
24.3 cy Stone



Pond DW-2: Chamber drywell



Summary for Pond DW-3: Chamber drywell

Inflow Area = 3,353 sf,100.00% Impervious, Inflow Depth = 8.02" for 100-Year Design Storm event
Inflow = 0.61 cfs @ 12.09 hrs, Volume= 2,241 cf
Outflow = 0.04 cfs @ 10.55 hrs, Volume= 2,241 cf, Atten= 94%, Lag= 0.0 min
Discarded = 0.04 cfs @ 10.55 hrs, Volume= 2,241 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 237.71' @ 13.74 hrs Surf.Area= 661 sf Storage= 914 cf

Plug-Flow detention time= 191.2 min calculated for 2,239 cf (100% of inflow)
Center-of-Mass det. time= 191.0 min (931.9 - 740.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.50'	451 cf	**12.67'W x 52.17'L x 2.54'H Field A** 1,679 cf Overall - 551 cf Embedded = 1,128 cf x 40.0% Voids
#2A	236.00'	551 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
		1,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 10.55 hrs HW=235.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond DW-3: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 4 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

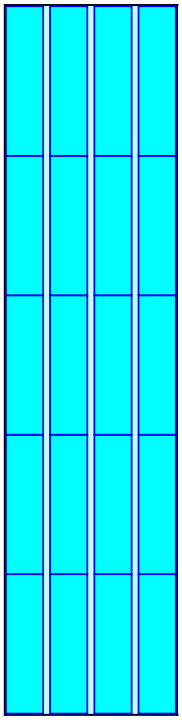
5 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 52.00' Row Length +1.0" End Stone x 2 = 52.17' Base Length
4 Rows x 33.0" Wide + 6.0" Spacing x 3 + 1.0" Side Stone x 2 = 12.67' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

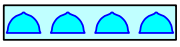
20 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 4 Rows = 551.0 cf Chamber Storage

1,679.5 cf Field - 551.0 cf Chambers = 1,128.5 cf Stone x 40.0% Voids = 451.4 cf Stone Storage

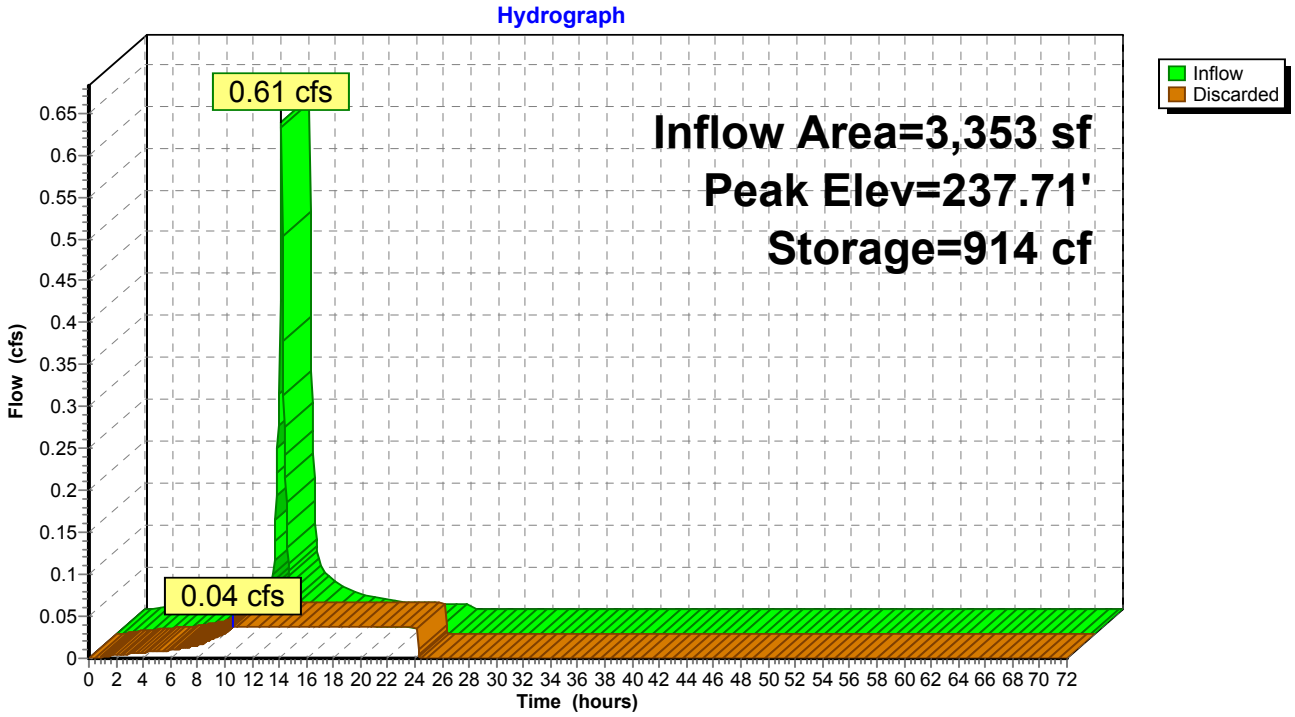
Stone + Chamber Storage = 1,002.4 cf = 0.023 af
Overall Storage Efficiency = 59.7%

