U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

COVENTRY QUADRANGLE
CONNECTICUT - TOLLAND COUNTY
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 18T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2016 - September 2016
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1979 - 2017
Hydrography.....National Hydrography Dataset, 2003
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 2016 - 2017

Wetlands.....FWS National Wetlands Inventory 2010

MN
GN
14°0'
249 MILS
1°48'
32 MILS
UTM GRID AND 2017 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
YM
Grid Zone Designation
18T

SCALE 1:24 000

KILOMETERS
METERS
MILES
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

CONNECTICUT
QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

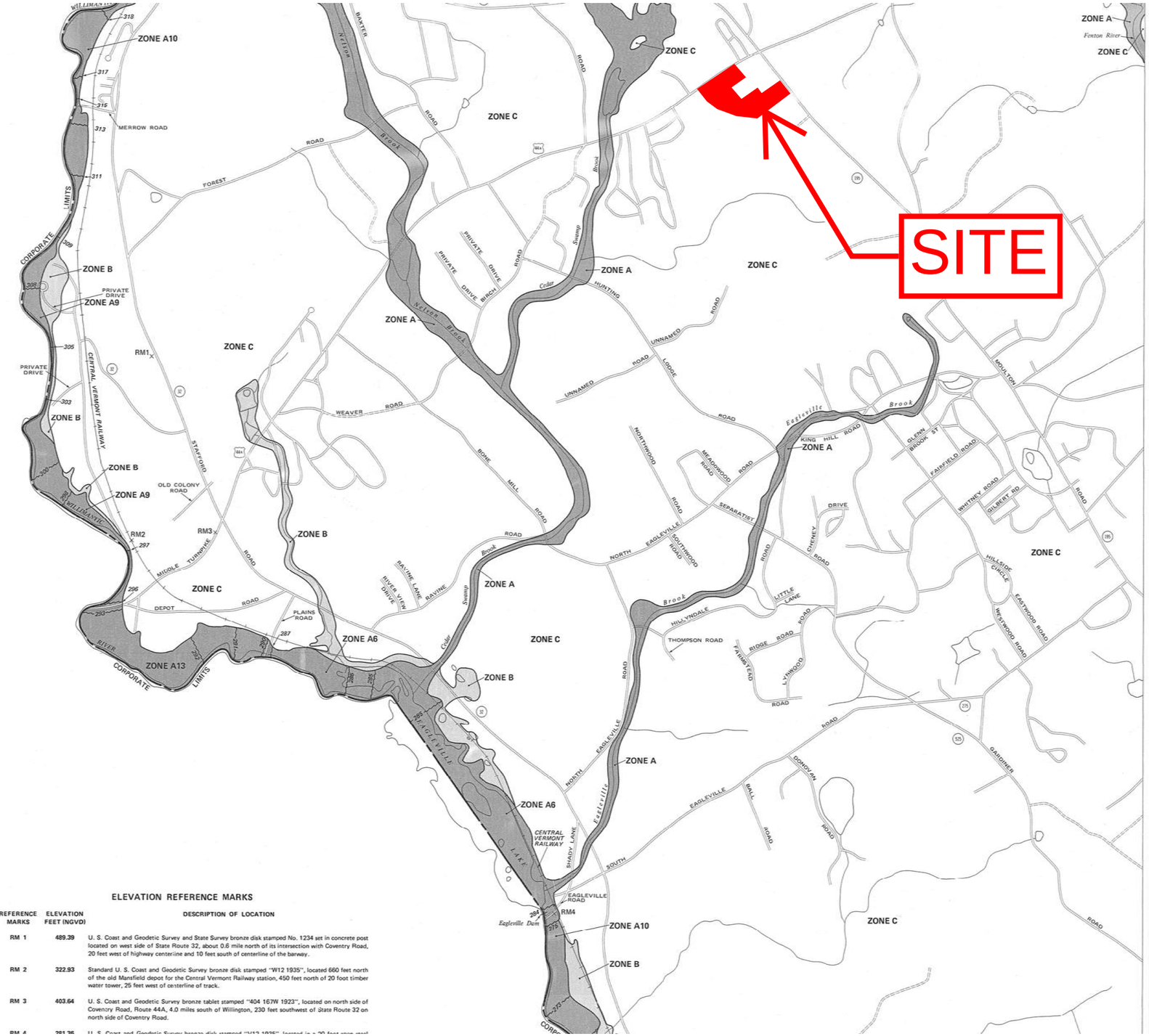
ADJOINING QUADRANGLES

1 Ellington
2 Stafford Springs
3 Westford
4 Rockville
5 Spring Hill
6 Marlborough
7 Columbia
8 Willimantic

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

COVENTRY, CT
2018

7643016360105
NSN. 7 6 4 3 0 1 6 3 6 0 1 0 5
NGA REF NO. U S G S X 2 4 K 1 0 3 9 3



ELEVATION REFERENCE MARKS

REFERENCE MARKS	ELEVATION FEET (NGVD)	DESCRIPTION OF LOCATION
RM 1	489.39	U. S. Coast and Geodetic Survey and State Survey bronze disk stamped No. 1234 set in concrete post located on west side of State Route 32, about 0.6 mile north of its intersection with Coventry Road, 20 feet west of highway centerline and 10 feet south of centerline of the barway.
RM 2	322.93	Standard U. S. Coast and Geodetic Survey bronze disk stamped "W12 1935", located 660 feet north of the old Mansfield depot for the Central Vermont Railway station, 450 feet north of 20 foot timber water tower, 25 feet west of centerline of track.
RM 3	403.64	U. S. Coast and Geodetic Survey bronze tablet stamped "404 167W 1923", located on north side of Coventry Road, Route 44A, 4.0 miles south of Willington, 230 feet southwest of State Route 32 on north side of Coventry Road.
RM 4	281.36	U. S. Coast and Geodetic Survey bronze disk stamped "W12 1935", located in a 20 foot [illegible]

River Mile • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
JANUARY 9, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
OCTOBER 29, 1976
JUNE 21, 1977

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 2, 1981

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620, or (800) 424-8872.

N

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
MANSFIELD,
CONNECTICUT
TOLLAND COUNTY

PANEL 5 OF 20

APPENDIX B: SOIL AND WETLAND INFORMATION

- *NCRS CUSTOM SOIL RESOURCE REPORT*
- *REPORT OF GEOTECHNICAL INVESTIGATION*
- *WETLAND/WATERCOURSES REPORT (under separate cover)*
- *PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION*
- *SUPPLEMENTAL STORMWATER MANAGEMENT AREA EVALUATION*

United States Department of Agriculture

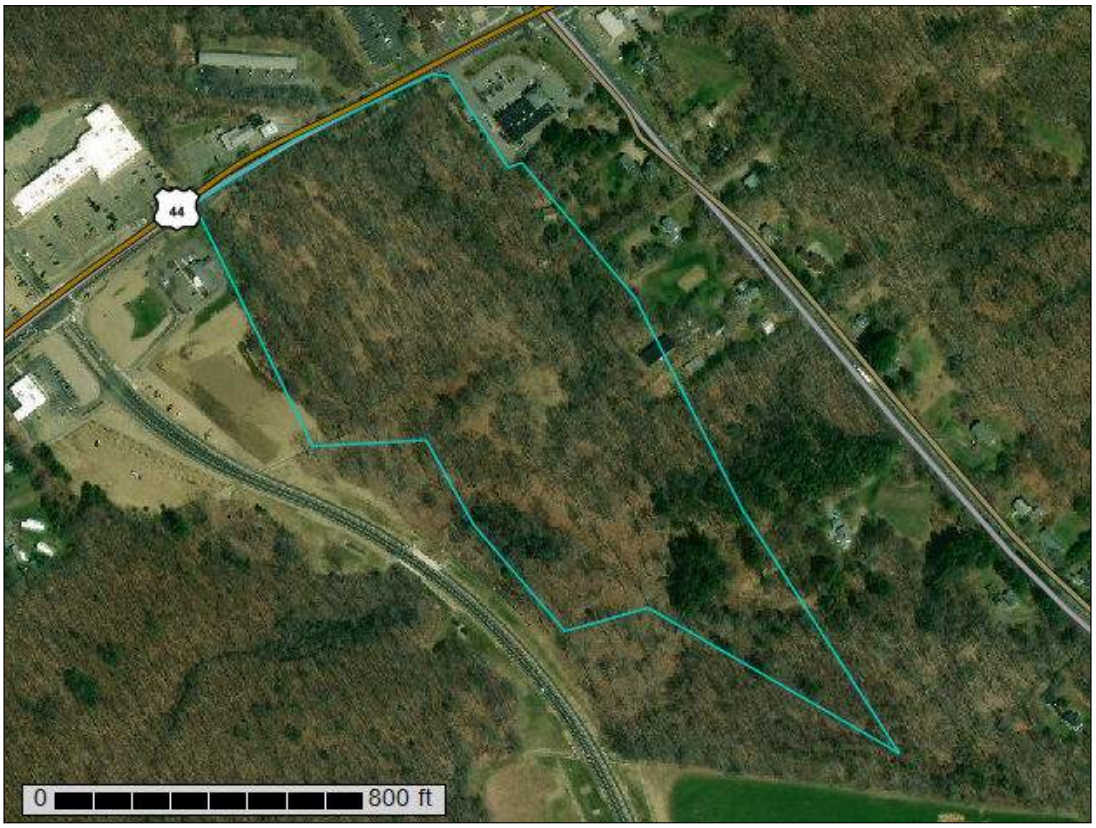
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

State of Connecticut

Mansfield Soil Survey



October 2, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Map Scale: 1:1,360 if printed on D landscape (34" x 22") sheet.

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:12,000.

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: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

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

Date(s) aerial images were photographed: Apr 30, 2013—Sep 23, 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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	0.5	1.8%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	6.7	24.1%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	1.5	5.2%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	5.6	20.2%
60B	Canton and Charlton fine sandy loams, 3 to 8 percent slopes	11.3	40.6%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	2.2	8.0%
306	Udorthents-Urban land complex	0.0	0.1%
Totals for Area of Interest		**27.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a

given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 40 percent
Leicester, extremely stony, and similar soils: 35 percent
Whitman, extremely stony, and similar soils: 17 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Ground moraines, drumlins, drainageways, depressions, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Hills, ground moraines, drainageways, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

Landform: Hills, ground moraines, drumlins, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam

Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

Percent of map unit: 2 percent
Landform: Swamps, bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

45B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2ql
Elevation: 0 to 1,470 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Woodbridge, fine sandy loam, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent
Landform: Ground moraines, depressions, drainageways, hills

Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

46B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Paxton, very stony
Percent of map unit: 10 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Ridgebury, very stony
Percent of map unit: 8 percent
Landform: Depressions, drainageways, ground moraines, drumlins, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

51B—Sutton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2xfff
Elevation: 0 to 1,410 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Sutton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton, Very Stony

Setting
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: fine sandy loam
Bw1 - 7 to 19 inches: fine sandy loam
Bw2 - 19 to 27 inches: sandy loam
C1 - 27 to 41 inches: gravelly sandy loam
C2 - 41 to 62 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Charlton, very stony

Percent of map unit: 7 percent
Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony

Percent of map unit: 4 percent
Landform: Moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 3 percent
Landform: Depressions, drainageways, hills, ground moraines
Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman, very stony
Percent of map unit: 1 percent
Landform: Drainageways, hills, ground moraines, drumlins, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

60B—Canton and Charlton fine sandy loams, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2w81s
Elevation: 0 to 1,460 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Canton and similar soils: 50 percent
Charlton and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting
Landform: Ridges, hills, moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile
Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Charlton

Setting

Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Sutton

Percent of map unit: 5 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope

Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chatfield

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

61B—Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81v
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, very stony, and similar soils: 50 percent
Charlton, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Ridges, hills, moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Sutton, very stony
Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester, very stony
Percent of map unit: 5 percent
Landform: Hills, depressions, drainageways, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Chatfield, very stony
Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting
National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents and similar soils: 50 percent

Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent

Hydric soil rating: No

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December 6, 2018

via email

CAPSTONE COLLEGIATE COMMUNITIES, LLC
431 Office Park Drive
Birmingham, Alabama 35223

Attention: Ms. Amanda Wallis
Executive Vice President – Development

Regarding: PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MAP 9, BLOCK 23, LOTS 1, 7, & 8
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
WHITESTONE PROJECT NO.: GM1816022.000

Dear Ms. Wallis:

Whitestone Associates, Inc. (Whitestone) has completed a preliminary geotechnical investigation at the above-referenced site. The results of the investigation and recommendations presented below are based on the soil conditions disclosed from a limited number of soil explorations performed during Whitestone's field investigation. The purpose of the investigation was to assess subsurface conditions within proposed building areas accessible to all terrain vehicle (ATV) mounted drilling equipment. Preliminary recommendations for support of the proposed buildings, slabs, and pavement, and anticipated earthwork requirements are included herein.

1.0 PROJECT DESCRIPTION

1.1 Site Location & Existing Conditions

The 24.1-acre site is located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut. According to the Town of Mansfield Assessor's Office, the site is identified as Map 9, Block 23, Lots 1, 7, and 8. The site currently is developed with several residential buildings along Storrs Road. The remaining portions of the site are wooded. Wetlands within the subject site reportedly limit the development area to approximately 15.9 acres. Based on a review of available topographic maps, the site slopes down to the northeast from the approximate elevation of 660 feet above North American Vertical Datum of 1988 (NAVD) to approximately 620 feet above NAVD.

1.2 Site Geology

On the *Surficial Materials Map of Connecticut (1992)*, the site is shown underlain by glacial till. The *Bedrock Geologic Map of Connecticut (1985)* indicates that the subject property is underlain by Silurian-aged schist with minor granofels of the upper member of the Bigelow Brook Formation, part of the Eastern Uplands.

1.3 Proposed Construction

The final design has not yet been determined, however, the client anticipates the proposed redevelopment will include approximately 150 residential units, separated into two-story and three-story buildings with associated parking, utilities, and recreational areas. No stormwater management facilities have been identified at this time.

Detailed structural information was not available at the time of this report, however, based on experience with similar facilities, Whitestone anticipates that maximum column, wall, and floor loads will be less than about 50 kips, two kips per lineal foot, and 150 pounds per square foot, respectively.

2.0 FIELD INVESTIGATION

2.1 Fieldwork

Field exploration at the project site consisted of performing five soil borings, completed as groundwater monitoring wells. The locations of the soil borings are shown on the accompanying *Boring Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone engineer who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, where encountered, were recorded during and immediately after the completion of field operations, and in the installed groundwater monitoring wells. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.2 Laboratory Testing Program

In addition to the field investigation, a laboratory testing program was conducted to assess additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory testing program was performed in general accordance with applicable ASTM standard test methods and included physical/textural testing.

The results of the laboratory testing program are presented in this section in a general manner and qualitatively interpreted. The results are incorporated into the findings and recommendations discussed throughout this report. Quantitative test results are provided in Appendix B.

Physical and Textural Analysis: Representative samples of the selected stratum encountered were subjected to a laboratory testing program that included moisture content determinations (ASTM D2216) and washed gradation analyses (ASTM D422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table.

PHYSICAL/TEXTURAL ANALYSES SUMMARY					
Boring	**Sample**	**Depth (fbgs)**	**Moisture Content (%)**	**% Passing No. 200 Sieve**	**USCS Classification**
B-1	S-3	5.0 - 7.0	11.2	43.3	SM
B-5	S-2	2.0 - 4.0	15.0	17.9	SM

3.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the subsurface tests conducted by Whitestone consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Cover Materials: The borings encountered topsoil, three inch to eight inches in thickness, at the ground surface.

Glacial Till: Beneath the surface cover materials, the borings encountered glacial till, consisting of brown, medium dense to very dense (surficially very loose to loose), silty sand with gravel (USCS: SM). SPT N-values within the glacial till were variable, ranging from two blows per foot (bpf) to greater than 100 bpf.

Apparent Bedrock: The explorations encountered refusal on apparent bedrock at depths ranging from 2.5 fbgs to 12.5 fbgs. Refusal materials were not sampled through rock coring efforts. Rock coring techniques would be required to further characterize the nature and extent of the refusal materials. Bedrock outcrops were noted at various locations throughout the site.

Groundwater: Static groundwater was encountered within the explorations at depths ranging from two fbgs to three fbgs. Groundwater levels should be expected to fluctuate seasonally and following periods of precipitation. Groundwater levels were measured in the monitoring wells at depths ranging from 0.8 fbgs to 4.1 fbgs on December 3, 2018.

4.0 PRELIMINARY CONCLUSIONS & RECOMMENDATIONS

Whitestone's findings indicate that the proposed structures may be supported on conventional shallow foundations bearing on approved natural glacial till and/or properly placed structural fill. Whitestone's findings also indicate that the site is suitable for ground-supported floor slabs deriving support from properly inspected and approved compacted glacial till, and/or compacted structural fill. Additionally, the site conditions support the use of typical pavement sections using standard CTDOT specified materials.

The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered within the limited exploration performed. If there are any significant changes to the project characteristics or if significantly different subsurface conditions are encountered during construction, Whitestone should be consulted, so that the recommendations of this report can be reviewed.

4.1 Site Preparation & Earthwork

Surface Preparation: Prior to placing fill to raise or restore grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm and unyielding surface with several passes in two perpendicular directions of a minimum 10-ton vibratory compactor. Fill and backfill should be placed and compacted in accordance with Section 4.2.

Weather Performance Criteria: Because the natural site soils will soften when exposed to water, every effort should be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of saturated soils and replacement with controlled structural fill per Section 4.2 of this report may be required prior to resuming work on disturbed subgrade soils.

Subgrade Protection and Inspection: Every effort should be made to reduce disturbance of the on-site soils by construction traffic and surface runoff. The on-site soils may deteriorate when subjected to repeated construction traffic and/or inclement weather, which would require removal and replacement. These materials also may require discing, drying, and aeration during wet periods. The contractor should be responsible for protection of subgrades and minimization of exposure of the site soils to precipitation by covering stockpiles and subgrades with plastic and preventing ponding of water by sealing subgrades before precipitation events and grading the site to allow proper drainage of surface water. All rutting from construction equipment should be removed prior to any forecasted or actual precipitation. The services of the geotechnical engineer should be retained to observe soils conditions during construction and review the suitability of prepared foundation subgrades for support of design loads.

Groundwater Control: Static groundwater was encountered within the explorations at depths that will impact excavation for foundations or utilities. As such, construction phase dewatering will likely consist of temporarily lowering the static groundwater and removing surface water runoff, infiltrating water, or trapped water at this site. Temporary construction phase dewatering of static and trapped/perched water should be feasible through the use of gravity fed sump pits and pumps.

Since excessive amounts of perched groundwater may accumulate during periods of wet weather, Whitestone recommends that foundation construction occur during periods of relatively dry weather. Every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of foundation areas to precipitation.

4.2 Structural Fill & Backfill

Imported Fill Material: Any imported material placed as structural fill or backfill to restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 12 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. Any imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

Soil Reusability: Portions of the site soils are acceptable for selective reuse as fill/backfill material, provided that soil moisture contents are controlled within two percent of optimum moisture level, particles larger than three inches in diameter are either removed or crushed, and objectionable portions, such as organics or debris, are segregated. Reuse of the site soils will be contingent on careful review in the field by the owner's geotechnical engineer by visual observation during construction as recommended herein. However, portions of the natural silty soils at the site are marginally acceptable for reuse as structural fill and/or backfill because of difficult workability. Reuse of these silty soils will likely require extensive moisture conditioning and/or drying to facilitate reuse, workability, and compaction in fill areas. Immediate re-use of on-site soils for structural fill or backfill should not be anticipated as the majority of the site natural soils are moisture sensitive. On-site natural materials that are or become wet will require extensive handling, such as discing and aerating, which may not be practical during wet seasons or where site area is limited. In order to attempt the re-use of on-site natural soil, the contractor should cover stockpiled soils, seal subgrades each day with a smooth drum roller, and provide proper surface drainage during forecasted wet weather. Alternatively, imported fill materials may be required to expedite earthwork operations. The stripped surface cover materials should not be used as structural fill or backfill.

Compaction and Placement Requirements: Fill and backfill should be placed in maximum eight-inch thick loose lifts and compacted using a vibratory drum roller during mass grading activities or a small hand-held vibratory compactor within excavations. Structural fill and backfill placed within the building pads, including 10 feet outside the exterior walls, should be compacted to at least 95 percent of the maximum dry density within two percent of the optimum moisture content, as determined by ASTM D1557 (Modified Proctor). Structural fill and backfill placed within non-building areas should be compacted to at least 92 percent of the maximum dry density within two percent of the optimum moisture content, as determined by ASTM D1557.

4.3 Preliminary Foundation Design Criteria

Foundations: Whitestone preliminarily recommends supporting the proposed structures on conventional spread foundations designed to bear within the approved natural glacial till and/or on controlled structural fill materials that are properly evaluated, placed and compacted as described herein. Foundations bearing within these materials may preliminarily be designed using a maximum net allowable bearing pressure of 4,000 pounds per square foot subject to review of final design loading, grading, and settlement tolerances.

Foundation subgrades should be compacted in the presence of the geotechnical engineer to densify loose upper soils and disturbed soils. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for spread footings.

Footings subject to lateral loads and/or overturning should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings, so that lateral resistance should be provided by friction resistance at the base of the footings. An allowable coefficient of friction against sliding of 0.4 is recommended for use in the design of the foundations bearing within the existing site soils or imported structural fill soils.

Seismic Site Class: Based on a review of the subsurface conditions relevant to the *Connecticut State Building Code*, the subject site has been assigned a Site Class C. The site soils are not susceptible to earthquake induced liquefaction.

Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils at the footing bottoms be reviewed by a geotechnical engineer immediately prior to placing concrete for the footings. In the event that areas of unsuitable materials are encountered, additional overexcavation and replacement of the materials may be necessary to provide a suitable footing subgrade. Any overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation may be eliminated if grades are restored with lean concrete. Compaction of the bottom of overexcavations should be reviewed by the on-site geotechnical engineer.

Frost Coverage: Footings subject to frost action should be placed at least 42 inches below adjacent exterior grades, in accordance with the *Connecticut State Building Code*, to provide protection from frost penetration. Interior footings not subject to frost action may be placed at a minimum depth of 18 inches below the floor slabs.

Settlement: Whitestone estimates post-construction settlements of proposed foundations of less than one inch, if the recommendations outlined in this report are properly implemented. Differential settlement of foundations should be less than one half inch.

4.4 Floor Slabs

Whitestone anticipates that the natural glacial till or controlled structural fill materials will be suitable for support of the proposed floor slabs provided these materials are properly evaluated, placed, and compacted.

4.5 Pavements

Whitestone anticipates that the properly inspected and approved natural glacial till or compacted structural fill and/or backfill placed to raise or restore design elevations will be suitable for support of the proposed pavements, provided these materials are properly evaluated, compacted, and proofrolled during favorable weather conditions.

A California Bearing Ratio value of 8.0 has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible pavement designs per the AASHTO *Guide for the Design of Pavement Structures*. Design traffic loads were assumed based on typical volumes for similar facilities and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. Estimated maximum pavement loads of 11,000 ESALs and 30,000 ESALs were used for the standard-duty and heavy-duty pavement areas, respectively.

Pavement components should meet material specifications from CTDOT *Standard Specifications* specified below. The recommended flexible pavement sections are tabulated below:

FLEXIBLE PAVEMENT SECTIONS			
Layer	**Material**	**Standard-Duty Thickness (inches)**	**Heavy-Duty Thickness (inches)**
Asphalt Wearing Course	CTDOT HMA S0.375 (Superpave); PG 64S-22	1.5	1.5
Asphalt Binder Course	CTDOT HMA S0.5 (Superpave); PG 64S-22	1.5	2.0
Granular Base	CTDOT M.05.01 Processed Aggregate Base	6.0	6.0
Granular Subbase	CTDOT M.02.02 Subbase; M.02.06 Gradation A	6.0	6.0

The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thickness may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. Proper drainage should be provided for the pavement structure, including appropriate grading and surface water control, and interceptor (edge) drains on the higher side(s) of the site. Consideration should also be given to radial drains at catch basins.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that CTDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials.

4.6 Excavations

The site soils encountered during the investigation generally are most consistent with, at least, Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA) that require a maximum unbraced excavation

angle of 1.5:1 (horizontal:vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA), so that safe excavation methods and/or shoring and bracing requirements are implemented. Competent bedrock may be excavated at an angle of 1:6 (horizontal:vertical). A steeper excavation angle in the bedrock may be feasible, if the exposed bedrock is reviewed by a professional engineer or geologist.

5.0 SUPPLEMENTAL POST INVESTIGATION SERVICES

Construction Inspection and Monitoring: The owner's geotechnical engineer with specific knowledge of the subsurface conditions and design intent should perform inspection, testing, and consultation during construction, as described in previous sections of this report. Monitoring and testing should also be performed to check that the existing surface cover materials are properly stripped and suitable materials, used for controlled fill, are properly placed and compacted over suitable subgrade soils. The proofrolling of all subgrades prior to pavement support should be witnessed and documented by the owner's geotechnical engineer.

6.0 CLOSING

Whitestone geotechnical division appreciates the opportunity to be of service to Capstone Collegiate Communities, LLC. Whitestone has the capability to perform the additional geotechnical engineering services recommended herein. Please contact us at (860) 726-7889 with any questions regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Richard W.M. McLaren, P.E.
Senior Consultant

Ryan R. Roy, P.E.
Principal, New England Region

RWM/br N:\Job Folders\2018\1816022GM\Reports and Submittals\GM1816022 Lim GI Mansfield CT.docx
Copy: Laurence W. Keller, P.E., Whitestone Associates, Inc.

WHITESTONE ASSOCIATES, INC.

FIGURE 1
Boring Location Plan

LEGEND

B-1 BORING LOCATION (APPROX.)

REFERENCE

THIS PLAN IS BASED UPON AN OCTOBER 11, 2018 *CONCEPTUAL DEVELOPMENT PLAN* PREPARED BY NILES BOLTON ASSOCIATES

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

DRAWING TITLE: **BORING LOCATION PLAN**

CLIENT: **CAPSTONE COLLEGIATE COMMUNITIES, LLC**

PROJECT: PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT

PROJECT #: GM1816022.000	
DESIGNED BY: JL	PROJ. MGR.: RRR
DATE: 12/05/18	FIGURE: 1
SCALE: 1" = 100'	

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APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018		**Water Depth | Elevation** (feet bgs) | (feet NAVD88)		**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)
Termination Depth:	9.5 feet bgs	**Date Completed:**	11/19/2018				
Proposed Location:	Building	**Logged By:**	JM	**During:**	3.0 | --		
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	-- | --	**At Completion:**	-- | --
		Equipment:	Diedrich D-50	**12/3/2018**	0.8 | --	**24 Hours:**	-- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		8" Topsoil	
0 - 2	S-1		W O H - 1 - 1 - 2	19	2		GLACIAL TILL		Brown, Very Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2		4 - 13 - 18 - 22	20	31				As Above, Dense (SM)	
						5.0				
5 - 7	S-3		17 - 8 - 15 - 22	24	23				As Above, Medium Dense (SM)	
7 - 9	S-4		14 - 21 - 27 - 29	20	48				As Above, Dense (SM)	
						10.0			Boring Log B-1Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 9.5 Feet Below Ground Surface.	Monitoring Well Installed
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018	**Water Depth | Elevation**	**Cave-In Depth | Elevation**		
Termination Depth:	2.5 feet bgs	**Date Completed:**	11/19/2018	(feet bgs) | (feet NAVD88)	(feet bgs) | (feet NAVD88)		
Proposed Location:	Building	**Logged By:**	JM	**During:**	-- | --		
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	-- | --	**At Completion:**	-- | --
		Equipment:	Diedrich D-50	**12/3/2018**	1.3 | --	**24 Hours:**	-- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - .8	S-1	X	28 - 50/3"	8	-		TS		3" Topsoil	
							GLACIAL TILL		Brown, Dense, Silty Sand with Gravel (SM)	Offset Boring, Same Refusal
						5.0			Boring Log B-2 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 2.5 Feet Below Ground Surface.	Monitoring Well Installed
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018	**Water Depth | Elevation** (feet bgs) | (feet NAVD88)	**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)
Termination Depth:	5.0 feet bgs	**Date Completed:**	11/19/2018		
Proposed Location:	Building	**Logged By:**	JM	**During:** -- | --	
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:** -- | --	**At Completion:** -- | --
		Equipment:	Diedrich D-50	**12/3/2018** 4.1 | --	**24 Hours:** -- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		4" Topsoil	
0 - 2	S-1	X	2 - 2 - 1 - 2	5	3		GLACIAL TILL		Brown, Very Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2	X	2 - 2 - 4 - 4	12	6				As Above, Loose (SM)	
						5.0				
									Boring Log B-3 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 5.0 Feet Below Ground Surface.	Monitoring Well Installed
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018	**Water Depth | Elevation** (feet bgs) | (feet NAVD88)	**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)
Termination Depth:	7.5 feet bgs	**Date Completed:**	11/19/2018		
Proposed Location:	Building	**Logged By:**	JM	**During:** 2.0 | --	
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:** -- | --	**At Completion:** -- | --
		Equipment:	Diedrich D-50	**12/3/2018** 0.3 | --	**24 Hours:** -- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		4" Topsoil	
0 - 2	S-1	X	6 - 3 - 3 - 9	13	6		GLACIAL TILL		Brown, Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2	X	5 - 19 - 21 - 22	13	40				As Above, Dense (SM)	
						5.0				
5 - 7	S-3	X	17 - 17 - 36 - 75	12	53				As Above, Very Dense (SM)	
									Boring Log B-4 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 7.5 Feet Below Ground Surface.	Monitoring Well Installed
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-5

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

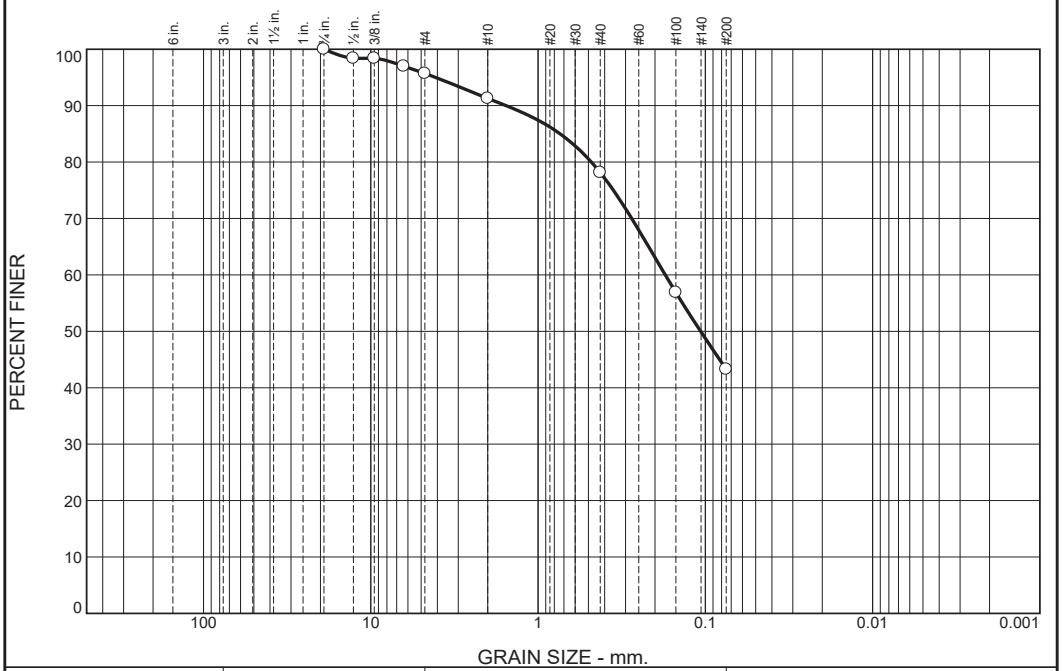
Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018		**Water Depth | Elevation** (feet bgs) | (feet NAVD88)		**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)
Termination Depth:	12.5 feet bgs	**Date Completed:**	11/19/2018				
Proposed Location:	Building	**Logged By:**	JM	**During:**	2.0 | --		
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	-- | --	**At Completion:**	-- | --
		Equipment:	Diedrich D-50	**12/3/2018**	1.2 | --	**24 Hours:**	-- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		8" Topsoil	
0 - 2	S-1		W O - 2 - 4 - 8 H	10	6				Brown, Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2		15 - 13 - 13 - 14	10	26				As Above, Medium Dense (SM)	
						5.0				
5 - 7	S-3		8 - 50 - 31 - 24	24	81		GLACIAL TILL		As Above, Very Dense (SM)	
7 - 9	S-4		26 - 41 - 37 - 35	24	78				As Above (SM)	
						10.0				
10 - 11.3	S-5		27 - 71 - 50/3"	11	>100				As Above (SM)	
									Boring Log B-5 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 12.5 Feet Below Ground Surface.	Monitoring Well Installed
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

APPENDIX B
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.3	4.4	13.2	34.8	43.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.4		
3/8"	98.4		
1/4"	97.0		
#4	95.7		
#10	91.3		
#40	78.1		
#100	56.9		
#200	43.3		

* (no specification provided)

Soil Description

Silty Sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 1.5546 D_{85}= 0.7382 D_{60}= 0.1736
D_{50}= 0.1066 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content: 11.2%

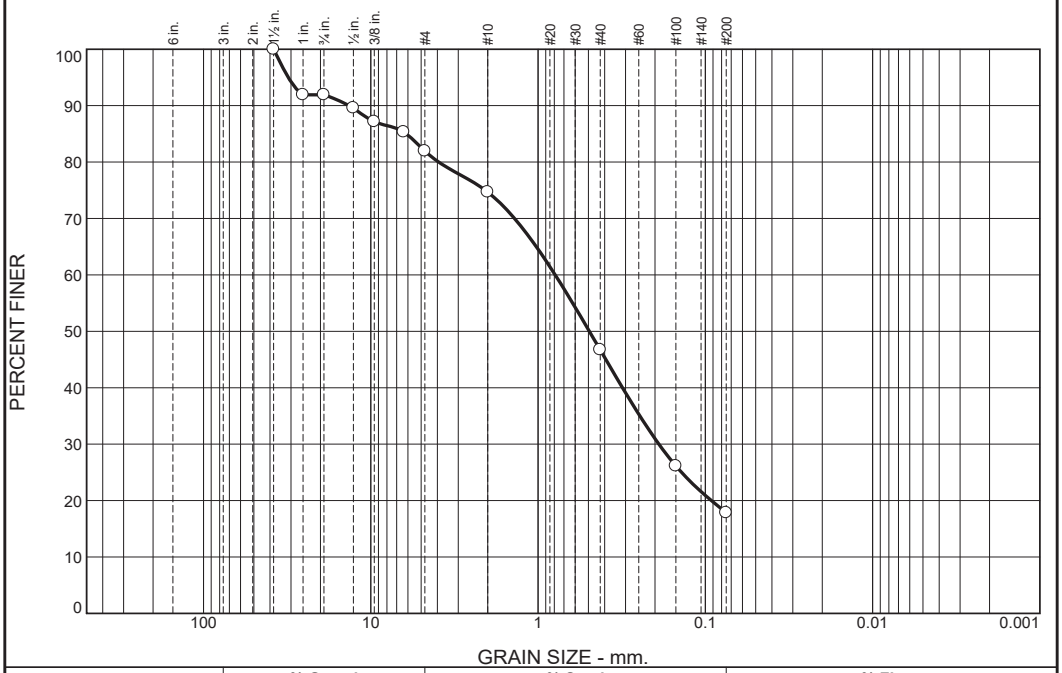
Location: B-1
Sample Number: S-3 **Depth:** 5'-7' **Date:** 11/26/2018

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

Client: Capstone Collegiate Communities, LLC
Project: Proposed Student Housing Development
Middle Turnpike (Route 44) & Storrs Road (Route 195),
Project No: GM1816022.000 **Figure** S-1

Tested By: CN **Checked By:** RWM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.1	10.0	7.2	28.0	28.8	17.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1"	91.9		
3/4"	91.9		
1/2"	89.6		
3/8"	87.2		
1/4"	85.3		
#4	81.9		
#10	74.7		
#40	46.7		
#100	26.1		
#200	17.9		

* (no specification provided)

Soil Description

Silty Sand with Gravel

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 13.4852 D_{85}= 6.1332 D_{60}= 0.7899
D_{50}= 0.4933 D_{30}= 0.1895 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture Content: 15.0%

Location: B-5
Sample Number: S-2 **Depth:** 2'-4' **Date:** 11/26/18

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

Client: Capstone Collegiate Communities, LLC
Project: Proposed Student Housing Development
Middle Turnpike (Route 44) & Storrs Road (Route 195),
Project No: GM1816022.000 **Figure** S-2

Tested By: CN **Checked By:** RWM

APPENDIX C
Supplemental Information
(USCS, Terms and Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

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Other Office Locations:

WARREN, NJ	CHALFONT, PA	SOUTHBOROUGH, MA	WALL, NJ	STERLING, VA	EVERGREEN, CO
908.668.7777	215.712.2700	508.485.0755	732.592.2101	703.464.5858	303.670.6905

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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Other Office Locations:

WARREN, NJ	CHALFONT, PA	SOUTHBOROUGH, MA	WALL, NJ	STERLING, VA	EVERGREEN, CO
908.668.7777	215.712.2700	508.485.0755	732.592.2101	703.464.5858	303.670.6905

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

January 8, 2019

via email

CAPSTONE COLLEGIATE COMMUNITIES, LLC
431 Office Park Drive
Birmingham, Alabama 35223

Attention: Ms. Amanda Wallis
Executive Vice President – Development

Regarding: SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
ROCK PROBE SUMMARY
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
PARCEL NOs: 9.23.1, 9.23.7 & 9.23.8
WHITESTONE PROJECT NO.: GM1816022.001

Dear Ms. Wallis:

Whitestone Associates, Inc. (Whitestone) is pleased to submit this rock probe summary letter in support of the proposed student housing development referenced above. Whitestone previously provided a December 6, 2018 *Preliminary Geotechnical Investigation* for the site. Whitestone's supplemental geotechnical services were performed in accordance with our December 12, 2018 proposal.

PROJECT DETAILS

The project site is an approximately 19.2-acre, irregularly-shaped parcel located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut currently developed with several residential buildings along Storrs Road. The remaining portions of the site are forested. Wetlands within the subject site reportedly limit the developable area to approximately 15.9 acres. Based on a review of available topographic maps and site reconnaissance, the site slopes down to the northeast from the approximate elevation of 660 feet above mean sea level (msl) to approximately 610 feet above msl.

The final design has not yet been determined, however, the client anticipates the proposed redevelopment will include approximately 200 residential units, separated into three-story to four-story buildings with associated parking, utilities, and recreational areas. It is expected that cuts and fills on the order of five feet to 10 feet and retaining walls or slopes may be required to develop the site. No stormwater management facilities have been identified at this time.

Whitestone's previously completed preliminary geotechnical investigation disclosed probable shallow bedrock at depths ranging from 2.5 feet below ground surface (fbgs) to 12.5 fbgs. Shallow bedrock can have a significant impact on site development costs. Based on the discovery of the shallow bedrock rock probing was requested to document bedrock topography beneath the site. The bedrock topography is intended to assist the design team in producing a cost-effective development plan for the site.

FIELD INVESTIGATION

Field exploration of the project site was conducted by means of 84 bedrock probes, identified as P-2 through P-85 (P-1 was inaccessible). Prior to mobilizing a rock probe drill Whitestone completed a field survey on December 19, 2018 to lay out probe locations and document apparent bedrock outcrops.

On December 26 through 28, 2018 Whitestone mobilized to the site to perform bedrock probes. The bedrock probes were advanced with a Furuwake HCR900 series rock drill to termination depths that ranged from approximately seven feet below ground surface (fbgs) to 23 fbgs. Probes were advanced approximately five feet beyond the apparent bedrock surface to help delineate between boulders and bedrock. Bedrock probe locations and estimated bedrock surface elevations contours are shown on the *Bedrock Surface Contour Plan*, included as Figure 1. Depth to bedrock is shown on the color-coded *Bedrock Depth Plan*, included as Figure 2. A table of probes and estimated bedrock depths is attached as Table 1.

PRELIMINARY FINDINGS

The shallow bedrock generally forms an irregular ridge across the mid-point of the site from west to east. However, there is a relatively large area of shallow bedrock at the south end of the site and a smaller area within the northeast quadrant.

Based on the results of the bedrock probes and the type of bedrock (metamorphosed schist) exposed in outcrops around the site, Whitestone considers that, apart from the upper foot or so, the rock will not be rippable. A portion of the bedrock could be removed with *Ho-Rams* (pneumatic hammers). This procedure would be aided by the soil seams encountered within the upper few feet of bedrock by the probes, which will allow easier removal of portions of the bedrock. However, blasting would likely be required for more extensive excavation.

Special measures should be employed for blasting, including pre- and post-blast surveys of neighboring properties and vibration monitoring during blasting. Blasting should be conducted by an experienced specialty contractor in accordance with applicable Town of Mansfield, State, and federal regulations. Care should be taken to minimize the amount of explosive charge used to reduce the likelihood of over-blast and to provide proper engineering controls during and following blasting operations. Engineering controls will include properly cleaning of loose shot rock from blasted surfaces and allowing the geotechnical engineer to inspect exposed rock conditions.

Rock pieces produced by blasting can be crushed and used on the site for roadway aggregate base and subbase and for crushed stone. Bedrock samples could be tested for L.A. Abrasion (AASHTO T96) and Soundness by Magnesium Sulfate (AASHTO T104) to determine if the bedrock meets the requirements for sale to the Connecticut Department of Transportation as fine and coarse aggregates, but given the bedrock type, its suitability is unlikely. However, regardless of the results of this testing, the crushed excavated rock will be suitable for reuse at the site for the proposed construction.

Whitestone appreciates being of continued service to Capstone Collegiate Communities, LLC. Please do not hesitate to contact us at with any questions regarding this summary letter.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Jason R. Landry
Project Manager

Ryan R. Roy, P.E.
Principal, New England Region

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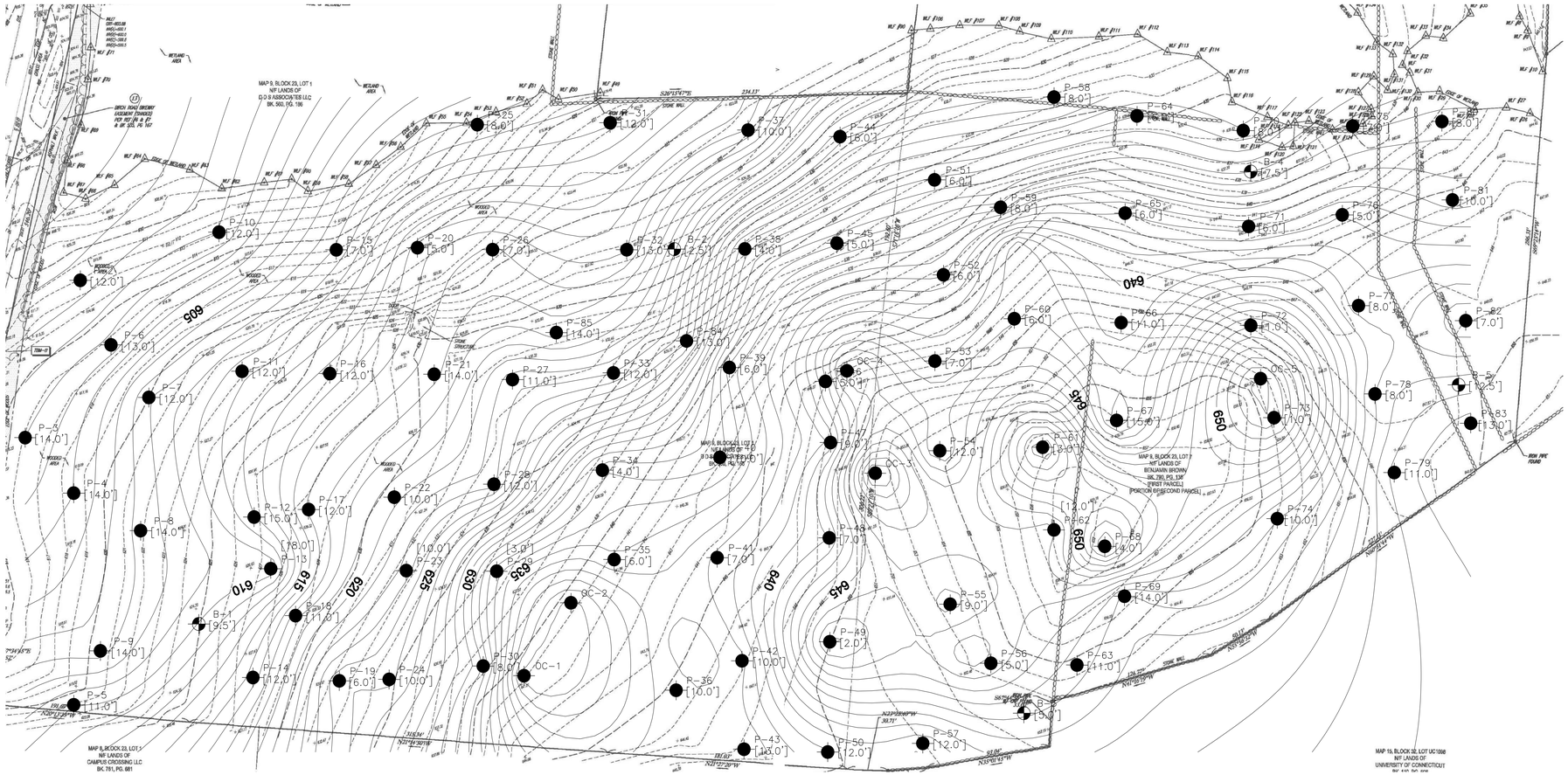
Enclosures

FIGURE 1
Bedrock Surface Contour Plan



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)

1 inch = 30 ft.

LEGEND

P-1	ROCK PROBE LOCATION (APPROX.)
[12.0']	APPROXIMATE DEPTH TO BEDROCK
650	APPROXIMATE BEDROCK SURFACE ELEVATION CONTOUR

REFERENCE

THIS PLAN IS BASED UPON AN AUGUST 24, 2018 ALTA LAND SURVEY PREPARED BY CONTROL POINT ASSOCIATES, INC.

PROJECT #: GM1816022.001	DRAWING TITLE: BEDROCK SURFACE CONTOUR PLAN
DESIGNED BY: JL / REV. MGR.: RR	CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC
DATE: 01/07/19 / SCALE: 1" = 40' / SHEET: 1	PROJECT: PROPOSED STUDENT HOUSING DEVELOPMENT MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195) MANSFIELD, TOLLAND COUNTY, CONNECTICUT

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

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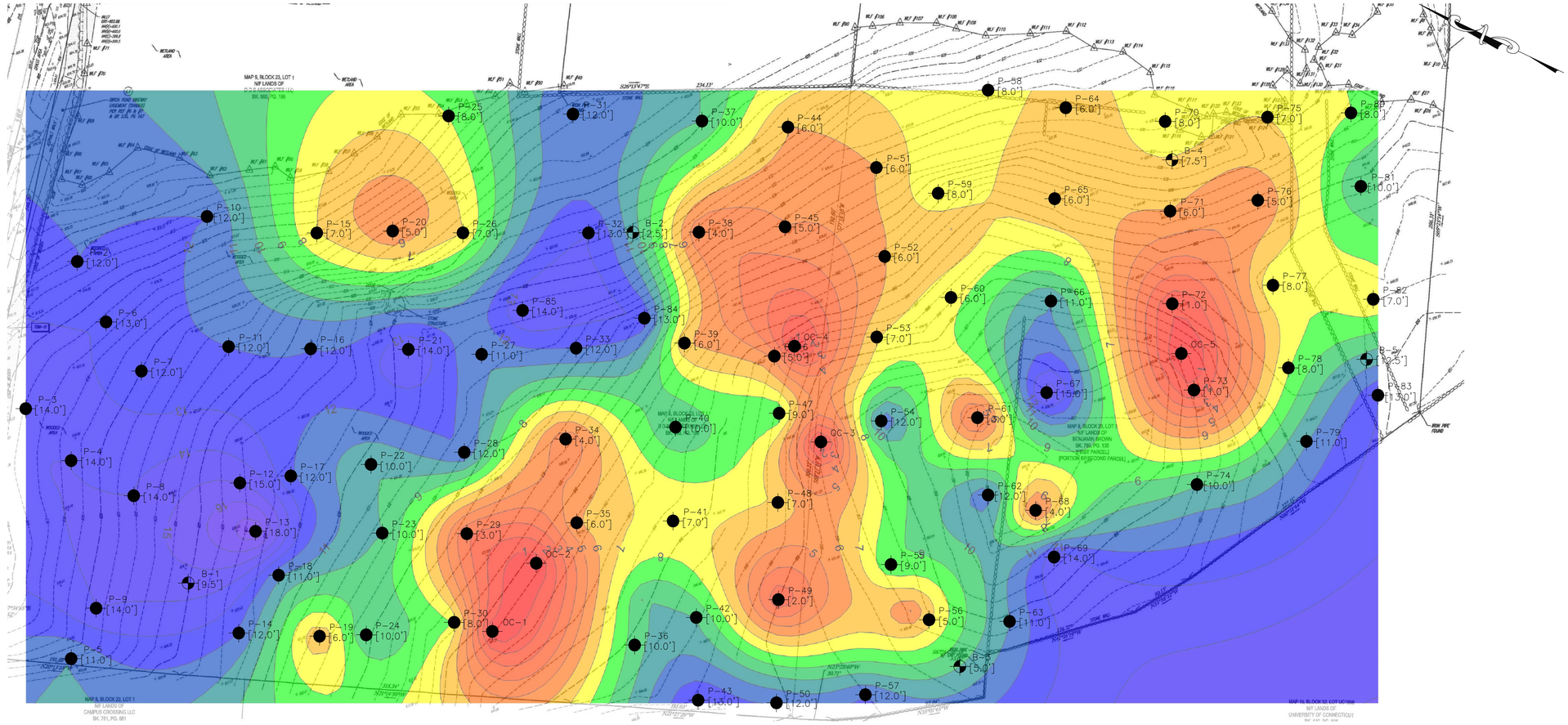
WHITESTONE ASSOCIATES, INC.

FIGURE 2
Bedrock Depth Plan



LEGEND

P-1 — ROCK PROBE LOCATION (APPROX.)

[12.0'] — APPROXIMATE DEPTH TO BEDROCK

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 — APPROXIMATE DEPTH TO BEDROCK (FEET)

REFERENCE

THIS PLAN IS BASED UPON AN AUGUST 24, 2018 ALTA LAND SURVEY PREPARED BY CONTROL POINT ASSOCIATES, INC.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PROJECT #	GM1816022.001
DESIGNED BY: JL	PROJ. MGR.: RR
DATE: 01/07/19	SHEET: 2
SCALE: 1" = 40'	

DRAWING TITLE: BEDROCK DEPTH PLAN

CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC

PROJECT: PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

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Table 1
Estimated Bedrock Depths

ESTIMATED BEDROCK DEPTHS															
Probe No.	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**	**Probe No.**	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**	**Probe No.**	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**	**Probe No.**	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**
P-1	-	-	-	**P-26**	7	623.5	616.5	**P-51**	6	636	630	**P-76**	5	643	638
P-2	12	611.5	599.5	**P-27**	11	632.5	621.5	**P-52**	6	643	637	**P-77**	8	647	639
P-3	14	616	602	**P-28**	12	633.5	621.5	**P-53**	7	648.5	641.5	**P-78**	8	648	640
P-4	14	618	604	**P-29**	3	637	634	**P-54**	12	654.5	642.5	**P-79**	11	648.5	637.5
P-5	11	621	610	**P-30**	8	639	631	**P-55**	9	653	644	**P-80**	8	641.5	633.5
P-6	13	615.5	602.5	**P-31**	12	622	610	**P-56**	5	653	648	**P-81**	10	645.5	635.5
P-7	12	620	608	**P-32**	13	628	615	**P-57**	12	651	639	**P-82**	7	649	642
P-8	14	621.5	607.5	**P-33**	12	634	622	**P-58**	8	633	625	**P-83**	13	649.5	636.5
P-9	14	620.5	606.5	**P-34**	4	637	633	**P-59**	8	641	633	**P-84**	13	637	624
P-10	12	613	601	**P-35**	6	641	635	**P-60**	6	649	643	**P-85**	14	631.5	617.5
P-11	12	622.5	610.5	**P-36**	10	645.5	635.5	**P-61**	3	657.5	654.5	**OC1**	0	6401	641
P-12	15	627	612	**P-37**	10	625	615	**P-62**	12	658.5	646.5	**OC2**	0	640.5	640.5
P-13	18	627	609	**P-38**	4	634	630	**P-63**	11	654.5	643.5	**OC3**	0	652	652
P-14	12	627.5	615.5	**P-39**	6	640.5	634.5	**P-64**	6	635	629	**OC4**	0	646.5	646.5
P-15	7	615	608	**P-40**	10	642.5	632.5	**P-65**	6	643	637	**OC5**	0	653.5	653.5
P-16	12	625.5	613.5	**P-41**	7	644.5	637.5	**P-66**	11	651	640				
P-17	12	628.5	616.5	**P-42**	10	646.5	636.5	**P-67**	15	656	641				
P-18	11	629	618	**P-43**	13	649	636	**P-68**	4	658.5	654.5				
P-19	6	631	625	**P-44**	6	630.5	624.5	**P-69**	14	656.5	642.5				
P-20	5	620	615	**P-45**	5	638	633	**P-70**	8	636	628				
P-21	14	630.5	616.5	**P-46**	5	646.5	641.5	**P-71**	6	642.5	636.5				
P-22	10	630	620	**P-47**	9	648	639	**P-72**	1	649	648				
P-23	10	632.5	622.5	**P-48**	7	648	641	**P-73**	1	654	653				
P-24	10	634.5	624.5	**P-49**	2	650.5	648.5	**P-74**	10	654	644				
P-25	8	616	608	**P-50**	12	651	639	**P-75**	7	639.5	632.5				

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

November 21, 2019

via email

BOHLER ENGINEERING MA, LLC
16 Old Forge Road
Suite A
Rocky Hill, Connecticut 06067

Attention: Geoffrey Fitzgerald, P.E.
Branch Manager

Regarding: PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
PARCEL NOs: 9.23.1, 9.23.7 & 9.23.8
WHITESTONE PROJECT NO.: PRO20194G.M19

Dear Mr. Fitzgerald:

Whitestone Associates, Inc. (Whitestone) is pleased to submit this summary letter regarding a preliminary stormwater management (SWM) area evaluation in support of the proposed student housing development referenced above. This letter is based on information provided in a November 12, 2019 *Grading Plan* provided by Bohler Engineering MA, LLC (Bohler).

SITE DESCRIPTION

The project site is an approximately 19.2-acre, irregularly-shaped parcel located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut. The site is developed with several residential buildings along Storrs Road. The remaining portions of the site are forested or covered by wetlands. Approximately 15.9 acres of the site can be developed. The remaining portion of the site is not suitable for development due to wetland impacts. Based on a review of available topographic maps, the site slopes to the northeast from the approximate elevation of 660 feet to approximately 620 feet as compared to the National American Vertical Datum of 1988 (NAVD). Four SWM areas are proposed along the eastern site property line.

FIELD INVESTIGATION & TESTING

On November 14, 2019 Whitestone monitored the excavation of twelve test pits. Test pit locations were determined in the field by a Bohler representative and are shown on the attached plan, a November 22, 2019, *Test Pit Exhibit* prepared by Bohler. Site subsurface conditions at the exploration locations generally consisted of forest mat or topsoil underlain by glacial till. The glacial till consisted of a mixture of silty sand, gravel, cobbles and boulders. *Records of Subsurface Exploration* are attached.

In order to evaluate in-situ infiltration rates a total of nine samples were collected and subjected to falling head infiltration testing in general conformance with Connecticut Department of Energy & Environmental Protection procedures. The results of the laboratory testing are summarized in the following table:

Falling Head Saturated Hydraulic Conductivity Test, K_{SAT} (in/hr)								
TP-1	**TP-2**	**TP-3**	**TP-7**	**TP-8**	**TP-9**	**TP-10**	**TP-11**	**TP-12**
0.02	8.76	1.47	0.06	0.08	9.46	0.10	2.74	0.25

A sample was not collected from test pit TP-4, however, soil conditions within TP-4 were consistent with those observed within TP-2. Infiltration conditions within TP-4 are expected to be similar to TP-2.

Whitestone appreciates the opportunity to be of continued service to Bohler Engineering MA, LLC. Please contact us with any questions regarding this proposal.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Jason R. Landry
Project Manager

Ryan R. Roy, P.E.
Principal, New England Region

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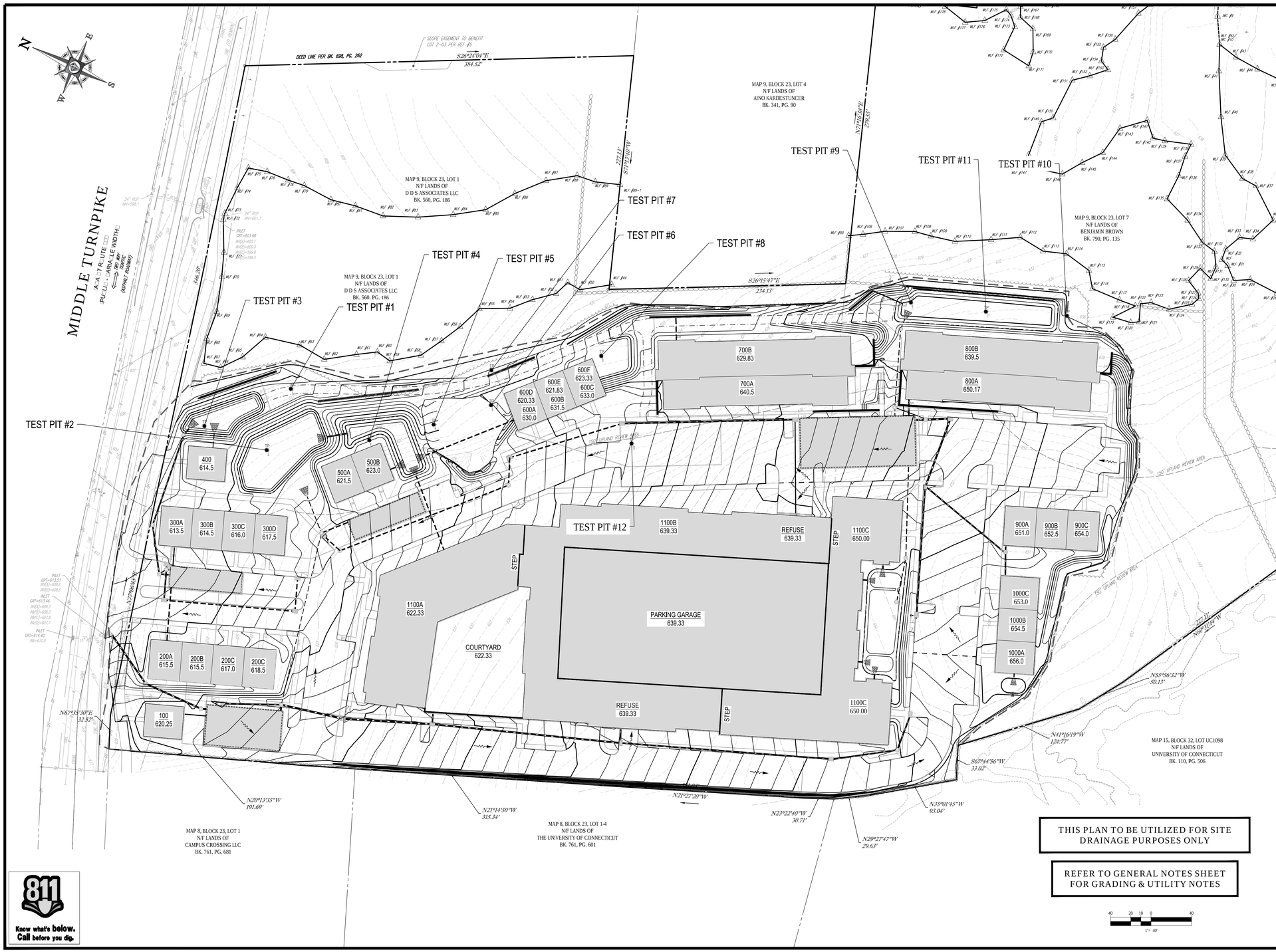
Enclosures



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REVISIONS

RE	DATE	COMMENT	BY
1		DRAINAGE FLOWS	MAA
2		2nd PARTY REVIEW COMMENTS	MAA
3		3rd PARTY REVIEW COMMENTS	MAA
4		3rd PARTY REVIEW COMMENTS	MAA

PERMIT SET

PROJECT NO. DRAWN BY MAA
CHECKED BY GPF
DATE
SCALE AS NOTED
PAD ID

PROJECT
RESIDENTIAL DEVELOPMENT
FOR
CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE
STREET ADDRESS MIDDLE TPKE
LOTS MAP
TOWN MANSFIELD
STATE CONNECTICUT

BOHLER ENGINEERING
OLD FORGE ROAD, SUITE A
NORWICH HILL
PO
FOR
www.BohlerEngineering.com

SHEET TITLE
TEST PIT EXHIBIT

SHEET NUMBER
7
OF

REVISION

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-1

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**		**Cave-In Depth (feet bgs) | Elevation (feet msl)**	
Termination Depth: 7.3 feet bgs	**Date Completed:** 11/14/2019				
Proposed Location:	**Logged By:** DC	**During:**			
Excavating Method: Test Pit Excavation	**Contractor:** JS	**At Completion:** 6.8		**At Completion:**	
Test Method: Visual Observation	**Rig Type:** Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Forest Mat	
2.3	TS-1	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 3.5 fbgs Seasonal High GWT @ 3.5 fbgs
			5.0			
					Test Pit Log TP-1 Terminated at a Depth of 7.3 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-2

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**		**Cave-In Depth (feet bgs) | Elevation (feet msl)**	
Termination Depth: 6.3 feet bgs	**Date Completed:** 11/14/2019				
Proposed Location:	**Logged By:** DC	**During:**			
Excavating Method: Test Pit Excavation	**Contractor:** JS	**At Completion:** 6.3		**At Completion:**	
Test Method: Visual Observation	**Rig Type:** Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Forest Mat	
2.5	TS-2	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @ 2.8 fbgs
			5.0			
			10.0		Test Pit Log TP-2 Terminated at a Depth of 6.3 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-3

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**		**Cave-In Depth (feet bgs) | Elevation (feet msl)**	
Termination Depth: 7.5 feet bgs	**Date Completed:** 11/14/2019				
Proposed Location:	**Logged By:** DC	**During:**			
Excavating Method: Test Pit Excavation	**Contractor:** JS	**At Completion:** 7.0		**At Completion:**	
Test Method: Visual Observation	**Rig Type:** Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	11" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
3.0	TS-3	1.25" Tube				Roots to 3 fbgs
					Orange/Rust Mottling	Seasonal High GWT @3.3 fbgs
			5.0		Gray to Light Brown, Silty Sand (SM)	
					Test Pit Log TP-3 Terminated at a Depth of 7.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-4

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	7.5 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:** 7.3	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
					Orange/Rust Mottling	Seasonal High GWT @ 3 fbgs
						Roots to 3.5 fbgs
					Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0			
					Test Pit Log TP-4 Terminated at a Depth of 7.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-5

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)** | **Elevation (feet msl)**		**Cave-In Depth (feet bgs)** | **Elevation (feet msl)**
Termination Depth:	5.0 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**			
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	4.3		**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	14" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Roots to 3.0 fbgs
					Orange/Rust Mottling	Seasonal High GWT @ 3.0 fbgs
			5.0		Test Pit Log TP-5 Terminated at a Depth of 5.0 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-6

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	3.5 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	No Seasonal High GWT Evidence
			5.0		Test Pit Log TP-6 Terminated at a Depth of 3.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-7

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**		**Cave-In Depth (feet bgs) | Elevation (feet msl)**	
Termination Depth: 6.5 feet bgs	**Date Completed:** 11/14/2019				
Proposed Location:	**Logged By:** DC	**During:**			
Excavating Method: Test Pit Excavation	**Contractor:** JS	**At Completion:** 4.3		**At Completion:**	
Test Method: Visual Observation	**Rig Type:** Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	11" Forest Mat	
2.5	TS-4	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @2.5 fbgs Roots to 2.5 fbgs
			5.0			
			10.0		Test Pit Log TP-7 Terminated at a Depth of 6.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-8

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	6.5 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:** 3.8	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Forest Mat	
2.3	TS-5	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 2.8 fbgs Seasonal High GWT @3.0 fbgs
			5.0			
			10.0		Test Pit Log TP-8 Terminated at a Depth of 6.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-9

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**		**Cave-In Depth (feet bgs) | Elevation (feet msl)**	
Termination Depth: 6.5 feet bgs	**Date Completed:** 11/14/2019				
Proposed Location:	**Logged By:** DC	**During:**	6.3 |		
Excavating Method: Test Pit Excavation	**Contractor:** JS	**At Completion:**	|	**At Completion:**	|
Test Method: Visual Observation	**Rig Type:** Kobelco SK55	**24 Hours:**	|		

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Forest Mat	
3.0	TS-6	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Roots to 4.0 fbgs
			5.0		Orange/Rust Mottling	Seasonal High GWT @ 4.25 fbgs
			10.0		Test Pit Log TP-9 Terminated at a Depth of 6.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-10

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)** | **Elevation (feet msl)**		**Cave-In Depth (feet bgs)** | **Elevation (feet msl)**
Termination Depth:	5.5 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**	6.3 |		
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	|	**At Completion:**	|
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	|		

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	15" Topsoil	
2.5	S-1	Grab		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Roots to 3.0 fbgs
					Gray Silty Sand with Gravel (4.3 fbgs to 4.5 fbgs)	Seasonal High GWT @ 3.3 fbgs
					Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0			Wet at Bottom of TP
					Test Pit Log TP-10 Terminated at a Depth of 5.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-11

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019		**Water Depth (feet bgs) | Elevation (feet msl)**		**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth: 5.5 feet bgs	**Date Completed:** 11/14/2019		**During:** 6.3 |		
Proposed Location:	**Logged By:** DC		**At Completion:** |		**At Completion:** |
Excavating Method: Test Pit Excavation	**Contractor:** JS		**24 Hours:** |		
Test Method: Visual Observation	**Rig Type:** Kobelco SK55				

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0				
				TS		15" Topsoil	
				GLACIAL TILL		Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
4.0	S-2	Grab				Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0				Seasonal High GWT @ 5.0 fbgs Wet at Bottom of TP
						Test Pit Log TP-11 Terminated at a Depth of 5.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-12

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation: ± NS feet above msl	**Date Started:** 11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth: 6.8 feet bgs	**Date Completed:** 11/14/2019		
Proposed Location:	**Logged By:** DC	**During:**	
Excavating Method: Test Pit Excavation	**Contractor:** JS	**At Completion:**	**At Completion:**
Test Method: Visual Observation	**Rig Type:** Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
4.5	S-3	Grab	5.0		Gray to Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @ 5.0 fbgs
			10.0		Test Pit Log TP-12 Terminated at a Depth of 6.8 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

December 24, 2019

via email

BOHLER ENGINEERING MA, LLC
16 Old Forge Road
Suite A
Rocky Hill, Connecticut 06067

Attention: Geoffrey Fitzgerald, P.E.
Branch Manager

Regarding: SUPPLEMENTAL STORMWATER MANAGEMENT AREA EVALUATION
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
PARCEL NOs: 9.23.1, 9.23.7 & 9.23.8
WHITESTONE PROJECT NO.: GM1916845.000

Dear Mr. Fitzgerald:

Whitestone Associates, Inc. (Whitestone) is pleased to submit this summary letter regarding the supplemental stormwater management (SWM) area evaluation in support of the proposed student housing development referenced above. This letter is based on information provided in the November 22, 2019, *Test Pit Exhibit* provided by Bohler Engineering MA, LLC (Bohler). Whitestone previously performed a preliminary SWM evaluation at this site on November 14, 2019.

SITE DESCRIPTION

The project site is an approximately 19.2-acre, irregularly shaped parcel located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut. The site is developed with several residential buildings along Storrs Road. The remaining portions of the site are forested or covered by wetlands. Approximately 15.9 acres of the site can be developed. The remaining portion of the site is not suitable for development due to wetland impacts. Based on a review of available topographic maps, the site slopes to the northeast from the approximate elevation of 660 feet to approximately 620 feet as compared to the National American Vertical Datum of 1988 (NAVD).

FIELD INVESTIGATION & TESTING

On December 5, 2019 and December 10, 2019, Whitestone monitored the excavation of 10 test pits. Test pit locations were determined in the field by a Bohler representative and are shown on the attached *Test Pit Exhibit* provided by Bohler. Site subsurface conditions at the exploration locations generally consisted of

forest mat or topsoil underlain by glacial till. The glacial till consisted of a mixture of silty sand, gravel, cobbles and boulders. *Records of Subsurface Exploration* are attached.

In order to evaluate *in-situ* infiltration rates, a total of 10 samples were collected and subjected to falling head infiltration testing in general conformance with Connecticut Department of Energy & Environmental Protection procedures. The results of the laboratory testing are summarized in the following table:

Falling Head Saturated Hydraulic Conductivity Test, K_{SAT} (inches/hour)									
TP-13	**TP-14**	**TP-15**	**TP-16**	**TP-17**	**TP-18**	**TP-19**	**TP-20**	**TP-21**	**TP-22**
8.63	16.81	0.93	4.02	*	0.76	5.75	18.41	7.08	1.16

* infiltration undetectable - considered impermeable

Whitestone appreciates the opportunity to be of continued service to Bohler Engineering MA, LLC. Please contact us with any questions regarding this report.

Sincerely,

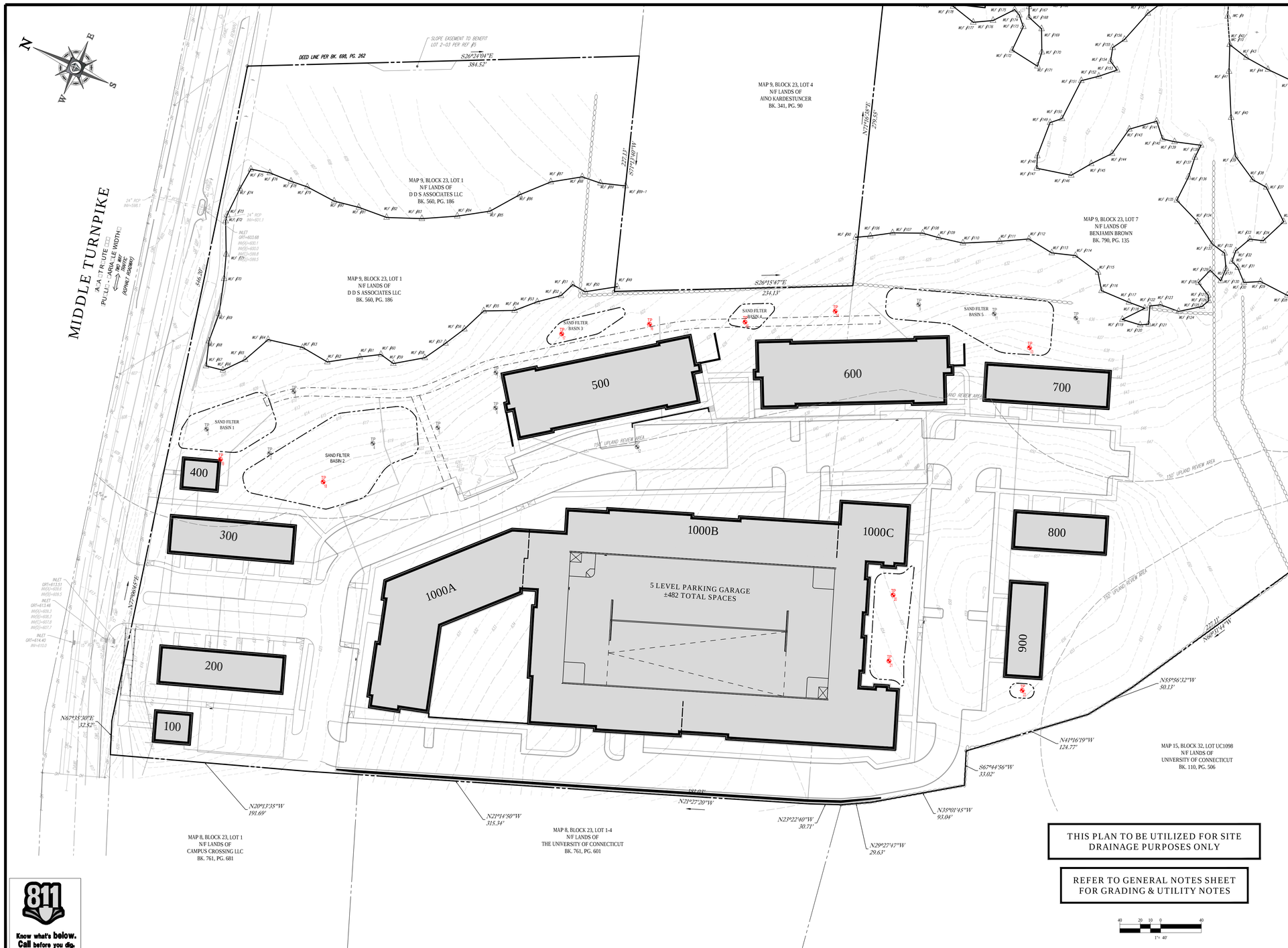
WHITESTONE ASSOCIATES, INC.

Jason R. Landry
Project Manager

Ryan R. Roy, P.E.
Principal, New England Region

JRL/hz N:\Job Folders\2019\1916845GM\Reports and Submittals\Mansfield CT-SWMA(GM1916845.000).docx
Enclosures

FIGURE 1
Test Location Plan



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- RALEIGH, NC
- WASHINGTON, DC
- ALTOONA, PA
- HAZLETON, PA
- NORRISTOWN, PA
- SARASOTA, FL
- ORLANDO, FL
- TAMPA, FL
- DALLAS, TX

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REVISIONS

REV.	DATE	COMMENT	BY
		DRAINAGE FLOWS	MAA
		3rd PARTY REVIEW COMMENTS	MAA
		3rd PARTY REVIEW COMMENTS	MAA
		3rd PARTY REVIEW COMMENTS	MAA

PERMIT SET

PROJECT NO. [illegible]
DRAWN BY: MAA
CHECKED BY: GPF
DATE: [illegible]
SCALE: AS NOTED
CAD ID: [illegible]

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

[illegible] STORRS RD & MIDDLE TPKE
LOTS [illegible] BLOCK [illegible] MAP [illegible]
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER ENGINEERING

[illegible] OLD FORGE ROAD, SUITE A
ROCKY HILL, CT [illegible]
P: [illegible] [illegible]
F: [illegible] [illegible]
www.BohlerEngineering.com

G.P. FITZGERALD

PROFESSIONAL ENGINEER

SHEET TITLE:

TEST PIT EXHIBIT

SHEET NUMBER:

TP

APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-13

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	4.0 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet msl)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
					Brown, Silty Sand, Cobbles, Boulders (SM)	
3.5	TS-2	1.25" Tube			Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
					Test Pit Log TP-13 Terminated at a Depth of 4.0 Feet Below Ground Surface.	
			5.0			
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-14

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019	**Water Depth (feet bgs) | Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs) | Elevation (feet NAVD88)**
Termination Depth:	6.5 feet bgs	**Date Completed:**	12/5/2019		
Proposed Location:	--	**Logged By:**	JM	**During:** 6.0 | --	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:** -- | --	**At Completion:** -- | --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:** -- | --	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
					Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
4.5	TS-3	1.25" Tube				
			5.0			
					Brown, Silty Sand with Gravel (SM)	
					Test Pit Log TP-14 Terminated at a Depth of 6.5 Feet Below Ground Surface.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-15

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/10/2019		**Water Depth (feet bgs)** | **Elevation (feet NAVD88)**		**Cave-In Depth (feet bgs)** | **Elevation (feet NAVD88)**
Termination Depth:	4.0 feet bgs	**Date Completed:**	12/10/2019				
Proposed Location:	Sand Filter	**Logged By:**	JM	**During:**	4.0 | --		
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	-- | --	**At Completion:**	-- | --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	-- | --		

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.0	TS-4	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Increase in Silt Content
			5.0		Test Pit Log TP-15 Terminated at a Depth of 4.0 Feet Below Ground Surface	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-16

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	6.5 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	--	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	3.0	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
2.5	TS-5	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel (SM) Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0			
			10.0		Test Pit Log TP-16 Terminated at a Depth of 6.5 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-17

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	7.5 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	7.0	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.5	TS-6	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	Increase in Silt Content
			10.0		Test Pit Log TP-17 Terminated at a Depth of 7.5 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-18

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	7.5 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	8" Topsoil	
2.5	TS-7	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand (SM) Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Increase in Silt Content
			10.0 15.0		Test Pit Log TP-18 Terminated at a Depth of 7.5 Feet Below Ground Surface.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-19

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	7.0 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Building	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	5.0	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	8" Topsoil	
3.0	TS-8	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
					Grey, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0		Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Increase in Silt Content
					Test Pit Log TP-19 Terminated at a Depth of 7.0 Feet Below Ground Surface.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-20

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	6.0 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.25	TS-9	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
			10.0 15.0		Test Pit Log TP-20 Terminated at a Depth of 6.0 Feet Below Ground Surface.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-21

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	6.5 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.5	TS-10	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
			10.0		Test Pit Log TP-21 Terminated at a Depth of 6.5 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-22

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	6.0 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
2.25	TS-11	1.25" Tube	2.5	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
			5.0			
			10.0		Test Pit Log TP-22 Terminated at a Depth of 6.0 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

APPENDIX B
Supplemental Information
(USCS, Terms and Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
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whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

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Other Office Locations:

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WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
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whitestoneassoc.com

GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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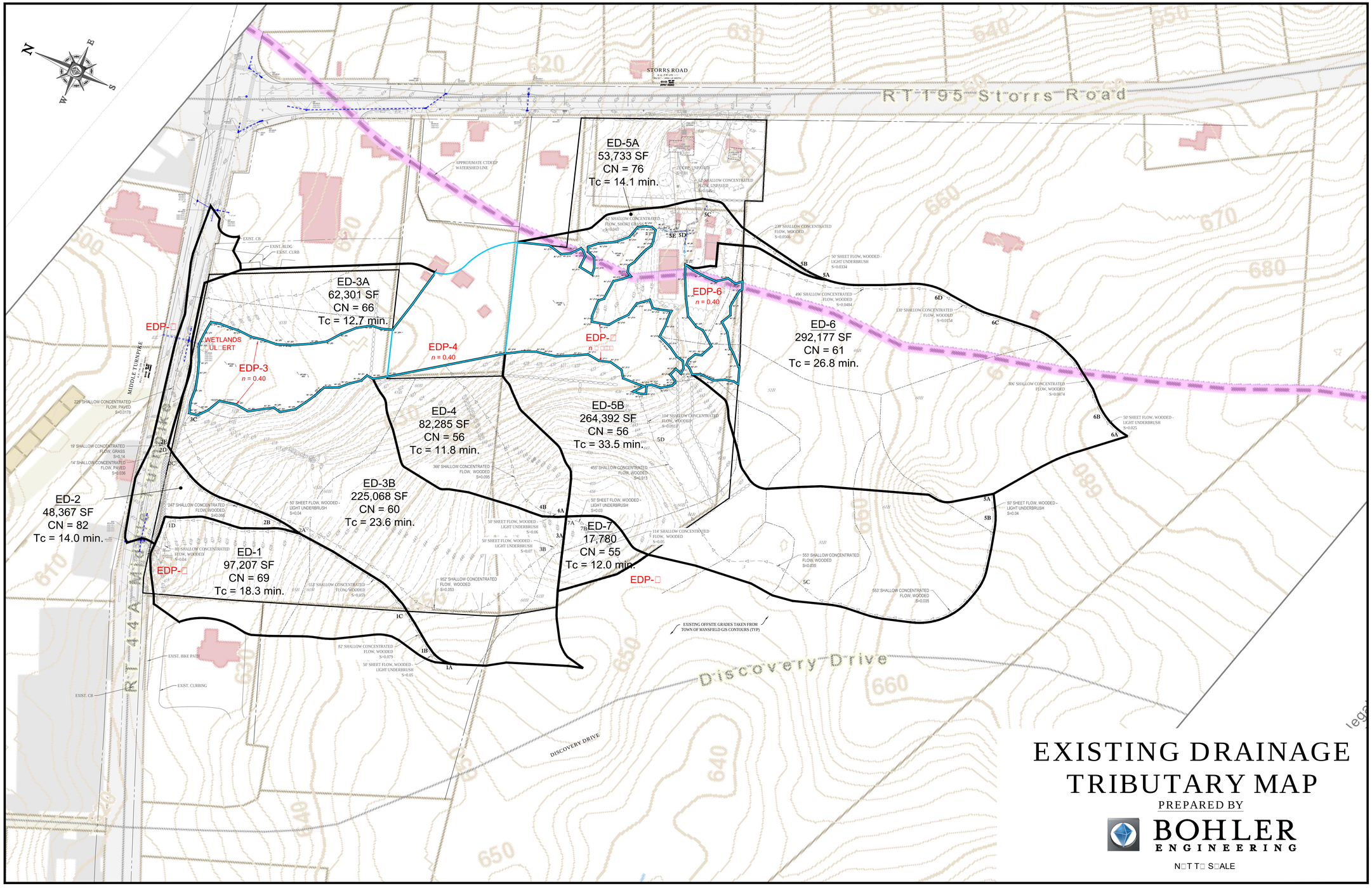
APPENDIX C: EXISTING CONDITIONS HYDROLOGIC ANALYSIS

- *EXISTING CONDITIONS DRAINAGE MAP*
- *EXISTING CONDITIONS HYDROCAD COMPUTATIONS*

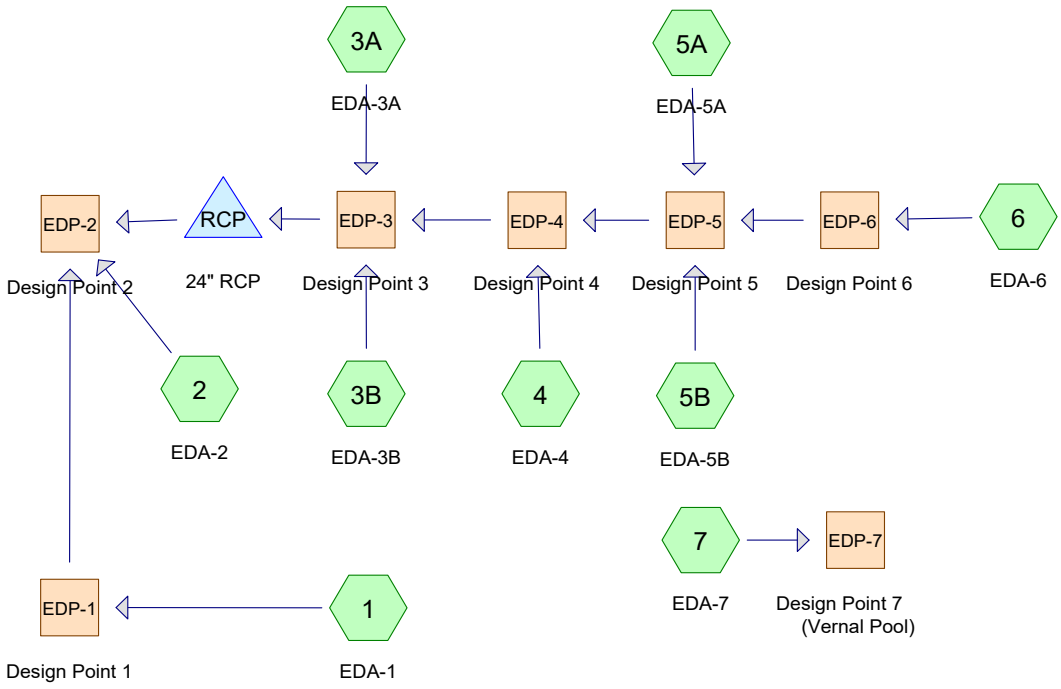


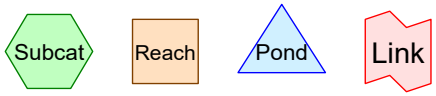
EXISTING DRAINAGE TRIBUTARY MAP

PREPARED BY

BOHLER ENGINEERING

NOT TO SCALE





Routing Diagram for Existing Conditions
Prepared by Bohler Engineering, Printed 12/29/2019
HydroCAD® 10.00-21 s/n 08311 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.439	79	50-75% Grass cover, Fair, HSG C (5A)
0.055	98	Paved parking, HSG B (3A)
0.463	98	Paved parking, HSG C (2)
0.111	98	Unconnected roofs, HSG C (5A)
16.762	55	Woods, Good, HSG B (1, 2, 3A, 3B, 4, 5B, 6, 7)
8.099	70	Woods, Good, HSG C (1, 2, 3A, 3B, 4, 5A, 6)
0.318	77	Woods, Good, HSG D (5B)
26.247	**61**	**TOTAL AREA**

Summary for Subcatchment 1: EDA-1

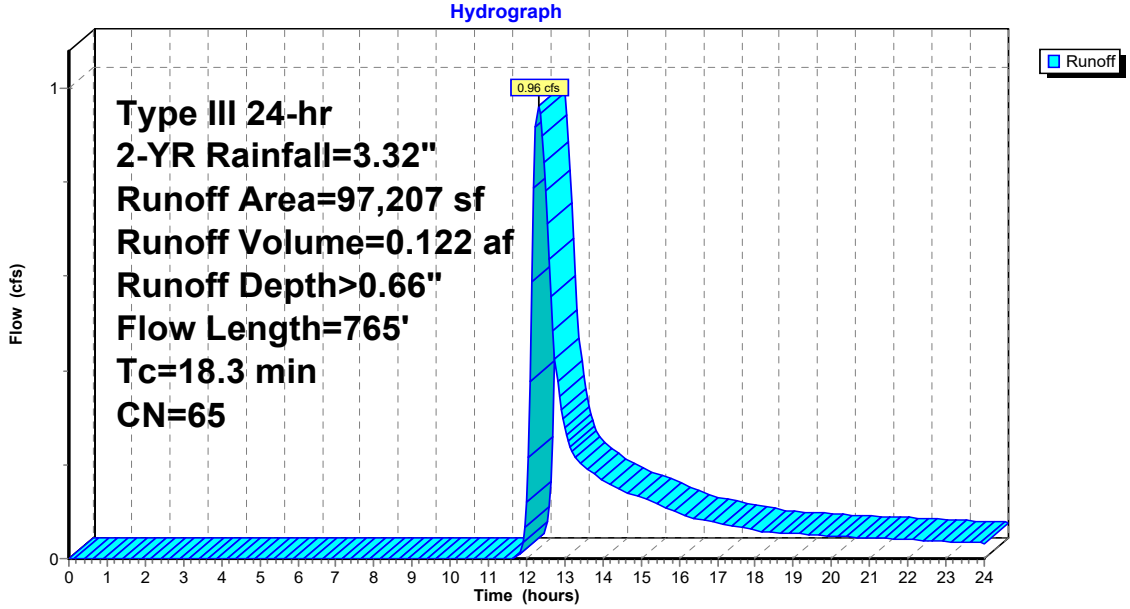
Runoff = 0.96 cfs @ 12.31 hrs, Volume= 0.122 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

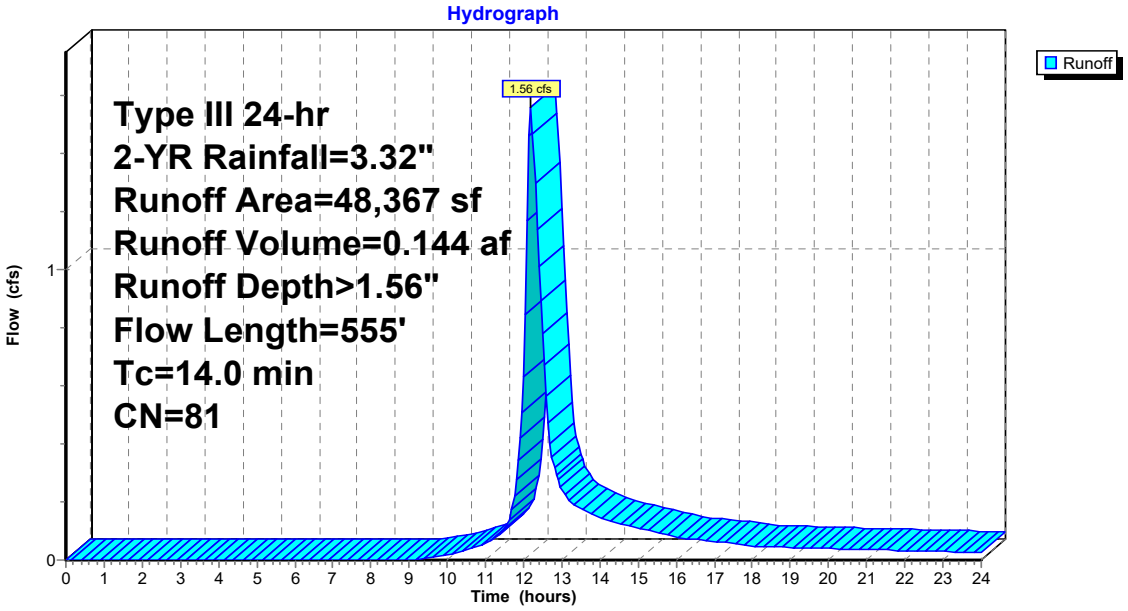
Runoff = 1.56 cfs @ 12.20 hrs, Volume= 0.144 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

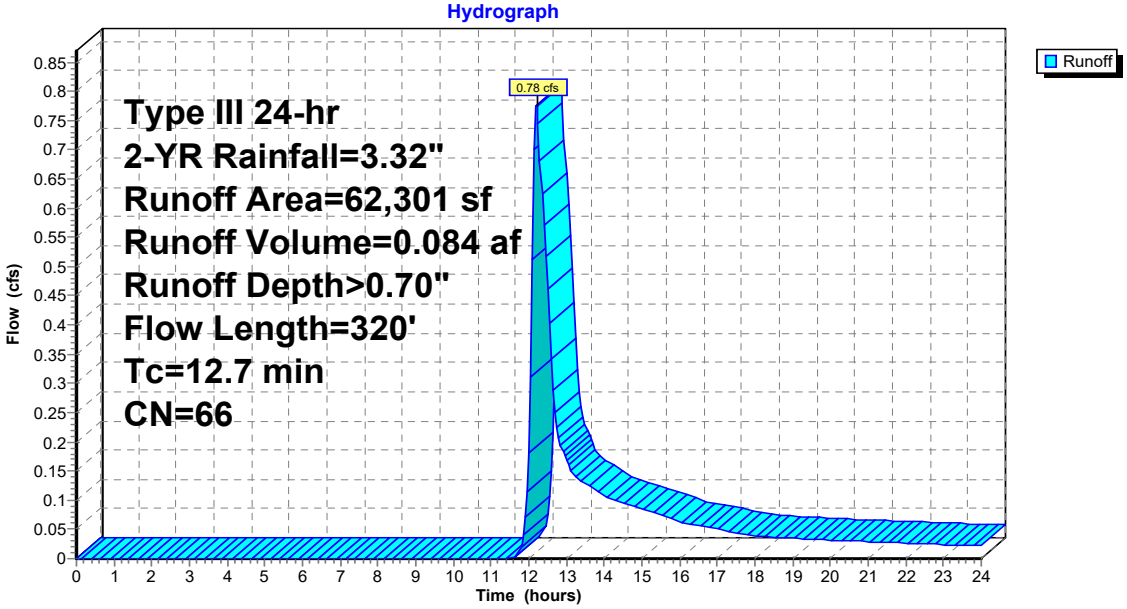
Runoff = 0.78 cfs @ 12.21 hrs, Volume= 0.084 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

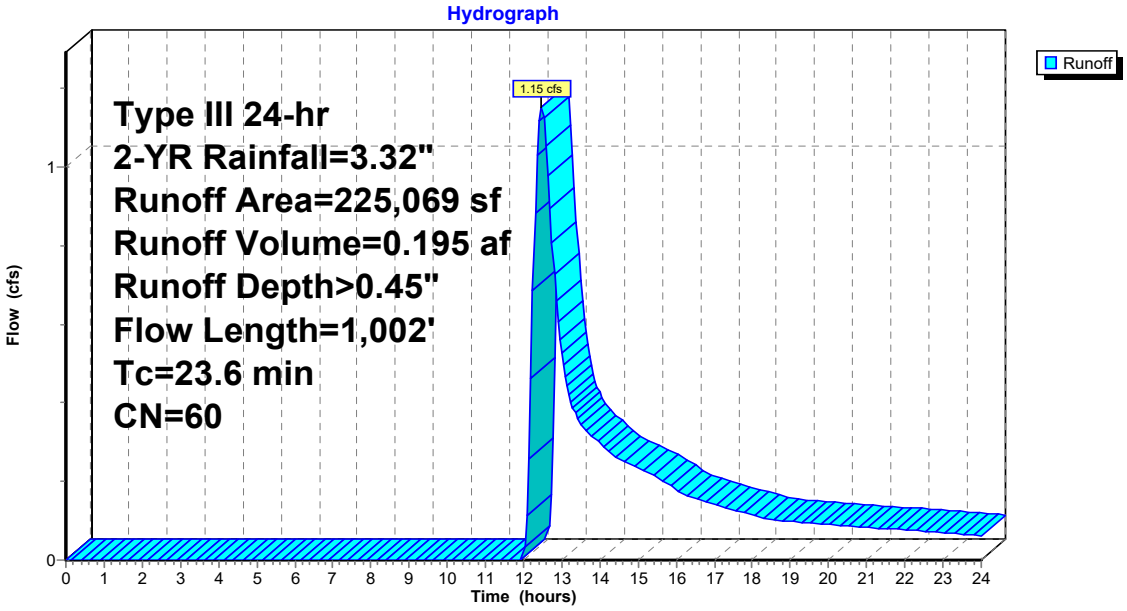
Runoff = 1.15 cfs @ 12.47 hrs, Volume= 0.195 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

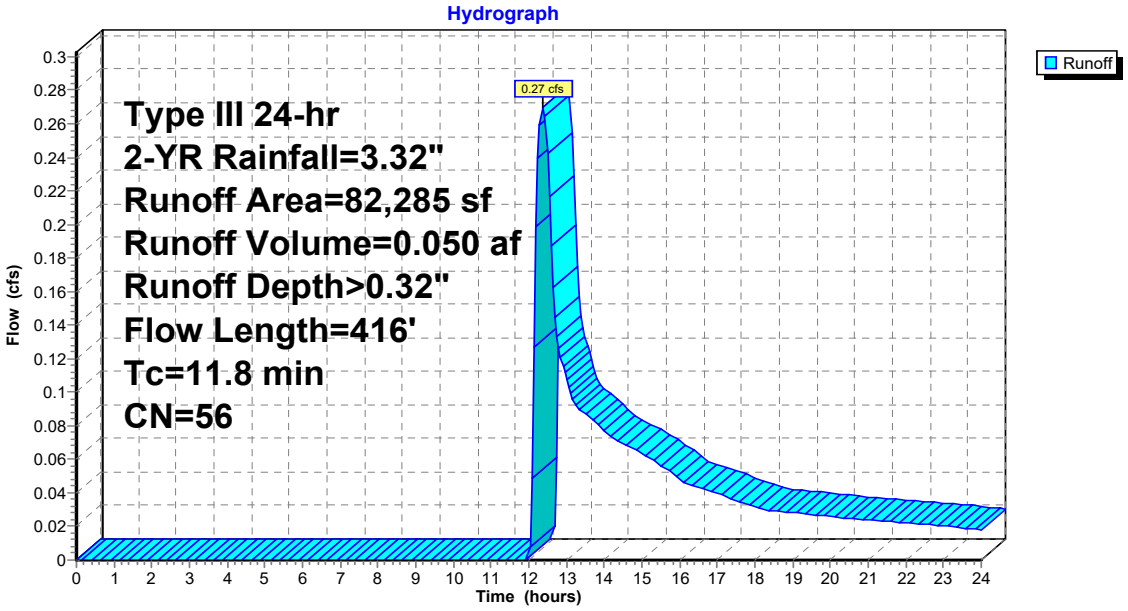
Runoff = 0.27 cfs @ 12.38 hrs, Volume= 0.050 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

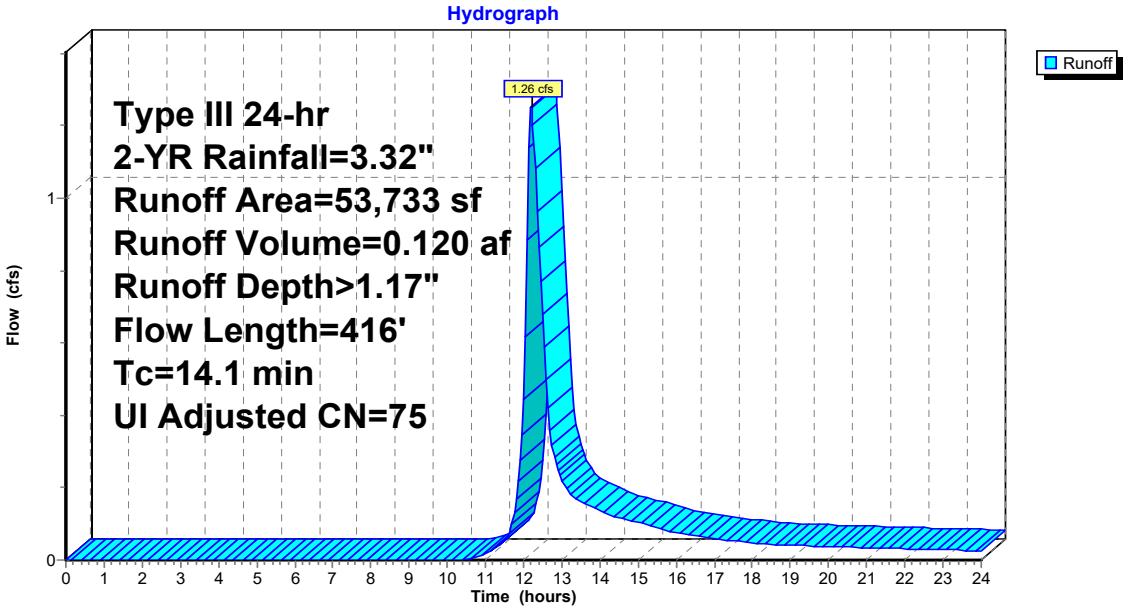
Runoff = 1.26 cfs @ 12.21 hrs, Volume= 0.120 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

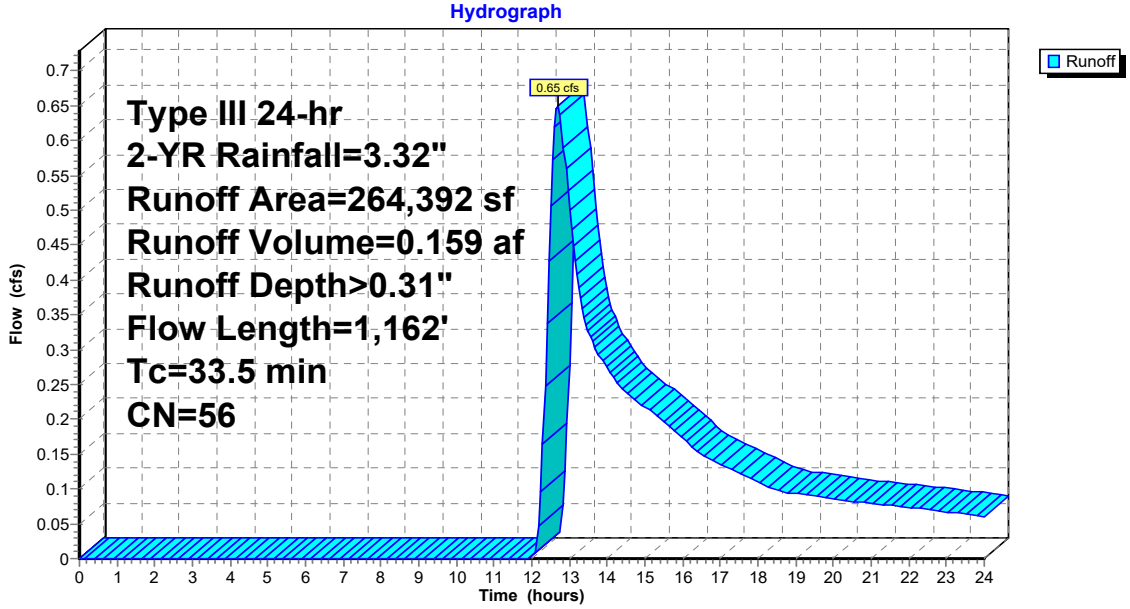
Runoff = 0.65 cfs @ 12.69 hrs, Volume= 0.159 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