20 Chambers
62.2 cy Field
41.8 cy Stone





Pond DW-3: Chamber drywell



Summary for Pond DW-4: Chamber drywell

Inflow Area = 3,336 sf,100.00% Impervious, Inflow Depth = 8.02" for 100-Year Design Storm event
Inflow = 0.61 cfs @ 12.09 hrs, Volume= 2,230 cf
Outflow = 0.04 cfs @ 11.10 hrs, Volume= 2,230 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.10 hrs, Volume= 2,230 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 238.04' @ 13.21 hrs Surf.Area= 803 sf Storage= 831 cf

Plug-Flow detention time= 134.6 min calculated for 2,228 cf (100% of inflow)
Center-of-Mass det. time= 134.5 min (875.4 - 740.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.50'	551 cf	**19.17'W x 41.92'L x 2.54'H Field A** 2,042 cf Overall - 664 cf Embedded = 1,378 cf x 40.0% Voids
#2A	237.00'	664 cf	**Cultec R-150XLHD** x 24 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 6 rows
		1,215 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	236.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.10 hrs HW=236.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond DW-4: Chamber drywell - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 6 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

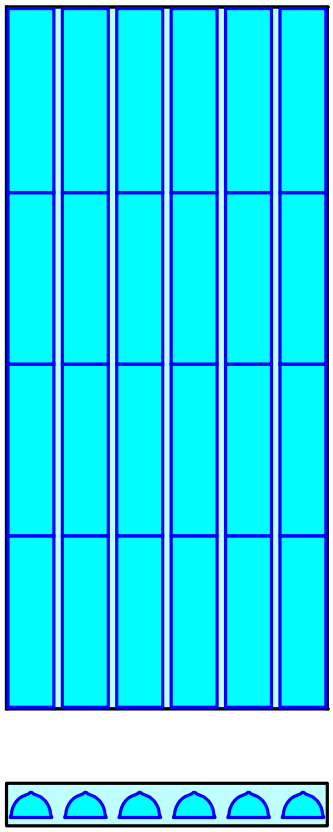
4 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 41.75' Row Length +1.0" End Stone x 2 = 41.92' Base Length
6 Rows x 33.0" Wide + 6.0" Spacing x 5 + 1.0" Side Stone x 2 = 19.17' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

24 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 6 Rows = 663.6 cf Chamber Storage