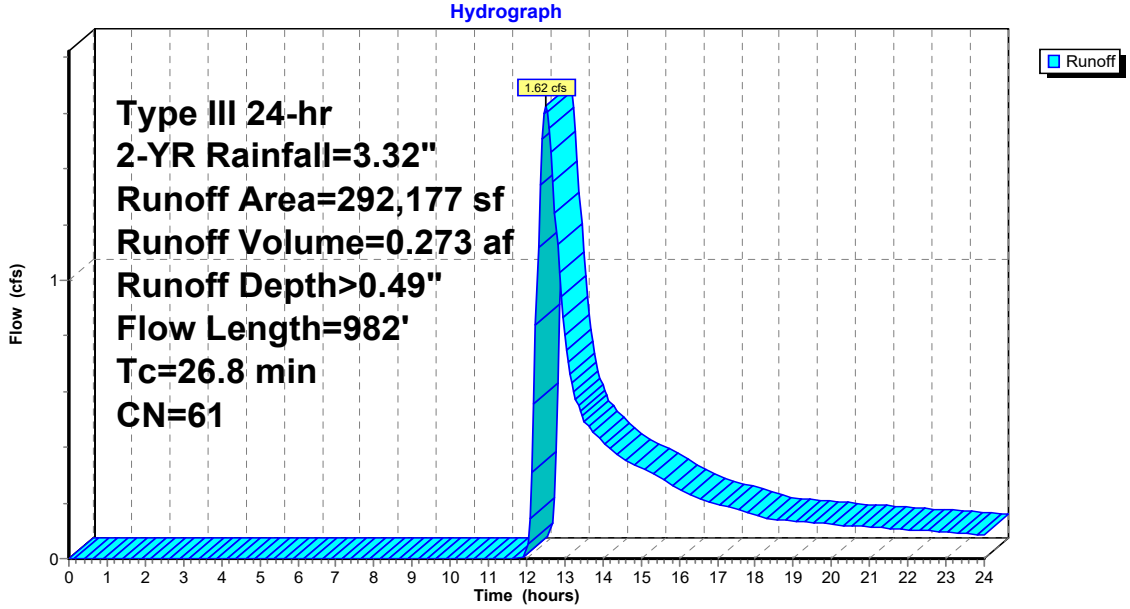
Runoff = 1.62 cfs @ 12.50 hrs, Volume= 0.273 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

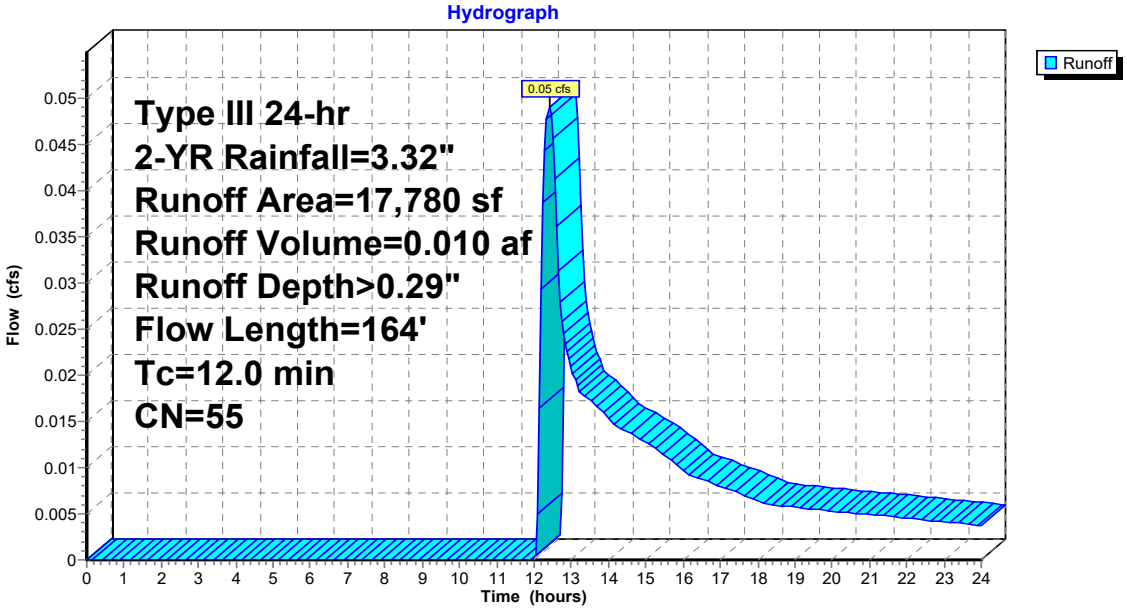
Runoff = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

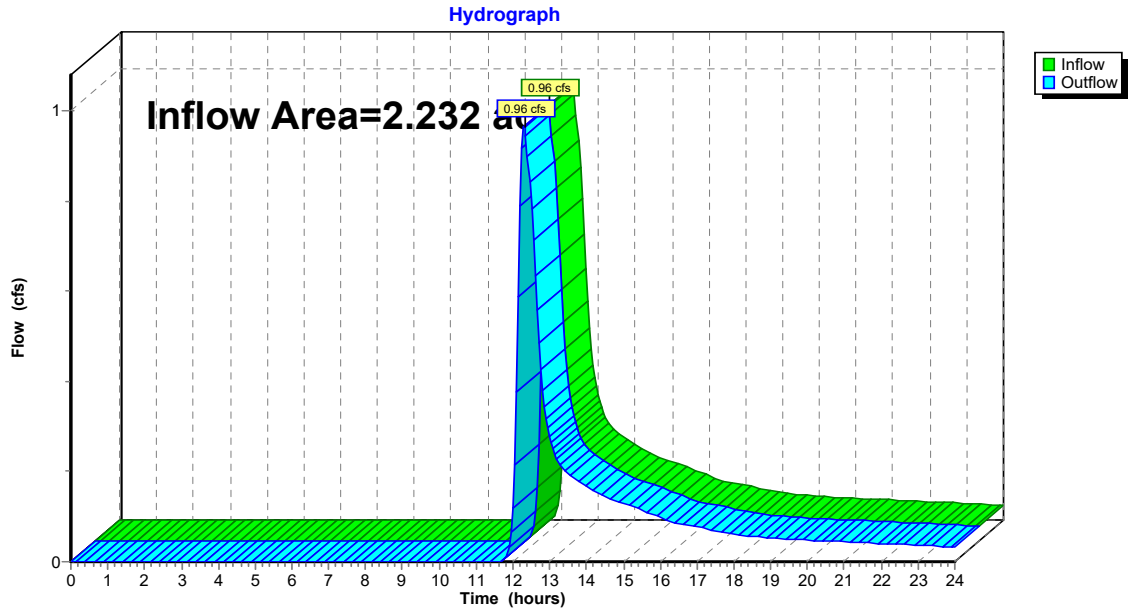


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 0.66" for 2-YR event
Inflow = 0.96 cfs @ 12.31 hrs, Volume= 0.122 af
Outflow = 0.96 cfs @ 12.31 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

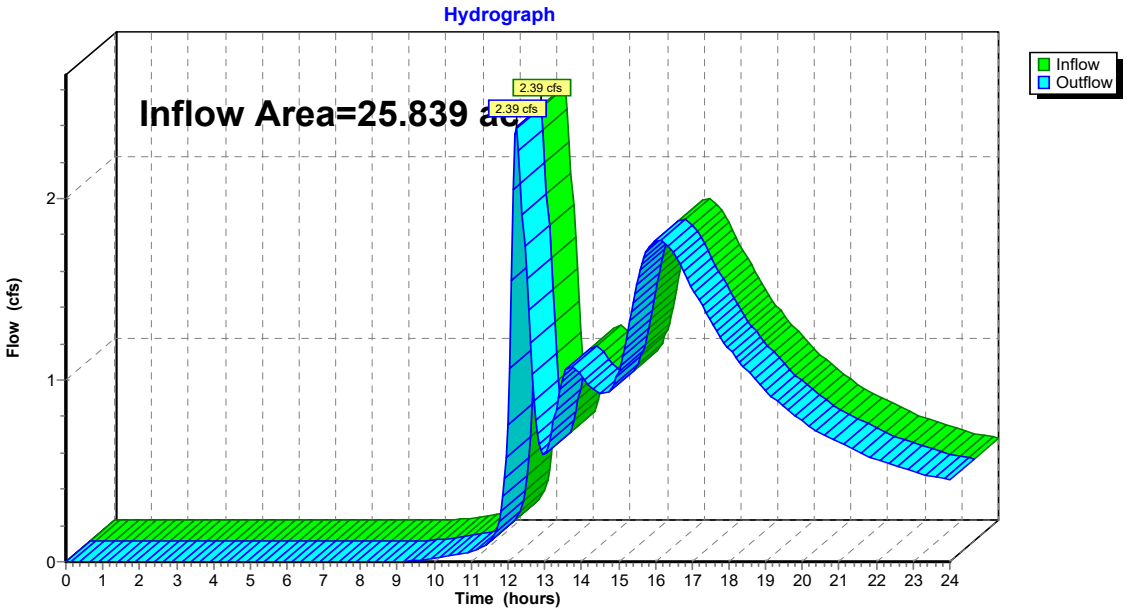


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 2.39 cfs @ 12.24 hrs, Volume= 1.007 af
Outflow = 2.39 cfs @ 12.24 hrs, Volume= 1.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

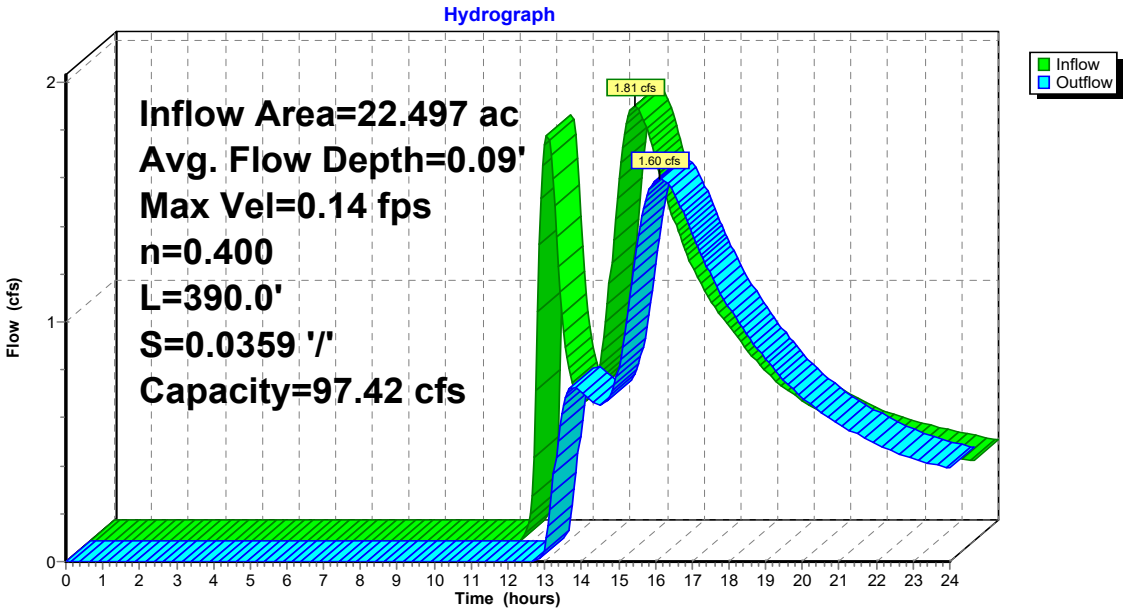
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 0.43" for 2-YR event
Inflow = 1.81 cfs @ 14.77 hrs, Volume= 0.807 af
Outflow = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af, Atten= 12%, Lag= 80.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.14 fps, Min. Travel Time= 47.1 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 66.0 min

Peak Storage= 4,521 cf @ 15.33 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 0.43" for 2-YR event
Inflow = 1.79 cfs @ 13.74 hrs, Volume= 0.564 af
Outflow = 1.48 cfs @ 14.80 hrs, Volume= 0.529 af, Atten= 18%, Lag= 63.8 min

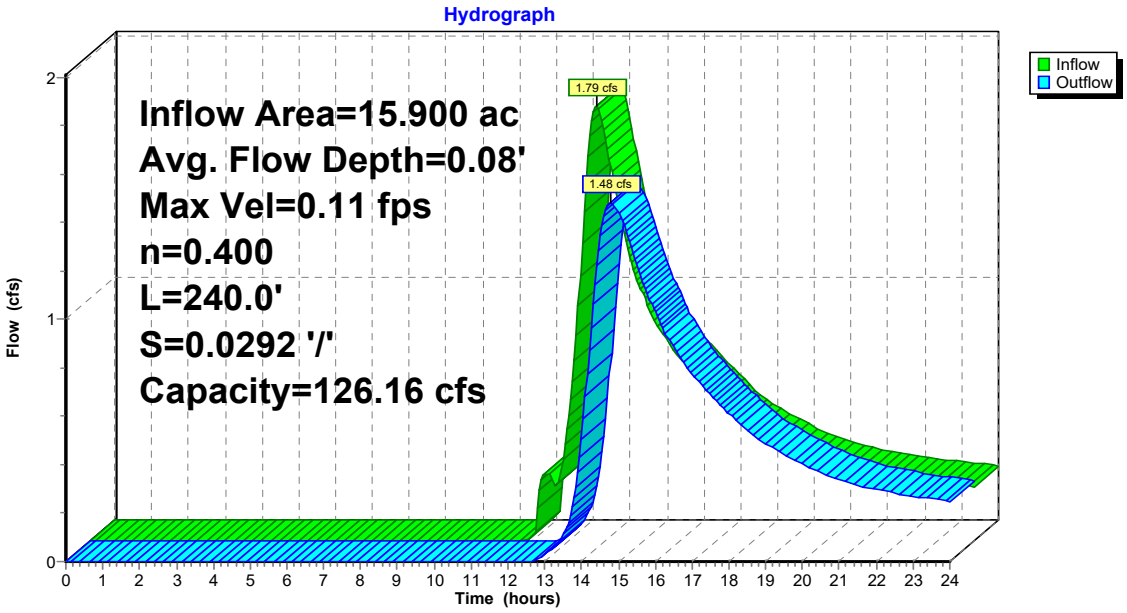
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.11 fps, Min. Travel Time= 35.5 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 57.8 min

Peak Storage= 3,154 cf @ 14.21 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

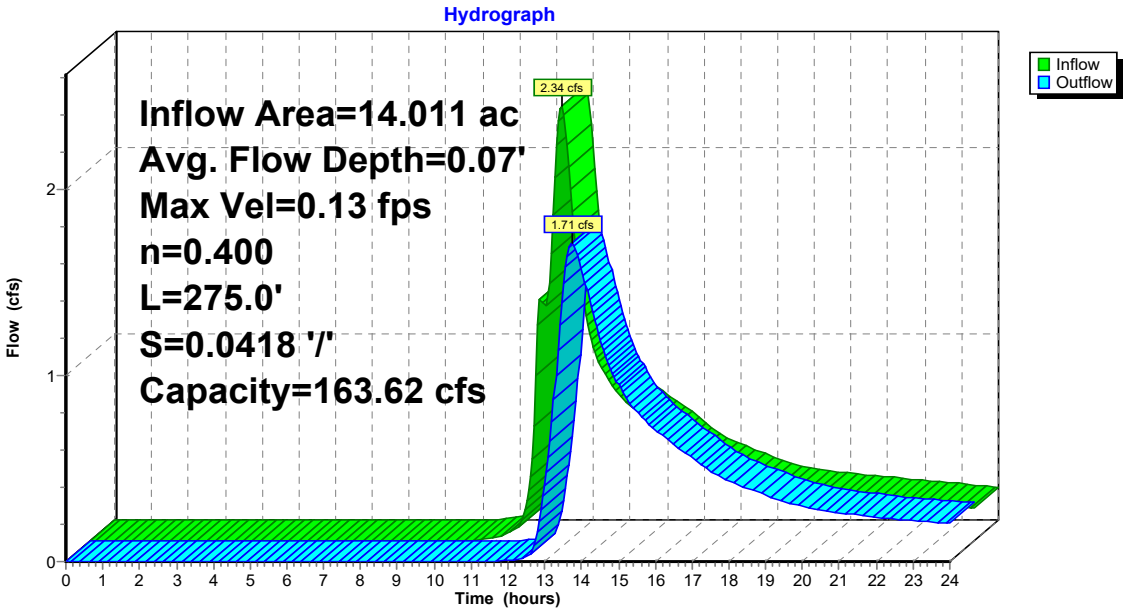
Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 2.34 cfs @ 12.79 hrs, Volume= 0.547 af
Outflow = 1.71 cfs @ 13.74 hrs, Volume= 0.514 af, Atten= 27%, Lag= 57.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.13 fps, Min. Travel Time= 36.6 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 65.7 min

Peak Storage= 3,761 cf @ 13.13 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

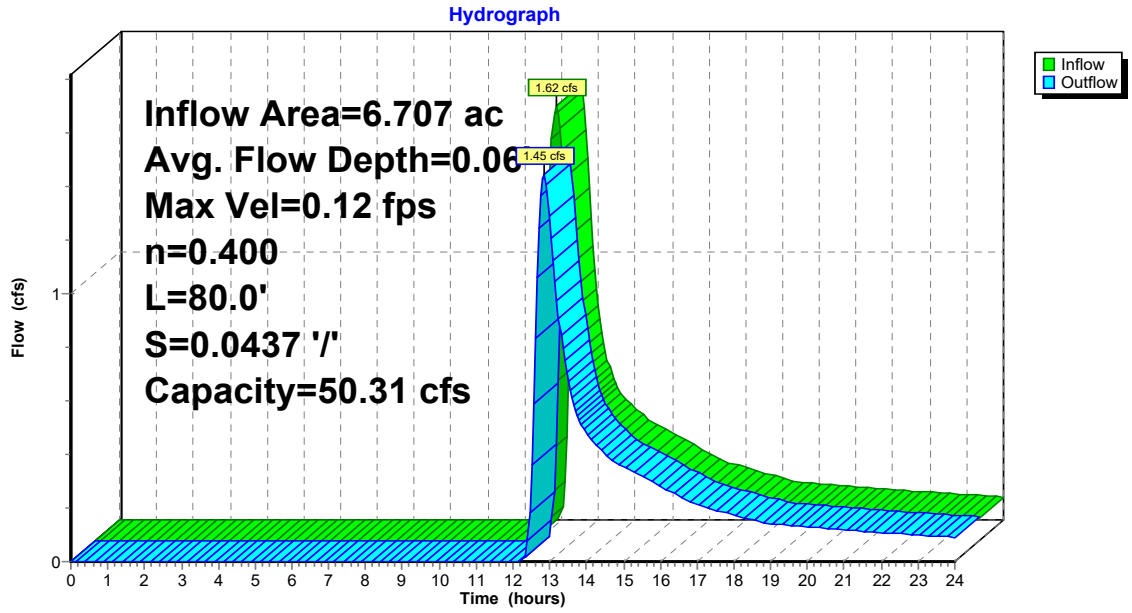
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 0.49" for 2-YR event
Inflow = 1.62 cfs @ 12.50 hrs, Volume= 0.273 af
Outflow = 1.45 cfs @ 12.84 hrs, Volume= 0.268 af, Atten= 11%, Lag= 20.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.12 fps, Min. Travel Time= 11.2 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 23.7 min

Peak Storage= 976 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

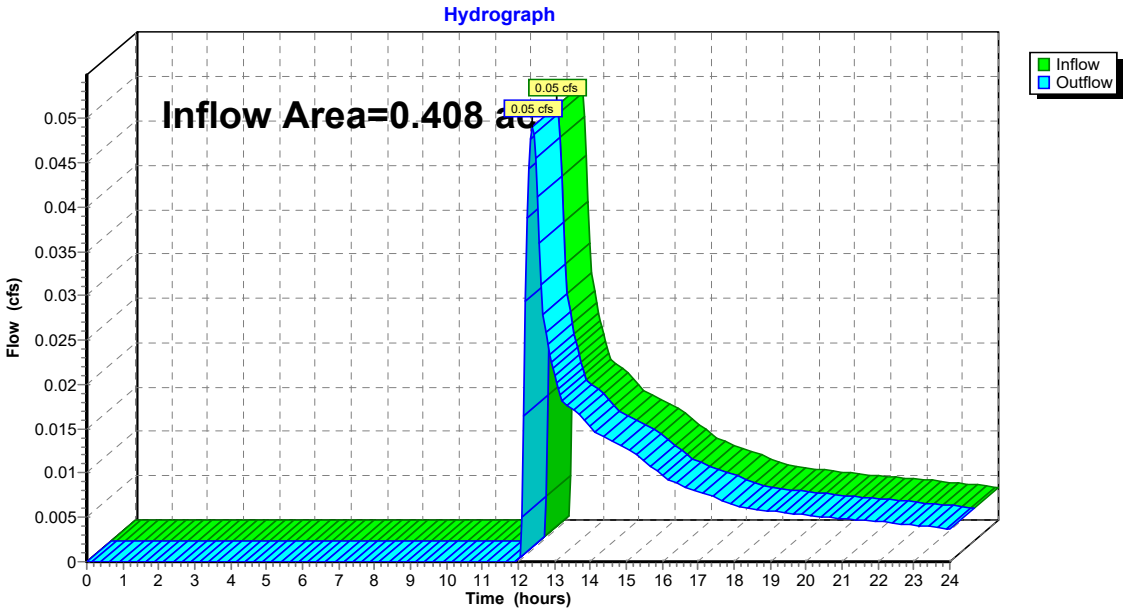


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 0.29" for 2-YR event
Inflow = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af
Outflow = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 0.40" for 2-YR event
Inflow = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af
Outflow = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min
Primary = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 601.56' @ 16.12 hrs Surf.Area= 15 sf Storage= 6 cf

Plug-Flow detention time= 0.1 min calculated for 0.739 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (1,070.3 - 1,070.2)

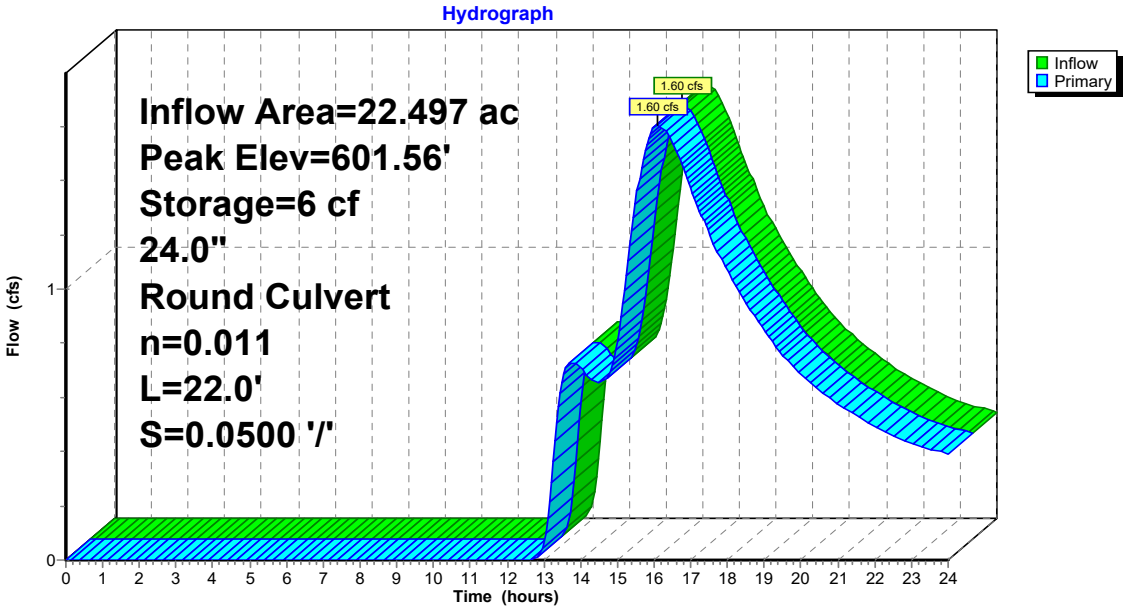
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.60 cfs @ 16.12 hrs HW=601.56' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 1.60 cfs @ 2.90 fps)

Pond RCP: 24" RCP



Summary for Subcatchment 1: EDA-1

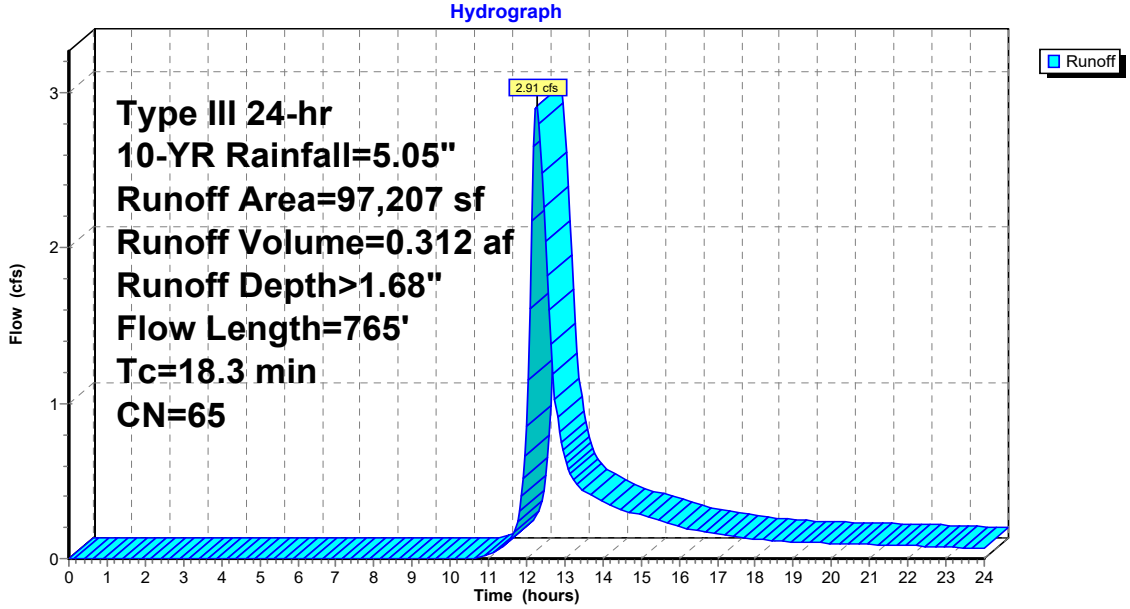
Runoff = 2.91 cfs @ 12.27 hrs, Volume= 0.312 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

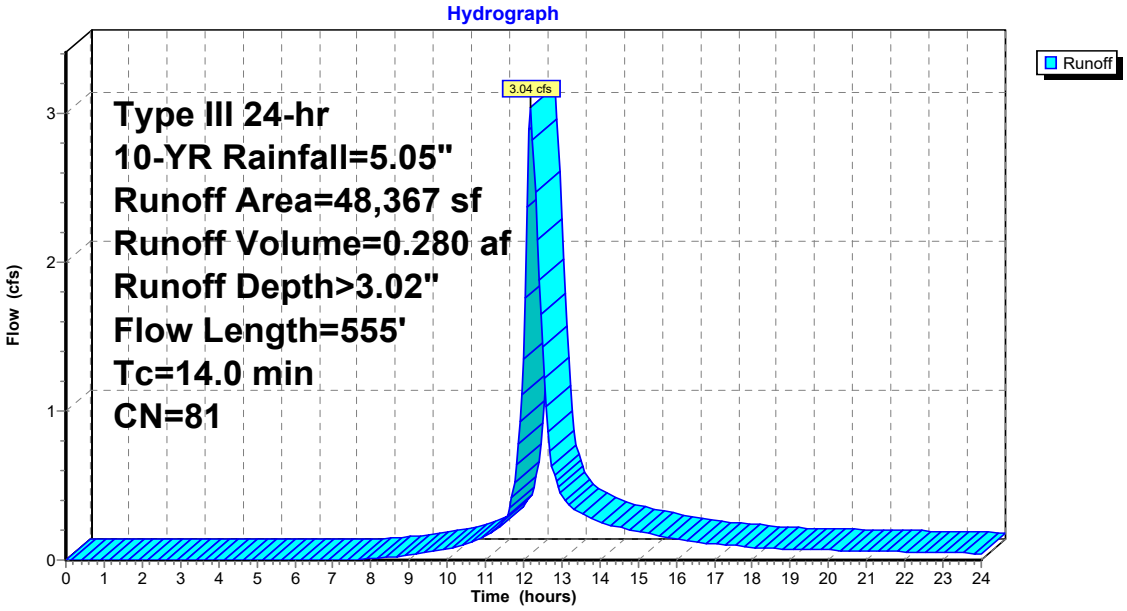
Runoff = 3.04 cfs @ 12.20 hrs, Volume= 0.280 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

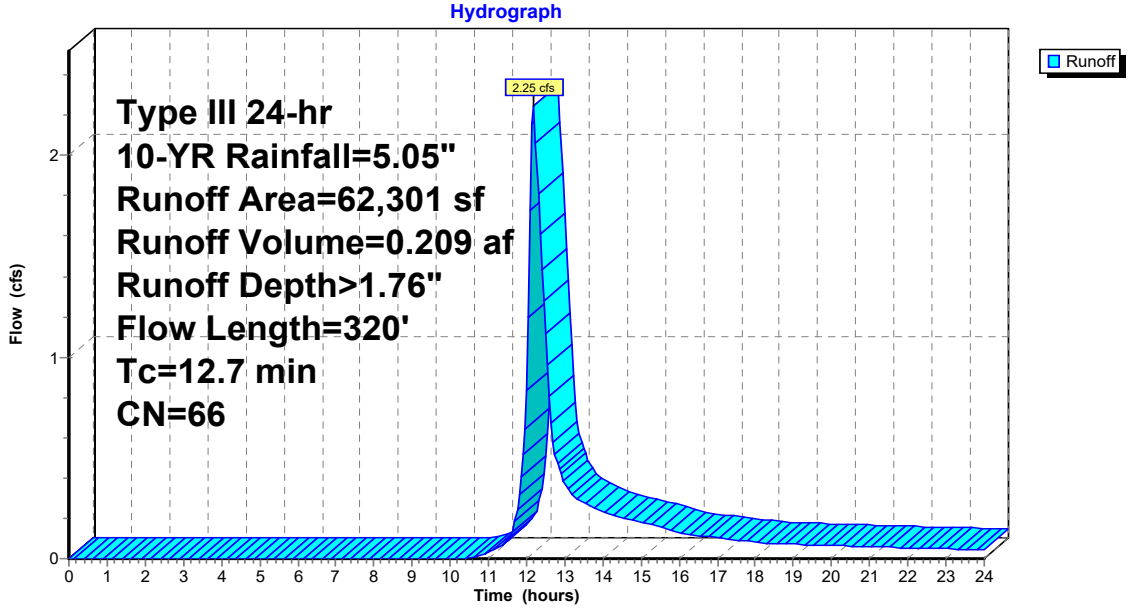
Runoff = 2.25 cfs @ 12.19 hrs, Volume= 0.209 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

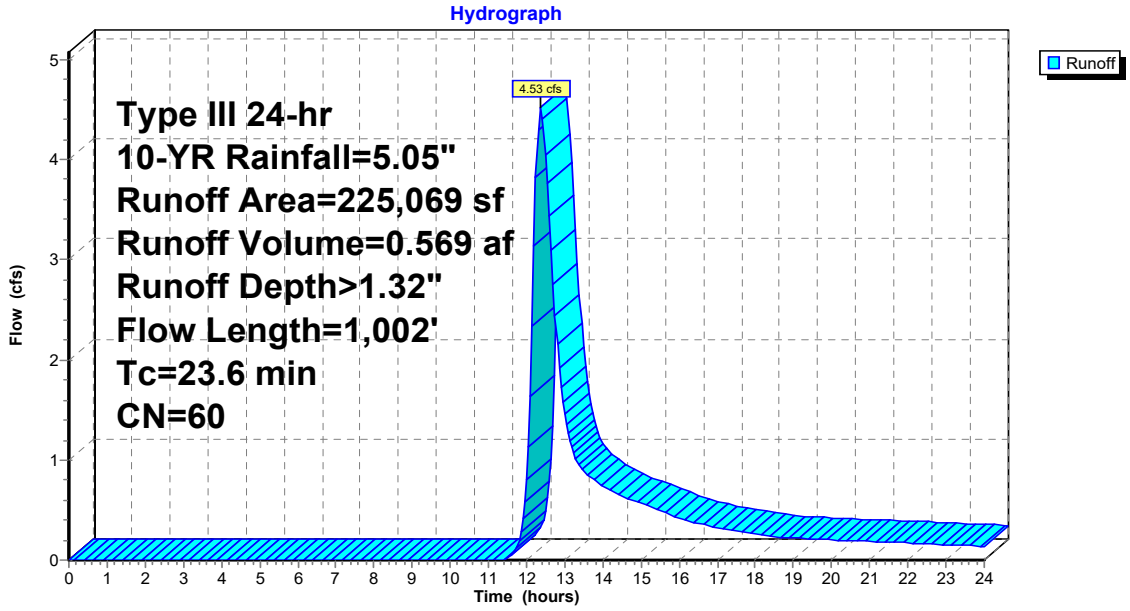
Runoff = 4.53 cfs @ 12.37 hrs, Volume= 0.569 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

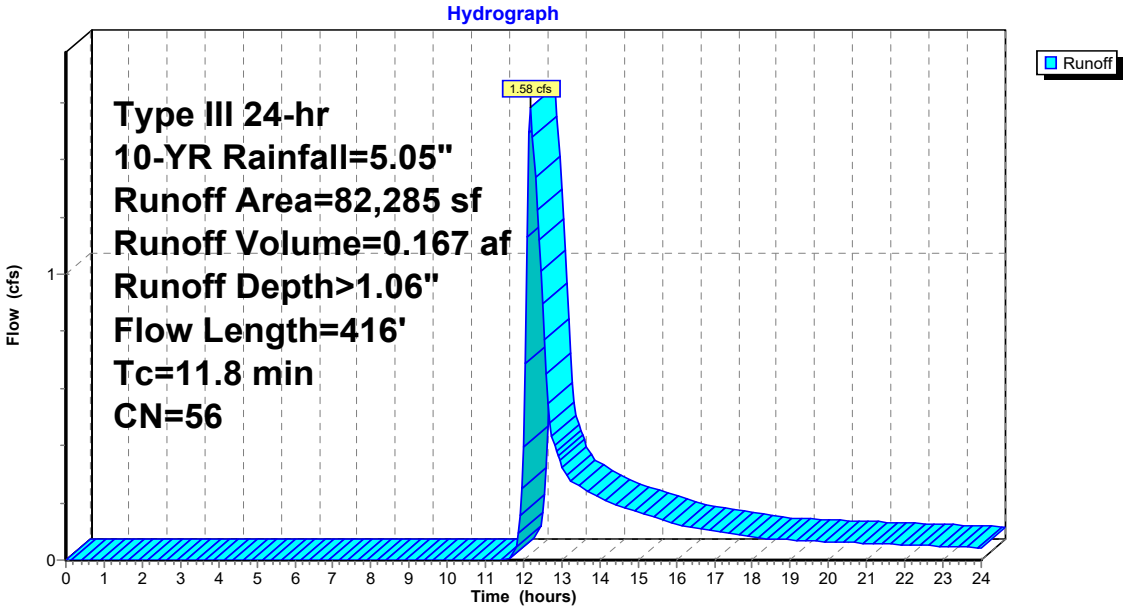
Runoff = 1.58 cfs @ 12.20 hrs, Volume= 0.167 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

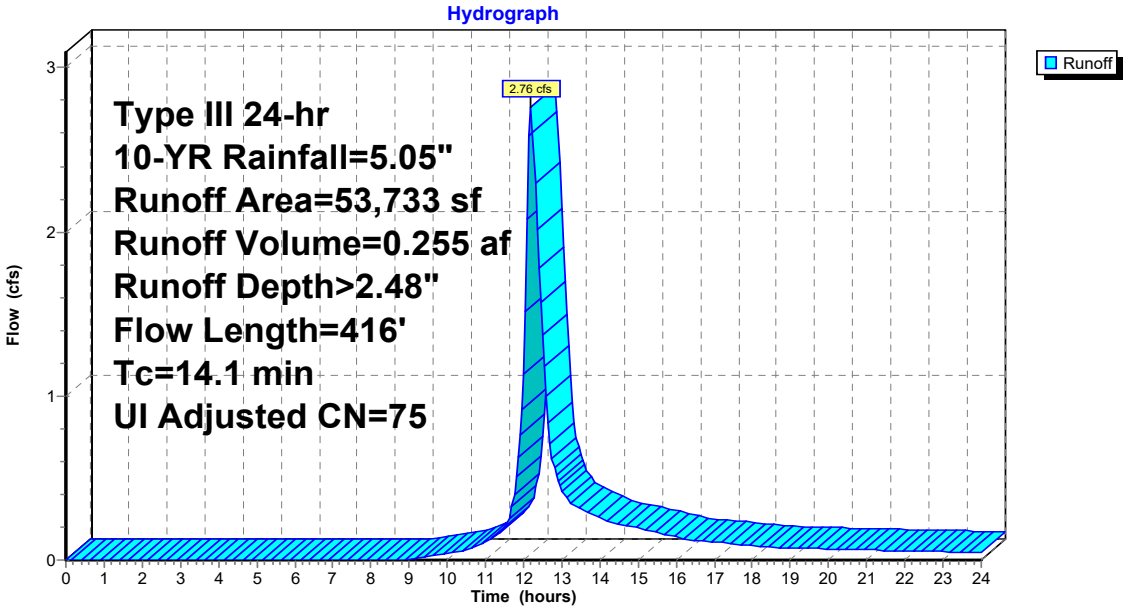
Runoff = 2.76 cfs @ 12.20 hrs, Volume= 0.255 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

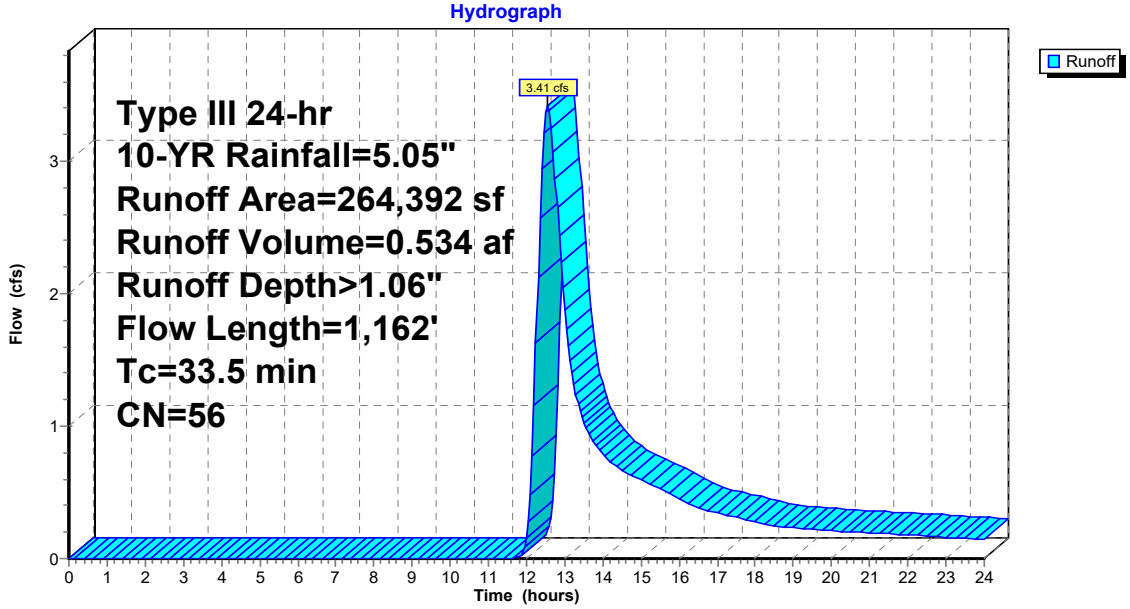
Runoff = 3.41 cfs @ 12.55 hrs, Volume= 0.534 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

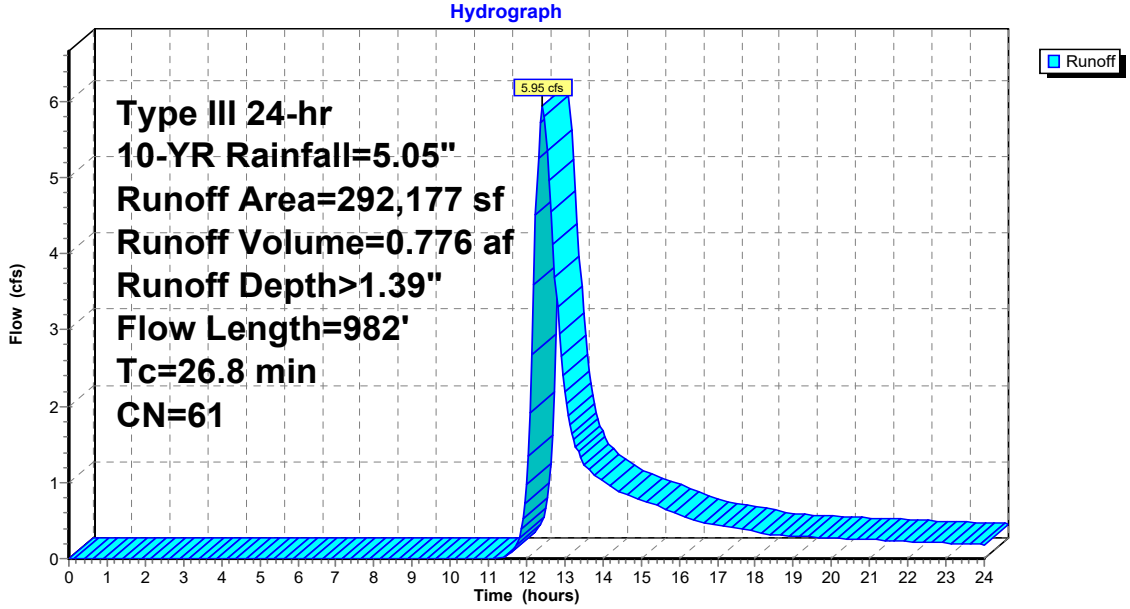
Runoff = 5.95 cfs @ 12.42 hrs, Volume= 0.776 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

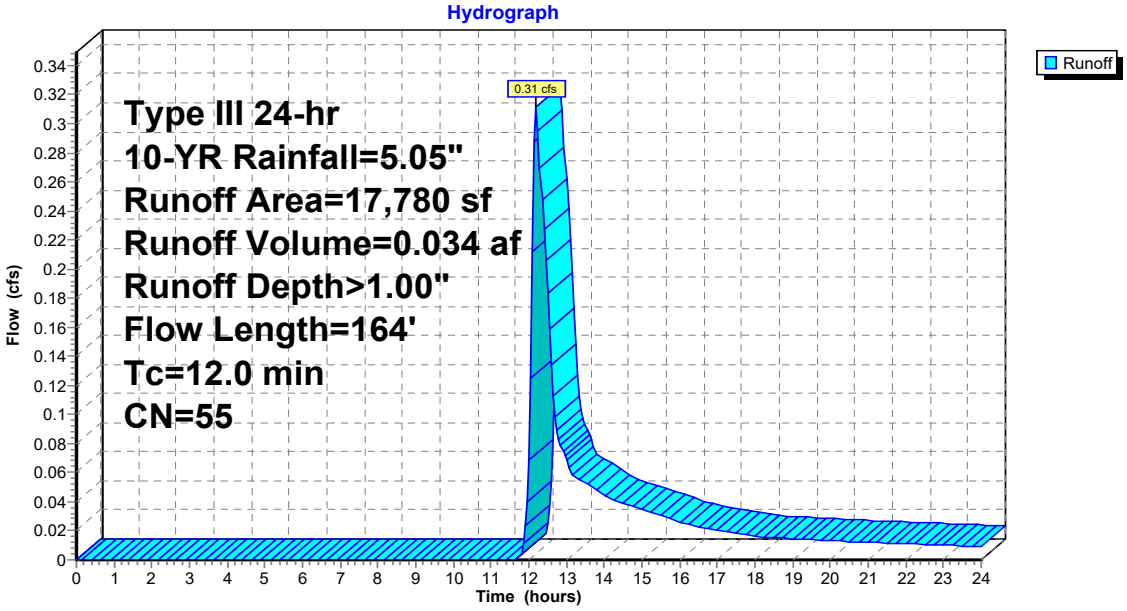
Runoff = 0.31 cfs @ 12.20 hrs, Volume= 0.034 af, Depth> 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

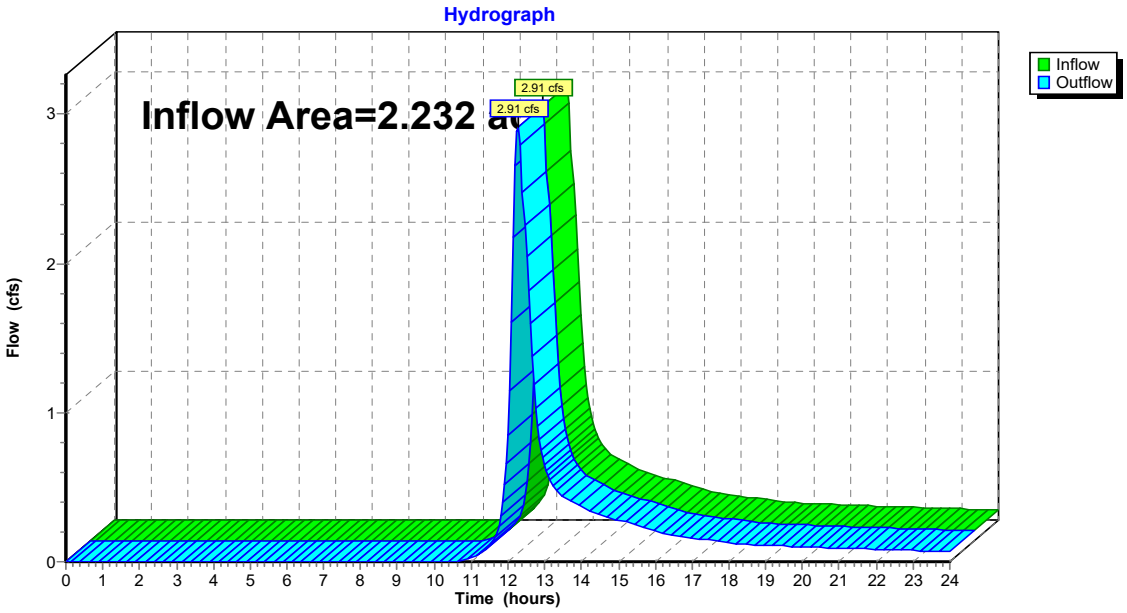


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 1.68" for 10-YR event
Inflow = 2.91 cfs @ 12.27 hrs, Volume= 0.312 af
Outflow = 2.91 cfs @ 12.27 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

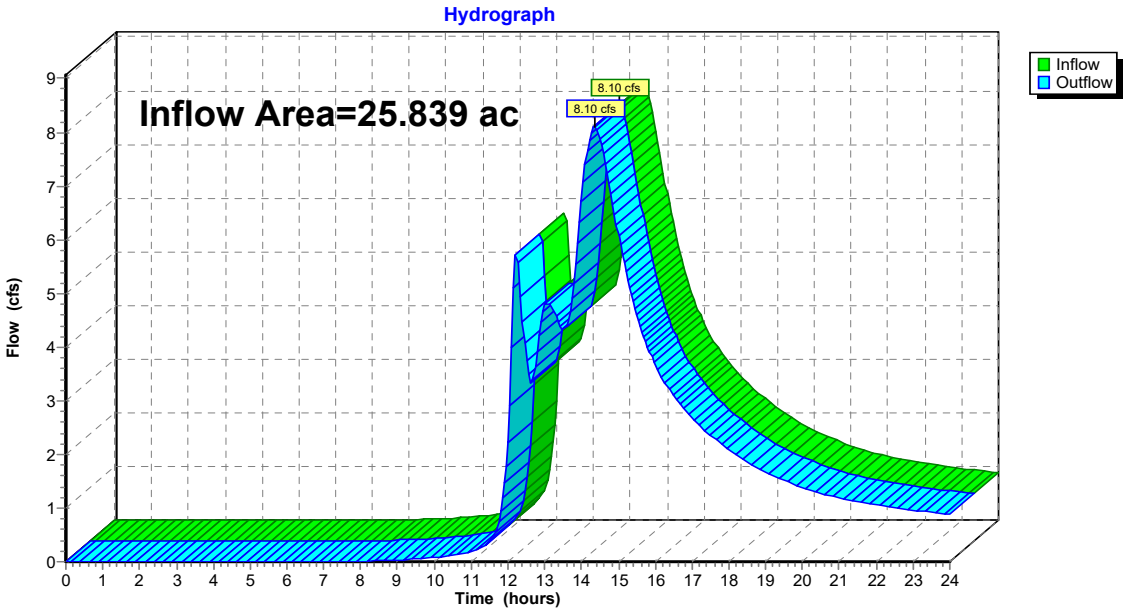


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 1.35" for 10-YR event
Inflow = 8.10 cfs @ 14.35 hrs, Volume= 2.906 af
Outflow = 8.10 cfs @ 14.35 hrs, Volume= 2.906 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

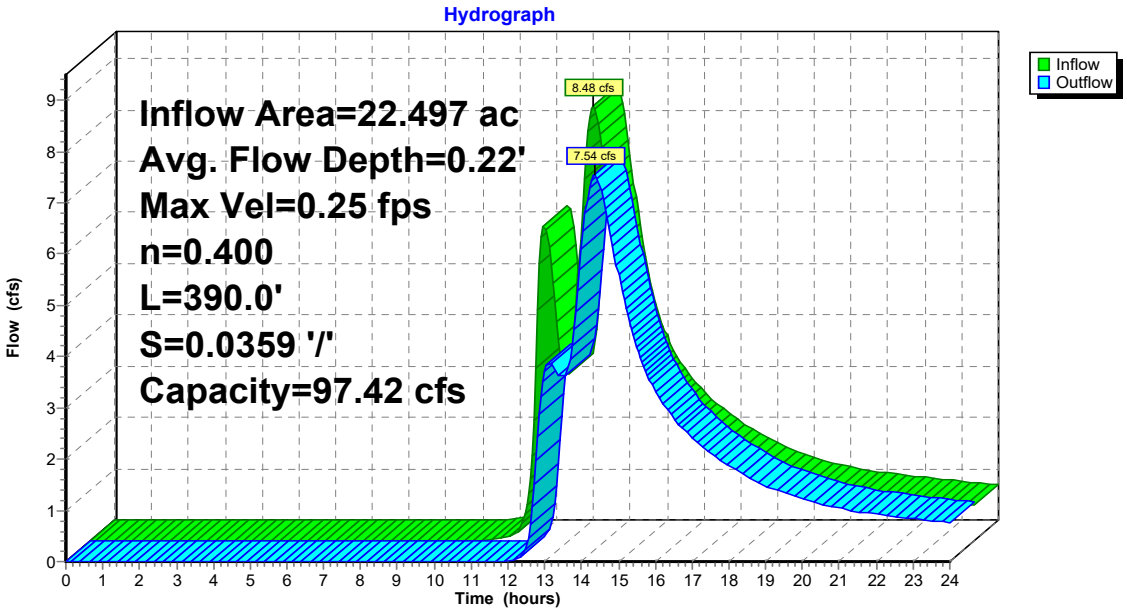
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.28" for 10-YR event
Inflow = 8.48 cfs @ 13.65 hrs, Volume= 2.405 af
Outflow = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af, Atten= 11%, Lag= 42.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 25.8 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 48.7 min

Peak Storage= 11,665 cf @ 13.92 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 1.27" for 10-YR event
Inflow = 8.54 cfs @ 13.10 hrs, Volume= 1.677 af
Outflow = 7.38 cfs @ 13.66 hrs, Volume= 1.627 af, Atten= 14%, Lag= 33.5 min

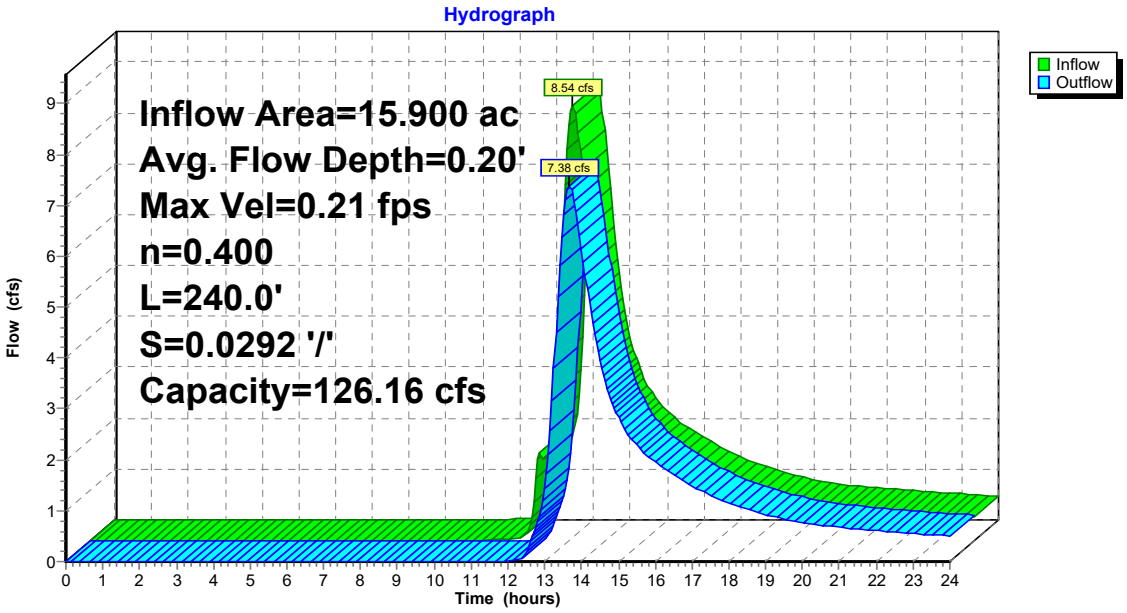
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.21 fps, Min. Travel Time= 19.4 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 43.1 min

Peak Storage= 8,610 cf @ 13.34 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 1.33" for 10-YR event
Inflow = 10.15 cfs @ 12.56 hrs, Volume= 1.557 af
Outflow = 8.24 cfs @ 13.11 hrs, Volume= 1.510 af, Atten= 19%, Lag= 32.8 min

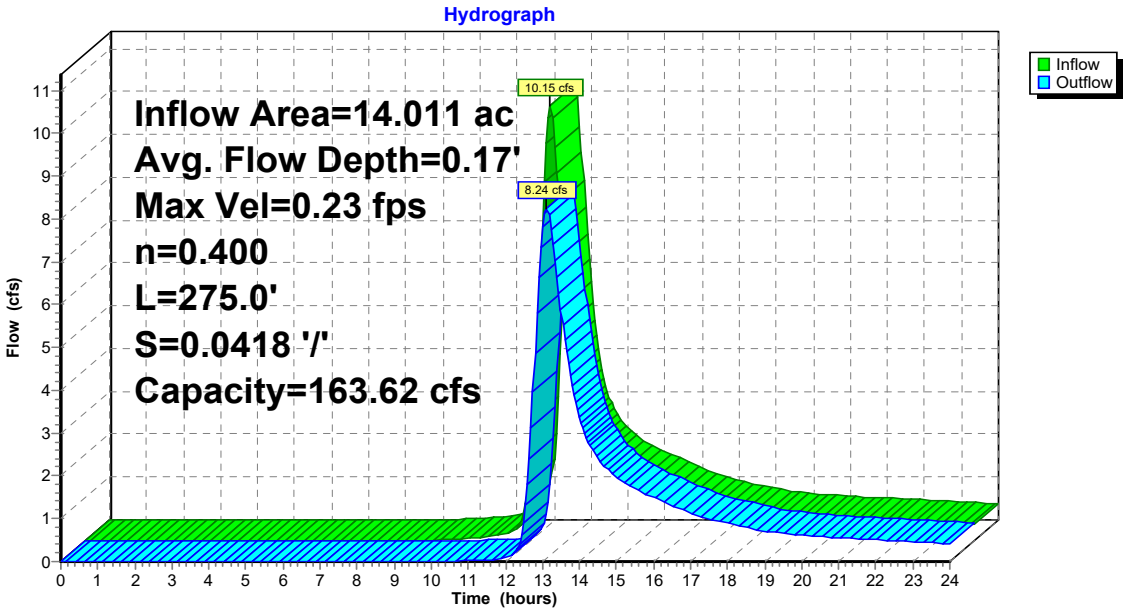
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.23 fps, Min. Travel Time= 19.8 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 49.3 min

Peak Storage= 9,825 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

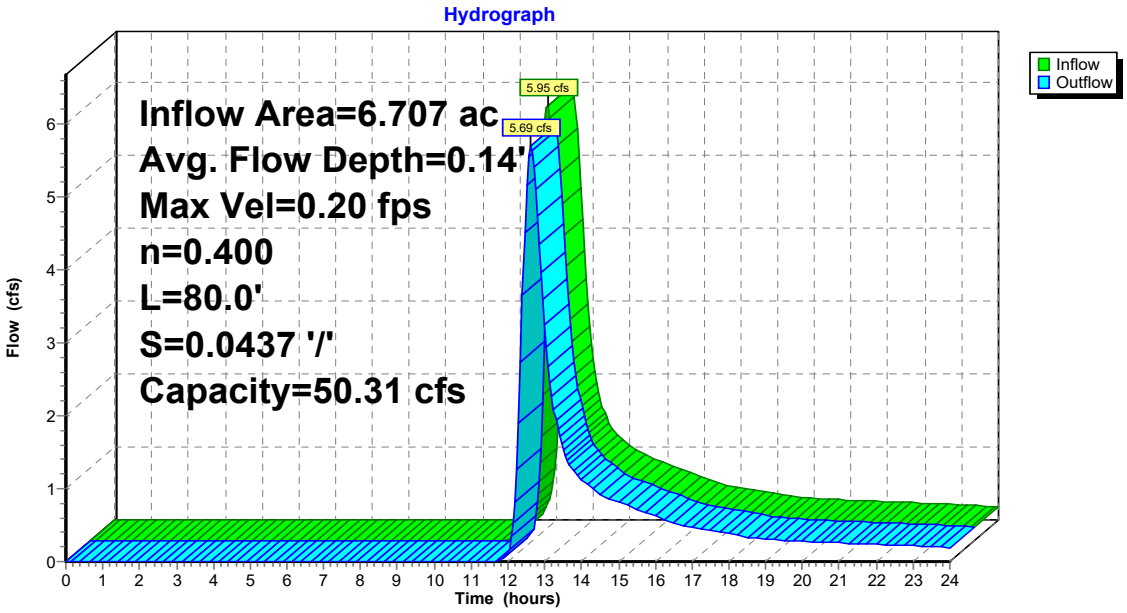
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 1.39" for 10-YR event
Inflow = 5.95 cfs @ 12.42 hrs, Volume= 0.776 af
Outflow = 5.69 cfs @ 12.61 hrs, Volume= 0.768 af, Atten= 4%, Lag= 11.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.20 fps, Min. Travel Time= 6.5 min
Avg. Velocity = 0.08 fps, Avg. Travel Time= 17.0 min

Peak Storage= 2,238 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

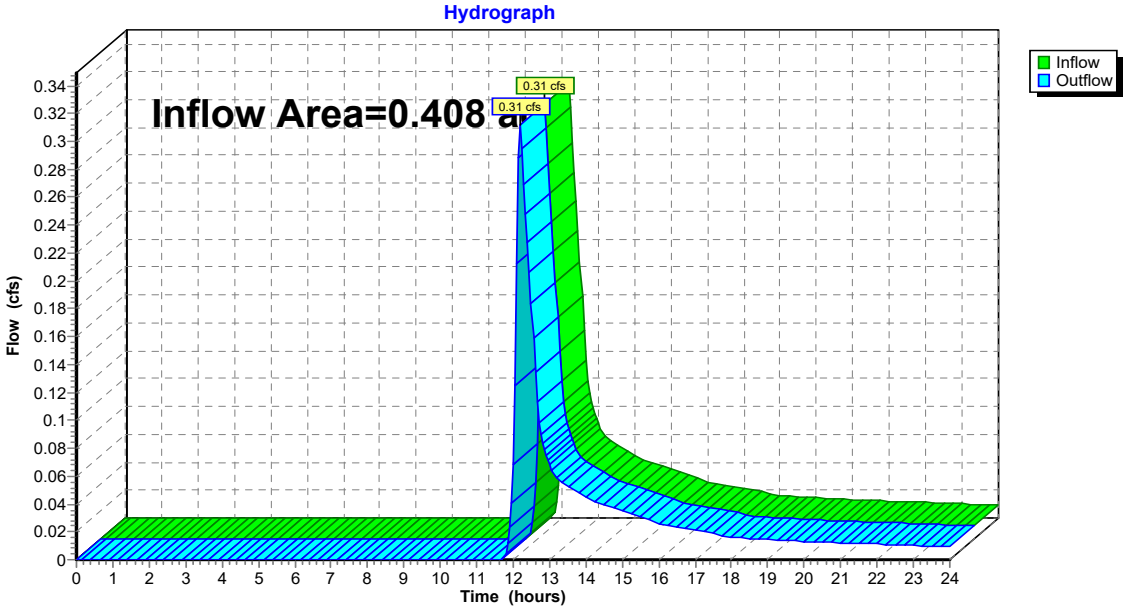


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 1.00" for 10-YR event
Inflow = 0.31 cfs @ 12.20 hrs, Volume= 0.034 af
Outflow = 0.31 cfs @ 12.20 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.23" for 10-YR event
Inflow = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af
Outflow = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af, Atten= 0%, Lag= 0.0 min
Primary = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 602.17' @ 14.35 hrs Surf.Area= 22 sf Storage= 17 cf

Plug-Flow detention time= 0.1 min calculated for 2.310 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (980.3 - 980.2)

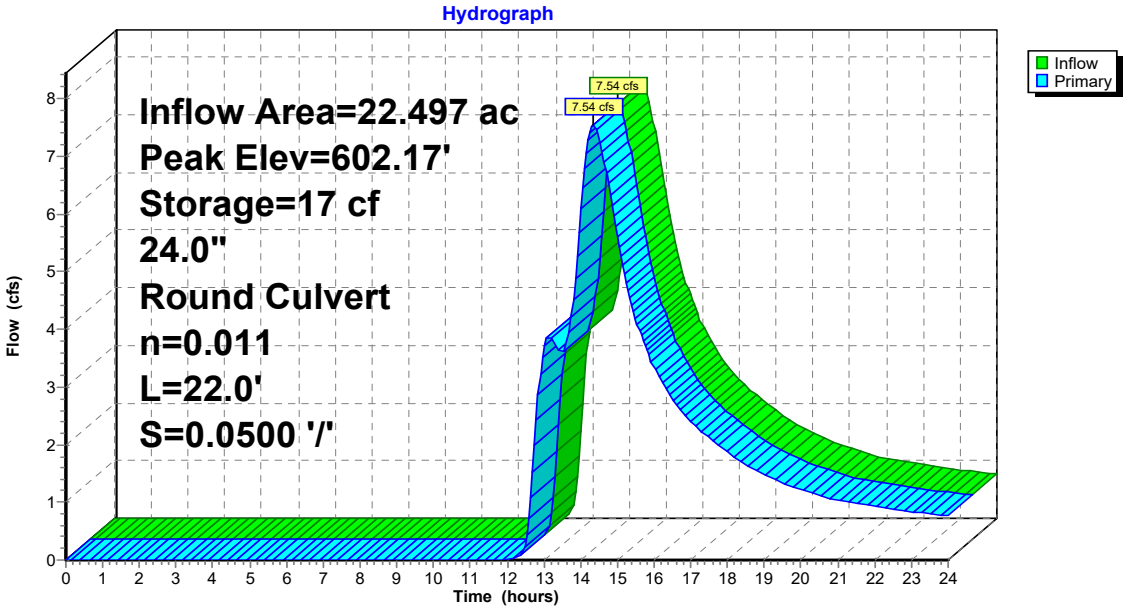
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.54 cfs @ 14.35 hrs HW=602.17' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 7.54 cfs @ 4.40 fps)

Pond RCP: 24" RCP



Summary for Subcatchment 1: EDA-1

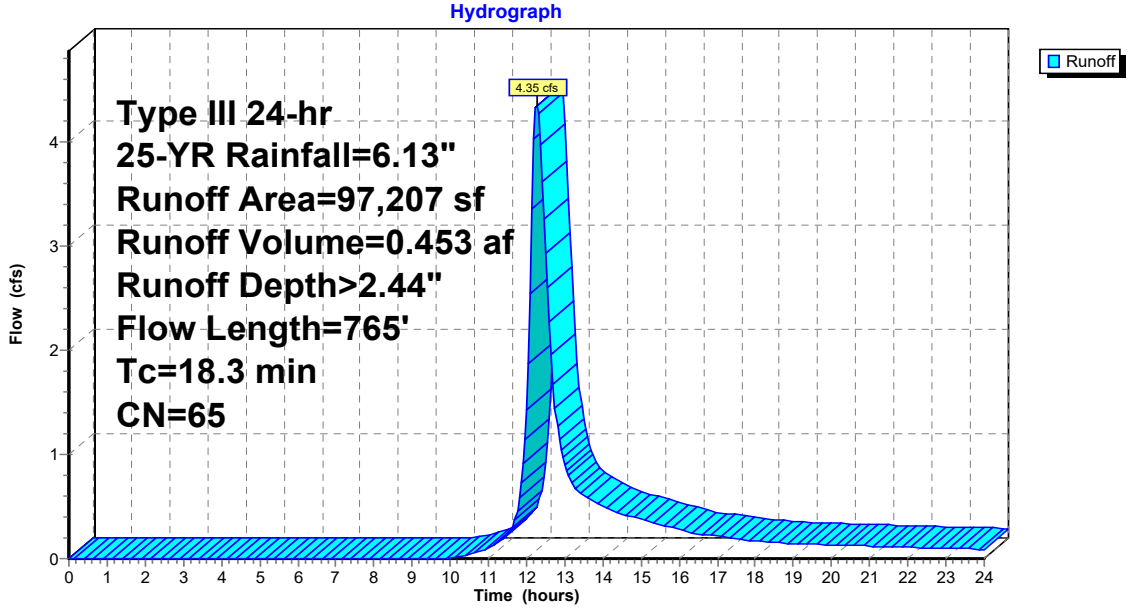
Runoff = 4.35 cfs @ 12.27 hrs, Volume= 0.453 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

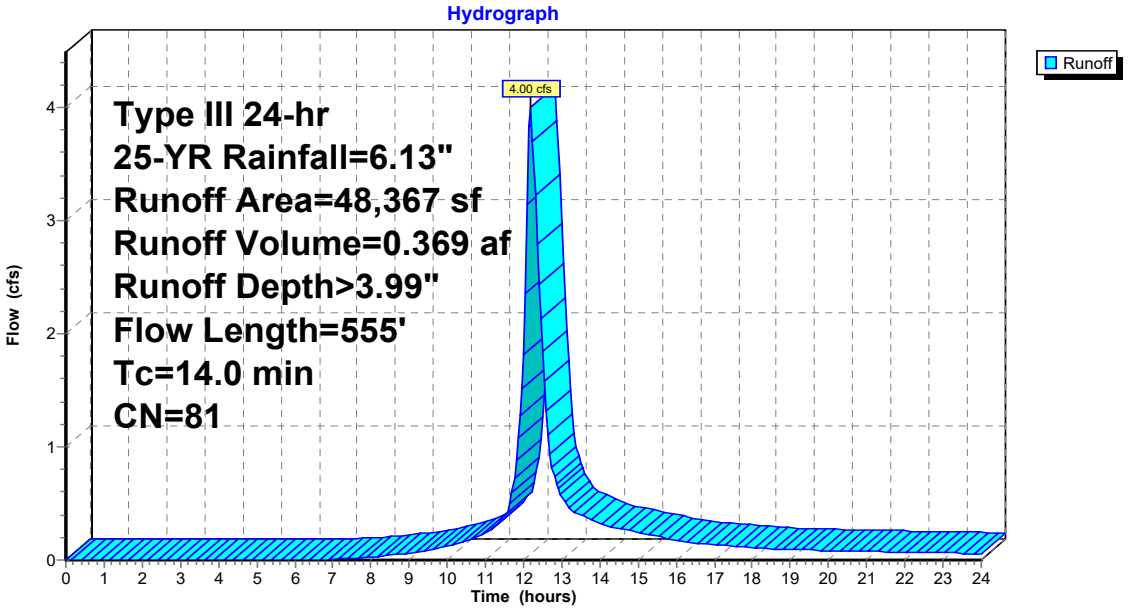
Runoff = 4.00 cfs @ 12.19 hrs, Volume= 0.369 af, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

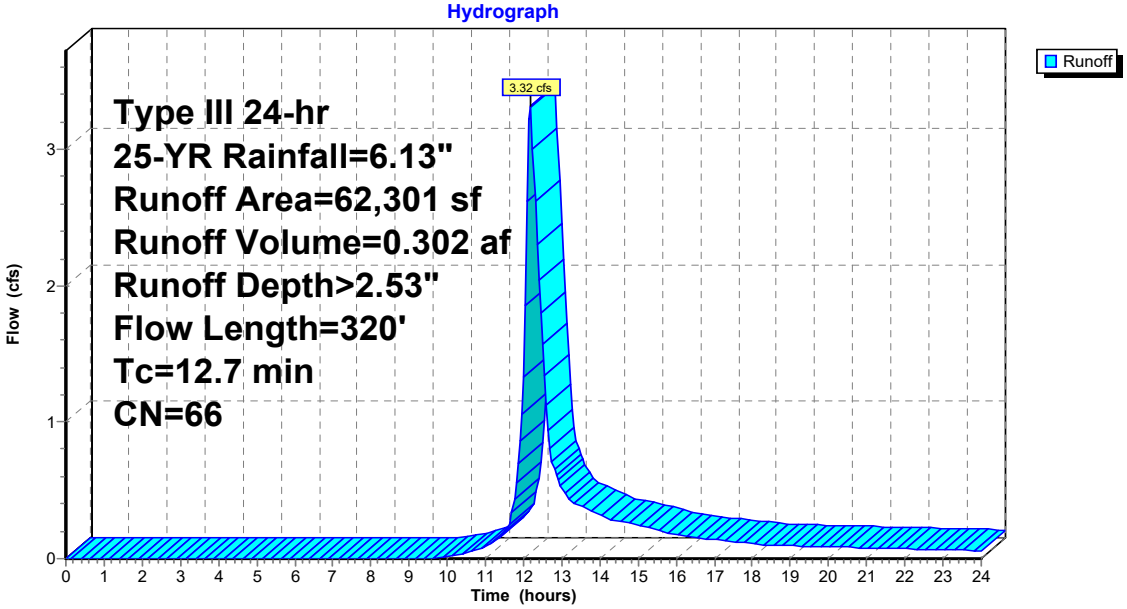
Runoff = 3.32 cfs @ 12.19 hrs, Volume= 0.302 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

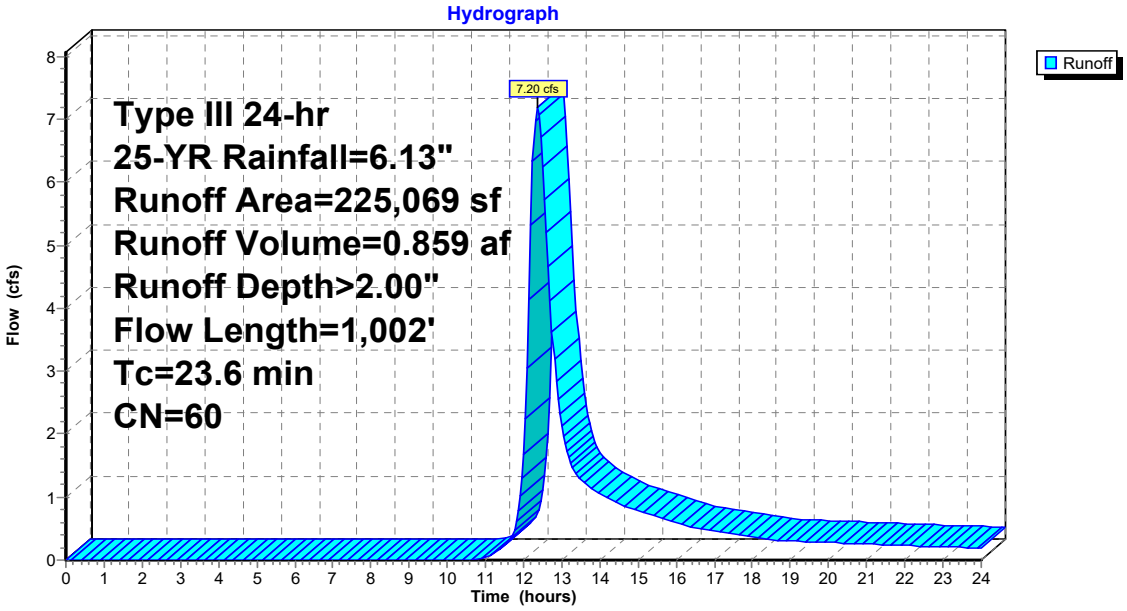
Runoff = 7.20 cfs @ 12.36 hrs, Volume= 0.859 af, Depth> 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

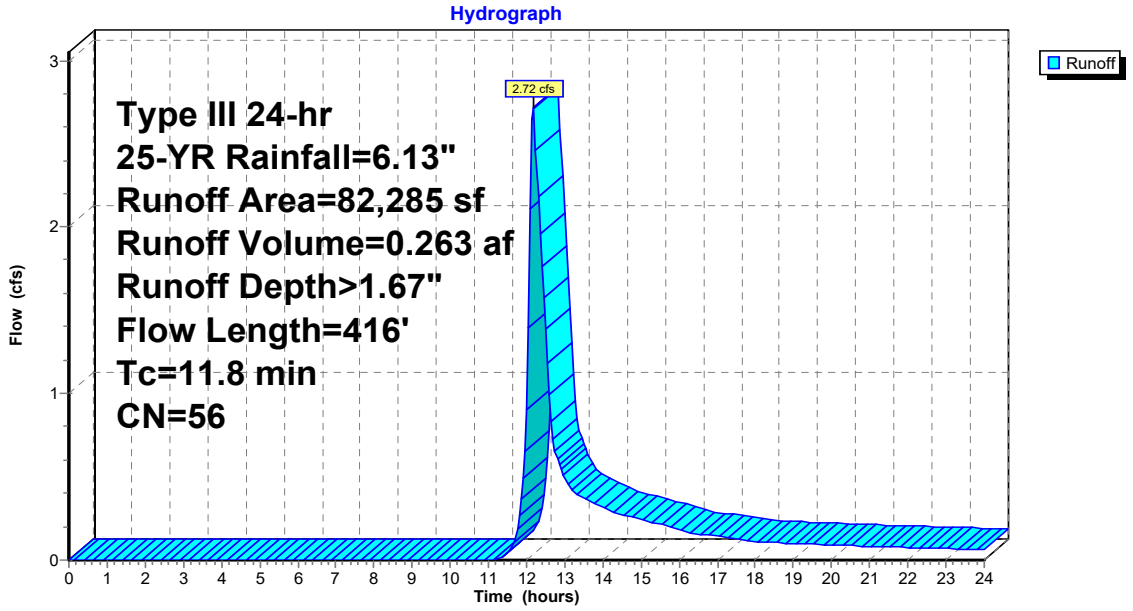
Runoff = 2.72 cfs @ 12.18 hrs, Volume= 0.263 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

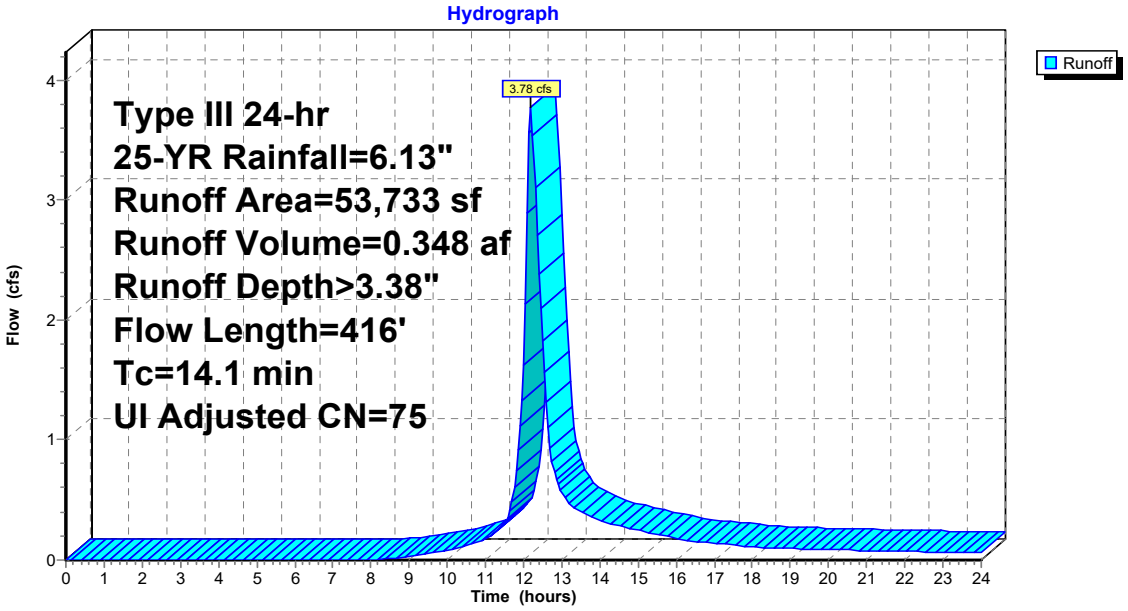
Runoff = 3.78 cfs @ 12.20 hrs, Volume= 0.348 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

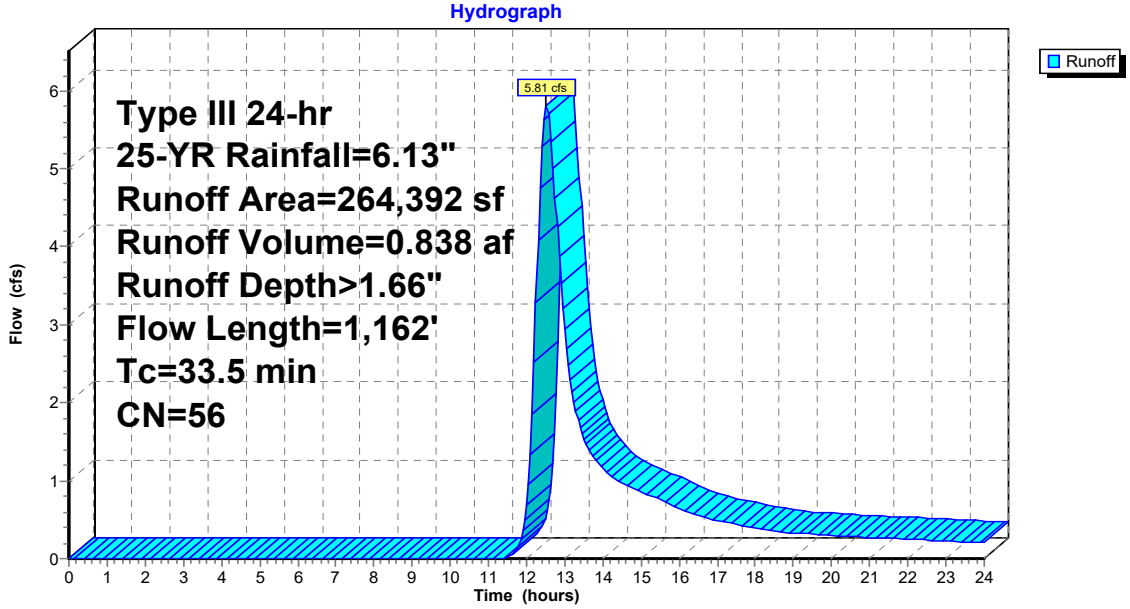
Runoff = 5.81 cfs @ 12.52 hrs, Volume= 0.838 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

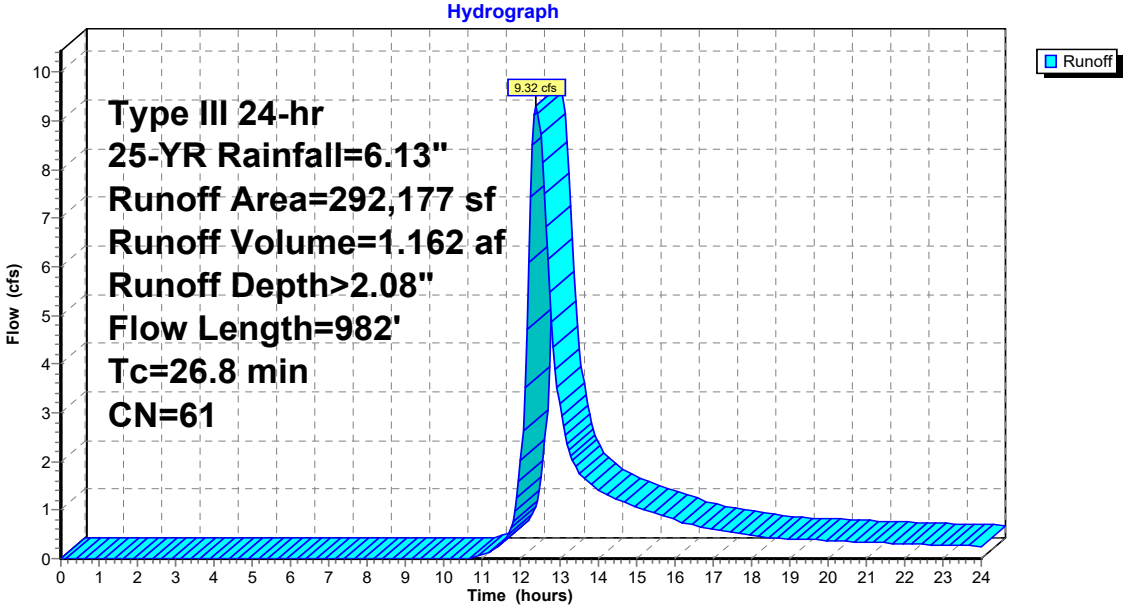
Runoff = 9.32 cfs @ 12.40 hrs, Volume= 1.162 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

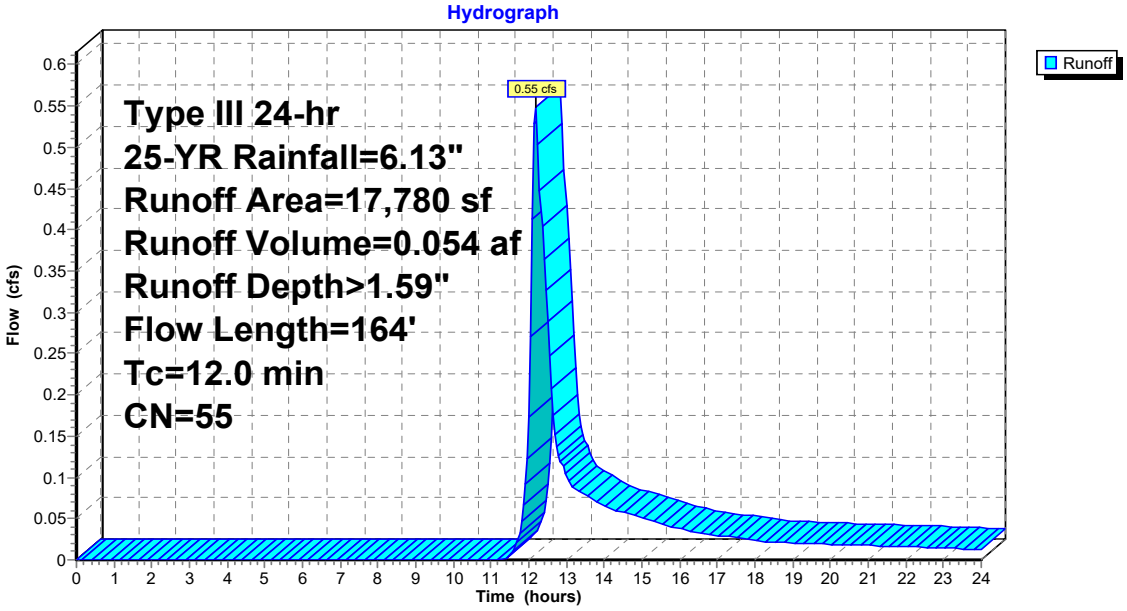
Runoff = 0.55 cfs @ 12.19 hrs, Volume= 0.054 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

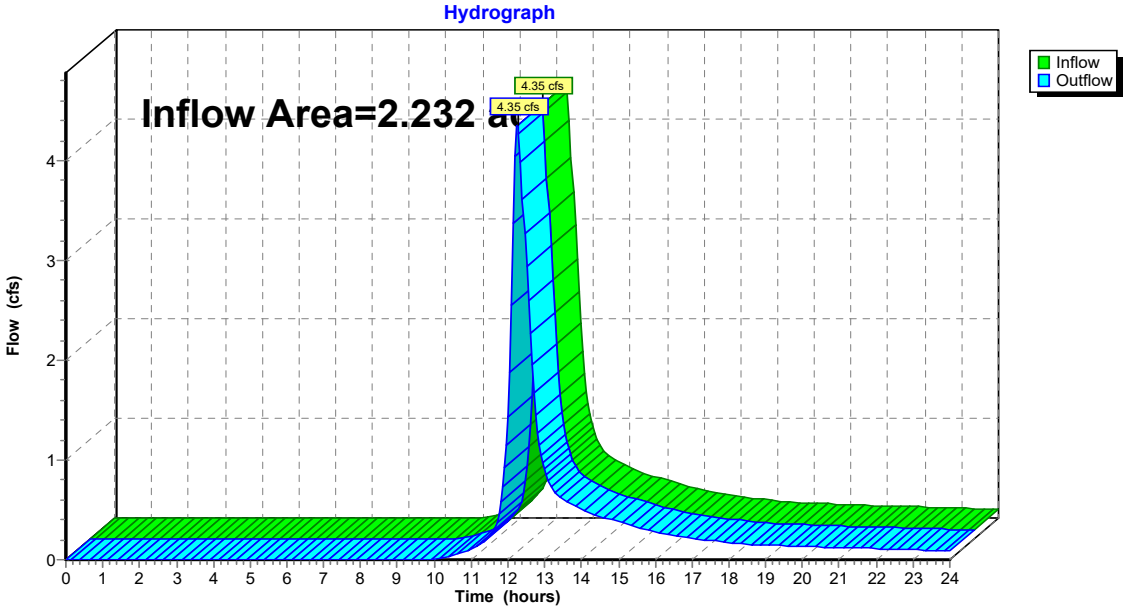


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 2.44" for 25-YR event
Inflow = 4.35 cfs @ 12.27 hrs, Volume= 0.453 af
Outflow = 4.35 cfs @ 12.27 hrs, Volume= 0.453 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

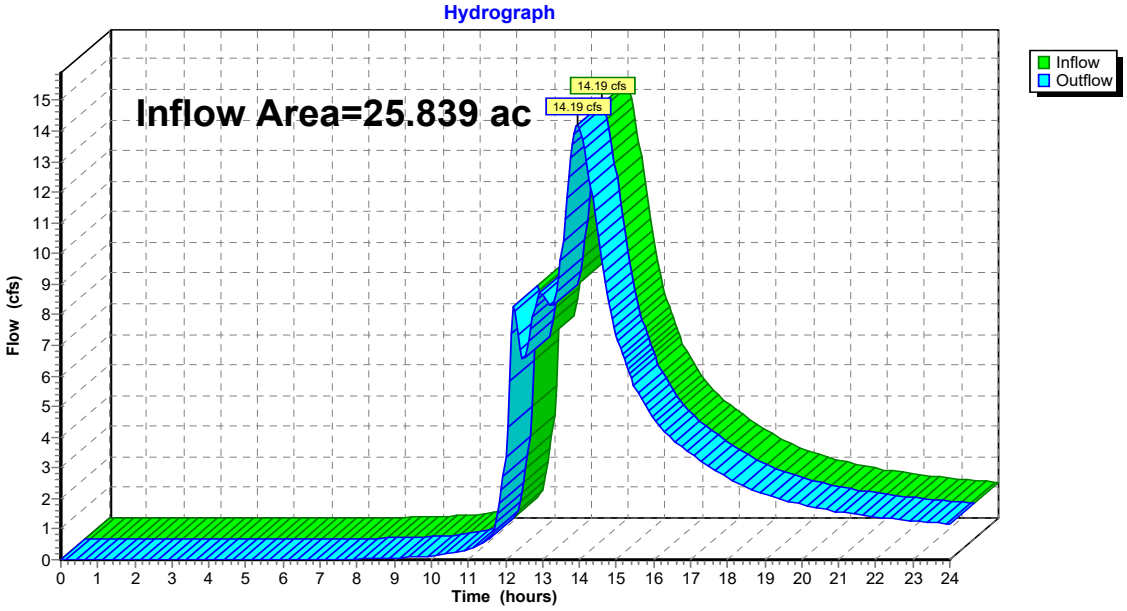


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 2.03" for 25-YR event
Inflow = 14.19 cfs @ 13.95 hrs, Volume= 4.364 af
Outflow = 14.19 cfs @ 13.95 hrs, Volume= 4.364 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

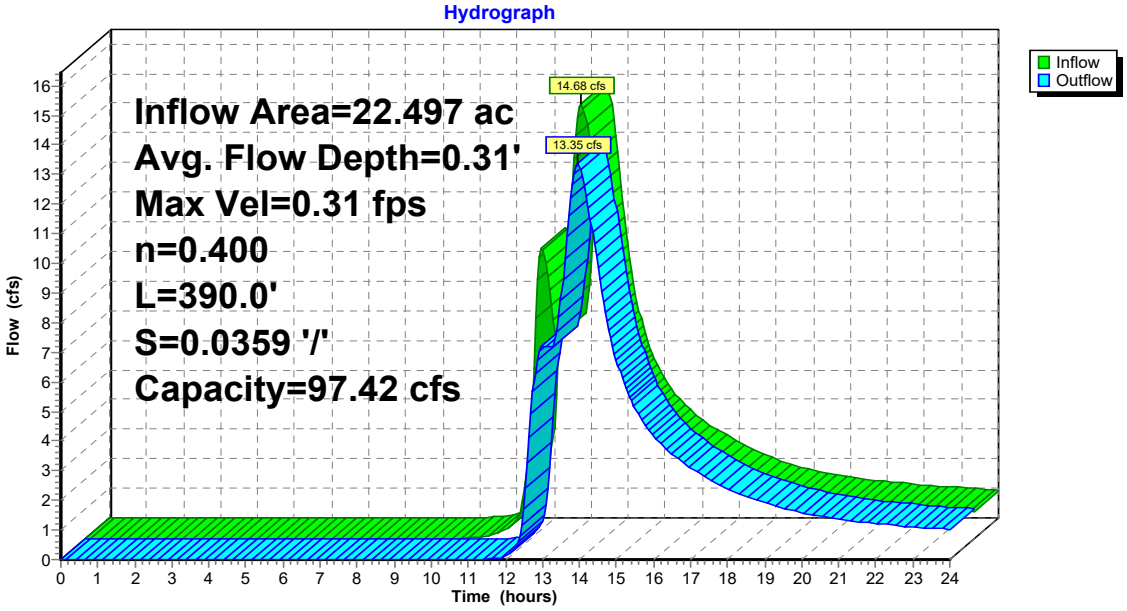
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.95" for 25-YR event
Inflow = 14.68 cfs @ 13.40 hrs, Volume= 3.647 af
Outflow = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af, Atten= 9%, Lag= 33.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 20.7 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 44.2 min

Peak Storage= 16,600 cf @ 13.61 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 1.92" for 25-YR event
Inflow = 14.56 cfs @ 12.96 hrs, Volume= 2.545 af
Outflow = 12.94 cfs @ 13.42 hrs, Volume= 2.486 af, Atten= 11%, Lag= 27.2 min

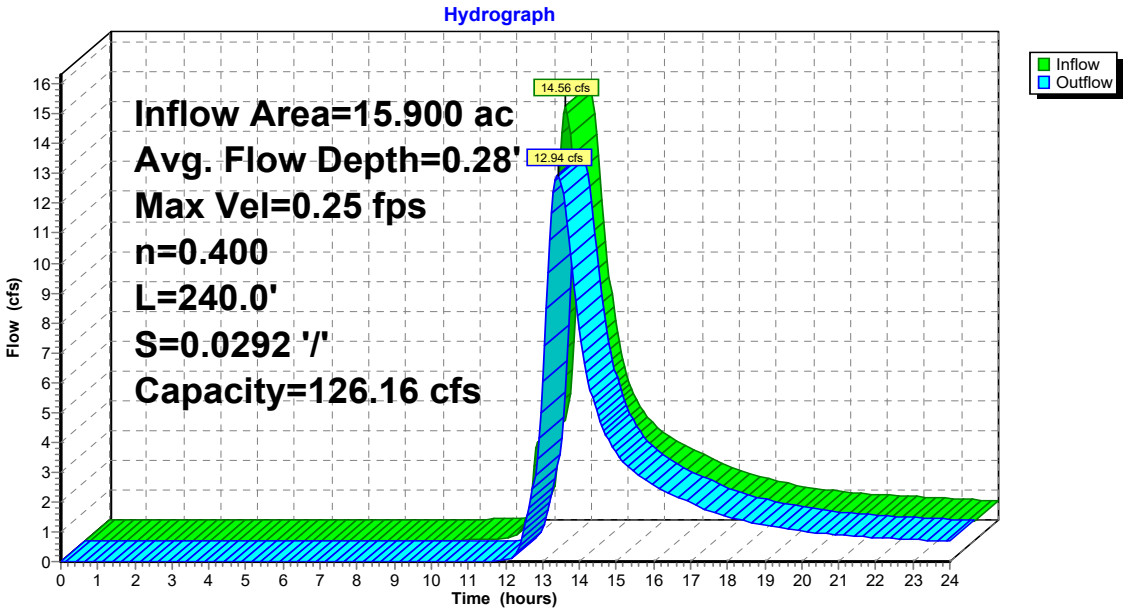
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 15.9 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 39.1 min

Peak Storage= 12,337 cf @ 13.15 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 2.00" for 25-YR event
Inflow = 16.45 cfs @ 12.52 hrs, Volume= 2.339 af
Outflow = 14.05 cfs @ 12.97 hrs, Volume= 2.283 af, Atten= 15%, Lag= 26.6 min

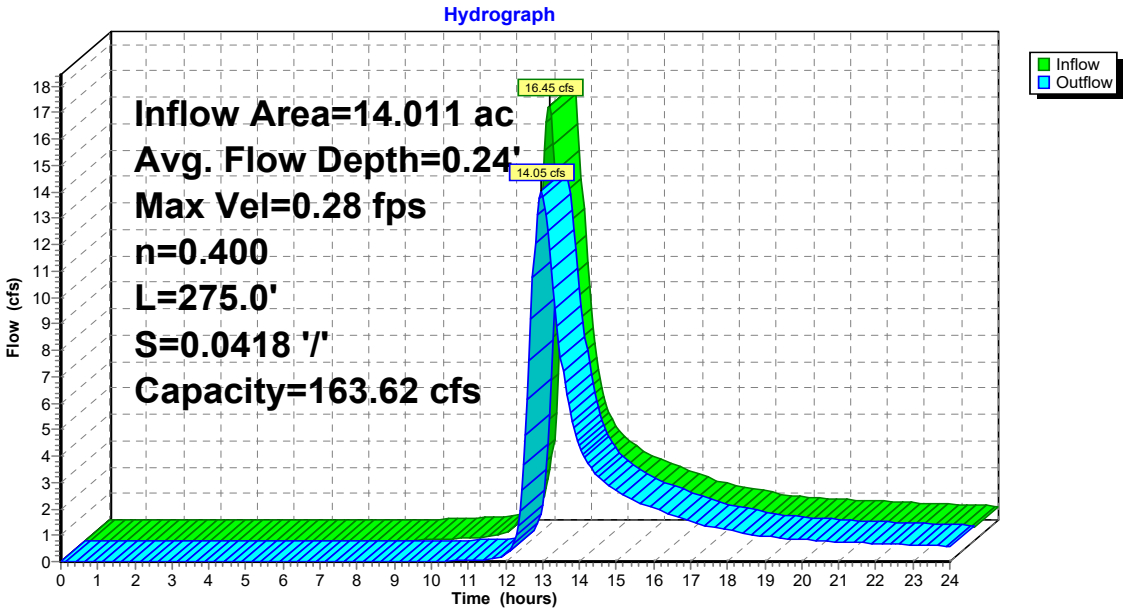
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.28 fps, Min. Travel Time= 16.2 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 44.5 min

Peak Storage= 13,659 cf @ 12.70 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

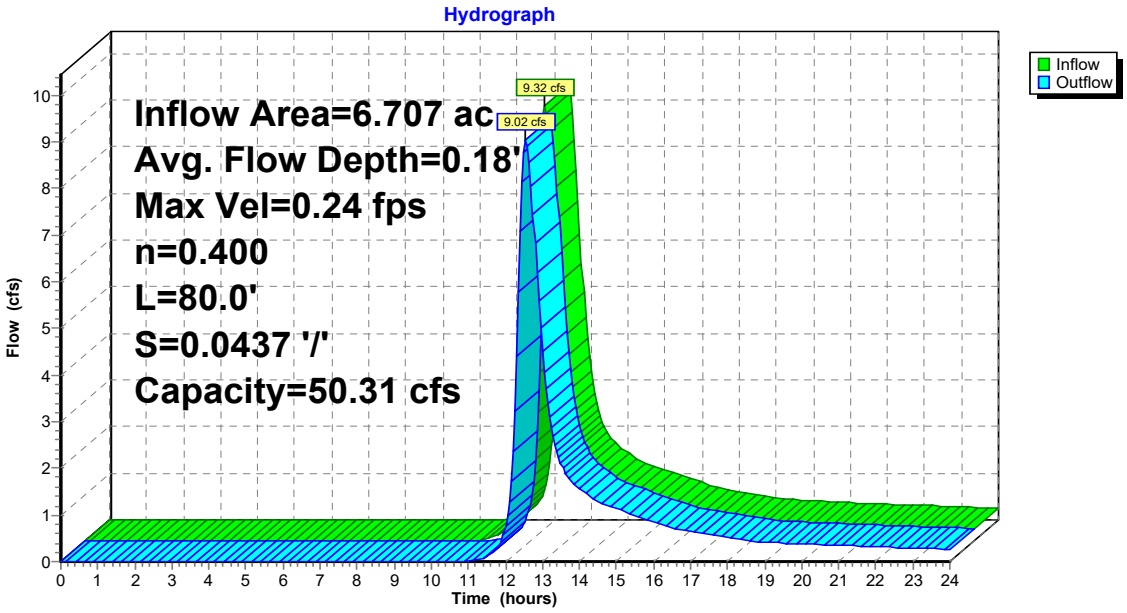
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 2.08" for 25-YR event
Inflow = 9.32 cfs @ 12.40 hrs, Volume= 1.162 af
Outflow = 9.02 cfs @ 12.56 hrs, Volume= 1.152 af, Atten= 3%, Lag= 9.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.24 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 15.1 min