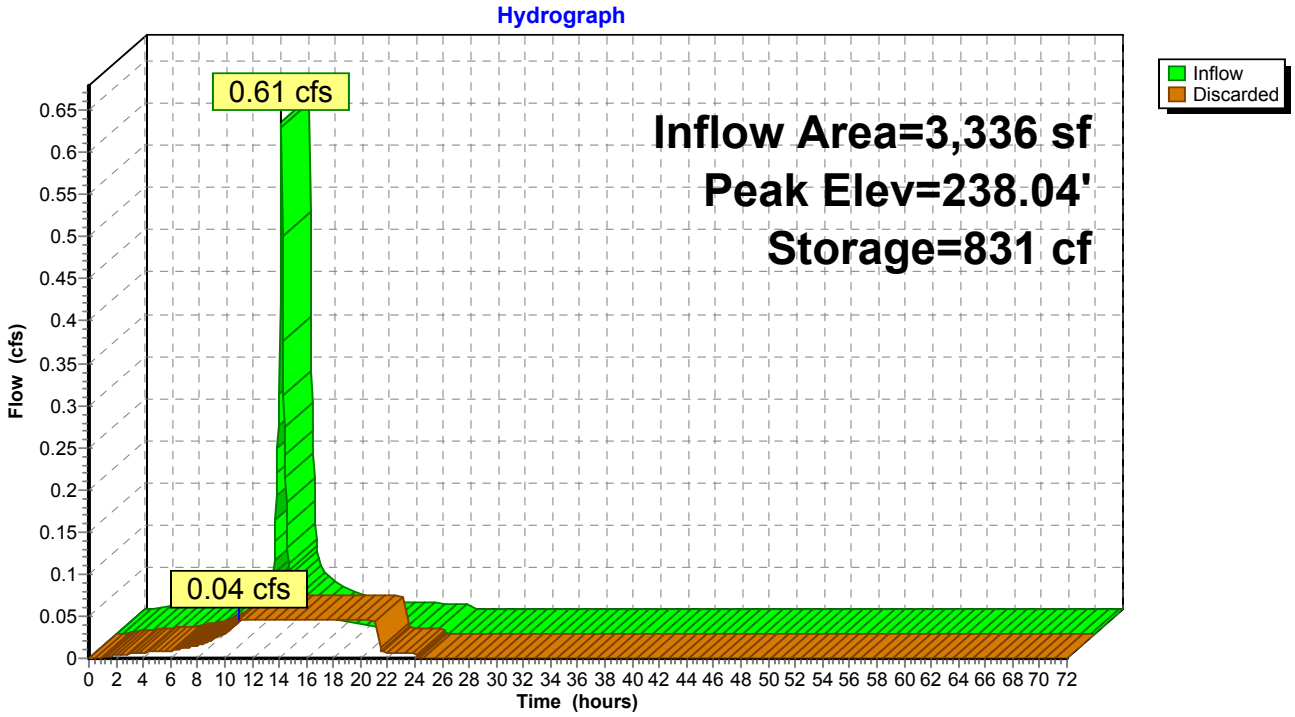
2,042.0 cf Field - 663.6 cf Chambers = 1,378.4 cf Stone x 40.0% Voids = 551.4 cf Stone Storage

Stone + Chamber Storage = 1,214.9 cf = 0.028 af
Overall Storage Efficiency = 59.5%

24 Chambers
75.6 cy Field
51.1 cy Stone



Pond DW-4: Chamber drywell



Summary for Pond PP-1: Proposed Detention Basin

Inflow Area = 29,024 sf, 37.89% Impervious, Inflow Depth = 5.24" for 100-Year Design Storm event
Inflow = 3.84 cfs @ 12.10 hrs, Volume= 12,680 cf
Outflow = 1.74 cfs @ 12.26 hrs, Volume= 11,949 cf, Atten= 55%, Lag= 9.5 min
Discarded = 0.06 cfs @ 12.26 hrs, Volume= 5,953 cf
Primary = 1.69 cfs @ 12.26 hrs, Volume= 5,996 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 230.00' @ 12.26 hrs Surf.Area= 2,460 sf Storage= 3,554 cf
Flood Elev= 230.00' Surf.Area= 2,461 sf Storage= 3,557 cf

Plug-Flow detention time= 370.0 min calculated for 11,949 cf (94% of inflow)
Center-of-Mass det. time= 338.5 min (1,149.9 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	3,557 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

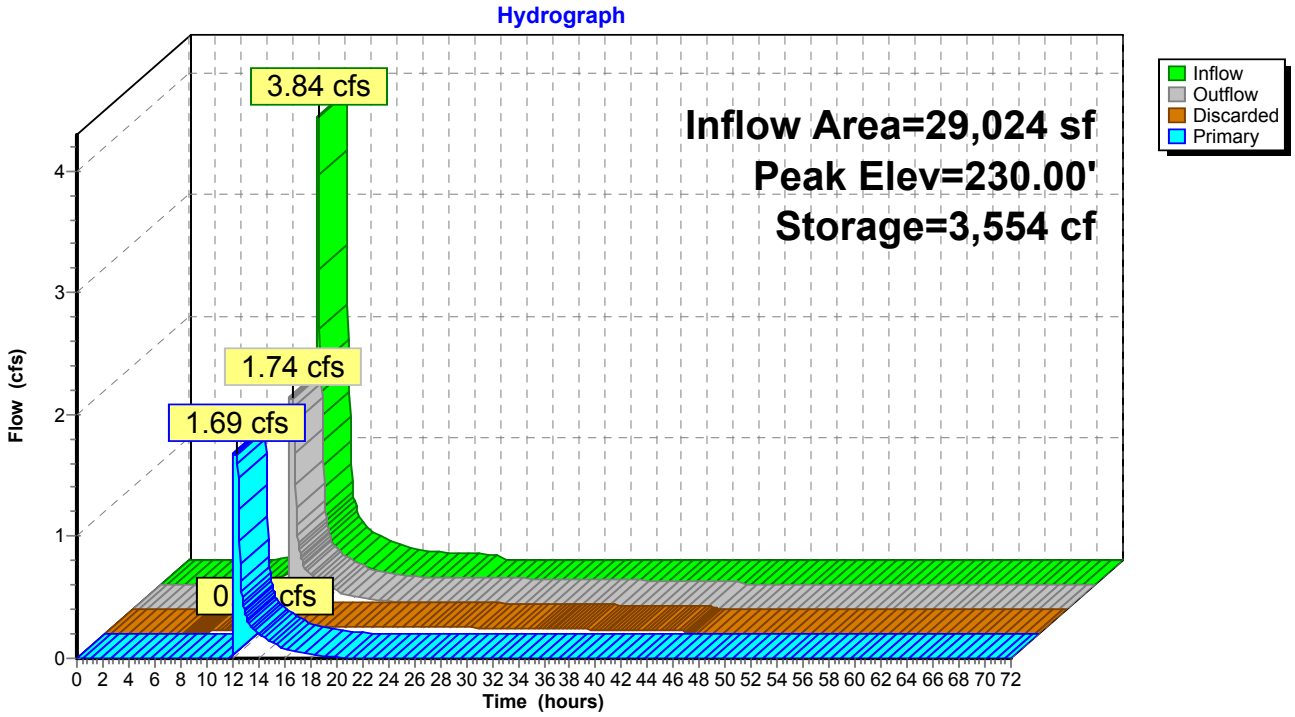
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	897	110.5	0	0	897
229.00	1,915	172.5	1,374	1,374	2,300
230.00	2,461	191.4	2,182	3,557	2,877

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	229.80'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	228.00'	**12.0" Round Culvert** L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 228.00' / 227.10' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.06 cfs @ 12.26 hrs HW=230.00' (Free Discharge)
↑**1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=1.68 cfs @ 12.26 hrs HW=230.00' (Free Discharge)
↑**2=Orifice/Grate** (Passes 1.68 cfs of 2.31 cfs potential flow)
↑**3=Culvert** (Inlet Controls 1.68 cfs @ 2.14 fps)

Pond PP-1: Proposed Detention Basin



WATER QUALITY

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS

Standard #1: No New Untreated Discharges

Developmental Measures:
The proposed development on this site includes the construction of eight new housing units. The units are split into one three-unit building and one two-unit building. A driveway will also be constructed to serve the two new buildings. The two existing single family homes on the property will remain, however the existing driveway will be reconstructed as part of the proposed driveway. The existing pool and shed will be removed.

To account for increased impervious from the new development, several stormwater management devices are proposed. Four subsurface infiltration systems are proposed to serve all five buildings on the site. These chambers will serve as drywells and are sized to infiltrate storms up to and including the 100-year storm event. Downspouts on all structures shall be fitted with overflows for larger storm events. Runoff from the remainder of the developed site shall be routed to a detention basin via deep sump catch basins and a sediment forebay. The detention basin is sized to contain the 100-year storm, however the rim elevation of the upstream catchbasins have been set such that additional flow can backwater into the catchbasins and flow overland to the municipal system on Main Street.

Standard #2: Peak Rate Attenuation

SUMMARY OF COMPUTATIONS

DEP Stormwater Management Regulations as well as Medway's Stormwater and Land Disturbance Bylaw both stipulate that no increase in the rate nor volume of stormwater runoff is allowed between existing and proposed conditions on a site. The following table shows peak flow rates and runoff volumes for this site and demonstrate that no increase for either parameter is seen.