Peak Storage= 2,966 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

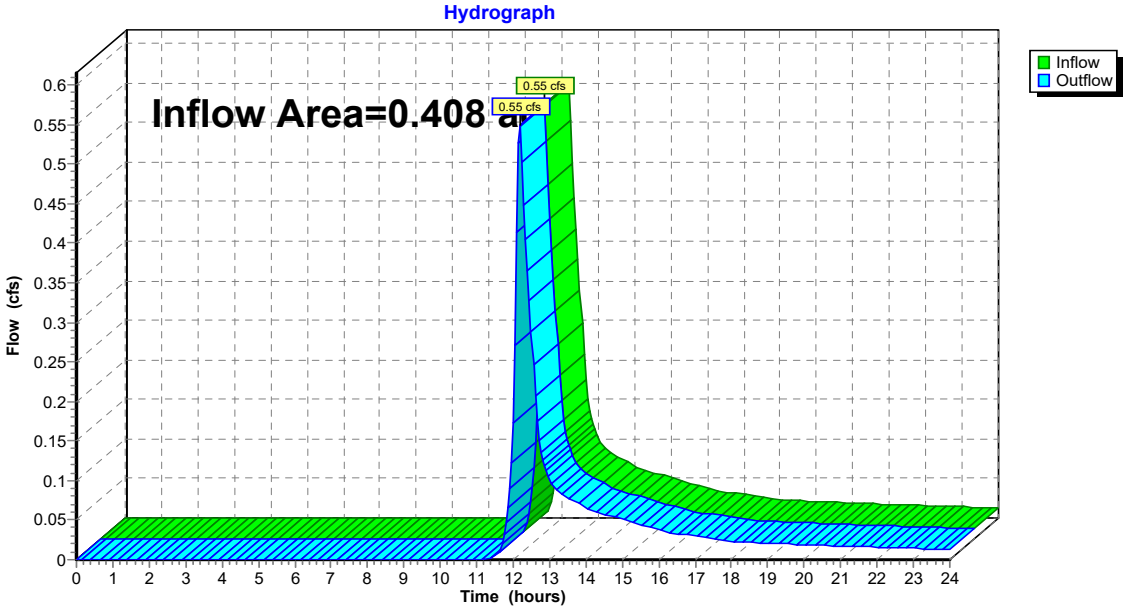


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 1.59" for 25-YR event
Inflow = 0.55 cfs @ 12.19 hrs, Volume= 0.054 af
Outflow = 0.55 cfs @ 12.19 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.89" for 25-YR event
Inflow = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af
Outflow = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af, Atten= 0%, Lag= 0.0 min
Primary = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 602.61' @ 13.96 hrs Surf.Area= 26 sf Storage= 28 cf

Plug-Flow detention time= 0.0 min calculated for 3.534 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (953.6 - 953.6)

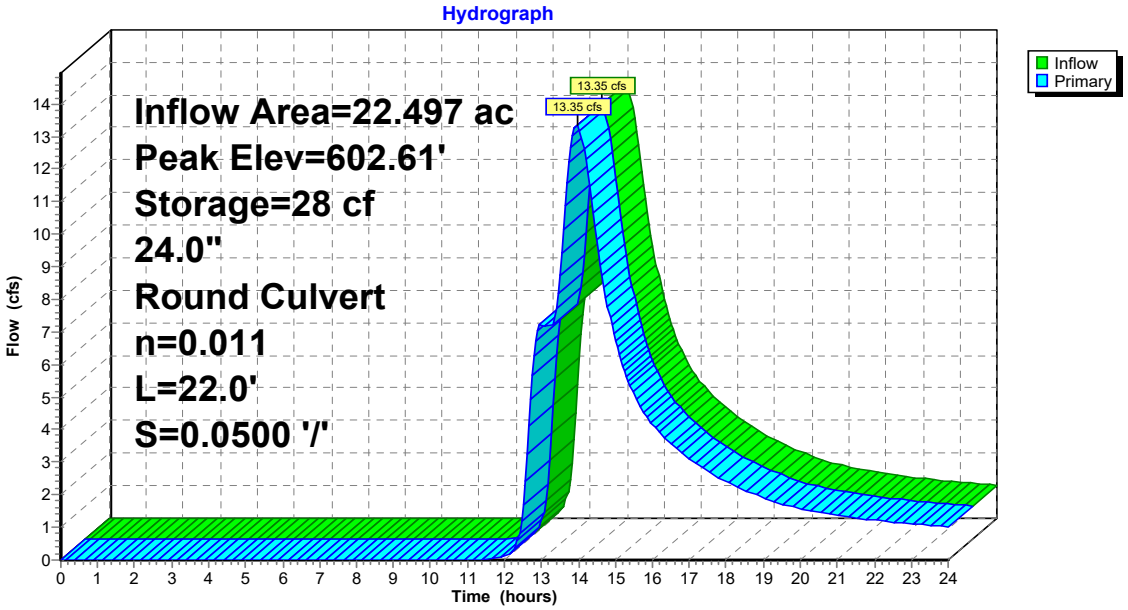
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=13.34 cfs @ 13.96 hrs HW=602.61' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 13.34 cfs @ 5.23 fps)

Pond RCP: 24" RCP



Summary for Subcatchment 1: EDA-1

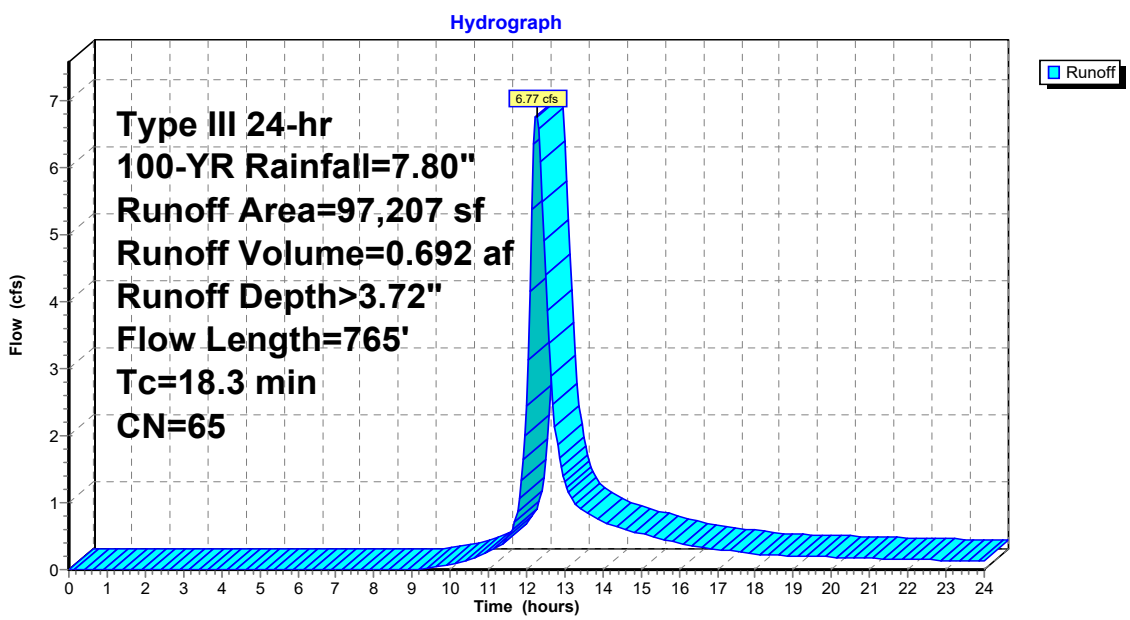
Runoff = 6.77 cfs @ 12.26 hrs, Volume= 0.692 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

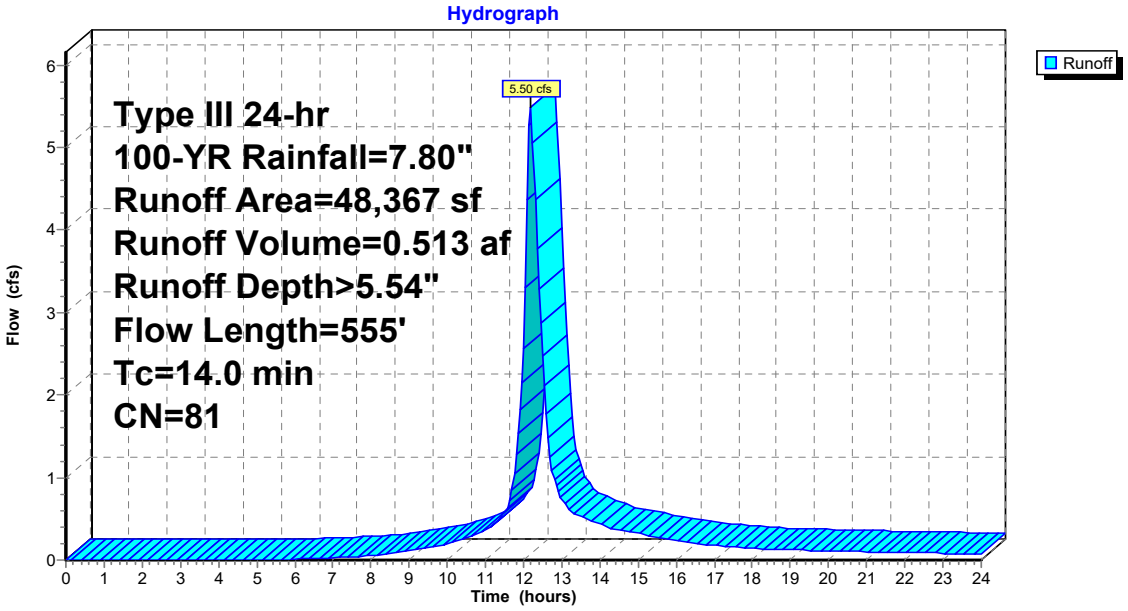
Runoff = 5.50 cfs @ 12.19 hrs, Volume= 0.513 af, Depth> 5.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

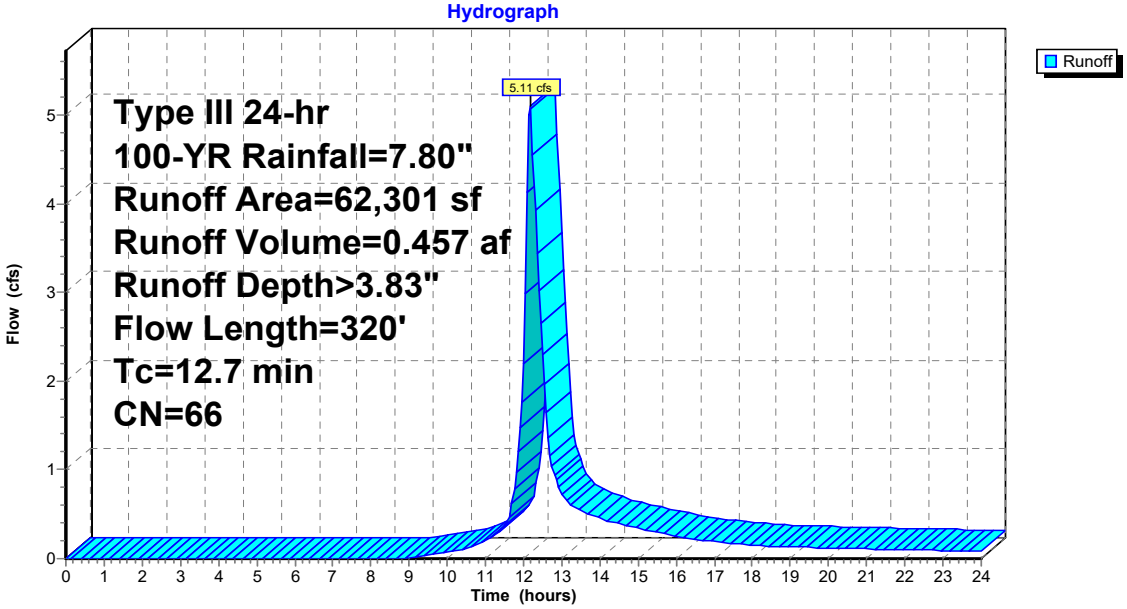
Runoff = 5.11 cfs @ 12.18 hrs, Volume= 0.457 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

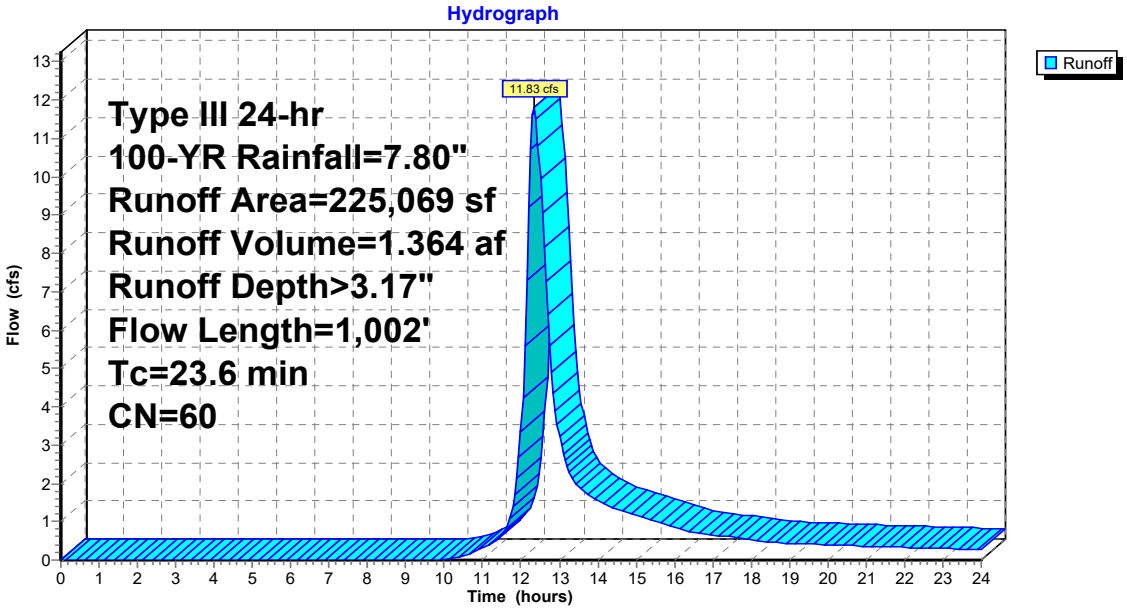
Runoff = 11.83 cfs @ 12.34 hrs, Volume= 1.364 af, Depth> 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

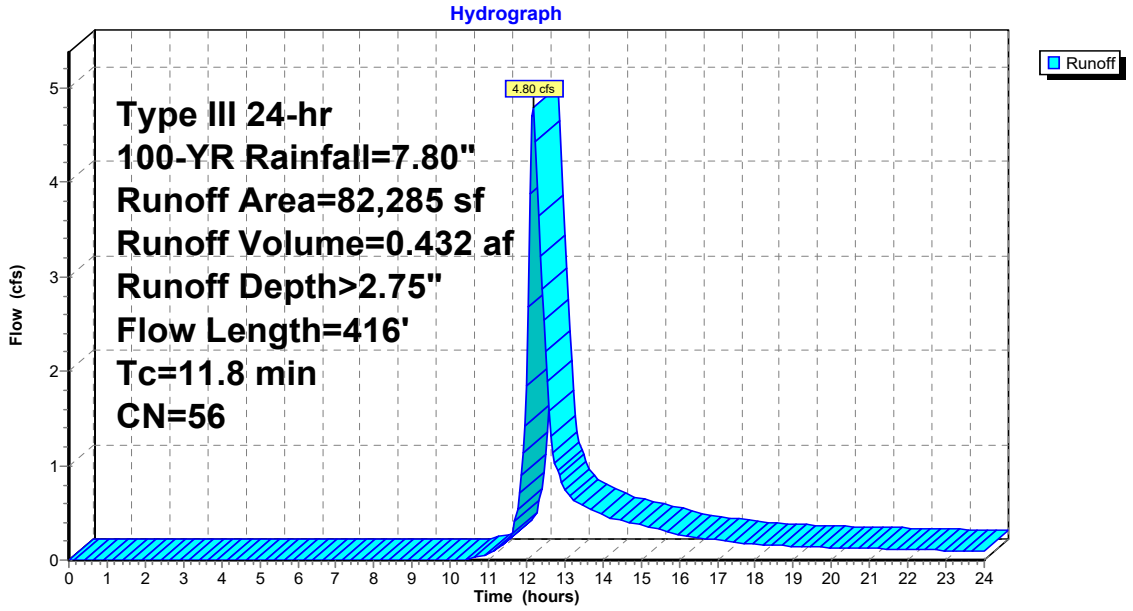
Runoff = 4.80 cfs @ 12.17 hrs, Volume= 0.432 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

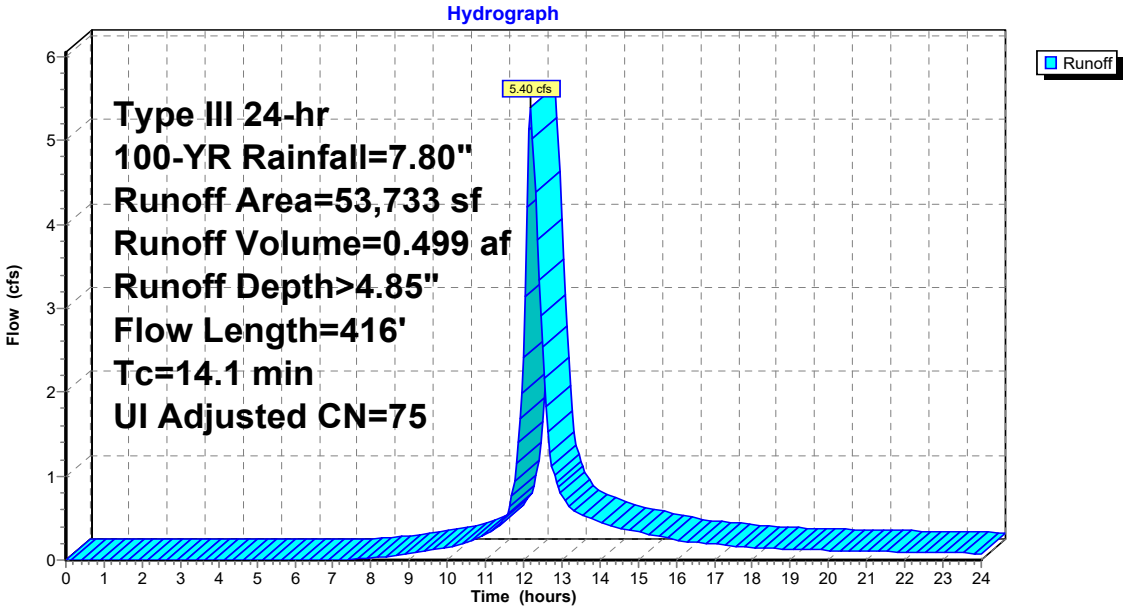
Runoff = 5.40 cfs @ 12.20 hrs, Volume= 0.499 af, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

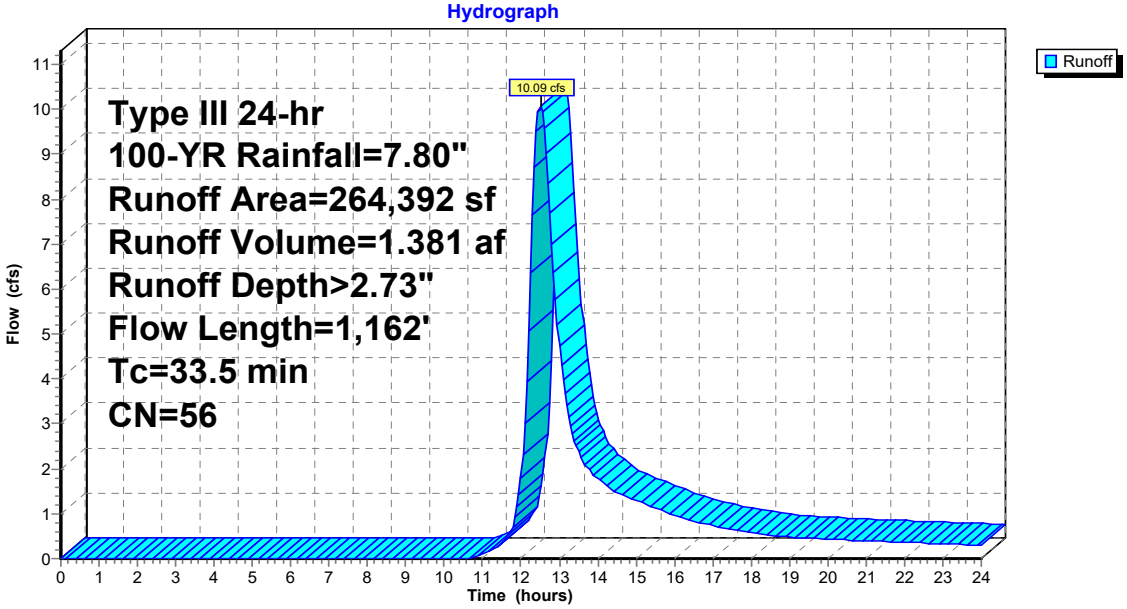
Runoff = 10.09 cfs @ 12.50 hrs, Volume= 1.381 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

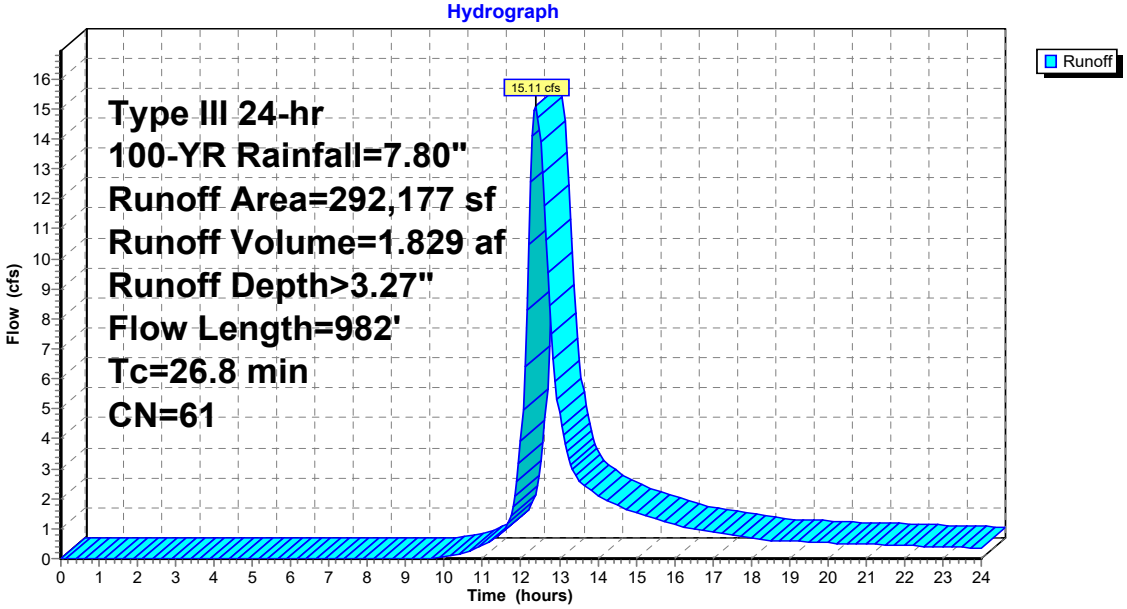
Runoff = 15.11 cfs @ 12.39 hrs, Volume= 1.829 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

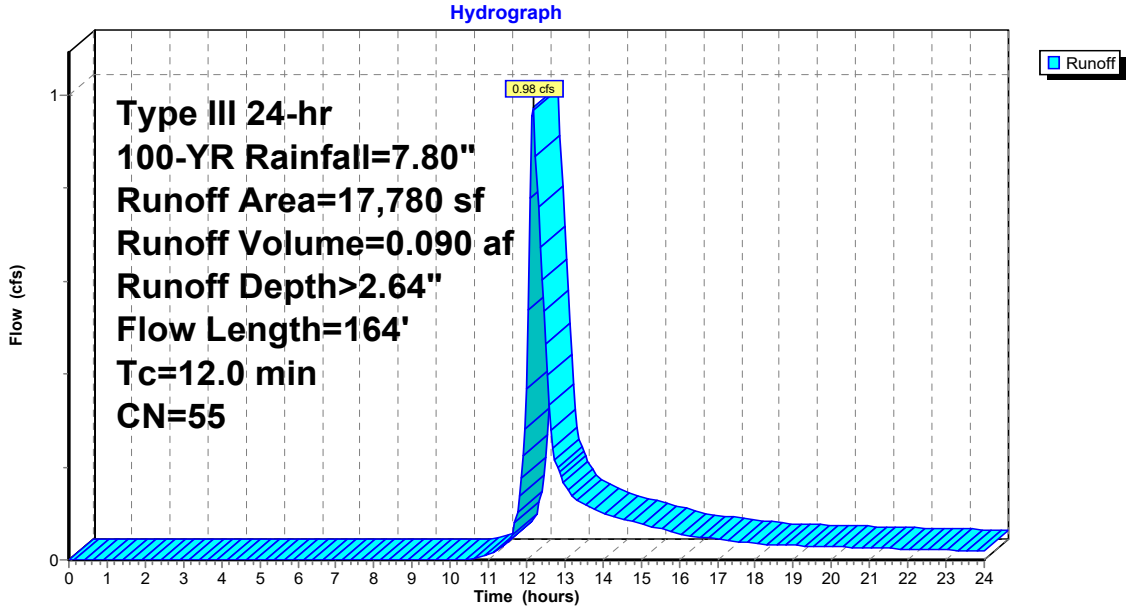
Runoff = 0.98 cfs @ 12.18 hrs, Volume= 0.090 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

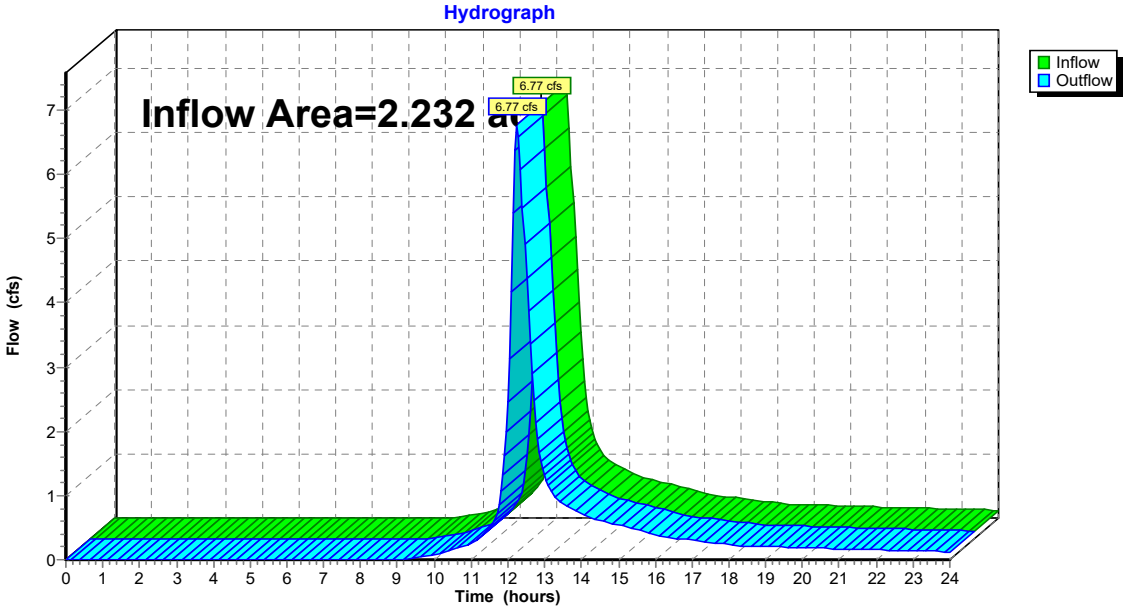


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 3.72" for 100-YR event
Inflow = 6.77 cfs @ 12.26 hrs, Volume= 0.692 af
Outflow = 6.77 cfs @ 12.26 hrs, Volume= 0.692 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

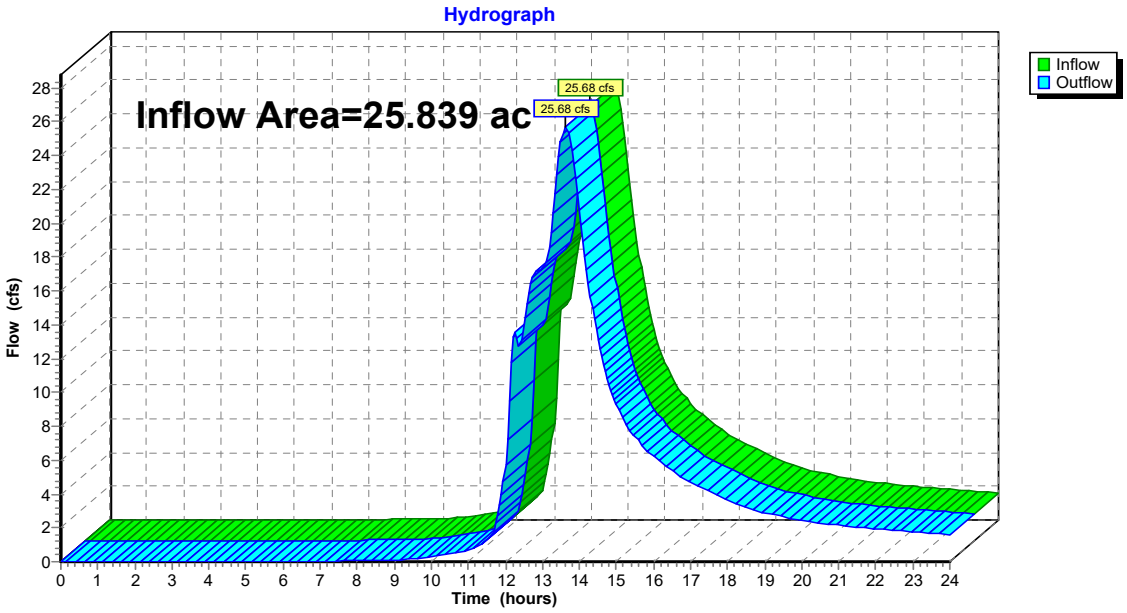


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 3.20" for 100-YR event
Inflow = 25.68 cfs @ 13.63 hrs, Volume= 6.889 af
Outflow = 25.68 cfs @ 13.63 hrs, Volume= 6.889 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

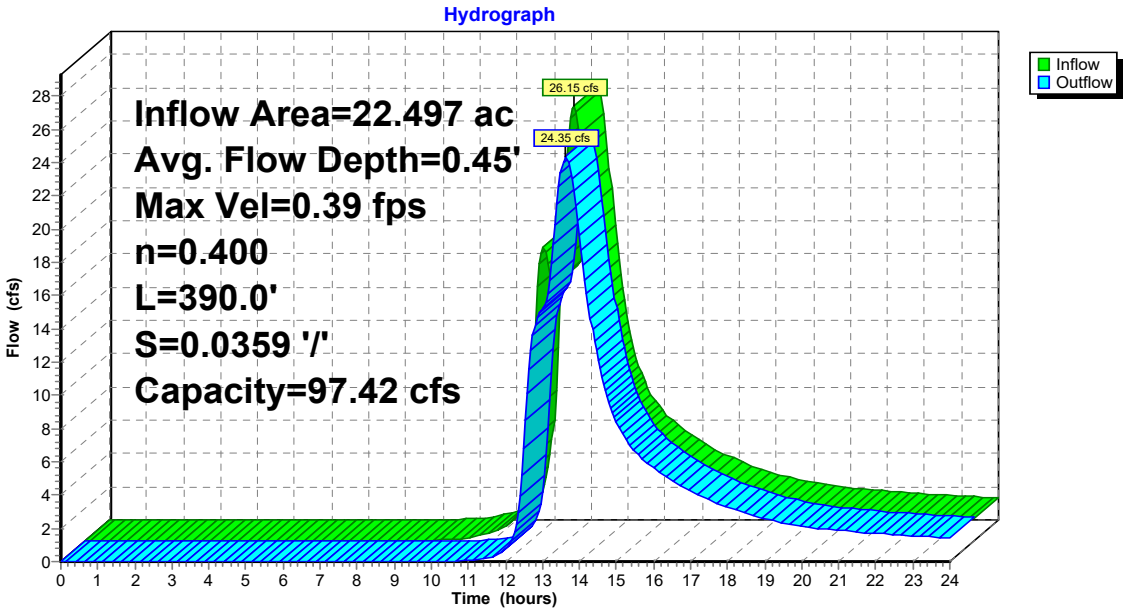
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 3.10" for 100-YR event
Inflow = 26.15 cfs @ 13.19 hrs, Volume= 5.811 af
Outflow = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af, Atten= 7%, Lag= 26.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.39 fps, Min. Travel Time= 16.5 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 39.6 min

Peak Storage= 24,197 cf @ 13.35 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 3.07" for 100-YR event
Inflow = 25.28 cfs @ 12.85 hrs, Volume= 4.062 af
Outflow = 23.10 cfs @ 13.21 hrs, Volume= 3.990 af, Atten= 9%, Lag= 21.9 min

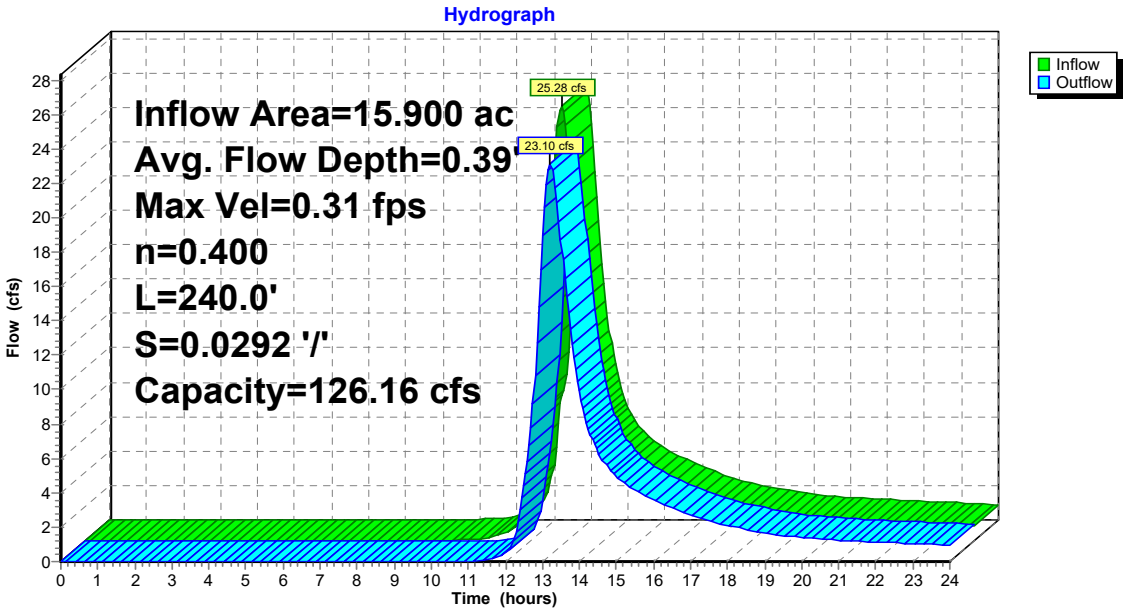
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 13.0 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 34.9 min

Peak Storage= 18,006 cf @ 13.00 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 3.17" for 100-YR event
Inflow = 27.33 cfs @ 12.49 hrs, Volume= 3.697 af
Outflow = 24.39 cfs @ 12.85 hrs, Volume= 3.629 af, Atten= 11%, Lag= 21.6 min

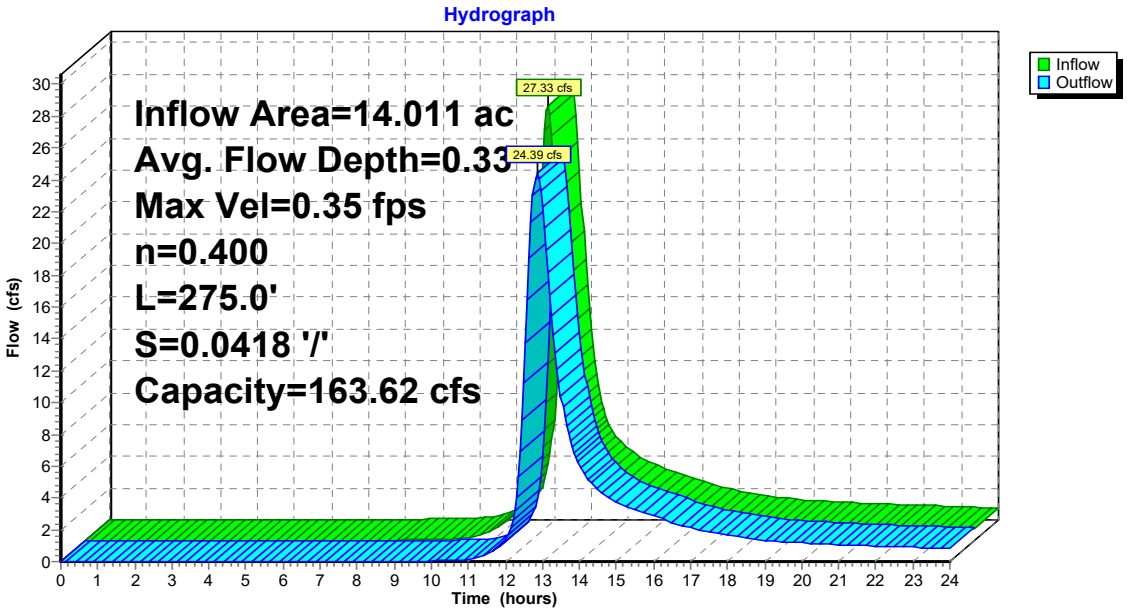
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.35 fps, Min. Travel Time= 13.1 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 39.2 min

Peak Storage= 19,258 cf @ 12.63 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

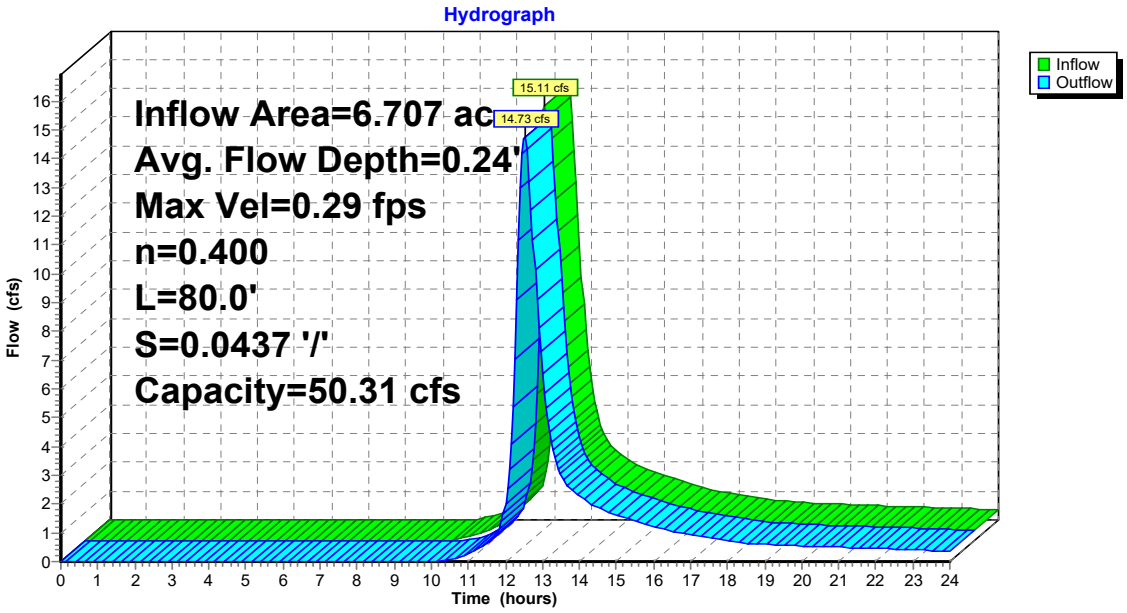
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 3.27" for 100-YR event
Inflow = 15.11 cfs @ 12.39 hrs, Volume= 1.829 af
Outflow = 14.73 cfs @ 12.52 hrs, Volume= 1.817 af, Atten= 3%, Lag= 7.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.29 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 13.1 min

Peak Storage= 4,012 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

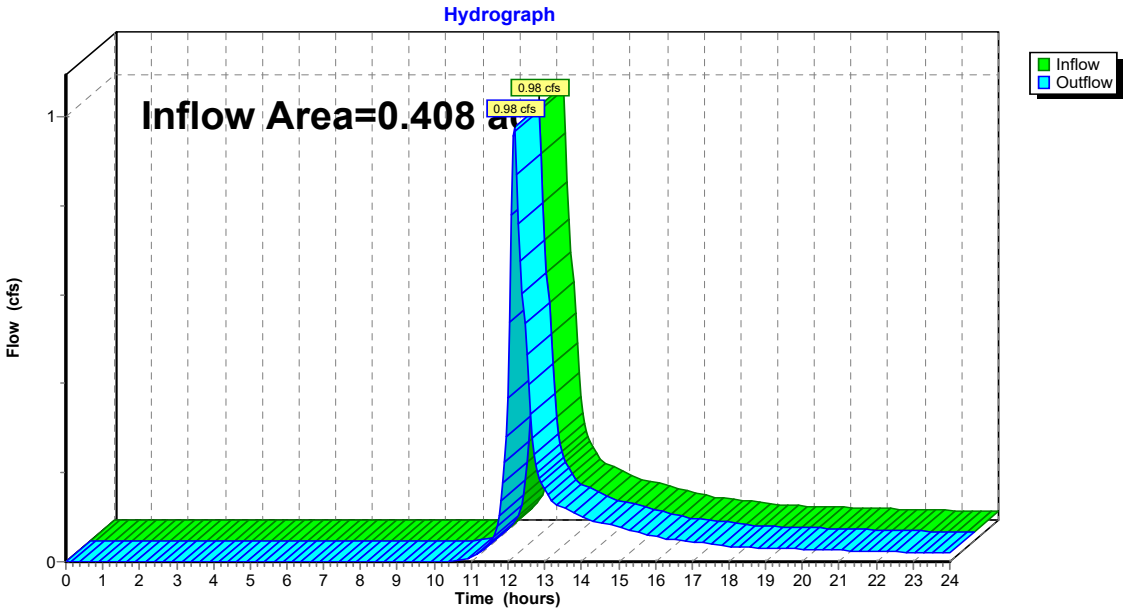


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 2.64" for 100-YR event
Inflow = 0.98 cfs @ 12.18 hrs, Volume= 0.090 af
Outflow = 0.98 cfs @ 12.18 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 3.03" for 100-YR event
Inflow = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af
Outflow = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af, Atten= 0%, Lag= 0.1 min
Primary = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 603.76' @ 13.63 hrs Surf.Area= 38 sf Storage= 64 cf

Plug-Flow detention time= 0.0 min calculated for 5.685 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (927.9 - 927.8)

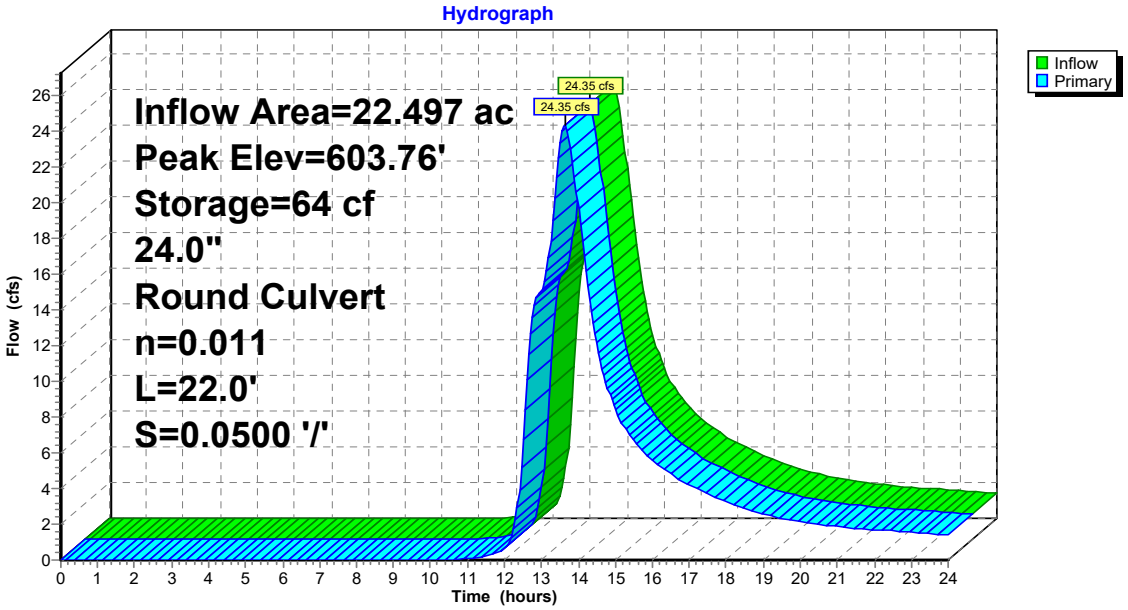
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

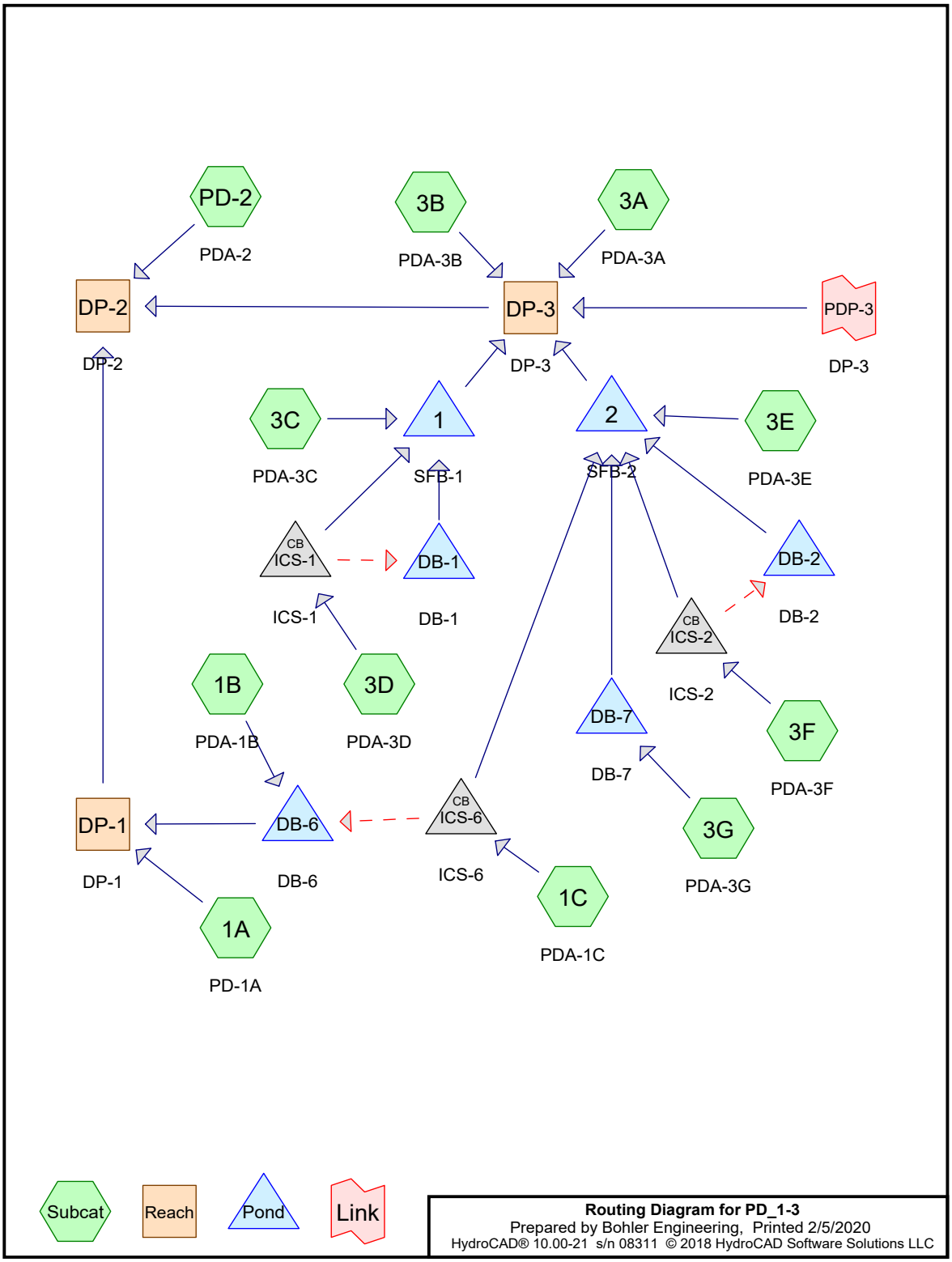
Primary OutFlow Max=24.32 cfs @ 13.63 hrs HW=603.75' (Free Discharge)
└**1=RCP_Round 24"** (Inlet Controls 24.32 cfs @ 7.74 fps)

Pond RCP: 24" RCP



APPENDIX D: PROPOSED CONDITIONS HYDROLOGIC ANALYSIS

- *PROPOSED CONDITIONS DRAINAGE MAP*
- *PROPOSED CONDITIONS HYDROCAD CALCULATIONS*
- *SAND FILTER BASIN DRAWDOWN CALCULATIONS*



Routing Diagram for PD_1-3
Prepared by Bohler Engineering, Printed 2/5/2020
HydroCAD® 10.00-21 s/n 08311 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.454	61	>75% Grass cover, Good, HSG B (1C, 3D, 3F, 3G)
1.359	74	>75% Grass cover, Good, HSG C (1A, 1C, 3B, 3C, 3D, 3E, 3F, 3G, PD-2)
0.775	98	Paved parking (1C)
0.479	98	Paved parking, HSG B (3A, 3F)
0.035	98	Paved parking, HSG C (1A, 3B)
0.975	98	Paved parking, HSG D (3D, PD-2)
0.570	98	Roofs, HSG B (1C, 3G)
0.133	98	Roofs, HSG C (3C, 3E)
0.115	98	Unconnected pavement, HSG B (3G)
0.019	98	Unconnected pavement, HSG C (3C, 3E)
0.133	98	Unconnected roofs, HSG C (1B)
1.731	55	Woods, Good, HSG B (1C, 3A, 3B, PD-2)
1.656	70	Woods, Good, HSG C (1A, 1C, 3A, 3B, PD-2)
8.437	**78**	**TOTAL AREA**

Summary for Subcatchment 1A: PD-1A

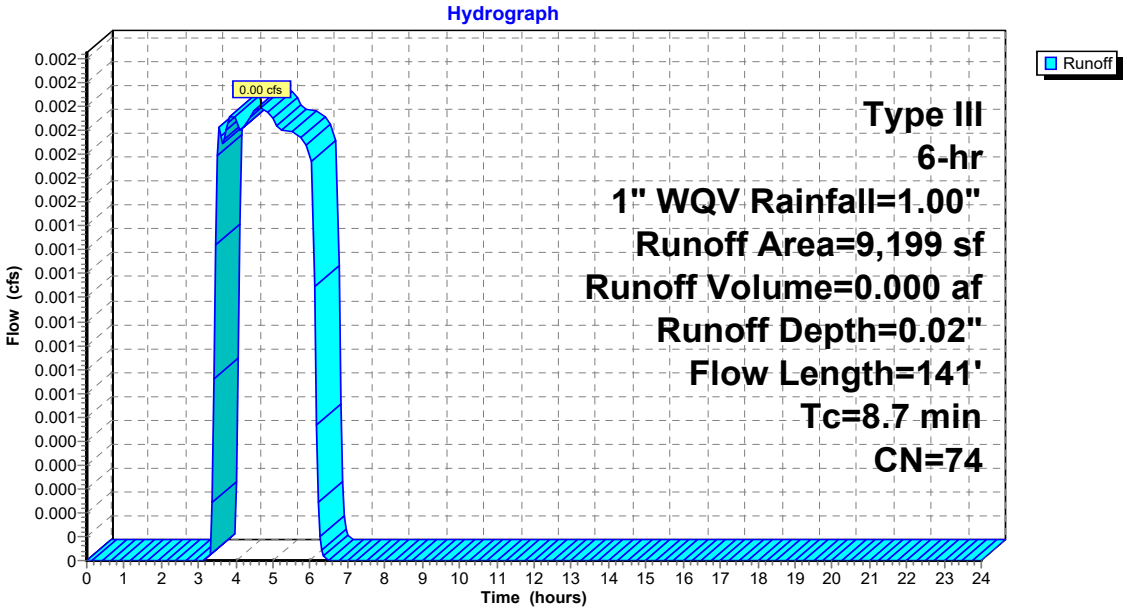
Runoff = 0.00 cfs @ 4.65 hrs, Volume= 0.000 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

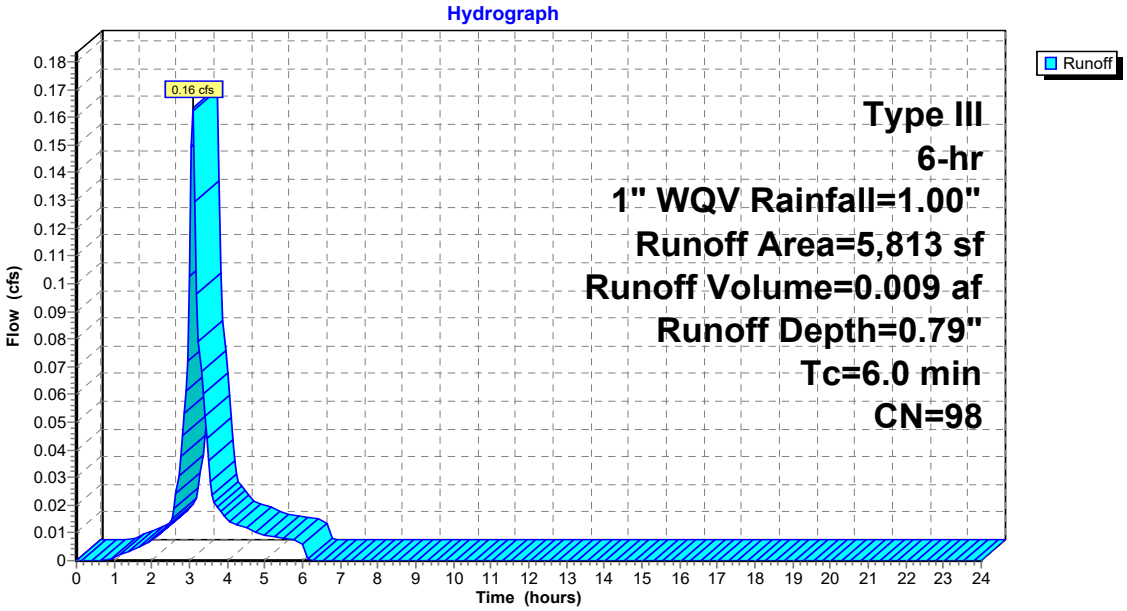
Runoff = 0.16 cfs @ 3.09 hrs, Volume= 0.009 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

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

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

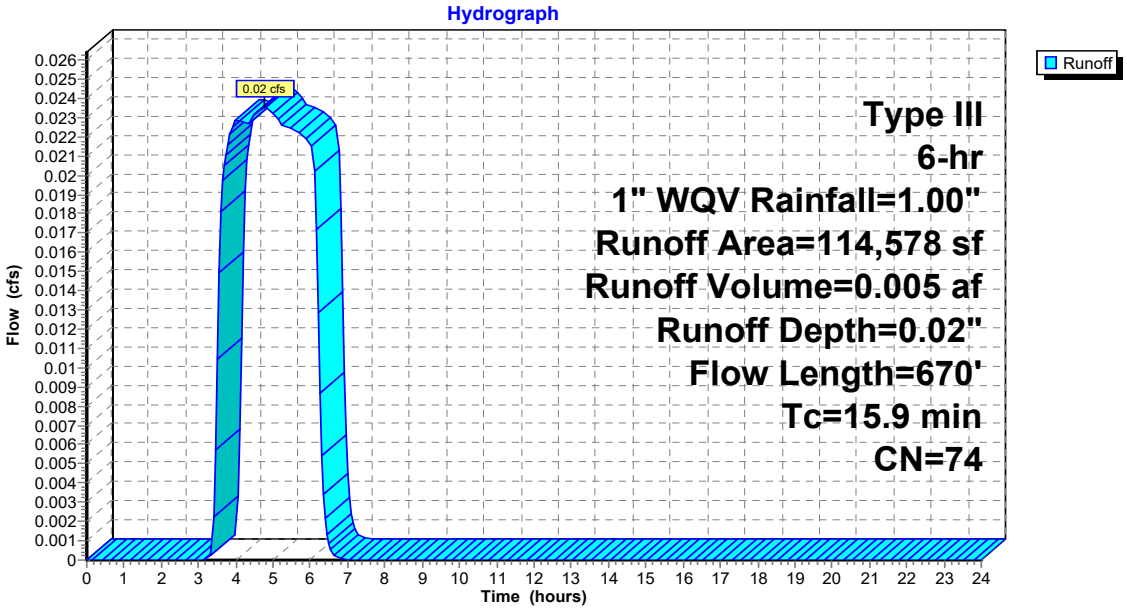
Runoff = 0.02 cfs @ 4.77 hrs, Volume= 0.005 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

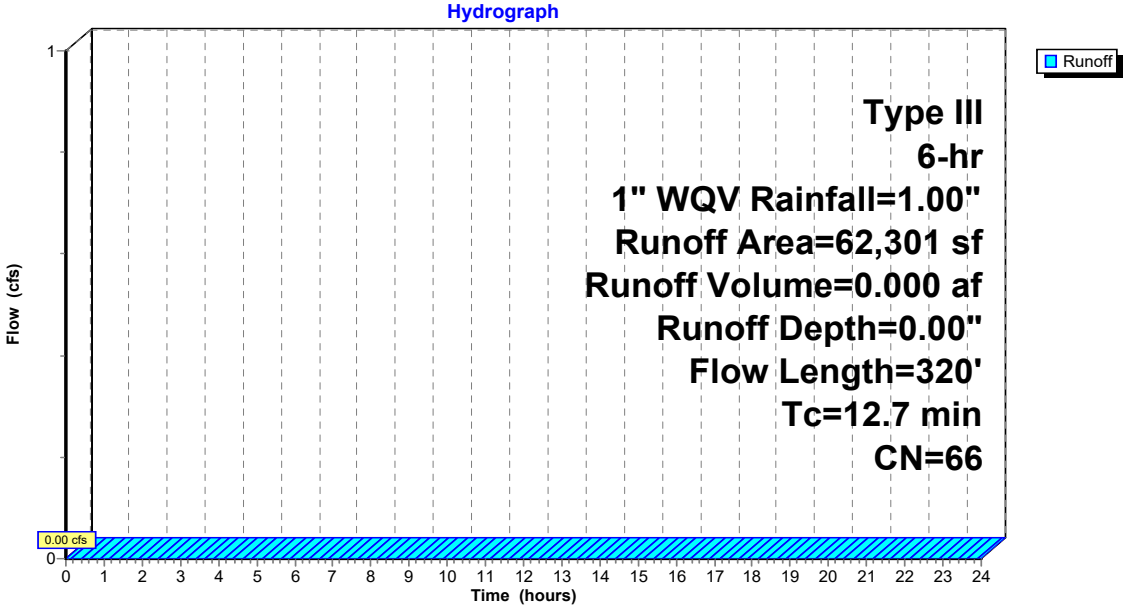
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

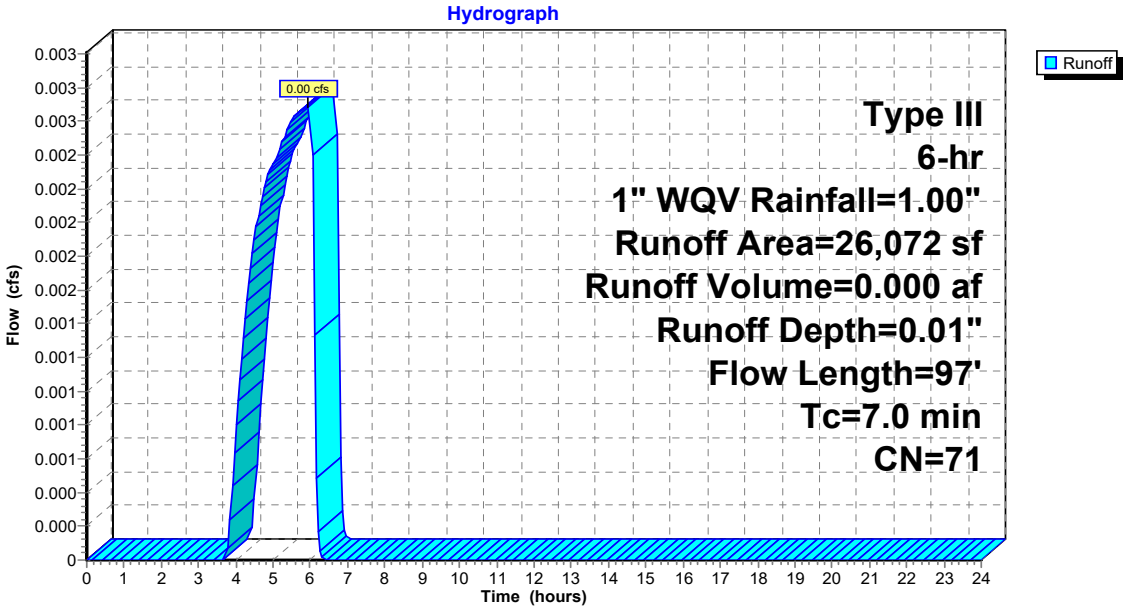
Runoff = 0.00 cfs @ 5.95 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

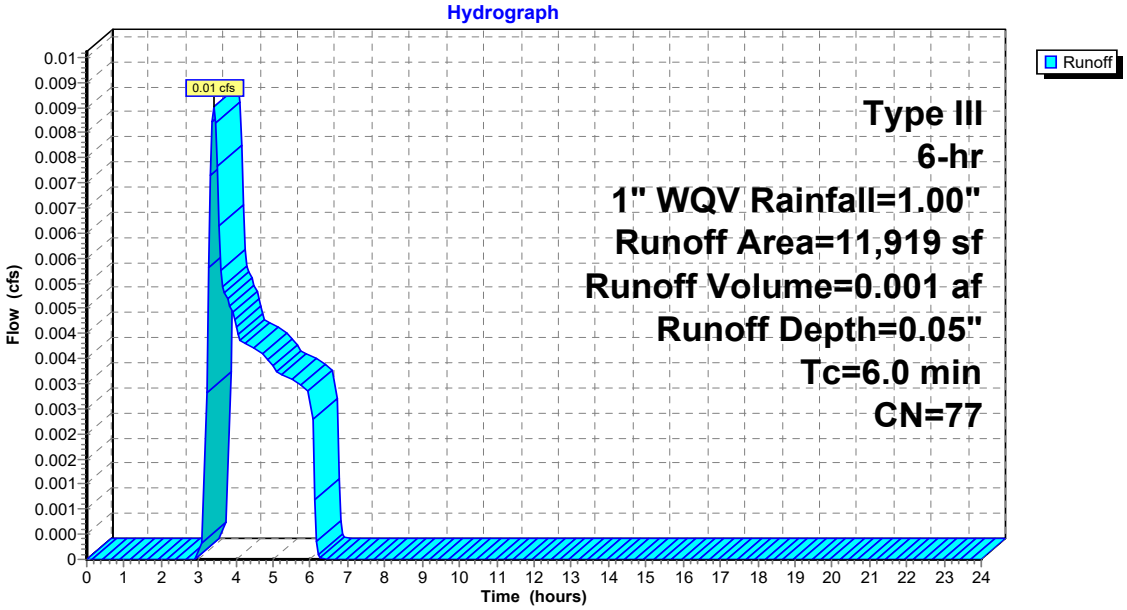
Runoff = 0.01 cfs @ 3.40 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

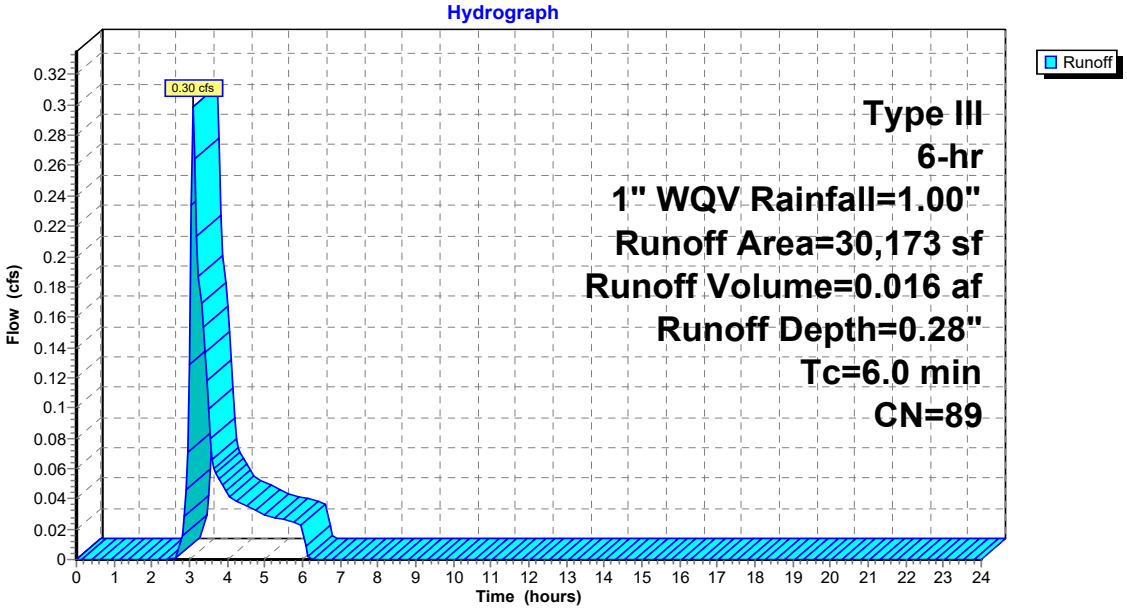
Runoff = 0.30 cfs @ 3.11 hrs, Volume= 0.016 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

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

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

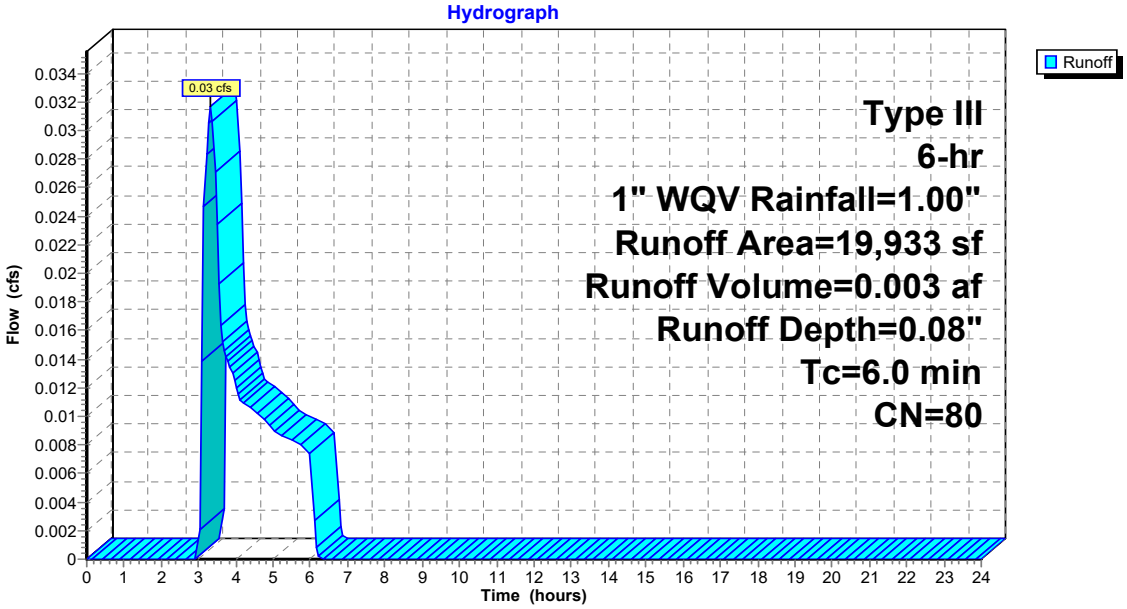
Runoff = 0.03 cfs @ 3.32 hrs, Volume= 0.003 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

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

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

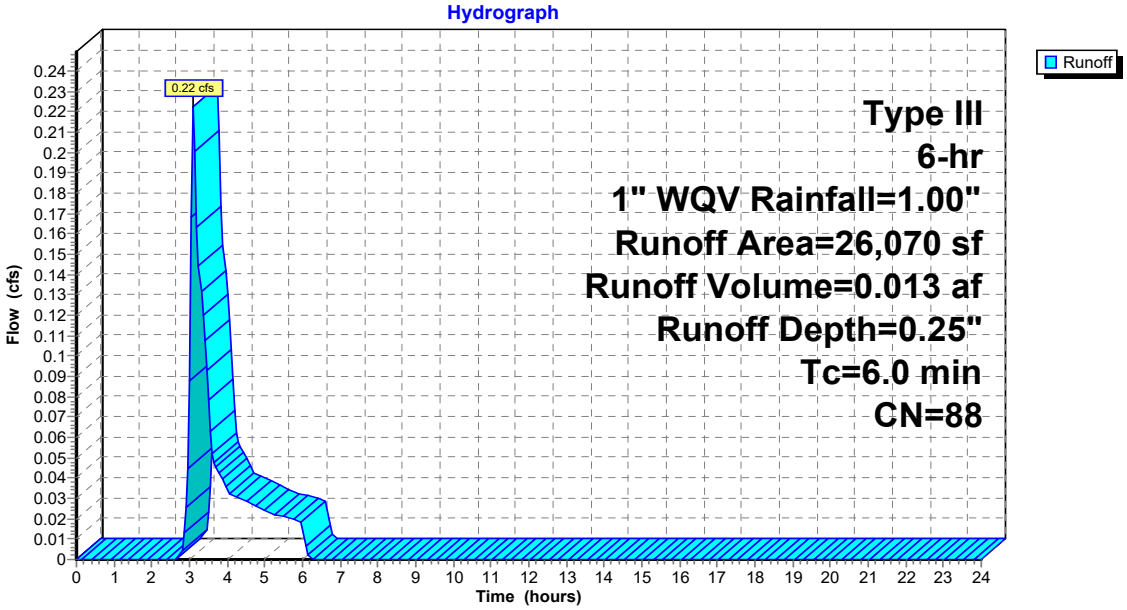
Runoff = 0.22 cfs @ 3.11 hrs, Volume= 0.013 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

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

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

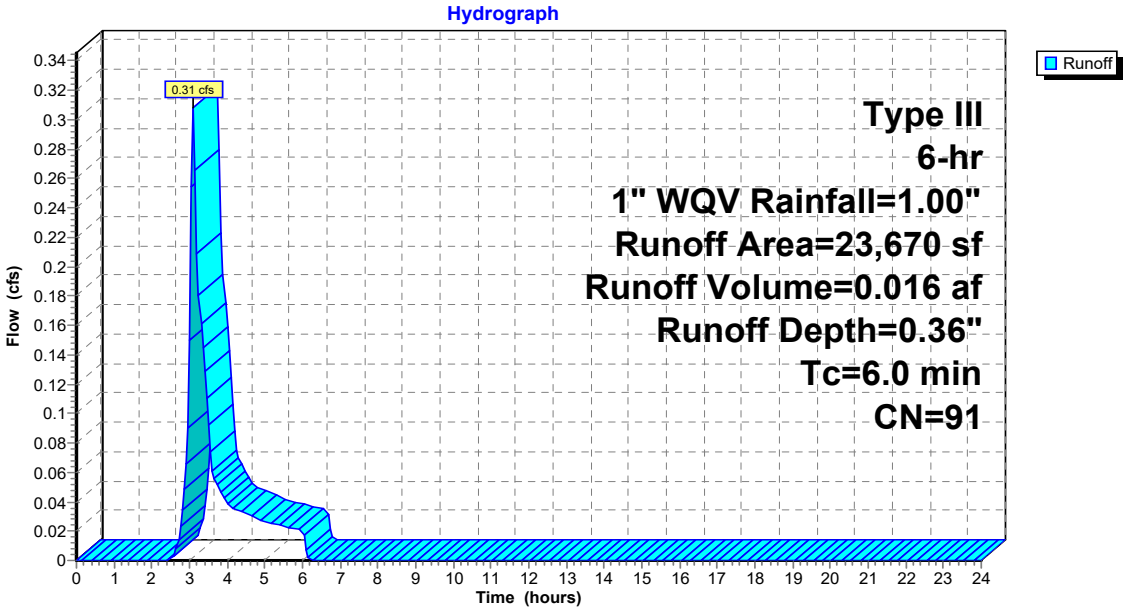
Runoff = 0.31 cfs @ 3.10 hrs, Volume= 0.016 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

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

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

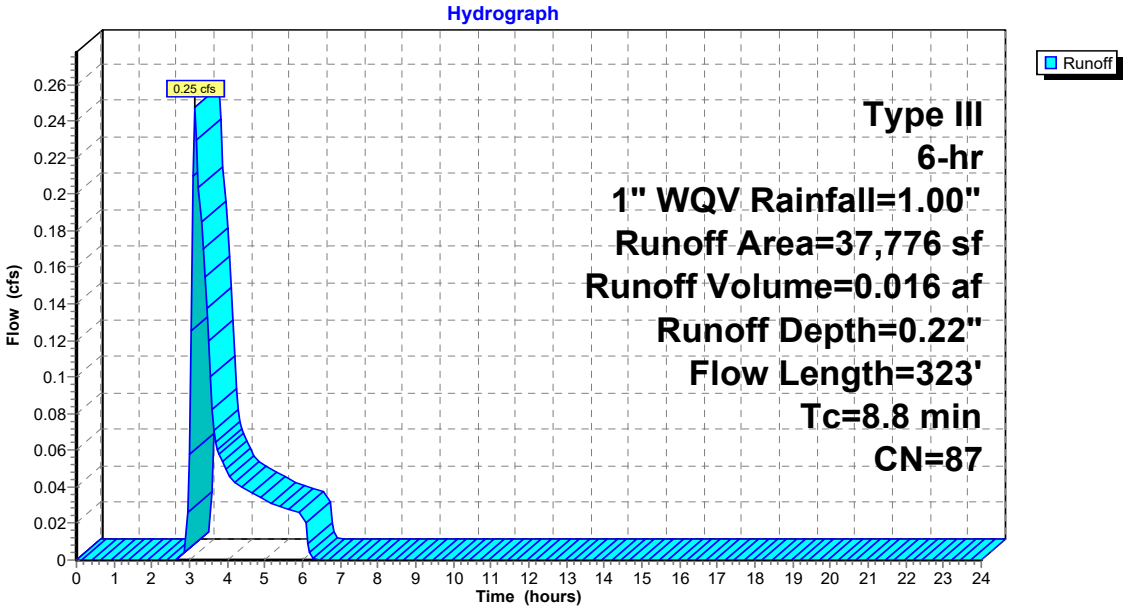
Runoff = 0.25 cfs @ 3.16 hrs, Volume= 0.016 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

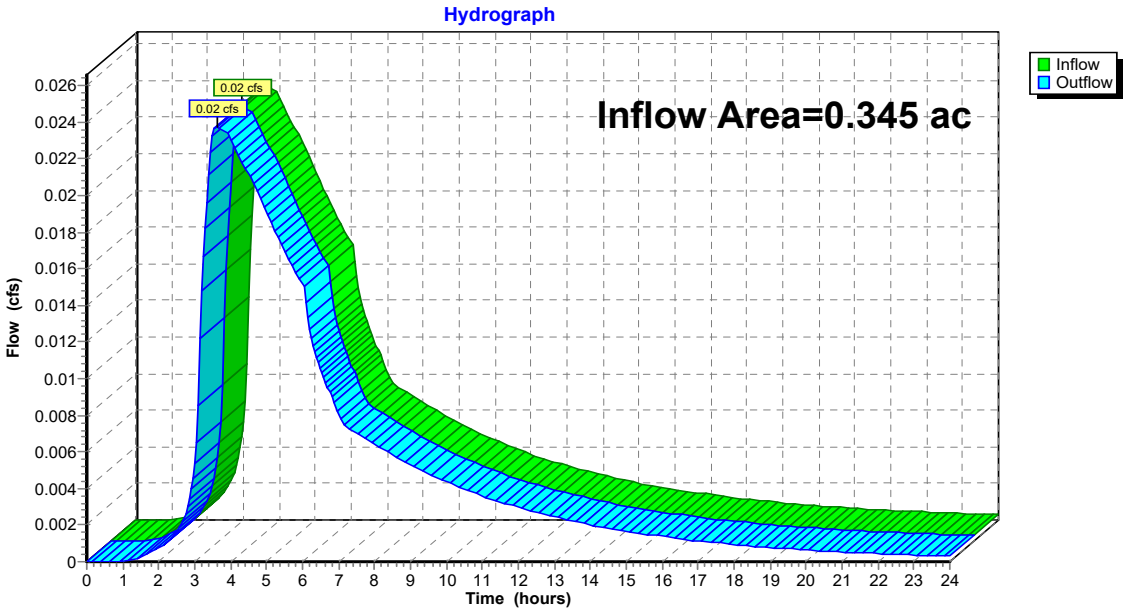


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 0.32" for 1" WQV event
Inflow = 0.02 cfs @ 3.61 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 3.61 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

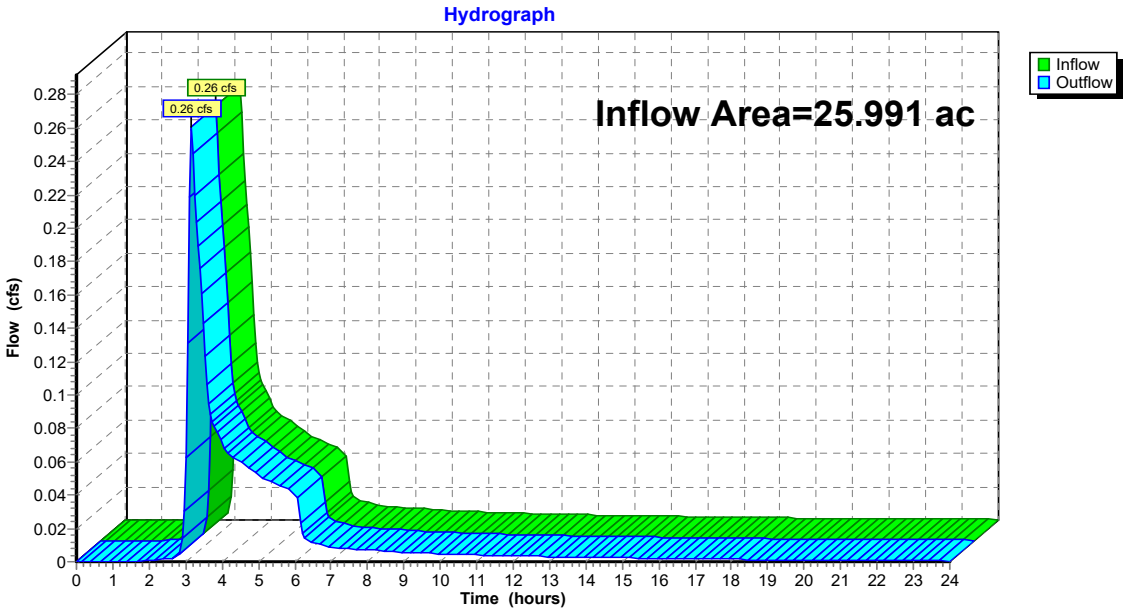


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 0.01" for 1" WQV event
Inflow = 0.26 cfs @ 3.16 hrs, Volume= 0.026 af
Outflow = 0.26 cfs @ 3.16 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

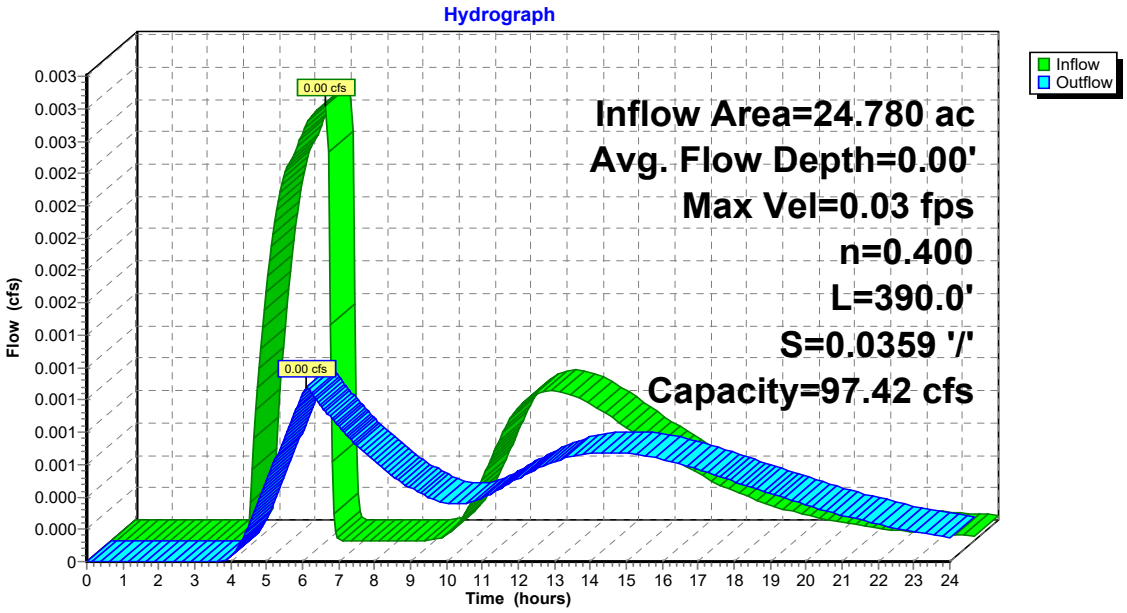
Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 5.95 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 6.12 hrs, Volume= 0.001 af, Atten= 60%, Lag= 10.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.03 fps, Min. Travel Time= 199.2 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 199.2 min

Peak Storage= 13 cf @ 6.12 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach DP-3: DP-3



Stage-Discharge for Reach DP-3: DP-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
618.00	0.00	0.00	618.52	0.43	31.73
618.01	0.03	0.04	618.53	0.44	32.77
618.02	0.05	0.13	618.54	0.44	33.83
618.03	0.07	0.27	618.55	0.45	34.91
618.04	0.08	0.43	618.56	0.45	35.99
618.05	0.10	0.62	618.57	0.46	37.09
618.06	0.11	0.84	618.58	0.46	38.21
618.07	0.12	1.09	618.59	0.47	39.34
618.08	0.13	1.37	618.60	0.47	40.48
618.09	0.14	1.66	618.61	0.48	41.64
618.10	0.15	1.98	618.62	0.48	42.81
618.11	0.16	2.32	618.63	0.49	44.00
618.12	0.17	2.69	618.64	0.49	45.20
618.13	0.18	3.07	618.65	0.50	46.41
618.14	0.19	3.48	618.66	0.50	47.64
618.15	0.20	3.91	618.67	0.51	48.88
618.16	0.20	4.35	618.68	0.51	50.14
618.17	0.21	4.82	618.69	0.52	51.40
618.18	0.22	5.30	618.70	0.52	52.69
618.19	0.23	5.81	618.71	0.52	53.98
618.20	0.24	6.33	618.72	0.53	55.29
618.21	0.24	6.87	618.73	0.53	56.62
618.22	0.25	7.43	618.74	0.54	57.95
618.23	0.26	8.00	618.75	0.54	59.30
618.24	0.27	8.60	618.76	0.55	60.67
618.25	0.27	9.21	618.77	0.55	62.05
618.26	0.28	9.84	618.78	0.56	63.44
618.27	0.29	10.48	618.79	0.56	64.84
618.28	0.29	11.14	618.80	0.56	66.26
618.29	0.30	11.82	618.81	0.57	67.69
618.30	0.31	12.51	618.82	0.57	69.14
618.31	0.31	13.23	618.83	0.58	70.59
618.32	0.32	13.95	618.84	0.58	72.07
618.33	0.33	14.70	618.85	0.59	73.55
618.34	0.33	15.45	618.86	0.59	75.05
618.35	0.34	16.23	618.87	0.59	76.56
618.36	0.34	17.02	618.88	0.60	78.09
618.37	0.35	17.83	618.89	0.60	79.63
618.38	0.36	18.65	618.90	0.61	81.18
618.39	0.36	19.48	618.91	0.61	82.74
618.40	0.37	20.34	618.92	0.61	84.32
618.41	0.37	21.20	618.93	0.62	85.91
618.42	0.38	22.09	618.94	0.62	87.52
618.43	0.38	22.99	618.95	0.63	89.14
618.44	0.39	23.90	618.96	0.63	90.77
618.45	0.40	24.83	618.97	0.63	92.41
618.46	0.40	25.77	618.98	0.64	94.07
618.47	0.41	26.72	618.99	0.64	95.74
618.48	0.41	27.70	619.00	**0.65**	**97.42**
618.49	0.42	28.68			
618.50	0.42	29.68			
618.51	0.43	30.70			

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth = 0.22" for 1" WQV event
Inflow = 0.30 cfs @ 3.11 hrs, Volume= 0.018 af
Outflow = 0.05 cfs @ 3.00 hrs, Volume= 0.018 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.05 cfs @ 3.00 hrs, Volume= 0.018 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 607.81' @ 3.99 hrs Surf.Area= 1,166 sf Storage= 311 cf
Flood Elev= 611.25' Surf.Area= 3,452 sf Storage= 7,739 cf

Plug-Flow detention time= 72.4 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 72.4 min (304.2 - 231.8)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	7,237 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,986 cf Overall - 1,749 cf Embedded = 7,237 cf
#2	607.00'	385 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,166 cf Overall x 33.0% Voids
#3	608.00'	117 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 583 cf Overall x 20.0% Voids
		7,739 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166
609.00	2,130	1,648	2,814
610.00	2,760	2,445	5,259
611.20	3,452	3,727	8,986

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166

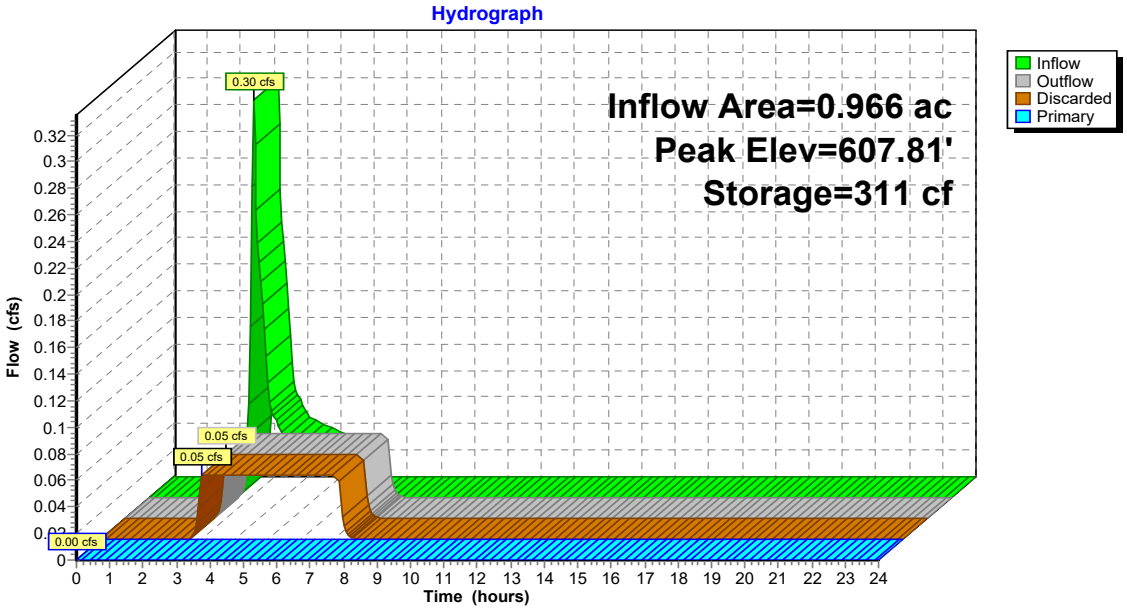
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,166	0	0
608.50	1,166	583	583

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.00' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	609.80'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 3.00 hrs HW=607.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=607.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1: SFB-1



Stage-Discharge for Pond 1: SFB-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
607.00	0.00	0.00	0.00
607.05	0.05	0.05	0.00
607.10	0.05	0.05	0.00
607.15	0.05	0.05	0.00
607.20	0.05	0.05	0.00
607.25	0.05	0.05	0.00
607.30	0.05	0.05	0.00
607.35	0.05	0.05	0.00
607.40	0.05	0.05	0.00
607.45	0.05	0.05	0.00
607.50	0.05	0.05	0.00
607.55	0.05	0.05	0.00
607.60	0.05	0.05	0.00
607.65	0.05	0.05	0.00
607.70	0.05	0.05	0.00
607.75	0.05	0.05	0.00
607.80	0.05	0.05	0.00
607.85	0.05	0.05	0.00
607.90	0.05	0.05	0.00
607.95	0.05	0.05	0.00
608.00	0.05	0.05	0.00
608.05	0.05	0.05	0.00
608.10	0.05	0.05	0.00
608.15	0.05	0.05	0.00
608.20	0.06	0.06	0.00
608.25	0.06	0.06	0.00
608.30	0.06	0.06	0.00
608.35	0.06	0.06	0.00
608.40	0.06	0.06	0.00
608.45	0.07	0.07	0.00
608.50	0.07	0.07	0.00
608.55	0.07	0.07	0.00
608.60	0.07	0.07	0.00
608.65	0.07	0.07	0.00
608.70	0.08	0.08	0.00
608.75	0.08	0.08	0.00
608.80	0.08	0.08	0.00
608.85	0.08	0.08	0.00
608.90	0.08	0.08	0.00
608.95	0.09	0.09	0.00
609.00	0.09	0.09	0.00
609.05	0.09	0.09	0.00
609.10	0.11	0.09	0.01
609.15	0.12	0.09	0.03
609.20	0.13	0.09	0.04
609.25	0.14	0.10	0.04
609.30	0.15	0.10	0.05
609.35	0.15	0.10	0.05
609.40	0.16	0.10	0.06
609.45	0.16	0.10	0.06
609.50	0.17	0.10	0.07
609.55	0.18	0.10	0.07
609.60	0.18	0.10	0.08
609.65	0.19	0.11	0.08
609.70	0.19	0.11	0.08
609.75	0.19	0.11	0.09
609.80	0.20	0.11	0.09
609.85	0.28	0.11	0.17
609.90	0.42	0.11	0.31
609.95	0.61	0.11	0.50
610.00	0.83	0.12	0.71
610.05	1.06	0.12	0.94
610.10	1.14	0.12	1.03
610.15	1.22	0.12	1.10
610.20	1.29	0.12	1.17
610.25	1.36	0.12	1.24
610.30	1.43	0.12	1.30
610.35	1.49	0.12	1.36
610.40	1.55	0.12	1.42
610.45	1.60	0.13	1.48
610.50	1.66	0.13	1.53
610.55	1.71	0.13	1.58
610.60	1.76	0.13	1.63
610.65	1.81	0.13	1.68
610.70	1.86	0.13	1.73
610.75	1.91	0.13	1.77
610.80	1.95	0.13	1.82
610.85	2.00	0.14	1.86
610.90	2.04	0.14	1.90
610.95	2.08	0.14	1.95
611.00	2.13	0.14	1.99
611.05	2.17	0.14	2.03
611.10	2.21	0.14	2.07
611.15	2.25	0.14	2.10
611.20	2.29	**0.14**	2.14
611.25	**2.32**	0.14	**2.18**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 0.10" for 1" WQV event
Inflow = 0.25 cfs @ 3.12 hrs, Volume= 0.036 af
Outflow = 0.21 cfs @ 3.21 hrs, Volume= 0.036 af, Atten= 15%, Lag= 5.5 min
Discarded = 0.21 cfs @ 3.21 hrs, Volume= 0.036 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 613.29' @ 3.21 hrs Surf.Area= 3,944 sf Storage= 53 cf
Flood Elev= 617.40' Surf.Area= 10,100 sf Storage= 21,942 cf

Plug-Flow detention time= 4.1 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 4.0 min (319.0 - 315.0)

Volume	Invert	Avail.Storage	Storage Description
#1	613.25'	20,246 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 26,162 cf Overall - 5,916 cf Embedded = 20,246 cf
#2	613.25'	1,302 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 3,944 cf Overall x 33.0% Voids
#3	614.25'	394 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,972 cf Overall x 20.0% Voids
		21,942 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944
615.00	5,539	3,556	7,500
616.00	7,378	6,459	13,959
617.00	9,278	8,328	22,287
617.40	10,100	3,876	26,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944

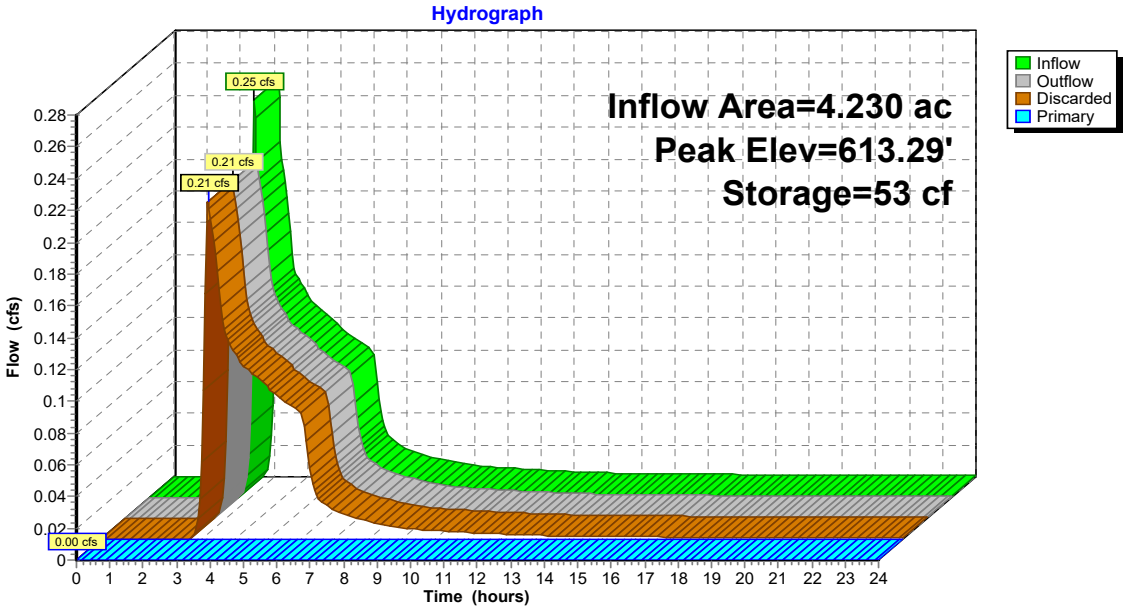
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.25	3,944	0	0
614.75	3,944	1,972	1,972

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.25'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.75'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.75' / 612.25' S= 0.0536 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.22 cfs @ 3.21 hrs HW=613.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.25' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2: SFB-2



Stage-Discharge for Pond 2: SFB-2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
613.25	0.00	0.00	0.00
613.30	0.22	0.22	0.00
613.35	0.22	0.22	0.00
613.40	0.22	0.22	0.00
613.45	0.22	0.22	0.00
613.50	0.22	0.22	0.00
613.55	0.22	0.22	0.00
613.60	0.22	0.22	0.00
613.65	0.22	0.22	0.00
613.70	0.22	0.22	0.00
613.75	0.22	0.22	0.00
613.80	0.22	0.22	0.00
613.85	0.22	0.22	0.00
613.90	0.22	0.22	0.00
613.95	0.22	0.22	0.00
614.00	0.22	0.22	0.00
614.05	0.22	0.22	0.00
614.10	0.22	0.22	0.00
614.15	0.22	0.22	0.00
614.20	0.22	0.22	0.00
614.25	0.22	0.22	0.00
614.30	0.22	0.22	0.00
614.35	0.23	0.23	0.00
614.40	0.23	0.23	0.00
614.45	0.24	0.24	0.00
614.50	0.25	0.25	0.00
614.55	0.25	0.25	0.00
614.60	0.26	0.26	0.00
614.65	0.26	0.26	0.00
614.70	0.27	0.27	0.00
614.75	0.28	0.28	0.00
614.80	0.28	0.28	0.00
614.85	0.29	0.29	0.00
614.90	0.29	0.29	0.00
614.95	0.30	0.30	0.00
615.00	0.31	0.31	0.00
615.05	0.31	0.31	0.00
615.10	0.32	0.32	0.00
615.15	0.32	0.32	0.00
615.20	0.33	0.33	0.00
615.25	0.33	0.33	0.00
615.30	0.35	0.34	0.01
615.35	0.37	0.34	0.03
615.40	0.38	0.35	0.04
615.45	0.39	0.35	0.04
615.50	0.40	0.36	0.05
615.55	0.42	0.36	0.05
615.60	0.43	0.37	0.06
615.65	0.43	0.37	0.06
615.70	0.44	0.38	0.07
615.75	0.45	0.38	0.07
615.80	0.46	0.39	0.08
615.85	0.47	0.39	0.08
615.90	0.48	0.40	0.08
615.95	0.49	0.40	0.09
616.00	0.50	0.41	0.09
616.05	0.56	0.41	0.15
616.10	0.67	0.42	0.26
616.15	0.82	0.42	0.40
616.20	0.95	0.43	0.52
616.25	1.01	0.43	0.58
616.30	1.06	0.44	0.62
616.35	1.11	0.44	0.67
616.40	1.16	0.45	0.71
616.45	1.20	0.45	0.75
616.50	1.24	0.46	0.78
616.55	1.28	0.46	0.82
616.60	1.32	0.47	0.85
616.65	1.36	0.47	0.89
616.70	1.40	0.48	0.92
616.75	1.43	0.48	0.95
616.80	1.47	0.49	0.97
616.85	1.50	0.50	1.00
616.90	1.53	0.50	1.03
616.95	1.56	0.51	1.06
617.00	1.59	0.51	1.08
617.05	1.63	0.52	1.11
617.10	1.66	0.52	1.13
617.15	1.69	0.53	1.16
617.20	1.71	0.53	1.18
617.25	1.74	0.54	1.20
617.30	1.77	0.55	1.23
617.35	1.80	0.55	1.25
617.40	**1.83**	**0.56**	**1.27**

Summary for Pond DB-1: DB-1

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.25' @ 0.00 hrs Surf.Area= 3,131 sf Storage= 0 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=609.25' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-1: DB-1 - Chamber Wizard Field A

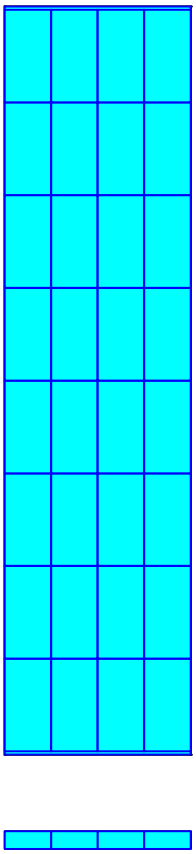
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