Design Point						
Peak Flow (cfs)	**2 Yr.**		**10 Yr.**		**100 Yr.**	
DP-1	0.55	0.16	1.38	0.38	2.93	2.63
DP-2	0.14	0.07	0.55	0.26	1.42	0.67

Design Point						
Runoff Volume (cf)	**2 Yr.**		**10 Yr.**		**100 Yr.**	
DP-1	2,284	525	5,385	2,380	11,179	8,488
DP-2	757	300	2,244	891	5,353	2,124

	Existing
	Proposed

Standard #3: Recharge Calculations

Based on the DEP Stormwater Handbook, a "Rawls" infiltration rate has been utilized for and Subsurface Infiltration Chamber Design. The NRCS Hydrologic Soil Group rating for site hydrology is "B" based on NRCS soil maps. On-site soil testing performed in April of 2020 revealed a layer of sandy loam underlain by loamy sand. As such, the chamber systems, which will be placed below existing grade in the loamy sand layer, were designed based on a Rawls Infiltration rate of 2.41 in/hr. This is consistent with HSG Type "A" soils. The detention basin, which will be constructed above existing grade and will therefore dewater into the sandy loam layer, was designed based on a Rawls Infiltration rate of 1.02 in/hr. This is consistent with Type "B" soils found at the surface across the site. Mounding and dewatering calculations were performed for each component consistent with the Rawls Rates noted above. NRCS data and test pit information supporting this can be found in the "Soils Information" section of this report.

The Required Recharge Volume (Rv):

This project is required to meet this Standard to the maximum extent practicable, but fully complies as designed. There are currently approximately 8,100 sf of impervious areas on the site. Under proposed conditions, the amount of impervious area would increase to 23,300sf.

Total impervious on site = 23,310 sf

Rv = F * Impervious Area

F = Target Depth Factor associated with Hydrological Soil Group; HSG = 0.35 inches

Rv = [(0.35 in)(23,310 sf)]/(12 in/ft) = 680 ft^3

Recharge volume provided by PP-1 below catchbasin rim (229.8) : 3,000 ft^3

Therefore, the total recharge volume provided is 3,000 ft^3 > 375.5 ft^3 required. OKAY

Drawdown Within 72 Hours

$$Time_{drawdown} = \frac{Rv}{(K)(Bottom\ Area)(n)}$$

Rv = Storage Volume (recharge volume provided)%
K = Saturated Hydraulic Conductivity (1.02 in/hr for PP-1, 2.41 in/hr for dry wells)
Bottom Area = Bottom Area of Recharge Structure
n = porosity of the stone; if applicable

PP-1

$Time_{drawdown}$SIS = 3,000 cu.ft / (1.02 in/hr * 1/12 ft/in * 897 sq.ft.) = 39.3 hrs <72 hrs

DW-1

$Time_{drawdown}$SIS = 593 cu.ft / (2.41 in/hr * 1/12 ft/in * 320 sq.ft.) = 9.2 hrs <72 hrs

DW-2

$Time_{drawdown}$SIS = 420 cu.ft / (2.41 in/hr * 1/12 ft/in * 403 sq.ft.) = 5.2 hrs <72 hrs

DW-3

$Time_{drawdown}$SIS = 914 cu.ft / (2.41 in/hr * 1/12 ft/in * 681 sq.ft.) = 6.7 hrs <72 hrs

DW-4

$Time_{drawdown}$SIS = 831 cu.ft / (2.41 in/hr * 1/12 ft/in * 672 sq.ft.) = 6.2 hrs <72 hrs

Standard #4: Water Quality Volume Calculations

The Water Quality Treatment Volume (V_{WQ}):

V_{WQ} = (D_{WQ}/12 inches/foot)* (A_{IMP})

D_{WQ} = 1 inch (required water quality volume)

A_{IMP} = 12,761 sf (does not include building roofs)

V_{WQ} (Proposed)= (1 inch/12 inches/foot)* (12,761 sf) = 1,063 ft^3

➔ 1,102 ft^3 (provided by forebay in detention basin PP-1)

TSS Removal Rate

Using deep sump catchbasins and a detention basin with a forebay, a TSS removal efficiency of 89% is achieved. See attached TSS calculation worksheet.

Standard #5: Land Uses with Higher Potential Pollutant Loads

This project does not have a land use with a higher potential pollutant loads.

Standard #6: Critical Areas

This project does not discharge to a Zone II, Interim Wellhead Protection Areas or directly to a Cold-Water Fisheries.

Standard #7: Redevelopment

While part of the Project could qualify as "redevelopment," the calculations for Standards 2-6 demonstrate full compliance with Massachusetts Stormwater Regulations and Medway's Stormwater Management and Land Disturbance Bylaw.

Standard #8: Construction Period Controls

Upon completion of the project, the site will have disturbed approximately 1.05 acres, therefore a NPDES Construction General Permit is required and will be completed prior to construction.

Standard #9: Operation And Maintenance Plan

A Long -Term Operation and Maintenance (O&M) Plan has be developed and is attached to this report.

Standard #10: Illicit Discharges To Drainage System

An Illicit Discharge Compliance Statement has not been incorporated into the Operation and Maintenance (O&M) plan, however one will be completed prior to construction.

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: PP-1

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Forebay Basin	**0.25**	**0.75**	**0.19**	**0.56**
Infiltration System	**0.80**	**0.56**	**0.45**	**0.11**

Total TSS Removal = **89%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **218-222 Main Street, Medway**

Prepared By: **Meridian Associates, Inc.**

Date: **3/18/2020**

*Equals remaining load from previous BMP (E) which enters the BMP

PP-1 (Basin): Mounding Analysis

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
2.0400	***R***	**Recharge (infiltration) rate (feet/day)**
0.150	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
20.40	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
15.000	**x**	**1/2 length of basin (x direction, in feet)**
15.000	**y**	**1/2 width of basin (y direction, in feet)**
1.000	**t**	**duration of infiltration period (days)**
5.000	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

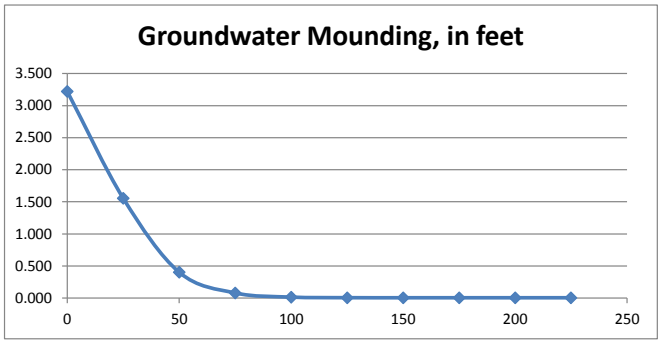
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

8.220	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
3.220	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
3.220	0
1.554	25
0.402	50
0.079	75
0.015	100
0.005	125
0.005	150
0.005	175
0.005	200
0.005	225

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

DW-1: Mounding Analysis

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8200	***R***	**Recharge (infiltration) rate (feet/day)**
0.150	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
48.20	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
27.000	**x**	**1/2 length of basin (x direction, in feet)**
5.725	**y**	**1/2 width of basin (y direction, in feet)**
1.000	**t**	**duration of infiltration period (days)**
3.950	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

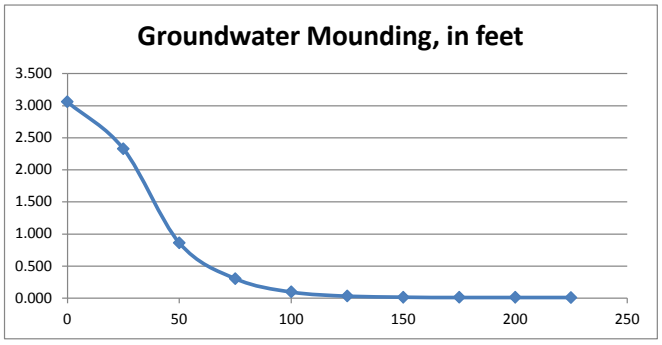
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

7.010	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
3.060	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
3.060	**0**
2.327	**25**
0.861	**50**
0.304	**75**
0.097	**100**
0.033	**125**
0.015	**150**
0.012	**175**
0.011	**200**
0.011	**225**

Re-Calculate Now



Disclaimer

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DW-2: Mounding Analysis

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8000	***R***	**Recharge (infiltration) rate (feet/day)**
0.150	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
48.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
23.750	**x**	**1/2 length of basin (x direction, in feet)**
4.250	**y**	**1/2 width of basin (y direction, in feet)**
1.000	**t**	**duration of infiltration period (days)**
3.950	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

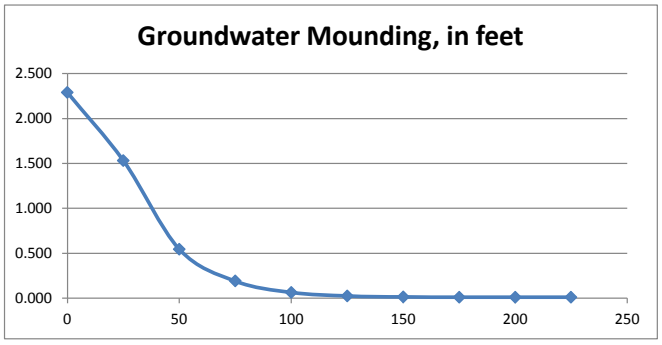
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