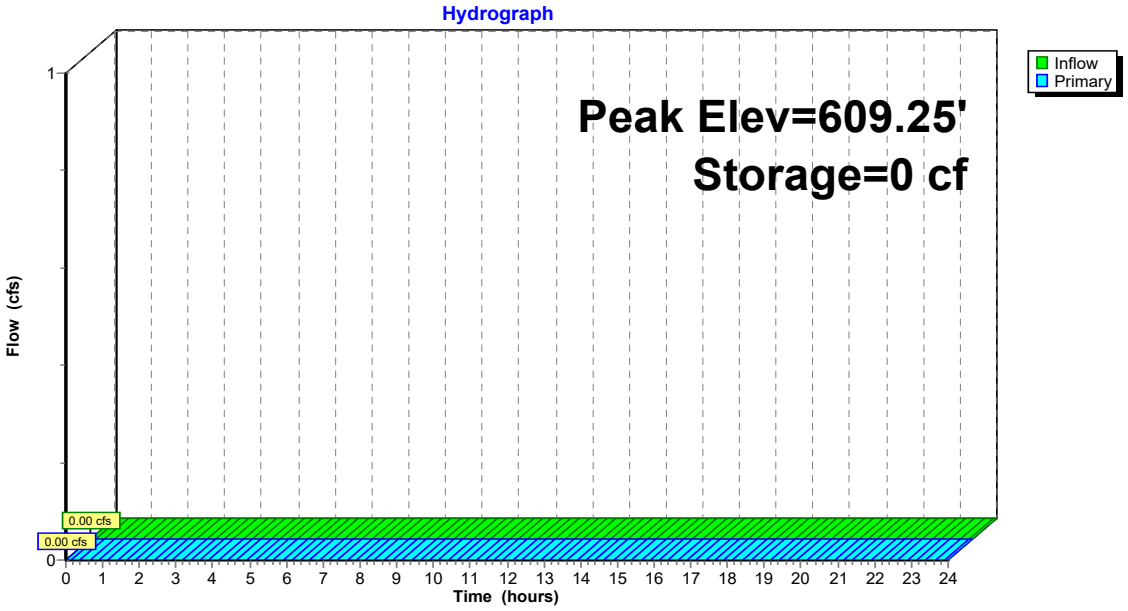
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Inflow
Primary
Peak Elev=609.25'
Storage=0 cf
Flow (cfs)
1
0
0.00 cfs
0.00 cfs
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Discharge for Pond DB-1: DB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
609.25	0.00	610.29	0.40	611.33	0.65
609.27	0.00	610.31	0.41	611.35	0.65
609.29	0.00	610.33	0.42	611.37	0.65
609.31	0.01	610.35	0.43	611.39	0.66
609.33	0.01	610.37	0.44	611.41	0.66
609.35	0.02	610.39	0.46	611.43	0.66
609.37	0.03	610.41	0.48	611.45	0.66
609.39	0.04	610.43	0.49	611.47	0.67
609.41	0.05	610.45	0.51	611.49	0.67
609.43	0.06	610.47	0.51	611.51	0.67
609.45	0.08	610.49	0.52	611.53	0.68
609.47	0.09	610.51	0.52	611.55	0.68
609.49	0.11	610.53	0.53	611.57	0.68
609.51	0.13	610.55	0.53	611.59	0.68
609.53	0.14	610.57	0.53	611.61	0.69
609.55	0.15	610.59	0.54	611.63	0.69
609.57	0.17	610.61	0.54	611.65	0.69
609.59	0.17	610.63	0.54	611.67	0.69
609.61	0.18	610.65	0.55	611.69	0.70
609.63	0.19	610.67	0.55	611.71	0.70
609.65	0.20	610.69	0.55	611.73	0.70
609.67	0.21	610.71	0.56	611.75	0.70
609.69	0.22	610.73	0.56	611.77	0.71
609.71	0.23	610.75	0.56	611.79	0.71
609.73	0.24	610.77	0.57	611.81	0.71
609.75	0.24	610.79	0.57	611.83	0.71
609.77	0.25	610.81	0.57	611.85	0.72
609.79	0.26	610.83	0.57	611.87	0.72
609.81	0.26	610.85	0.58	611.89	0.72
609.83	0.27	610.87	0.58	611.91	**0.72**
609.85	0.28	610.89	0.58		
609.87	0.28	610.91	0.59		
609.89	0.29	610.93	0.59		
609.91	0.30	610.95	0.59		
609.93	0.30	610.97	0.60		
609.95	0.31	610.99	0.60		
609.97	0.31	611.01	0.60		
609.99	0.32	611.03	0.61		
610.01	0.32	611.05	0.61		
610.03	0.33	611.07	0.61		
610.05	0.33	611.09	0.61		
610.07	0.34	611.11	0.62		
610.09	0.34	611.13	0.62		
610.11	0.35	611.15	0.62		
610.13	0.35	611.17	0.63		
610.15	0.36	611.19	0.63		
610.17	0.36	611.21	0.63		
610.19	0.37	611.23	0.63		
610.21	0.37	611.25	0.64		
610.23	0.38	611.27	0.64		
610.25	0.38	611.29	0.64		
610.27	0.39	611.31	0.65		

Summary for Pond DB-2: DB-2

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 615.25' @ 0.00 hrs Surf.Area= 3,131 sf Storage= 0 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**8.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=615.25' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-2: DB-2 - Chamber Wizard Field A

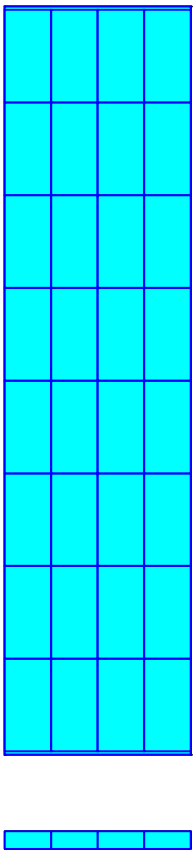
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

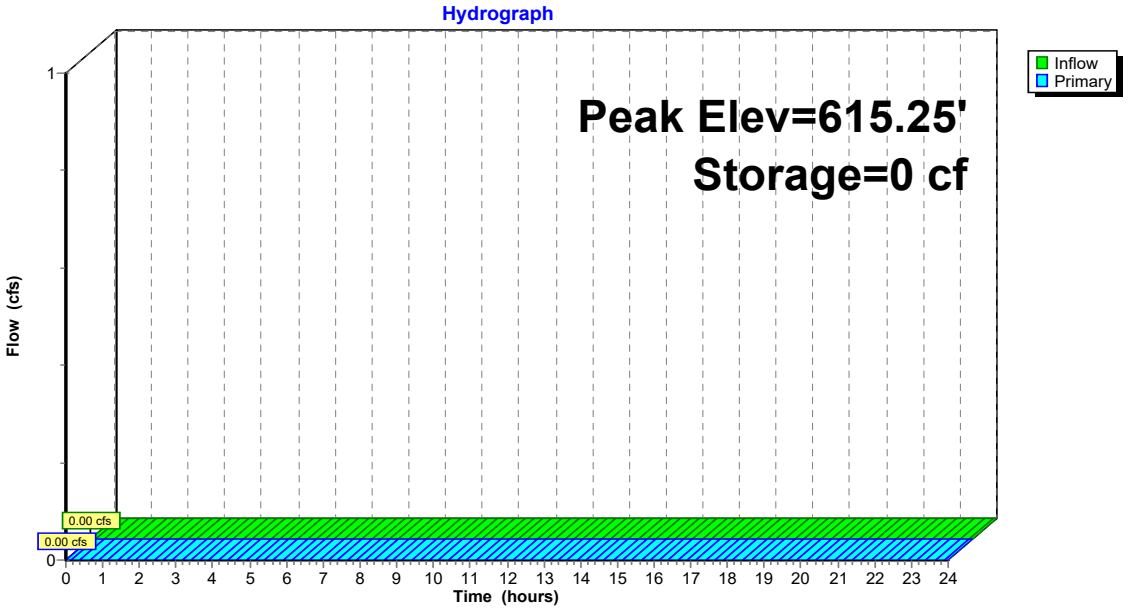
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Peak Elev=615.25'
Storage=0 cf
Inflow
Primary
0.00 cfs
0.00 cfs
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-2: DB-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.25	0.00	616.29	0.10	617.33	0.15
615.27	0.00	616.31	0.10	617.35	0.15
615.29	0.00	616.33	0.10	617.37	0.15
615.31	0.01	616.35	0.11	617.39	0.15
615.33	0.01	616.37	0.11	617.41	0.15
615.35	0.01	616.39	0.11	617.43	0.15
615.37	0.02	616.41	0.11	617.45	0.15
615.39	0.02	616.43	0.11	617.47	0.15
615.41	0.03	616.45	0.11	617.49	0.15
615.43	0.03	616.47	0.11	617.51	0.15
615.45	0.04	616.49	0.11	617.53	0.16
615.47	0.04	616.51	0.11	617.55	0.16
615.49	0.04	616.53	0.11	617.57	0.16
615.51	0.04	616.55	0.12	617.59	0.16
615.53	0.05	616.57	0.12	617.61	0.16
615.55	0.05	616.59	0.12	617.63	0.16
615.57	0.05	616.61	0.12	617.65	0.16
615.59	0.05	616.63	0.12	617.67	0.16
615.61	0.06	616.65	0.12	617.69	0.16
615.63	0.06	616.67	0.12	617.71	0.16
615.65	0.06	616.69	0.12	617.73	0.16
615.67	0.06	616.71	0.12	617.75	0.16
615.69	0.06	616.73	0.12	617.77	0.16
615.71	0.06	616.75	0.13	617.79	0.16
615.73	0.07	616.77	0.13	617.81	0.17
615.75	0.07	616.79	0.13	617.83	0.17
615.77	0.07	616.81	0.13	617.85	0.17
615.79	0.07	616.83	0.13	617.87	0.17
615.81	0.07	616.85	0.13	617.89	0.17
615.83	0.07	616.87	0.13	617.91	**0.17**
615.85	0.08	616.89	0.13		
615.87	0.08	616.91	0.13		
615.89	0.08	616.93	0.13		
615.91	0.08	616.95	0.13		
615.93	0.08	616.97	0.13		
615.95	0.08	616.99	0.14		
615.97	0.08	617.01	0.14		
615.99	0.09	617.03	0.14		
616.01	0.09	617.05	0.14		
616.03	0.09	617.07	0.14		
616.05	0.09	617.09	0.14		
616.07	0.09	617.11	0.14		
616.09	0.09	617.13	0.14		
616.11	0.09	617.15	0.14		
616.13	0.09	617.17	0.14		
616.15	0.09	617.19	0.14		
616.17	0.10	617.21	0.14		
616.19	0.10	617.23	0.14		
616.21	0.10	617.25	0.15		
616.23	0.10	617.27	0.15		
616.25	0.10	617.29	0.15		
616.27	0.10	617.31	0.15		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth = 0.79" for 1" WQV event
Inflow = 0.16 cfs @ 3.09 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 3.64 hrs, Volume= 0.009 af, Atten= 87%, Lag= 32.9 min
Primary = 0.02 cfs @ 3.64 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.34' @ 3.64 hrs Surf.Area= 2,902 sf Storage= 240 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 231.5 min calculated for 0.009 af (98% of inflow)
Center-of-Mass det. time= 230.9 min (434.7 - 203.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 3.64 hrs HW=612.34' (Free Discharge)
└─**1=Culvert** (Passes 0.02 cfs of 0.03 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.04 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

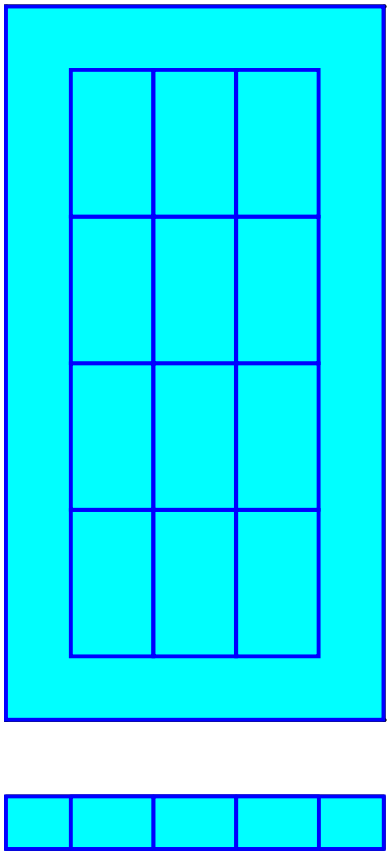
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

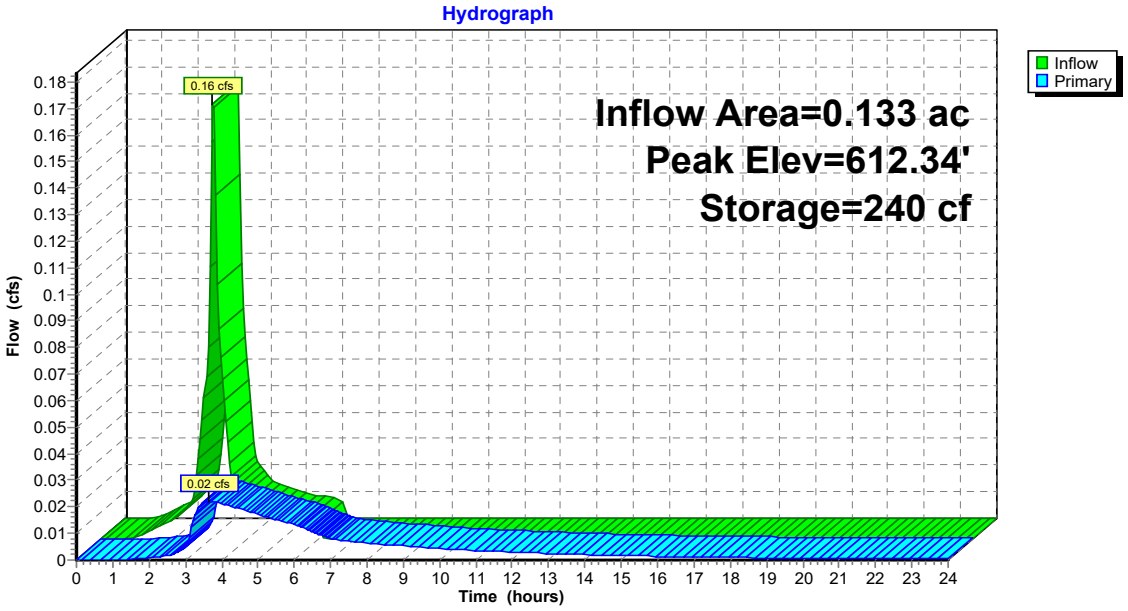
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow
Primary
0.16 cfs
0.02 cfs
Inflow Area=0.133 ac
Peak Elev=612.34'
Storage=240 cf
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-6: DB-6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
612.25	0.00	614.33	0.92	616.41	4.90
612.29	0.00	614.37	1.00	616.45	5.02
612.33	0.02	614.41	1.08	616.49	5.16
612.37	0.03	614.45	1.17	616.53	5.30
612.41	0.06	614.49	1.26	616.57	5.46
612.45	0.08	614.53	1.35	616.61	5.62
612.49	0.11	614.57	1.43	616.65	5.79
612.53	0.14	614.61	1.51	616.69	5.93
612.57	0.17	614.65	1.58	616.73	5.96
612.61	0.18	614.69	1.64	616.77	5.99
612.65	0.20	614.73	1.70	616.81	6.02
612.69	0.22	614.77	1.76	616.85	6.05
612.73	0.24	614.81	1.81	616.89	6.07
612.77	0.25	614.85	1.86	616.93	6.10
612.81	0.26	614.89	1.91	616.97	6.13
612.85	0.28	614.93	1.96	617.01	6.16
612.89	0.29	614.97	2.01	617.05	6.19
612.93	0.30	615.01	2.06	617.09	6.22
612.97	0.31	615.05	2.10	617.13	6.25
613.01	0.32	615.09	2.15	617.17	6.28
613.05	0.33	615.13	2.19	617.21	6.31
613.09	0.34	615.17	2.23	617.25	6.33
613.13	0.35	615.21	2.28	617.29	6.36
613.17	0.36	615.25	2.32	617.33	6.39
613.21	0.37	615.29	2.36	617.37	6.42
613.25	0.38	615.33	2.42	617.41	6.44
613.29	0.39	615.37	2.48	617.45	6.47
613.33	0.40	615.41	2.56	617.49	6.50
613.37	0.41	615.45	2.64	617.53	6.53
613.41	0.42	615.49	2.73	617.57	6.55
613.45	0.43	615.53	2.83	617.61	6.58
613.49	0.44	615.57	2.93	617.65	6.61
613.53	0.44	615.61	3.04	617.69	6.64
613.57	0.45	615.65	3.16	617.73	**6.66**
613.61	0.46	615.69	3.27		
613.65	0.47	615.73	3.39		
613.69	0.47	615.77	3.50		
613.73	0.48	615.81	3.61		
613.77	0.49	615.85	3.72		
613.81	0.50	615.89	3.82		
613.85	0.50	615.93	3.90		
613.89	0.51	615.97	3.99		
613.93	0.52	616.01	4.07		
613.97	0.52	616.05	4.15		
614.01	0.53	616.09	4.23		
614.05	0.55	616.13	4.31		
614.09	0.57	616.17	4.38		
614.13	0.61	616.21	4.45		
614.17	0.65	616.25	4.52		
614.21	0.71	616.29	4.60		
614.25	0.77	616.33	4.69		
614.29	0.84	616.37	4.79		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth = 0.36" for 1" WQV event
Inflow = 0.31 cfs @ 3.10 hrs, Volume= 0.016 af
Outflow = 0.05 cfs @ 3.85 hrs, Volume= 0.016 af, Atten= 85%, Lag= 45.0 min
Primary = 0.05 cfs @ 3.85 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 615.94' @ 3.85 hrs Surf.Area= 3,131 sf Storage= 380 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 181.0 min calculated for 0.016 af (96% of inflow)
Center-of-Mass det. time= 177.2 min (402.3 - 225.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 3.85 hrs HW=615.94' (Free Discharge)
└─**1=Culvert** (Passes 0.05 cfs of 0.05 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.29 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-7: DB-7 - Chamber Wizard Field A

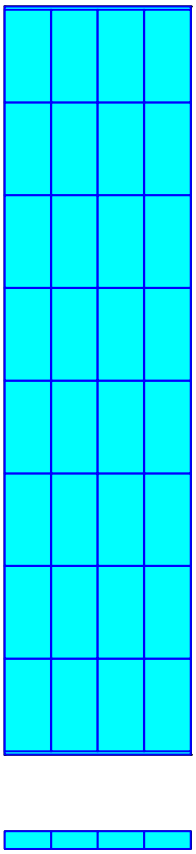
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

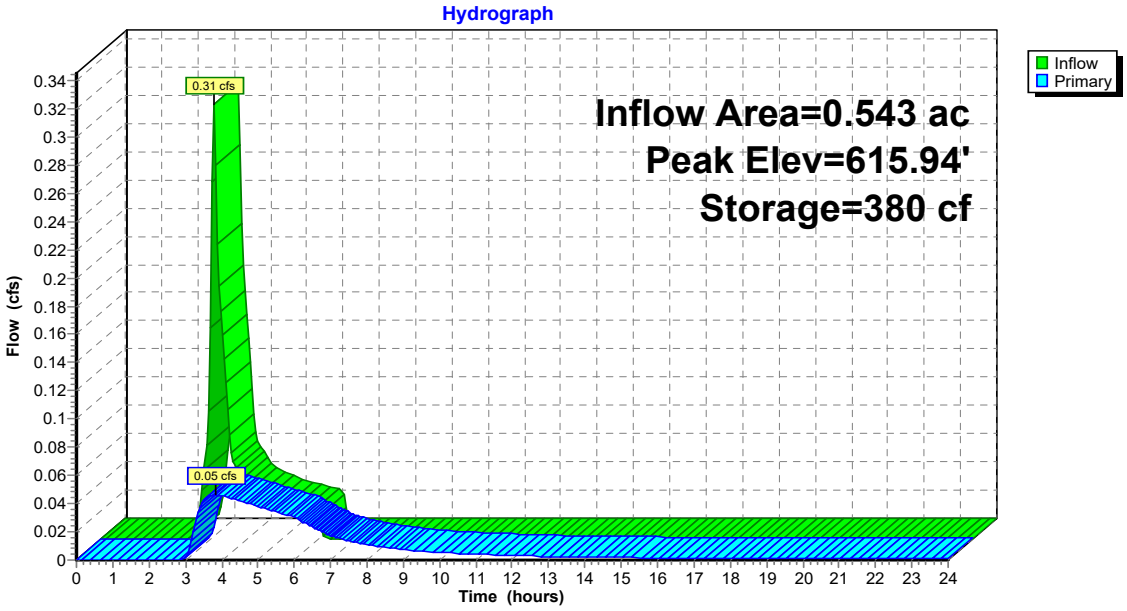
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow
Primary
0.31 cfs
0.05 cfs
Inflow Area=0.543 ac
Peak Elev=615.94'
Storage=380 cf
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-7: DB-7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.80	0.00	616.84	0.39	617.88	0.85
615.82	0.00	616.86	0.40	617.90	0.86
615.84	0.00	616.88	0.40	617.92	0.87
615.86	0.01	616.90	0.41	617.94	0.88
615.88	0.02	616.92	0.41	617.96	0.89
615.90	0.02	616.94	0.41	617.98	0.89
615.92	0.03	616.96	0.42	618.00	0.90
615.94	0.04	616.98	0.42	618.02	0.90
615.96	0.06	617.00	0.43	618.04	0.90
615.98	0.07	617.02	0.43	618.06	0.91
616.00	0.08	617.04	0.44	618.08	0.91
616.02	0.10	617.06	0.44	618.10	0.92
616.04	0.11	617.08	0.44	618.12	0.92
616.06	0.13	617.10	0.45	618.14	0.92
616.08	0.14	617.12	0.45	618.16	0.93
616.10	0.15	617.14	0.46	618.18	0.93
616.12	0.17	617.16	0.46	618.20	0.93
616.14	0.17	617.18	0.46	618.22	0.94
616.16	0.18	617.20	0.47	618.24	0.94
616.18	0.19	617.22	0.47	618.26	0.94
616.20	0.20	617.24	0.47	618.28	0.95
616.22	0.21	617.26	0.48	618.30	0.95
616.24	0.22	617.28	0.48	618.32	0.95
616.26	0.23	617.30	0.49	618.34	0.96
616.28	0.24	617.32	0.49	618.36	0.96
616.30	0.24	617.34	0.50	618.38	0.96
616.32	0.25	617.36	0.50	618.40	0.97
616.34	0.26	617.38	0.52	618.42	0.97
616.36	0.26	617.40	0.53	618.44	0.97
616.38	0.27	617.42	0.54	618.46	**0.98**
616.40	0.28	617.44	0.55		
616.42	0.28	617.46	0.57		
616.44	0.29	617.48	0.59		
616.46	0.30	617.50	0.60		
616.48	0.30	617.52	0.62		
616.50	0.31	617.54	0.64		
616.52	0.31	617.56	0.66		
616.54	0.32	617.58	0.67		
616.56	0.32	617.60	0.69		
616.58	0.33	617.62	0.71		
616.60	0.33	617.64	0.72		
616.62	0.34	617.66	0.73		
616.64	0.34	617.68	0.74		
616.66	0.35	617.70	0.76		
616.68	0.35	617.72	0.77		
616.70	0.36	617.74	0.78		
616.72	0.36	617.76	0.79		
616.74	0.37	617.78	0.80		
616.76	0.37	617.80	0.81		
616.78	0.38	617.82	0.82		
616.80	0.38	617.84	0.83		
616.82	0.39	617.86	0.84		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac, 62.75% Impervious, Inflow Depth = 0.28" for 1" WQV event				
Inflow =	0.30 cfs @	3.11 hrs,	Volume=	0.016 af	
Outflow =	0.30 cfs @	3.11 hrs,	Volume=	0.016 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.30 cfs @	3.11 hrs,	Volume=	0.016 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

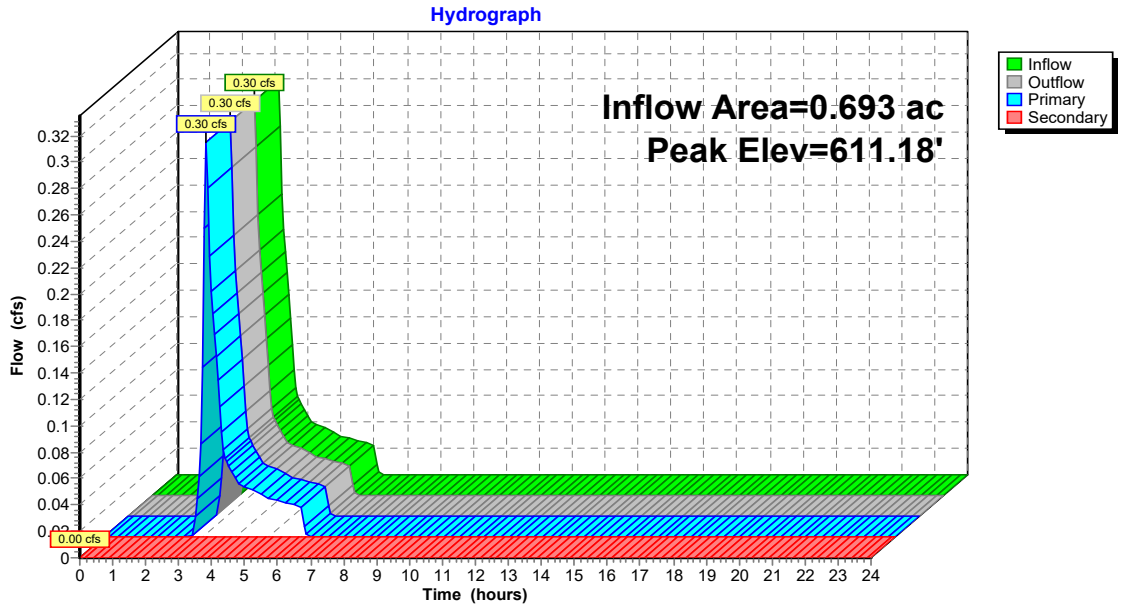
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 611.18' @ 3.11 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 3.11 hrs HW=611.08' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.29 cfs @ 3.36 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=609.25' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond ICS-1: ICS-1



Stage-Discharge for Pond ICS-1: ICS-1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
609.25	0.00	0.00	0.00
609.30	0.00	0.00	0.00
609.35	0.02	0.02	0.00
609.40	0.04	0.04	0.00
609.45	0.07	0.07	0.00
609.50	0.11	0.11	0.00
609.55	0.14	0.14	0.00
609.60	0.17	0.17	0.00
609.65	0.19	0.19	0.00
609.70	0.18	0.18	0.00
609.75	0.19	0.19	0.00
609.80	0.19	0.19	0.00
609.85	0.20	0.20	0.00
609.90	0.20	0.20	0.00
609.95	0.21	0.21	0.00
610.00	0.21	0.21	0.00
610.05	0.22	0.22	0.00
610.10	0.22	0.22	0.00
610.15	0.22	0.22	0.00
610.20	0.23	0.23	0.00
610.25	0.23	0.23	0.00
610.30	0.24	0.24	0.00
610.35	0.24	0.24	0.00
610.40	0.24	0.24	0.00
610.45	0.25	0.25	0.00
610.50	0.25	0.25	0.00
610.55	0.26	0.26	0.00
610.60	0.26	0.26	0.00
610.65	0.26	0.26	0.00
610.70	0.27	0.27	0.00
610.75	0.27	0.27	0.00
610.80	0.27	0.27	0.00
610.85	0.28	0.28	0.00
610.90	0.28	0.28	0.00
610.95	0.28	0.28	0.00
611.00	0.29	0.29	0.00
611.05	0.29	0.29	0.00
611.10	0.29	0.29	0.00
611.15	0.30	0.30	0.00
611.20	0.30	0.30	0.00
611.25	0.32	0.30	0.01
611.30	0.36	0.31	0.06
611.35	0.43	0.31	0.12
611.40	0.53	0.31	0.21
611.45	0.64	0.32	0.33
611.50	0.78	0.32	0.46
611.55	0.94	0.32	0.62
611.60	1.11	0.32	0.79
611.65	1.31	0.33	0.98
611.70	1.51	0.33	1.18
611.75	1.73	0.33	1.40
611.80	1.96	0.34	1.62
611.85	2.19	0.34	1.85
611.90	2.43	0.34	2.09
611.95	2.67	0.34	2.33
612.00	2.91	0.35	2.56
612.05	3.14	0.35	2.79
612.10	3.36	0.35	3.01
612.15	3.55	0.36	3.20
612.20	3.70	0.36	3.34
612.25	3.87	0.36	3.51
612.30	4.03	0.36	3.66
612.35	4.18	0.37	3.81
612.40	4.32	0.37	3.95
612.45	4.47	0.37	4.09
612.50	4.60	0.37	4.23
612.55	4.73	0.38	4.36
612.60	4.86	0.38	4.48
612.65	4.99	0.38	4.61
612.70	5.11	0.38	4.73
612.75	5.23	0.39	4.84
612.80	5.35	0.39	4.96
612.85	5.46	0.39	5.07
612.90	5.57	0.39	5.18
612.95	5.68	0.40	5.29
613.00	5.79	0.40	5.39
613.05	5.89	0.40	5.49
613.10	6.00	0.40	5.59
613.15	6.10	0.41	5.69
613.20	6.20	0.41	5.79
613.25	**6.30**	**0.41**	**5.89**

Summary for Pond ICS-2: ICS-2

Inflow Area =	0.598 ac, 70.86% Impervious, Inflow Depth = 0.25" for 1" WQV event				
Inflow =	0.22 cfs @	3.11 hrs,	Volume=	0.013 af	
Outflow =	0.22 cfs @	3.11 hrs,	Volume=	0.013 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.22 cfs @	3.11 hrs,	Volume=	0.013 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

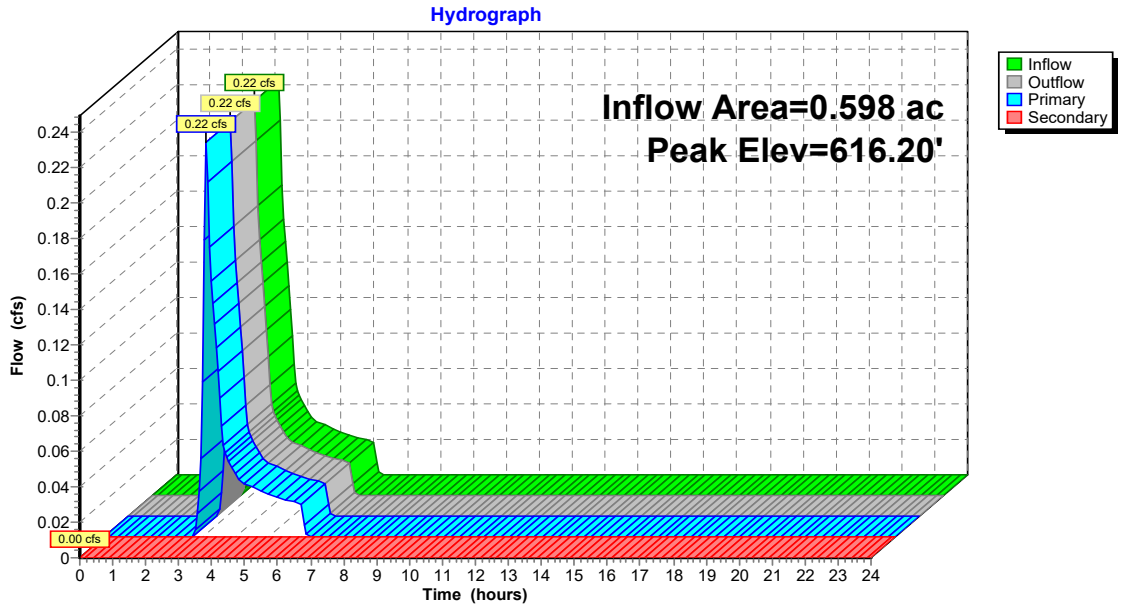
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.20' @ 3.11 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 3.11 hrs HW=616.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.22 cfs @ 2.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=615.85' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond ICS-2: ICS-2



Stage-Discharge for Pond ICS-2: ICS-2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
615.85	0.00	0.00	0.00
615.87	0.00	0.00	0.00
615.89	0.01	0.01	0.00
615.91	0.01	0.01	0.00
615.93	0.02	0.02	0.00
615.95	0.03	0.03	0.00
615.97	0.04	0.04	0.00
615.99	0.06	0.06	0.00
616.01	0.07	0.07	0.00
616.03	0.09	0.09	0.00
616.05	0.10	0.10	0.00
616.07	0.12	0.12	0.00
616.09	0.14	0.14	0.00
616.11	0.16	0.16	0.00
616.13	0.18	0.18	0.00
616.15	0.19	0.19	0.00
616.17	0.21	0.21	0.00
616.19	0.22	0.22	0.00
616.21	0.23	0.23	0.00
616.23	0.24	0.24	0.00
616.25	0.26	0.25	0.00
616.27	0.28	0.26	0.01
616.29	0.30	0.27	0.02
616.31	0.32	0.28	0.03
616.33	0.34	0.29	0.05
616.35	0.37	0.30	0.07
616.37	0.40	0.31	0.09
616.39	0.43	0.32	0.11
616.41	0.46	0.33	0.13
616.43	0.50	0.34	0.16
616.45	0.53	0.35	0.19
616.47	0.57	0.35	0.22
616.49	0.61	0.35	0.25
616.51	0.65	0.36	0.29
616.53	0.69	0.36	0.33
616.55	0.73	0.36	0.37
616.57	0.77	0.37	0.41
616.59	0.82	0.37	0.45
616.61	0.87	0.37	0.50
616.63	0.92	0.38	0.54
616.65	0.97	0.38	0.59
616.67	1.02	0.38	0.64
616.69	1.08	0.38	0.69
616.71	1.13	0.39	0.74
616.73	1.19	0.39	0.80
616.75	1.25	0.39	0.86
616.77	1.31	0.40	0.91
616.79	1.37	0.40	0.97
616.81	1.43	0.40	1.03
616.83	1.50	0.40	1.09
616.85	1.56	0.41	1.15
616.87	1.63	0.41	1.22
616.89	1.69	0.41	1.28
616.91	1.76	0.41	1.35
616.93	1.83	0.42	1.41
616.95	1.90	0.42	1.48
616.97	1.97	0.42	1.54
616.99	2.04	0.42	1.61
617.01	2.11	0.43	1.68
617.03	2.18	0.43	1.75
617.05	2.25	0.43	1.82
617.07	2.32	0.43	1.89
617.09	2.40	0.44	1.96
617.11	2.47	0.44	2.03
617.13	2.54	0.44	2.10
617.15	2.61	0.44	2.17
617.17	2.69	0.45	2.24
617.19	2.76	0.45	2.31
617.21	2.83	0.45	2.38
617.23	2.90	0.45	2.45
617.25	**2.97**	**0.46**	**2.51**

Summary for Pond ICS-6: ICS-6

Inflow Area =	2.630 ac, 39.25% Impervious, Inflow Depth = 0.02" for 1" WQV event				
Inflow =	0.02 cfs @	4.77 hrs,	Volume=	0.005 af	
Outflow =	0.02 cfs @	4.77 hrs,	Volume=	0.005 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.02 cfs @	4.77 hrs,	Volume=	0.005 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

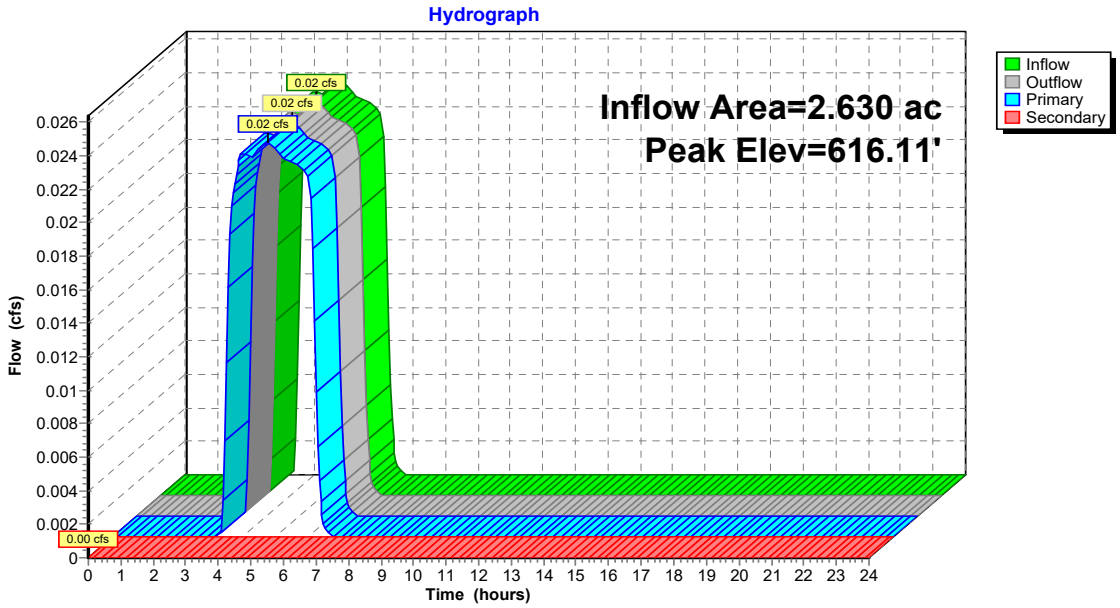
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.11' @ 4.77 hrs
Flood Elev= 621.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.02 cfs @ 4.77 hrs HW=616.11' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.02 cfs @ 1.38 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=616.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond ICS-6: ICS-6



Stage-Discharge for Pond ICS-6: ICS-6

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
616.00	0.00	0.00	0.00
616.10	0.02	0.02	0.00
616.20	0.08	0.07	0.01
616.30	0.24	0.14	0.10
616.40	0.44	0.19	0.26
616.50	0.66	0.18	0.48
616.60	0.94	0.19	0.75
616.70	1.27	0.20	1.08
616.80	1.65	0.20	1.44
616.90	2.06	0.21	1.85
617.00	2.51	0.22	2.30
617.10	2.99	0.22	2.77
617.20	3.49	0.23	3.26
617.30	3.99	0.24	3.76
617.40	4.50	0.24	4.26
617.50	5.00	0.25	4.75
617.60	5.47	0.25	5.22
617.70	5.89	0.26	5.63
617.80	6.21	0.26	5.95
617.90	6.75	0.27	6.48
618.00	7.32	0.27	7.05
618.10	7.85	0.28	7.57
618.20	8.34	0.28	8.06
618.30	8.81	0.29	8.52
618.40	9.25	0.29	8.96
618.50	9.67	0.30	9.38
618.60	10.08	0.30	9.77
618.70	10.47	0.31	10.16
618.80	10.82	0.31	10.51
618.90	11.08	0.32	10.77
619.00	11.34	0.32	11.02
619.10	11.59	0.33	11.26
619.20	11.83	0.33	11.50
619.30	12.07	0.33	11.74
619.40	12.31	0.34	11.97
619.50	12.54	0.34	12.19
619.60	12.76	0.35	12.41
619.70	12.98	0.35	12.63
619.80	13.20	0.35	12.85
619.90	13.42	0.36	13.06
620.00	13.63	0.36	13.26
620.10	13.83	0.37	13.47
620.20	14.04	0.37	13.67
620.30	14.24	0.37	13.87
620.40	14.44	0.38	14.06
620.50	14.64	0.38	14.26
620.60	14.83	0.38	14.45
620.70	15.02	0.39	14.63
620.80	15.21	0.39	14.82
620.90	15.40	0.40	15.00
621.00	15.58	0.40	15.18
621.10	**15.76**	**0.40**	**15.36**

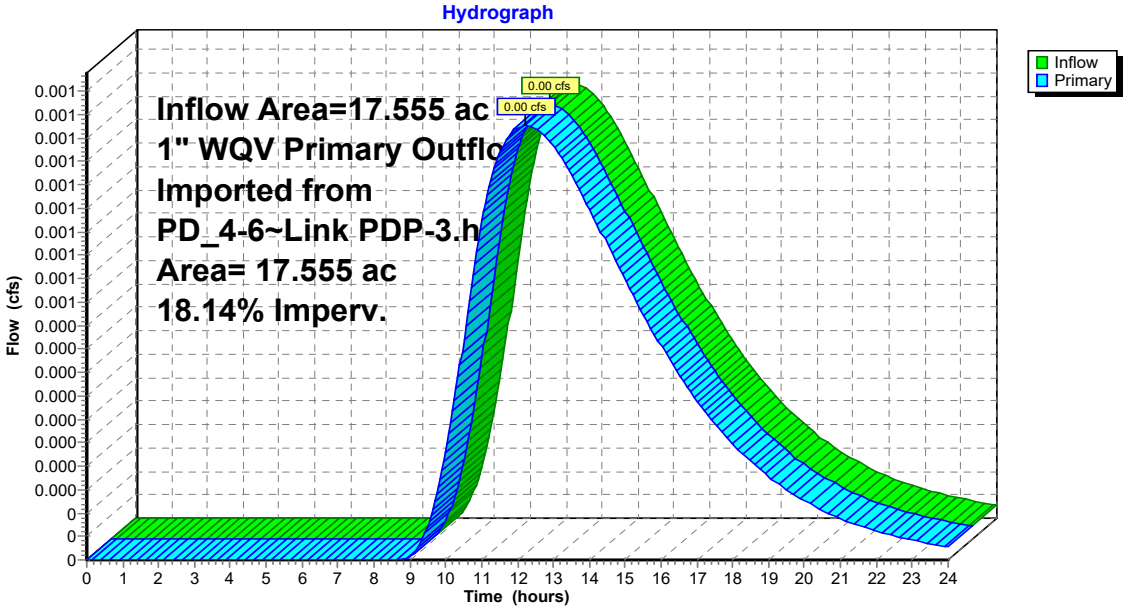
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 12.22 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 12.22 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

1" WQV Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

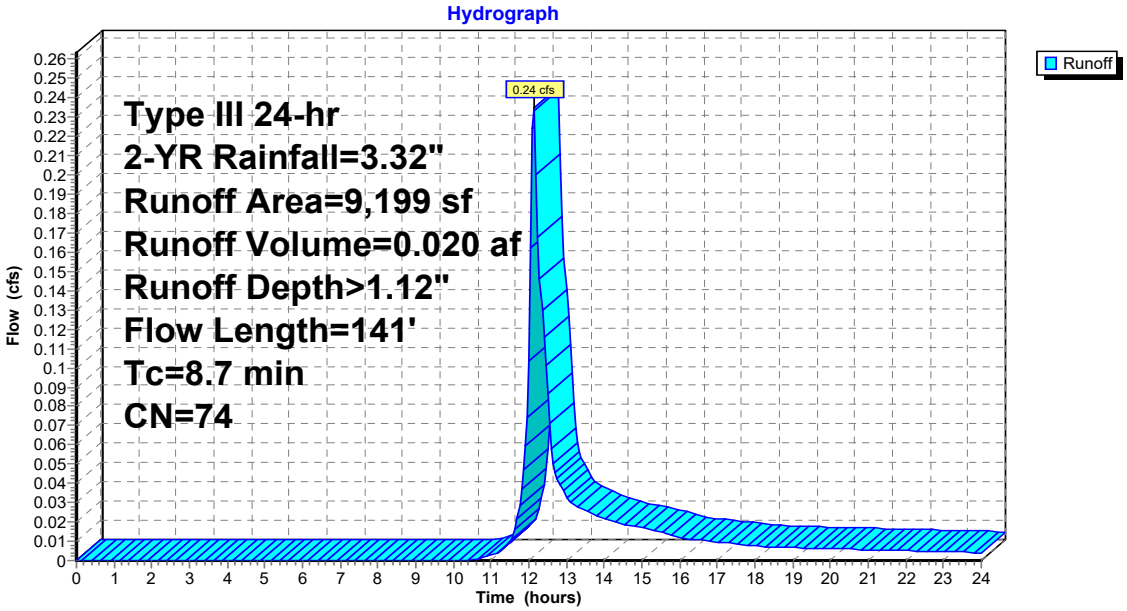
Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.020 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

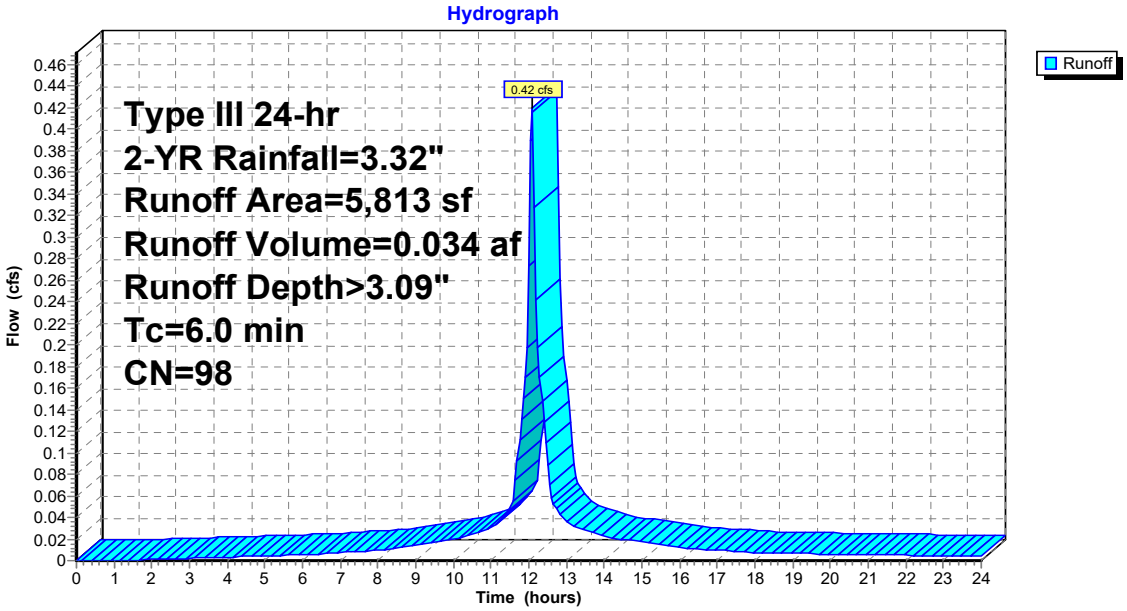
Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

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

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

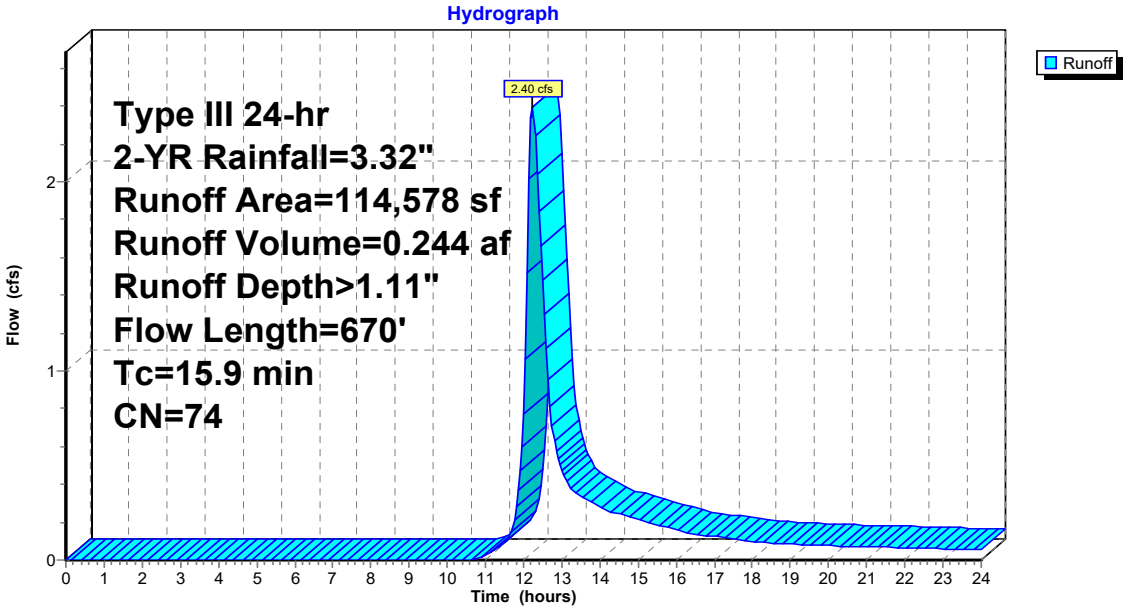
Runoff = 2.40 cfs @ 12.24 hrs, Volume= 0.244 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

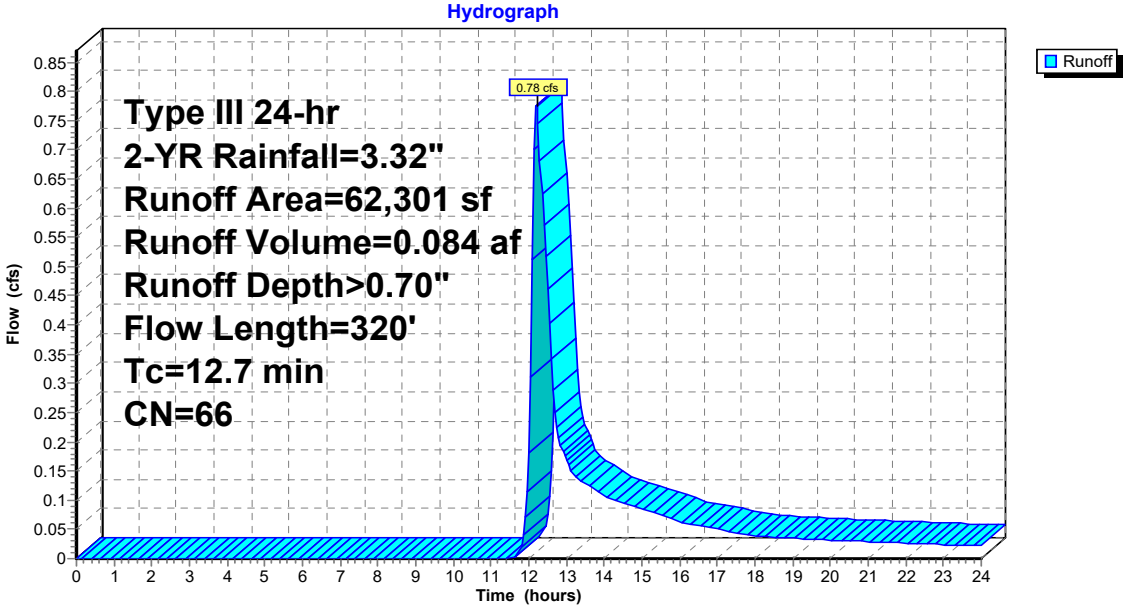
Runoff = 0.78 cfs @ 12.21 hrs, Volume= 0.084 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

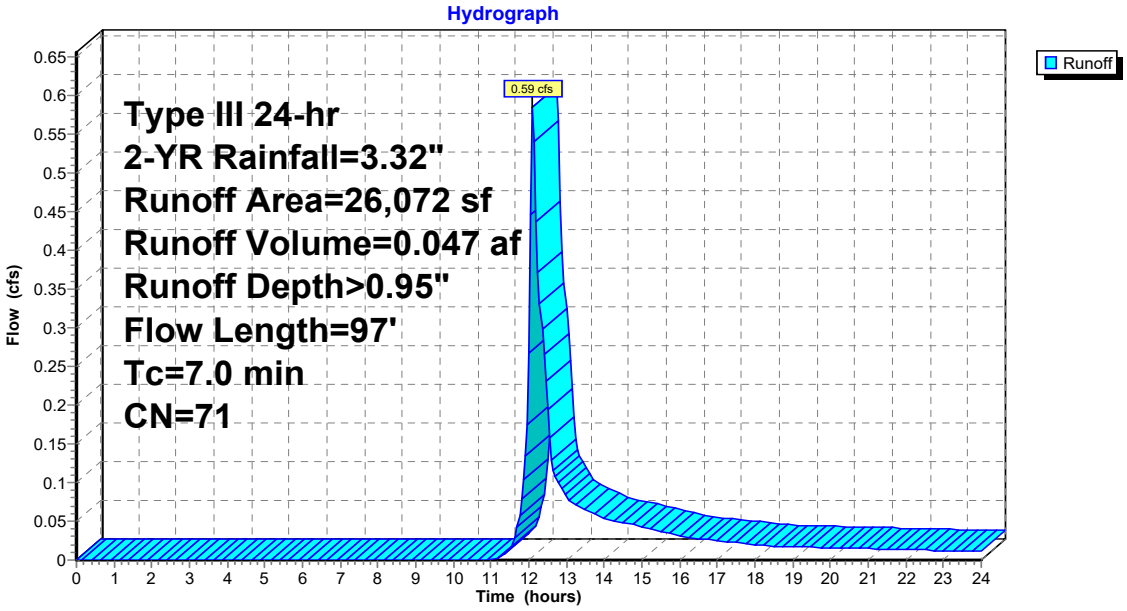
Runoff = 0.59 cfs @ 12.11 hrs, Volume= 0.047 af, Depth> 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

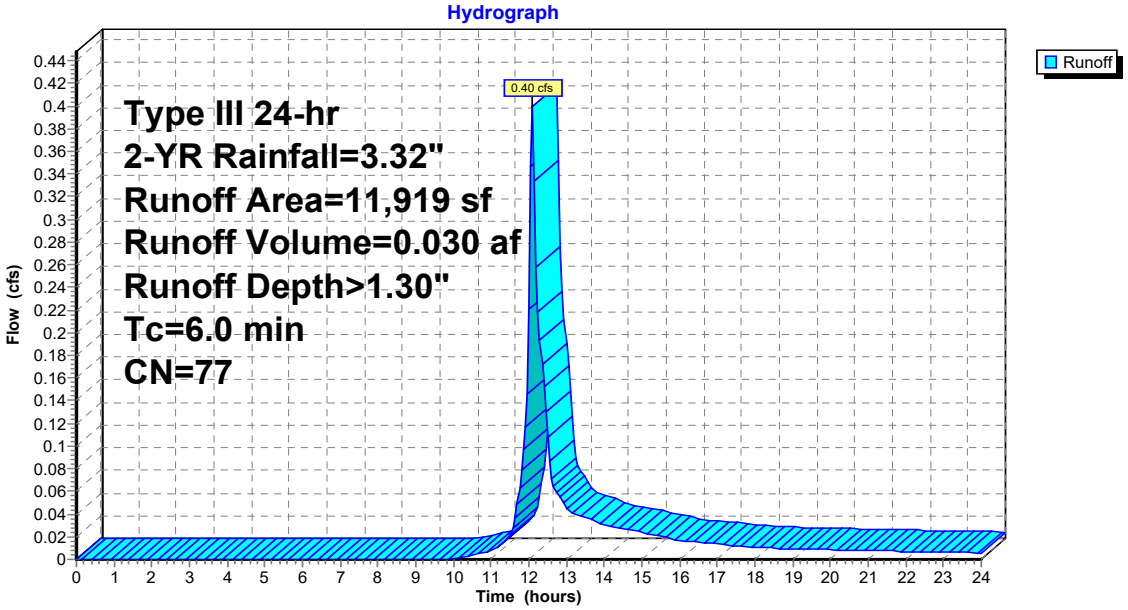
Runoff = 0.40 cfs @ 12.10 hrs, Volume= 0.030 af, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

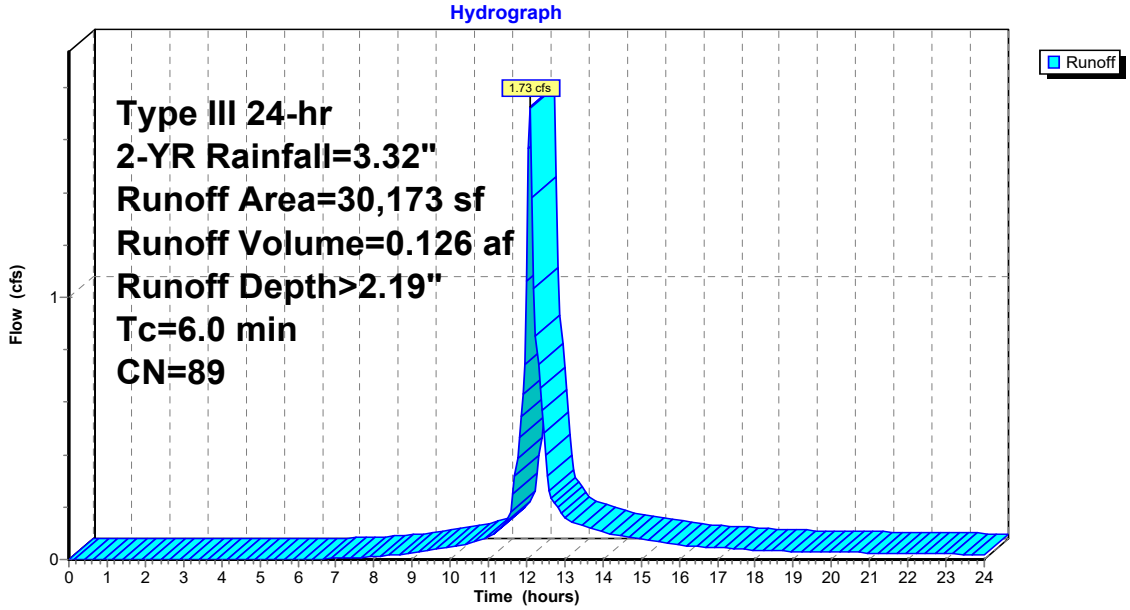
Runoff = 1.73 cfs @ 12.09 hrs, Volume= 0.126 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

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

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

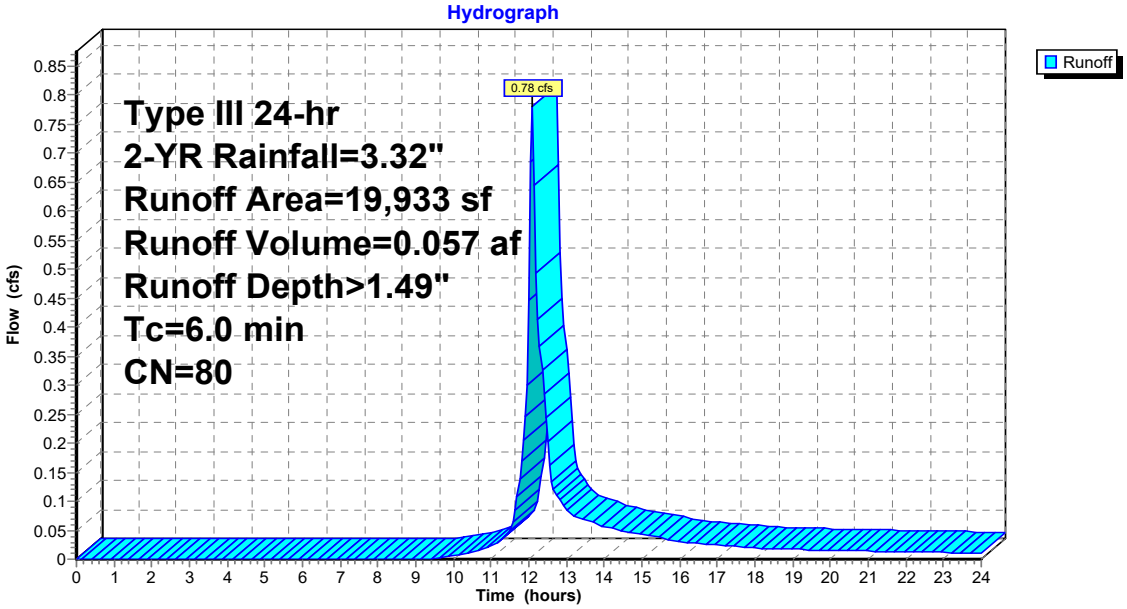
Runoff = 0.78 cfs @ 12.10 hrs, Volume= 0.057 af, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

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

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

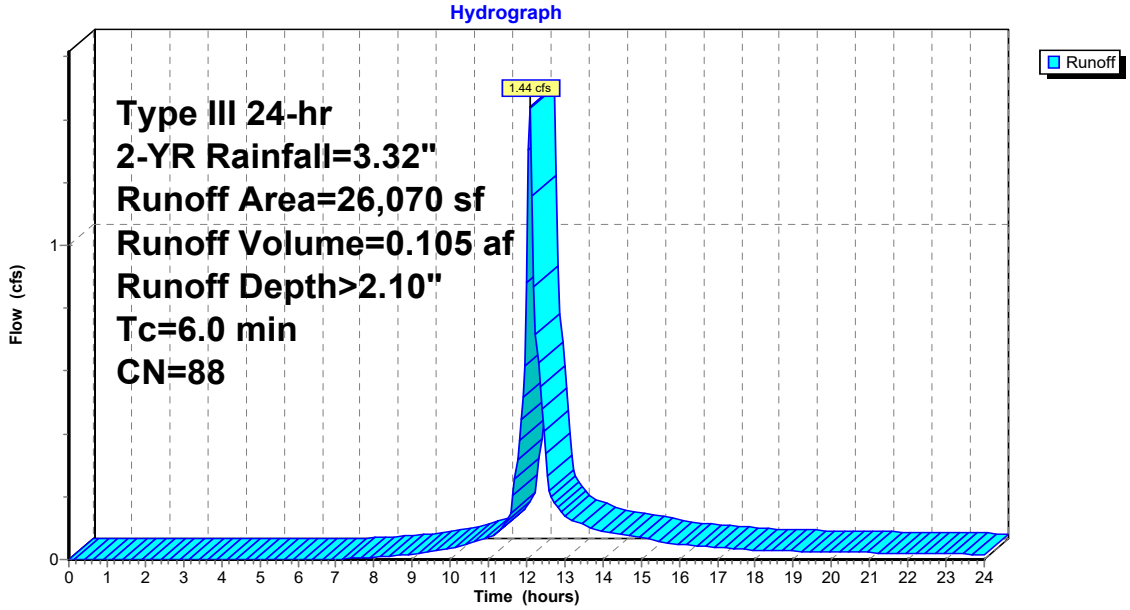
Runoff = 1.44 cfs @ 12.09 hrs, Volume= 0.105 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

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

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

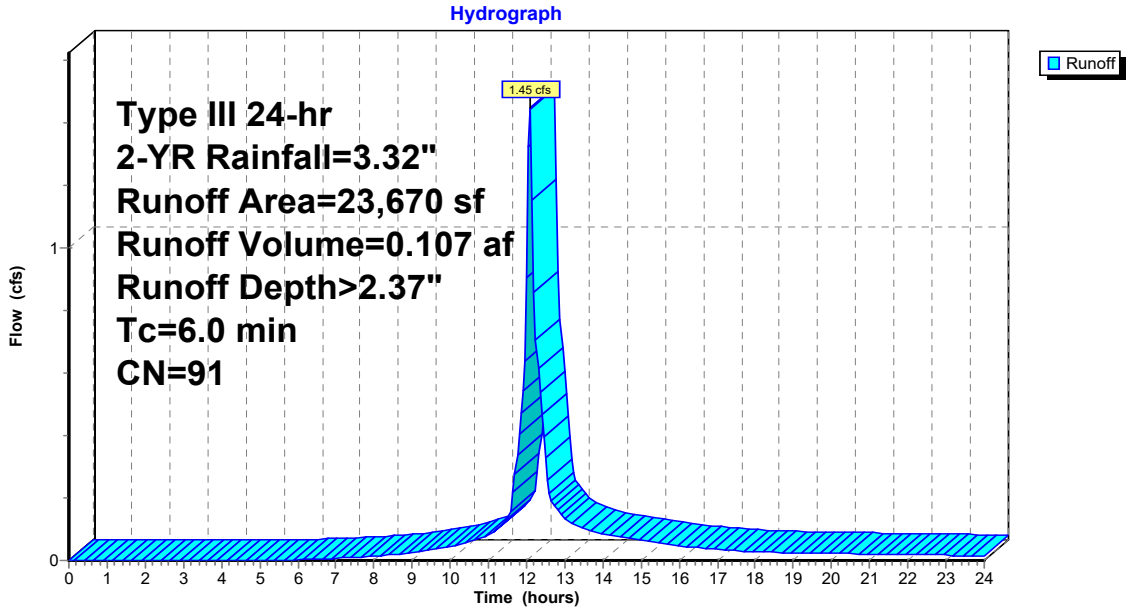
Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.107 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

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

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

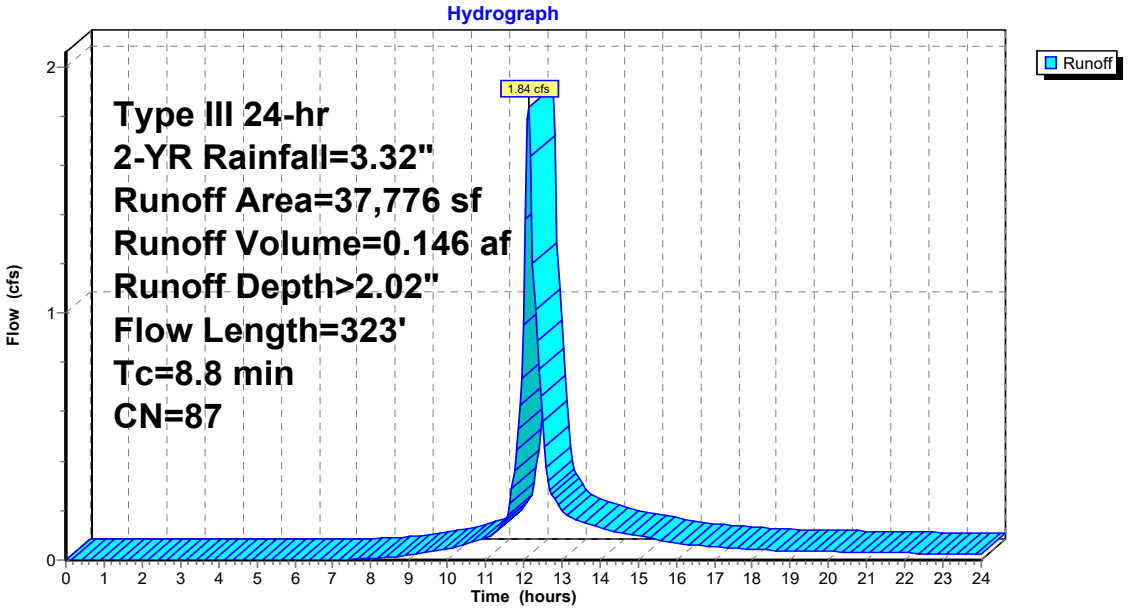
Runoff = 1.84 cfs @ 12.12 hrs, Volume= 0.146 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

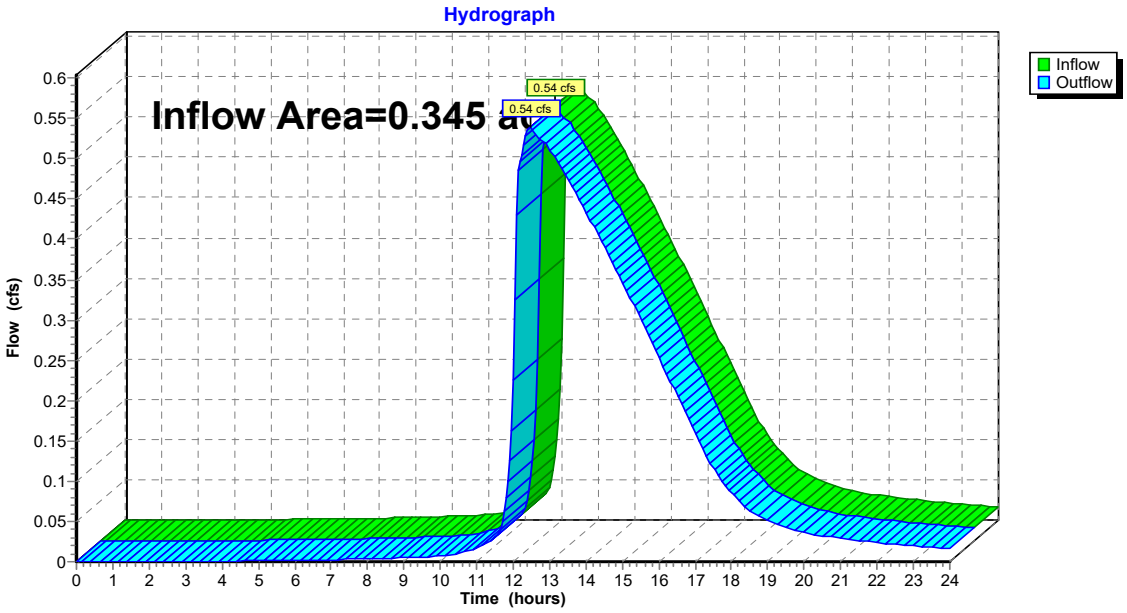


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 6.57" for 2-YR event
Inflow = 0.54 cfs @ 12.47 hrs, Volume= 0.189 af
Outflow = 0.54 cfs @ 12.47 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

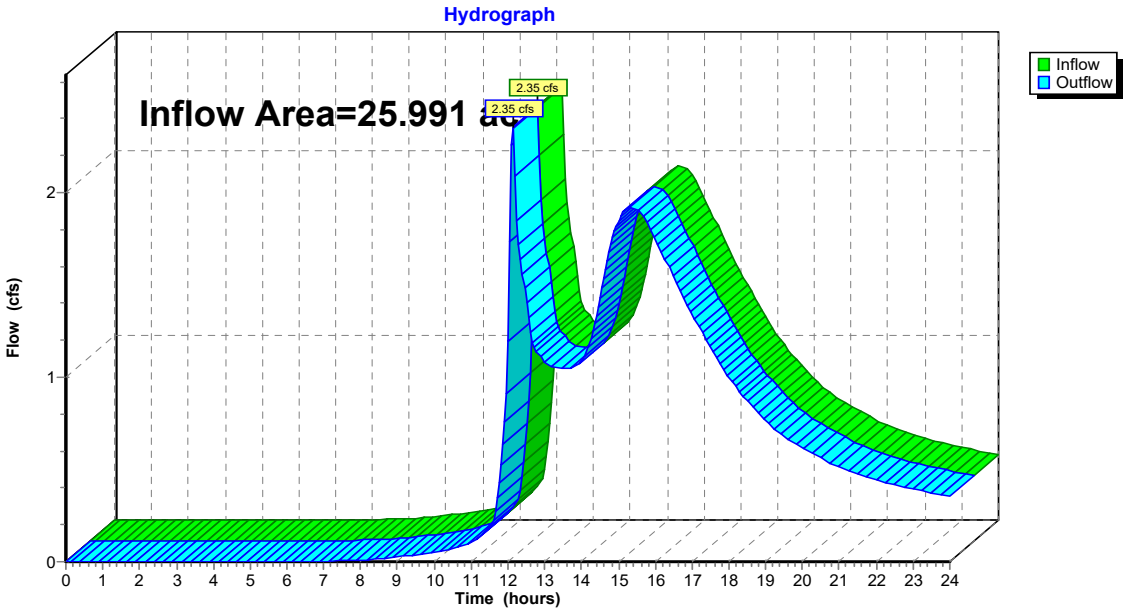


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 2.35 cfs @ 12.14 hrs, Volume= 1.027 af
Outflow = 2.35 cfs @ 12.14 hrs, Volume= 1.027 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

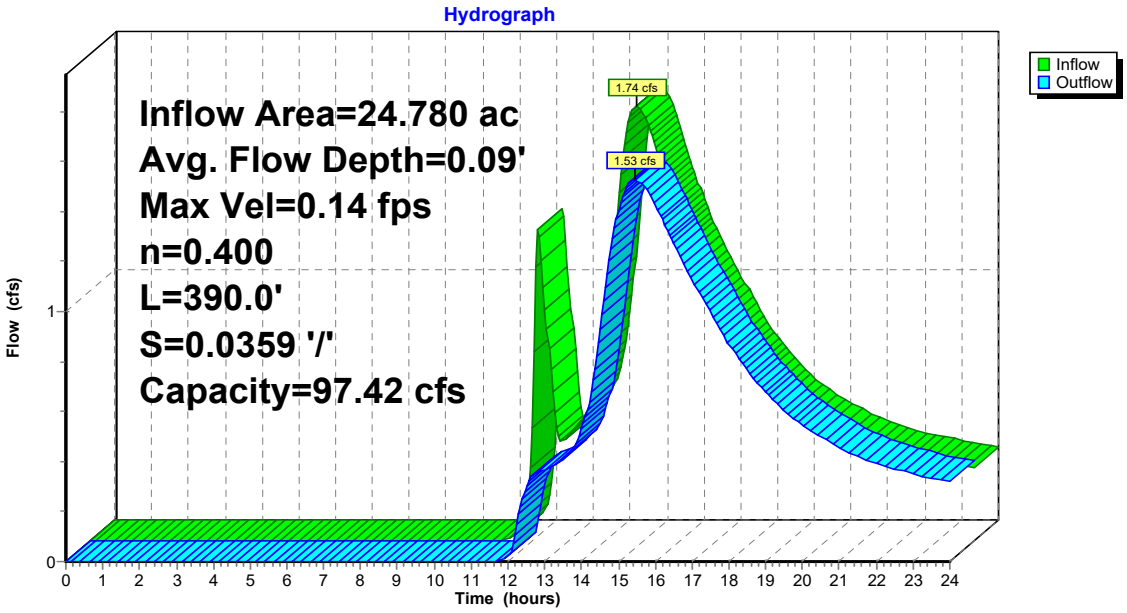
Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 0.35" for 2-YR event
Inflow = 1.74 cfs @ 14.83 hrs, Volume= 0.731 af
Outflow = 1.53 cfs @ 15.44 hrs, Volume= 0.692 af, Atten= 12%, Lag= 36.9 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.14 fps, Min. Travel Time= 48.0 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 71.2 min

Peak Storage= 4,390 cf @ 15.44 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach DP-3: DP-3



Stage-Discharge for Reach DP-3: DP-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
618.00	0.00	0.00
618.01	0.03	0.04
618.02	0.05	0.13
618.03	0.07	0.27
618.04	0.08	0.43
618.05	0.10	0.62
618.06	0.11	0.84
618.07	0.12	1.09
618.08	0.13	1.37
618.09	0.14	1.66
618.10	0.15	1.98
618.11	0.16	2.32
618.12	0.17	2.69
618.13	0.18	3.07
618.14	0.19	3.48
618.15	0.20	3.91
618.16	0.20	4.35
618.17	0.21	4.82
618.18	0.22	5.30
618.19	0.23	5.81
618.20	0.24	6.33
618.21	0.24	6.87
618.22	0.25	7.43
618.23	0.26	8.00
618.24	0.27	8.60
618.25	0.27	9.21
618.26	0.28	9.84
618.27	0.29	10.48
618.28	0.29	11.14
618.29	0.30	11.82
618.30	0.31	12.51
618.31	0.31	13.23
618.32	0.32	13.95
618.33	0.33	14.70
618.34	0.33	15.45
618.35	0.34	16.23
618.36	0.34	17.02
618.37	0.35	17.83
618.38	0.36	18.65
618.39	0.36	19.48
618.40	0.37	20.34
618.41	0.37	21.20
618.42	0.38	22.09
618.43	0.38	22.99
618.44	0.39	23.90
618.45	0.40	24.83
618.46	0.40	25.77
618.47	0.41	26.72
618.48	0.41	27.70
618.49	0.42	28.68
618.50	0.42	29.68
618.51	0.43	30.70
618.52	0.43	31.73
618.53	0.44	32.77
618.54	0.44	33.83
618.55	0.45	34.91
618.56	0.45	35.99
618.57	0.46	37.09
618.58	0.46	38.21
618.59	0.47	39.34
618.60	0.47	40.48
618.61	0.48	41.64
618.62	0.48	42.81
618.63	0.49	44.00
618.64	0.49	45.20
618.65	0.50	46.41
618.66	0.50	47.64
618.67	0.51	48.88
618.68	0.51	50.14
618.69	0.52	51.40
618.70	0.52	52.69
618.71	0.52	53.98
618.72	0.53	55.29
618.73	0.53	56.62
618.74	0.54	57.95
618.75	0.54	59.30
618.76	0.55	60.67
618.77	0.55	62.05
618.78	0.56	63.44
618.79	0.56	64.84
618.80	0.56	66.26
618.81	0.57	67.69
618.82	0.57	69.14
618.83	0.58	70.59
618.84	0.58	72.07
618.85	0.59	73.55
618.86	0.59	75.05
618.87	0.59	76.56
618.88	0.60	78.09
618.89	0.60	79.63
618.90	0.61	81.18
618.91	0.61	82.74
618.92	0.61	84.32
618.93	0.62	85.91
618.94	0.62	87.52
618.95	0.63	89.14
618.96	0.63	90.77
618.97	0.63	92.41
618.98	0.64	94.07
618.99	0.64	95.74
619.00	**0.65**	**97.42**

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 1.91" for 2-YR event
Inflow = 0.86 cfs @ 12.12 hrs, Volume= 0.154 af
Outflow = 0.18 cfs @ 14.20 hrs, Volume= 0.134 af, Atten= 80%, Lag= 124.9 min
Discarded = 0.10 cfs @ 14.20 hrs, Volume= 0.104 af
Primary = 0.07 cfs @ 14.20 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.56' @ 14.20 hrs Surf.Area= 2,481 sf Storage= 2,849 cf
Flood Elev= 611.25' Surf.Area= 3,452 sf Storage= 7,739 cf

Plug-Flow detention time= 208.5 min calculated for 0.134 af (87% of inflow)
Center-of-Mass det. time= 151.3 min (990.1 - 838.9)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	7,237 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,986 cf Overall - 1,749 cf Embedded = 7,237 cf
#2	607.00'	385 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,166 cf Overall x 33.0% Voids
#3	608.00'	117 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 583 cf Overall x 20.0% Voids
		7,739 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166
609.00	2,130	1,648	2,814
610.00	2,760	2,445	5,259
611.20	3,452	3,727	8,986

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166

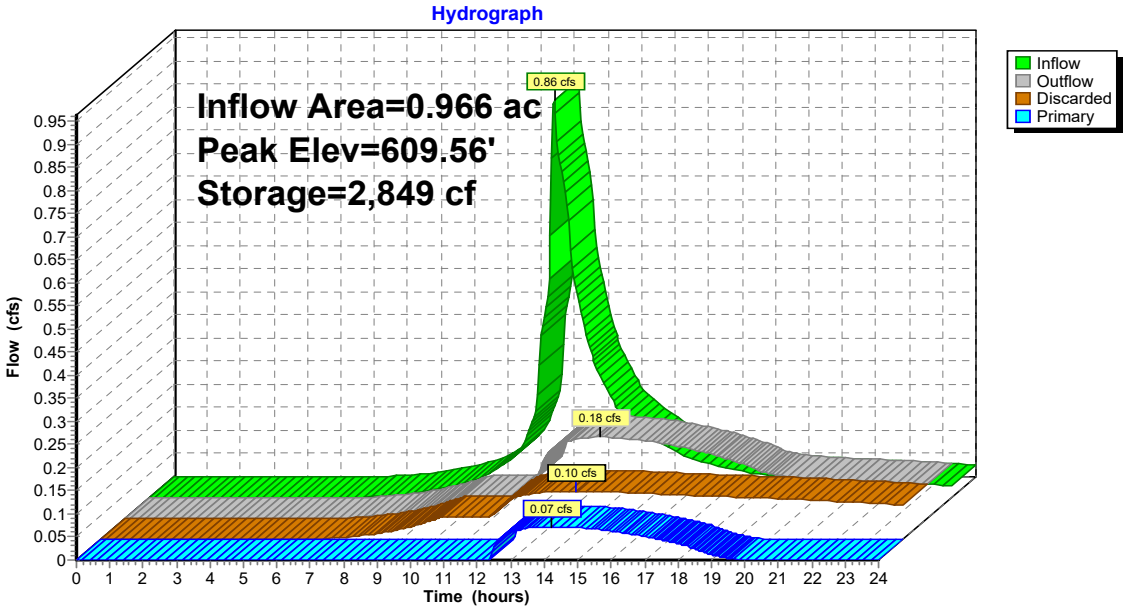
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,166	0	0
608.50	1,166	583	583

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.00' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	609.80'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.10 cfs @ 14.20 hrs HW=609.56' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.07 cfs @ 14.20 hrs HW=609.56' (Free Discharge)
└─**2=Culvert** (Passes 0.07 cfs of 1.74 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.31 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1: SFB-1



Stage-Discharge for Pond 1: SFB-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
607.00	0.00	0.00	0.00
607.05	0.05	0.05	0.00
607.10	0.05	0.05	0.00
607.15	0.05	0.05	0.00
607.20	0.05	0.05	0.00
607.25	0.05	0.05	0.00
607.30	0.05	0.05	0.00
607.35	0.05	0.05	0.00
607.40	0.05	0.05	0.00
607.45	0.05	0.05	0.00
607.50	0.05	0.05	0.00
607.55	0.05	0.05	0.00
607.60	0.05	0.05	0.00
607.65	0.05	0.05	0.00
607.70	0.05	0.05	0.00
607.75	0.05	0.05	0.00
607.80	0.05	0.05	0.00
607.85	0.05	0.05	0.00
607.90	0.05	0.05	0.00
607.95	0.05	0.05	0.00
608.00	0.05	0.05	0.00
608.05	0.05	0.05	0.00
608.10	0.05	0.05	0.00
608.15	0.05	0.05	0.00
608.20	0.06	0.06	0.00
608.25	0.06	0.06	0.00
608.30	0.06	0.06	0.00
608.35	0.06	0.06	0.00
608.40	0.06	0.06	0.00
608.45	0.07	0.07	0.00
608.50	0.07	0.07	0.00
608.55	0.07	0.07	0.00
608.60	0.07	0.07	0.00
608.65	0.07	0.07	0.00
608.70	0.08	0.08	0.00
608.75	0.08	0.08	0.00
608.80	0.08	0.08	0.00
608.85	0.08	0.08	0.00
608.90	0.08	0.08	0.00
608.95	0.09	0.09	0.00
609.00	0.09	0.09	0.00
609.05	0.09	0.09	0.00
609.10	0.11	0.09	0.01
609.15	0.12	0.09	0.03
609.20	0.13	0.09	0.04
609.25	0.14	0.10	0.04
609.30	0.15	0.10	0.05
609.35	0.15	0.10	0.05
609.40	0.16	0.10	0.06
609.45	0.16	0.10	0.06
609.50	0.17	0.10	0.07
609.55	0.18	0.10	0.07
609.60	0.18	0.10	0.08
609.65	0.19	0.11	0.08
609.70	0.19	0.11	0.08
609.75	0.19	0.11	0.09
609.80	0.20	0.11	0.09
609.85	0.28	0.11	0.17
609.90	0.42	0.11	0.31
609.95	0.61	0.11	0.50
610.00	0.83	0.12	0.71
610.05	1.06	0.12	0.94
610.10	1.14	0.12	1.03
610.15	1.22	0.12	1.10
610.20	1.29	0.12	1.17
610.25	1.36	0.12	1.24
610.30	1.43	0.12	1.30
610.35	1.49	0.12	1.36
610.40	1.55	0.12	1.42
610.45	1.60	0.13	1.48
610.50	1.66	0.13	1.53
610.55	1.71	0.13	1.58
610.60	1.76	0.13	1.63
610.65	1.81	0.13	1.68
610.70	1.86	0.13	1.73
610.75	1.91	0.13	1.77
610.80	1.95	0.13	1.82
610.85	2.00	0.14	1.86
610.90	2.04	0.14	1.90
610.95	2.08	0.14	1.95
611.00	2.13	0.14	1.99
611.05	2.17	0.14	2.03
611.10	2.21	0.14	2.07
611.15	2.25	0.14	2.10
611.20	2.29	**0.14**	2.14
611.25	**2.32**	0.14	**2.18**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 1.04" for 2-YR event
Inflow = 1.65 cfs @ 12.10 hrs, Volume= 0.367 af
Outflow = 0.37 cfs @ 15.39 hrs, Volume= 0.340 af, Atten= 78%, Lag= 197.3 min
Discarded = 0.34 cfs @ 15.39 hrs, Volume= 0.333 af
Primary = 0.03 cfs @ 15.39 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 615.36' @ 15.39 hrs Surf.Area= 6,207 sf Storage= 5,413 cf
Flood Elev= 617.40' Surf.Area= 10,100 sf Storage= 21,942 cf

Plug-Flow detention time= 174.3 min calculated for 0.339 af (92% of inflow)
Center-of-Mass det. time= 138.1 min (1,030.1 - 892.1)

Volume	Invert	Avail.Storage	Storage Description
#1	613.25'	20,246 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 26,162 cf Overall - 5,916 cf Embedded = 20,246 cf
#2	613.25'	1,302 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 3,944 cf Overall x 33.0% Voids
#3	614.25'	394 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,972 cf Overall x 20.0% Voids
		21,942 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944
615.00	5,539	3,556	7,500
616.00	7,378	6,459	13,959
617.00	9,278	8,328	22,287
617.40	10,100	3,876	26,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944

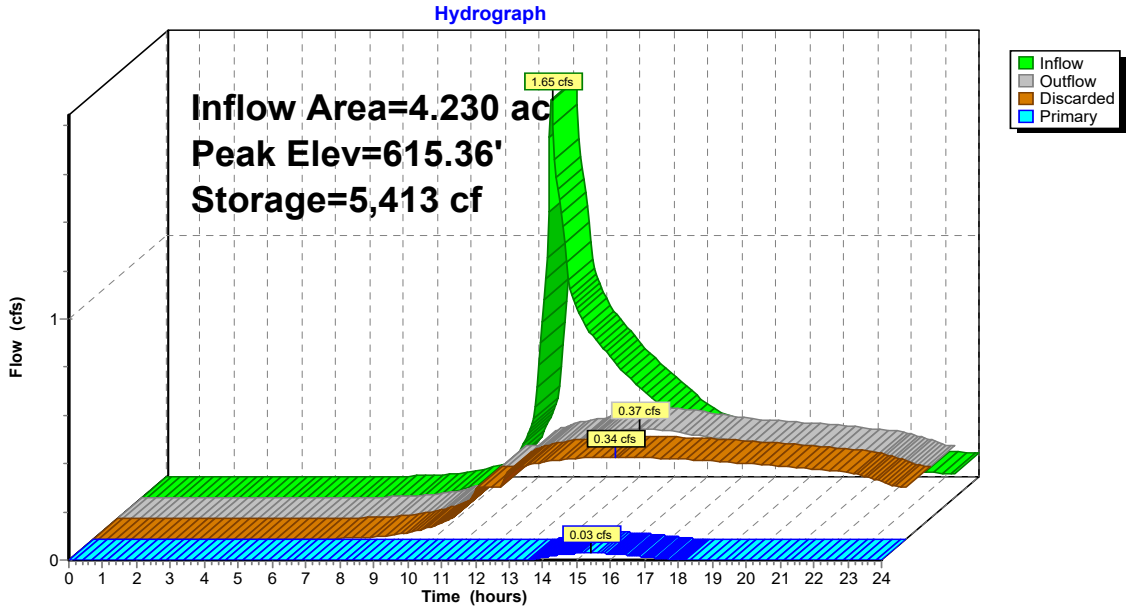
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.25	3,944	0	0
614.75	3,944	1,972	1,972

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.25'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.75'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.75' / 612.25' S= 0.0536 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.34 cfs @ 15.39 hrs HW=615.36' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.03 cfs @ 15.39 hrs HW=615.36' (Free Discharge)
└─**2=Culvert** (Passes 0.03 cfs of 1.50 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.38 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2: SFB-2



Stage-Discharge for Pond 2: SFB-2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
613.25	0.00	0.00	0.00
613.30	0.22	0.22	0.00
613.35	0.22	0.22	0.00
613.40	0.22	0.22	0.00
613.45	0.22	0.22	0.00
613.50	0.22	0.22	0.00
613.55	0.22	0.22	0.00
613.60	0.22	0.22	0.00
613.65	0.22	0.22	0.00
613.70	0.22	0.22	0.00
613.75	0.22	0.22	0.00
613.80	0.22	0.22	0.00
613.85	0.22	0.22	0.00
613.90	0.22	0.22	0.00
613.95	0.22	0.22	0.00
614.00	0.22	0.22	0.00
614.05	0.22	0.22	0.00
614.10	0.22	0.22	0.00
614.15	0.22	0.22	0.00
614.20	0.22	0.22	0.00
614.25	0.22	0.22	0.00
614.30	0.22	0.22	0.00
614.35	0.23	0.23	0.00
614.40	0.23	0.23	0.00
614.45	0.24	0.24	0.00
614.50	0.25	0.25	0.00
614.55	0.25	0.25	0.00
614.60	0.26	0.26	0.00
614.65	0.26	0.26	0.00
614.70	0.27	0.27	0.00
614.75	0.28	0.28	0.00
614.80	0.28	0.28	0.00
614.85	0.29	0.29	0.00
614.90	0.29	0.29	0.00
614.95	0.30	0.30	0.00
615.00	0.31	0.31	0.00
615.05	0.31	0.31	0.00
615.10	0.32	0.32	0.00
615.15	0.32	0.32	0.00
615.20	0.33	0.33	0.00
615.25	0.33	0.33	0.00
615.30	0.35	0.34	0.01
615.35	0.37	0.34	0.03
615.40	0.38	0.35	0.04
615.45	0.39	0.35	0.04
615.50	0.40	0.36	0.05
615.55	0.42	0.36	0.05
615.60	0.43	0.37	0.06
615.65	0.43	0.37	0.06
615.70	0.44	0.38	0.07
615.75	0.45	0.38	0.07
615.80	0.46	0.39	0.08
615.85	0.47	0.39	0.08
615.90	0.48	0.40	0.08
615.95	0.49	0.40	0.09
616.00	0.50	0.41	0.09
616.05	0.56	0.41	0.15
616.10	0.67	0.42	0.26
616.15	0.82	0.42	0.40
616.20	0.95	0.43	0.52
616.25	1.01	0.43	0.58
616.30	1.06	0.44	0.62
616.35	1.11	0.44	0.67
616.40	1.16	0.45	0.71
616.45	1.20	0.45	0.75
616.50	1.24	0.46	0.78
616.55	1.28	0.46	0.82
616.60	1.32	0.47	0.85
616.65	1.36	0.47	0.89
616.70	1.40	0.48	0.92
616.75	1.43	0.48	0.95
616.80	1.47	0.49	0.97
616.85	1.50	0.50	1.00
616.90	1.53	0.50	1.03
616.95	1.56	0.51	1.06
617.00	1.59	0.51	1.08
617.05	1.63	0.52	1.11
617.10	1.66	0.52	1.13
617.15	1.69	0.53	1.16
617.20	1.71	0.53	1.18
617.25	1.74	0.54	1.20
617.30	1.77	0.55	1.23
617.35	1.80	0.55	1.25
617.40	**1.83**	**0.56**	**1.27**

Summary for Pond DB-1: DB-1

Inflow	=	1.39 cfs @	12.09 hrs,	Volume=	0.034 af
Outflow	=	0.22 cfs @	12.42 hrs,	Volume=	0.032 af, Atten= 84%, Lag= 19.9 min
Primary	=	0.22 cfs @	12.42 hrs,	Volume=	0.032 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.69' @ 12.42 hrs Surf.Area= 3,131 sf Storage= 1,163 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 101.4 min calculated for 0.032 af (94% of inflow)
Center-of-Mass det. time= 101.5 min (828.6 - 727.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.22 cfs @ 12.42 hrs HW=609.69' (Free Discharge)
└─**1=Culvert** (Passes 0.22 cfs of 0.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.50 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-1: DB-1 - Chamber Wizard Field A

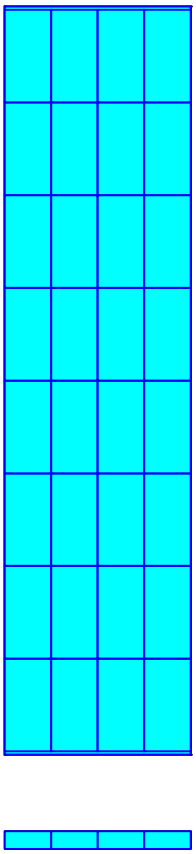
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

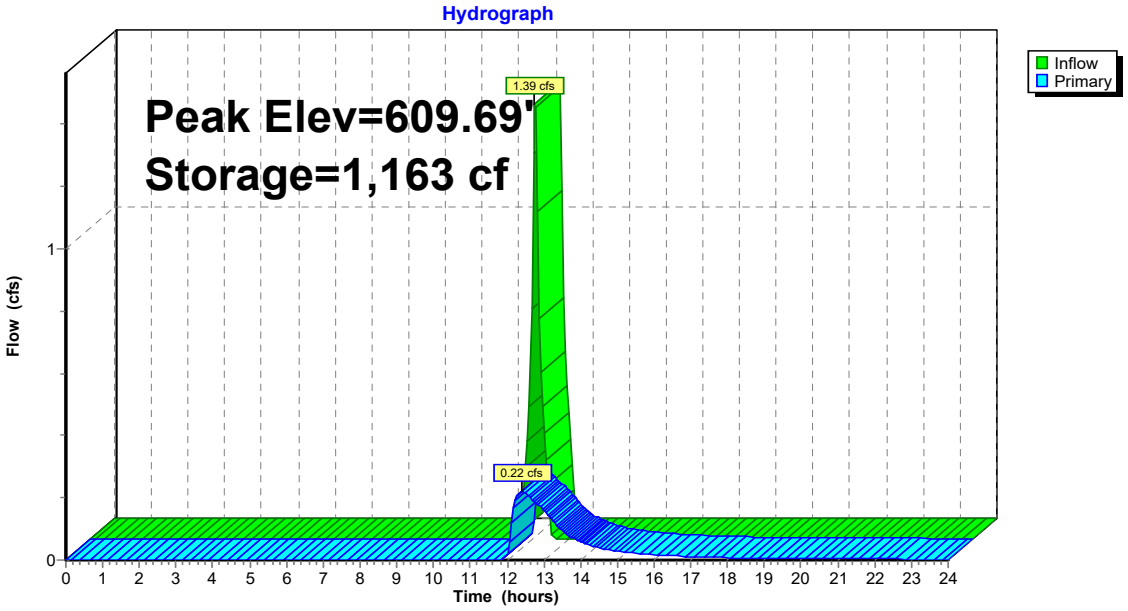
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Peak Elev=609.69'
Storage=1,163 cf
1.39 cfs
0.22 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-1: DB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
609.25	0.00	610.29	0.40	611.33	0.65
609.27	0.00	610.31	0.41	611.35	0.65
609.29	0.00	610.33	0.42	611.37	0.65
609.31	0.01	610.35	0.43	611.39	0.66
609.33	0.01	610.37	0.44	611.41	0.66
609.35	0.02	610.39	0.46	611.43	0.66
609.37	0.03	610.41	0.48	611.45	0.66
609.39	0.04	610.43	0.49	611.47	0.67
609.41	0.05	610.45	0.51	611.49	0.67
609.43	0.06	610.47	0.51	611.51	0.67
609.45	0.08	610.49	0.52	611.53	0.68
609.47	0.09	610.51	0.52	611.55	0.68
609.49	0.11	610.53	0.53	611.57	0.68
609.51	0.13	610.55	0.53	611.59	0.68
609.53	0.14	610.57	0.53	611.61	0.69
609.55	0.15	610.59	0.54	611.63	0.69
609.57	0.17	610.61	0.54	611.65	0.69
609.59	0.17	610.63	0.54	611.67	0.69
609.61	0.18	610.65	0.55	611.69	0.70
609.63	0.19	610.67	0.55	611.71	0.70
609.65	0.20	610.69	0.55	611.73	0.70
609.67	0.21	610.71	0.56	611.75	0.70
609.69	0.22	610.73	0.56	611.77	0.71
609.71	0.23	610.75	0.56	611.79	0.71
609.73	0.24	610.77	0.57	611.81	0.71
609.75	0.24	610.79	0.57	611.83	0.71
609.77	0.25	610.81	0.57	611.85	0.72
609.79	0.26	610.83	0.57	611.87	0.72
609.81	0.26	610.85	0.58	611.89	0.72
609.83	0.27	610.87	0.58	611.91	**0.72**
609.85	0.28	610.89	0.58		
609.87	0.28	610.91	0.59		
609.89	0.29	610.93	0.59		
609.91	0.30	610.95	0.59		
609.93	0.30	610.97	0.60		
609.95	0.31	610.99	0.60		
609.97	0.31	611.01	0.60		
609.99	0.32	611.03	0.61		
610.01	0.32	611.05	0.61		
610.03	0.33	611.07	0.61		
610.05	0.33	611.09	0.61		
610.07	0.34	611.11	0.62		
610.09	0.34	611.13	0.62		
610.11	0.35	611.15	0.62		
610.13	0.35	611.17	0.63		
610.15	0.36	611.19	0.63		
610.17	0.36	611.21	0.63		
610.19	0.37	611.23	0.63		
610.21	0.37	611.25	0.64		
610.23	0.38	611.27	0.64		
610.25	0.38	611.29	0.64		
610.27	0.39	611.31	0.65		

Summary for Pond DB-2: DB-2

Inflow	=	1.04 cfs @	12.09 hrs,	Volume=	0.023 af
Outflow	=	0.05 cfs @	12.49 hrs,	Volume=	0.020 af, Atten= 95%, Lag= 24.1 min
Primary	=	0.05 cfs @	12.49 hrs,	Volume=	0.020 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 615.59' @ 12.49 hrs Surf.Area= 3,131 sf Storage= 904 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 199.4 min calculated for 0.020 af (89% of inflow)
Center-of-Mass det. time= 197.4 min (924.6 - 727.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**8.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 12.49 hrs HW=615.59' (Free Discharge)
└─**1=Culvert** (Passes 0.05 cfs of 0.28 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 2.44 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

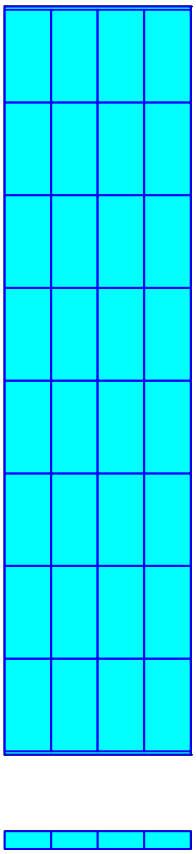
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

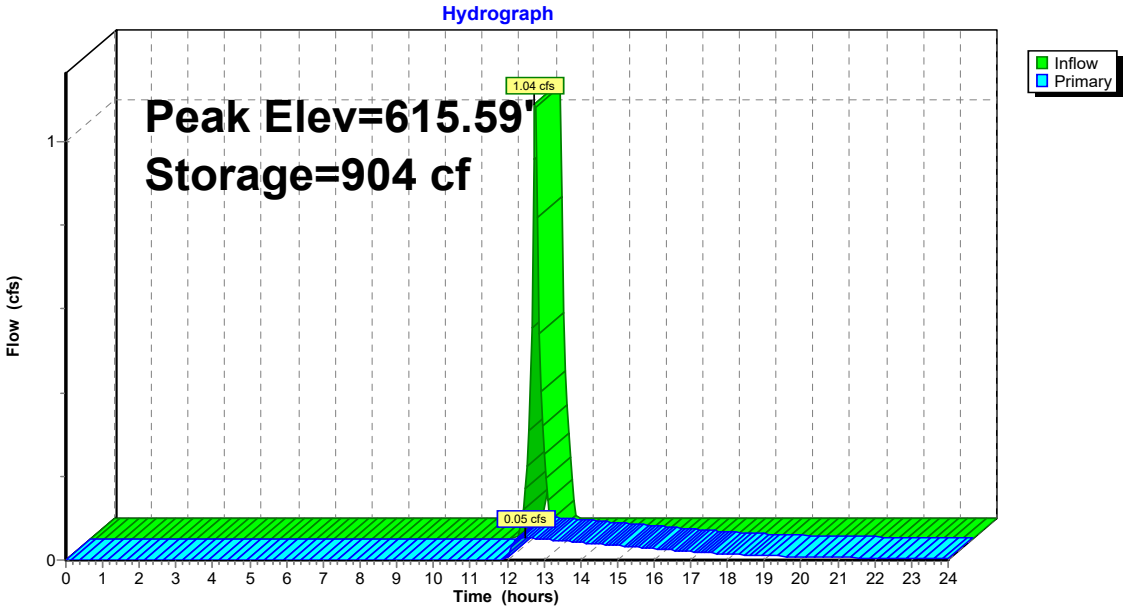
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Inflow
Primary
1.04 cfs
0.05 cfs
Peak Elev=615.59'
Storage=904 cf
Flow (cfs)
1
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Discharge for Pond DB-2: DB-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.25	0.00	616.29	0.10	617.33	0.15
615.27	0.00	616.31	0.10	617.35	0.15
615.29	0.00	616.33	0.10	617.37	0.15
615.31	0.01	616.35	0.11	617.39	0.15
615.33	0.01	616.37	0.11	617.41	0.15
615.35	0.01	616.39	0.11	617.43	0.15
615.37	0.02	616.41	0.11	617.45	0.15
615.39	0.02	616.43	0.11	617.47	0.15
615.41	0.03	616.45	0.11	617.49	0.15
615.43	0.03	616.47	0.11	617.51	0.15
615.45	0.04	616.49	0.11	617.53	0.16
615.47	0.04	616.51	0.11	617.55	0.16
615.49	0.04	616.53	0.11	617.57	0.16
615.51	0.04	616.55	0.12	617.59	0.16
615.53	0.05	616.57	0.12	617.61	0.16
615.55	0.05	616.59	0.12	617.63	0.16
615.57	0.05	616.61	0.12	617.65	0.16
615.59	0.05	616.63	0.12	617.67	0.16
615.61	0.06	616.65	0.12	617.69	0.16
615.63	0.06	616.67	0.12	617.71	0.16
615.65	0.06	616.69	0.12	617.73	0.16
615.67	0.06	616.71	0.12	617.75	0.16
615.69	0.06	616.73	0.12	617.77	0.16
615.71	0.06	616.75	0.13	617.79	0.16
615.73	0.07	616.77	0.13	617.81	0.17
615.75	0.07	616.79	0.13	617.83	0.17
615.77	0.07	616.81	0.13	617.85	0.17
615.79	0.07	616.83	0.13	617.87	0.17
615.81	0.07	616.85	0.13	617.89	0.17
615.83	0.07	616.87	0.13	617.91	**0.17**
615.85	0.08	616.89	0.13		
615.87	0.08	616.91	0.13		
615.89	0.08	616.93	0.13		
615.91	0.08	616.95	0.13		
615.93	0.08	616.97	0.13		
615.95	0.08	616.99	0.14		
615.97	0.08	617.01	0.14		
615.99	0.09	617.03	0.14		
616.01	0.09	617.05	0.14		
616.03	0.09	617.07	0.14		
616.05	0.09	617.09	0.14		
616.07	0.09	617.11	0.14		
616.09	0.09	617.13	0.14		
616.11	0.09	617.15	0.14		
616.13	0.09	617.17	0.14		
616.15	0.09	617.19	0.14		
616.17	0.10	617.21	0.14		
616.19	0.10	617.23	0.14		
616.21	0.10	617.25	0.15		
616.23	0.10	617.27	0.15		
616.25	0.10	617.29	0.15		
616.27	0.10	617.31	0.15		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 15.55" for 2-YR event
Inflow = 2.39 cfs @ 12.23 hrs, Volume= 0.173 af
Outflow = 0.48 cfs @ 12.82 hrs, Volume= 0.169 af, Atten= 80%, Lag= 35.4 min
Primary = 0.48 cfs @ 12.82 hrs, Volume= 0.169 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 613.74' @ 12.82 hrs Surf.Area= 2,902 sf Storage= 3,827 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 113.6 min calculated for 0.169 af (98% of inflow)
Center-of-Mass det. time= 102.0 min (884.3 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.48 cfs @ 12.82 hrs HW=613.74' (Free Discharge)
└─**1=Culvert** (Passes 0.48 cfs of 2.96 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.53 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

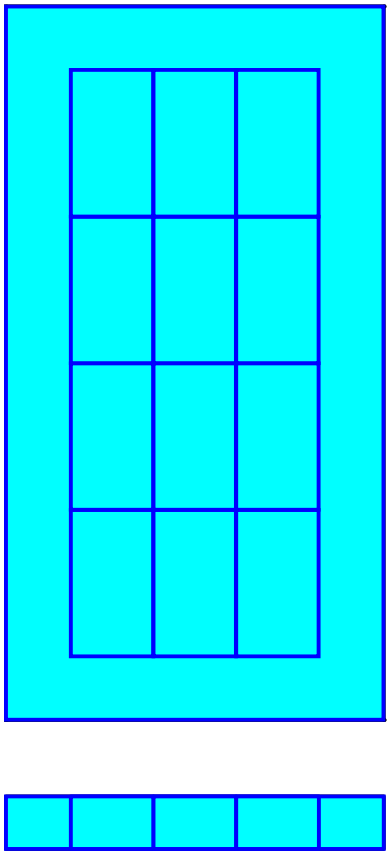
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

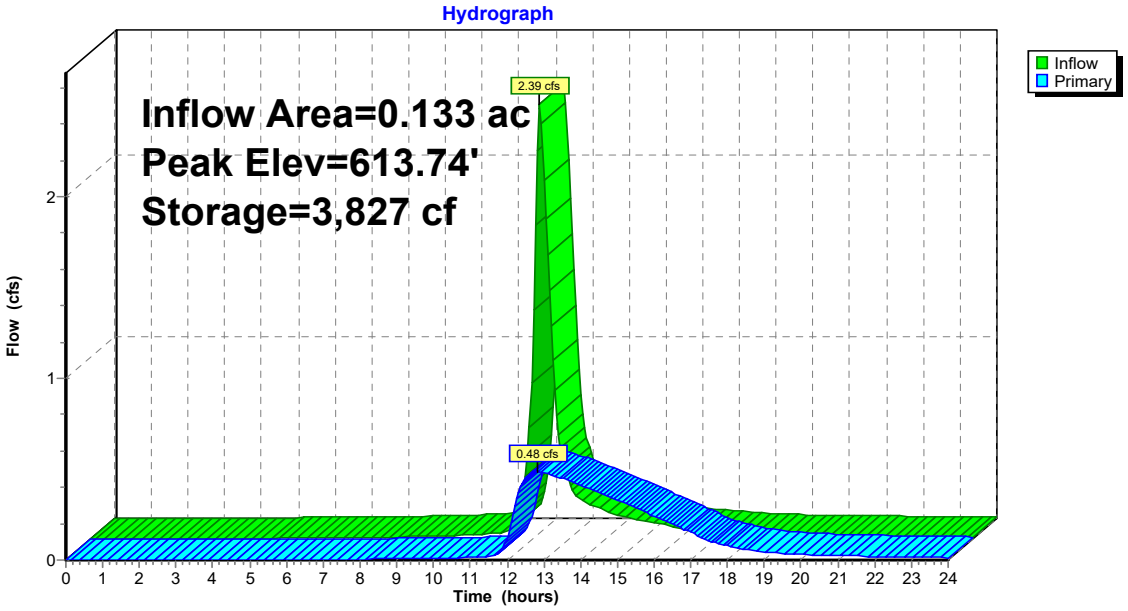
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=613.74'
Storage=3,827 cf
2.39 cfs
0.48 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-6: DB-6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
612.25	0.00	614.33	0.92	616.41	4.90
612.29	0.00	614.37	1.00	616.45	5.02
612.33	0.02	614.41	1.08	616.49	5.16
612.37	0.03	614.45	1.17	616.53	5.30
612.41	0.06	614.49	1.26	616.57	5.46
612.45	0.08	614.53	1.35	616.61	5.62
612.49	0.11	614.57	1.43	616.65	5.79
612.53	0.14	614.61	1.51	616.69	5.93
612.57	0.17	614.65	1.58	616.73	5.96
612.61	0.18	614.69	1.64	616.77	5.99
612.65	0.20	614.73	1.70	616.81	6.02
612.69	0.22	614.77	1.76	616.85	6.05
612.73	0.24	614.81	1.81	616.89	6.07
612.77	0.25	614.85	1.86	616.93	6.10
612.81	0.26	614.89	1.91	616.97	6.13
612.85	0.28	614.93	1.96	617.01	6.16
612.89	0.29	614.97	2.01	617.05	6.19
612.93	0.30	615.01	2.06	617.09	6.22
612.97	0.31	615.05	2.10	617.13	6.25
613.01	0.32	615.09	2.15	617.17	6.28
613.05	0.33	615.13	2.19	617.21	6.31
613.09	0.34	615.17	2.23	617.25	6.33
613.13	0.35	615.21	2.28	617.29	6.36
613.17	0.36	615.25	2.32	617.33	6.39
613.21	0.37	615.29	2.36	617.37	6.42
613.25	0.38	615.33	2.42	617.41	6.44
613.29	0.39	615.37	2.48	617.45	6.47
613.33	0.40	615.41	2.56	617.49	6.50
613.37	0.41	615.45	2.64	617.53	6.53
613.41	0.42	615.49	2.73	617.57	6.55
613.45	0.43	615.53	2.83	617.61	6.58
613.49	0.44	615.57	2.93	617.65	6.61
613.53	0.44	615.61	3.04	617.69	6.64
613.57	0.45	615.65	3.16	617.73	**6.66**
613.61	0.46	615.69	3.27		
613.65	0.47	615.73	3.39		
613.69	0.47	615.77	3.50		
613.73	0.48	615.81	3.61		
613.77	0.49	615.85	3.72		
613.81	0.50	615.89	3.82		
613.85	0.50	615.93	3.90		
613.89	0.51	615.97	3.99		
613.93	0.52	616.01	4.07		
613.97	0.52	616.05	4.15		
614.01	0.53	616.09	4.23		
614.05	0.55	616.13	4.31		
614.09	0.57	616.17	4.38		
614.13	0.61	616.21	4.45		
614.17	0.65	616.25	4.52		
614.21	0.71	616.29	4.60		
614.25	0.77	616.33	4.69		
614.29	0.84	616.37	4.79		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 2.37" for 2-YR event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.107 af
Outflow = 0.31 cfs @ 12.51 hrs, Volume= 0.102 af, Atten= 79%, Lag= 25.4 min
Primary = 0.31 cfs @ 12.51 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.51' @ 12.51 hrs Surf.Area= 3,131 sf Storage= 1,895 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 106.4 min calculated for 0.102 af (95% of inflow)
Center-of-Mass det. time= 79.2 min (879.9 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.31 cfs @ 12.51 hrs HW=616.51' (Free Discharge)
└─**1=Culvert** (Passes 0.31 cfs of 0.51 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.55 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-7: DB-7 - Chamber Wizard Field A

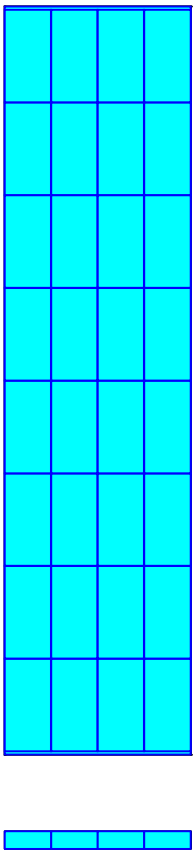
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

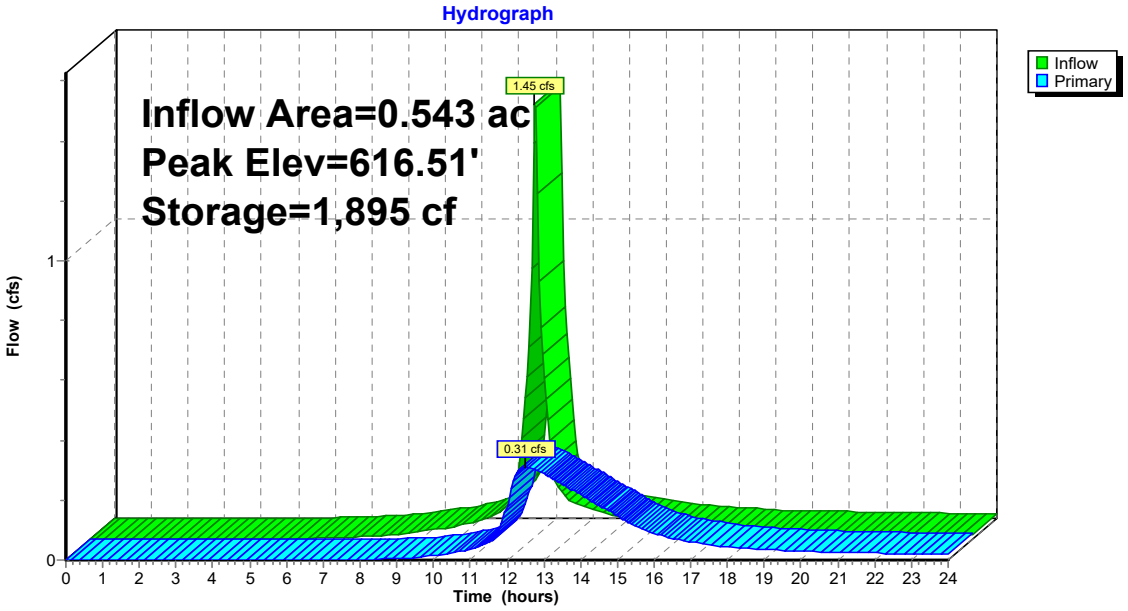
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=616.51'
Storage=1,895 cf
1.45 cfs
0.31 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-7: DB-7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.80	0.00	616.84	0.39	617.88	0.85
615.82	0.00	616.86	0.40	617.90	0.86
615.84	0.00	616.88	0.40	617.92	0.87
615.86	0.01	616.90	0.41	617.94	0.88
615.88	0.02	616.92	0.41	617.96	0.89
615.90	0.02	616.94	0.41	617.98	0.89
615.92	0.03	616.96	0.42	618.00	0.90
615.94	0.04	616.98	0.42	618.02	0.90
615.96	0.06	617.00	0.43	618.04	0.90
615.98	0.07	617.02	0.43	618.06	0.91
616.00	0.08	617.04	0.44	618.08	0.91
616.02	0.10	617.06	0.44	618.10	0.92
616.04	0.11	617.08	0.44	618.12	0.92
616.06	0.13	617.10	0.45	618.14	0.92
616.08	0.14	617.12	0.45	618.16	0.93
616.10	0.15	617.14	0.46	618.18	0.93
616.12	0.17	617.16	0.46	618.20	0.93
616.14	0.17	617.18	0.46	618.22	0.94
616.16	0.18	617.20	0.47	618.24	0.94
616.18	0.19	617.22	0.47	618.26	0.94
616.20	0.20	617.24	0.47	618.28	0.95
616.22	0.21	617.26	0.48	618.30	0.95
616.24	0.22	617.28	0.48	618.32	0.95
616.26	0.23	617.30	0.49	618.34	0.96
616.28	0.24	617.32	0.49	618.36	0.96
616.30	0.24	617.34	0.50	618.38	0.96
616.32	0.25	617.36	0.50	618.40	0.97
616.34	0.26	617.38	0.52	618.42	0.97
616.36	0.26	617.40	0.53	618.44	0.97
616.38	0.27	617.42	0.54	618.46	**0.98**
616.40	0.28	617.44	0.55		
616.42	0.28	617.46	0.57		
616.44	0.29	617.48	0.59		
616.46	0.30	617.50	0.60		
616.48	0.30	617.52	0.62		
616.50	0.31	617.54	0.64		
616.52	0.31	617.56	0.66		
616.54	0.32	617.58	0.67		
616.56	0.32	617.60	0.69		
616.58	0.33	617.62	0.71		
616.60	0.33	617.64	0.72		
616.62	0.34	617.66	0.73		
616.64	0.34	617.68	0.74		
616.66	0.35	617.70	0.76		
616.68	0.35	617.72	0.77		
616.70	0.36	617.74	0.78		
616.72	0.36	617.76	0.79		
616.74	0.37	617.78	0.80		
616.76	0.37	617.80	0.81		
616.78	0.38	617.82	0.82		
616.80	0.38	617.84	0.83		
616.82	0.39	617.86	0.84		

Summary for Pond ICS-1: ICS-1

Inflow Area = 0.693 ac, 62.75% Impervious, Inflow Depth > 2.19" for 2-YR event
Inflow = 1.73 cfs @ 12.09 hrs, Volume= 0.126 af
Outflow = 1.73 cfs @ 12.09 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.09 hrs, Volume= 0.093 af
Secondary = 1.39 cfs @ 12.09 hrs, Volume= 0.034 af

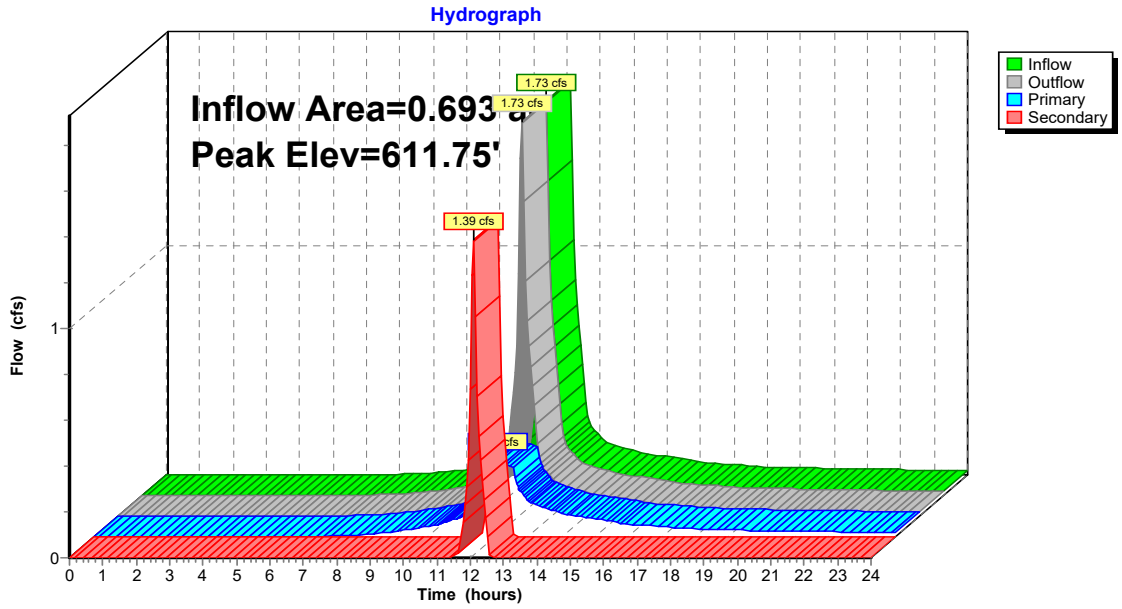
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 611.75' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.09 hrs HW=611.74' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.33 cfs @ 3.82 fps)

Secondary OutFlow Max=1.36 cfs @ 12.09 hrs HW=611.74' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.36 cfs @ 3.13 fps)

Pond ICS-1: ICS-1



Stage-Discharge for Pond ICS-1: ICS-1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
609.25	0.00	0.00	0.00
609.30	0.00	0.00	0.00
609.35	0.02	0.02	0.00
609.40	0.04	0.04	0.00
609.45	0.07	0.07	0.00
609.50	0.11	0.11	0.00
609.55	0.14	0.14	0.00
609.60	0.17	0.17	0.00
609.65	0.19	0.19	0.00
609.70	0.18	0.18	0.00
609.75	0.19	0.19	0.00
609.80	0.19	0.19	0.00
609.85	0.20	0.20	0.00
609.90	0.20	0.20	0.00
609.95	0.21	0.21	0.00
610.00	0.21	0.21	0.00
610.05	0.22	0.22	0.00
610.10	0.22	0.22	0.00
610.15	0.22	0.22	0.00
610.20	0.23	0.23	0.00
610.25	0.23	0.23	0.00
610.30	0.24	0.24	0.00
610.35	0.24	0.24	0.00
610.40	0.24	0.24	0.00
610.45	0.25	0.25	0.00
610.50	0.25	0.25	0.00
610.55	0.26	0.26	0.00
610.60	0.26	0.26	0.00
610.65	0.26	0.26	0.00
610.70	0.27	0.27	0.00
610.75	0.27	0.27	0.00
610.80	0.27	0.27	0.00
610.85	0.28	0.28	0.00
610.90	0.28	0.28	0.00
610.95	0.28	0.28	0.00
611.00	0.29	0.29	0.00
611.05	0.29	0.29	0.00
611.10	0.29	0.29	0.00
611.15	0.30	0.30	0.00
611.20	0.30	0.30	0.00
611.25	0.32	0.30	0.01
611.30	0.36	0.31	0.06
611.35	0.43	0.31	0.12
611.40	0.53	0.31	0.21
611.45	0.64	0.32	0.33
611.50	0.78	0.32	0.46
611.55	0.94	0.32	0.62
611.60	1.11	0.32	0.79
611.65	1.31	0.33	0.98
611.70	1.51	0.33	1.18
611.75	1.73	0.33	1.40
611.80	1.96	0.34	1.62
611.85	2.19	0.34	1.85
611.90	2.43	0.34	2.09
611.95	2.67	0.34	2.33
612.00	2.91	0.35	2.56
612.05	3.14	0.35	2.79
612.10	3.36	0.35	3.01
612.15	3.55	0.36	3.20
612.20	3.70	0.36	3.34
612.25	3.87	0.36	3.51
612.30	4.03	0.36	3.66
612.35	4.18	0.37	3.81
612.40	4.32	0.37	3.95
612.45	4.47	0.37	4.09
612.50	4.60	0.37	4.23
612.55	4.73	0.38	4.36
612.60	4.86	0.38	4.48
612.65	4.99	0.38	4.61
612.70	5.11	0.38	4.73
612.75	5.23	0.39	4.84
612.80	5.35	0.39	4.96
612.85	5.46	0.39	5.07
612.90	5.57	0.39	5.18
612.95	5.68	0.40	5.29
613.00	5.79	0.40	5.39
613.05	5.89	0.40	5.49
613.10	6.00	0.40	5.59
613.15	6.10	0.41	5.69
613.20	6.20	0.41	5.79
613.25	**6.30**	**0.41**	**5.89**

Summary for Pond ICS-2: ICS-2

Inflow Area = 0.598 ac, 70.86% Impervious, Inflow Depth > 2.10" for 2-YR event
Inflow = 1.44 cfs @ 12.09 hrs, Volume= 0.105 af
Outflow = 1.44 cfs @ 12.09 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.09 hrs, Volume= 0.082 af
Secondary = 1.04 cfs @ 12.09 hrs, Volume= 0.023 af

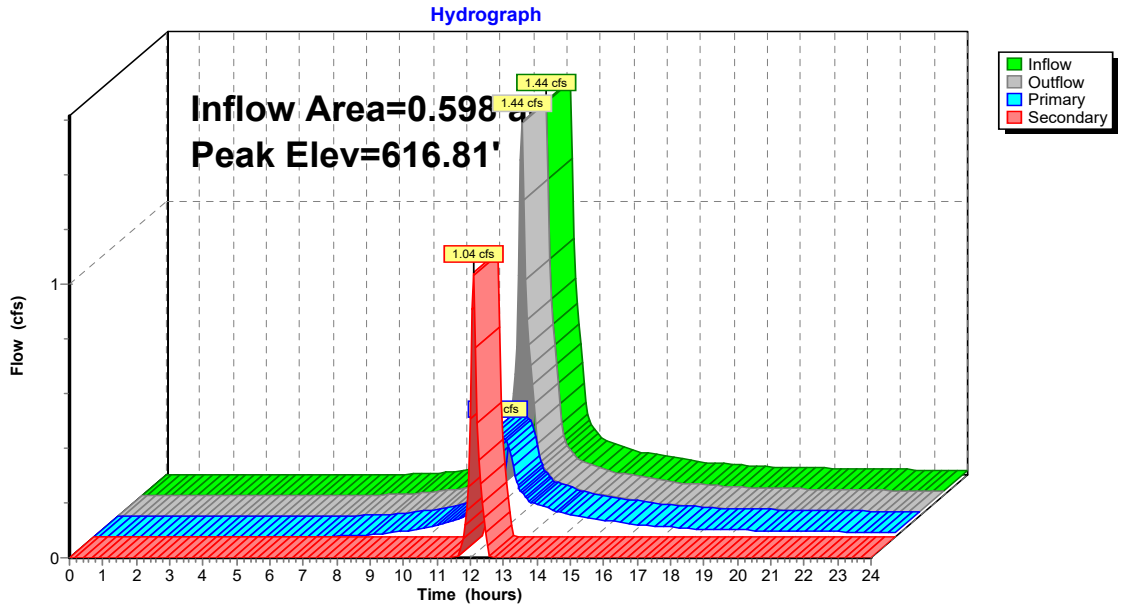
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.81' @ 12.09 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.09 hrs HW=616.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.40 cfs @ 4.58 fps)

Secondary OutFlow Max=1.01 cfs @ 12.09 hrs HW=616.80' (Free Discharge)
└**2=Culvert** (Barrel Controls 1.01 cfs @ 2.99 fps)

Pond ICS-2: ICS-2



Stage-Discharge for Pond ICS-2: ICS-2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
615.85	0.00	0.00	0.00
615.87	0.00	0.00	0.00
615.89	0.01	0.01	0.00
615.91	0.01	0.01	0.00
615.93	0.02	0.02	0.00
615.95	0.03	0.03	0.00
615.97	0.04	0.04	0.00
615.99	0.06	0.06	0.00
616.01	0.07	0.07	0.00
616.03	0.09	0.09	0.00
616.05	0.10	0.10	0.00
616.07	0.12	0.12	0.00
616.09	0.14	0.14	0.00
616.11	0.16	0.16	0.00
616.13	0.18	0.18	0.00
616.15	0.19	0.19	0.00
616.17	0.21	0.21	0.00
616.19	0.22	0.22	0.00
616.21	0.23	0.23	0.00
616.23	0.24	0.24	0.00
616.25	0.26	0.25	0.00
616.27	0.28	0.26	0.01
616.29	0.30	0.27	0.02
616.31	0.32	0.28	0.03
616.33	0.34	0.29	0.05
616.35	0.37	0.30	0.07
616.37	0.40	0.31	0.09
616.39	0.43	0.32	0.11
616.41	0.46	0.33	0.13
616.43	0.50	0.34	0.16
616.45	0.53	0.35	0.19
616.47	0.57	0.35	0.22
616.49	0.61	0.35	0.25
616.51	0.65	0.36	0.29
616.53	0.69	0.36	0.33
616.55	0.73	0.36	0.37
616.57	0.77	0.37	0.41
616.59	0.82	0.37	0.45
616.61	0.87	0.37	0.50
616.63	0.92	0.38	0.54
616.65	0.97	0.38	0.59
616.67	1.02	0.38	0.64
616.69	1.08	0.38	0.69
616.71	1.13	0.39	0.74
616.73	1.19	0.39	0.80
616.75	1.25	0.39	0.86
616.77	1.31	0.40	0.91
616.79	1.37	0.40	0.97
616.81	1.43	0.40	1.03
616.83	1.50	0.40	1.09
616.85	1.56	0.41	1.15
616.87	1.63	0.41	1.22
616.89	1.69	0.41	1.28
616.91	1.76	0.41	1.35
616.93	1.83	0.42	1.41
616.95	1.90	0.42	1.48
616.97	1.97	0.42	1.54
616.99	2.04	0.42	1.61
617.01	2.11	0.43	1.68
617.03	2.18	0.43	1.75
617.05	2.25	0.43	1.82
617.07	2.32	0.43	1.89
617.09	2.40	0.44	1.96
617.11	2.47	0.44	2.03
617.13	2.54	0.44	2.10
617.15	2.61	0.44	2.17
617.17	2.69	0.45	2.24
617.19	2.76	0.45	2.31
617.21	2.83	0.45	2.38
617.23	2.90	0.45	2.45
617.25	**2.97**	**0.46**	**2.51**

Summary for Pond ICS-6: ICS-6

Inflow Area = 2.630 ac, 39.25% Impervious, Inflow Depth > 1.11" for 2-YR event
Inflow = 2.40 cfs @ 12.24 hrs, Volume= 0.244 af
Outflow = 2.40 cfs @ 12.24 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.24 hrs, Volume= 0.105 af
Secondary = 2.18 cfs @ 12.24 hrs, Volume= 0.139 af

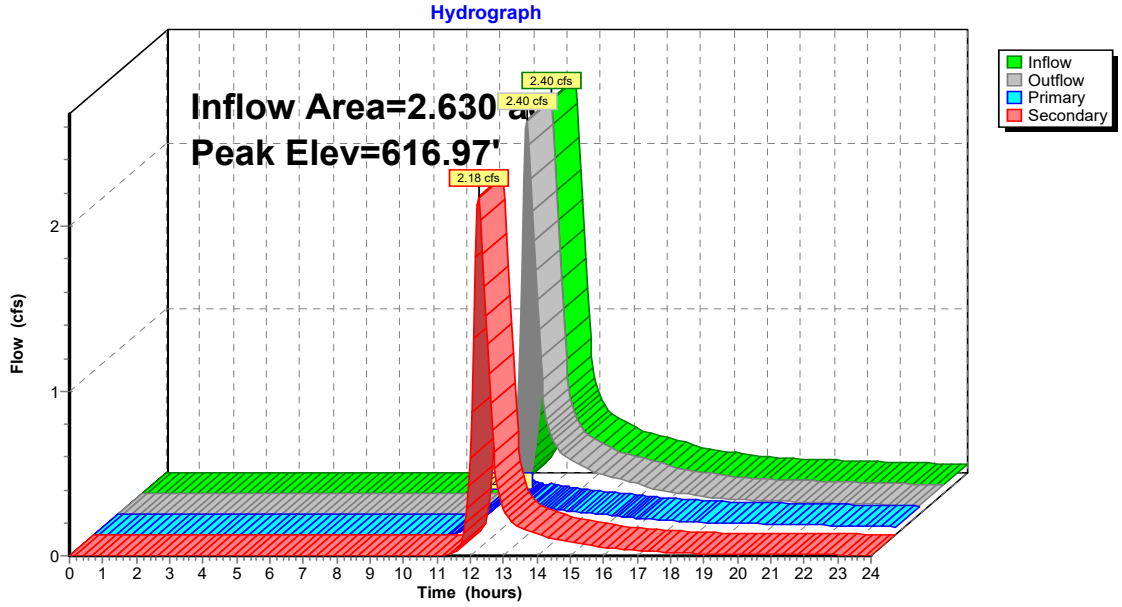
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.97' @ 12.24 hrs
Flood Elev= 621.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.21 cfs @ 12.24 hrs HW=616.97' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.21 cfs @ 2.46 fps)

Secondary OutFlow Max=2.16 cfs @ 12.24 hrs HW=616.97' (Free Discharge)
└**2=Culvert** (Barrel Controls 2.16 cfs @ 3.60 fps)

Pond ICS-6: ICS-6



Stage-Discharge for Pond ICS-6: ICS-6

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
616.00	0.00	0.00	0.00
616.10	0.02	0.02	0.00
616.20	0.08	0.07	0.01
616.30	0.24	0.14	0.10
616.40	0.44	0.19	0.26
616.50	0.66	0.18	0.48
616.60	0.94	0.19	0.75
616.70	1.27	0.20	1.08
616.80	1.65	0.20	1.44
616.90	2.06	0.21	1.85
617.00	2.51	0.22	2.30
617.10	2.99	0.22	2.77
617.20	3.49	0.23	3.26
617.30	3.99	0.24	3.76
617.40	4.50	0.24	4.26
617.50	5.00	0.25	4.75
617.60	5.47	0.25	5.22
617.70	5.89	0.26	5.63
617.80	6.21	0.26	5.95
617.90	6.75	0.27	6.48
618.00	7.32	0.27	7.05
618.10	7.85	0.28	7.57
618.20	8.34	0.28	8.06
618.30	8.81	0.29	8.52
618.40	9.25	0.29	8.96
618.50	9.67	0.30	9.38
618.60	10.08	0.30	9.77
618.70	10.47	0.31	10.16
618.80	10.82	0.31	10.51
618.90	11.08	0.32	10.77
619.00	11.34	0.32	11.02
619.10	11.59	0.33	11.26
619.20	11.83	0.33	11.50
619.30	12.07	0.33	11.74
619.40	12.31	0.34	11.97
619.50	12.54	0.34	12.19
619.60	12.76	0.35	12.41
619.70	12.98	0.35	12.63
619.80	13.20	0.35	12.85
619.90	13.42	0.36	13.06
620.00	13.63	0.36	13.26
620.10	13.83	0.37	13.47
620.20	14.04	0.37	13.67
620.30	14.24	0.37	13.87
620.40	14.44	0.38	14.06
620.50	14.64	0.38	14.26
620.60	14.83	0.38	14.45
620.70	15.02	0.39	14.63
620.80	15.21	0.39	14.82
620.90	15.40	0.40	15.00
621.00	15.58	0.40	15.18
621.10	**15.76**	**0.40**	**15.36**

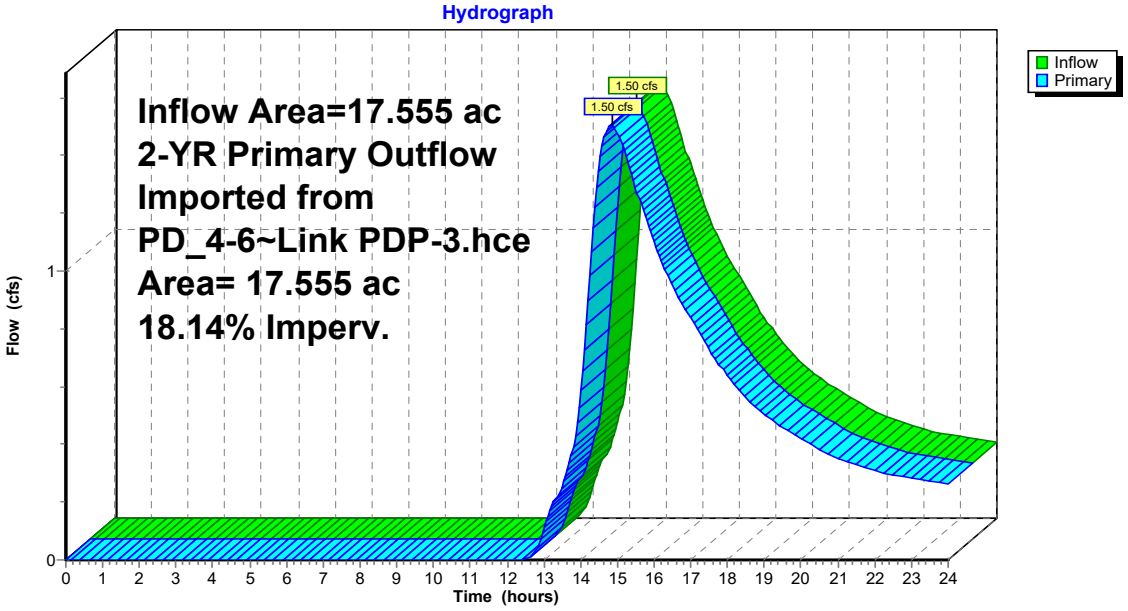
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 0.39" for 2-YR event
Inflow = 1.50 cfs @ 14.84 hrs, Volume= 0.563 af
Primary = 1.50 cfs @ 14.84 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

2-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

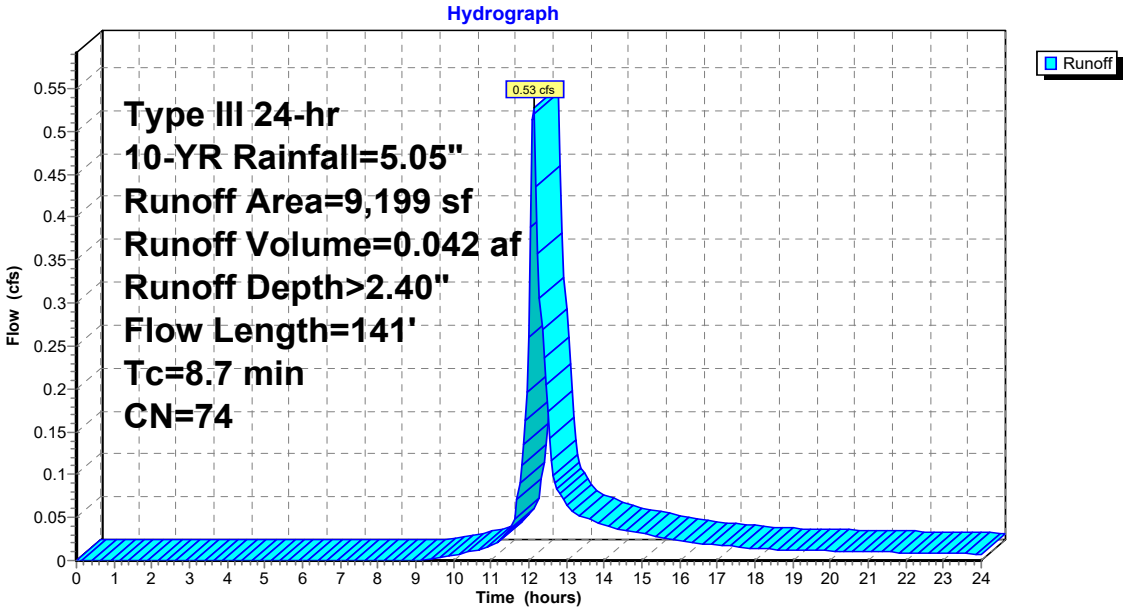
Runoff = 0.53 cfs @ 12.13 hrs, Volume= 0.042 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

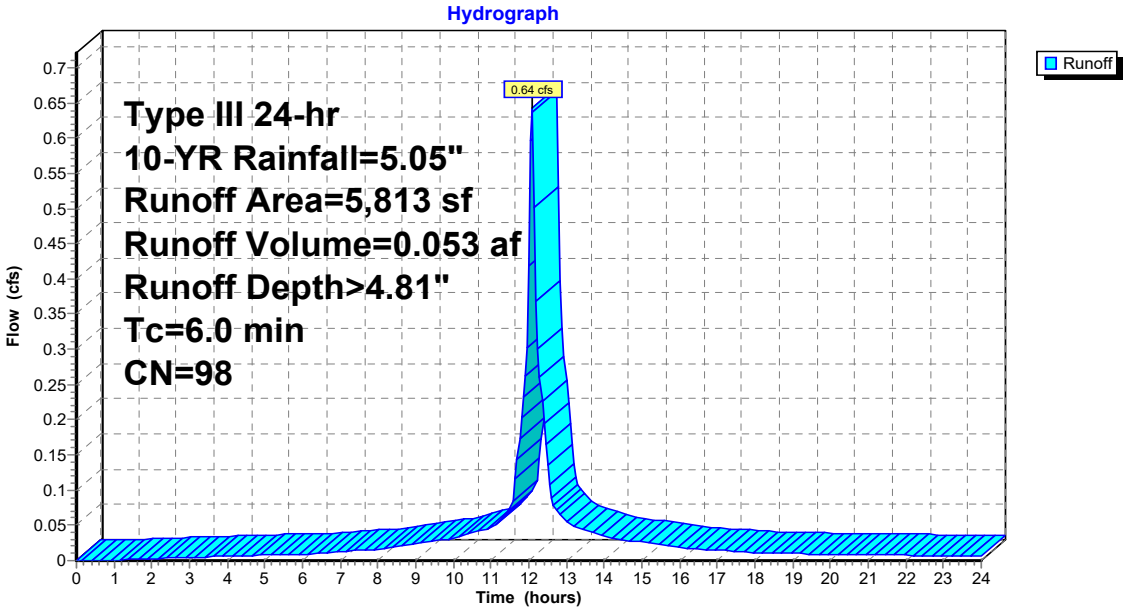
Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.053 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

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

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

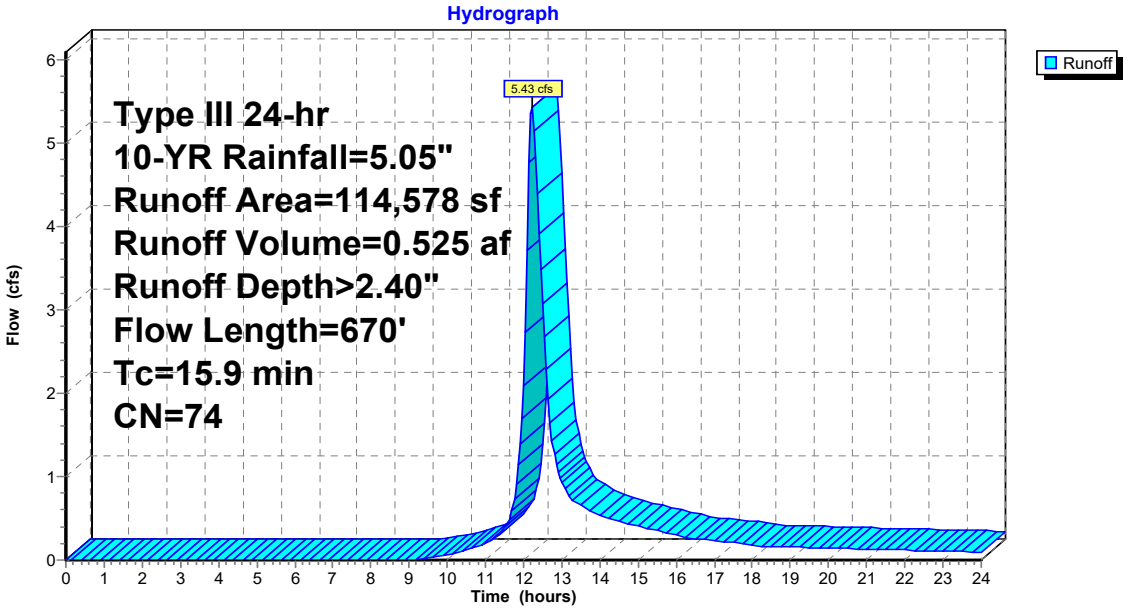
Runoff = 5.43 cfs @ 12.22 hrs, Volume= 0.525 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

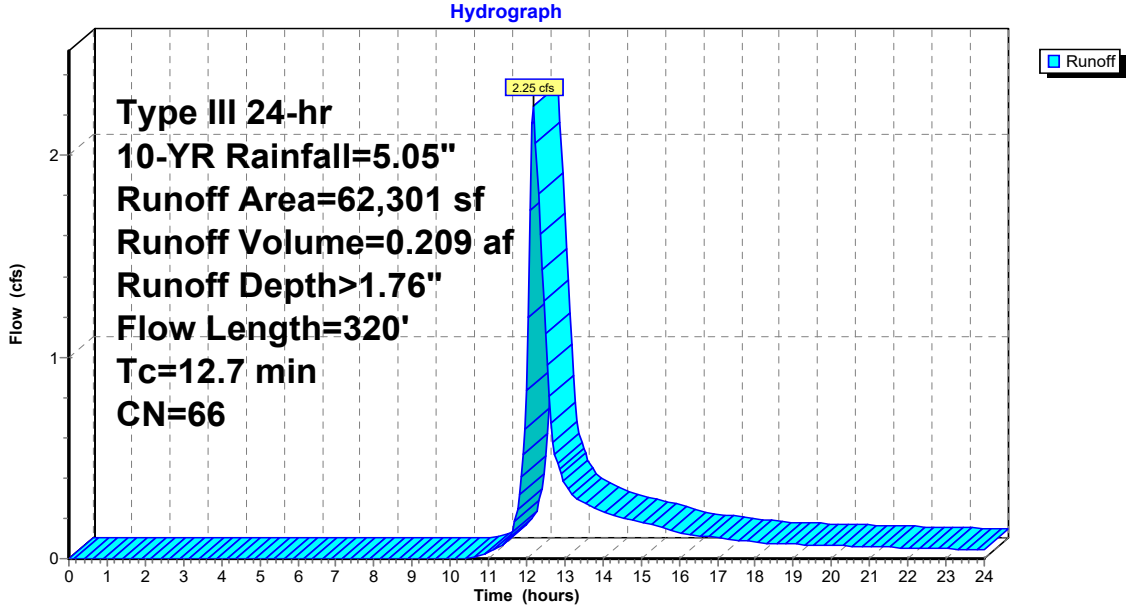
Runoff = 2.25 cfs @ 12.19 hrs, Volume= 0.209 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

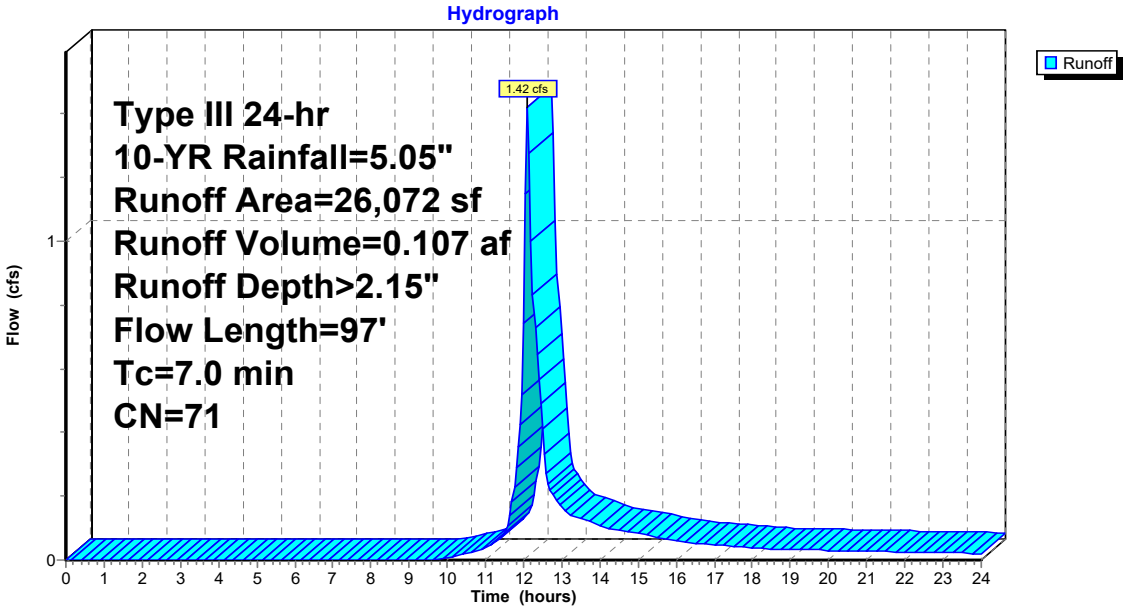
Runoff = 1.42 cfs @ 12.11 hrs, Volume= 0.107 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

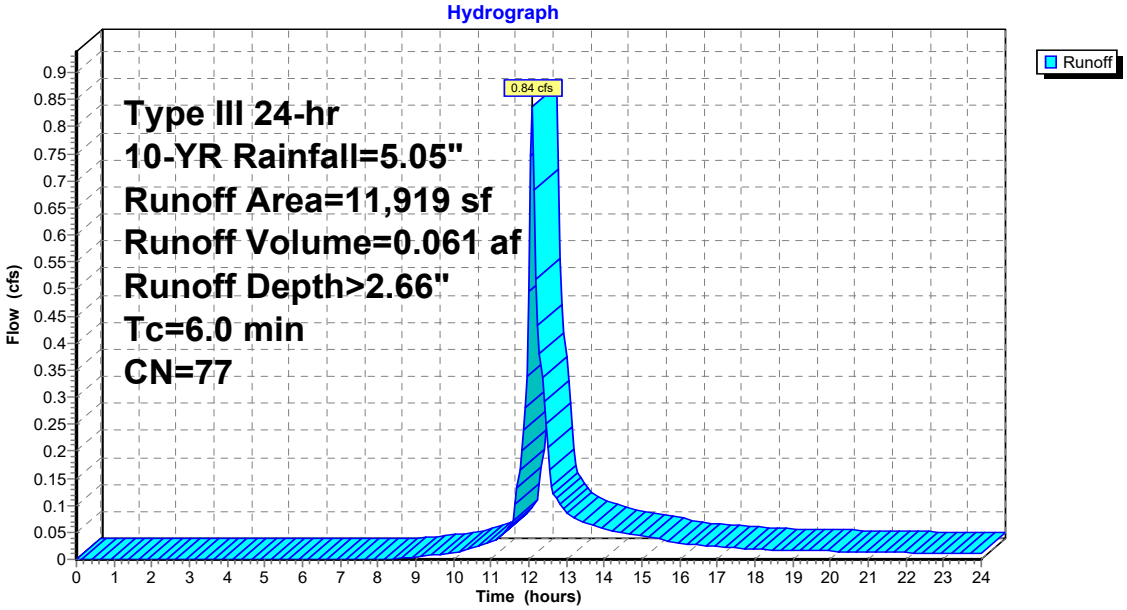
Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

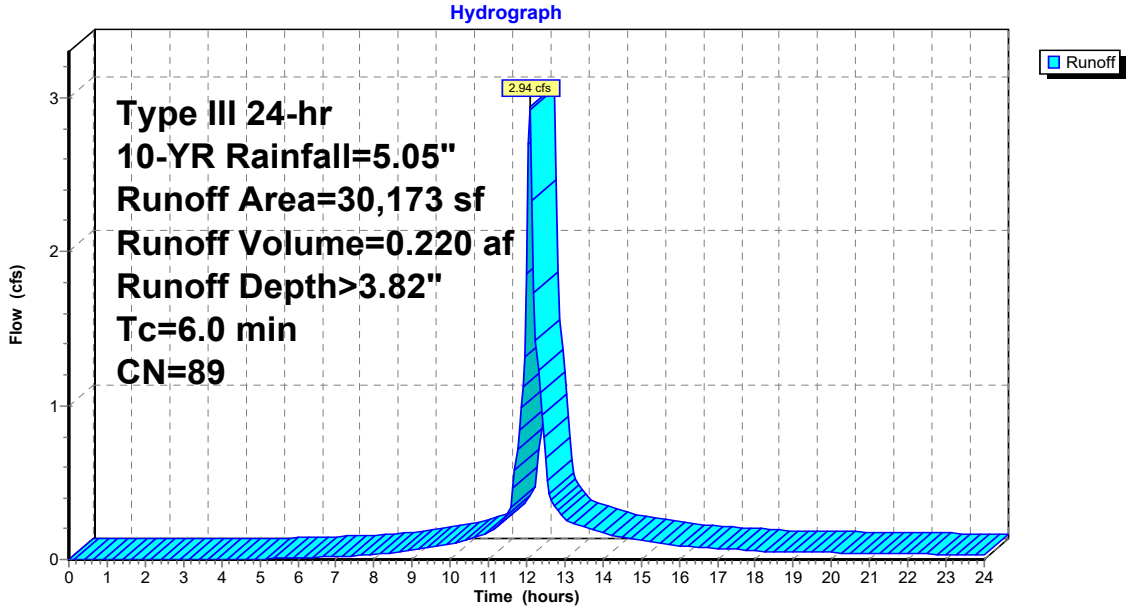
Runoff = 2.94 cfs @ 12.09 hrs, Volume= 0.220 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

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

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

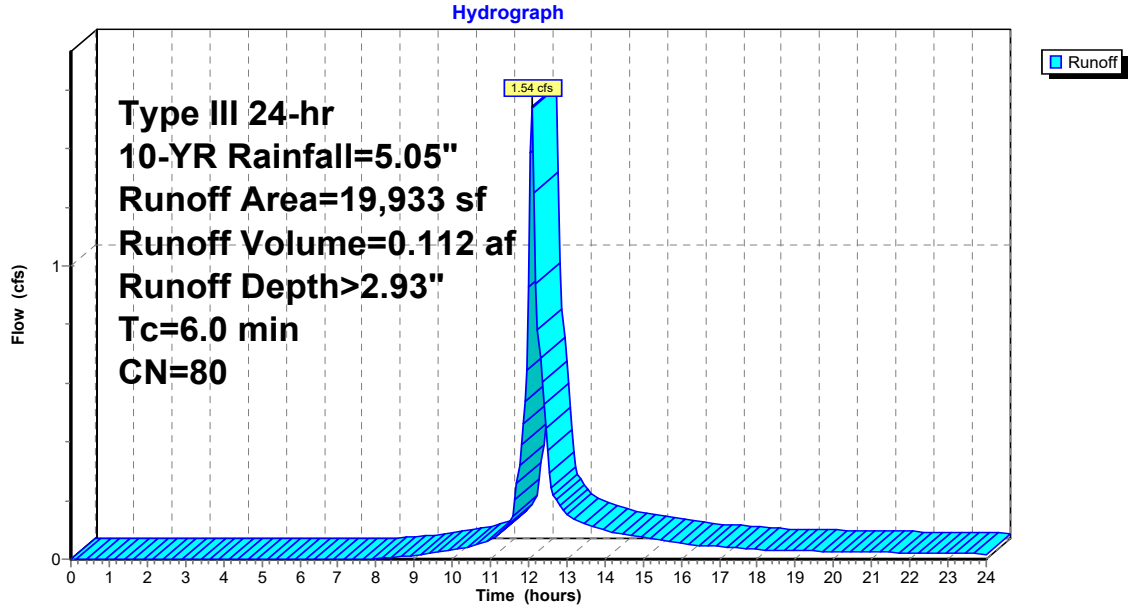
Runoff = 1.54 cfs @ 12.09 hrs, Volume= 0.112 af, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

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

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

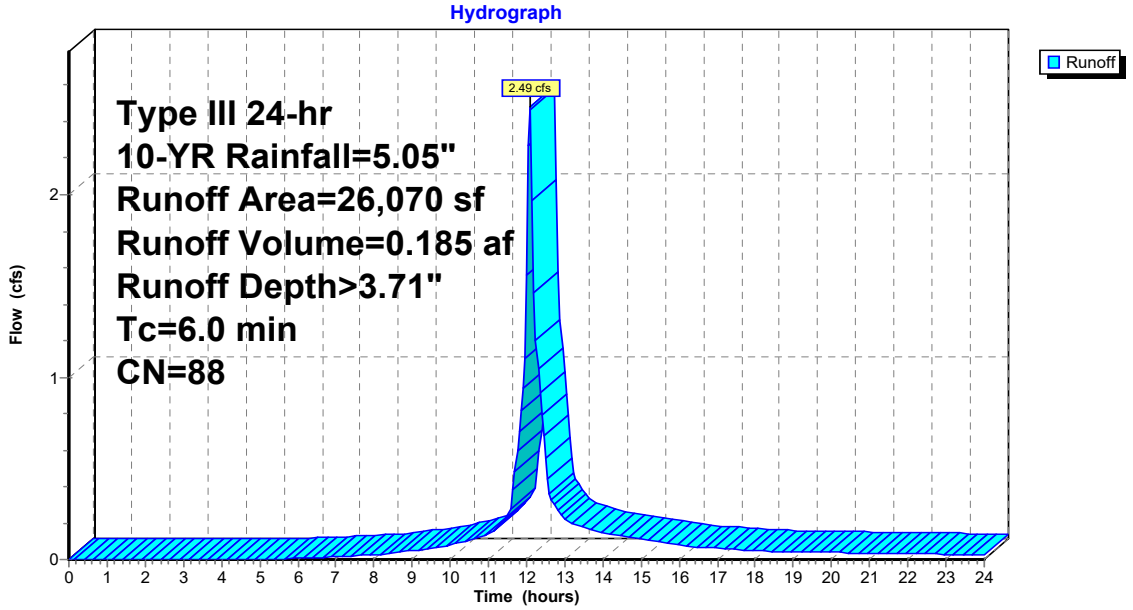
Runoff = 2.49 cfs @ 12.09 hrs, Volume= 0.185 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

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

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

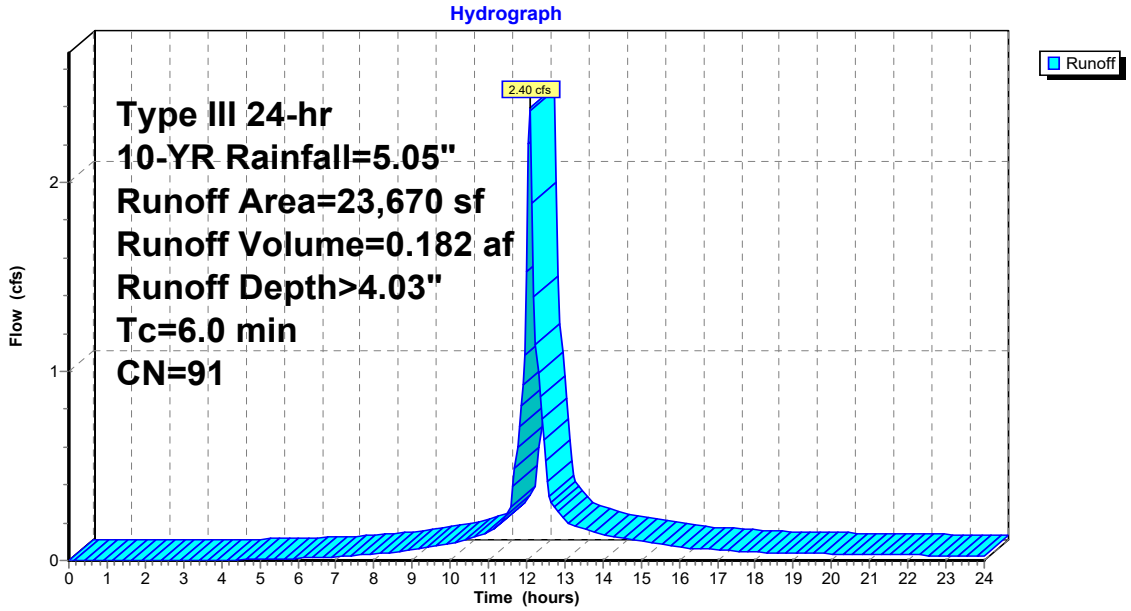
Runoff = 2.40 cfs @ 12.09 hrs, Volume= 0.182 af, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

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

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

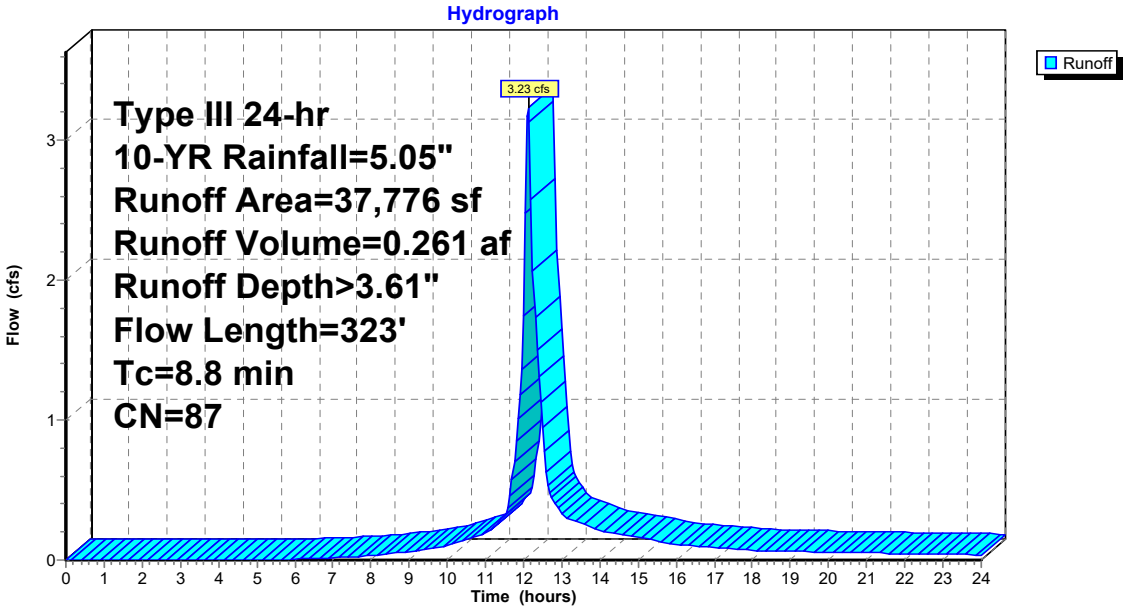
Runoff = 3.23 cfs @ 12.12 hrs, Volume= 0.261 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

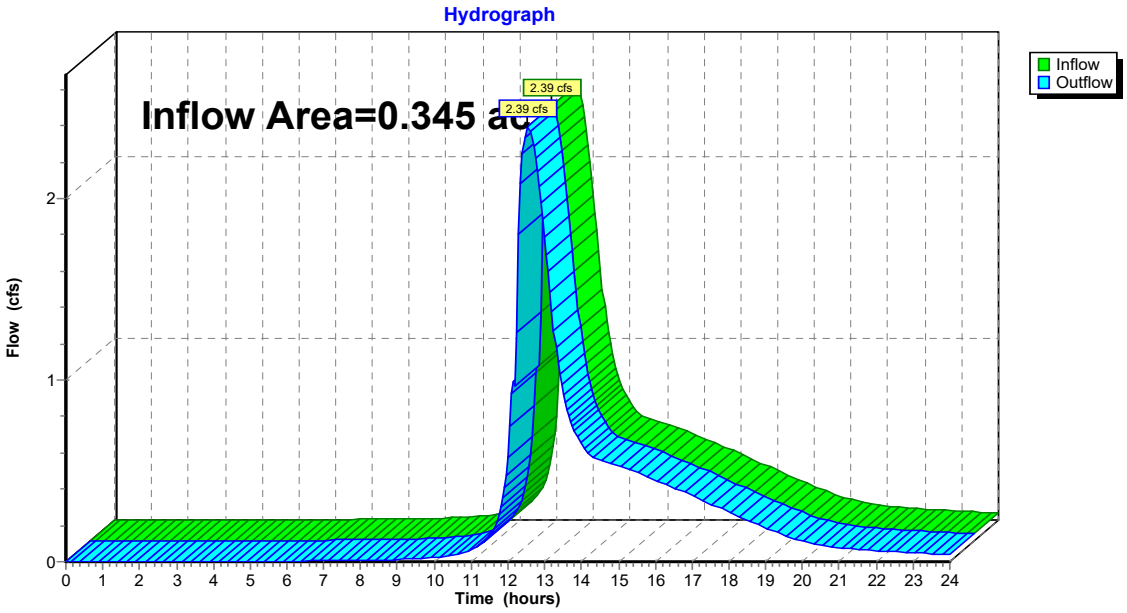


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 15.99" for 10-YR event
Inflow = 2.39 cfs @ 12.54 hrs, Volume= 0.459 af
Outflow = 2.39 cfs @ 12.54 hrs, Volume= 0.459 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

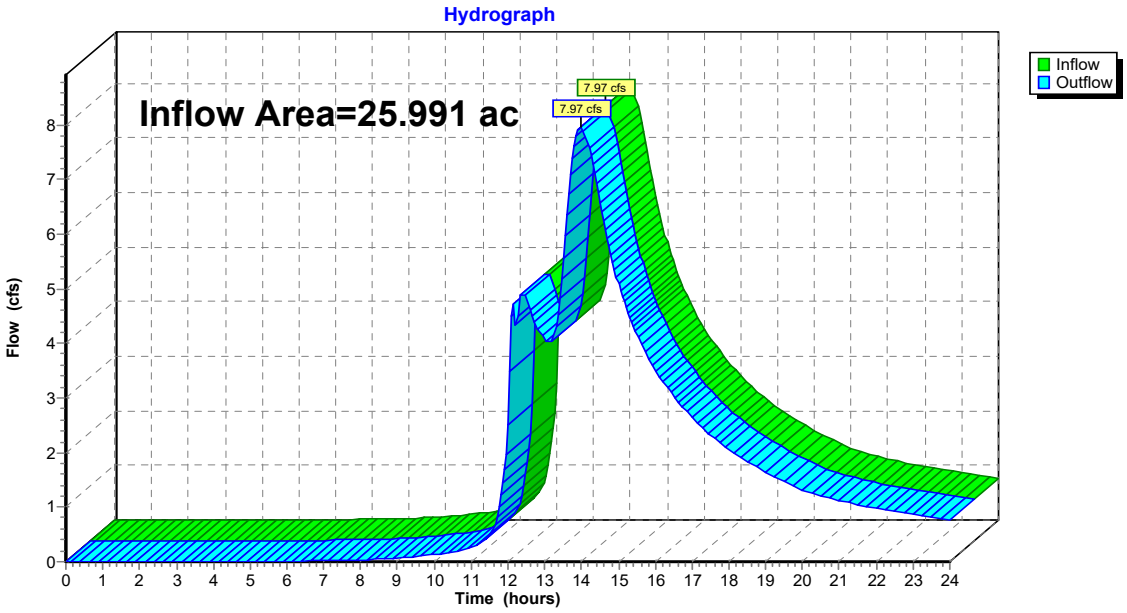


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 1.33" for 10-YR event
Inflow = 7.97 cfs @ 13.98 hrs, Volume= 2.880 af
Outflow = 7.97 cfs @ 13.98 hrs, Volume= 2.880 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

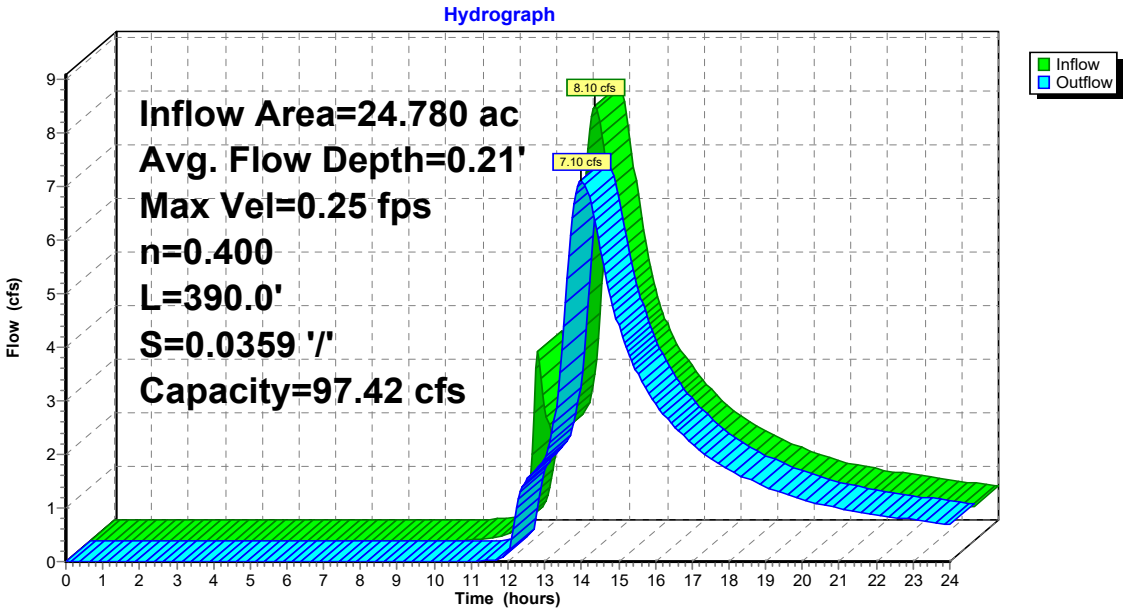
Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 1.08" for 10-YR event
Inflow = 8.10 cfs @ 13.70 hrs, Volume= 2.222 af
Outflow = 7.10 cfs @ 14.00 hrs, Volume= 2.160 af, Atten= 12%, Lag= 17.8 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 26.4 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 51.1 min

Peak Storage= 11,236 cf @ 14.00 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach DP-3: DP-3



Stage-Discharge for Reach DP-3: DP-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
618.00	0.00	0.00
618.01	0.03	0.04
618.02	0.05	0.13
618.03	0.07	0.27
618.04	0.08	0.43
618.05	0.10	0.62
618.06	0.11	0.84
618.07	0.12	1.09
618.08	0.13	1.37
618.09	0.14	1.66
618.10	0.15	1.98
618.11	0.16	2.32
618.12	0.17	2.69
618.13	0.18	3.07
618.14	0.19	3.48
618.15	0.20	3.91
618.16	0.20	4.35
618.17	0.21	4.82
618.18	0.22	5.30
618.19	0.23	5.81
618.20	0.24	6.33
618.21	0.24	6.87
618.22	0.25	7.43
618.23	0.26	8.00
618.24	0.27	8.60
618.25	0.27	9.21
618.26	0.28	9.84
618.27	0.29	10.48
618.28	0.29	11.14
618.29	0.30	11.82
618.30	0.31	12.51
618.31	0.31	13.23
618.32	0.32	13.95
618.33	0.33	14.70
618.34	0.33	15.45
618.35	0.34	16.23
618.36	0.34	17.02
618.37	0.35	17.83
618.38	0.36	18.65
618.39	0.36	19.48
618.40	0.37	20.34
618.41	0.37	21.20
618.42	0.38	22.09
618.43	0.38	22.99
618.44	0.39	23.90
618.45	0.40	24.83
618.46	0.40	25.77
618.47	0.41	26.72
618.48	0.41	27.70
618.49	0.42	28.68
618.50	0.42	29.68
618.51	0.43	30.70
618.52	0.43	31.73
618.53	0.44	32.77
618.54	0.44	33.83
618.55	0.45	34.91
618.56	0.45	35.99
618.57	0.46	37.09
618.58	0.46	38.21
618.59	0.47	39.34
618.60	0.47	40.48
618.61	0.48	41.64
618.62	0.48	42.81
618.63	0.49	44.00
618.64	0.49	45.20
618.65	0.50	46.41
618.66	0.50	47.64
618.67	0.51	48.88
618.68	0.51	50.14
618.69	0.52	51.40
618.70	0.52	52.69
618.71	0.52	53.98
618.72	0.53	55.29
618.73	0.53	56.62
618.74	0.54	57.95
618.75	0.54	59.30
618.76	0.55	60.67
618.77	0.55	62.05
618.78	0.56	63.44
618.79	0.56	64.84
618.80	0.56	66.26
618.81	0.57	67.69
618.82	0.57	69.14
618.83	0.58	70.59
618.84	0.58	72.07
618.85	0.59	73.55
618.86	0.59	75.05
618.87	0.59	76.56
618.88	0.60	78.09
618.89	0.60	79.63
618.90	0.61	81.18
618.91	0.61	82.74
618.92	0.61	84.32
618.93	0.62	85.91
618.94	0.62	87.52
618.95	0.63	89.14
618.96	0.63	90.77
618.97	0.63	92.41
618.98	0.64	94.07
618.99	0.64	95.74
619.00	**0.65**	**97.42**

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 3.46" for 10-YR event
Inflow = 1.45 cfs @ 12.10 hrs, Volume= 0.279 af
Outflow = 0.68 cfs @ 13.00 hrs, Volume= 0.246 af, Atten= 53%, Lag= 53.9 min
Discarded = 0.11 cfs @ 13.00 hrs, Volume= 0.123 af
Primary = 0.57 cfs @ 13.00 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.97' @ 13.00 hrs Surf.Area= 2,739 sf Storage= 3,920 cf
Flood Elev= 611.25' Surf.Area= 3,452 sf Storage= 7,739 cf

Plug-Flow detention time= 164.7 min calculated for 0.245 af (88% of inflow)
Center-of-Mass det. time= 111.7 min (939.7 - 828.0)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	7,237 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,986 cf Overall - 1,749 cf Embedded = 7,237 cf
#2	607.00'	385 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,166 cf Overall x 33.0% Voids
#3	608.00'	117 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 583 cf Overall x 20.0% Voids
		7,739 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166
609.00	2,130	1,648	2,814
610.00	2,760	2,445	5,259
611.20	3,452	3,727	8,986

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166

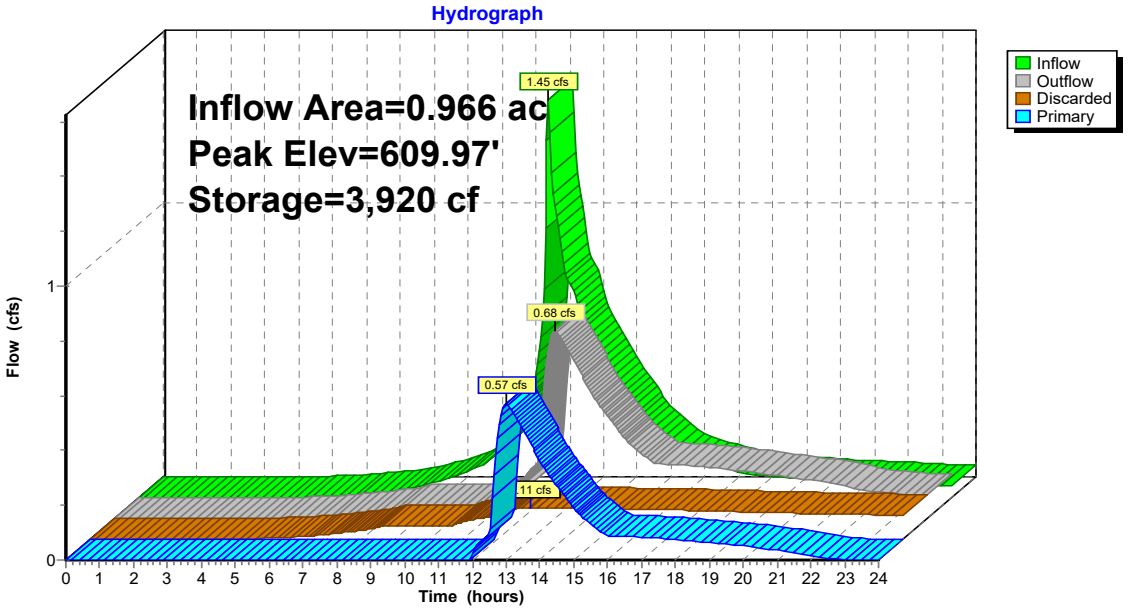
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,166	0	0
608.50	1,166	583	583

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.00' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	609.80'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.11 cfs @ 13.00 hrs HW=609.97' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.57 cfs @ 13.00 hrs HW=609.97' (Free Discharge)
└─**2=Culvert** (Passes 0.57 cfs of 1.94 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.53 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.47 cfs @ 1.34 fps)

Pond 1: SFB-1



Stage-Discharge for Pond 1: SFB-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
607.00	0.00	0.00	0.00
607.05	0.05	0.05	0.00
607.10	0.05	0.05	0.00
607.15	0.05	0.05	0.00
607.20	0.05	0.05	0.00
607.25	0.05	0.05	0.00
607.30	0.05	0.05	0.00
607.35	0.05	0.05	0.00
607.40	0.05	0.05	0.00
607.45	0.05	0.05	0.00
607.50	0.05	0.05	0.00
607.55	0.05	0.05	0.00
607.60	0.05	0.05	0.00
607.65	0.05	0.05	0.00
607.70	0.05	0.05	0.00
607.75	0.05	0.05	0.00
607.80	0.05	0.05	0.00
607.85	0.05	0.05	0.00
607.90	0.05	0.05	0.00
607.95	0.05	0.05	0.00
608.00	0.05	0.05	0.00
608.05	0.05	0.05	0.00
608.10	0.05	0.05	0.00
608.15	0.05	0.05	0.00
608.20	0.06	0.06	0.00
608.25	0.06	0.06	0.00
608.30	0.06	0.06	0.00
608.35	0.06	0.06	0.00
608.40	0.06	0.06	0.00
608.45	0.07	0.07	0.00
608.50	0.07	0.07	0.00
608.55	0.07	0.07	0.00
608.60	0.07	0.07	0.00
608.65	0.07	0.07	0.00
608.70	0.08	0.08	0.00
608.75	0.08	0.08	0.00
608.80	0.08	0.08	0.00
608.85	0.08	0.08	0.00
608.90	0.08	0.08	0.00
608.95	0.09	0.09	0.00
609.00	0.09	0.09	0.00
609.05	0.09	0.09	0.00
609.10	0.11	0.09	0.01
609.15	0.12	0.09	0.03
609.20	0.13	0.09	0.04
609.25	0.14	0.10	0.04
609.30	0.15	0.10	0.05
609.35	0.15	0.10	0.05
609.40	0.16	0.10	0.06
609.45	0.16	0.10	0.06
609.50	0.17	0.10	0.07
609.55	0.18	0.10	0.07
609.60	0.18	0.10	0.08
609.65	0.19	0.11	0.08
609.70	0.19	0.11	0.08
609.75	0.19	0.11	0.09
609.80	0.20	0.11	0.09
609.85	0.28	0.11	0.17
609.90	0.42	0.11	0.31
609.95	0.61	0.11	0.50
610.00	0.83	0.12	0.71
610.05	1.06	0.12	0.94
610.10	1.14	0.12	1.03
610.15	1.22	0.12	1.10
610.20	1.29	0.12	1.17
610.25	1.36	0.12	1.24
610.30	1.43	0.12	1.30
610.35	1.49	0.12	1.36
610.40	1.55	0.12	1.42
610.45	1.60	0.13	1.48
610.50	1.66	0.13	1.53
610.55	1.71	0.13	1.58
610.60	1.76	0.13	1.63
610.65	1.81	0.13	1.68
610.70	1.86	0.13	1.73
610.75	1.91	0.13	1.77
610.80	1.95	0.13	1.82
610.85	2.00	0.14	1.86
610.90	2.04	0.14	1.90
610.95	2.08	0.14	1.95
611.00	2.13	0.14	1.99
611.05	2.17	0.14	2.03
611.10	2.21	0.14	2.07
611.15	2.25	0.14	2.10
611.20	2.29	**0.14**	2.14
611.25	**2.32**	0.14	**2.18**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 1.77" for 10-YR event
Inflow = 2.61 cfs @ 12.10 hrs, Volume= 0.623 af
Outflow = 0.56 cfs @ 15.94 hrs, Volume= 0.508 af, Atten= 79%, Lag= 230.4 min
Discarded = 0.41 cfs @ 15.94 hrs, Volume= 0.434 af
Primary = 0.15 cfs @ 15.94 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.05' @ 15.94 hrs Surf.Area= 7,468 sf Storage= 10,091 cf
Flood Elev= 617.40' Surf.Area= 10,100 sf Storage= 21,942 cf

Plug-Flow detention time= 216.4 min calculated for 0.507 af (81% of inflow)
Center-of-Mass det. time= 137.3 min (1,022.1 - 884.8)

Volume	Invert	Avail.Storage	Storage Description
#1	613.25'	20,246 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 26,162 cf Overall - 5,916 cf Embedded = 20,246 cf
#2	613.25'	1,302 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 3,944 cf Overall x 33.0% Voids
#3	614.25'	394 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,972 cf Overall x 20.0% Voids
		21,942 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944
615.00	5,539	3,556	7,500
616.00	7,378	6,459	13,959
617.00	9,278	8,328	22,287
617.40	10,100	3,876	26,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944

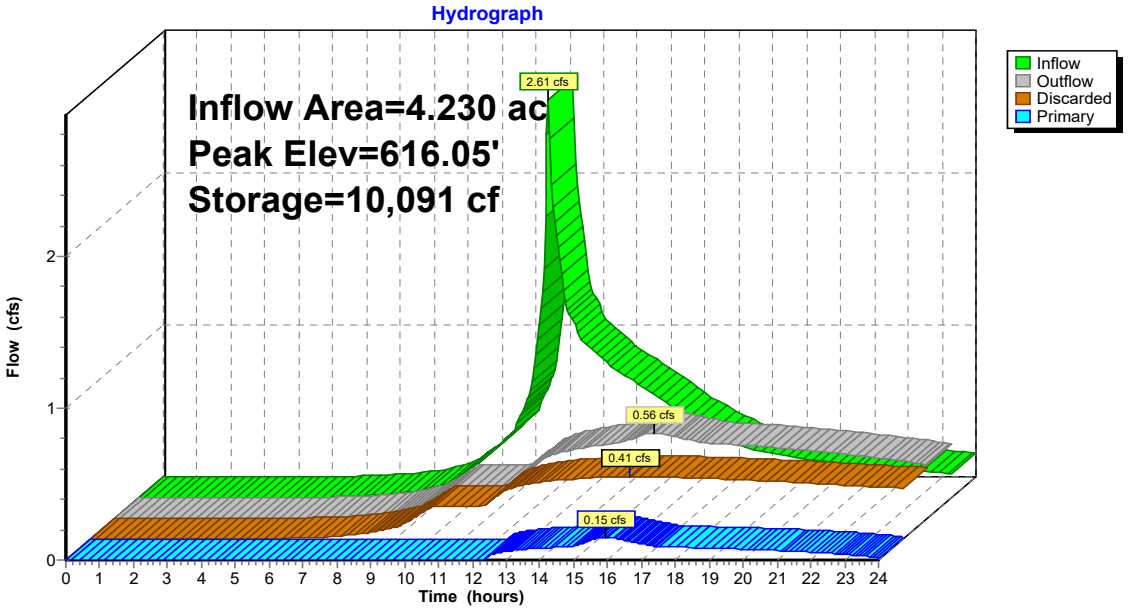
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.25	3,944	0	0
614.75	3,944	1,972	1,972

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.25'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.75'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.75' / 612.25' S= 0.0536 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.41 cfs @ 15.94 hrs HW=616.05' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.14 cfs @ 15.94 hrs HW=616.05' (Free Discharge)
└─**2=Culvert** (Passes 0.14 cfs of 1.86 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.21 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.71 fps)

Pond 2: SFB-2



Stage-Discharge for Pond 2: SFB-2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
613.25	0.00	0.00	0.00
613.30	0.22	0.22	0.00
613.35	0.22	0.22	0.00
613.40	0.22	0.22	0.00
613.45	0.22	0.22	0.00
613.50	0.22	0.22	0.00
613.55	0.22	0.22	0.00
613.60	0.22	0.22	0.00
613.65	0.22	0.22	0.00
613.70	0.22	0.22	0.00
613.75	0.22	0.22	0.00
613.80	0.22	0.22	0.00
613.85	0.22	0.22	0.00
613.90	0.22	0.22	0.00
613.95	0.22	0.22	0.00
614.00	0.22	0.22	0.00
614.05	0.22	0.22	0.00
614.10	0.22	0.22	0.00
614.15	0.22	0.22	0.00
614.20	0.22	0.22	0.00
614.25	0.22	0.22	0.00
614.30	0.22	0.22	0.00
614.35	0.23	0.23	0.00
614.40	0.23	0.23	0.00
614.45	0.24	0.24	0.00
614.50	0.25	0.25	0.00
614.55	0.25	0.25	0.00
614.60	0.26	0.26	0.00
614.65	0.26	0.26	0.00
614.70	0.27	0.27	0.00
614.75	0.28	0.28	0.00
614.80	0.28	0.28	0.00
614.85	0.29	0.29	0.00
614.90	0.29	0.29	0.00
614.95	0.30	0.30	0.00
615.00	0.31	0.31	0.00
615.05	0.31	0.31	0.00
615.10	0.32	0.32	0.00
615.15	0.32	0.32	0.00
615.20	0.33	0.33	0.00
615.25	0.33	0.33	0.00
615.30	0.35	0.34	0.01
615.35	0.37	0.34	0.03
615.40	0.38	0.35	0.04
615.45	0.39	0.35	0.04
615.50	0.40	0.36	0.05
615.55	0.42	0.36	0.05
615.60	0.43	0.37	0.06
615.65	0.43	0.37	0.06
615.70	0.44	0.38	0.07
615.75	0.45	0.38	0.07
615.80	0.46	0.39	0.08
615.85	0.47	0.39	0.08
615.90	0.48	0.40	0.08
615.95	0.49	0.40	0.09
616.00	0.50	0.41	0.09
616.05	0.56	0.41	0.15
616.10	0.67	0.42	0.26
616.15	0.82	0.42	0.40
616.20	0.95	0.43	0.52
616.25	1.01	0.43	0.58
616.30	1.06	0.44	0.62
616.35	1.11	0.44	0.67
616.40	1.16	0.45	0.71
616.45	1.20	0.45	0.75
616.50	1.24	0.46	0.78
616.55	1.28	0.46	0.82
616.60	1.32	0.47	0.85
616.65	1.36	0.47	0.89
616.70	1.40	0.48	0.92
616.75	1.43	0.48	0.95
616.80	1.47	0.49	0.97
616.85	1.50	0.50	1.00
616.90	1.53	0.50	1.03
616.95	1.56	0.51	1.06
617.00	1.59	0.51	1.08
617.05	1.63	0.52	1.11
617.10	1.66	0.52	1.13
617.15	1.69	0.53	1.16
617.20	1.71	0.53	1.18
617.25	1.74	0.54	1.20
617.30	1.77	0.55	1.23
617.35	1.80	0.55	1.25
617.40	**1.83**	**0.56**	**1.27**

Summary for Pond DB-1: DB-1

Inflow	=	2.60 cfs @	12.09 hrs,	Volume=	0.076 af
Outflow	=	0.37 cfs @	12.49 hrs,	Volume=	0.074 af, Atten= 86%, Lag= 23.9 min
Primary	=	0.37 cfs @	12.49 hrs,	Volume=	0.074 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.21' @ 12.49 hrs Surf.Area= 3,131 sf Storage= 2,563 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 100.4 min calculated for 0.074 af (97% of inflow)
Center-of-Mass det. time= 99.5 min (826.4 - 726.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.37 cfs @ 12.49 hrs HW=610.21' (Free Discharge)
└─**1=Culvert** (Passes 0.37 cfs of 0.47 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.29 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-1: DB-1 - Chamber Wizard Field A

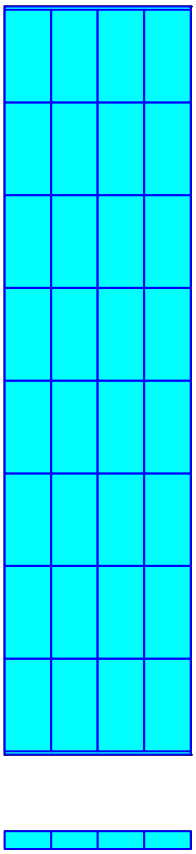
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

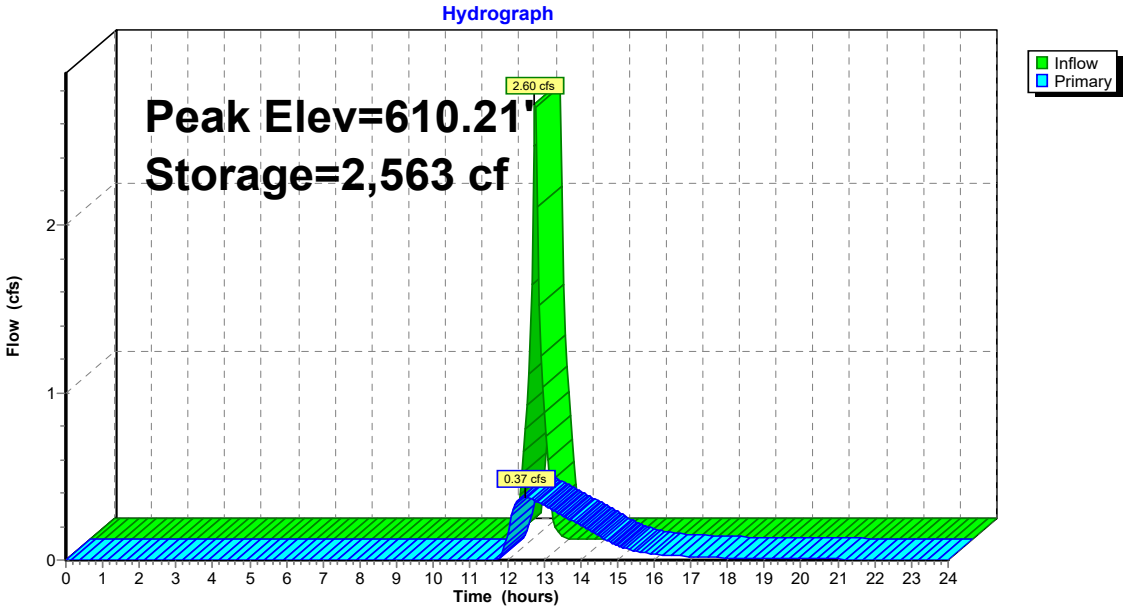
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Peak Elev=610.21'
Storage=2,563 cf
2.60 cfs
0.37 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-1: DB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
609.25	0.00	610.29	0.40	611.33	0.65
609.27	0.00	610.31	0.41	611.35	0.65
609.29	0.00	610.33	0.42	611.37	0.65
609.31	0.01	610.35	0.43	611.39	0.66
609.33	0.01	610.37	0.44	611.41	0.66
609.35	0.02	610.39	0.46	611.43	0.66
609.37	0.03	610.41	0.48	611.45	0.66
609.39	0.04	610.43	0.49	611.47	0.67
609.41	0.05	610.45	0.51	611.49	0.67
609.43	0.06	610.47	0.51	611.51	0.67
609.45	0.08	610.49	0.52	611.53	0.68
609.47	0.09	610.51	0.52	611.55	0.68
609.49	0.11	610.53	0.53	611.57	0.68
609.51	0.13	610.55	0.53	611.59	0.68
609.53	0.14	610.57	0.53	611.61	0.69
609.55	0.15	610.59	0.54	611.63	0.69
609.57	0.17	610.61	0.54	611.65	0.69
609.59	0.17	610.63	0.54	611.67	0.69
609.61	0.18	610.65	0.55	611.69	0.70
609.63	0.19	610.67	0.55	611.71	0.70
609.65	0.20	610.69	0.55	611.73	0.70
609.67	0.21	610.71	0.56	611.75	0.70
609.69	0.22	610.73	0.56	611.77	0.71
609.71	0.23	610.75	0.56	611.79	0.71
609.73	0.24	610.77	0.57	611.81	0.71
609.75	0.24	610.79	0.57	611.83	0.71
609.77	0.25	610.81	0.57	611.85	0.72
609.79	0.26	610.83	0.57	611.87	0.72
609.81	0.26	610.85	0.58	611.89	0.72
609.83	0.27	610.87	0.58	611.91	**0.72**
609.85	0.28	610.89	0.58		
609.87	0.28	610.91	0.59		
609.89	0.29	610.93	0.59		
609.91	0.30	610.95	0.59		
609.93	0.30	610.97	0.60		
609.95	0.31	610.99	0.60		
609.97	0.31	611.01	0.60		
609.99	0.32	611.03	0.61		
610.01	0.32	611.05	0.61		
610.03	0.33	611.07	0.61		
610.05	0.33	611.09	0.61		
610.07	0.34	611.11	0.62		
610.09	0.34	611.13	0.62		
610.11	0.35	611.15	0.62		
610.13	0.35	611.17	0.63		
610.15	0.36	611.19	0.63		
610.17	0.36	611.21	0.63		
610.19	0.37	611.23	0.63		
610.21	0.37	611.25	0.64		
610.23	0.38	611.27	0.64		
610.25	0.38	611.29	0.64		
610.27	0.39	611.31	0.65		

Summary for Pond DB-2: DB-2

Inflow	=	2.05 cfs @	12.09 hrs,	Volume=	0.056 af
Outflow	=	0.09 cfs @	12.57 hrs,	Volume=	0.051 af, Atten= 96%, Lag= 29.1 min
Primary	=	0.09 cfs @	12.57 hrs,	Volume=	0.051 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.08' @ 12.57 hrs Surf.Area= 3,131 sf Storage= 2,221 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 253.9 min calculated for 0.051 af (91% of inflow)
Center-of-Mass det. time= 252.7 min (979.6 - 726.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**8.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.09 cfs @ 12.57 hrs HW=616.08' (Free Discharge)
└─**1=Culvert** (Passes 0.09 cfs of 0.94 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.17 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

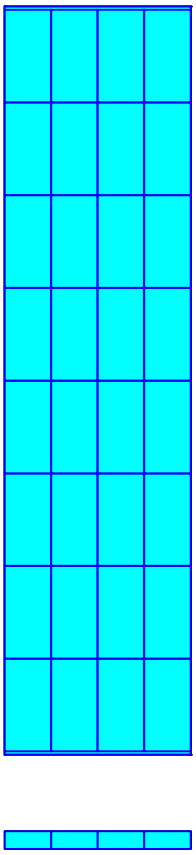
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

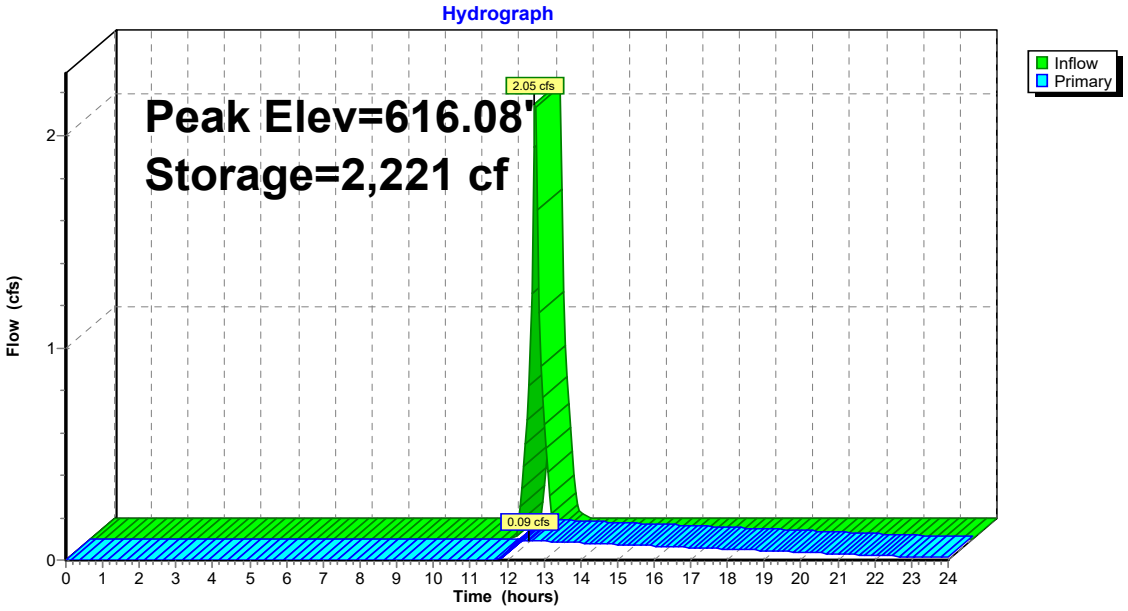
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Peak Elev=616.08'
Storage=2,221 cf
2.05 cfs
0.09 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-2: DB-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.25	0.00	616.29	0.10	617.33	0.15
615.27	0.00	616.31	0.10	617.35	0.15
615.29	0.00	616.33	0.10	617.37	0.15
615.31	0.01	616.35	0.11	617.39	0.15
615.33	0.01	616.37	0.11	617.41	0.15
615.35	0.01	616.39	0.11	617.43	0.15
615.37	0.02	616.41	0.11	617.45	0.15
615.39	0.02	616.43	0.11	617.47	0.15
615.41	0.03	616.45	0.11	617.49	0.15
615.43	0.03	616.47	0.11	617.51	0.15
615.45	0.04	616.49	0.11	617.53	0.16
615.47	0.04	616.51	0.11	617.55	0.16
615.49	0.04	616.53	0.11	617.57	0.16
615.51	0.04	616.55	0.12	617.59	0.16
615.53	0.05	616.57	0.12	617.61	0.16
615.55	0.05	616.59	0.12	617.63	0.16
615.57	0.05	616.61	0.12	617.65	0.16
615.59	0.05	616.63	0.12	617.67	0.16
615.61	0.06	616.65	0.12	617.69	0.16
615.63	0.06	616.67	0.12	617.71	0.16
615.65	0.06	616.69	0.12	617.73	0.16
615.67	0.06	616.71	0.12	617.75	0.16
615.69	0.06	616.73	0.12	617.77	0.16
615.71	0.06	616.75	0.13	617.79	0.16
615.73	0.07	616.77	0.13	617.81	0.17
615.75	0.07	616.79	0.13	617.83	0.17
615.77	0.07	616.81	0.13	617.85	0.17
615.79	0.07	616.83	0.13	617.87	0.17
615.81	0.07	616.85	0.13	617.89	0.17
615.83	0.07	616.87	0.13	617.91	**0.17**
615.85	0.08	616.89	0.13		
615.87	0.08	616.91	0.13		
615.89	0.08	616.93	0.13		
615.91	0.08	616.95	0.13		
615.93	0.08	616.97	0.13		
615.95	0.08	616.99	0.14		
615.97	0.08	617.01	0.14		
615.99	0.09	617.03	0.14		
616.01	0.09	617.05	0.14		
616.03	0.09	617.07	0.14		
616.05	0.09	617.09	0.14		
616.07	0.09	617.11	0.14		
616.09	0.09	617.13	0.14		
616.11	0.09	617.15	0.14		
616.13	0.09	617.17	0.14		
616.15	0.09	617.19	0.14		
616.17	0.10	617.21	0.14		
616.19	0.10	617.23	0.14		
616.21	0.10	617.25	0.15		
616.23	0.10	617.27	0.15		
616.25	0.10	617.29	0.15		
616.27	0.10	617.31	0.15		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 38.13" for 10-YR event
Inflow = 5.51 cfs @ 12.22 hrs, Volume= 0.424 af
Outflow = 2.26 cfs @ 12.59 hrs, Volume= 0.417 af, Atten= 59%, Lag= 22.3 min
Primary = 2.26 cfs @ 12.59 hrs, Volume= 0.417 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 615.19' @ 12.59 hrs Surf.Area= 2,902 sf Storage= 7,570 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 94.1 min calculated for 0.416 af (98% of inflow)
Center-of-Mass det. time= 84.9 min (874.6 - 789.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.25 cfs @ 12.59 hrs HW=615.19' (Free Discharge)
└─**1=Culvert** (Passes 2.25 cfs of 4.66 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.70 cfs @ 8.02 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.55 cfs @ 4.45 fps)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

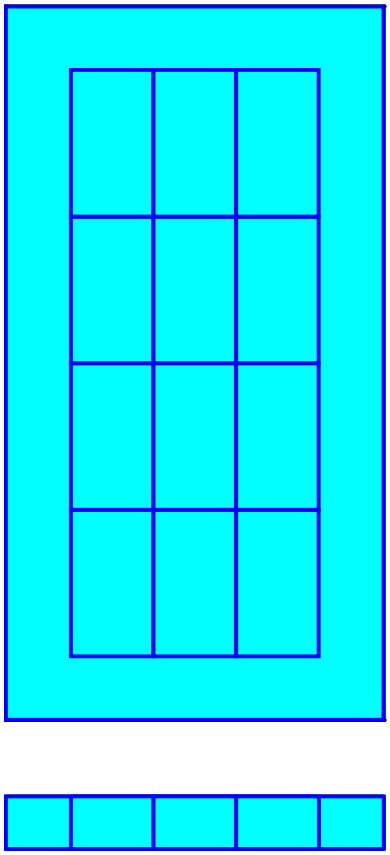
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

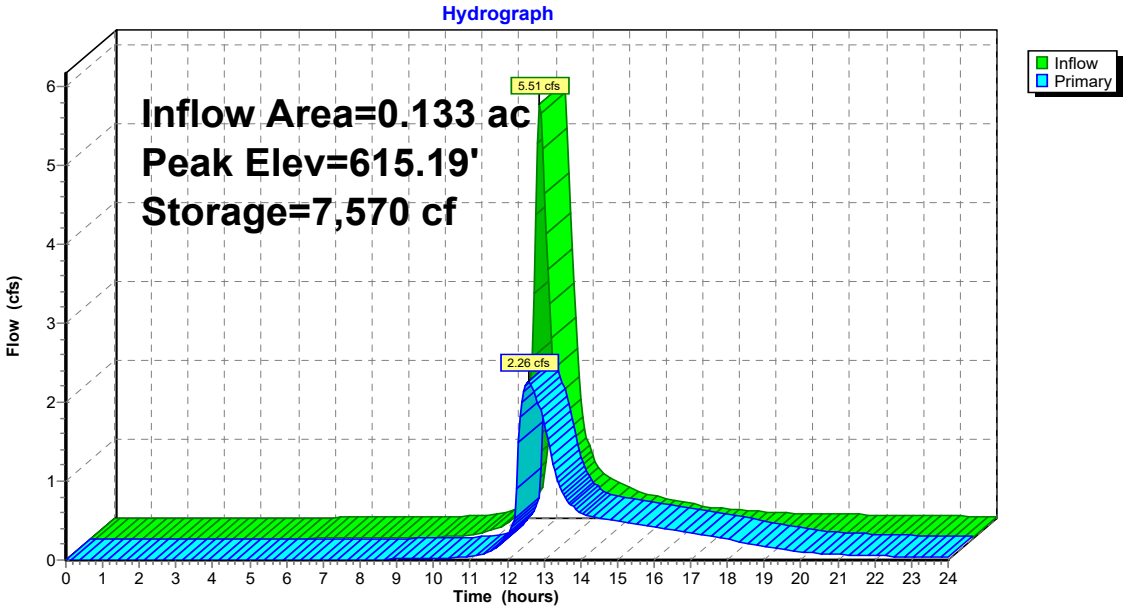
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=615.19'
Storage=7,570 cf
5.51 cfs
2.26 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Discharge for Pond DB-6: DB-6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
612.25	0.00	614.33	0.92	616.41	4.90
612.29	0.00	614.37	1.00	616.45	5.02
612.33	0.02	614.41	1.08	616.49	5.16
612.37	0.03	614.45	1.17	616.53	5.30
612.41	0.06	614.49	1.26	616.57	5.46
612.45	0.08	614.53	1.35	616.61	5.62
612.49	0.11	614.57	1.43	616.65	5.79
612.53	0.14	614.61	1.51	616.69	5.93
612.57	0.17	614.65	1.58	616.73	5.96
612.61	0.18	614.69	1.64	616.77	5.99
612.65	0.20	614.73	1.70	616.81	6.02
612.69	0.22	614.77	1.76	616.85	6.05
612.73	0.24	614.81	1.81	616.89	6.07
612.77	0.25	614.85	1.86	616.93	6.10
612.81	0.26	614.89	1.91	616.97	6.13
612.85	0.28	614.93	1.96	617.01	6.16
612.89	0.29	614.97	2.01	617.05	6.19
612.93	0.30	615.01	2.06	617.09	6.22
612.97	0.31	615.05	2.10	617.13	6.25
613.01	0.32	615.09	2.15	617.17	6.28
613.05	0.33	615.13	2.19	617.21	6.31
613.09	0.34	615.17	2.23	617.25	6.33
613.13	0.35	615.21	2.28	617.29	6.36
613.17	0.36	615.25	2.32	617.33	6.39
613.21	0.37	615.29	2.36	617.37	6.42
613.25	0.38	615.33	2.42	617.41	6.44
613.29	0.39	615.37	2.48	617.45	6.47
613.33	0.40	615.41	2.56	617.49	6.50
613.37	0.41	615.45	2.64	617.53	6.53
613.41	0.42	615.49	2.73	617.57	6.55
613.45	0.43	615.53	2.83	617.61	6.58
613.49	0.44	615.57	2.93	617.65	6.61
613.53	0.44	615.61	3.04	617.69	6.64
613.57	0.45	615.65	3.16	617.73	**6.66**
613.61	0.46	615.69	3.27		
613.65	0.47	615.73	3.39		
613.69	0.47	615.77	3.50		
613.73	0.48	615.81	3.61		
613.77	0.49	615.85	3.72		
613.81	0.50	615.89	3.82		
613.85	0.50	615.93	3.90		
613.89	0.51	615.97	3.99		
613.93	0.52	616.01	4.07		
613.97	0.52	616.05	4.15		
614.01	0.53	616.09	4.23		
614.05	0.55	616.13	4.31		
614.09	0.57	616.17	4.38		
614.13	0.61	616.21	4.45		
614.17	0.65	616.25	4.52		
614.21	0.71	616.29	4.60		
614.25	0.77	616.33	4.69		
614.29	0.84	616.37	4.79		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 4.03" for 10-YR event
Inflow = 2.40 cfs @ 12.09 hrs, Volume= 0.182 af
Outflow = 0.43 cfs @ 12.55 hrs, Volume= 0.176 af, Atten= 82%, Lag= 27.5 min
Primary = 0.43 cfs @ 12.55 hrs, Volume= 0.176 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 617.02' @ 12.55 hrs Surf.Area= 3,131 sf Storage= 3,259 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 109.4 min calculated for 0.175 af (96% of inflow)
Center-of-Mass det. time= 88.4 min (874.4 - 786.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.43 cfs @ 12.55 hrs HW=617.02' (Free Discharge)
└─**1=Culvert** (Passes 0.43 cfs of 0.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.95 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-7: DB-7 - Chamber Wizard Field A