6.239	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.289	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.289	**0**
1.529	**25**
0.545	**50**
0.191	**75**
0.063	**100**
0.024	**125**
0.013	**150**
0.011	**175**
0.011	**200**
0.011	**225**

Re-Calculate Now



Disclaimer

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DW-3: Mounding Analysis

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8200	***R***	**Recharge (infiltration) rate (feet/day)**
0.150	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
48.20	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
26.100	**x**	**1/2 length of basin (x direction, in feet)**
6.300	**y**	**1/2 width of basin (y direction, in feet)**
1.000	**t**	**duration of infiltration period (days)**
2.200	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

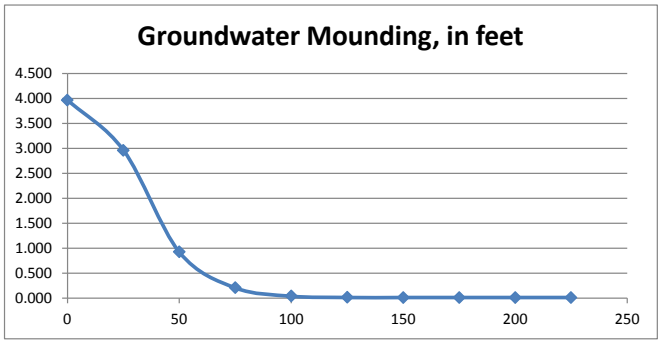
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

6.169	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
3.969	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
3.969	**0**
2.963	**25**
0.925	**50**
0.209	**75**
0.042	**100**
0.014	**125**
0.011	**150**
0.011	**175**
0.011	**200**
0.011	**225**

Re-Calculate Now



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DW-4: Mounding Analysis

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8200	***R***	**Recharge (infiltration) rate (feet/day)**
0.150	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
48.20	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
26.000	**x**	**1/2 length of basin (x direction, in feet)**
7.000	**y**	**1/2 width of basin (y direction, in feet)**
1.000	**t**	**duration of infiltration period (days)**
2.200	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	**feet/day**
0.67	1.33
2.00	4.00

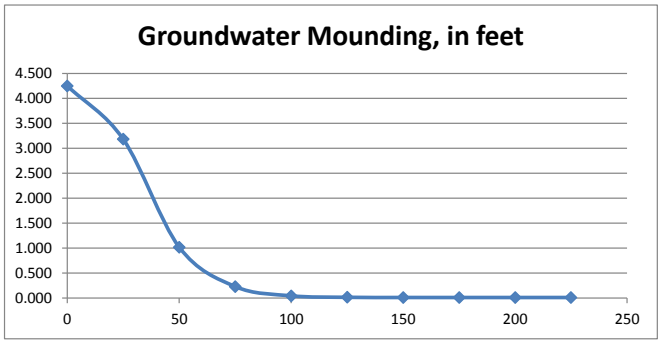
hours	**days**
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

6.451	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
4.251	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	**Distance from center of basin in x direction, in feet**
4.251	**0**
3.182	**25**
1.020	**50**
0.230	**75**
0.045	**100**
0.015	**125**
0.011	**150**
0.011	**175**
0.011	**200**
0.011	**225**

Re-Calculate Now



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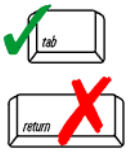
MADEP STORMWATER MANAGEMENT CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- [X] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [X] Minimizing disturbance to existing trees and shrubs
- [ ] LID Site Design Credit Requested:
  - [ ] Credit 1
  - [ ] Credit 2
  - [ ] Credit 3
- [ ] Use of "country drainage" versus curb and gutter conveyance and pipe
- [ ] Bioretention Cells (includes Rain Gardens)
- [ ] Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- [ ] Treebox Filter
- [ ] Water Quality Swale
- [ ] Grass Channel
- [ ] Green Roof
- [ ] Other (describe): _____

Standard 1: No New Untreated Discharges

- [X] No new untreated discharges
- [ ] Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- [X] Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☒ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☒ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.