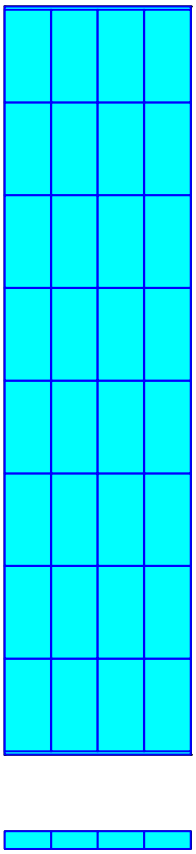
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

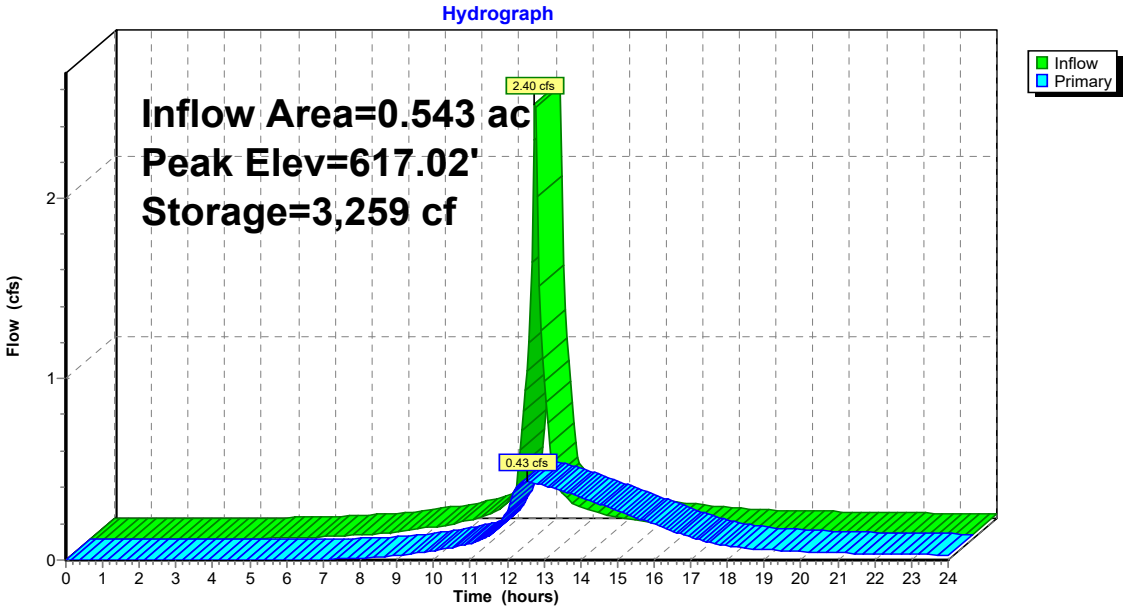
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=617.02'
Storage=3,259 cf
2.40 cfs
0.43 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-7: DB-7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.80	0.00	616.84	0.39	617.88	0.85
615.82	0.00	616.86	0.40	617.90	0.86
615.84	0.00	616.88	0.40	617.92	0.87
615.86	0.01	616.90	0.41	617.94	0.88
615.88	0.02	616.92	0.41	617.96	0.89
615.90	0.02	616.94	0.41	617.98	0.89
615.92	0.03	616.96	0.42	618.00	0.90
615.94	0.04	616.98	0.42	618.02	0.90
615.96	0.06	617.00	0.43	618.04	0.90
615.98	0.07	617.02	0.43	618.06	0.91
616.00	0.08	617.04	0.44	618.08	0.91
616.02	0.10	617.06	0.44	618.10	0.92
616.04	0.11	617.08	0.44	618.12	0.92
616.06	0.13	617.10	0.45	618.14	0.92
616.08	0.14	617.12	0.45	618.16	0.93
616.10	0.15	617.14	0.46	618.18	0.93
616.12	0.17	617.16	0.46	618.20	0.93
616.14	0.17	617.18	0.46	618.22	0.94
616.16	0.18	617.20	0.47	618.24	0.94
616.18	0.19	617.22	0.47	618.26	0.94
616.20	0.20	617.24	0.47	618.28	0.95
616.22	0.21	617.26	0.48	618.30	0.95
616.24	0.22	617.28	0.48	618.32	0.95
616.26	0.23	617.30	0.49	618.34	0.96
616.28	0.24	617.32	0.49	618.36	0.96
616.30	0.24	617.34	0.50	618.38	0.96
616.32	0.25	617.36	0.50	618.40	0.97
616.34	0.26	617.38	0.52	618.42	0.97
616.36	0.26	617.40	0.53	618.44	0.97
616.38	0.27	617.42	0.54	618.46	**0.98**
616.40	0.28	617.44	0.55		
616.42	0.28	617.46	0.57		
616.44	0.29	617.48	0.59		
616.46	0.30	617.50	0.60		
616.48	0.30	617.52	0.62		
616.50	0.31	617.54	0.64		
616.52	0.31	617.56	0.66		
616.54	0.32	617.58	0.67		
616.56	0.32	617.60	0.69		
616.58	0.33	617.62	0.71		
616.60	0.33	617.64	0.72		
616.62	0.34	617.66	0.73		
616.64	0.34	617.68	0.74		
616.66	0.35	617.70	0.76		
616.68	0.35	617.72	0.77		
616.70	0.36	617.74	0.78		
616.72	0.36	617.76	0.79		
616.74	0.37	617.78	0.80		
616.76	0.37	617.80	0.81		
616.78	0.38	617.82	0.82		
616.80	0.38	617.84	0.83		
616.82	0.39	617.86	0.84		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac,	62.75% Impervious,	Inflow Depth >	3.82"	for 10-YR event
Inflow =	2.94 cfs @	12.09 hrs,	Volume=	0.220 af	
Outflow =	2.94 cfs @	12.09 hrs,	Volume=	0.220 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.35 cfs @	12.09 hrs,	Volume=	0.144 af	
Secondary =	2.60 cfs @	12.09 hrs,	Volume=	0.076 af	

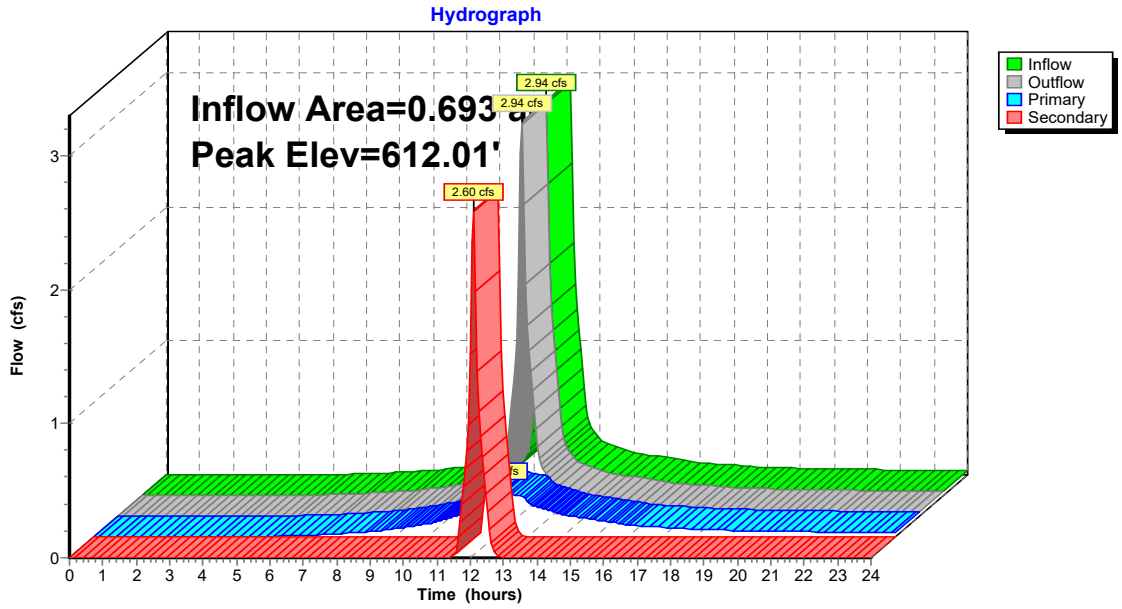
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.01' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.35 cfs @ 12.09 hrs HW=611.99' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.35 cfs @ 3.98 fps)

Secondary OutFlow Max=2.53 cfs @ 12.09 hrs HW=611.99' (Free Discharge)
└**2=Culvert** (Inlet Controls 2.53 cfs @ 3.79 fps)

Pond ICS-1: ICS-1



Stage-Discharge for Pond ICS-1: ICS-1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
609.25	0.00	0.00	0.00
609.30	0.00	0.00	0.00
609.35	0.02	0.02	0.00
609.40	0.04	0.04	0.00
609.45	0.07	0.07	0.00
609.50	0.11	0.11	0.00
609.55	0.14	0.14	0.00
609.60	0.17	0.17	0.00
609.65	0.19	0.19	0.00
609.70	0.18	0.18	0.00
609.75	0.19	0.19	0.00
609.80	0.19	0.19	0.00
609.85	0.20	0.20	0.00
609.90	0.20	0.20	0.00
609.95	0.21	0.21	0.00
610.00	0.21	0.21	0.00
610.05	0.22	0.22	0.00
610.10	0.22	0.22	0.00
610.15	0.22	0.22	0.00
610.20	0.23	0.23	0.00
610.25	0.23	0.23	0.00
610.30	0.24	0.24	0.00
610.35	0.24	0.24	0.00
610.40	0.24	0.24	0.00
610.45	0.25	0.25	0.00
610.50	0.25	0.25	0.00
610.55	0.26	0.26	0.00
610.60	0.26	0.26	0.00
610.65	0.26	0.26	0.00
610.70	0.27	0.27	0.00
610.75	0.27	0.27	0.00
610.80	0.27	0.27	0.00
610.85	0.28	0.28	0.00
610.90	0.28	0.28	0.00
610.95	0.28	0.28	0.00
611.00	0.29	0.29	0.00
611.05	0.29	0.29	0.00
611.10	0.29	0.29	0.00
611.15	0.30	0.30	0.00
611.20	0.30	0.30	0.00
611.25	0.32	0.30	0.01
611.30	0.36	0.31	0.06
611.35	0.43	0.31	0.12
611.40	0.53	0.31	0.21
611.45	0.64	0.32	0.33
611.50	0.78	0.32	0.46
611.55	0.94	0.32	0.62
611.60	1.11	0.32	0.79
611.65	1.31	0.33	0.98
611.70	1.51	0.33	1.18
611.75	1.73	0.33	1.40
611.80	1.96	0.34	1.62
611.85	2.19	0.34	1.85
611.90	2.43	0.34	2.09
611.95	2.67	0.34	2.33
612.00	2.91	0.35	2.56
612.05	3.14	0.35	2.79
612.10	3.36	0.35	3.01
612.15	3.55	0.36	3.20
612.20	3.70	0.36	3.34
612.25	3.87	0.36	3.51
612.30	4.03	0.36	3.66
612.35	4.18	0.37	3.81
612.40	4.32	0.37	3.95
612.45	4.47	0.37	4.09
612.50	4.60	0.37	4.23
612.55	4.73	0.38	4.36
612.60	4.86	0.38	4.48
612.65	4.99	0.38	4.61
612.70	5.11	0.38	4.73
612.75	5.23	0.39	4.84
612.80	5.35	0.39	4.96
612.85	5.46	0.39	5.07
612.90	5.57	0.39	5.18
612.95	5.68	0.40	5.29
613.00	5.79	0.40	5.39
613.05	5.89	0.40	5.49
613.10	6.00	0.40	5.59
613.15	6.10	0.41	5.69
613.20	6.20	0.41	5.79
613.25	**6.30**	**0.41**	**5.89**

Summary for Pond ICS-2: ICS-2

Inflow Area = 0.598 ac, 70.86% Impervious, Inflow Depth > 3.71" for 10-YR event
Inflow = 2.49 cfs @ 12.09 hrs, Volume= 0.185 af
Outflow = 2.49 cfs @ 12.09 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.129 af
Secondary = 2.05 cfs @ 12.09 hrs, Volume= 0.056 af

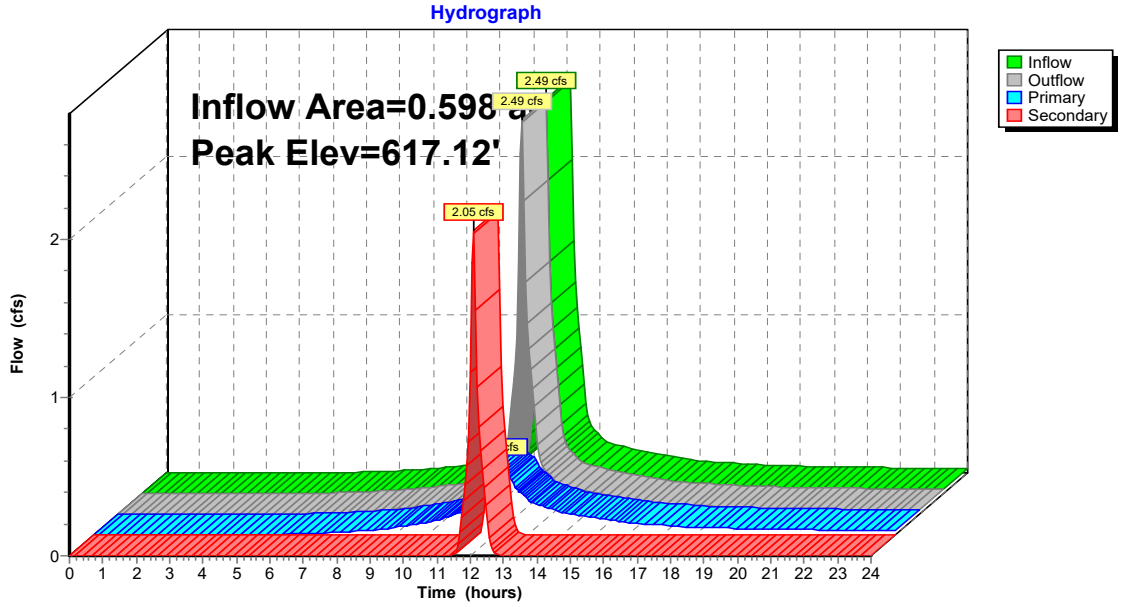
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.12' @ 12.09 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.44 cfs @ 12.09 hrs HW=617.10' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.44 cfs @ 5.02 fps)

Secondary OutFlow Max=1.99 cfs @ 12.09 hrs HW=617.10' (Free Discharge)
└**2=Culvert** (Barrel Controls 1.99 cfs @ 3.58 fps)

Pond ICS-2: ICS-2



Stage-Discharge for Pond ICS-2: ICS-2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
615.85	0.00	0.00	0.00
615.87	0.00	0.00	0.00
615.89	0.01	0.01	0.00
615.91	0.01	0.01	0.00
615.93	0.02	0.02	0.00
615.95	0.03	0.03	0.00
615.97	0.04	0.04	0.00
615.99	0.06	0.06	0.00
616.01	0.07	0.07	0.00
616.03	0.09	0.09	0.00
616.05	0.10	0.10	0.00
616.07	0.12	0.12	0.00
616.09	0.14	0.14	0.00
616.11	0.16	0.16	0.00
616.13	0.18	0.18	0.00
616.15	0.19	0.19	0.00
616.17	0.21	0.21	0.00
616.19	0.22	0.22	0.00
616.21	0.23	0.23	0.00
616.23	0.24	0.24	0.00
616.25	0.26	0.25	0.00
616.27	0.28	0.26	0.01
616.29	0.30	0.27	0.02
616.31	0.32	0.28	0.03
616.33	0.34	0.29	0.05
616.35	0.37	0.30	0.07
616.37	0.40	0.31	0.09
616.39	0.43	0.32	0.11
616.41	0.46	0.33	0.13
616.43	0.50	0.34	0.16
616.45	0.53	0.35	0.19
616.47	0.57	0.35	0.22
616.49	0.61	0.35	0.25
616.51	0.65	0.36	0.29
616.53	0.69	0.36	0.33
616.55	0.73	0.36	0.37
616.57	0.77	0.37	0.41
616.59	0.82	0.37	0.45
616.61	0.87	0.37	0.50
616.63	0.92	0.38	0.54
616.65	0.97	0.38	0.59
616.67	1.02	0.38	0.64
616.69	1.08	0.38	0.69
616.71	1.13	0.39	0.74
616.73	1.19	0.39	0.80
616.75	1.25	0.39	0.86
616.77	1.31	0.40	0.91
616.79	1.37	0.40	0.97
616.81	1.43	0.40	1.03
616.83	1.50	0.40	1.09
616.85	1.56	0.41	1.15
616.87	1.63	0.41	1.22
616.89	1.69	0.41	1.28
616.91	1.76	0.41	1.35
616.93	1.83	0.42	1.41
616.95	1.90	0.42	1.48
616.97	1.97	0.42	1.54
616.99	2.04	0.42	1.61
617.01	2.11	0.43	1.68
617.03	2.18	0.43	1.75
617.05	2.25	0.43	1.82
617.07	2.32	0.43	1.89
617.09	2.40	0.44	1.96
617.11	2.47	0.44	2.03
617.13	2.54	0.44	2.10
617.15	2.61	0.44	2.17
617.17	2.69	0.45	2.24
617.19	2.76	0.45	2.31
617.21	2.83	0.45	2.38
617.23	2.90	0.45	2.45
617.25	**2.97**	**0.46**	**2.51**

Summary for Pond ICS-6: ICS-6

Inflow Area =	2.630 ac, 39.25% Impervious, Inflow Depth > 2.40" for 10-YR event				
Inflow =	5.43 cfs @	12.22 hrs,	Volume=	0.525 af	
Outflow =	5.43 cfs @	12.22 hrs,	Volume=	0.525 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.25 cfs @	12.22 hrs,	Volume=	0.155 af	
Secondary =	5.18 cfs @	12.22 hrs,	Volume=	0.371 af	

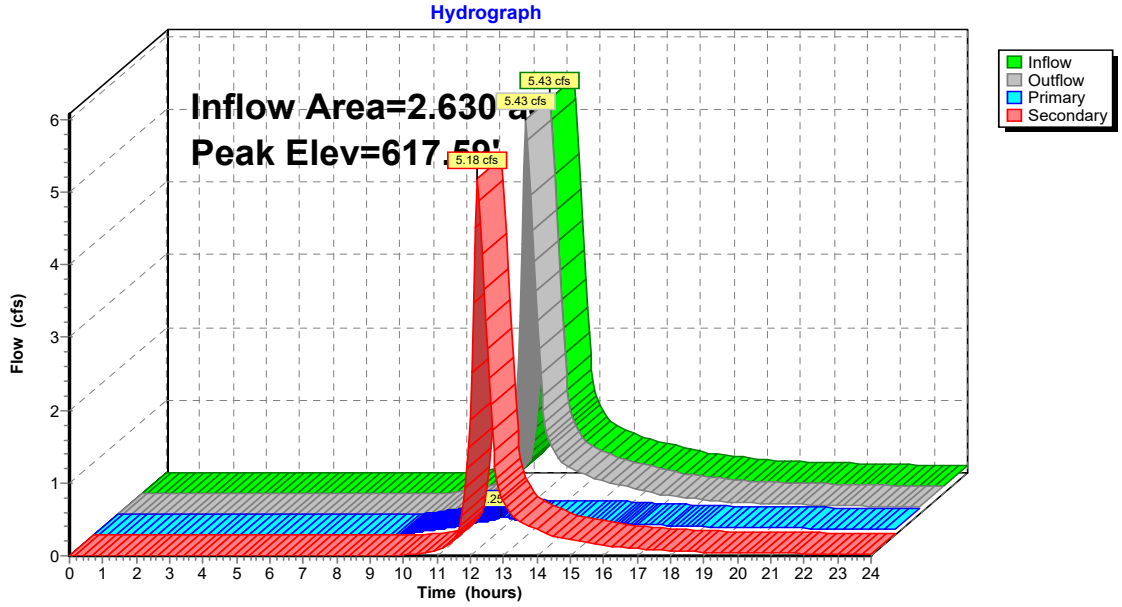
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.59' @ 12.22 hrs
Flood Elev= 621.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.25 cfs @ 12.22 hrs HW=617.57' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.25 cfs @ 2.88 fps)

Secondary OutFlow Max=5.10 cfs @ 12.22 hrs HW=617.57' (Free Discharge)
└─**2=Culvert** (Barrel Controls 5.10 cfs @ 4.57 fps)

Pond ICS-6: ICS-6



Stage-Discharge for Pond ICS-6: ICS-6

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
616.00	0.00	0.00	0.00
616.10	0.02	0.02	0.00
616.20	0.08	0.07	0.01
616.30	0.24	0.14	0.10
616.40	0.44	0.19	0.26
616.50	0.66	0.18	0.48
616.60	0.94	0.19	0.75
616.70	1.27	0.20	1.08
616.80	1.65	0.20	1.44
616.90	2.06	0.21	1.85
617.00	2.51	0.22	2.30
617.10	2.99	0.22	2.77
617.20	3.49	0.23	3.26
617.30	3.99	0.24	3.76
617.40	4.50	0.24	4.26
617.50	5.00	0.25	4.75
617.60	5.47	0.25	5.22
617.70	5.89	0.26	5.63
617.80	6.21	0.26	5.95
617.90	6.75	0.27	6.48
618.00	7.32	0.27	7.05
618.10	7.85	0.28	7.57
618.20	8.34	0.28	8.06
618.30	8.81	0.29	8.52
618.40	9.25	0.29	8.96
618.50	9.67	0.30	9.38
618.60	10.08	0.30	9.77
618.70	10.47	0.31	10.16
618.80	10.82	0.31	10.51
618.90	11.08	0.32	10.77
619.00	11.34	0.32	11.02
619.10	11.59	0.33	11.26
619.20	11.83	0.33	11.50
619.30	12.07	0.33	11.74
619.40	12.31	0.34	11.97
619.50	12.54	0.34	12.19
619.60	12.76	0.35	12.41
619.70	12.98	0.35	12.63
619.80	13.20	0.35	12.85
619.90	13.42	0.36	13.06
620.00	13.63	0.36	13.26
620.10	13.83	0.37	13.47
620.20	14.04	0.37	13.67
620.30	14.24	0.37	13.87
620.40	14.44	0.38	14.06
620.50	14.64	0.38	14.26
620.60	14.83	0.38	14.45
620.70	15.02	0.39	14.63
620.80	15.21	0.39	14.82
620.90	15.40	0.40	15.00
621.00	15.58	0.40	15.18
621.10	**15.76**	**0.40**	**15.36**

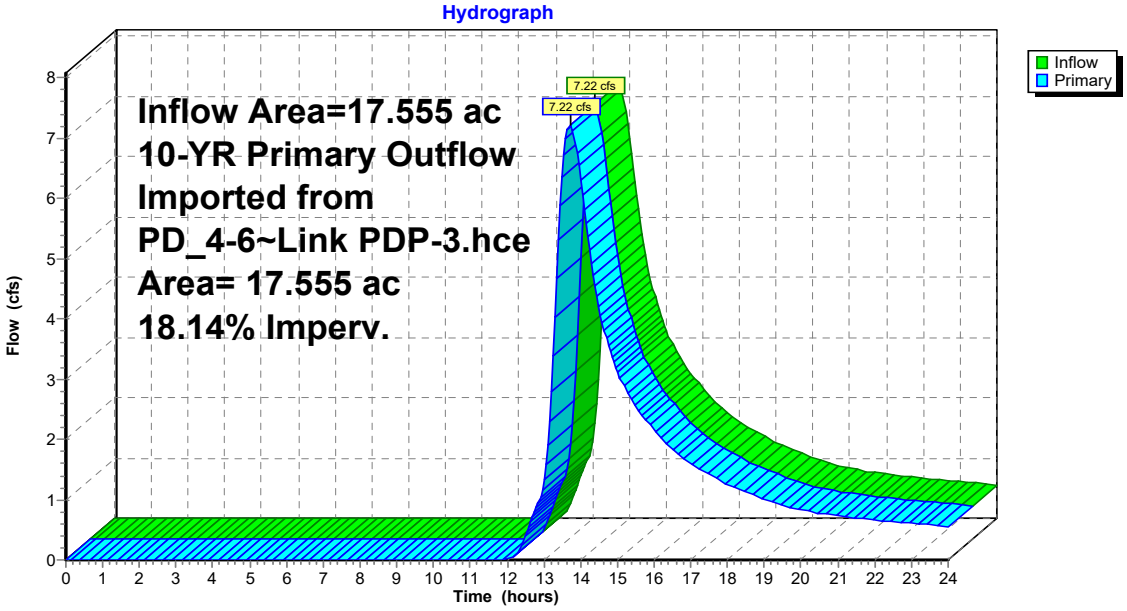
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 1.17" for 10-YR event
Inflow = 7.22 cfs @ 13.71 hrs, Volume= 1.710 af
Primary = 7.22 cfs @ 13.71 hrs, Volume= 1.710 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

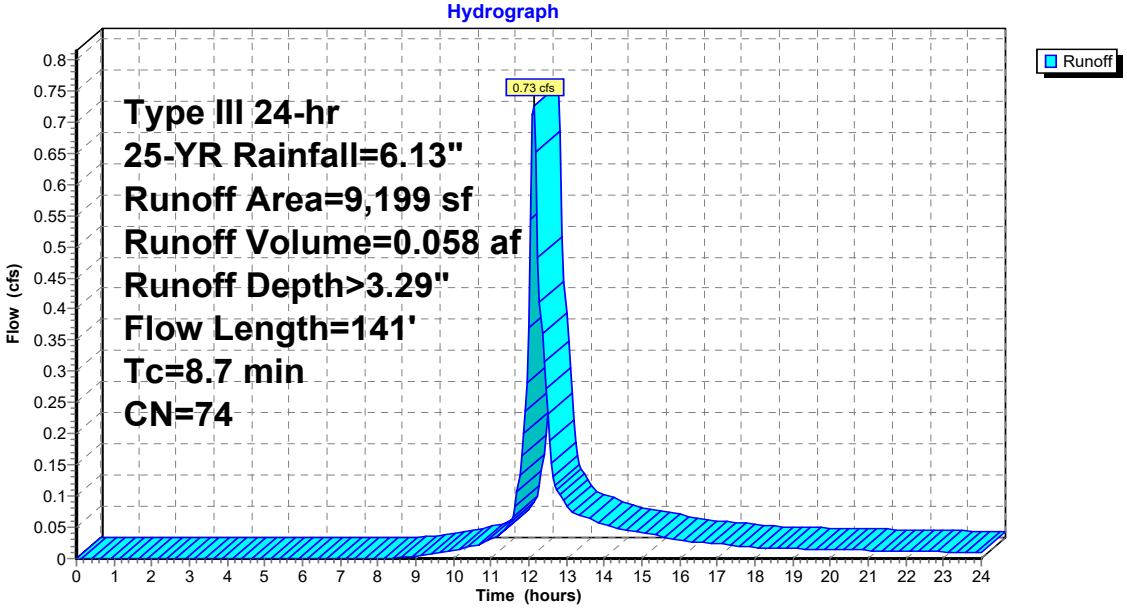
Runoff = 0.73 cfs @ 12.13 hrs, Volume= 0.058 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

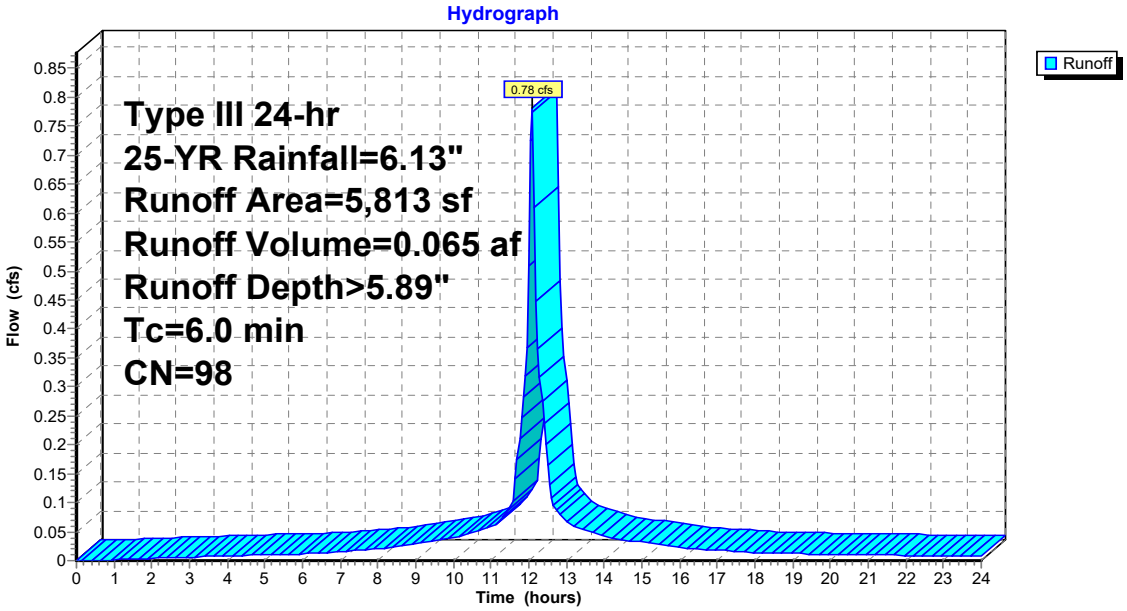
Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.065 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

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

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

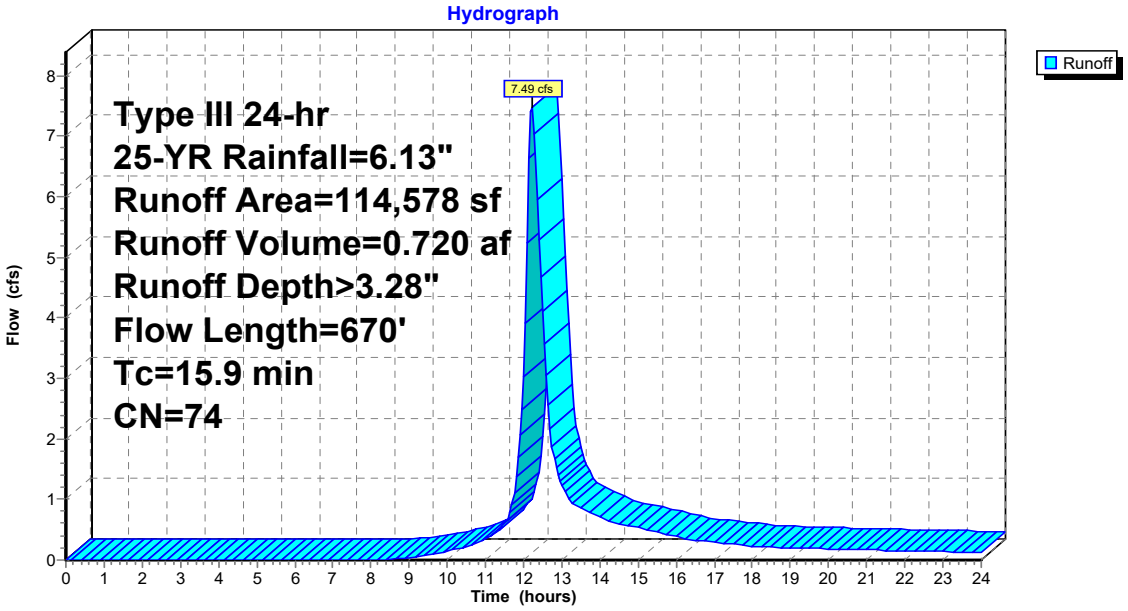
Runoff = 7.49 cfs @ 12.22 hrs, Volume= 0.720 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

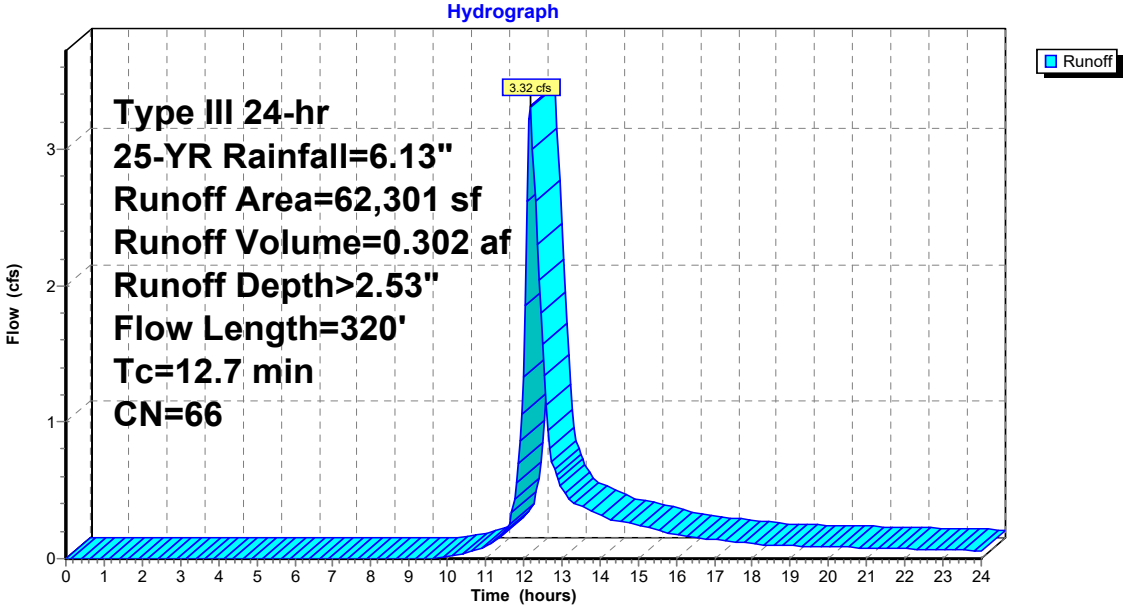
Runoff = 3.32 cfs @ 12.19 hrs, Volume= 0.302 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

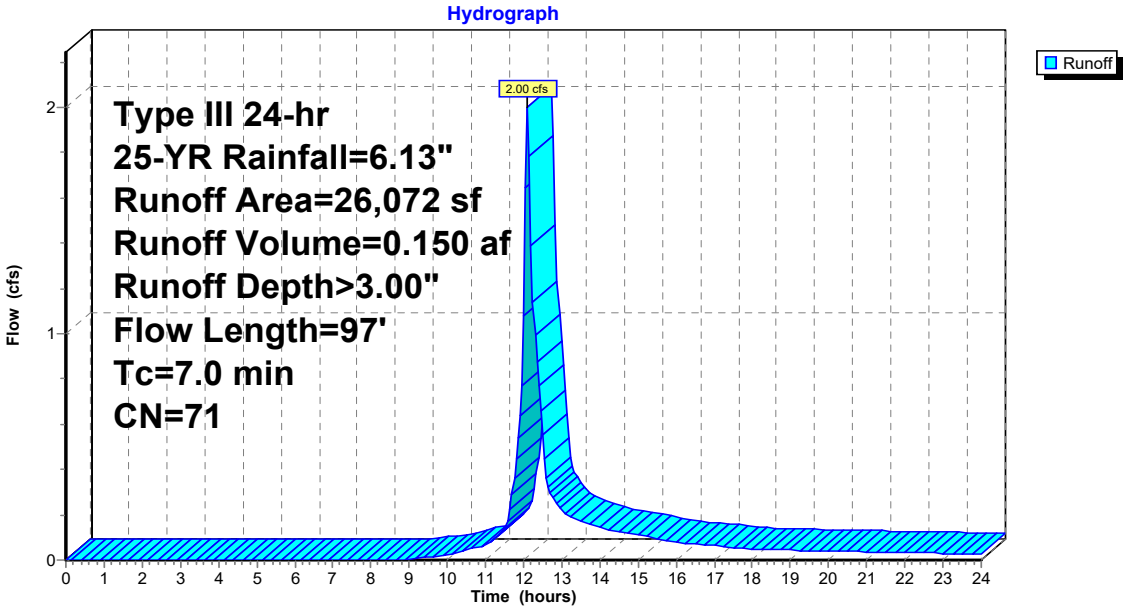
Runoff = 2.00 cfs @ 12.11 hrs, Volume= 0.150 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

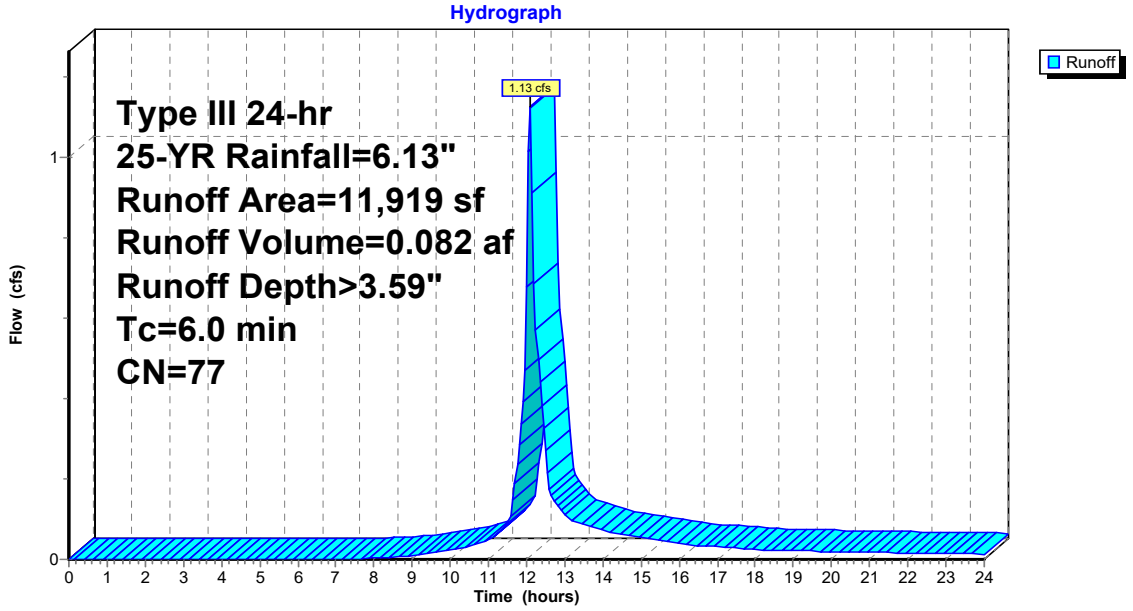
Runoff = 1.13 cfs @ 12.09 hrs, Volume= 0.082 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

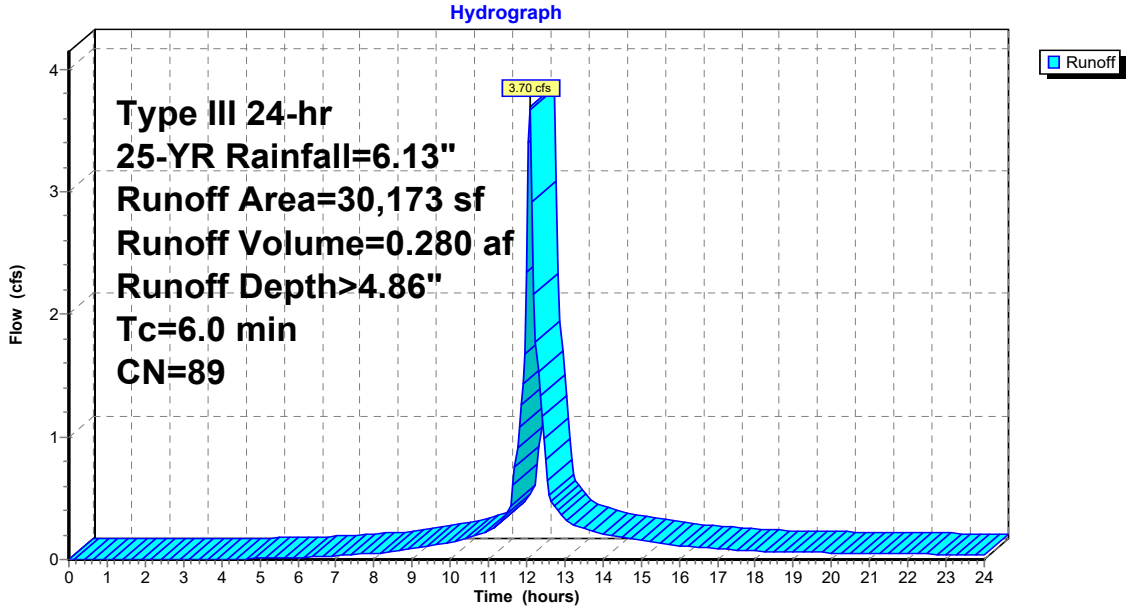
Runoff = 3.70 cfs @ 12.09 hrs, Volume= 0.280 af, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

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

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

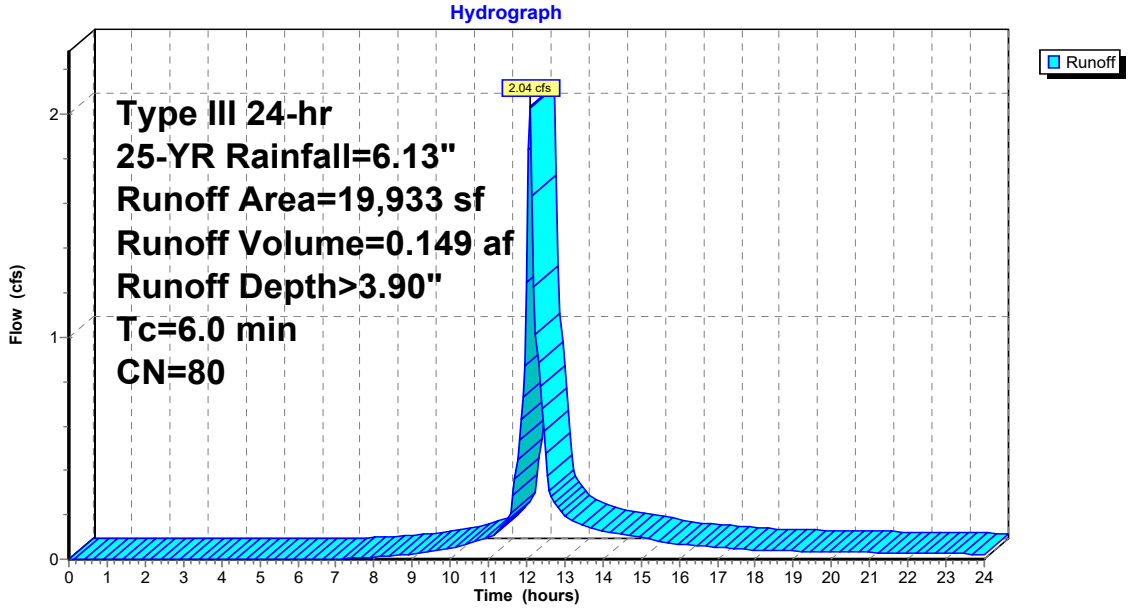
Runoff = 2.04 cfs @ 12.09 hrs, Volume= 0.149 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

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

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

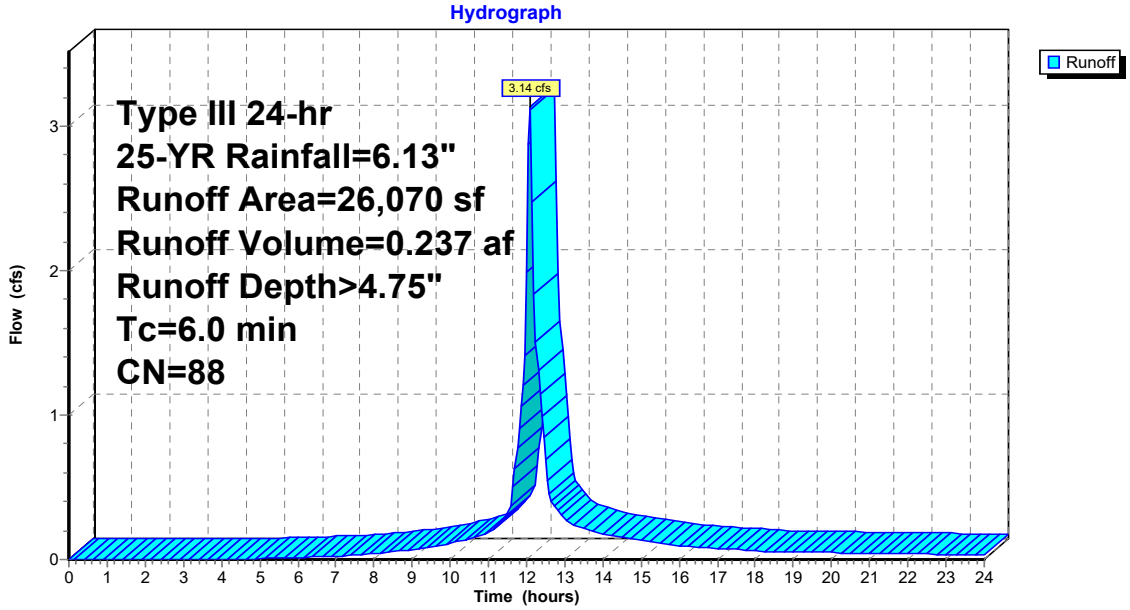
Runoff = 3.14 cfs @ 12.09 hrs, Volume= 0.237 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

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

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

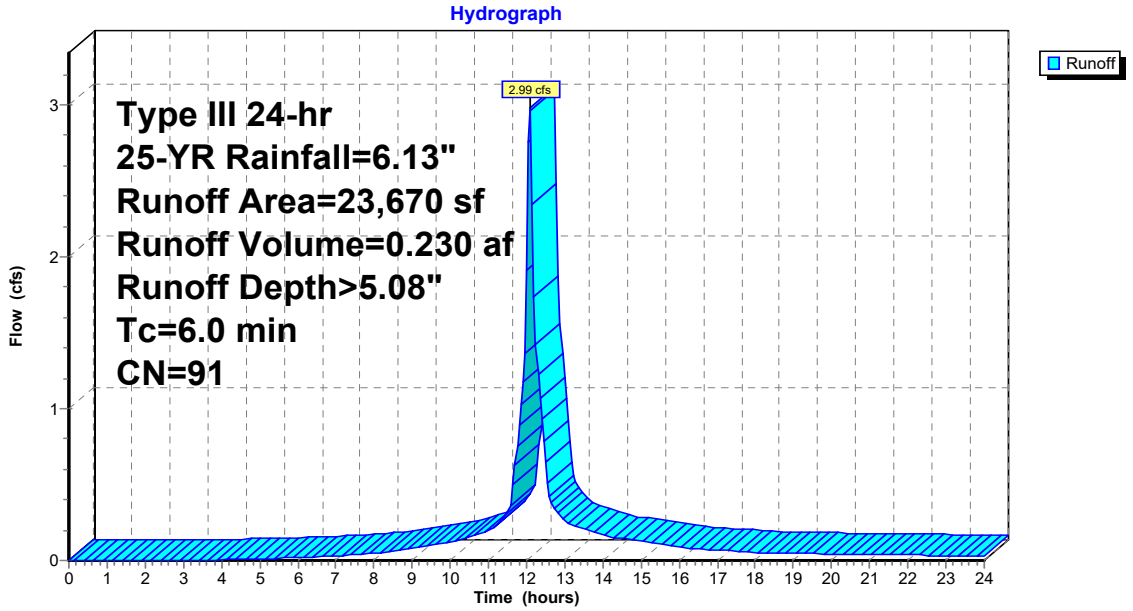
Runoff = 2.99 cfs @ 12.09 hrs, Volume= 0.230 af, Depth> 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

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

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

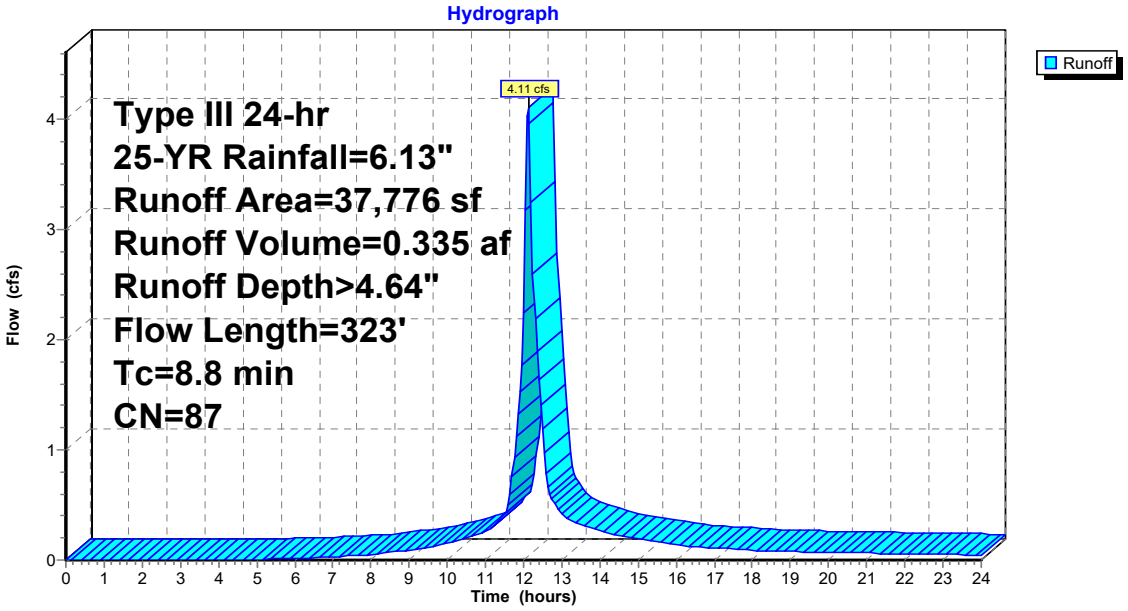
Runoff = 4.11 cfs @ 12.12 hrs, Volume= 0.335 af, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

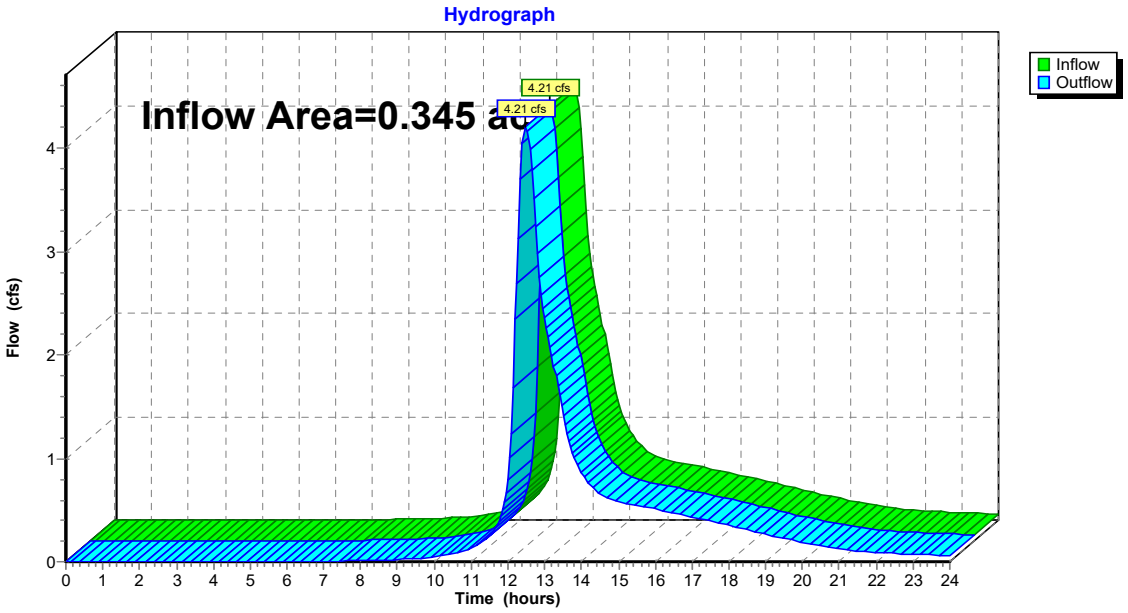


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 22.84" for 25-YR event
Inflow = 4.21 cfs @ 12.48 hrs, Volume= 0.656 af
Outflow = 4.21 cfs @ 12.48 hrs, Volume= 0.656 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

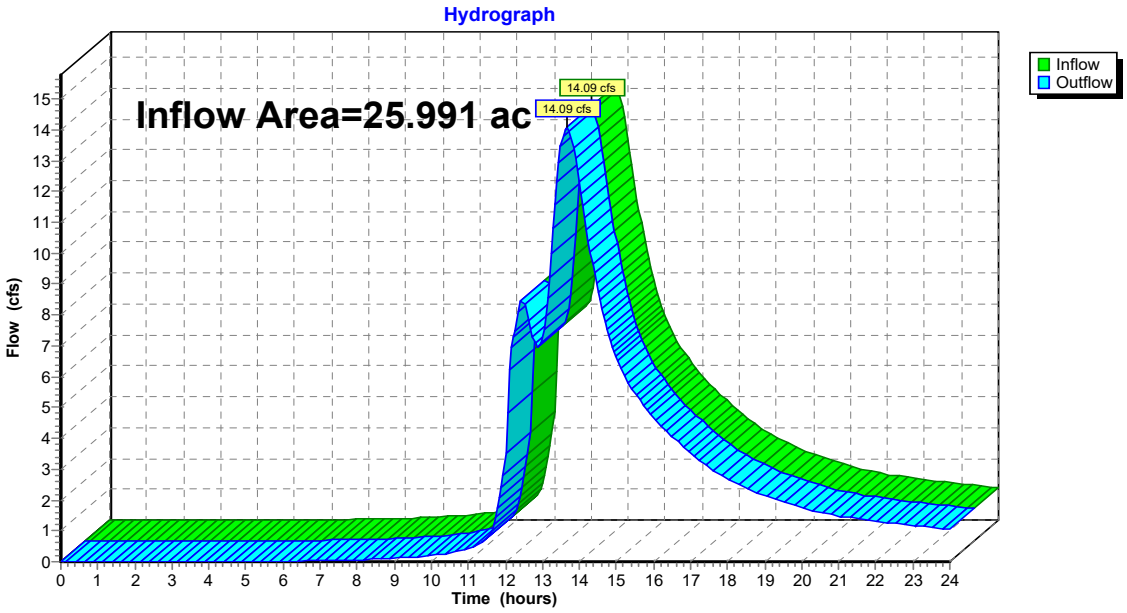


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 1.99" for 25-YR event
Inflow = 14.09 cfs @ 13.66 hrs, Volume= 4.316 af
Outflow = 14.09 cfs @ 13.66 hrs, Volume= 4.316 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 1.65" for 25-YR event
Inflow = 14.19 cfs @ 13.45 hrs, Volume= 3.401 af
Outflow = 12.65 cfs @ 13.69 hrs, Volume= 3.325 af, Atten= 11%, Lag= 14.5 min

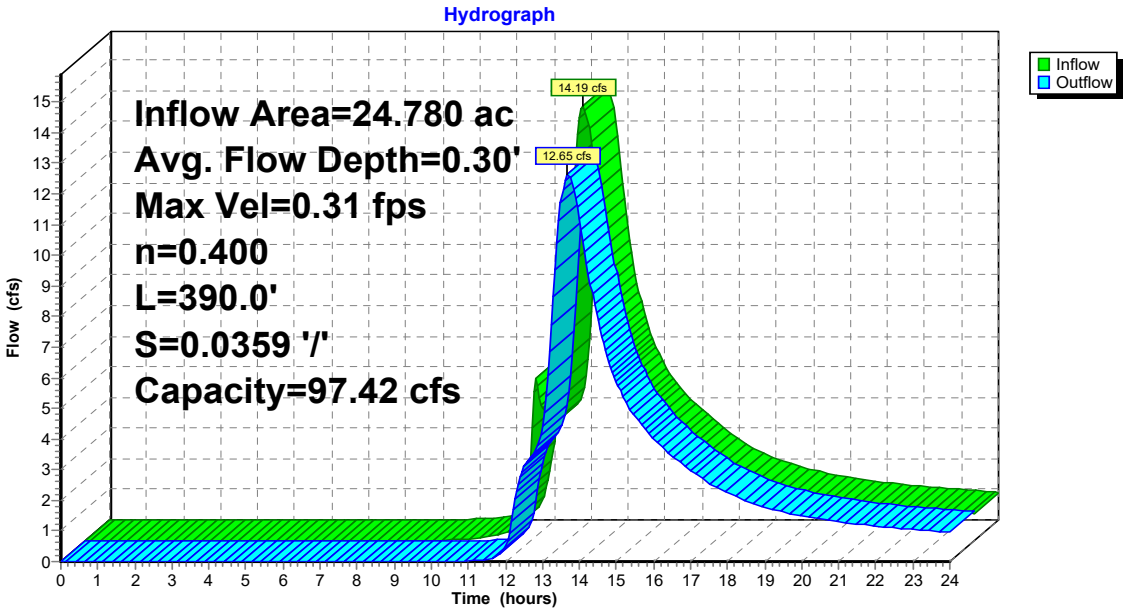
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 21.2 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 45.7 min

Peak Storage= 16,050 cf @ 13.69 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

‡

Reach DP-3: DP-3



Stage-Discharge for Reach DP-3: DP-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
618.00	0.00	0.00	618.52	0.43	31.73
618.01	0.03	0.04	618.53	0.44	32.77
618.02	0.05	0.13	618.54	0.44	33.83
618.03	0.07	0.27	618.55	0.45	34.91
618.04	0.08	0.43	618.56	0.45	35.99
618.05	0.10	0.62	618.57	0.46	37.09
618.06	0.11	0.84	618.58	0.46	38.21
618.07	0.12	1.09	618.59	0.47	39.34
618.08	0.13	1.37	618.60	0.47	40.48
618.09	0.14	1.66	618.61	0.48	41.64
618.10	0.15	1.98	618.62	0.48	42.81
618.11	0.16	2.32	618.63	0.49	44.00
618.12	0.17	2.69	618.64	0.49	45.20
618.13	0.18	3.07	618.65	0.50	46.41
618.14	0.19	3.48	618.66	0.50	47.64
618.15	0.20	3.91	618.67	0.51	48.88
618.16	0.20	4.35	618.68	0.51	50.14
618.17	0.21	4.82	618.69	0.52	51.40
618.18	0.22	5.30	618.70	0.52	52.69
618.19	0.23	5.81	618.71	0.52	53.98
618.20	0.24	6.33	618.72	0.53	55.29
618.21	0.24	6.87	618.73	0.53	56.62
618.22	0.25	7.43	618.74	0.54	57.95
618.23	0.26	8.00	618.75	0.54	59.30
618.24	0.27	8.60	618.76	0.55	60.67
618.25	0.27	9.21	618.77	0.55	62.05
618.26	0.28	9.84	618.78	0.56	63.44
618.27	0.29	10.48	618.79	0.56	64.84
618.28	0.29	11.14	618.80	0.56	66.26
618.29	0.30	11.82	618.81	0.57	67.69
618.30	0.31	12.51	618.82	0.57	69.14
618.31	0.31	13.23	618.83	0.58	70.59
618.32	0.32	13.95	618.84	0.58	72.07
618.33	0.33	14.70	618.85	0.59	73.55
618.34	0.33	15.45	618.86	0.59	75.05
618.35	0.34	16.23	618.87	0.59	76.56
618.36	0.34	17.02	618.88	0.60	78.09
618.37	0.35	17.83	618.89	0.60	79.63
618.38	0.36	18.65	618.90	0.61	81.18
618.39	0.36	19.48	618.91	0.61	82.74
618.40	0.37	20.34	618.92	0.61	84.32
618.41	0.37	21.20	618.93	0.62	85.91
618.42	0.38	22.09	618.94	0.62	87.52
618.43	0.38	22.99	618.95	0.63	89.14
618.44	0.39	23.90	618.96	0.63	90.77
618.45	0.40	24.83	618.97	0.63	92.41
618.46	0.40	25.77	618.98	0.64	94.07
618.47	0.41	26.72	618.99	0.64	95.74
618.48	0.41	27.70	619.00	**0.65**	**97.42**
618.49	0.42	28.68			
618.50	0.42	29.68			
618.51	0.43	30.70			

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 4.47" for 25-YR event
Inflow = 1.81 cfs @ 12.10 hrs, Volume= 0.360 af
Outflow = 1.00 cfs @ 12.62 hrs, Volume= 0.322 af, Atten= 45%, Lag= 31.4 min
Discarded = 0.12 cfs @ 12.62 hrs, Volume= 0.131 af
Primary = 0.89 cfs @ 12.62 hrs, Volume= 0.191 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.04' @ 12.62 hrs Surf.Area= 2,784 sf Storage= 4,125 cf
Flood Elev= 611.25' Surf.Area= 3,452 sf Storage= 7,739 cf

Plug-Flow detention time= 139.7 min calculated for 0.322 af (89% of inflow)
Center-of-Mass det. time= 91.7 min (915.6 - 823.8)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	7,237 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,986 cf Overall - 1,749 cf Embedded = 7,237 cf
#2	607.00'	385 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,166 cf Overall x 33.0% Voids
#3	608.00'	117 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 583 cf Overall x 20.0% Voids
		7,739 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166
609.00	2,130	1,648	2,814
610.00	2,760	2,445	5,259
611.20	3,452	3,727	8,986

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166

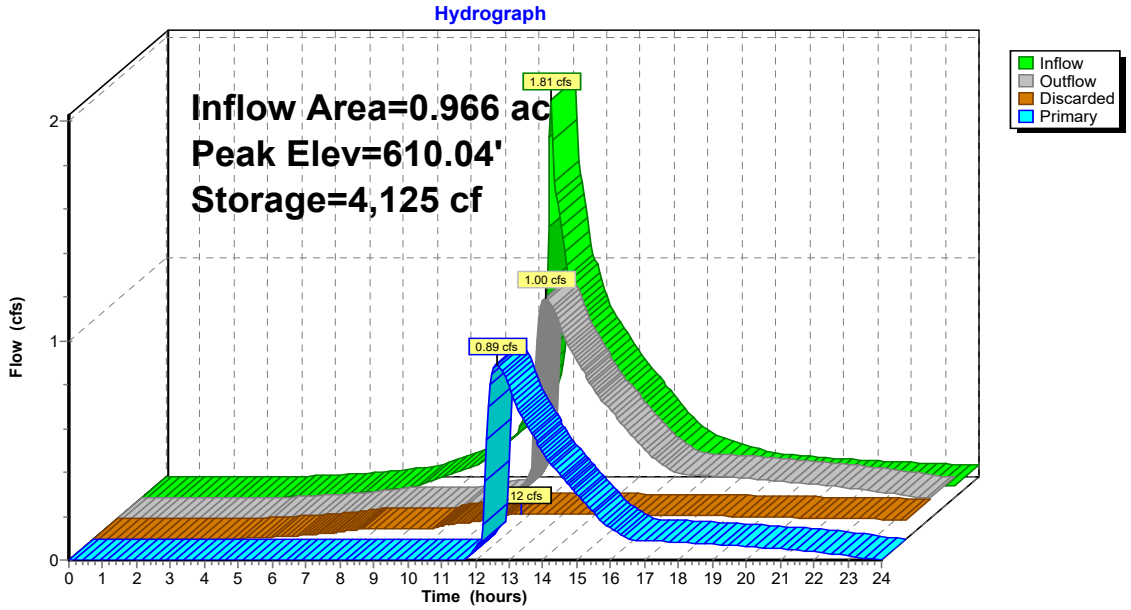
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,166	0	0
608.50	1,166	583	583

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.00' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	609.80'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 12.62 hrs HW=610.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.91 cfs @ 12.62 hrs HW=610.04' (Free Discharge)
└─**2=Culvert** (Passes 0.91 cfs of 1.97 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.71 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.81 cfs @ 1.60 fps)

Pond 1: SFB-1



Stage-Discharge for Pond 1: SFB-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
607.00	0.00	0.00	0.00
607.05	0.05	0.05	0.00
607.10	0.05	0.05	0.00
607.15	0.05	0.05	0.00
607.20	0.05	0.05	0.00
607.25	0.05	0.05	0.00
607.30	0.05	0.05	0.00
607.35	0.05	0.05	0.00
607.40	0.05	0.05	0.00
607.45	0.05	0.05	0.00
607.50	0.05	0.05	0.00
607.55	0.05	0.05	0.00
607.60	0.05	0.05	0.00
607.65	0.05	0.05	0.00
607.70	0.05	0.05	0.00
607.75	0.05	0.05	0.00
607.80	0.05	0.05	0.00
607.85	0.05	0.05	0.00
607.90	0.05	0.05	0.00
607.95	0.05	0.05	0.00
608.00	0.05	0.05	0.00
608.05	0.05	0.05	0.00
608.10	0.05	0.05	0.00
608.15	0.05	0.05	0.00
608.20	0.06	0.06	0.00
608.25	0.06	0.06	0.00
608.30	0.06	0.06	0.00
608.35	0.06	0.06	0.00
608.40	0.06	0.06	0.00
608.45	0.07	0.07	0.00
608.50	0.07	0.07	0.00
608.55	0.07	0.07	0.00
608.60	0.07	0.07	0.00
608.65	0.07	0.07	0.00
608.70	0.08	0.08	0.00
608.75	0.08	0.08	0.00
608.80	0.08	0.08	0.00
608.85	0.08	0.08	0.00
608.90	0.08	0.08	0.00
608.95	0.09	0.09	0.00
609.00	0.09	0.09	0.00
609.05	0.09	0.09	0.00
609.10	0.11	0.09	0.01
609.15	0.12	0.09	0.03
609.20	0.13	0.09	0.04
609.25	0.14	0.10	0.04
609.30	0.15	0.10	0.05
609.35	0.15	0.10	0.05
609.40	0.16	0.10	0.06
609.45	0.16	0.10	0.06
609.50	0.17	0.10	0.07
609.55	0.18	0.10	0.07
609.60	0.18	0.10	0.08
609.65	0.19	0.11	0.08
609.70	0.19	0.11	0.08
609.75	0.19	0.11	0.09
609.80	0.20	0.11	0.09
609.85	0.28	0.11	0.17
609.90	0.42	0.11	0.31
609.95	0.61	0.11	0.50
610.00	0.83	0.12	0.71
610.05	1.06	0.12	0.94
610.10	1.14	0.12	1.03
610.15	1.22	0.12	1.10
610.20	1.29	0.12	1.17
610.25	1.36	0.12	1.24
610.30	1.43	0.12	1.30
610.35	1.49	0.12	1.36
610.40	1.55	0.12	1.42
610.45	1.60	0.13	1.48
610.50	1.66	0.13	1.53
610.55	1.71	0.13	1.58
610.60	1.76	0.13	1.63
610.65	1.81	0.13	1.68
610.70	1.86	0.13	1.73
610.75	1.91	0.13	1.77
610.80	1.95	0.13	1.82
610.85	2.00	0.14	1.86
610.90	2.04	0.14	1.90
610.95	2.08	0.14	1.95
611.00	2.13	0.14	1.99
611.05	2.17	0.14	2.03
611.10	2.21	0.14	2.07
611.15	2.25	0.14	2.10
611.20	2.29	**0.14**	2.14
611.25	**2.32**	0.14	**2.18**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 2.21" for 25-YR event
Inflow = 3.21 cfs @ 12.10 hrs, Volume= 0.778 af
Outflow = 0.88 cfs @ 14.78 hrs, Volume= 0.634 af, Atten= 73%, Lag= 161.0 min
Discarded = 0.42 cfs @ 14.78 hrs, Volume= 0.467 af
Primary = 0.45 cfs @ 14.78 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.17' @ 14.78 hrs Surf.Area= 7,703 sf Storage= 11,028 cf
Flood Elev= 617.40' Surf.Area= 10,100 sf Storage= 21,942 cf

Plug-Flow detention time= 197.9 min calculated for 0.633 af (81% of inflow)
Center-of-Mass det. time= 117.2 min (999.2 - 882.0)

Volume	Invert	Avail.Storage	Storage Description
#1	613.25'	20,246 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 26,162 cf Overall - 5,916 cf Embedded = 20,246 cf
#2	613.25'	1,302 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 3,944 cf Overall x 33.0% Voids
#3	614.25'	394 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,972 cf Overall x 20.0% Voids
		21,942 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944
615.00	5,539	3,556	7,500
616.00	7,378	6,459	13,959
617.00	9,278	8,328	22,287
617.40	10,100	3,876	26,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944

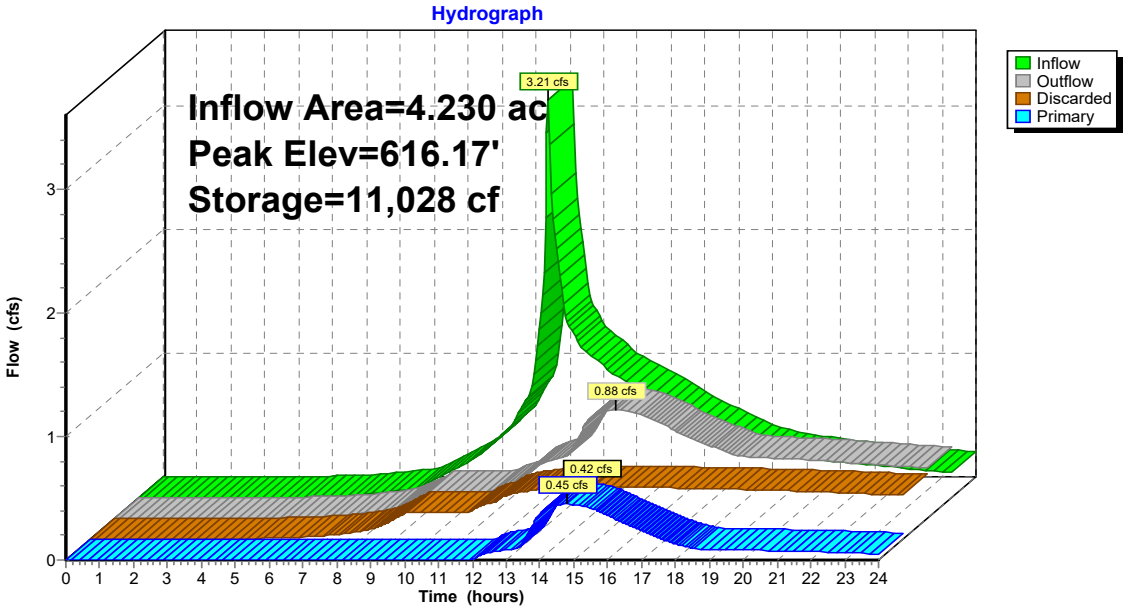
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.25	3,944	0	0
614.75	3,944	1,972	1,972

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.25'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.75'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.75' / 612.25' S= 0.0536 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.42 cfs @ 14.78 hrs HW=616.17' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.42 cfs)

Primary OutFlow Max=0.46 cfs @ 14.78 hrs HW=616.17' (Free Discharge)
└─**2=Culvert** (Passes 0.46 cfs of 1.92 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.54 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.36 cfs @ 1.35 fps)

Pond 2: SFB-2



Stage-Discharge for Pond 2: SFB-2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
613.25	0.00	0.00	0.00
613.30	0.22	0.22	0.00
613.35	0.22	0.22	0.00
613.40	0.22	0.22	0.00
613.45	0.22	0.22	0.00
613.50	0.22	0.22	0.00
613.55	0.22	0.22	0.00
613.60	0.22	0.22	0.00
613.65	0.22	0.22	0.00
613.70	0.22	0.22	0.00
613.75	0.22	0.22	0.00
613.80	0.22	0.22	0.00
613.85	0.22	0.22	0.00
613.90	0.22	0.22	0.00
613.95	0.22	0.22	0.00
614.00	0.22	0.22	0.00
614.05	0.22	0.22	0.00
614.10	0.22	0.22	0.00
614.15	0.22	0.22	0.00
614.20	0.22	0.22	0.00
614.25	0.22	0.22	0.00
614.30	0.22	0.22	0.00
614.35	0.23	0.23	0.00
614.40	0.23	0.23	0.00
614.45	0.24	0.24	0.00
614.50	0.25	0.25	0.00
614.55	0.25	0.25	0.00
614.60	0.26	0.26	0.00
614.65	0.26	0.26	0.00
614.70	0.27	0.27	0.00
614.75	0.28	0.28	0.00
614.80	0.28	0.28	0.00
614.85	0.29	0.29	0.00
614.90	0.29	0.29	0.00
614.95	0.30	0.30	0.00
615.00	0.31	0.31	0.00
615.05	0.31	0.31	0.00
615.10	0.32	0.32	0.00
615.15	0.32	0.32	0.00
615.20	0.33	0.33	0.00
615.25	0.33	0.33	0.00
615.30	0.35	0.34	0.01
615.35	0.37	0.34	0.03
615.40	0.38	0.35	0.04
615.45	0.39	0.35	0.04
615.50	0.40	0.36	0.05
615.55	0.42	0.36	0.05
615.60	0.43	0.37	0.06
615.65	0.43	0.37	0.06
615.70	0.44	0.38	0.07
615.75	0.45	0.38	0.07
615.80	0.46	0.39	0.08
615.85	0.47	0.39	0.08
615.90	0.48	0.40	0.08
615.95	0.49	0.40	0.09
616.00	0.50	0.41	0.09
616.05	0.56	0.41	0.15
616.10	0.67	0.42	0.26
616.15	0.82	0.42	0.40
616.20	0.95	0.43	0.52
616.25	1.01	0.43	0.58
616.30	1.06	0.44	0.62
616.35	1.11	0.44	0.67
616.40	1.16	0.45	0.71
616.45	1.20	0.45	0.75
616.50	1.24	0.46	0.78
616.55	1.28	0.46	0.82
616.60	1.32	0.47	0.85
616.65	1.36	0.47	0.89
616.70	1.40	0.48	0.92
616.75	1.43	0.48	0.95
616.80	1.47	0.49	0.97
616.85	1.50	0.50	1.00
616.90	1.53	0.50	1.03
616.95	1.56	0.51	1.06
617.00	1.59	0.51	1.08
617.05	1.63	0.52	1.11
617.10	1.66	0.52	1.13
617.15	1.69	0.53	1.16
617.20	1.71	0.53	1.18
617.25	1.74	0.54	1.20
617.30	1.77	0.55	1.23
617.35	1.80	0.55	1.25
617.40	**1.83**	**0.56**	**1.27**

Summary for Pond DB-1: DB-1

Inflow	=	3.34 cfs @	12.09 hrs,	Volume=	0.106 af
Outflow	=	0.53 cfs @	12.49 hrs,	Volume=	0.103 af, Atten= 84%, Lag= 24.1 min
Primary	=	0.53 cfs @	12.49 hrs,	Volume=	0.103 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.55' @ 12.49 hrs Surf.Area= 3,131 sf Storage= 3,454 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 101.6 min calculated for 0.103 af (98% of inflow)
Center-of-Mass det. time= 100.7 min (827.7 - 727.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.53 cfs @ 12.49 hrs HW=610.55' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.53 cfs @ 2.69 fps)
  ├─**2=Orifice/Grate** (Passes < 0.45 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 0.15 cfs potential flow)

Pond DB-1: DB-1 - Chamber Wizard Field A

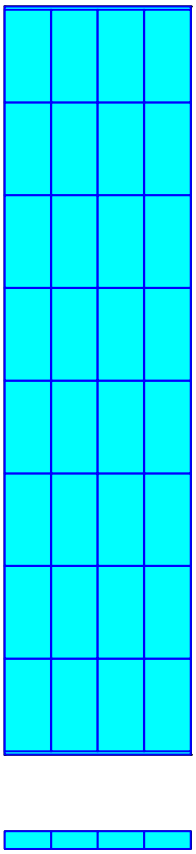
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

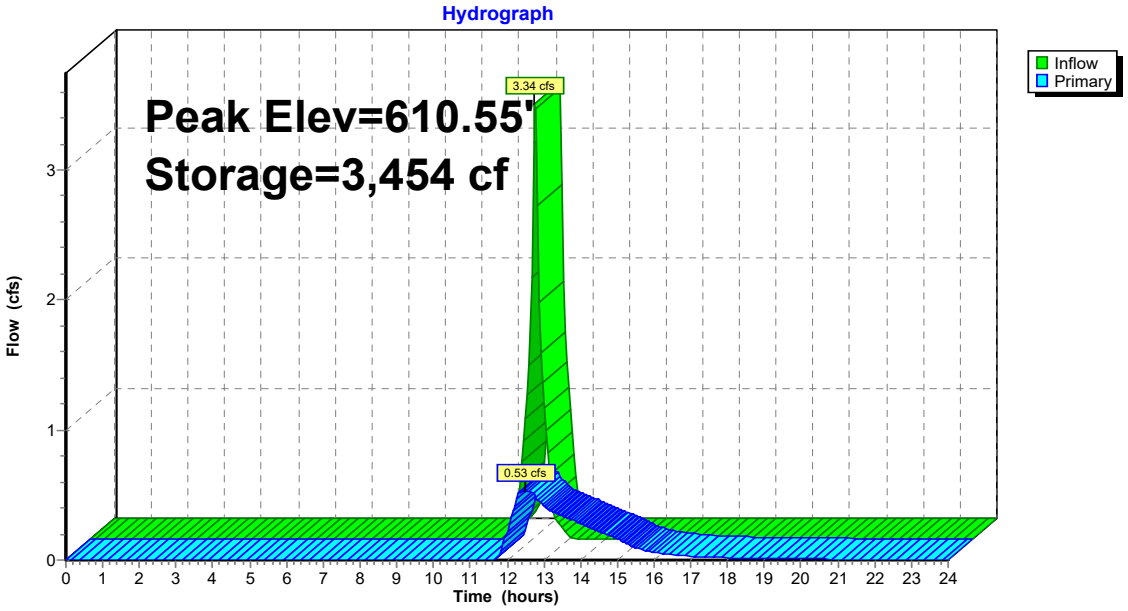
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Peak Elev=610.55'
Storage=3,454 cf
3.34 cfs
0.53 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-1: DB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
609.25	0.00	610.29	0.40	611.33	0.65
609.27	0.00	610.31	0.41	611.35	0.65
609.29	0.00	610.33	0.42	611.37	0.65
609.31	0.01	610.35	0.43	611.39	0.66
609.33	0.01	610.37	0.44	611.41	0.66
609.35	0.02	610.39	0.46	611.43	0.66
609.37	0.03	610.41	0.48	611.45	0.66
609.39	0.04	610.43	0.49	611.47	0.67
609.41	0.05	610.45	0.51	611.49	0.67
609.43	0.06	610.47	0.51	611.51	0.67
609.45	0.08	610.49	0.52	611.53	0.68
609.47	0.09	610.51	0.52	611.55	0.68
609.49	0.11	610.53	0.53	611.57	0.68
609.51	0.13	610.55	0.53	611.59	0.68
609.53	0.14	610.57	0.53	611.61	0.69
609.55	0.15	610.59	0.54	611.63	0.69
609.57	0.17	610.61	0.54	611.65	0.69
609.59	0.17	610.63	0.54	611.67	0.69
609.61	0.18	610.65	0.55	611.69	0.70
609.63	0.19	610.67	0.55	611.71	0.70
609.65	0.20	610.69	0.55	611.73	0.70
609.67	0.21	610.71	0.56	611.75	0.70
609.69	0.22	610.73	0.56	611.77	0.71
609.71	0.23	610.75	0.56	611.79	0.71
609.73	0.24	610.77	0.57	611.81	0.71
609.75	0.24	610.79	0.57	611.83	0.71
609.77	0.25	610.81	0.57	611.85	0.72
609.79	0.26	610.83	0.57	611.87	0.72
609.81	0.26	610.85	0.58	611.89	0.72
609.83	0.27	610.87	0.58	611.91	**0.72**
609.85	0.28	610.89	0.58		
609.87	0.28	610.91	0.59		
609.89	0.29	610.93	0.59		
609.91	0.30	610.95	0.59		
609.93	0.30	610.97	0.60		
609.95	0.31	610.99	0.60		
609.97	0.31	611.01	0.60		
609.99	0.32	611.03	0.61		
610.01	0.32	611.05	0.61		
610.03	0.33	611.07	0.61		
610.05	0.33	611.09	0.61		
610.07	0.34	611.11	0.62		
610.09	0.34	611.13	0.62		
610.11	0.35	611.15	0.62		
610.13	0.35	611.17	0.63		
610.15	0.36	611.19	0.63		
610.17	0.36	611.21	0.63		
610.19	0.37	611.23	0.63		
610.21	0.37	611.25	0.64		
610.23	0.38	611.27	0.64		
610.25	0.38	611.29	0.64		
610.27	0.39	611.31	0.65		

Summary for Pond DB-2: DB-2

Inflow	=	2.68 cfs @	12.09 hrs,	Volume=	0.079 af
Outflow	=	0.11 cfs @	12.62 hrs,	Volume=	0.070 af, Atten= 96%, Lag= 32.1 min
Primary	=	0.11 cfs @	12.62 hrs,	Volume=	0.070 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.43' @ 12.62 hrs Surf.Area= 3,131 sf Storage= 3,133 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 282.2 min calculated for 0.070 af (89% of inflow)
Center-of-Mass det. time= 279.1 min (1,006.1 - 727.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**8.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.11 cfs @ 12.62 hrs HW=616.43' (Free Discharge)
└─**1=Culvert** (Passes 0.11 cfs of 1.22 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.03 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

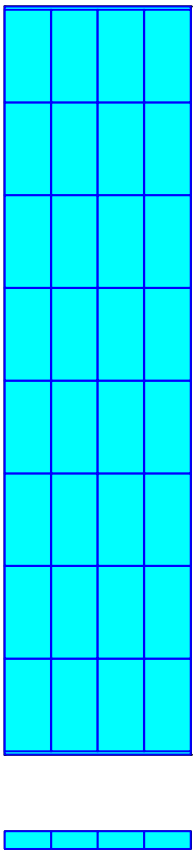
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

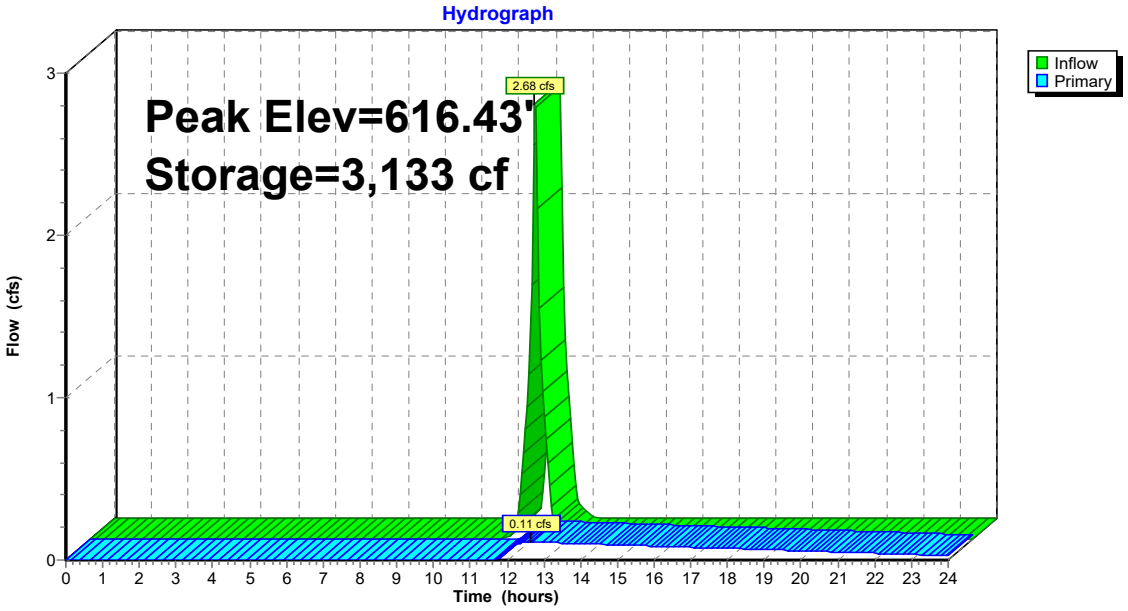
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Peak Elev=616.43'
Storage=3,133 cf
2.68 cfs
0.11 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-2: DB-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.25	0.00	616.29	0.10	617.33	0.15
615.27	0.00	616.31	0.10	617.35	0.15
615.29	0.00	616.33	0.10	617.37	0.15
615.31	0.01	616.35	0.11	617.39	0.15
615.33	0.01	616.37	0.11	617.41	0.15
615.35	0.01	616.39	0.11	617.43	0.15
615.37	0.02	616.41	0.11	617.45	0.15
615.39	0.02	616.43	0.11	617.47	0.15
615.41	0.03	616.45	0.11	617.49	0.15
615.43	0.03	616.47	0.11	617.51	0.15
615.45	0.04	616.49	0.11	617.53	0.16
615.47	0.04	616.51	0.11	617.55	0.16
615.49	0.04	616.53	0.11	617.57	0.16
615.51	0.04	616.55	0.12	617.59	0.16
615.53	0.05	616.57	0.12	617.61	0.16
615.55	0.05	616.59	0.12	617.63	0.16
615.57	0.05	616.61	0.12	617.65	0.16
615.59	0.05	616.63	0.12	617.67	0.16
615.61	0.06	616.65	0.12	617.69	0.16
615.63	0.06	616.67	0.12	617.71	0.16
615.65	0.06	616.69	0.12	617.73	0.16
615.67	0.06	616.71	0.12	617.75	0.16
615.69	0.06	616.73	0.12	617.77	0.16
615.71	0.06	616.75	0.13	617.79	0.16
615.73	0.07	616.77	0.13	617.81	0.17
615.75	0.07	616.79	0.13	617.83	0.17
615.77	0.07	616.81	0.13	617.85	0.17
615.79	0.07	616.83	0.13	617.87	0.17
615.81	0.07	616.85	0.13	617.89	0.17
615.83	0.07	616.87	0.13	617.91	**0.17**
615.85	0.08	616.89	0.13		
615.87	0.08	616.91	0.13		
615.89	0.08	616.93	0.13		
615.91	0.08	616.95	0.13		
615.93	0.08	616.97	0.13		
615.95	0.08	616.99	0.14		
615.97	0.08	617.01	0.14		
615.99	0.09	617.03	0.14		
616.01	0.09	617.05	0.14		
616.03	0.09	617.07	0.14		
616.05	0.09	617.09	0.14		
616.07	0.09	617.11	0.14		
616.09	0.09	617.13	0.14		
616.11	0.09	617.15	0.14		
616.13	0.09	617.17	0.14		
616.15	0.09	617.19	0.14		
616.17	0.10	617.21	0.14		
616.19	0.10	617.23	0.14		
616.21	0.10	617.25	0.15		
616.23	0.10	617.27	0.15		
616.25	0.10	617.29	0.15		
616.27	0.10	617.31	0.15		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 54.57" for 25-YR event
Inflow = 7.62 cfs @ 12.22 hrs, Volume= 0.607 af
Outflow = 3.97 cfs @ 12.51 hrs, Volume= 0.598 af, Atten= 48%, Lag= 17.5 min
Primary = 3.97 cfs @ 12.51 hrs, Volume= 0.598 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 615.96' @ 12.51 hrs Surf.Area= 2,902 sf Storage= 9,559 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 82.1 min calculated for 0.598 af (99% of inflow)
Center-of-Mass det. time= 73.7 min (864.5 - 790.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.97 cfs @ 12.51 hrs HW=615.96' (Free Discharge)
└─**1=Culvert** (Passes 3.97 cfs of 5.35 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.79 cfs @ 9.06 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 2.14 cfs @ 6.14 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 1.03 cfs @ 2.96 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

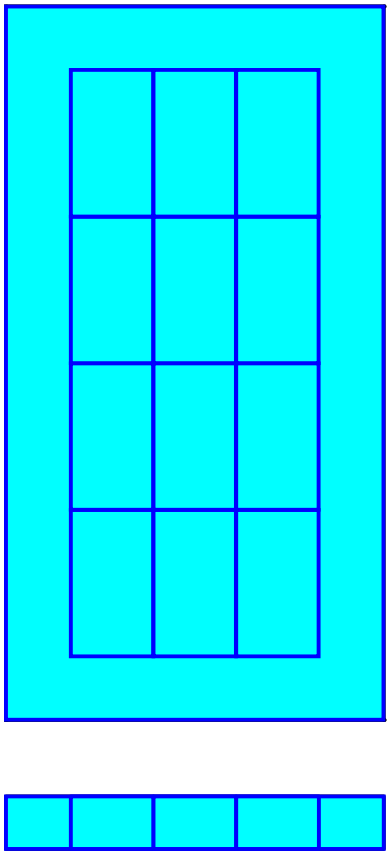
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

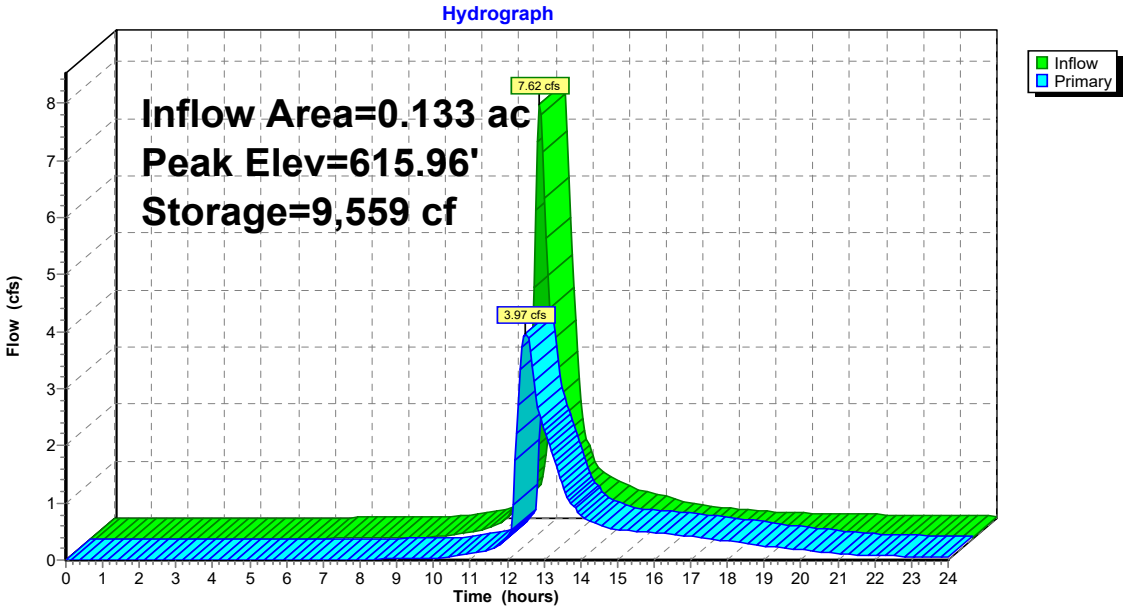
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=615.96'
Storage=9,559 cf
7.62 cfs
3.97 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-6: DB-6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
612.25	0.00	614.33	0.92	616.41	4.90
612.29	0.00	614.37	1.00	616.45	5.02
612.33	0.02	614.41	1.08	616.49	5.16
612.37	0.03	614.45	1.17	616.53	5.30
612.41	0.06	614.49	1.26	616.57	5.46
612.45	0.08	614.53	1.35	616.61	5.62
612.49	0.11	614.57	1.43	616.65	5.79
612.53	0.14	614.61	1.51	616.69	5.93
612.57	0.17	614.65	1.58	616.73	5.96
612.61	0.18	614.69	1.64	616.77	5.99
612.65	0.20	614.73	1.70	616.81	6.02
612.69	0.22	614.77	1.76	616.85	6.05
612.73	0.24	614.81	1.81	616.89	6.07
612.77	0.25	614.85	1.86	616.93	6.10
612.81	0.26	614.89	1.91	616.97	6.13
612.85	0.28	614.93	1.96	617.01	6.16
612.89	0.29	614.97	2.01	617.05	6.19
612.93	0.30	615.01	2.06	617.09	6.22
612.97	0.31	615.05	2.10	617.13	6.25
613.01	0.32	615.09	2.15	617.17	6.28
613.05	0.33	615.13	2.19	617.21	6.31
613.09	0.34	615.17	2.23	617.25	6.33
613.13	0.35	615.21	2.28	617.29	6.36
613.17	0.36	615.25	2.32	617.33	6.39
613.21	0.37	615.29	2.36	617.37	6.42
613.25	0.38	615.33	2.42	617.41	6.44
613.29	0.39	615.37	2.48	617.45	6.47
613.33	0.40	615.41	2.56	617.49	6.50
613.37	0.41	615.45	2.64	617.53	6.53
613.41	0.42	615.49	2.73	617.57	6.55
613.45	0.43	615.53	2.83	617.61	6.58
613.49	0.44	615.57	2.93	617.65	6.61
613.53	0.44	615.61	3.04	617.69	6.64
613.57	0.45	615.65	3.16	617.73	**6.66**
613.61	0.46	615.69	3.27		
613.65	0.47	615.73	3.39		
613.69	0.47	615.77	3.50		
613.73	0.48	615.81	3.61		
613.77	0.49	615.85	3.72		
613.81	0.50	615.89	3.82		
613.85	0.50	615.93	3.90		
613.89	0.51	615.97	3.99		
613.93	0.52	616.01	4.07		
613.97	0.52	616.05	4.15		
614.01	0.53	616.09	4.23		
614.05	0.55	616.13	4.31		
614.09	0.57	616.17	4.38		
614.13	0.61	616.21	4.45		
614.17	0.65	616.25	4.52		
614.21	0.71	616.29	4.60		
614.25	0.77	616.33	4.69		
614.29	0.84	616.37	4.79		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 5.08" for 25-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.230 af
Outflow = 0.50 cfs @ 12.56 hrs, Volume= 0.223 af, Atten= 83%, Lag= 28.3 min
Primary = 0.50 cfs @ 12.56 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 617.35' @ 12.56 hrs Surf.Area= 3,131 sf Storage= 4,142 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 113.7 min calculated for 0.222 af (97% of inflow)
Center-of-Mass det. time= 94.8 min (874.8 - 779.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.50 cfs @ 12.56 hrs HW=617.35' (Free Discharge)
└─**1=Culvert** (Passes 0.50 cfs of 0.77 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.49 cfs @ 5.67 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.79 fps)

Pond DB-7: DB-7 - Chamber Wizard Field A

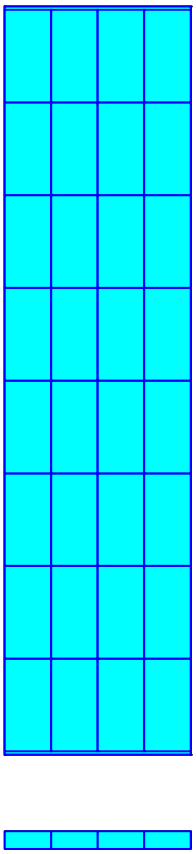
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

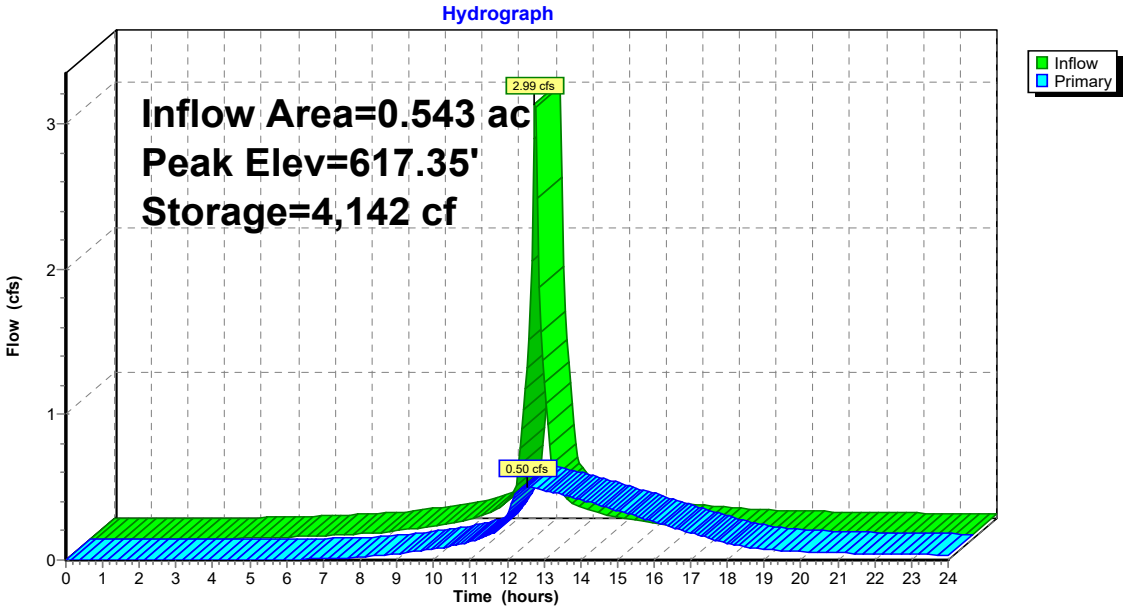
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=617.35'
Storage=4,142 cf
2.99 cfs
0.50 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Pond DB-7: DB-7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.80	0.00	616.84	0.39	617.88	0.85
615.82	0.00	616.86	0.40	617.90	0.86
615.84	0.00	616.88	0.40	617.92	0.87
615.86	0.01	616.90	0.41	617.94	0.88
615.88	0.02	616.92	0.41	617.96	0.89
615.90	0.02	616.94	0.41	617.98	0.89
615.92	0.03	616.96	0.42	618.00	0.90
615.94	0.04	616.98	0.42	618.02	0.90
615.96	0.06	617.00	0.43	618.04	0.90
615.98	0.07	617.02	0.43	618.06	0.91
616.00	0.08	617.04	0.44	618.08	0.91
616.02	0.10	617.06	0.44	618.10	0.92
616.04	0.11	617.08	0.44	618.12	0.92
616.06	0.13	617.10	0.45	618.14	0.92
616.08	0.14	617.12	0.45	618.16	0.93
616.10	0.15	617.14	0.46	618.18	0.93
616.12	0.17	617.16	0.46	618.20	0.93
616.14	0.17	617.18	0.46	618.22	0.94
616.16	0.18	617.20	0.47	618.24	0.94
616.18	0.19	617.22	0.47	618.26	0.94
616.20	0.20	617.24	0.47	618.28	0.95
616.22	0.21	617.26	0.48	618.30	0.95
616.24	0.22	617.28	0.48	618.32	0.95
616.26	0.23	617.30	0.49	618.34	0.96
616.28	0.24	617.32	0.49	618.36	0.96
616.30	0.24	617.34	0.50	618.38	0.96
616.32	0.25	617.36	0.50	618.40	0.97
616.34	0.26	617.38	0.52	618.42	0.97
616.36	0.26	617.40	0.53	618.44	0.97
616.38	0.27	617.42	0.54	618.46	**0.98**
616.40	0.28	617.44	0.55		
616.42	0.28	617.46	0.57		
616.44	0.29	617.48	0.59		
616.46	0.30	617.50	0.60		
616.48	0.30	617.52	0.62		
616.50	0.31	617.54	0.64		
616.52	0.31	617.56	0.66		
616.54	0.32	617.58	0.67		
616.56	0.32	617.60	0.69		
616.58	0.33	617.62	0.71		
616.60	0.33	617.64	0.72		
616.62	0.34	617.66	0.73		
616.64	0.34	617.68	0.74		
616.66	0.35	617.70	0.76		
616.68	0.35	617.72	0.77		
616.70	0.36	617.74	0.78		
616.72	0.36	617.76	0.79		
616.74	0.37	617.78	0.80		
616.76	0.37	617.80	0.81		
616.78	0.38	617.82	0.82		
616.80	0.38	617.84	0.83		
616.82	0.39	617.86	0.84		

Summary for Pond ICS-1: ICS-1

Inflow Area = 0.693 ac, 62.75% Impervious, Inflow Depth > 4.86" for 25-YR event
Inflow = 3.70 cfs @ 12.09 hrs, Volume= 0.280 af
Outflow = 3.70 cfs @ 12.09 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.175 af
Secondary = 3.34 cfs @ 12.09 hrs, Volume= 0.106 af

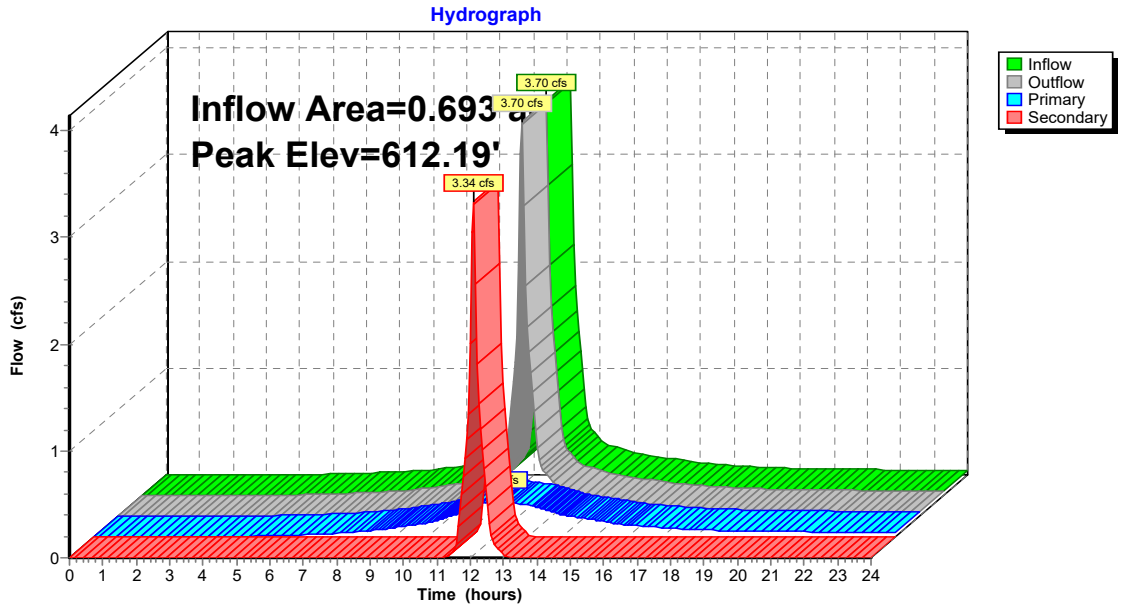
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.19' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=612.17' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.36 cfs @ 4.09 fps)

Secondary OutFlow Max=3.26 cfs @ 12.09 hrs HW=612.17' (Free Discharge)
└**2=Culvert** (Inlet Controls 3.26 cfs @ 4.19 fps)

Pond ICS-1: ICS-1



Stage-Discharge for Pond ICS-1: ICS-1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
609.25	0.00	0.00	0.00
609.30	0.00	0.00	0.00
609.35	0.02	0.02	0.00
609.40	0.04	0.04	0.00
609.45	0.07	0.07	0.00
609.50	0.11	0.11	0.00
609.55	0.14	0.14	0.00
609.60	0.17	0.17	0.00
609.65	0.19	0.19	0.00
609.70	0.18	0.18	0.00
609.75	0.19	0.19	0.00
609.80	0.19	0.19	0.00
609.85	0.20	0.20	0.00
609.90	0.20	0.20	0.00
609.95	0.21	0.21	0.00
610.00	0.21	0.21	0.00
610.05	0.22	0.22	0.00
610.10	0.22	0.22	0.00
610.15	0.22	0.22	0.00
610.20	0.23	0.23	0.00
610.25	0.23	0.23	0.00
610.30	0.24	0.24	0.00
610.35	0.24	0.24	0.00
610.40	0.24	0.24	0.00
610.45	0.25	0.25	0.00
610.50	0.25	0.25	0.00
610.55	0.26	0.26	0.00
610.60	0.26	0.26	0.00
610.65	0.26	0.26	0.00
610.70	0.27	0.27	0.00
610.75	0.27	0.27	0.00
610.80	0.27	0.27	0.00
610.85	0.28	0.28	0.00
610.90	0.28	0.28	0.00
610.95	0.28	0.28	0.00
611.00	0.29	0.29	0.00
611.05	0.29	0.29	0.00
611.10	0.29	0.29	0.00
611.15	0.30	0.30	0.00
611.20	0.30	0.30	0.00
611.25	0.32	0.30	0.01
611.30	0.36	0.31	0.06
611.35	0.43	0.31	0.12
611.40	0.53	0.31	0.21
611.45	0.64	0.32	0.33
611.50	0.78	0.32	0.46
611.55	0.94	0.32	0.62
611.60	1.11	0.32	0.79
611.65	1.31	0.33	0.98
611.70	1.51	0.33	1.18
611.75	1.73	0.33	1.40
611.80	1.96	0.34	1.62
611.85	2.19	0.34	1.85
611.90	2.43	0.34	2.09
611.95	2.67	0.34	2.33
612.00	2.91	0.35	2.56
612.05	3.14	0.35	2.79
612.10	3.36	0.35	3.01
612.15	3.55	0.36	3.20
612.20	3.70	0.36	3.34
612.25	3.87	0.36	3.51
612.30	4.03	0.36	3.66
612.35	4.18	0.37	3.81
612.40	4.32	0.37	3.95
612.45	4.47	0.37	4.09
612.50	4.60	0.37	4.23
612.55	4.73	0.38	4.36
612.60	4.86	0.38	4.48
612.65	4.99	0.38	4.61
612.70	5.11	0.38	4.73
612.75	5.23	0.39	4.84
612.80	5.35	0.39	4.96
612.85	5.46	0.39	5.07
612.90	5.57	0.39	5.18
612.95	5.68	0.40	5.29
613.00	5.79	0.40	5.39
613.05	5.89	0.40	5.49
613.10	6.00	0.40	5.59
613.15	6.10	0.41	5.69
613.20	6.20	0.41	5.79
613.25	**6.30**	**0.41**	**5.89**

Summary for Pond ICS-2: ICS-2

Inflow Area = 0.598 ac, 70.86% Impervious, Inflow Depth > 4.75" for 25-YR event
Inflow = 3.14 cfs @ 12.09 hrs, Volume= 0.237 af
Outflow = 3.14 cfs @ 12.09 hrs, Volume= 0.237 af, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.09 hrs, Volume= 0.158 af
Secondary = 2.68 cfs @ 12.09 hrs, Volume= 0.079 af

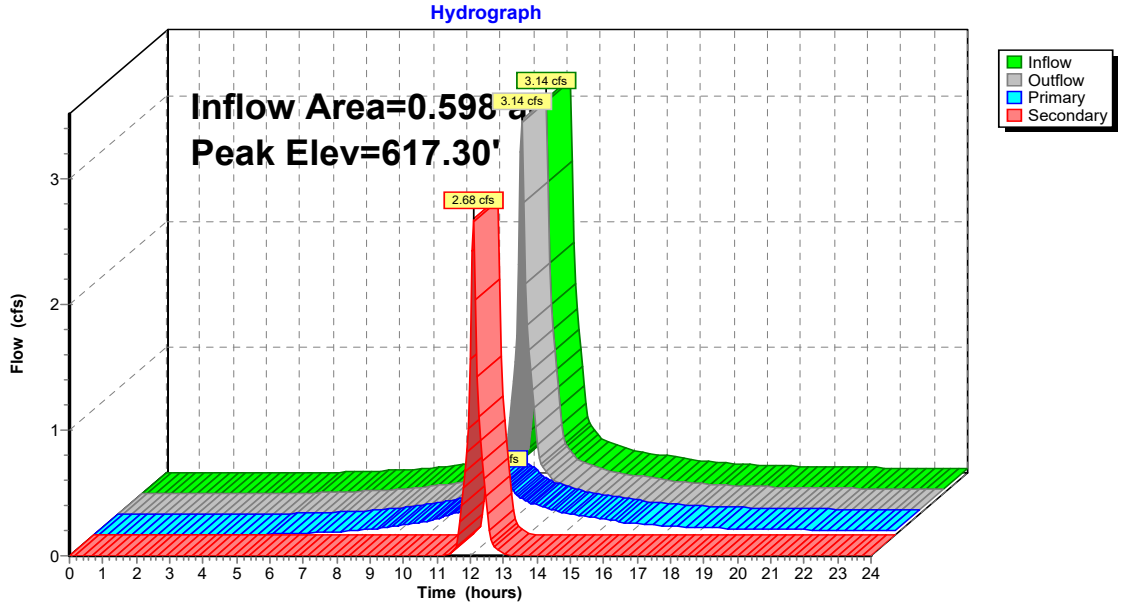
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.30' @ 12.09 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.09 hrs HW=617.28' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.46 cfs @ 5.27 fps)

Secondary OutFlow Max=2.61 cfs @ 12.09 hrs HW=617.28' (Free Discharge)
└**2=Culvert** (Barrel Controls 2.61 cfs @ 3.87 fps)

Pond ICS-2: ICS-2



Stage-Discharge for Pond ICS-2: ICS-2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
615.85	0.00	0.00	0.00
615.87	0.00	0.00	0.00
615.89	0.01	0.01	0.00
615.91	0.01	0.01	0.00
615.93	0.02	0.02	0.00
615.95	0.03	0.03	0.00
615.97	0.04	0.04	0.00
615.99	0.06	0.06	0.00
616.01	0.07	0.07	0.00
616.03	0.09	0.09	0.00
616.05	0.10	0.10	0.00
616.07	0.12	0.12	0.00
616.09	0.14	0.14	0.00
616.11	0.16	0.16	0.00
616.13	0.18	0.18	0.00
616.15	0.19	0.19	0.00
616.17	0.21	0.21	0.00
616.19	0.22	0.22	0.00
616.21	0.23	0.23	0.00
616.23	0.24	0.24	0.00
616.25	0.26	0.25	0.00
616.27	0.28	0.26	0.01
616.29	0.30	0.27	0.02
616.31	0.32	0.28	0.03
616.33	0.34	0.29	0.05
616.35	0.37	0.30	0.07
616.37	0.40	0.31	0.09
616.39	0.43	0.32	0.11
616.41	0.46	0.33	0.13
616.43	0.50	0.34	0.16
616.45	0.53	0.35	0.19
616.47	0.57	0.35	0.22
616.49	0.61	0.35	0.25
616.51	0.65	0.36	0.29
616.53	0.69	0.36	0.33
616.55	0.73	0.36	0.37
616.57	0.77	0.37	0.41
616.59	0.82	0.37	0.45
616.61	0.87	0.37	0.50
616.63	0.92	0.38	0.54
616.65	0.97	0.38	0.59
616.67	1.02	0.38	0.64
616.69	1.08	0.38	0.69
616.71	1.13	0.39	0.74
616.73	1.19	0.39	0.80
616.75	1.25	0.39	0.86
616.77	1.31	0.40	0.91
616.79	1.37	0.40	0.97
616.81	1.43	0.40	1.03
616.83	1.50	0.40	1.09
616.85	1.56	0.41	1.15
616.87	1.63	0.41	1.22
616.89	1.69	0.41	1.28
616.91	1.76	0.41	1.35
616.93	1.83	0.42	1.41
616.95	1.90	0.42	1.48
616.97	1.97	0.42	1.54
616.99	2.04	0.42	1.61
617.01	2.11	0.43	1.68
617.03	2.18	0.43	1.75
617.05	2.25	0.43	1.82
617.07	2.32	0.43	1.89
617.09	2.40	0.44	1.96
617.11	2.47	0.44	2.03
617.13	2.54	0.44	2.10
617.15	2.61	0.44	2.17
617.17	2.69	0.45	2.24
617.19	2.76	0.45	2.31
617.21	2.83	0.45	2.38
617.23	2.90	0.45	2.45
617.25	2.97	0.46	2.51
617.27	3.04	0.46	2.58
617.29	3.11	0.46	2.65
617.31	**3.18**	**0.46**	**2.71**

Summary for Pond ICS-6: ICS-6

Inflow Area = 2.630 ac, 39.25% Impervious, Inflow Depth > 3.28" for 25-YR event
Inflow = 7.49 cfs @ 12.22 hrs, Volume= 0.720 af
Outflow = 7.49 cfs @ 12.22 hrs, Volume= 0.720 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.22 hrs, Volume= 0.179 af
Secondary = 7.21 cfs @ 12.22 hrs, Volume= 0.541 af

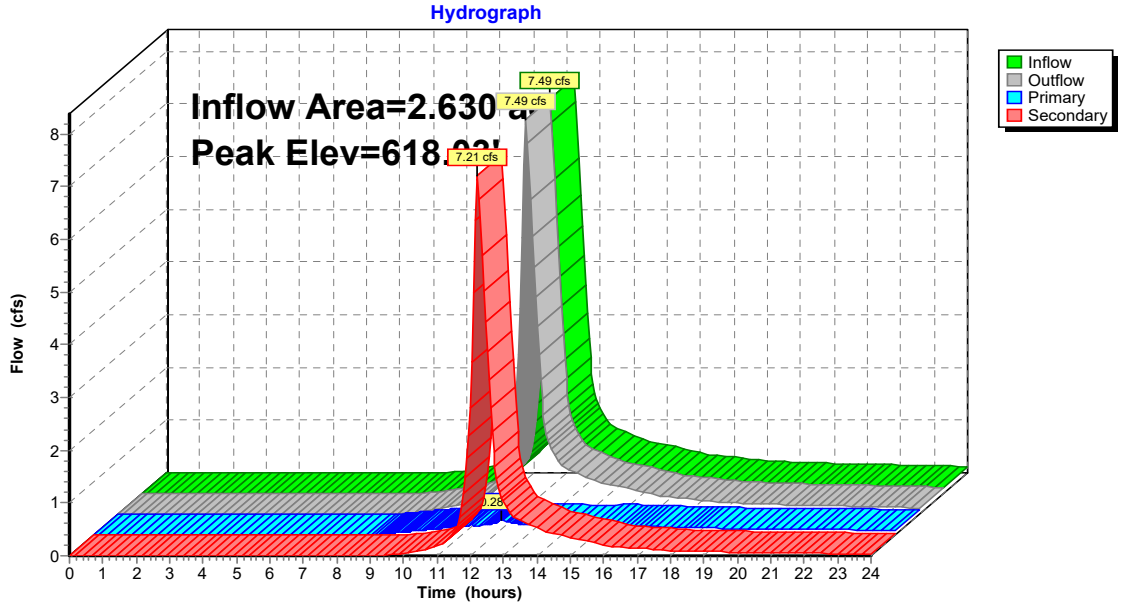
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 618.03' @ 12.22 hrs
Flood Elev= 621.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.27 cfs @ 12.22 hrs HW=618.01' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.27 cfs @ 3.15 fps)

Secondary OutFlow Max=7.11 cfs @ 12.22 hrs HW=618.01' (Free Discharge)
└**2=Culvert** (Barrel Controls 7.11 cfs @ 5.79 fps)

Pond ICS-6: ICS-6



Stage-Discharge for Pond ICS-6: ICS-6

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
616.00	0.00	0.00	0.00
616.10	0.02	0.02	0.00
616.20	0.08	0.07	0.01
616.30	0.24	0.14	0.10
616.40	0.44	0.19	0.26
616.50	0.66	0.18	0.48
616.60	0.94	0.19	0.75
616.70	1.27	0.20	1.08
616.80	1.65	0.20	1.44
616.90	2.06	0.21	1.85
617.00	2.51	0.22	2.30
617.10	2.99	0.22	2.77
617.20	3.49	0.23	3.26
617.30	3.99	0.24	3.76
617.40	4.50	0.24	4.26
617.50	5.00	0.25	4.75
617.60	5.47	0.25	5.22
617.70	5.89	0.26	5.63
617.80	6.21	0.26	5.95
617.90	6.75	0.27	6.48
618.00	7.32	0.27	7.05
618.10	7.85	0.28	7.57
618.20	8.34	0.28	8.06
618.30	8.81	0.29	8.52
618.40	9.25	0.29	8.96
618.50	9.67	0.30	9.38
618.60	10.08	0.30	9.77
618.70	10.47	0.31	10.16
618.80	10.82	0.31	10.51
618.90	11.08	0.32	10.77
619.00	11.34	0.32	11.02
619.10	11.59	0.33	11.26
619.20	11.83	0.33	11.50
619.30	12.07	0.33	11.74
619.40	12.31	0.34	11.97
619.50	12.54	0.34	12.19
619.60	12.76	0.35	12.41
619.70	12.98	0.35	12.63
619.80	13.20	0.35	12.85
619.90	13.42	0.36	13.06
620.00	13.63	0.36	13.26
620.10	13.83	0.37	13.47
620.20	14.04	0.37	13.67
620.30	14.24	0.37	13.87
620.40	14.44	0.38	14.06
620.50	14.64	0.38	14.26
620.60	14.83	0.38	14.45
620.70	15.02	0.39	14.63
620.80	15.21	0.39	14.82
620.90	15.40	0.40	15.00
621.00	15.58	0.40	15.18
621.10	**15.76**	**0.40**	**15.36**

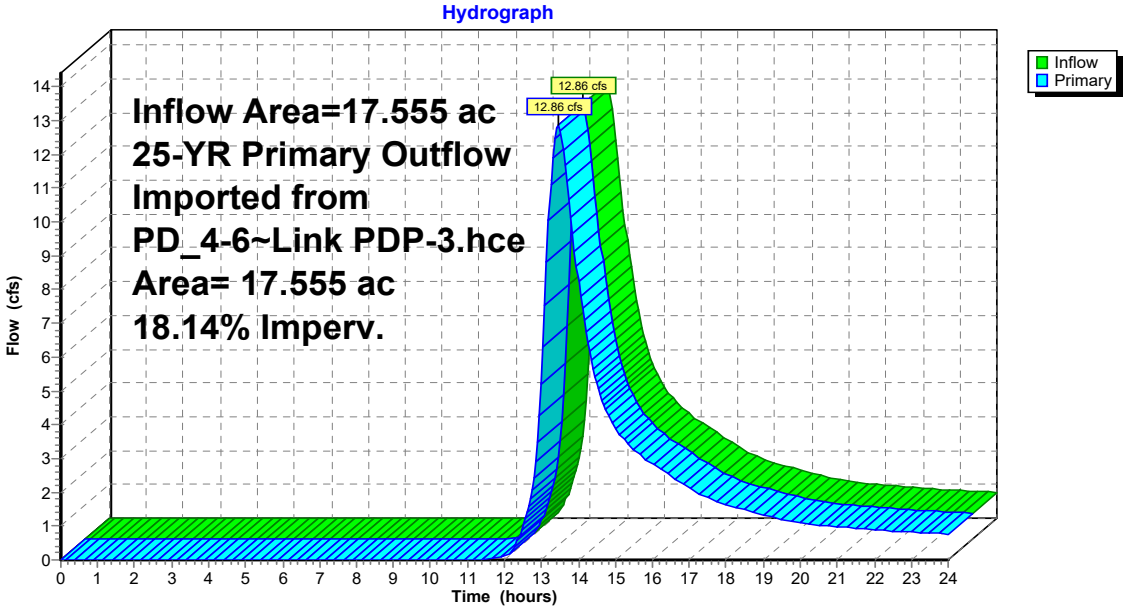
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 1.77" for 25-YR event
Inflow = 12.86 cfs @ 13.45 hrs, Volume= 2.591 af
Primary = 12.86 cfs @ 13.45 hrs, Volume= 2.591 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

25-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

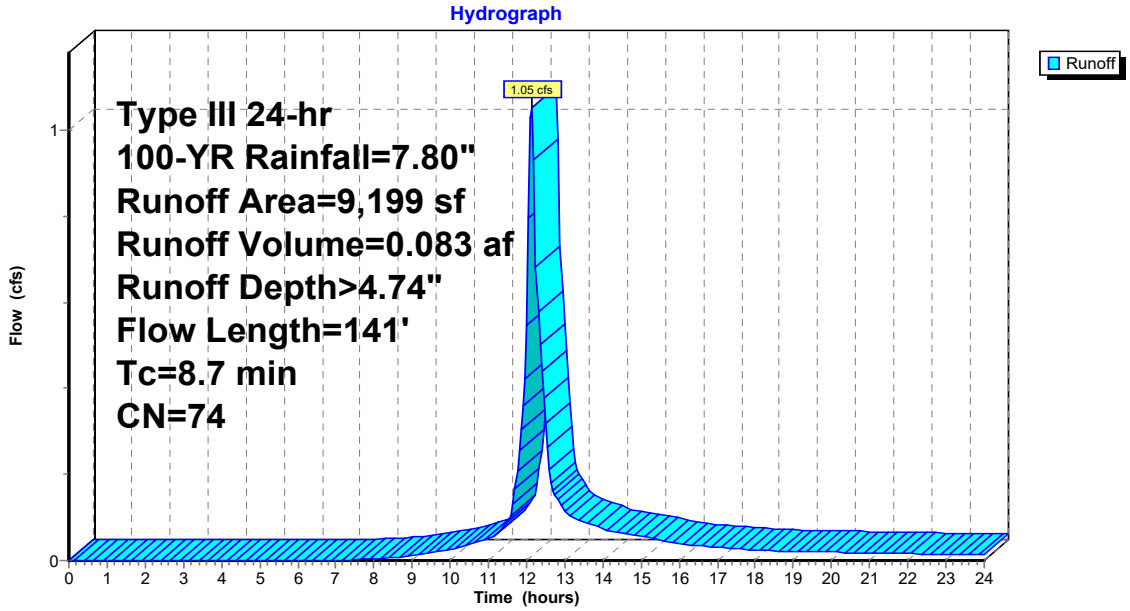
Runoff = 1.05 cfs @ 12.12 hrs, Volume= 0.083 af, Depth> 4.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

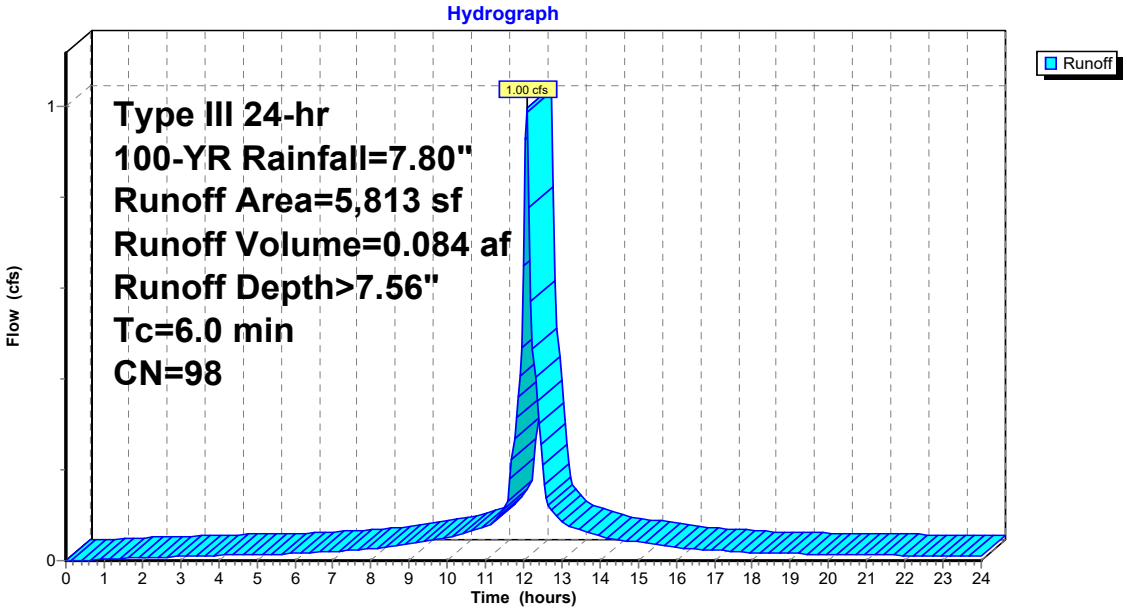
Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.084 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

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

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

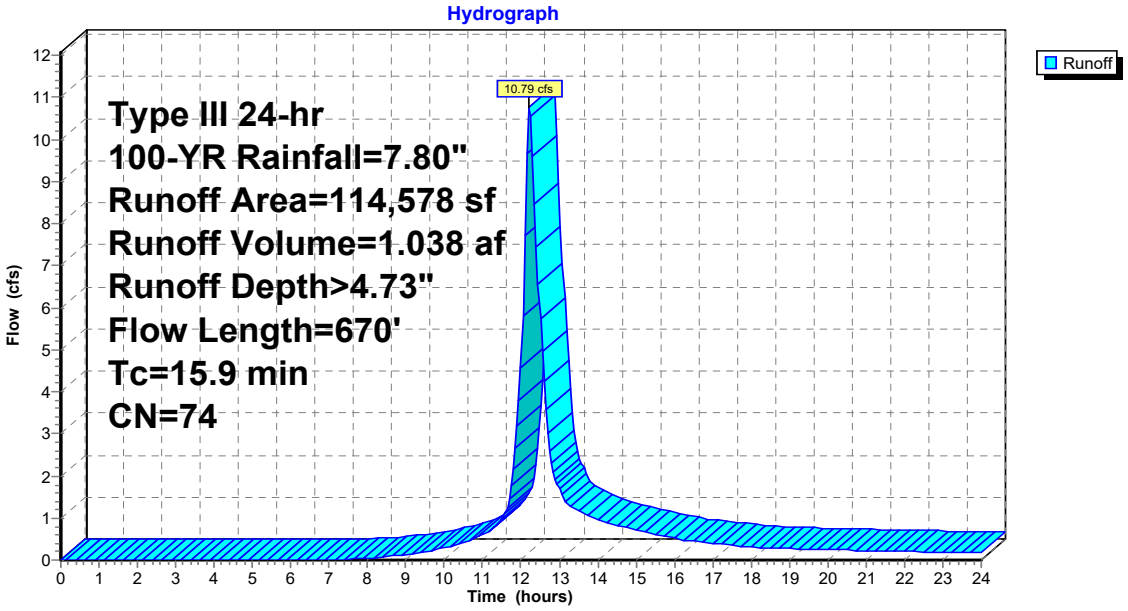
Runoff = 10.79 cfs @ 12.22 hrs, Volume= 1.038 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

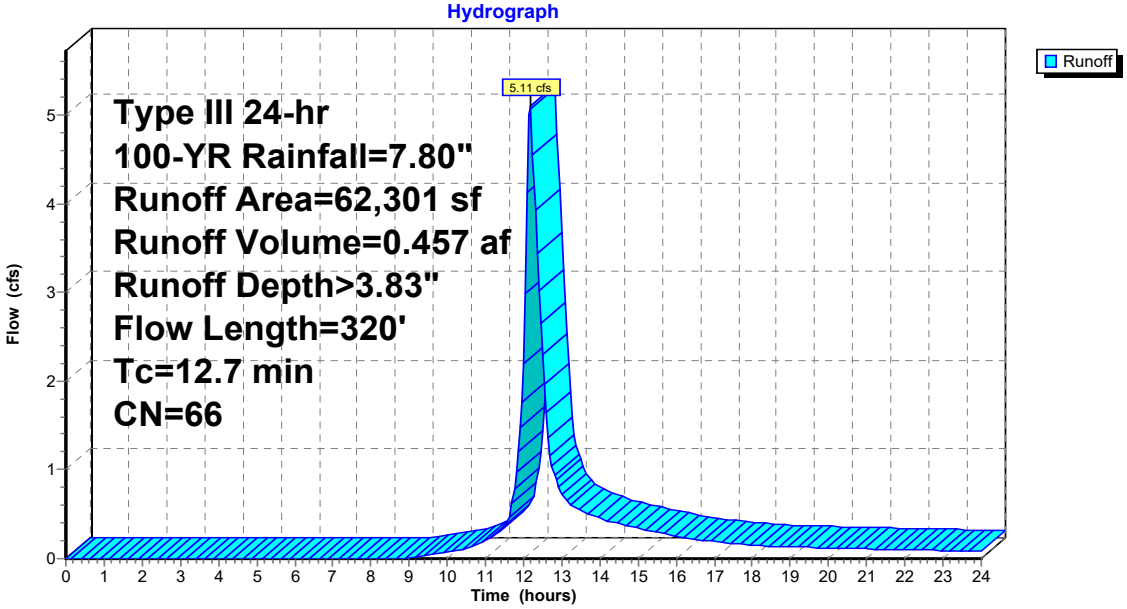
Runoff = 5.11 cfs @ 12.18 hrs, Volume= 0.457 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

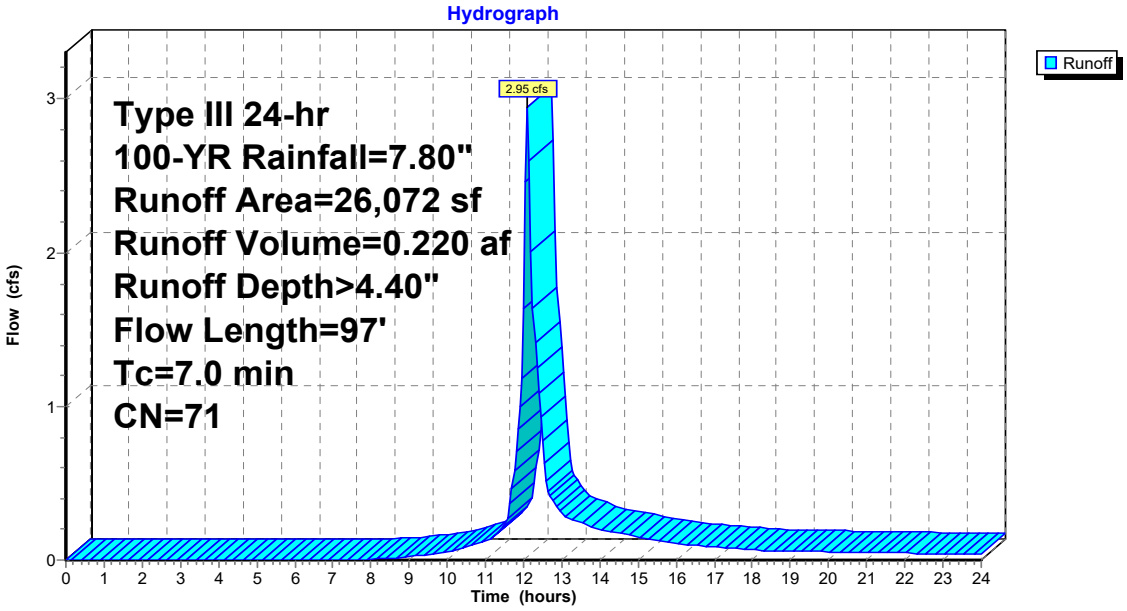
Runoff = 2.95 cfs @ 12.10 hrs, Volume= 0.220 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

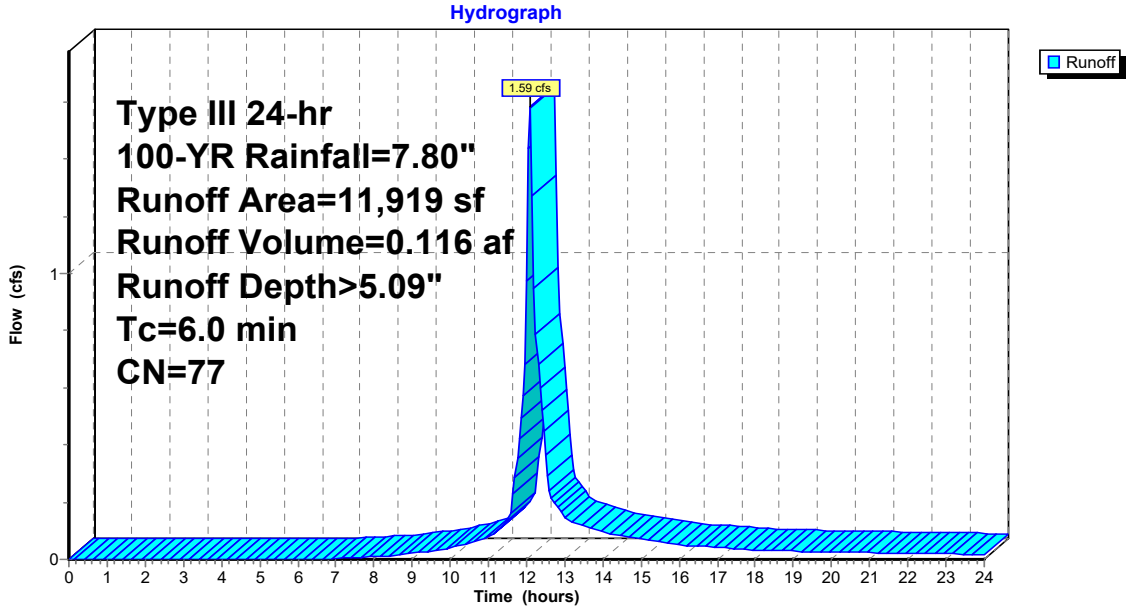
Runoff = 1.59 cfs @ 12.09 hrs, Volume= 0.116 af, Depth> 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

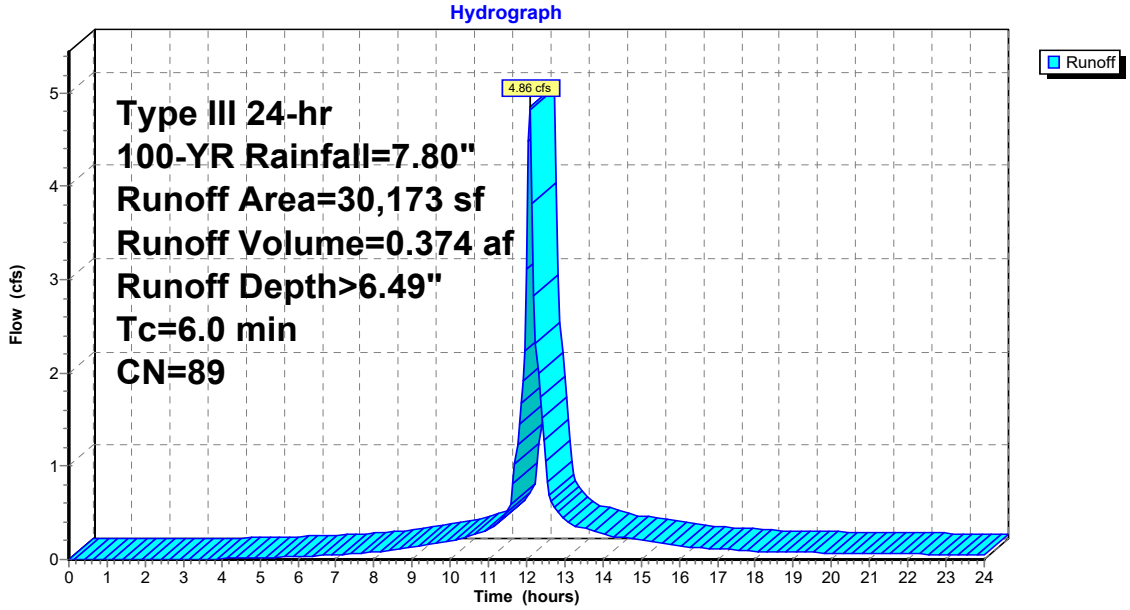
Runoff = 4.86 cfs @ 12.09 hrs, Volume= 0.374 af, Depth> 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

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

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

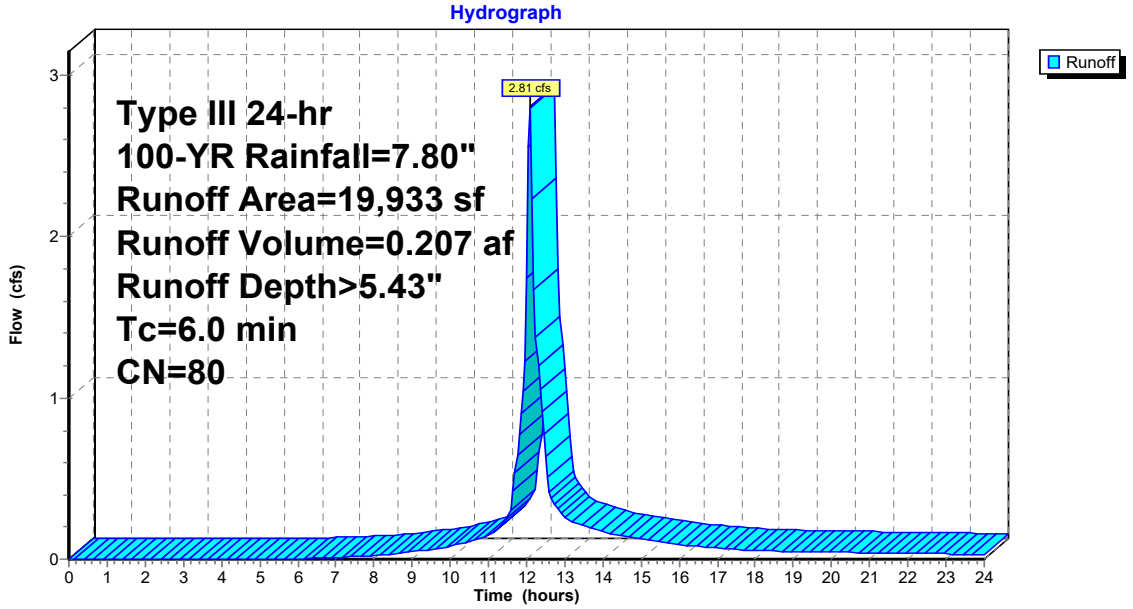
Runoff = 2.81 cfs @ 12.09 hrs, Volume= 0.207 af, Depth> 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

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

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

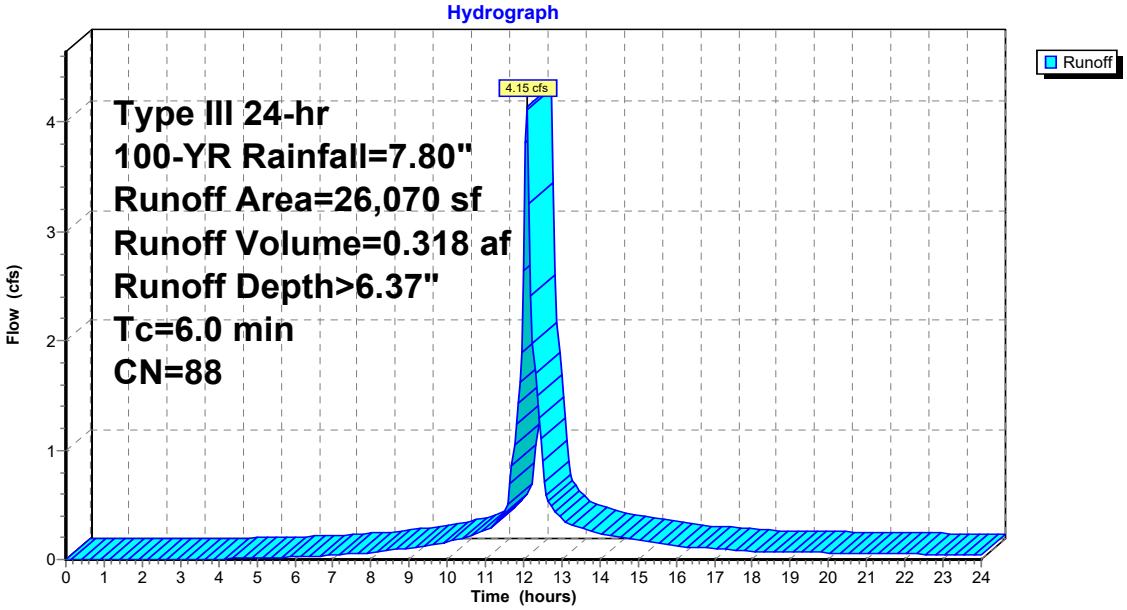
Runoff = 4.15 cfs @ 12.09 hrs, Volume= 0.318 af, Depth> 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

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

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

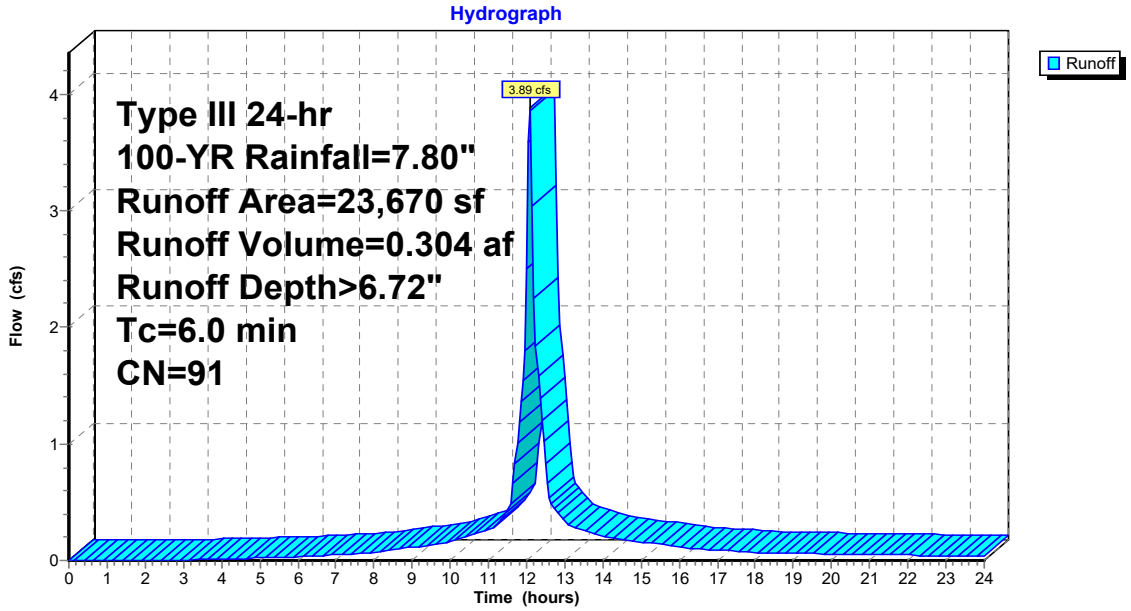
Runoff = 3.89 cfs @ 12.09 hrs, Volume= 0.304 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

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

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

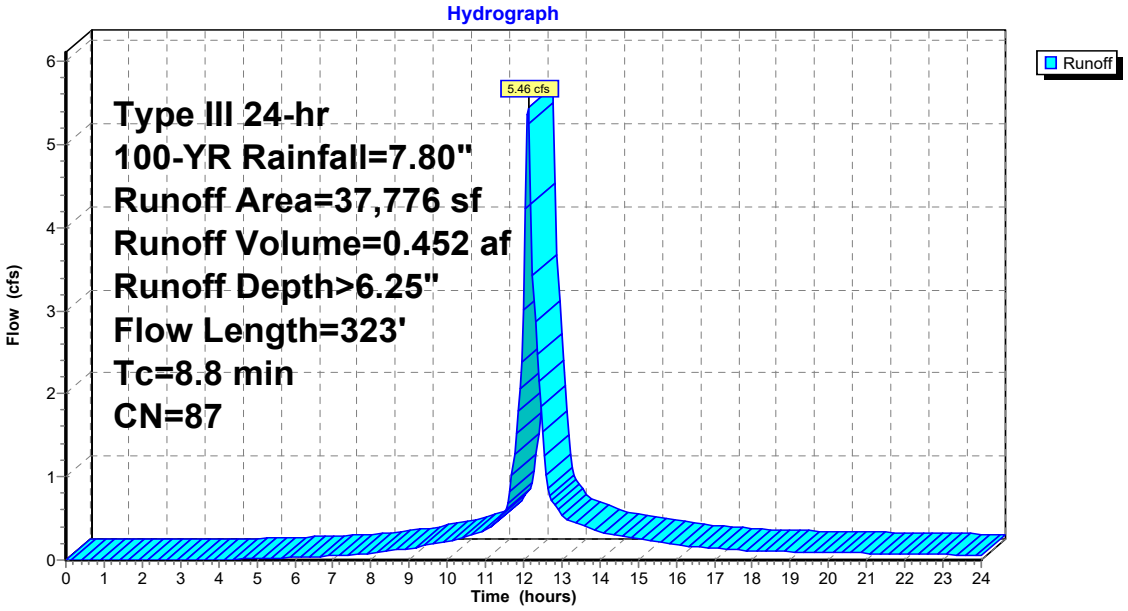
Runoff = 5.46 cfs @ 12.12 hrs, Volume= 0.452 af, Depth> 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

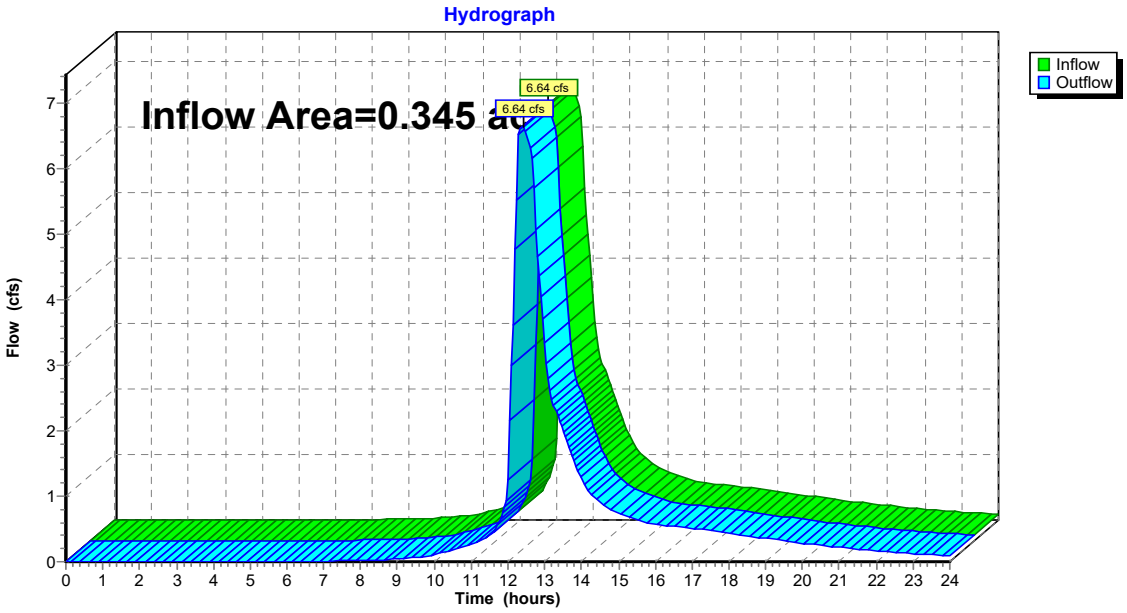


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 34.26" for 100-YR event
Inflow = 6.64 cfs @ 12.40 hrs, Volume= 0.984 af
Outflow = 6.64 cfs @ 12.40 hrs, Volume= 0.984 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

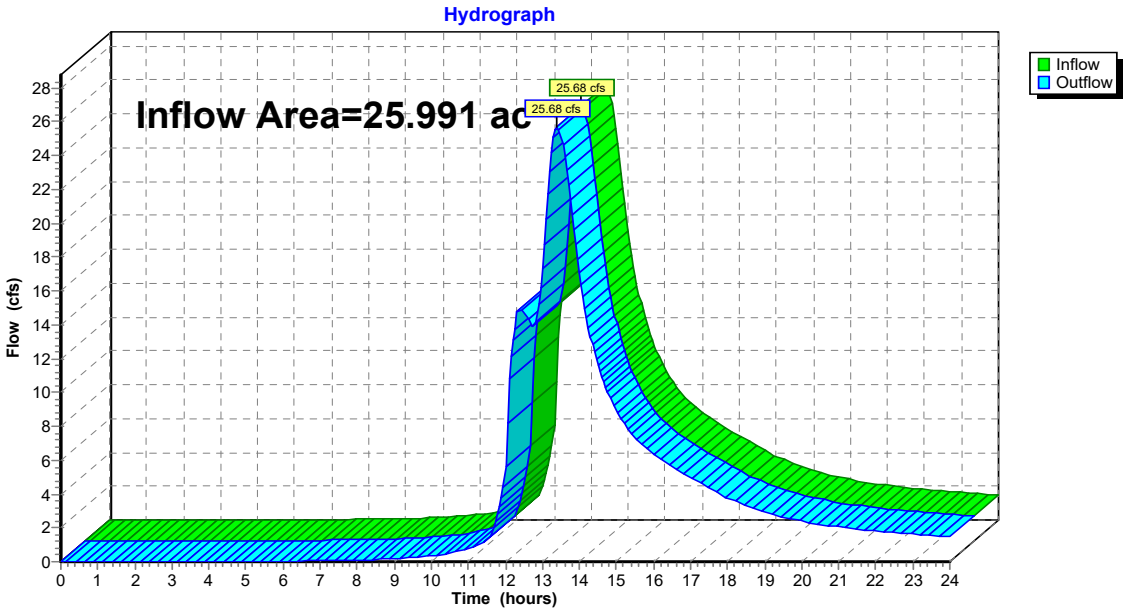


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 3.12" for 100-YR event
Inflow = 25.68 cfs @ 13.40 hrs, Volume= 6.768 af
Outflow = 25.68 cfs @ 13.40 hrs, Volume= 6.768 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 2.63" for 100-YR event
Inflow = 25.34 cfs @ 13.23 hrs, Volume= 5.425 af
Outflow = 23.12 cfs @ 13.42 hrs, Volume= 5.332 af, Atten= 9%, Lag= 11.5 min

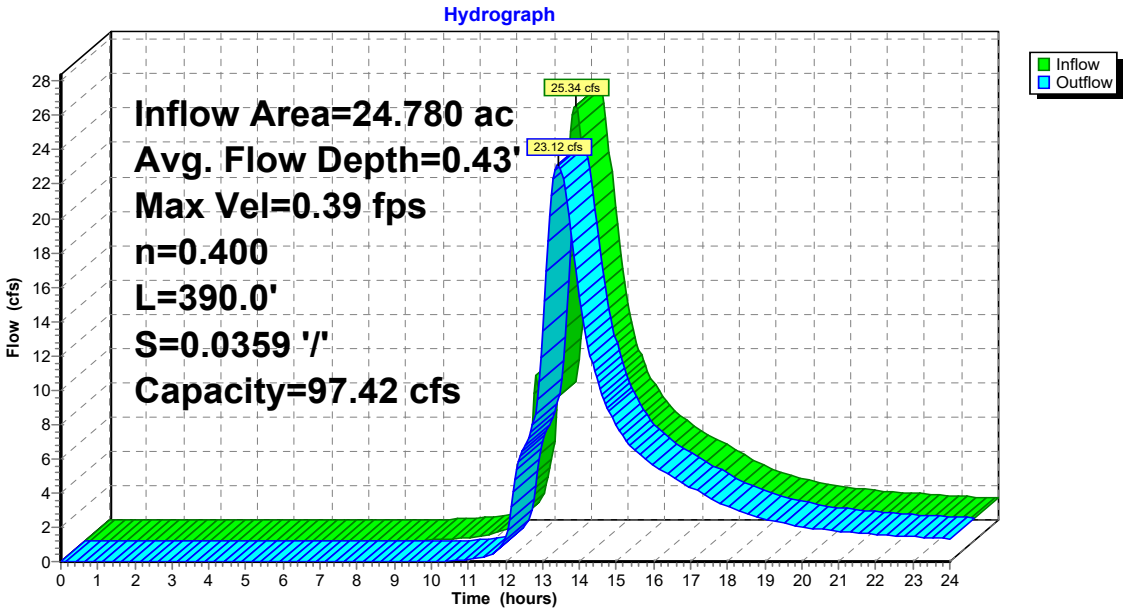
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.39 fps, Min. Travel Time= 16.9 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 40.6 min

Peak Storage= 23,402 cf @ 13.42 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

‡

Reach DP-3: DP-3



Stage-Discharge for Reach DP-3: DP-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
618.00	0.00	0.00
618.01	0.03	0.04
618.02	0.05	0.13
618.03	0.07	0.27
618.04	0.08	0.43
618.05	0.10	0.62
618.06	0.11	0.84
618.07	0.12	1.09
618.08	0.13	1.37
618.09	0.14	1.66
618.10	0.15	1.98
618.11	0.16	2.32
618.12	0.17	2.69
618.13	0.18	3.07
618.14	0.19	3.48
618.15	0.20	3.91
618.16	0.20	4.35
618.17	0.21	4.82
618.18	0.22	5.30
618.19	0.23	5.81
618.20	0.24	6.33
618.21	0.24	6.87
618.22	0.25	7.43
618.23	0.26	8.00
618.24	0.27	8.60
618.25	0.27	9.21
618.26	0.28	9.84
618.27	0.29	10.48
618.28	0.29	11.14
618.29	0.30	11.82
618.30	0.31	12.51
618.31	0.31	13.23
618.32	0.32	13.95
618.33	0.33	14.70
618.34	0.33	15.45
618.35	0.34	16.23
618.36	0.34	17.02
618.37	0.35	17.83
618.38	0.36	18.65
618.39	0.36	19.48
618.40	0.37	20.34
618.41	0.37	21.20
618.42	0.38	22.09
618.43	0.38	22.99
618.44	0.39	23.90
618.45	0.40	24.83
618.46	0.40	25.77
618.47	0.41	26.72
618.48	0.41	27.70
618.49	0.42	28.68
618.50	0.42	29.68
618.51	0.43	30.70
618.52	0.43	31.73
618.53	0.44	32.77
618.54	0.44	33.83
618.55	0.45	34.91
618.56	0.45	35.99
618.57	0.46	37.09
618.58	0.46	38.21
618.59	0.47	39.34
618.60	0.47	40.48
618.61	0.48	41.64
618.62	0.48	42.81
618.63	0.49	44.00
618.64	0.49	45.20
618.65	0.50	46.41
618.66	0.50	47.64
618.67	0.51	48.88
618.68	0.51	50.14
618.69	0.52	51.40
618.70	0.52	52.69
618.71	0.52	53.98
618.72	0.53	55.29
618.73	0.53	56.62
618.74	0.54	57.95
618.75	0.54	59.30
618.76	0.55	60.67
618.77	0.55	62.05
618.78	0.56	63.44
618.79	0.56	64.84
618.80	0.56	66.26
618.81	0.57	67.69
618.82	0.57	69.14
618.83	0.58	70.59
618.84	0.58	72.07
618.85	0.59	73.55
618.86	0.59	75.05
618.87	0.59	76.56
618.88	0.60	78.09
618.89	0.60	79.63
618.90	0.61	81.18
618.91	0.61	82.74
618.92	0.61	84.32
618.93	0.62	85.91
618.94	0.62	87.52
618.95	0.63	89.14
618.96	0.63	90.77
618.97	0.63	92.41
618.98	0.64	94.07
618.99	0.64	95.74
619.00	**0.65**	**97.42**

Summary for Pond 1: SFB-1

Inflow Area =	0.966 ac,	48.65% Impervious,	Inflow Depth >	6.06"	for 100-YR event
Inflow =	2.42 cfs @	12.10 hrs,	Volume=	0.488 af	
Outflow =	1.33 cfs @	12.49 hrs,	Volume=	0.443 af,	Atten= 45%, Lag= 23.3 min
Discarded =	0.12 cfs @	12.49 hrs,	Volume=	0.142 af	
Primary =	1.21 cfs @	12.49 hrs,	Volume=	0.302 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.23' @ 12.49 hrs Surf.Area= 2,891 sf Storage= 4,653 cf
Flood Elev= 611.25' Surf.Area= 3,452 sf Storage= 7,739 cf

Plug-Flow detention time= 116.5 min calculated for 0.443 af (91% of inflow)
Center-of-Mass det. time= 73.9 min (895.4 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	7,237 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,986 cf Overall - 1,749 cf Embedded = 7,237 cf
#2	607.00'	385 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,166 cf Overall x 33.0% Voids
#3	608.00'	117 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 583 cf Overall x 20.0% Voids
		7,739 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166
609.00	2,130	1,648	2,814
610.00	2,760	2,445	5,259
611.20	3,452	3,727	8,986

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	1,166	0	0
608.00	1,166	1,166	1,166

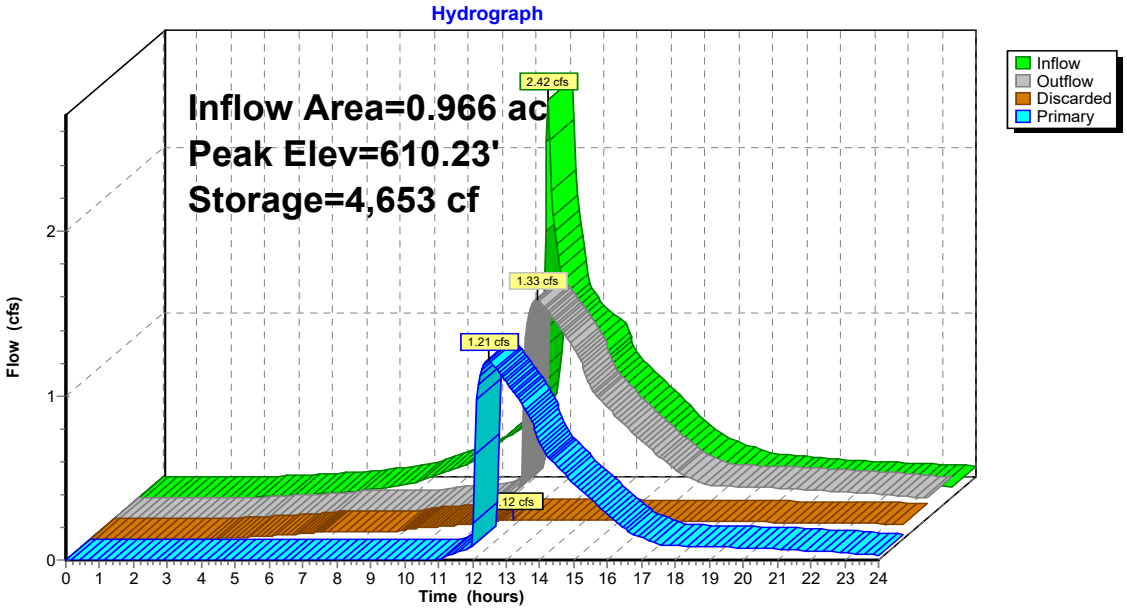
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,166	0	0
608.50	1,166	583	583

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.00' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	609.80'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 12.49 hrs HW=610.23' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=1.21 cfs @ 12.49 hrs HW=610.23' (Free Discharge)
└─**2=Culvert** (Passes 1.21 cfs of 2.05 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.15 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.10 cfs @ 3.15 fps)

Pond 1: SFB-1



Stage-Discharge for Pond 1: SFB-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
607.00	0.00	0.00	0.00
607.05	0.05	0.05	0.00
607.10	0.05	0.05	0.00
607.15	0.05	0.05	0.00
607.20	0.05	0.05	0.00
607.25	0.05	0.05	0.00
607.30	0.05	0.05	0.00
607.35	0.05	0.05	0.00
607.40	0.05	0.05	0.00
607.45	0.05	0.05	0.00
607.50	0.05	0.05	0.00
607.55	0.05	0.05	0.00
607.60	0.05	0.05	0.00
607.65	0.05	0.05	0.00
607.70	0.05	0.05	0.00
607.75	0.05	0.05	0.00
607.80	0.05	0.05	0.00
607.85	0.05	0.05	0.00
607.90	0.05	0.05	0.00
607.95	0.05	0.05	0.00
608.00	0.05	0.05	0.00
608.05	0.05	0.05	0.00
608.10	0.05	0.05	0.00
608.15	0.05	0.05	0.00
608.20	0.06	0.06	0.00
608.25	0.06	0.06	0.00
608.30	0.06	0.06	0.00
608.35	0.06	0.06	0.00
608.40	0.06	0.06	0.00
608.45	0.07	0.07	0.00
608.50	0.07	0.07	0.00
608.55	0.07	0.07	0.00
608.60	0.07	0.07	0.00
608.65	0.07	0.07	0.00
608.70	0.08	0.08	0.00
608.75	0.08	0.08	0.00
608.80	0.08	0.08	0.00
608.85	0.08	0.08	0.00
608.90	0.08	0.08	0.00
608.95	0.09	0.09	0.00
609.00	0.09	0.09	0.00
609.05	0.09	0.09	0.00
609.10	0.11	0.09	0.01
609.15	0.12	0.09	0.03
609.20	0.13	0.09	0.04
609.25	0.14	0.10	0.04
609.30	0.15	0.10	0.05
609.35	0.15	0.10	0.05
609.40	0.16	0.10	0.06
609.45	0.16	0.10	0.06
609.50	0.17	0.10	0.07
609.55	0.18	0.10	0.07
609.60	0.18	0.10	0.08
609.65	0.19	0.11	0.08
609.70	0.19	0.11	0.08
609.75	0.19	0.11	0.09
609.80	0.20	0.11	0.09
609.85	0.28	0.11	0.17
609.90	0.42	0.11	0.31
609.95	0.61	0.11	0.50
610.00	0.83	0.12	0.71
610.05	1.06	0.12	0.94
610.10	1.14	0.12	1.03
610.15	1.22	0.12	1.10
610.20	1.29	0.12	1.17
610.25	1.36	0.12	1.24
610.30	1.43	0.12	1.30
610.35	1.49	0.12	1.36
610.40	1.55	0.12	1.42
610.45	1.60	0.13	1.48
610.50	1.66	0.13	1.53
610.55	1.71	0.13	1.58
610.60	1.76	0.13	1.63
610.65	1.81	0.13	1.68
610.70	1.86	0.13	1.73
610.75	1.91	0.13	1.77
610.80	1.95	0.13	1.82
610.85	2.00	0.14	1.86
610.90	2.04	0.14	1.90
610.95	2.08	0.14	1.95
611.00	2.13	0.14	1.99
611.05	2.17	0.14	2.03
611.10	2.21	0.14	2.07
611.15	2.25	0.14	2.10
611.20	2.29	**0.14**	2.14
611.25	**2.32**	0.14	**2.18**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 2.86" for 100-YR event
Inflow = 4.14 cfs @ 12.09 hrs, Volume= 1.009 af
Outflow = 1.15 cfs @ 14.20 hrs, Volume= 0.831 af, Atten= 72%, Lag= 126.1 min
Discarded = 0.45 cfs @ 14.20 hrs, Volume= 0.509 af
Primary = 0.70 cfs @ 14.20 hrs, Volume= 0.322 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.39' @ 14.20 hrs Surf.Area= 8,117 sf Storage= 12,752 cf
Flood Elev= 617.40' Surf.Area= 10,100 sf Storage= 21,942 cf

Plug-Flow detention time= 176.3 min calculated for 0.831 af (82% of inflow)
Center-of-Mass det. time= 95.9 min (970.7 - 874.8)

Volume	Invert	Avail.Storage	Storage Description
#1	613.25'	20,246 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 26,162 cf Overall - 5,916 cf Embedded = 20,246 cf
#2	613.25'	1,302 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 3,944 cf Overall x 33.0% Voids
#3	614.25'	394 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,972 cf Overall x 20.0% Voids
		21,942 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944
615.00	5,539	3,556	7,500
616.00	7,378	6,459	13,959
617.00	9,278	8,328	22,287
617.40	10,100	3,876	26,162

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.25	3,944	0	0
614.25	3,944	3,944	3,944

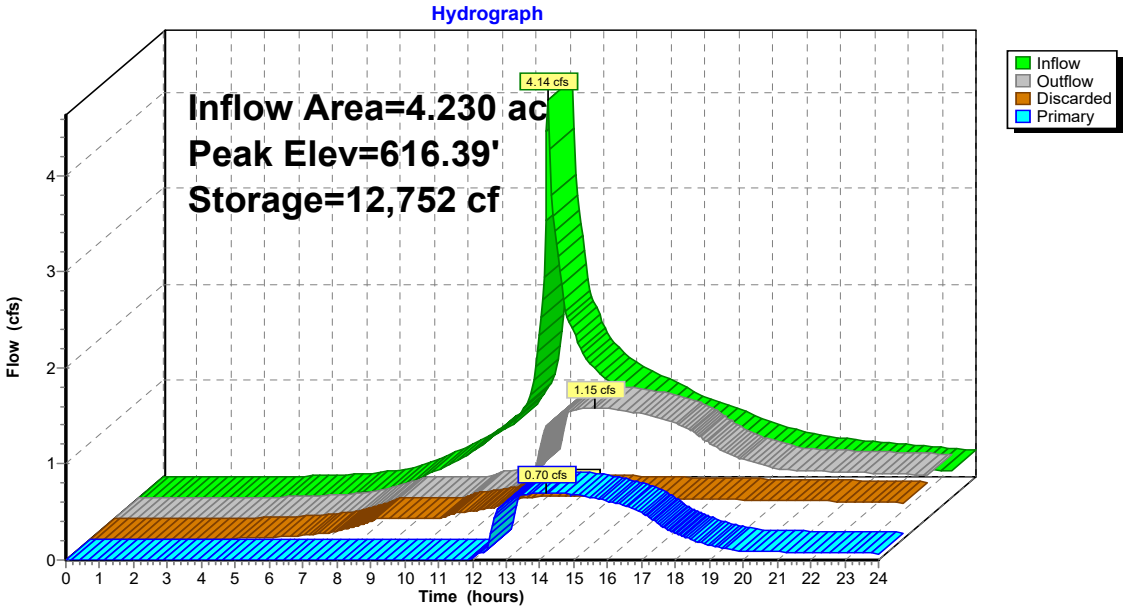
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.25	3,944	0	0
614.75	3,944	1,972	1,972

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.25'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.75'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.75' / 612.25' S= 0.0536 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.45 cfs @ 14.20 hrs HW=616.39' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.45 cfs)

Primary OutFlow Max=0.70 cfs @ 14.20 hrs HW=616.39' (Free Discharge)
└─**2=Culvert** (Passes 0.70 cfs of 2.01 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.06 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.59 cfs @ 3.00 fps)

Pond 2: SFB-2



Stage-Discharge for Pond 2: SFB-2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
613.25	0.00	0.00	0.00
613.30	0.22	0.22	0.00
613.35	0.22	0.22	0.00
613.40	0.22	0.22	0.00
613.45	0.22	0.22	0.00
613.50	0.22	0.22	0.00
613.55	0.22	0.22	0.00
613.60	0.22	0.22	0.00
613.65	0.22	0.22	0.00
613.70	0.22	0.22	0.00
613.75	0.22	0.22	0.00
613.80	0.22	0.22	0.00
613.85	0.22	0.22	0.00
613.90	0.22	0.22	0.00
613.95	0.22	0.22	0.00
614.00	0.22	0.22	0.00
614.05	0.22	0.22	0.00
614.10	0.22	0.22	0.00
614.15	0.22	0.22	0.00
614.20	0.22	0.22	0.00
614.25	0.22	0.22	0.00
614.30	0.22	0.22	0.00
614.35	0.23	0.23	0.00
614.40	0.23	0.23	0.00
614.45	0.24	0.24	0.00
614.50	0.25	0.25	0.00
614.55	0.25	0.25	0.00
614.60	0.26	0.26	0.00
614.65	0.26	0.26	0.00
614.70	0.27	0.27	0.00
614.75	0.28	0.28	0.00
614.80	0.28	0.28	0.00
614.85	0.29	0.29	0.00
614.90	0.29	0.29	0.00
614.95	0.30	0.30	0.00
615.00	0.31	0.31	0.00
615.05	0.31	0.31	0.00
615.10	0.32	0.32	0.00
615.15	0.32	0.32	0.00
615.20	0.33	0.33	0.00
615.25	0.33	0.33	0.00
615.30	0.35	0.34	0.01
615.35	0.37	0.34	0.03
615.40	0.38	0.35	0.04
615.45	0.39	0.35	0.04
615.50	0.40	0.36	0.05
615.55	0.42	0.36	0.05
615.60	0.43	0.37	0.06
615.65	0.43	0.37	0.06
615.70	0.44	0.38	0.07
615.75	0.45	0.38	0.07
615.80	0.46	0.39	0.08
615.85	0.47	0.39	0.08
615.90	0.48	0.40	0.08
615.95	0.49	0.40	0.09
616.00	0.50	0.41	0.09
616.05	0.56	0.41	0.15
616.10	0.67	0.42	0.26
616.15	0.82	0.42	0.40
616.20	0.95	0.43	0.52
616.25	1.01	0.43	0.58
616.30	1.06	0.44	0.62
616.35	1.11	0.44	0.67
616.40	1.16	0.45	0.71
616.45	1.20	0.45	0.75
616.50	1.24	0.46	0.78
616.55	1.28	0.46	0.82
616.60	1.32	0.47	0.85
616.65	1.36	0.47	0.89
616.70	1.40	0.48	0.92
616.75	1.43	0.48	0.95
616.80	1.47	0.49	0.97
616.85	1.50	0.50	1.00
616.90	1.53	0.50	1.03
616.95	1.56	0.51	1.06
617.00	1.59	0.51	1.08
617.05	1.63	0.52	1.11
617.10	1.66	0.52	1.13
617.15	1.69	0.53	1.16
617.20	1.71	0.53	1.18
617.25	1.74	0.54	1.20
617.30	1.77	0.55	1.23
617.35	1.80	0.55	1.25
617.40	**1.83**	**0.56**	**1.27**

Summary for Pond DB-1: DB-1

Inflow	=	4.48 cfs @	12.09 hrs,	Volume=	0.157 af
Outflow	=	0.62 cfs @	12.52 hrs,	Volume=	0.154 af, Atten= 86%, Lag= 26.2 min
Primary	=	0.62 cfs @	12.52 hrs,	Volume=	0.154 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 611.13' @ 12.52 hrs Surf.Area= 3,131 sf Storage= 5,021 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 110.2 min calculated for 0.154 af (98% of inflow)
Center-of-Mass det. time= 109.1 min (836.7 - 727.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.62 cfs @ 12.52 hrs HW=611.13' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.62 cfs @ 3.16 fps)
  ├─**2=Orifice/Grate** (Passes < 0.55 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 0.36 cfs potential flow)

Pond DB-1: DB-1 - Chamber Wizard Field A

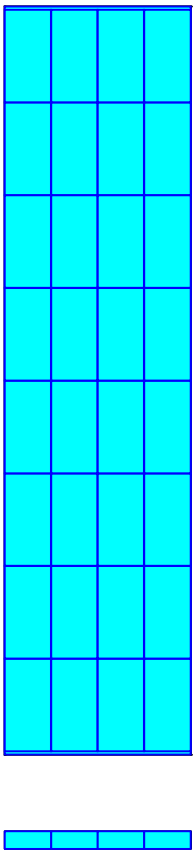
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

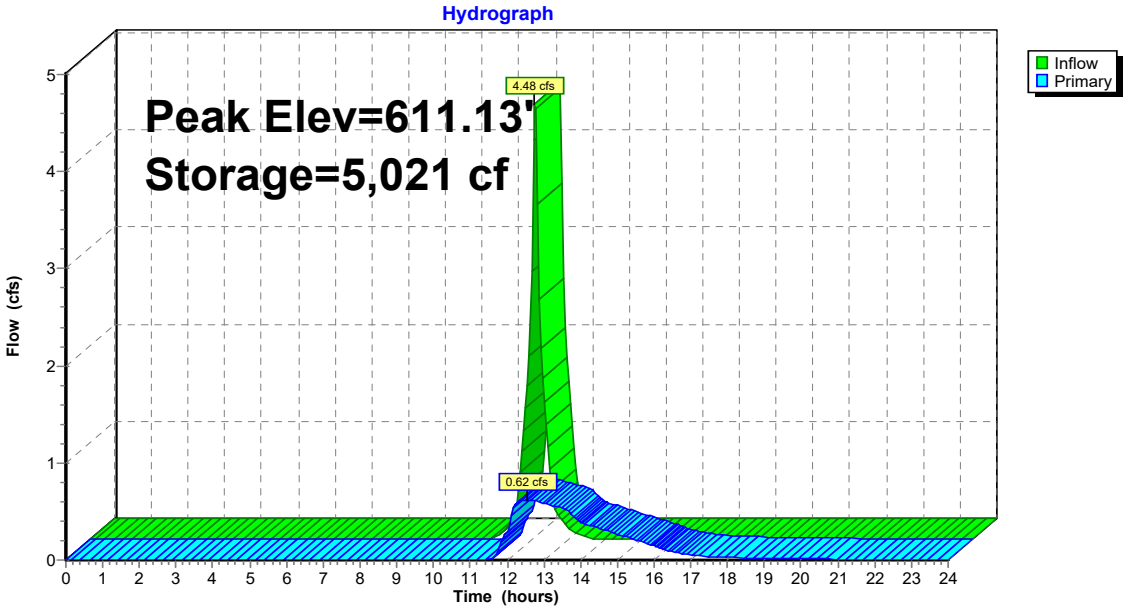
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Peak Elev=611.13'
Storage=5,021 cf
4.48 cfs
0.62 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
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24

Stage-Discharge for Pond DB-1: DB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
609.25	0.00	610.29	0.40	611.33	0.65
609.27	0.00	610.31	0.41	611.35	0.65
609.29	0.00	610.33	0.42	611.37	0.65
609.31	0.01	610.35	0.43	611.39	0.66
609.33	0.01	610.37	0.44	611.41	0.66
609.35	0.02	610.39	0.46	611.43	0.66
609.37	0.03	610.41	0.48	611.45	0.66
609.39	0.04	610.43	0.49	611.47	0.67
609.41	0.05	610.45	0.51	611.49	0.67
609.43	0.06	610.47	0.51	611.51	0.67
609.45	0.08	610.49	0.52	611.53	0.68
609.47	0.09	610.51	0.52	611.55	0.68
609.49	0.11	610.53	0.53	611.57	0.68
609.51	0.13	610.55	0.53	611.59	0.68
609.53	0.14	610.57	0.53	611.61	0.69
609.55	0.15	610.59	0.54	611.63	0.69
609.57	0.17	610.61	0.54	611.65	0.69
609.59	0.17	610.63	0.54	611.67	0.69
609.61	0.18	610.65	0.55	611.69	0.70
609.63	0.19	610.67	0.55	611.71	0.70
609.65	0.20	610.69	0.55	611.73	0.70
609.67	0.21	610.71	0.56	611.75	0.70
609.69	0.22	610.73	0.56	611.77	0.71
609.71	0.23	610.75	0.56	611.79	0.71
609.73	0.24	610.77	0.57	611.81	0.71
609.75	0.24	610.79	0.57	611.83	0.71
609.77	0.25	610.81	0.57	611.85	0.72
609.79	0.26	610.83	0.57	611.87	0.72
609.81	0.26	610.85	0.58	611.89	0.72
609.83	0.27	610.87	0.58	611.91	**0.72**
609.85	0.28	610.89	0.58		
609.87	0.28	610.91	0.59		
609.89	0.29	610.93	0.59		
609.91	0.30	610.95	0.59		
609.93	0.30	610.97	0.60		
609.95	0.31	610.99	0.60		
609.97	0.31	611.01	0.60		
609.99	0.32	611.03	0.61		
610.01	0.32	611.05	0.61		
610.03	0.33	611.07	0.61		
610.05	0.33	611.09	0.61		
610.07	0.34	611.11	0.62		
610.09	0.34	611.13	0.62		
610.11	0.35	611.15	0.62		
610.13	0.35	611.17	0.63		
610.15	0.36	611.19	0.63		
610.17	0.36	611.21	0.63		
610.19	0.37	611.23	0.63		
610.21	0.37	611.25	0.64		
610.23	0.38	611.27	0.64		
610.25	0.38	611.29	0.64		
610.27	0.39	611.31	0.65		

Summary for Pond DB-2: DB-2

Inflow	=	3.65 cfs @	12.09 hrs,	Volume=	0.119 af
Outflow	=	0.14 cfs @	12.77 hrs,	Volume=	0.098 af, Atten= 96%, Lag= 40.7 min
Primary	=	0.14 cfs @	12.77 hrs,	Volume=	0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.99' @ 12.77 hrs Surf.Area= 3,131 sf Storage= 4,645 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 303.6 min calculated for 0.098 af (82% of inflow)
Center-of-Mass det. time= 298.8 min (1,026.2 - 727.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**8.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.14 cfs @ 12.77 hrs HW=616.99' (Free Discharge)
└─**1=Culvert** (Passes 0.14 cfs of 1.58 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.20 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

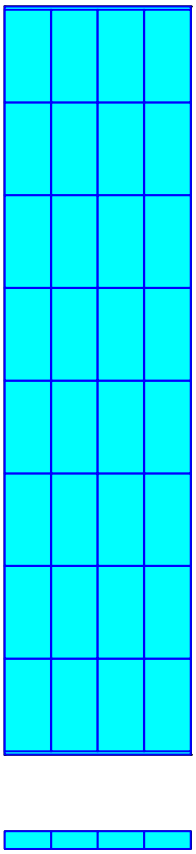
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

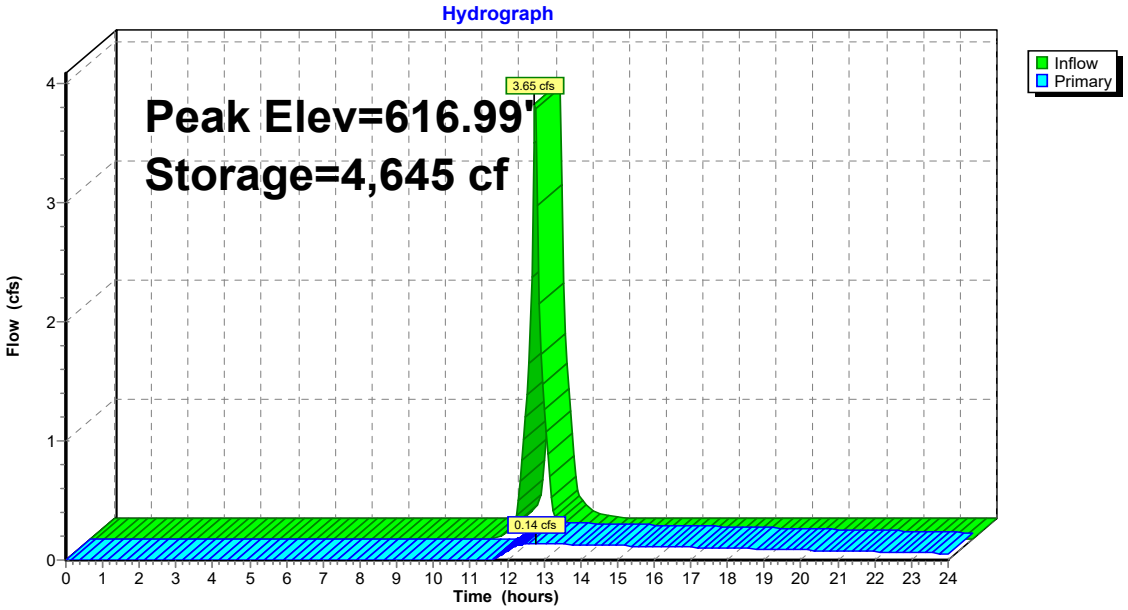
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Peak Elev=616.99'
Storage=4,645 cf
3.65 cfs
0.14 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Discharge for Pond DB-2: DB-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.25	0.00	616.29	0.10	617.33	0.15
615.27	0.00	616.31	0.10	617.35	0.15
615.29	0.00	616.33	0.10	617.37	0.15
615.31	0.01	616.35	0.11	617.39	0.15
615.33	0.01	616.37	0.11	617.41	0.15
615.35	0.01	616.39	0.11	617.43	0.15
615.37	0.02	616.41	0.11	617.45	0.15
615.39	0.02	616.43	0.11	617.47	0.15
615.41	0.03	616.45	0.11	617.49	0.15
615.43	0.03	616.47	0.11	617.51	0.15
615.45	0.04	616.49	0.11	617.53	0.16
615.47	0.04	616.51	0.11	617.55	0.16
615.49	0.04	616.53	0.11	617.57	0.16
615.51	0.04	616.55	0.12	617.59	0.16
615.53	0.05	616.57	0.12	617.61	0.16
615.55	0.05	616.59	0.12	617.63	0.16
615.57	0.05	616.61	0.12	617.65	0.16
615.59	0.05	616.63	0.12	617.67	0.16
615.61	0.06	616.65	0.12	617.69	0.16
615.63	0.06	616.67	0.12	617.71	0.16
615.65	0.06	616.69	0.12	617.73	0.16
615.67	0.06	616.71	0.12	617.75	0.16
615.69	0.06	616.73	0.12	617.77	0.16
615.71	0.06	616.75	0.13	617.79	0.16
615.73	0.07	616.77	0.13	617.81	0.17
615.75	0.07	616.79	0.13	617.83	0.17
615.77	0.07	616.81	0.13	617.85	0.17
615.79	0.07	616.83	0.13	617.87	0.17
615.81	0.07	616.85	0.13	617.89	0.17
615.83	0.07	616.87	0.13	617.91	**0.17**
615.85	0.08	616.89	0.13		
615.87	0.08	616.91	0.13		
615.89	0.08	616.93	0.13		
615.91	0.08	616.95	0.13		
615.93	0.08	616.97	0.13		
615.95	0.08	616.99	0.14		
615.97	0.08	617.01	0.14		
615.99	0.09	617.03	0.14		
616.01	0.09	617.05	0.14		
616.03	0.09	617.07	0.14		
616.05	0.09	617.09	0.14		
616.07	0.09	617.11	0.14		
616.09	0.09	617.13	0.14		
616.11	0.09	617.15	0.14		
616.13	0.09	617.17	0.14		
616.15	0.09	617.19	0.14		
616.17	0.10	617.21	0.14		
616.19	0.10	617.23	0.14		
616.21	0.10	617.25	0.15		
616.23	0.10	617.27	0.15		
616.25	0.10	617.29	0.15		
616.27	0.10	617.31	0.15		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 82.03" for 100-YR event
Inflow = 11.00 cfs @ 12.21 hrs, Volume= 0.912 af
Outflow = 6.25 cfs @ 12.47 hrs, Volume= 0.901 af, Atten= 43%, Lag= 15.4 min
Primary = 6.25 cfs @ 12.47 hrs, Volume= 0.901 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.13' @ 12.47 hrs Surf.Area= 2,902 sf Storage= 12,555 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 70.2 min calculated for 0.899 af (99% of inflow)
Center-of-Mass det. time= 62.8 min (853.2 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=6.24 cfs @ 12.47 hrs HW=617.12' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.24 cfs @ 7.95 fps)
  ├─**2=Orifice/Grate** (Passes < 0.91 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 2.81 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 2.08 cfs potential flow)
  └─**5=Orifice/Grate** (Passes < 2.30 cfs potential flow)

Pond DB-6: DB-6 - Chamber Wizard Field A

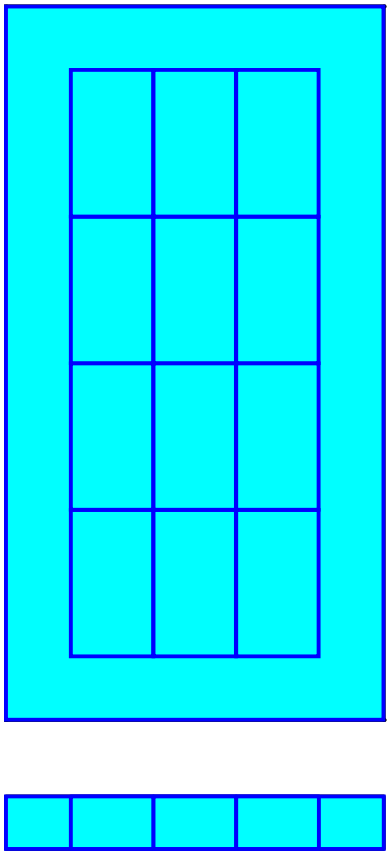
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

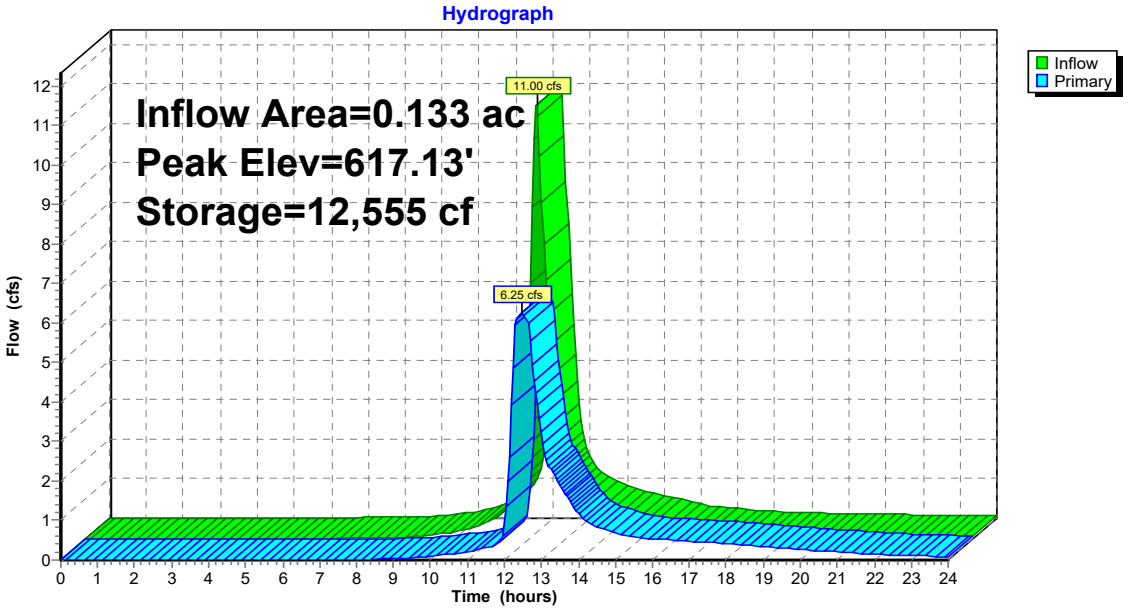
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=617.13'
Storage=12,555 cf
11.00 cfs
6.25 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-6: DB-6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
612.25	0.00	614.33	0.92	616.41	4.90
612.29	0.00	614.37	1.00	616.45	5.02
612.33	0.02	614.41	1.08	616.49	5.16
612.37	0.03	614.45	1.17	616.53	5.30
612.41	0.06	614.49	1.26	616.57	5.46
612.45	0.08	614.53	1.35	616.61	5.62
612.49	0.11	614.57	1.43	616.65	5.79
612.53	0.14	614.61	1.51	616.69	5.93
612.57	0.17	614.65	1.58	616.73	5.96
612.61	0.18	614.69	1.64	616.77	5.99
612.65	0.20	614.73	1.70	616.81	6.02
612.69	0.22	614.77	1.76	616.85	6.05
612.73	0.24	614.81	1.81	616.89	6.07
612.77	0.25	614.85	1.86	616.93	6.10
612.81	0.26	614.89	1.91	616.97	6.13
612.85	0.28	614.93	1.96	617.01	6.16
612.89	0.29	614.97	2.01	617.05	6.19
612.93	0.30	615.01	2.06	617.09	6.22
612.97	0.31	615.05	2.10	617.13	6.25
613.01	0.32	615.09	2.15	617.17	6.28
613.05	0.33	615.13	2.19	617.21	6.31
613.09	0.34	615.17	2.23	617.25	6.33
613.13	0.35	615.21	2.28	617.29	6.36
613.17	0.36	615.25	2.32	617.33	6.39
613.21	0.37	615.29	2.36	617.37	6.42
613.25	0.38	615.33	2.42	617.41	6.44
613.29	0.39	615.37	2.48	617.45	6.47
613.33	0.40	615.41	2.56	617.49	6.50
613.37	0.41	615.45	2.64	617.53	6.53
613.41	0.42	615.49	2.73	617.57	6.55
613.45	0.43	615.53	2.83	617.61	6.58
613.49	0.44	615.57	2.93	617.65	6.61
613.53	0.44	615.61	3.04	617.69	6.64
613.57	0.45	615.65	3.16	617.73	**6.66**
613.61	0.46	615.69	3.27		
613.65	0.47	615.73	3.39		
613.69	0.47	615.77	3.50		
613.73	0.48	615.81	3.61		
613.77	0.49	615.85	3.72		
613.81	0.50	615.89	3.82		
613.85	0.50	615.93	3.90		
613.89	0.51	615.97	3.99		
613.93	0.52	616.01	4.07		
613.97	0.52	616.05	4.15		
614.01	0.53	616.09	4.23		
614.05	0.55	616.13	4.31		
614.09	0.57	616.17	4.38		
614.13	0.61	616.21	4.45		
614.17	0.65	616.25	4.52		
614.21	0.71	616.29	4.60		
614.25	0.77	616.33	4.69		
614.29	0.84	616.37	4.79		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 6.72" for 100-YR event
Inflow = 3.89 cfs @ 12.09 hrs, Volume= 0.304 af
Outflow = 0.81 cfs @ 12.51 hrs, Volume= 0.296 af, Atten= 79%, Lag= 25.3 min
Primary = 0.81 cfs @ 12.51 hrs, Volume= 0.296 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 617.79' @ 12.51 hrs Surf.Area= 3,131 sf Storage= 5,305 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 111.5 min calculated for 0.296 af (97% of inflow)
Center-of-Mass det. time= 94.9 min (867.7 - 772.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.81 cfs @ 12.51 hrs HW=617.79' (Free Discharge)
└─**1=Culvert** (Passes 0.81 cfs of 0.86 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.57 cfs @ 6.50 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.24 cfs @ 2.74 fps)

Pond DB-7: DB-7 - Chamber Wizard Field A

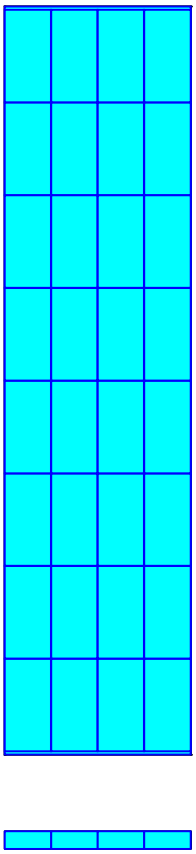
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

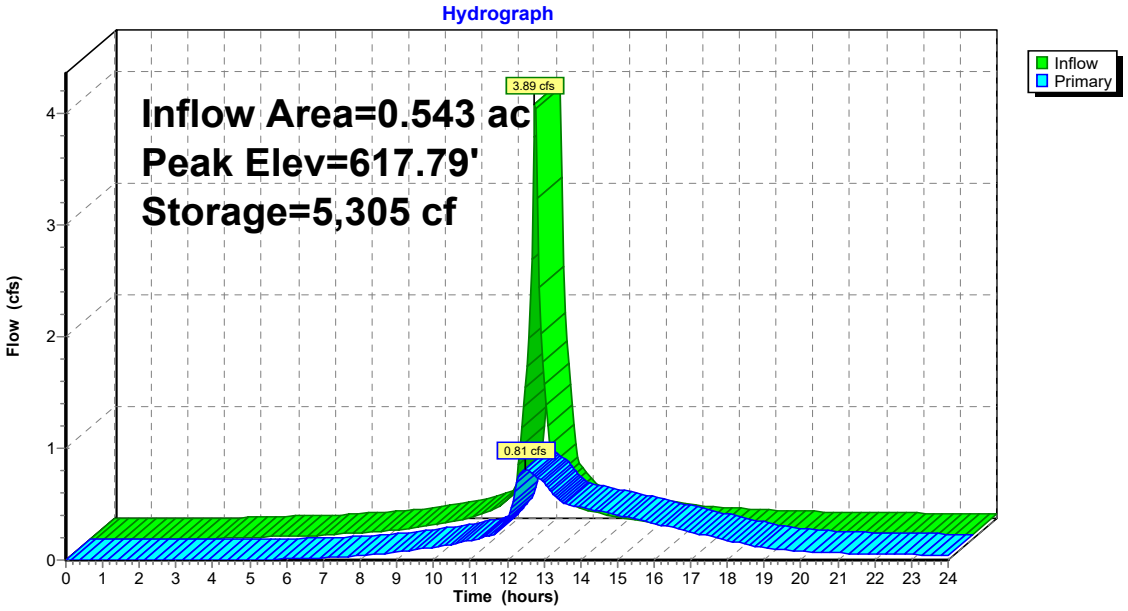
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=617.79'
Storage=5,305 cf
3.89 cfs
0.81 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Discharge for Pond DB-7: DB-7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
615.80	0.00	616.84	0.39	617.88	0.85
615.82	0.00	616.86	0.40	617.90	0.86
615.84	0.00	616.88	0.40	617.92	0.87
615.86	0.01	616.90	0.41	617.94	0.88
615.88	0.02	616.92	0.41	617.96	0.89
615.90	0.02	616.94	0.41	617.98	0.89
615.92	0.03	616.96	0.42	618.00	0.90
615.94	0.04	616.98	0.42	618.02	0.90
615.96	0.06	617.00	0.43	618.04	0.90
615.98	0.07	617.02	0.43	618.06	0.91
616.00	0.08	617.04	0.44	618.08	0.91
616.02	0.10	617.06	0.44	618.10	0.92
616.04	0.11	617.08	0.44	618.12	0.92
616.06	0.13	617.10	0.45	618.14	0.92
616.08	0.14	617.12	0.45	618.16	0.93
616.10	0.15	617.14	0.46	618.18	0.93
616.12	0.17	617.16	0.46	618.20	0.93
616.14	0.17	617.18	0.46	618.22	0.94
616.16	0.18	617.20	0.47	618.24	0.94
616.18	0.19	617.22	0.47	618.26	0.94
616.20	0.20	617.24	0.47	618.28	0.95
616.22	0.21	617.26	0.48	618.30	0.95
616.24	0.22	617.28	0.48	618.32	0.95
616.26	0.23	617.30	0.49	618.34	0.96
616.28	0.24	617.32	0.49	618.36	0.96
616.30	0.24	617.34	0.50	618.38	0.96
616.32	0.25	617.36	0.50	618.40	0.97
616.34	0.26	617.38	0.52	618.42	0.97
616.36	0.26	617.40	0.53	618.44	0.97
616.38	0.27	617.42	0.54	618.46	**0.98**
616.40	0.28	617.44	0.55		
616.42	0.28	617.46	0.57		
616.44	0.29	617.48	0.59		
616.46	0.30	617.50	0.60		
616.48	0.30	617.52	0.62		
616.50	0.31	617.54	0.64		
616.52	0.31	617.56	0.66		
616.54	0.32	617.58	0.67		
616.56	0.32	617.60	0.69		
616.58	0.33	617.62	0.71		
616.60	0.33	617.64	0.72		
616.62	0.34	617.66	0.73		
616.64	0.34	617.68	0.74		
616.66	0.35	617.70	0.76		
616.68	0.35	617.72	0.77		
616.70	0.36	617.74	0.78		
616.72	0.36	617.76	0.79		
616.74	0.37	617.78	0.80		
616.76	0.37	617.80	0.81		
616.78	0.38	617.82	0.82		
616.80	0.38	617.84	0.83		
616.82	0.39	617.86	0.84		

Summary for Pond ICS-1: ICS-1

Inflow Area = 0.693 ac, 62.75% Impervious, Inflow Depth > 6.49" for 100-YR event
Inflow = 4.86 cfs @ 12.09 hrs, Volume= 0.374 af
Outflow = 4.86 cfs @ 12.09 hrs, Volume= 0.374 af, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.09 hrs, Volume= 0.218 af
Secondary = 4.48 cfs @ 12.09 hrs, Volume= 0.157 af

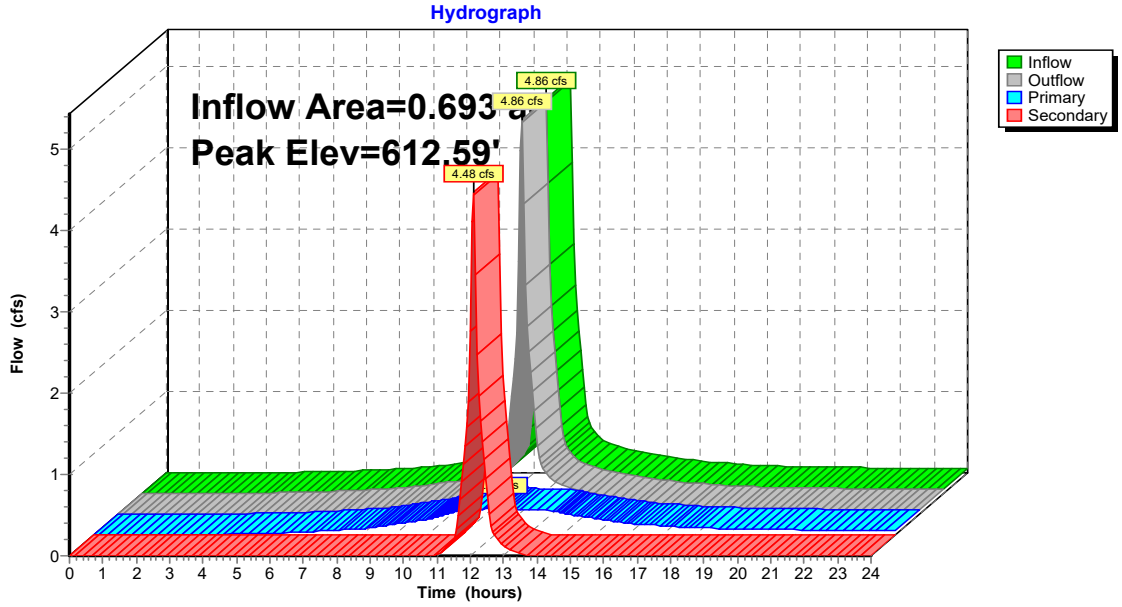
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.59' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.38 cfs @ 12.09 hrs HW=612.55' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.38 cfs @ 4.32 fps)

Secondary OutFlow Max=4.36 cfs @ 12.09 hrs HW=612.55' (Free Discharge)
└**2=Culvert** (Inlet Controls 4.36 cfs @ 5.55 fps)

Pond ICS-1: ICS-1



Stage-Discharge for Pond ICS-1: ICS-1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
609.25	0.00	0.00	0.00
609.30	0.00	0.00	0.00
609.35	0.02	0.02	0.00
609.40	0.04	0.04	0.00
609.45	0.07	0.07	0.00
609.50	0.11	0.11	0.00
609.55	0.14	0.14	0.00
609.60	0.17	0.17	0.00
609.65	0.19	0.19	0.00
609.70	0.18	0.18	0.00
609.75	0.19	0.19	0.00
609.80	0.19	0.19	0.00
609.85	0.20	0.20	0.00
609.90	0.20	0.20	0.00
609.95	0.21	0.21	0.00
610.00	0.21	0.21	0.00
610.05	0.22	0.22	0.00
610.10	0.22	0.22	0.00
610.15	0.22	0.22	0.00
610.20	0.23	0.23	0.00
610.25	0.23	0.23	0.00
610.30	0.24	0.24	0.00
610.35	0.24	0.24	0.00
610.40	0.24	0.24	0.00
610.45	0.25	0.25	0.00
610.50	0.25	0.25	0.00
610.55	0.26	0.26	0.00
610.60	0.26	0.26	0.00
610.65	0.26	0.26	0.00
610.70	0.27	0.27	0.00
610.75	0.27	0.27	0.00
610.80	0.27	0.27	0.00
610.85	0.28	0.28	0.00
610.90	0.28	0.28	0.00
610.95	0.28	0.28	0.00
611.00	0.29	0.29	0.00
611.05	0.29	0.29	0.00
611.10	0.29	0.29	0.00
611.15	0.30	0.30	0.00
611.20	0.30	0.30	0.00
611.25	0.32	0.30	0.01
611.30	0.36	0.31	0.06
611.35	0.43	0.31	0.12
611.40	0.53	0.31	0.21
611.45	0.64	0.32	0.33
611.50	0.78	0.32	0.46
611.55	0.94	0.32	0.62
611.60	1.11	0.32	0.79
611.65	1.31	0.33	0.98
611.70	1.51	0.33	1.18
611.75	1.73	0.33	1.40
611.80	1.96	0.34	1.62
611.85	2.19	0.34	1.85
611.90	2.43	0.34	2.09
611.95	2.67	0.34	2.33
612.00	2.91	0.35	2.56
612.05	3.14	0.35	2.79
612.10	3.36	0.35	3.01
612.15	3.55	0.36	3.20
612.20	3.70	0.36	3.34
612.25	3.87	0.36	3.51
612.30	4.03	0.36	3.66
612.35	4.18	0.37	3.81
612.40	4.32	0.37	3.95
612.45	4.47	0.37	4.09
612.50	4.60	0.37	4.23
612.55	4.73	0.38	4.36
612.60	4.86	0.38	4.48
612.65	4.99	0.38	4.61
612.70	5.11	0.38	4.73
612.75	5.23	0.39	4.84
612.80	5.35	0.39	4.96
612.85	5.46	0.39	5.07
612.90	5.57	0.39	5.18
612.95	5.68	0.40	5.29
613.00	5.79	0.40	5.39
613.05	5.89	0.40	5.49
613.10	6.00	0.40	5.59
613.15	6.10	0.41	5.69
613.20	6.20	0.41	5.79
613.25	**6.30**	**0.41**	**5.89**

Summary for Pond ICS-2: ICS-2

Inflow Area = 0.598 ac, 70.86% Impervious, Inflow Depth > 6.37" for 100-YR event
Inflow = 4.15 cfs @ 12.09 hrs, Volume= 0.318 af
Outflow = 4.15 cfs @ 12.09 hrs, Volume= 0.318 af, Atten= 0%, Lag= 0.0 min
Primary = 0.50 cfs @ 12.08 hrs, Volume= 0.199 af
Secondary = 3.65 cfs @ 12.09 hrs, Volume= 0.119 af

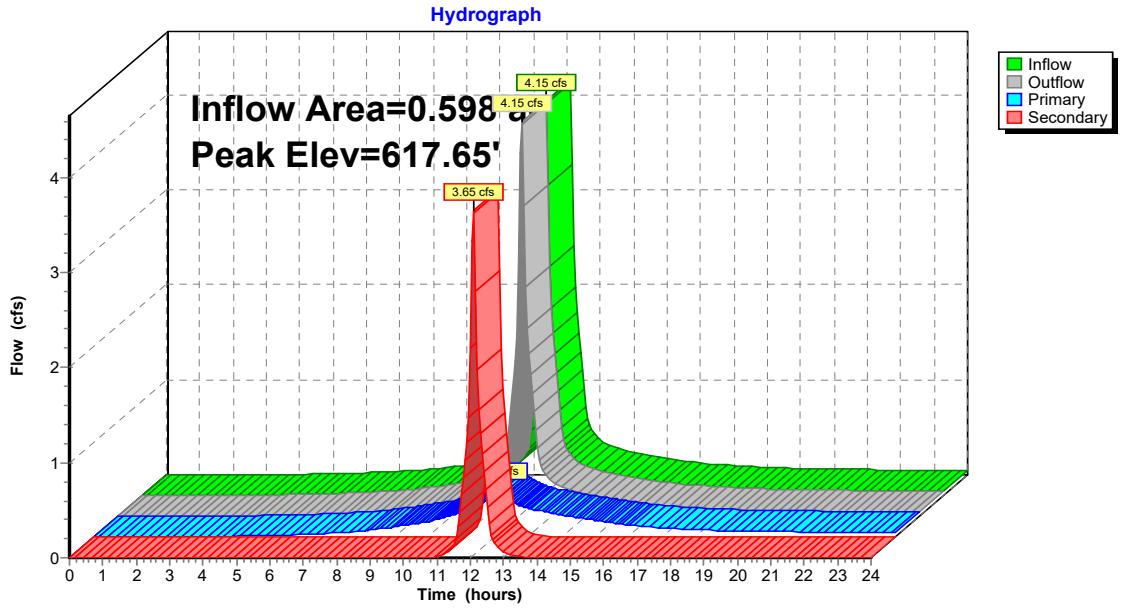
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.65' @ 12.08 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.08 hrs HW=617.61' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.50 cfs @ 5.71 fps)

Secondary OutFlow Max=3.55 cfs @ 12.09 hrs HW=617.62' (Free Discharge)
└**2=Culvert** (Barrel Controls 3.55 cfs @ 4.52 fps)

Pond ICS-2: ICS-2



Stage-Discharge for Pond ICS-2: ICS-2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
615.85	0.00	0.00	0.00
615.87	0.00	0.00	0.00
615.89	0.01	0.01	0.00
615.91	0.01	0.01	0.00
615.93	0.02	0.02	0.00
615.95	0.03	0.03	0.00
615.97	0.04	0.04	0.00
615.99	0.06	0.06	0.00
616.01	0.07	0.07	0.00
616.03	0.09	0.09	0.00
616.05	0.10	0.10	0.00
616.07	0.12	0.12	0.00
616.09	0.14	0.14	0.00
616.11	0.16	0.16	0.00
616.13	0.18	0.18	0.00
616.15	0.19	0.19	0.00
616.17	0.21	0.21	0.00
616.19	0.22	0.22	0.00
616.21	0.23	0.23	0.00
616.23	0.24	0.24	0.00
616.25	0.26	0.25	0.00
616.27	0.28	0.26	0.01
616.29	0.30	0.27	0.02
616.31	0.32	0.28	0.03
616.33	0.34	0.29	0.05
616.35	0.37	0.30	0.07
616.37	0.40	0.31	0.09
616.39	0.43	0.32	0.11
616.41	0.46	0.33	0.13
616.43	0.50	0.34	0.16
616.45	0.53	0.35	0.19
616.47	0.57	0.35	0.22
616.49	0.61	0.35	0.25
616.51	0.65	0.36	0.29
616.53	0.69	0.36	0.33
616.55	0.73	0.36	0.37
616.57	0.77	0.37	0.41
616.59	0.82	0.37	0.45
616.61	0.87	0.37	0.50
616.63	0.92	0.38	0.54
616.65	0.97	0.38	0.59
616.67	1.02	0.38	0.64
616.69	1.08	0.38	0.69
616.71	1.13	0.39	0.74
616.73	1.19	0.39	0.80
616.75	1.25	0.39	0.86
616.77	1.31	0.40	0.91
616.79	1.37	0.40	0.97
616.81	1.43	0.40	1.03
616.83	1.50	0.40	1.09
616.85	1.56	0.41	1.15
616.87	1.63	0.41	1.22
616.89	1.69	0.41	1.28
616.91	1.76	0.41	1.35
616.93	1.83	0.42	1.41
616.95	1.90	0.42	1.48
616.97	1.97	0.42	1.54
616.99	2.04	0.42	1.61
617.01	2.11	0.43	1.68
617.03	2.18	0.43	1.75
617.05	2.25	0.43	1.82
617.07	2.32	0.43	1.89
617.09	2.40	0.44	1.96
617.11	2.47	0.44	2.03
617.13	2.54	0.44	2.10
617.15	2.61	0.44	2.17
617.17	2.69	0.45	2.24
617.19	2.76	0.45	2.31
617.21	2.83	0.45	2.38
617.23	2.90	0.45	2.45
617.25	2.97	0.46	2.51
617.27	3.04	0.46	2.58
617.29	3.11	0.46	2.65
617.31	3.18	0.46	2.71
617.33	3.24	0.47	2.78
617.35	3.31	0.47	2.84
617.37	3.37	0.47	2.90
617.39	3.43	0.47	2.96
617.41	3.49	0.48	3.02
617.43	3.55	0.48	3.07
617.45	3.60	0.48	3.12
617.47	3.65	0.48	3.17
617.49	3.69	0.48	3.21
617.51	3.73	0.49	3.24
617.53	3.75	0.49	3.27
617.55	3.78	0.49	3.29
617.57	3.86	0.49	3.37
617.59	3.94	0.50	3.45
617.61	4.02	0.50	3.53
617.63	**4.10**	**0.50**	**3.60**

Summary for Pond ICS-6: ICS-6

Inflow Area = 2.630 ac, 39.25% Impervious, Inflow Depth > 4.73" for 100-YR event
Inflow = 10.79 cfs @ 12.22 hrs, Volume= 1.038 af
Outflow = 10.79 cfs @ 12.22 hrs, Volume= 1.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.22 hrs, Volume= 0.209 af
Secondary = 10.47 cfs @ 12.22 hrs, Volume= 0.828 af

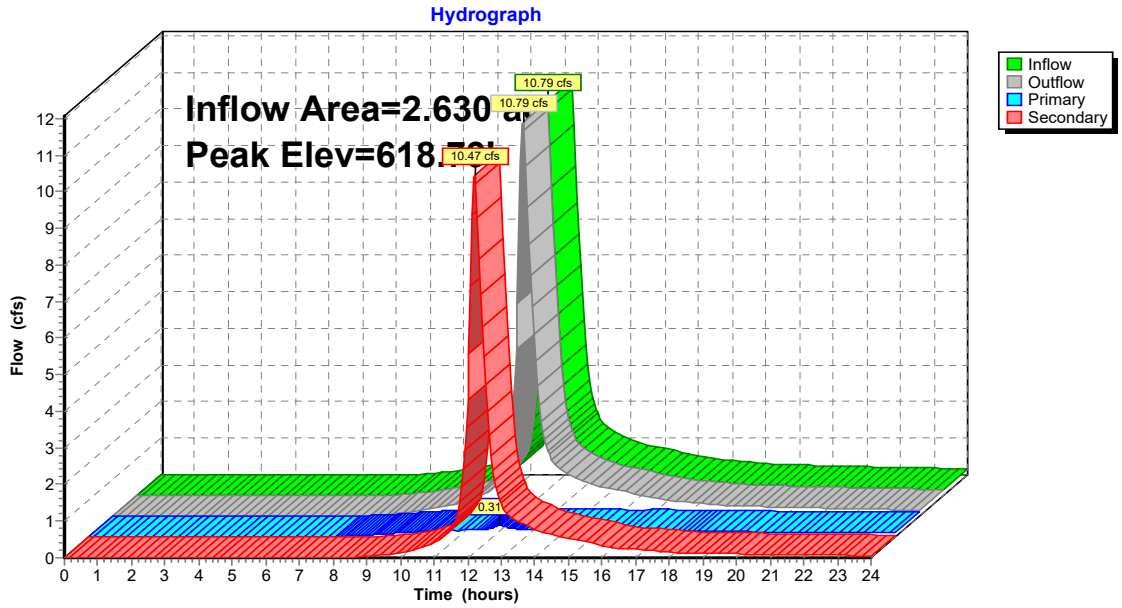
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 618.79' @ 12.22 hrs
Flood Elev= 621.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.31 cfs @ 12.22 hrs HW=618.75' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.31 cfs @ 3.55 fps)

Secondary OutFlow Max=10.34 cfs @ 12.22 hrs HW=618.75' (Free Discharge)
└**2=Culvert** (Barrel Controls 10.34 cfs @ 8.43 fps)

Pond ICS-6: ICS-6



Stage-Discharge for Pond ICS-6: ICS-6

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
616.00	0.00	0.00	0.00
616.10	0.02	0.02	0.00
616.20	0.08	0.07	0.01
616.30	0.24	0.14	0.10
616.40	0.44	0.19	0.26
616.50	0.66	0.18	0.48
616.60	0.94	0.19	0.75
616.70	1.27	0.20	1.08
616.80	1.65	0.20	1.44
616.90	2.06	0.21	1.85
617.00	2.51	0.22	2.30
617.10	2.99	0.22	2.77
617.20	3.49	0.23	3.26
617.30	3.99	0.24	3.76
617.40	4.50	0.24	4.26
617.50	5.00	0.25	4.75
617.60	5.47	0.25	5.22
617.70	5.89	0.26	5.63
617.80	6.21	0.26	5.95
617.90	6.75	0.27	6.48
618.00	7.32	0.27	7.05
618.10	7.85	0.28	7.57
618.20	8.34	0.28	8.06
618.30	8.81	0.29	8.52
618.40	9.25	0.29	8.96
618.50	9.67	0.30	9.38
618.60	10.08	0.30	9.77
618.70	10.47	0.31	10.16
618.80	10.82	0.31	10.51
618.90	11.08	0.32	10.77
619.00	11.34	0.32	11.02
619.10	11.59	0.33	11.26
619.20	11.83	0.33	11.50
619.30	12.07	0.33	11.74
619.40	12.31	0.34	11.97
619.50	12.54	0.34	12.19
619.60	12.76	0.35	12.41
619.70	12.98	0.35	12.63
619.80	13.20	0.35	12.85
619.90	13.42	0.36	13.06
620.00	13.63	0.36	13.26
620.10	13.83	0.37	13.47
620.20	14.04	0.37	13.67
620.30	14.24	0.37	13.87
620.40	14.44	0.38	14.06
620.50	14.64	0.38	14.26
620.60	14.83	0.38	14.45
620.70	15.02	0.39	14.63
620.80	15.21	0.39	14.82
620.90	15.40	0.40	15.00
621.00	15.58	0.40	15.18
621.10	**15.76**	**0.40**	**15.36**

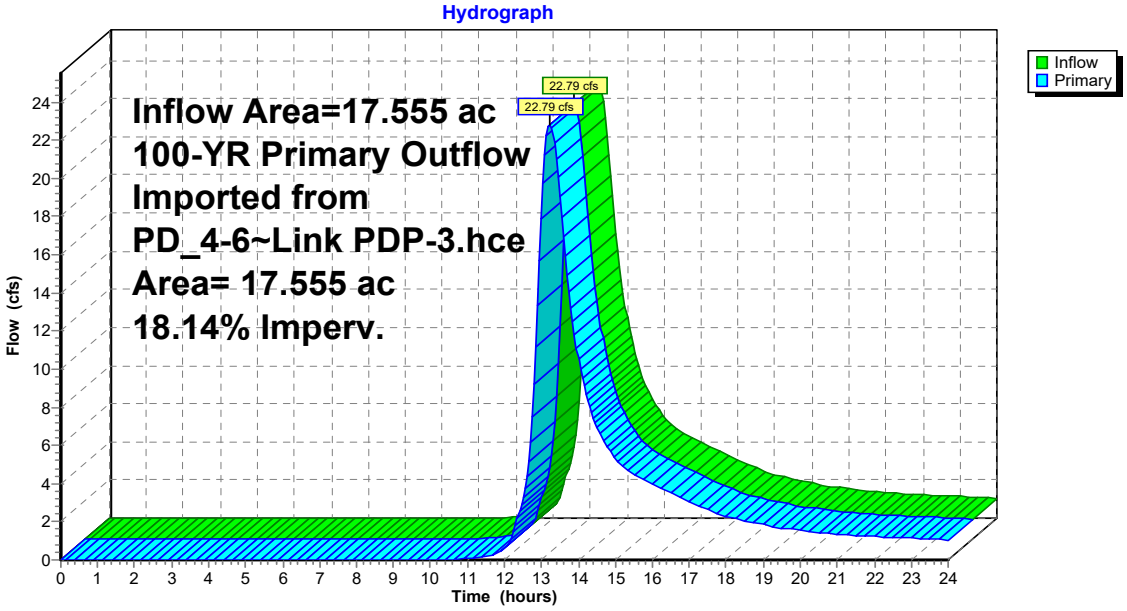
Summary for Link PDP-3: DP-3

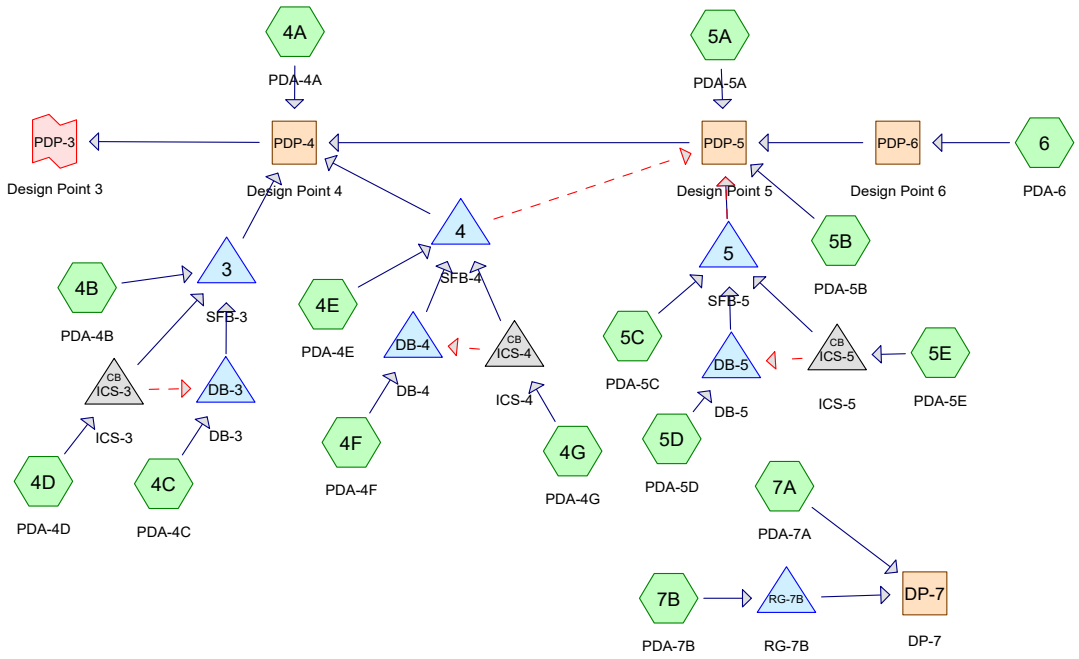
Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 2.82" for 100-YR event
Inflow = 22.79 cfs @ 13.23 hrs, Volume= 4.124 af
Primary = 22.79 cfs @ 13.23 hrs, Volume= 4.124 af, Atten= 0%, Lag= 0.0 min

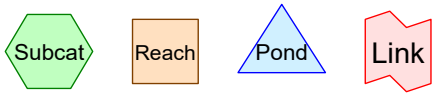
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

100-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3







Routing Diagram for PD_4-7
Prepared by Bohler Engineering, Printed 2/5/2020
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.223	61	>75% Grass cover, Good, HSG B (4A, 4B, 4D, 4E, 4G, 5B, 5C, 5D, 5E, 7A, 7B)
0.078	74	>75% Grass cover, Good, HSG C (4A, 4B)
0.937	98	Paved parking, HSG B (4D, 4E, 4G, 5E)
2.273	98	Roofs, HSG B (4C, 4F, 4G, 5D, 7B)
0.029	98	Unconnected pavement, HSG B (4B, 5C)
9.068	55	Woods, Good, HSG B (4A, 5B, 6, 7A)
3.909	70	Woods, Good, HSG C (4A, 5A, 6)
0.318	77	Woods, Good, HSG D (5B)
17.835	**67**	**TOTAL AREA**

Summary for Subcatchment 4A: PDA-4A

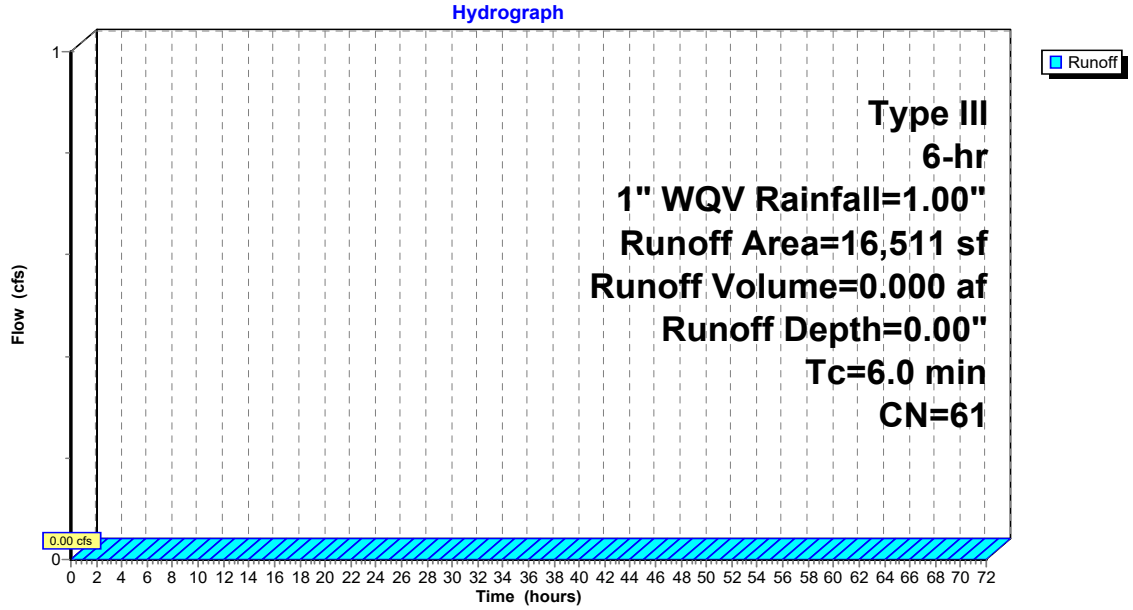
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

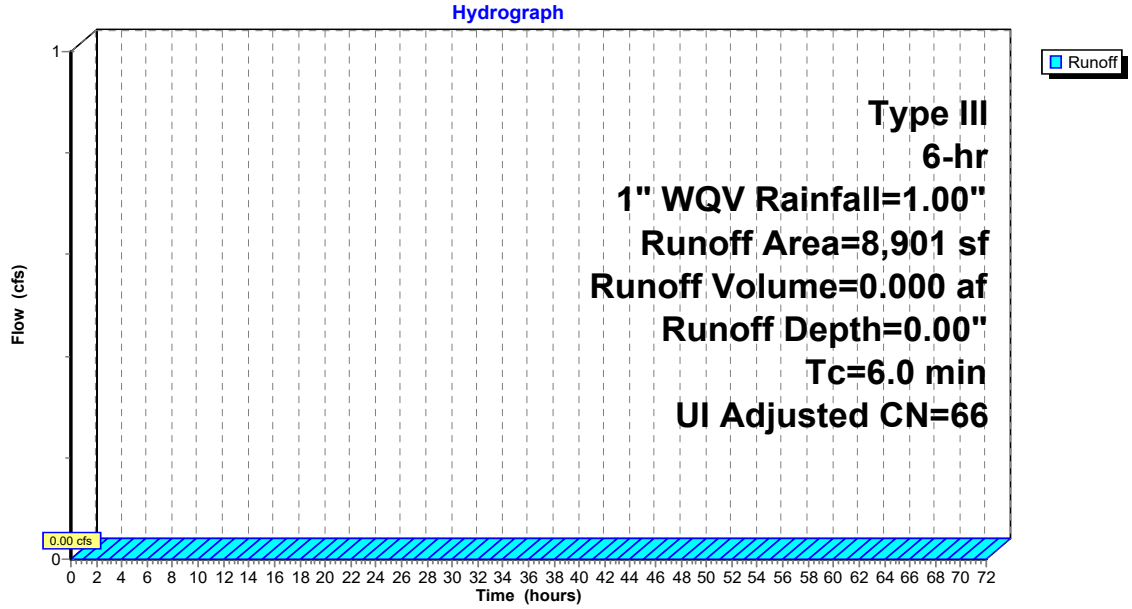
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

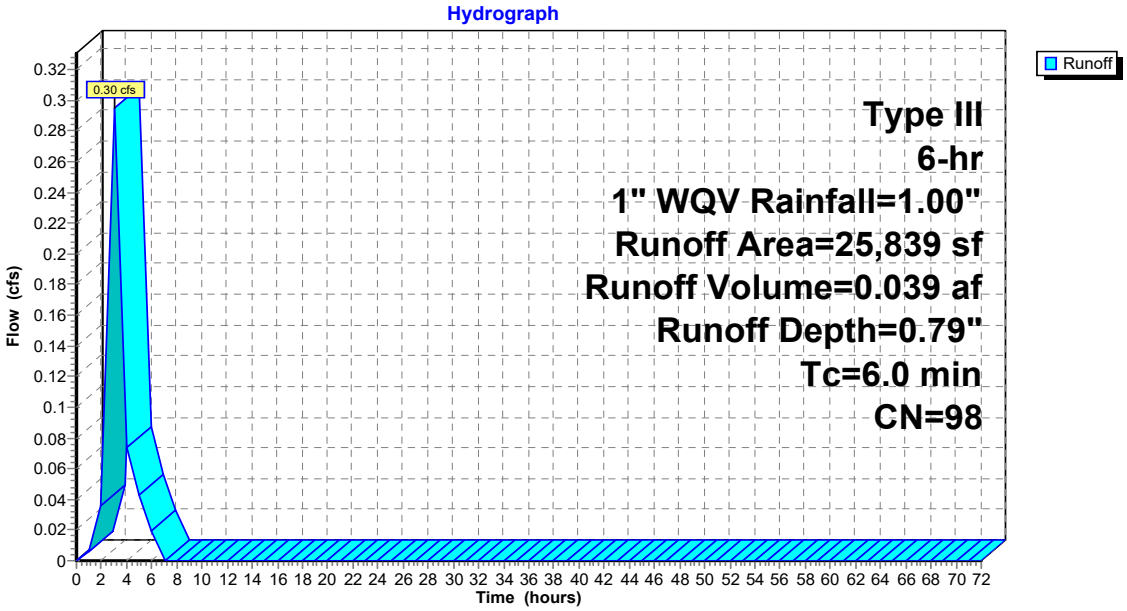
Runoff = 0.30 cfs @ 3.04 hrs, Volume= 0.039 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

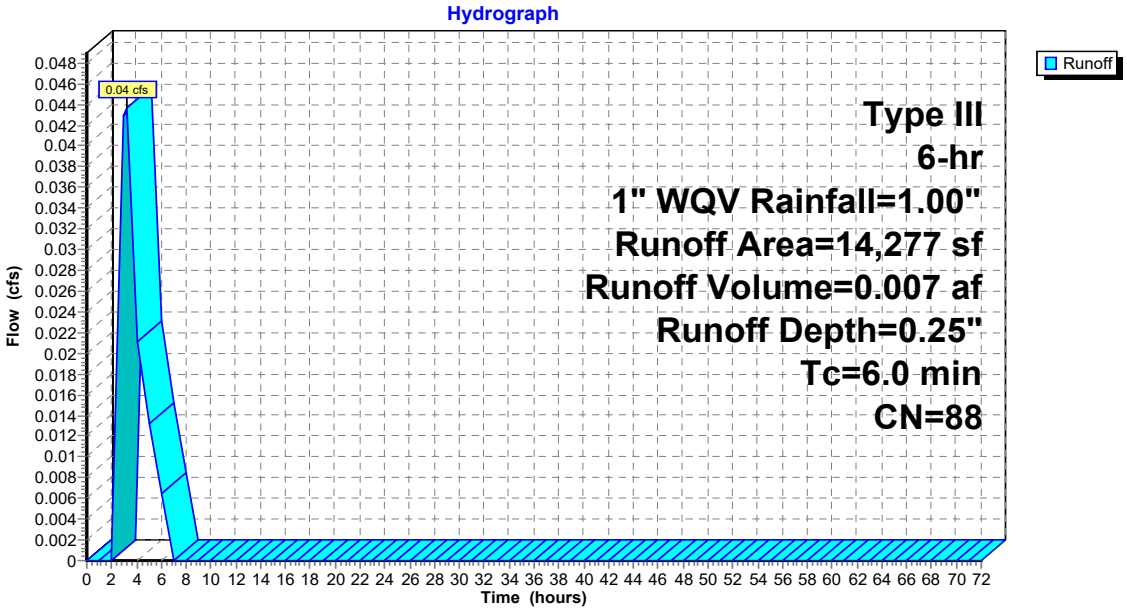
Runoff = 0.04 cfs @ 3.16 hrs, Volume= 0.007 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

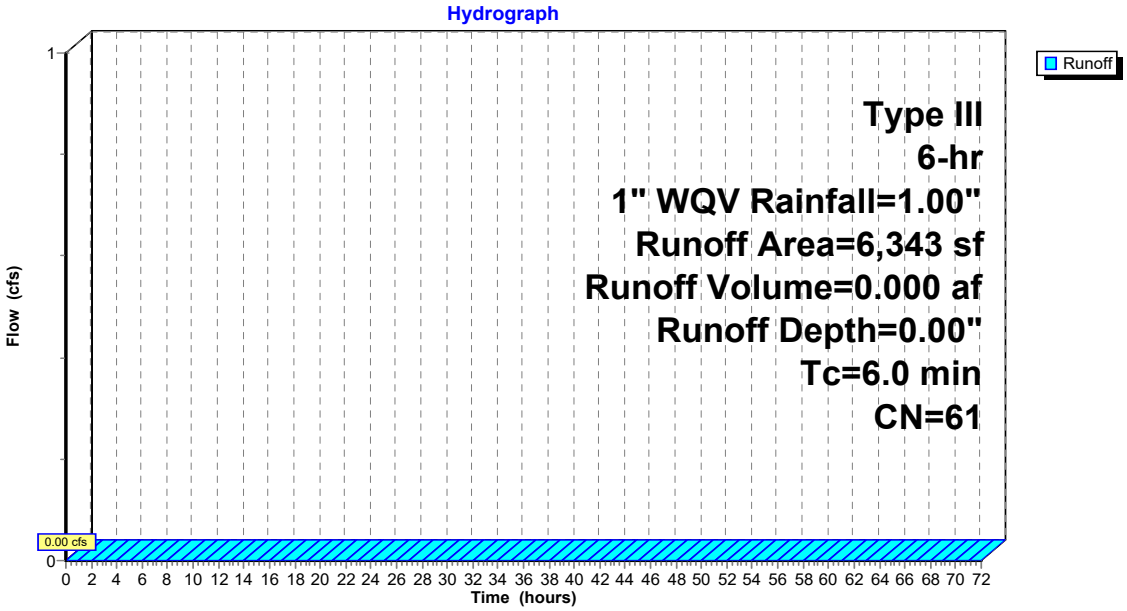
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

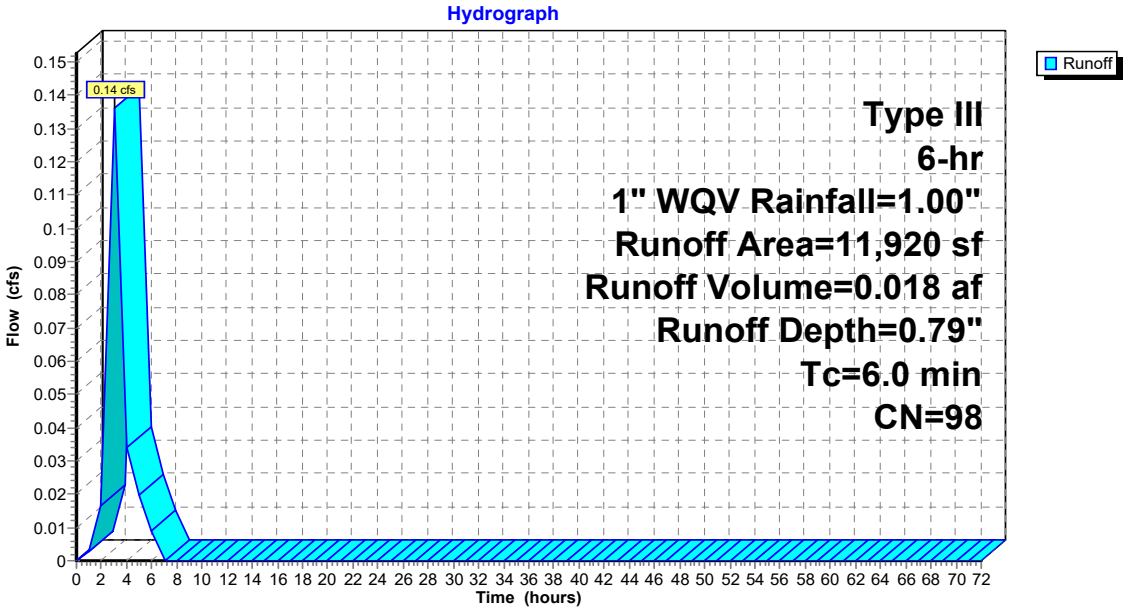
Runoff = 0.14 cfs @ 3.04 hrs, Volume= 0.018 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

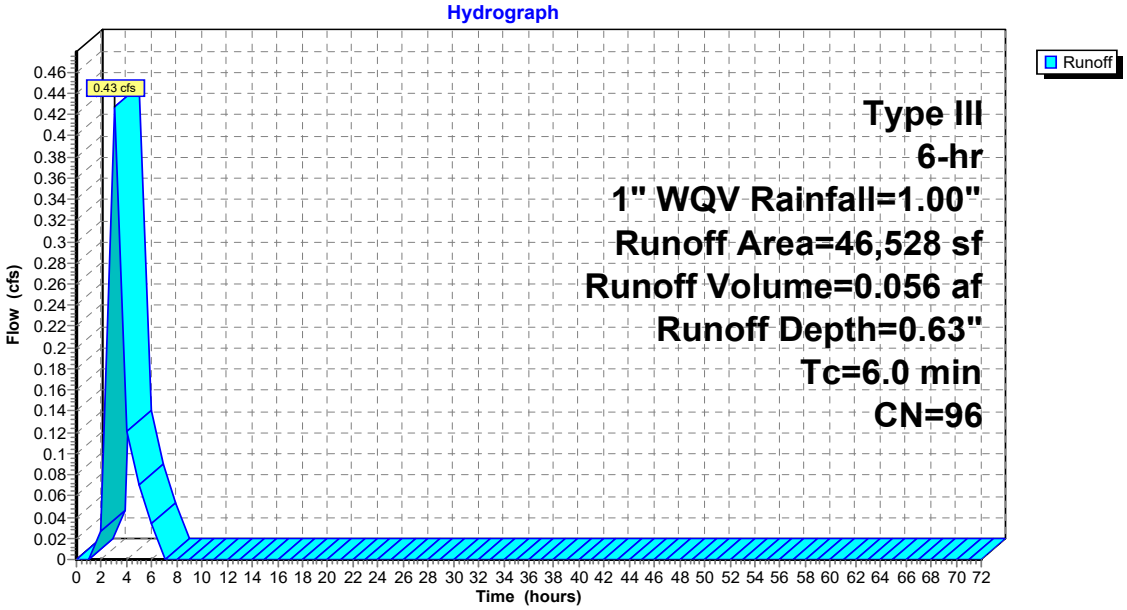
Runoff = 0.43 cfs @ 3.07 hrs, Volume= 0.056 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

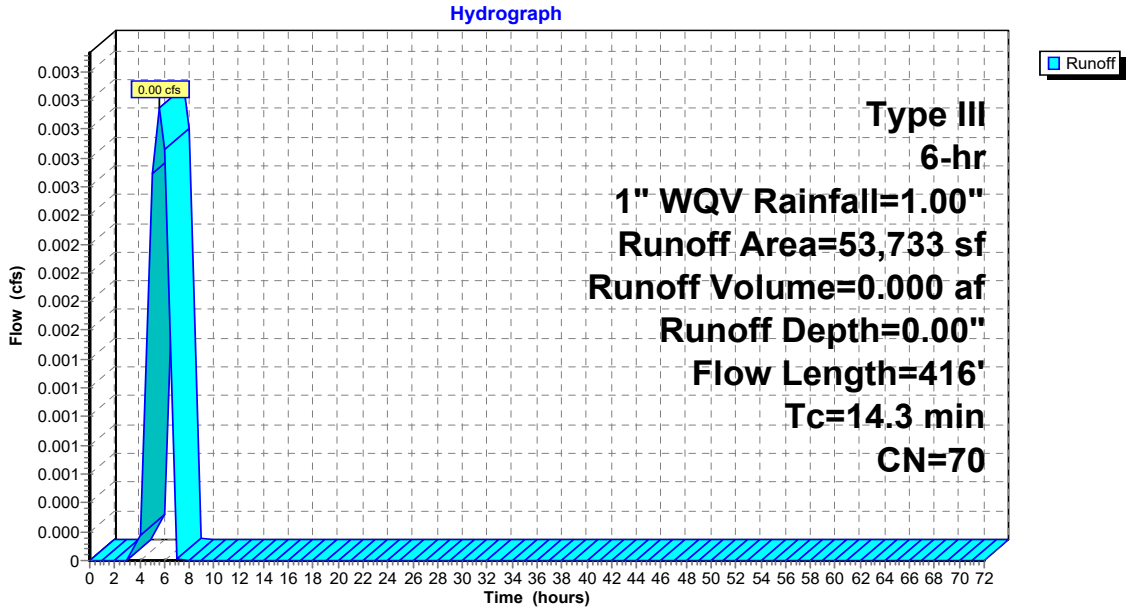
Runoff = 0.00 cfs @ 5.55 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

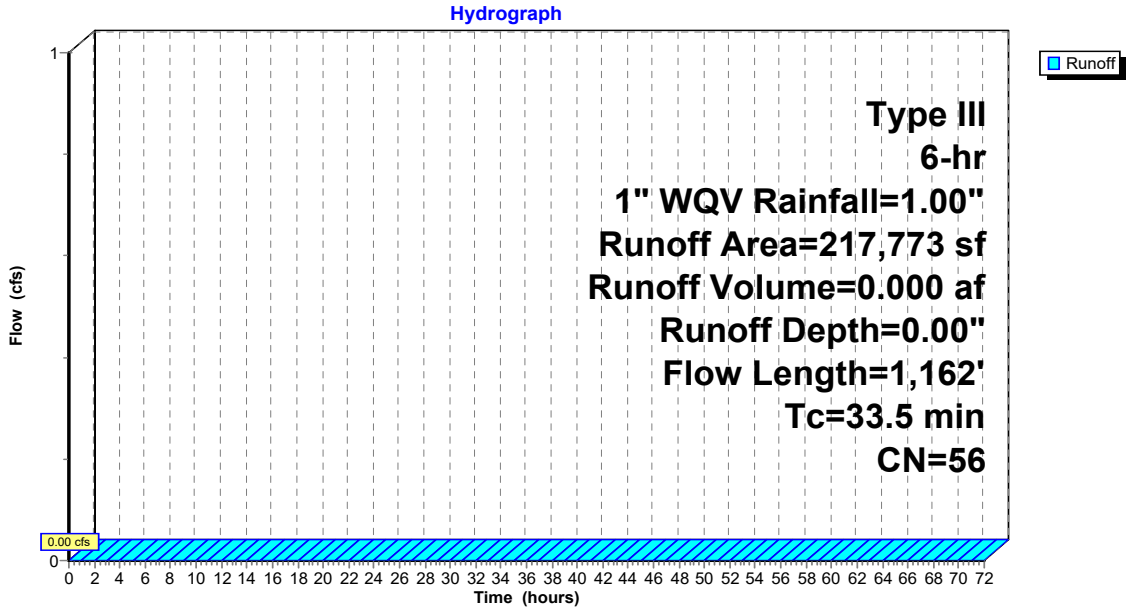
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

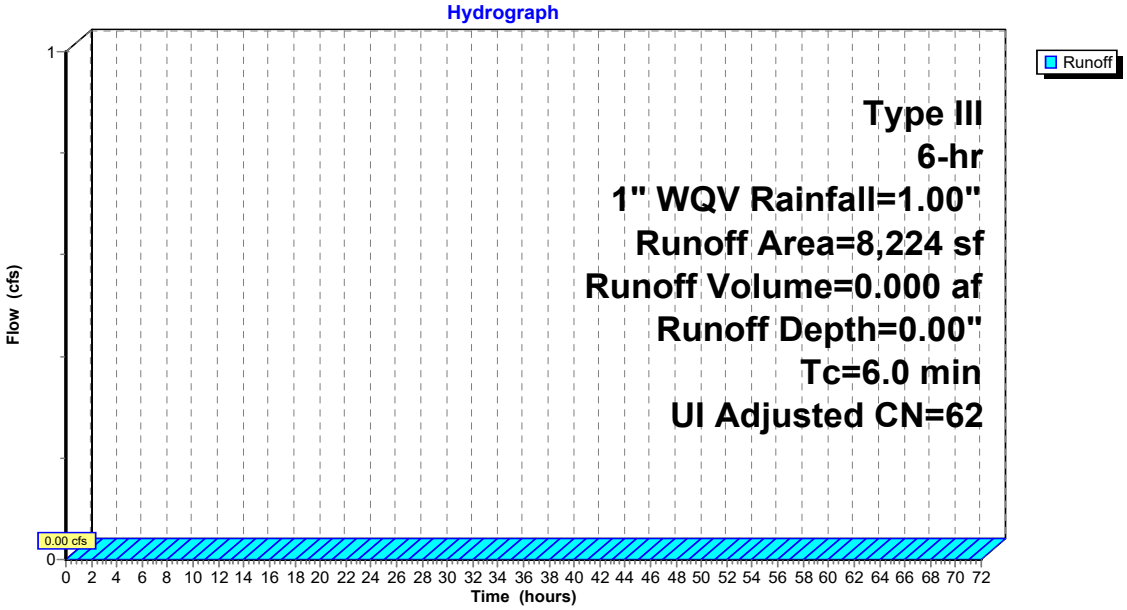
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

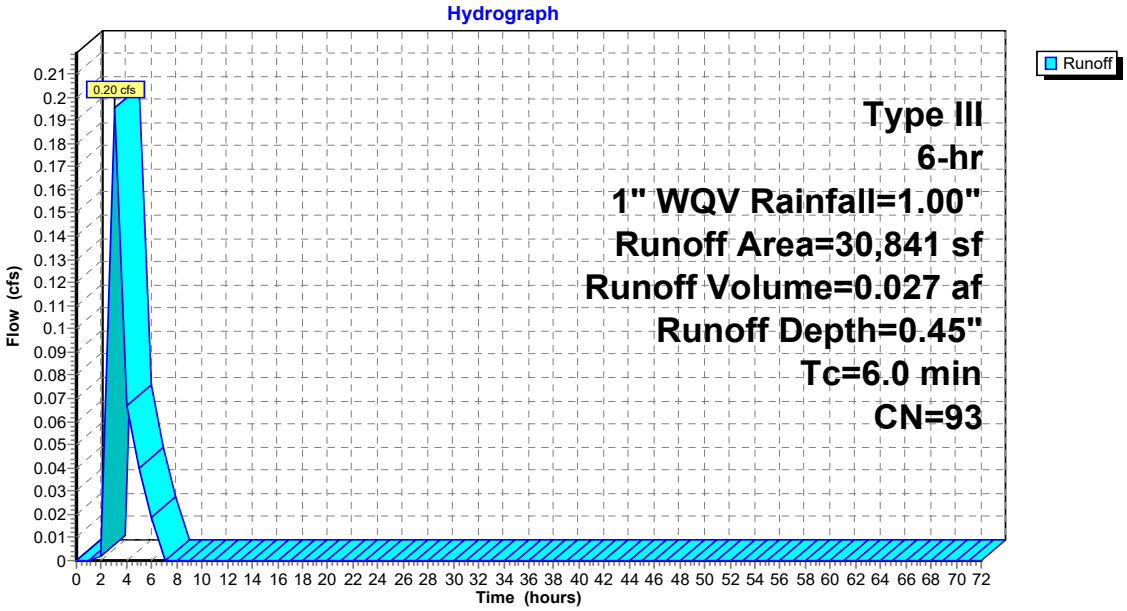
Runoff = 0.20 cfs @ 3.10 hrs, Volume= 0.027 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

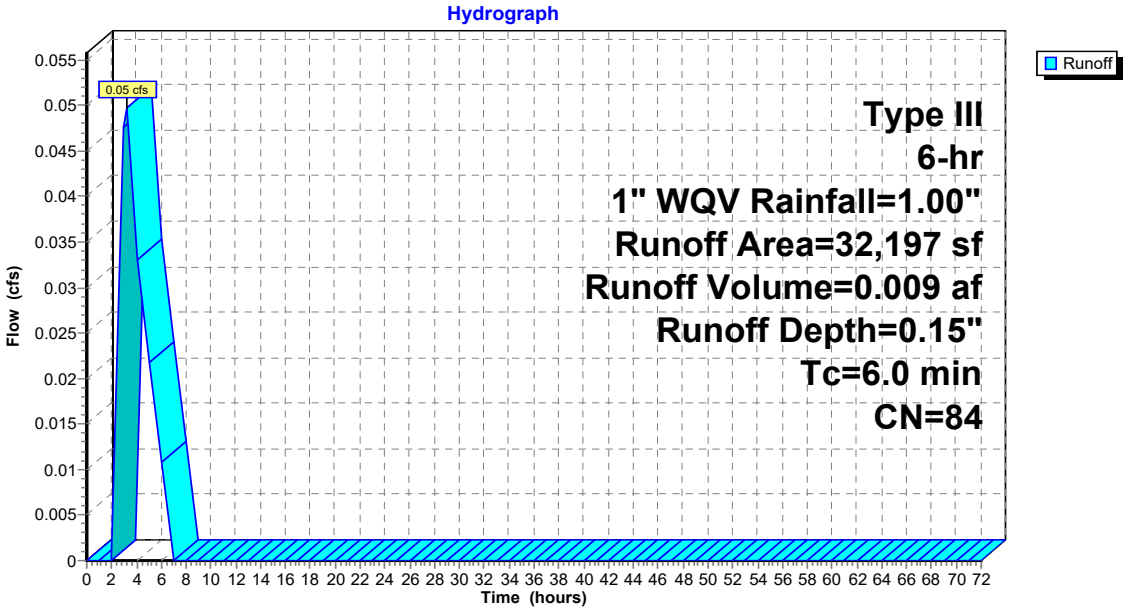
Runoff = 0.05 cfs @ 3.26 hrs, Volume= 0.009 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

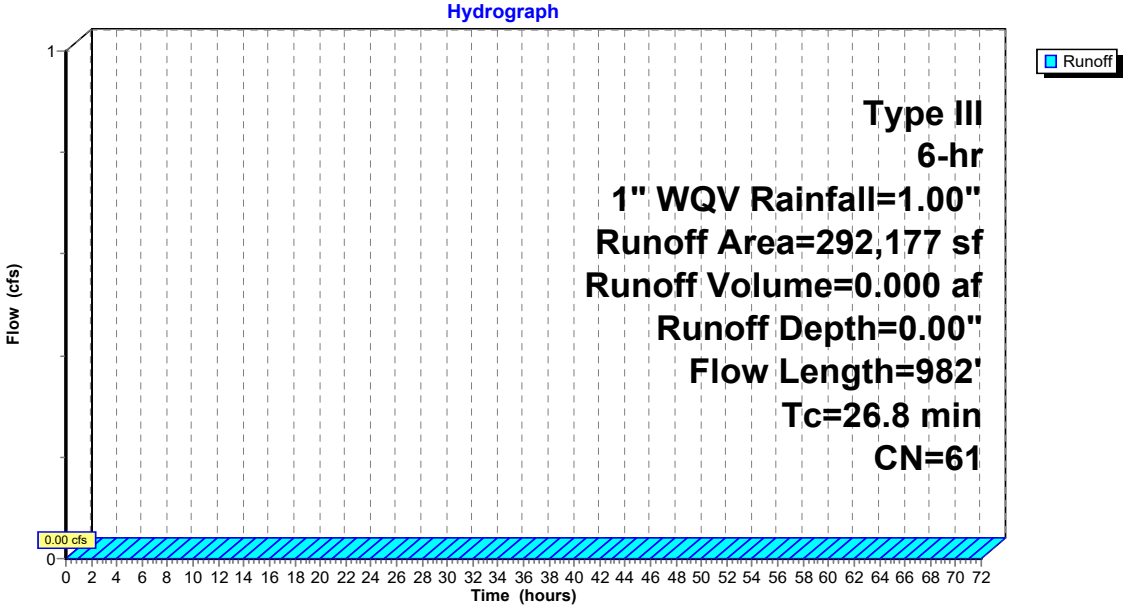
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

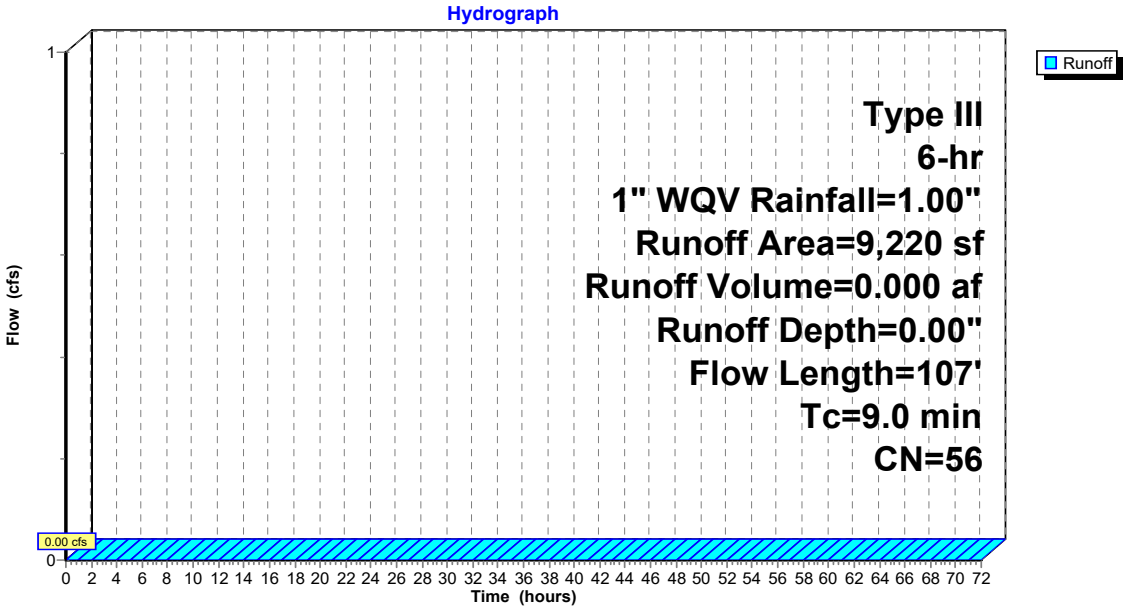
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

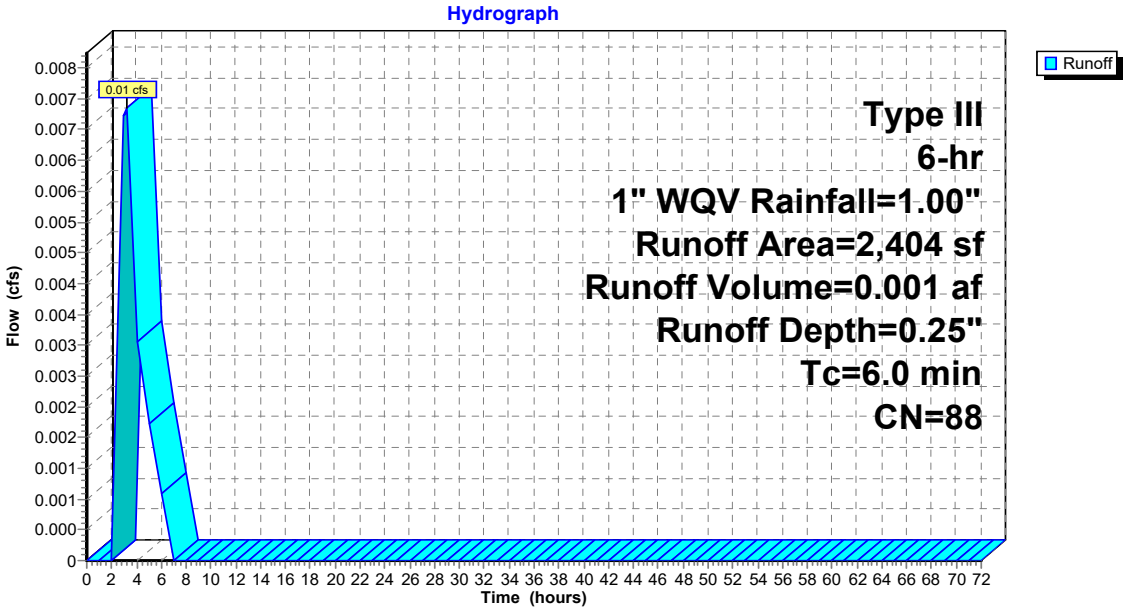
Runoff = 0.01 cfs @ 3.16 hrs, Volume= 0.001 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

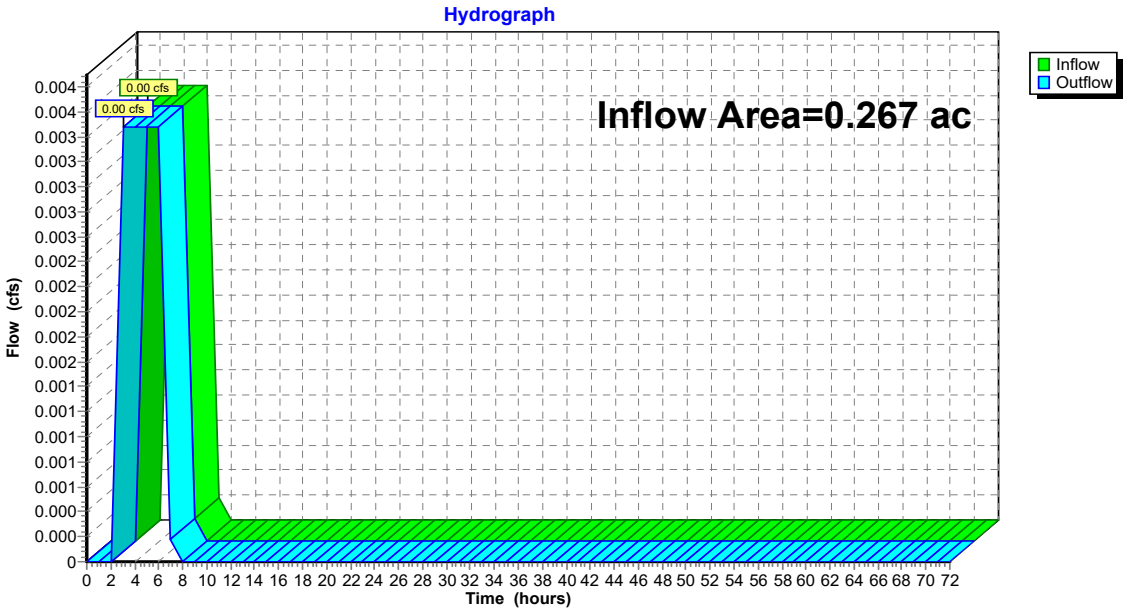


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth = 0.05" for 1" WQV event
Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 6.48 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 8.13 hrs, Volume= 0.000 af, Atten= 40%, Lag= 98.9 min

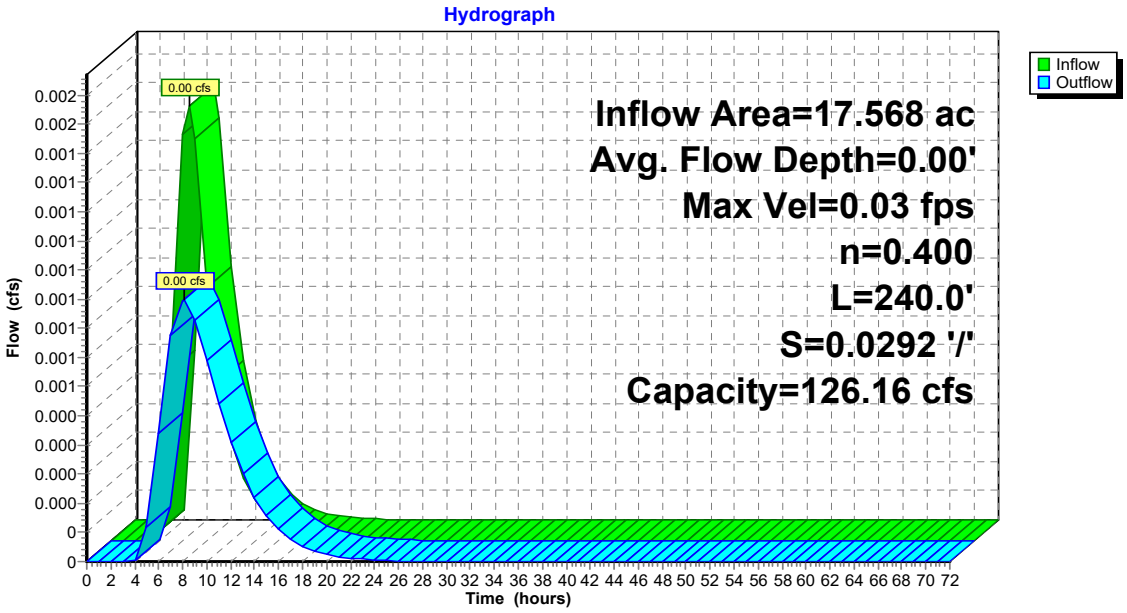
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.03 fps, Min. Travel Time= 136.2 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 136.2 min

Peak Storage= 7 cf @ 8.13 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Discharge for Reach PDP-4: Design Point 4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
625.00	0.00	0.00	625.52	0.37	38.60
625.01	0.03	0.05	625.53	0.37	39.92
625.02	0.05	0.15	625.54	0.37	41.26
625.03	0.06	0.30	625.55	0.38	42.62
625.04	0.07	0.49	625.56	0.38	44.01
625.05	0.08	0.72	625.57	0.39	45.42
625.06	0.10	0.97	625.58	0.39	46.84
625.07	0.11	1.26	625.59	0.39	48.29
625.08	0.12	1.57	625.60	0.40	49.76
625.09	0.12	1.92	625.61	0.40	51.25
625.10	0.13	2.29	625.62	0.41	52.76
625.11	0.14	2.69	625.63	0.41	54.29
625.12	0.15	3.11	625.64	0.41	55.85
625.13	0.16	3.56	625.65	0.42	57.42
625.14	0.16	4.04	625.66	0.42	59.02
625.15	0.17	4.54	625.67	0.42	60.64
625.16	0.18	5.06	625.68	0.43	62.27
625.17	0.19	5.61	625.69	0.43	63.93
625.18	0.19	6.18	625.70	0.43	65.62
625.19	0.20	6.78	625.71	0.44	67.32
625.20	0.21	7.40	625.72	0.44	69.04
625.21	0.21	8.04	625.73	0.44	70.79
625.22	0.22	8.70	625.74	0.45	72.55
625.23	0.22	9.39	625.75	0.45	74.34
625.24	0.23	10.09	625.76	0.46	76.15
625.25	0.24	10.82	625.77	0.46	77.98
625.26	0.24	11.58	625.78	0.46	79.84
625.27	0.25	12.35	625.79	0.47	81.71
625.28	0.25	13.15	625.80	0.47	83.61
625.29	0.26	13.96	625.81	0.47	85.53
625.30	0.26	14.80	625.82	0.48	87.47
625.31	0.27	15.66	625.83	0.48	89.43
625.32	0.27	16.54	625.84	0.48	91.41
625.33	0.28	17.45	625.85	0.48	93.42
625.34	0.28	18.37	625.86	0.49	95.44
625.35	0.29	19.31	625.87	0.49	97.49
625.36	0.29	20.28	625.88	0.49	99.56
625.37	0.30	21.27	625.89	0.50	101.66
625.38	0.30	22.28	625.90	0.50	103.77
625.39	0.31	23.31	625.91	0.50	105.91
625.40	0.31	24.36	625.92	0.51	108.07
625.41	0.32	25.43	625.93	0.51	110.25
625.42	0.32	26.52	625.94	0.51	112.46
625.43	0.33	27.63	625.95	0.52	114.69
625.44	0.33	28.77	625.96	0.52	116.94
625.45	0.34	29.92	625.97	0.52	119.21
625.46	0.34	31.10	625.98	0.53	121.50
625.47	0.35	32.30	625.99	0.53	123.82
625.48	0.35	33.51	626.00	**0.53**	**126.16**
625.49	0.35	34.75			
625.50	0.36	36.01			
625.51	0.36	37.29			

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 5.55 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 6.48 hrs, Volume= 0.000 af, Atten= 53%, Lag= 55.5 min

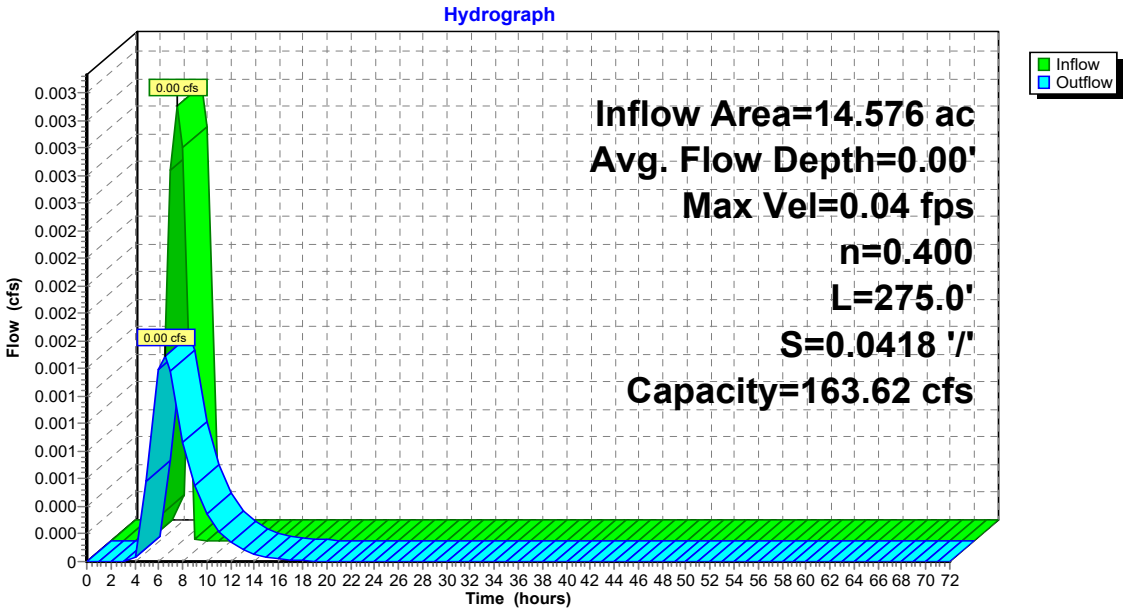
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.04 fps, Min. Travel Time= 130.1 min
Avg. Velocity = 0.04 fps, Avg. Travel Time= 130.1 min

Peak Storage= 12 cf @ 6.48 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Discharge for Reach PDP-5: Design Point 5

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
636.50	0.00	0.00	637.02	0.46	52.98
636.51	0.04	0.07	637.03	0.47	54.73
636.52	0.06	0.22	637.04	0.48	56.50
636.53	0.07	0.44	637.05	0.48	58.30
636.54	0.09	0.71	637.06	0.49	60.12
636.55	0.10	1.03	637.07	0.49	61.97
636.56	0.12	1.40	637.08	0.50	63.84
636.57	0.13	1.81	637.09	0.50	65.74
636.58	0.14	2.27	637.10	0.51	67.66
636.59	0.15	2.76	637.11	0.51	69.60
636.60	0.16	3.29	637.12	0.52	71.57
636.61	0.17	3.86	637.13	0.52	73.56
636.62	0.18	4.47	637.14	0.53	75.57
636.63	0.19	5.11	637.15	0.53	77.61
636.64	0.20	5.79	637.16	0.54	79.67
636.65	0.21	6.50	637.17	0.54	81.76
636.66	0.22	7.24	637.18	0.55	83.87
636.67	0.23	8.01	637.19	0.55	86.00
636.68	0.24	8.82	637.20	0.56	88.16
636.69	0.25	9.66	637.21	0.56	90.34
636.70	0.25	10.53	637.22	0.57	92.54
636.71	0.26	11.43	637.23	0.57	94.77
636.72	0.27	12.36	637.24	0.58	97.02
636.73	0.28	13.32	637.25	0.58	99.29
636.74	0.29	14.31	637.26	0.58	101.58
636.75	0.29	15.33	637.27	0.59	103.90
636.76	0.30	16.37	637.28	0.59	106.25
636.77	0.31	17.45	637.29	0.60	108.61
636.78	0.31	18.55	637.30	0.60	111.00
636.79	0.32	19.68	637.31	0.61	113.41
636.80	0.33	20.84	637.32	0.61	115.85
636.81	0.34	22.03	637.33	0.62	118.31
636.82	0.34	23.24	637.34	0.62	120.79
636.83	0.35	24.48	637.35	0.63	123.29
636.84	0.36	25.75	637.36	0.63	125.82
636.85	0.36	27.04	637.37	0.63	128.37
636.86	0.37	28.36	637.38	0.64	130.95
636.87	0.38	29.71	637.39	0.64	133.54
636.88	0.38	31.08	637.40	0.65	136.16
636.89	0.39	32.48	637.41	0.65	138.80
636.90	0.39	33.91	637.42	0.66	141.47
636.91	0.40	35.36	637.43	0.66	144.16
636.92	0.41	36.83	637.44	0.66	146.87
636.93	0.41	38.34	637.45	0.67	149.60
636.94	0.42	39.86	637.46	0.67	152.36
636.95	0.42	41.42	637.47	0.68	155.14
636.96	0.43	42.99	637.48	0.68	157.94
636.97	0.44	44.59	637.49	0.68	160.77
636.98	0.44	46.22	637.50	**0.69**	**163.62**
636.99	0.45	47.87			
637.00	0.45	49.55			
637.01	0.46	51.25			

Summary for Reach PDP-6: Design Point 6

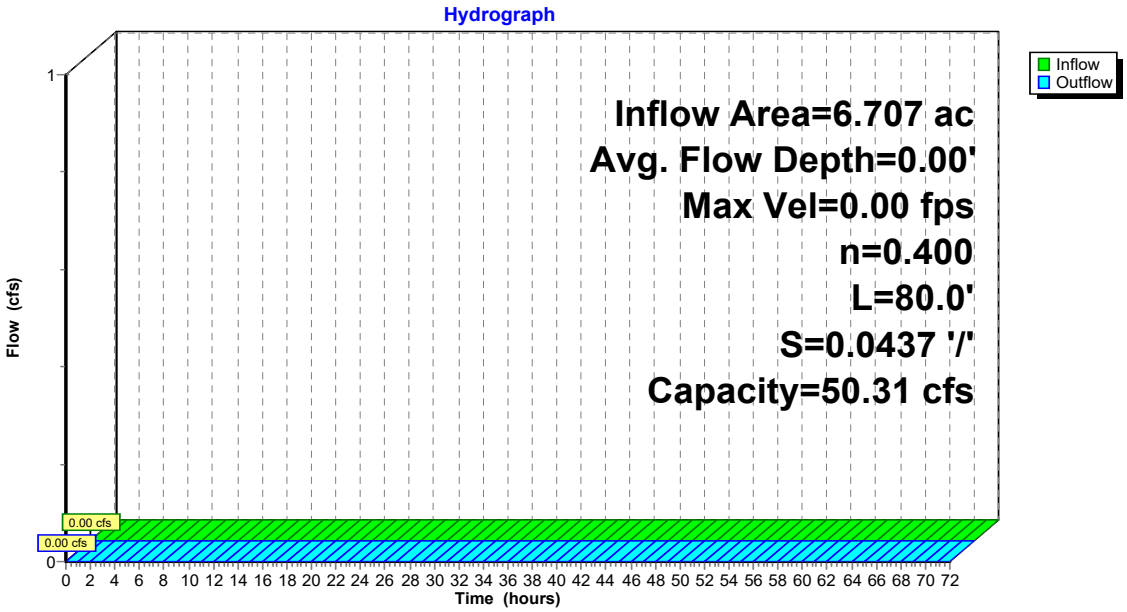
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Discharge for Reach PDP-6: Design Point 6

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
642.50	0.00	0.00
642.51	0.04	0.07
642.52	0.06	0.23
642.53	0.07	0.45
642.54	0.09	0.73
642.55	0.10	1.06
642.56	0.12	1.43
642.57	0.13	1.85
642.58	0.14	2.32
642.59	0.15	2.82
642.60	0.17	3.37
642.61	0.18	3.95
642.62	0.19	4.57
642.63	0.20	5.22
642.64	0.21	5.91
642.65	0.22	6.63
642.66	0.23	7.39
642.67	0.23	8.18
642.68	0.24	9.00
642.69	0.25	9.86
642.70	0.26	10.74
642.71	0.27	11.66
642.72	0.28	12.60
642.73	0.29	13.58
642.74	0.29	14.59
642.75	0.30	15.62
642.76	0.31	16.69
642.77	0.32	17.78
642.78	0.32	18.90
642.79	0.33	20.05
642.80	0.34	21.23
642.81	0.35	22.43
642.82	0.35	23.67
642.83	0.36	24.92
642.84	0.37	26.21
642.85	0.37	27.52
642.86	0.38	28.86
642.87	0.39	30.23
642.88	0.39	31.62
642.89	0.40	33.04
642.90	0.41	34.48
642.91	0.41	35.95
642.92	0.42	37.45
642.93	0.43	38.97
642.94	0.43	40.51
642.95	0.44	42.08
642.96	0.44	43.68
642.97	0.45	45.30
642.98	0.46	46.94
642.99	0.46	48.61
643.00	**0.47**	**50.31**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 0.49" for 1" WQV event
Inflow = 0.09 cfs @ 3.48 hrs, Volume= 0.046 af
Outflow = 0.05 cfs @ 7.31 hrs, Volume= 0.046 af, Atten= 47%, Lag= 230.2 min
Discarded = 0.05 cfs @ 7.31 hrs, Volume= 0.046 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 621.61' @ 7.31 hrs Surf.Area= 1,002 sf Storage= 459 cf
Flood Elev= 623.50' Surf.Area= 2,450 sf Storage= 3,580 cf

Plug-Flow detention time= 121.5 min calculated for 0.045 af (99% of inflow)
Center-of-Mass det. time= 118.1 min (616.9 - 498.8)

Volume	Invert	Avail.Storage	Storage Description
#1	620.00'	3,306 cf	**Overall storage (Prismatic)** Listed below (Recalc) 4,263 cf Overall - 957 cf Embedded = 3,306 cf
#2	620.00'	211 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 638 cf Overall x 33.0% Voids
#3	621.00'	64 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 319 cf Overall x 20.0% Voids
		3,580 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638
622.00	1,230	934	1,572
623.00	1,951	1,591	3,163
623.50	2,450	1,100	4,263

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638

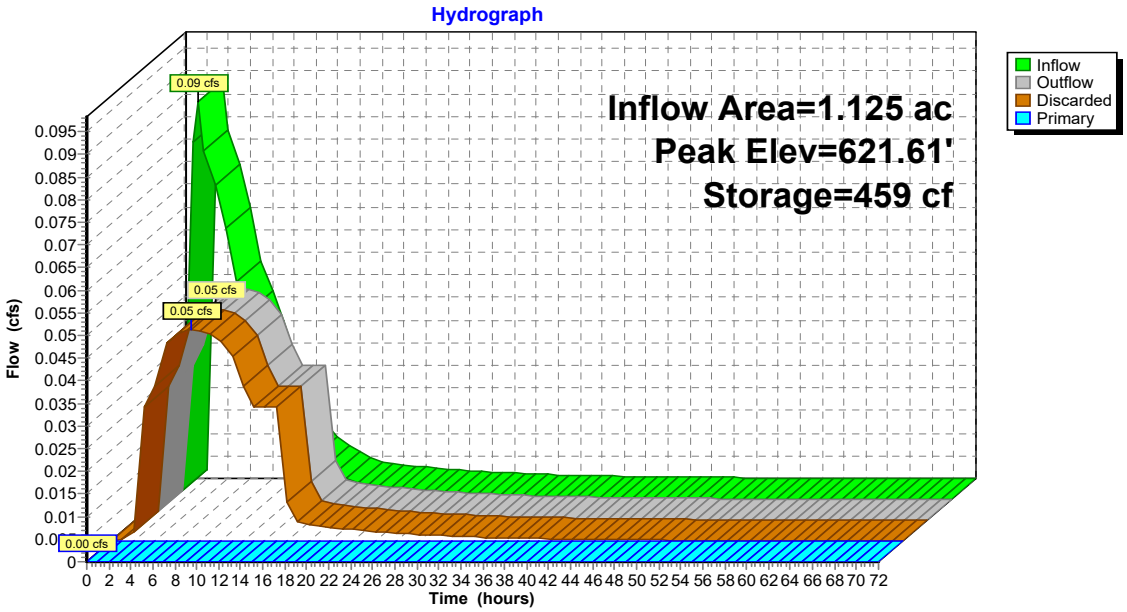
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
621.00	638	0	0
621.50	638	319	319

Device	Routing	Invert	Outlet Devices
#1	Discarded	620.00'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.14'	**8.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.14' / 620.00' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	622.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 7.31 hrs HW=621.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=620.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3: SFB-3



Stage-Discharge for Pond 3: SFB-3

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
620.00	0.00	0.00	0.00
620.05	0.03	0.03	0.00
620.10	0.03	0.03	0.00
620.15	0.03	0.03	0.00
620.20	0.03	0.03	0.00
620.25	0.03	0.03	0.00
620.30	0.03	0.03	0.00
620.35	0.03	0.03	0.00
620.40	0.03	0.03	0.00
620.45	0.03	0.03	0.00
620.50	0.03	0.03	0.00
620.55	0.03	0.03	0.00
620.60	0.03	0.03	0.00
620.65	0.03	0.03	0.00
620.70	0.03	0.03	0.00
620.75	0.03	0.03	0.00
620.80	0.03	0.03	0.00
620.85	0.03	0.03	0.00
620.90	0.03	0.03	0.00
620.95	0.03	0.03	0.00
621.00	0.03	0.03	0.00
621.05	0.03	0.03	0.00
621.10	0.03	0.03	0.00
621.15	0.03	0.03	0.00
621.20	0.04	0.04	0.00
621.25	0.04	0.04	0.00
621.30	0.04	0.04	0.00
621.35	0.04	0.04	0.00
621.40	0.04	0.04	0.00
621.45	0.04	0.04	0.00
621.50	0.04	0.04	0.00
621.55	0.04	0.04	0.00
621.60	0.05	0.05	0.00
621.65	0.05	0.05	0.00
621.70	0.05	0.05	0.00
621.75	0.05	0.05	0.00
621.80	0.05	0.05	0.00
621.85	0.05	0.05	0.00
621.90	0.05	0.05	0.00
621.95	0.06	0.06	0.00
622.00	0.06	0.06	0.00
622.05	0.14	0.06	0.08
622.10	0.28	0.06	0.22
622.15	0.46	0.06	0.40
622.20	0.68	0.06	0.61
622.25	0.91	0.07	0.84
622.30	0.99	0.07	0.92
622.35	1.06	0.07	0.99
622.40	1.13	0.07	1.06
622.45	1.20	0.07	1.13
622.50	1.26	0.07	1.19
622.55	1.32	0.08	1.25
622.60	1.38	0.08	1.30
622.65	1.43	0.08	1.36
622.70	1.49	0.08	1.41
622.75	1.54	0.08	1.46
622.80	1.59	0.08	1.50
622.85	1.64	0.09	1.55
622.90	1.68	0.09	1.59
622.95	1.73	0.09	1.64
623.00	1.77	0.09	1.68
623.05	1.82	0.09	1.72
623.10	1.86	0.10	1.76
623.15	1.90	0.10	1.80
623.20	1.94	0.10	1.84
623.25	1.98	0.10	1.88
623.30	2.02	0.10	1.92
623.35	2.06	0.11	1.95
623.40	2.10	0.11	1.99
623.45	2.14	0.11	2.02
623.50	**2.17**	**0.11**	**2.06**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth = 0.60" for 1" WQV event				
Inflow =	0.45 cfs @	3.09 hrs,	Volume=	0.074 af	
Outflow =	0.28 cfs @	3.50 hrs,	Volume=	0.068 af,	Atten= 38%, Lag= 24.6 min
Discarded =	0.28 cfs @	3.50 hrs,	Volume=	0.068 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 630.72' @ 3.82 hrs Surf.Area= 1,643 sf Storage= 389 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,373 cf

Plug-Flow detention time= 92.0 min calculated for 0.068 af (92% of inflow)
Center-of-Mass det. time= 20.1 min (307.9 - 287.8)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	542 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,643 cf Overall x 33.0% Voids
#3	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,373 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.25' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

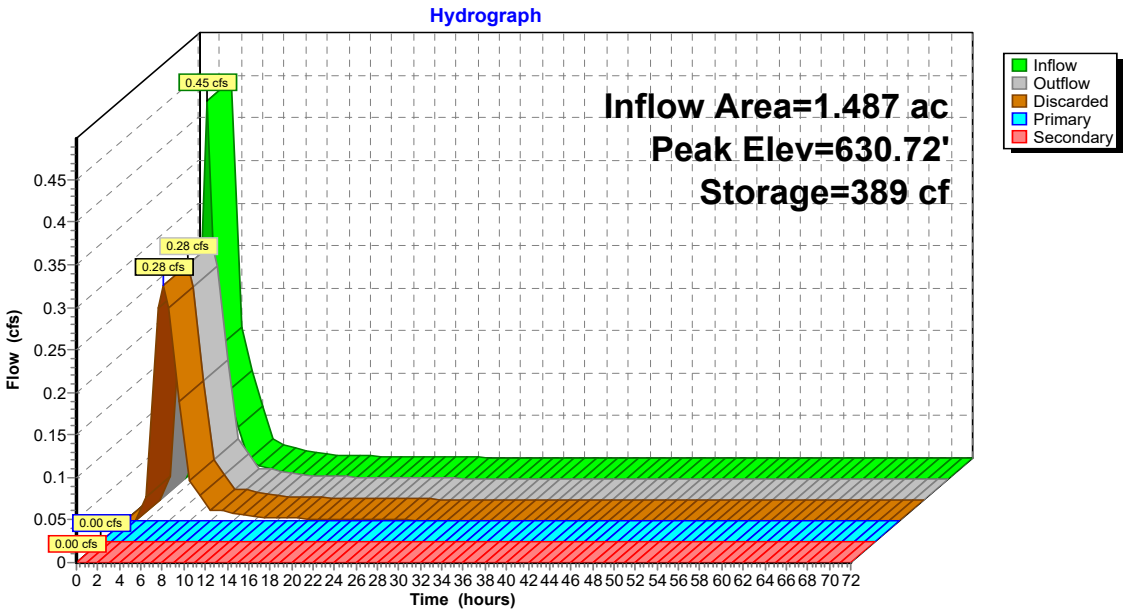
#5 Secondary 633.30' **50.0' long x 1.0' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.25 cfs @ 3.50 hrs HW=630.54' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Discharge for Pond 4: SFB-4

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
630.00	0.00	0.00	0.00	0.00
630.10	0.25	0.25	0.00	0.00
630.20	0.25	0.25	0.00	0.00
630.30	0.25	0.25	0.00	0.00
630.40	0.25	0.25	0.00	0.00
630.50	0.25	0.25	0.00	0.00
630.60	0.25	0.25	0.00	0.00
630.70	0.25	0.25	0.00	0.00
630.80	0.25	0.25	0.00	0.00
630.90	0.25	0.25	0.00	0.00
631.00	0.25	0.25	0.00	0.00
631.10	0.26	0.26	0.00	0.00
631.20	0.27	0.27	0.00	0.00
631.30	0.29	0.29	0.00	0.00
631.40	0.30	0.30	0.00	0.00
631.50	0.31	0.31	0.00	0.00
631.60	0.32	0.32	0.00	0.00
631.70	0.33	0.33	0.00	0.00
631.80	0.35	0.35	0.00	0.00
631.90	0.36	0.36	0.00	0.00
632.00	0.37	0.37	0.00	0.00
632.10	0.40	0.38	0.01	0.00
632.20	0.43	0.39	0.04	0.00
632.30	0.46	0.41	0.05	0.00
632.40	0.48	0.42	0.06	0.00
632.50	0.50	0.43	0.07	0.00
632.60	0.52	0.44	0.08	0.00
632.70	0.57	0.45	0.12	0.00
632.80	0.72	0.47	0.25	0.00
632.90	0.78	0.48	0.31	0.00
633.00	0.84	0.49	0.35	0.00
633.10	0.89	0.50	0.39	0.00
633.20	0.94	0.51	0.42	0.00
633.30	0.98	0.52	0.45	0.00
633.40	5.27	0.54	0.48	4.25
633.50	13.09	0.55	0.51	12.03
633.60	23.32	0.56	0.54	22.22
633.70	35.54	0.57	0.56	34.41
633.80	49.52	0.58	0.59	48.35
633.90	65.11	0.60	0.61	63.90
634.00	**83.23**	**0.61**	**0.63**	**81.99**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac,	65.78% Impervious,	Inflow Depth =	0.25"	for 1" WQV event
Inflow =	0.13 cfs @	3.42 hrs,	Volume=	0.034 af	
Outflow =	0.10 cfs @	3.00 hrs,	Volume=	0.034 af,	Atten= 24%, Lag= 0.0 min
Discarded =	0.10 cfs @	3.00 hrs,	Volume=	0.034 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 632.20' @ 4.74 hrs Surf.Area= 1,505 sf Storage= 97 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,589 cf

Plug-Flow detention time= 12.5 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 14.2 min (274.2 - 260.0)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	497 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,505 cf Overall x 33.0% Voids
#3	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,589 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.00	1,505	1,505	1,505

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**6.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir**

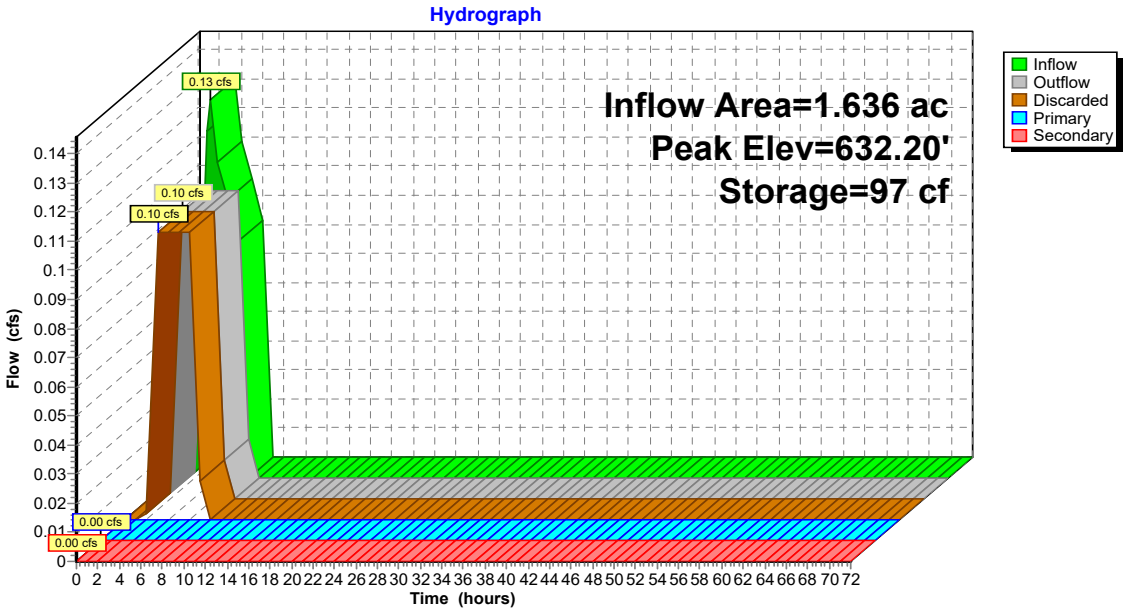
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.10 cfs @ 3.00 hrs HW=632.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Discharge for Pond 5: SFB-5

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
632.00	0.00	0.00	0.00	0.00
632.10	0.10	0.10	0.00	0.00
632.20	0.10	0.10	0.00	0.00
632.30	0.10	0.10	0.00	0.00
632.40	0.10	0.10	0.00	0.00
632.50	0.10	0.10	0.00	0.00
632.60	0.10	0.10	0.00	0.00
632.70	0.10	0.10	0.00	0.00
632.80	0.10	0.10	0.00	0.00
632.90	0.10	0.10	0.00	0.00
633.00	0.10	0.10	0.00	0.00
633.10	0.10	0.10	0.00	0.00
633.20	0.10	0.10	0.00	0.00
633.30	0.10	0.10	0.00	0.00
633.40	0.10	0.10	0.00	0.00
633.50	0.10	0.10	0.00	0.00
633.60	0.12	0.12	0.00	0.00
633.70	0.13	0.13	0.00	0.00
633.80	0.15	0.15	0.00	0.00
633.90	0.16	0.16	0.00	0.00
634.00	0.18	0.18	0.00	0.00
634.10	0.19	0.19	0.00	0.00
634.20	0.19	0.19	0.00	0.00
634.30	0.19	0.19	0.00	0.00
634.40	0.20	0.20	0.00	0.00
634.50	0.20	0.20	0.00	0.00
634.60	0.22	0.21	0.01	0.00
634.70	0.25	0.21	0.04	0.00
634.80	0.27	0.22	0.05	0.00
634.90	0.28	0.22	0.06	0.00
635.00	0.30	0.23	0.07	0.00
635.10	7.11	0.23	0.08	6.81
635.20	19.57	0.24	0.08	19.25
635.30	35.89	0.24	0.09	35.56
635.40	55.39	0.24	0.09	55.05
635.50	77.71	0.25	0.10	77.36
635.60	102.60	0.25	0.11	102.25
635.70	131.55	0.26	0.11	131.19
635.80	163.52	0.26	0.12	163.14
635.90	199.49	0.26	0.12	199.11
636.00	**238.79**	**0.27**	**0.13**	**238.40**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth = 0.79" for 1" WQV event
Inflow = 0.30 cfs @ 3.04 hrs, Volume= 0.039 af
Outflow = 0.06 cfs @ 4.58 hrs, Volume= 0.039 af, Atten= 81%, Lag= 92.6 min
Primary = 0.06 cfs @ 4.58 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 626.37' @ 4.58 hrs Surf.Area= 0.081 ac Storage= 0.026 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 352.2 min calculated for 0.039 af (100% of inflow)
Center-of-Mass det. time= 345.0 min (546.6 - 201.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0**x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**8.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 622.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 4.58 hrs HW=626.37' (Free Discharge)
└─**1=Culvert** (Passes 0.06 cfs of 0.32 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.57 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

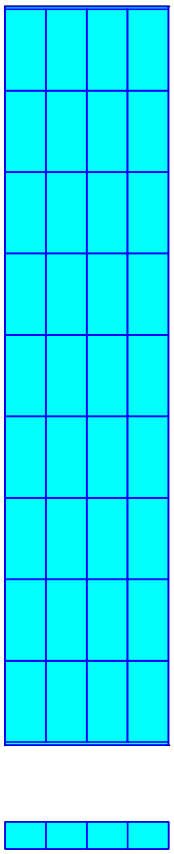
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

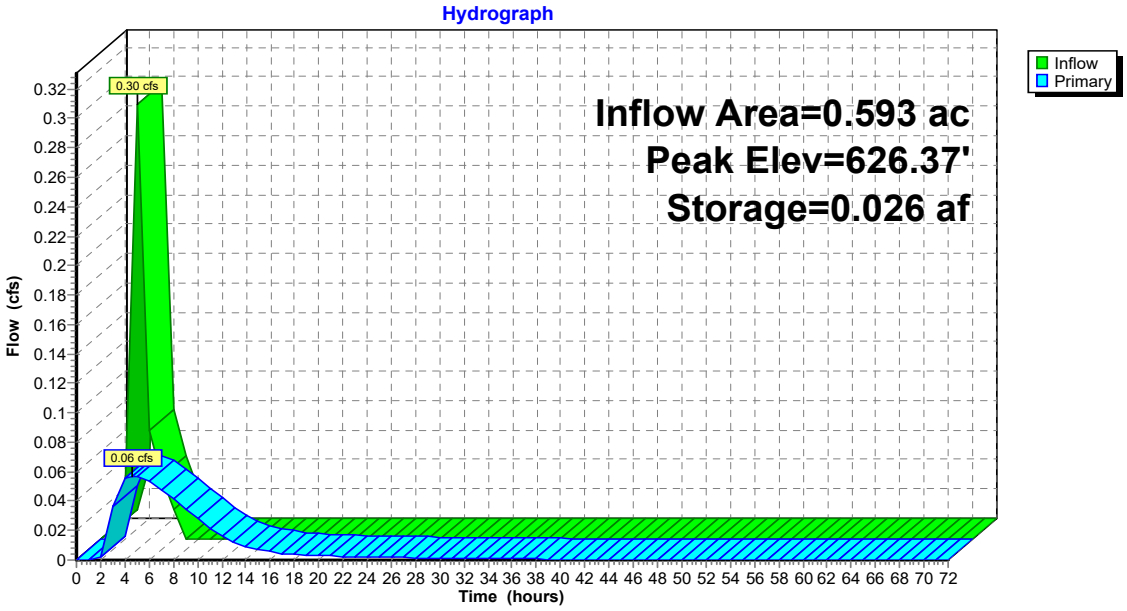
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow
Primary
0.30 cfs
0.06 cfs
Inflow Area=0.593 ac
Peak Elev=626.37'
Storage=0.026 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-3: DB-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
626.00	0.00	628.60	0.17
626.05	0.00	628.65	0.17
626.10	0.01	628.70	0.17
626.15	0.03	628.75	0.17
626.20	0.04	628.80	0.17
626.25	0.04	628.85	0.17
626.30	0.05	628.90	0.18
626.35	0.05	628.95	0.18
626.40	0.06	629.00	0.18
626.45	0.06	629.05	0.18
626.50	0.07	629.10	0.18
626.55	0.07	629.15	0.18
626.60	0.08	629.20	0.19
626.65	0.08	629.25	0.19
626.70	0.08	629.30	0.19
626.75	0.09	629.35	0.19
626.80	0.09	629.40	0.19
626.85	0.09	629.45	0.19
626.90	0.09	629.50	0.19
626.95	0.10	629.55	0.20
627.00	0.10	629.60	0.20
627.05	0.10	629.65	0.20
627.10	0.11	629.70	0.20
627.15	0.11	629.75	0.20
627.20	0.11	629.80	0.20
627.25	0.11	629.85	0.20
627.30	0.12	629.90	0.21
627.35	0.12	629.95	0.21
627.40	0.12	630.00	0.21
627.45	0.12	630.05	0.21
627.50	0.13	630.10	0.21
627.55	0.13	630.15	0.21
627.60	0.13	630.20	0.21
627.65	0.13	630.25	0.21
627.70	0.13	630.30	0.22
627.75	0.14	630.35	0.22
627.80	0.14	630.40	0.22
627.85	0.14	630.45	0.22
627.90	0.14	630.50	0.22
627.95	0.14	630.55	0.22
628.00	0.15	630.60	0.22
628.05	0.15	630.65	**0.22**
628.10	0.15		
628.15	0.15		
628.20	0.15		
628.25	0.15		
628.30	0.16		
628.35	0.16		
628.40	0.16		
628.45	0.16		
628.50	0.16		
628.55	0.16		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth = 0.79" for 1" WQV event
Inflow = 0.14 cfs @ 3.04 hrs, Volume= 0.018 af
Outflow = 0.04 cfs @ 4.42 hrs, Volume= 0.018 af, Atten= 74%, Lag= 82.8 min
Primary = 0.04 cfs @ 4.42 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 634.19' @ 4.41 hrs Surf.Area= 0.072 ac Storage= 0.012 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 337.4 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 329.4 min (531.1 - 201.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.03 cfs @ 4.42 hrs HW=634.18' (Free Discharge)
└─**1=Culvert** (Passes 0.03 cfs of 0.07 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.52 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

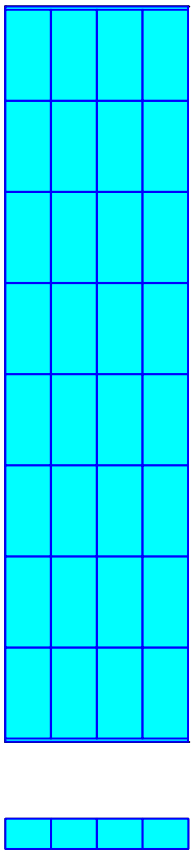
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

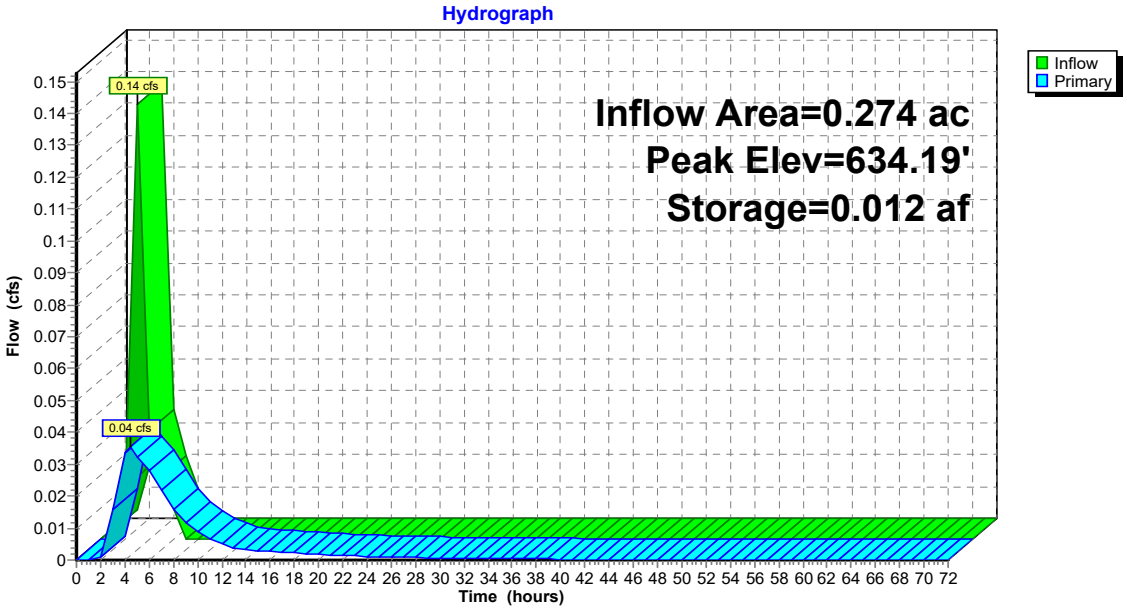
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow
Primary
0.14 cfs
0.04 cfs
Inflow Area=0.274 ac
Peak Elev=634.19'
Storage=0.012 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-4: DB-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
634.00	0.00	636.60	0.44
634.05	0.00	636.65	0.46
634.10	0.01	636.70	0.48
634.15	0.03	636.75	0.49
634.20	0.04	636.80	0.51
634.25	0.04	636.85	0.52
634.30	0.05	636.90	0.54
634.35	0.05	636.95	0.55
634.40	0.06	637.00	0.56
634.45	0.06	637.05	0.58
634.50	0.07	637.10	0.61
634.55	0.07	637.15	0.65
634.60	0.08	637.20	0.70
634.65	0.08	637.25	0.74
634.70	0.08	637.30	0.79
634.75	0.09	637.35	0.83
634.80	0.09	637.40	0.86
634.85	0.09	637.45	0.89
634.90	0.09	637.50	0.92
634.95	0.10	637.55	0.95
635.00	0.10	637.60	0.98
635.05	0.10	637.65	1.00
635.10	0.11	637.70	1.03
635.15	0.11	637.75	1.05
635.20	0.11	637.80	1.07
635.25	0.11	637.85	1.10
635.30	0.12	637.90	1.12
635.35	0.12	637.95	1.14
635.40	0.12	638.00	1.16
635.45	0.12	638.05	1.18
635.50	0.13	638.10	1.20
635.55	0.13	638.15	1.22
635.60	0.13	638.20	1.24
635.65	0.13	638.25	1.25
635.70	0.13	638.30	1.26
635.75	0.14	638.35	1.26
635.80	0.14	638.40	1.27
635.85	0.14	638.45	1.27
635.90	0.14	638.50	1.28
635.95	0.14	638.55	1.29
636.00	0.15	638.60	1.29
636.05	0.15	638.65	**1.30**
636.10	0.17		
636.15	0.20		
636.20	0.24		
636.25	0.27		
636.30	0.31		
636.35	0.34		
636.40	0.36		
636.45	0.39		
636.50	0.41		
636.55	0.43		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth = 0.45" for 1" WQV event
Inflow = 0.20 cfs @ 3.10 hrs, Volume= 0.027 af
Outflow = 0.08 cfs @ 4.23 hrs, Volume= 0.024 af, Atten= 61%, Lag= 67.6 min
Primary = 0.08 cfs @ 4.23 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Peak Elev= 638.10' @ 4.22 hrs Surf.Area= 0.090 ac Storage= 0.009 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= 63.3 min calculated for 0.024 af (91% of inflow)
Center-of-Mass det. time= 51.0 min (268.5 - 217.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 4.23 hrs HW=638.10' (Free Discharge)
└─**1=Culvert** (Passes 0.08 cfs of 0.76 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.45 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

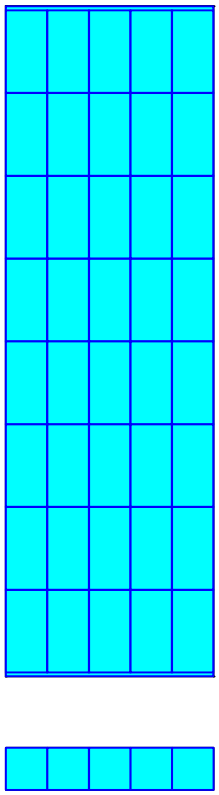
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

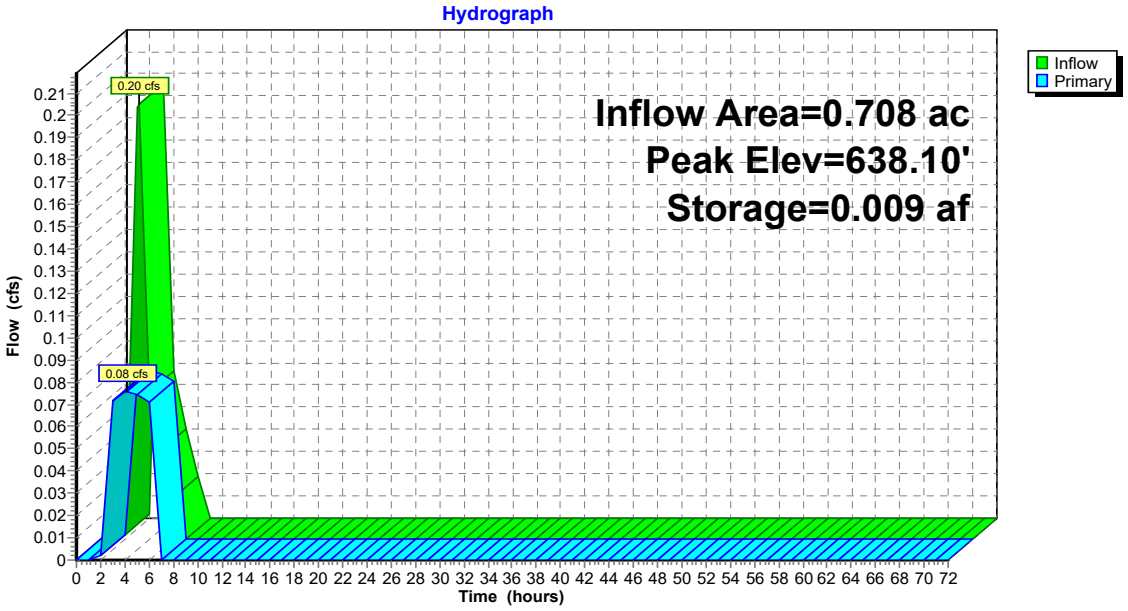
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow
Primary
0.20 cfs
0.08 cfs
Inflow Area=0.708 ac
Peak Elev=638.10'
Storage=0.009 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-5: DB-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
637.50	0.00	639.58	0.15	641.66	0.21	643.74	0.26
637.54	0.00	639.62	0.15	641.70	0.21	643.78	0.26
637.58	0.01	639.66	0.15	641.74	0.21	643.82	0.26
637.62	0.02	639.70	0.15	641.78	0.22	643.86	0.26
637.66	0.03	639.74	0.15	641.82	0.22	643.90	0.26
637.70	0.04	639.78	0.16	641.86	0.22	643.94	0.26
637.74	0.04	639.82	0.16	641.90	0.22	643.98	0.27
637.78	0.05	639.86	0.16	641.94	0.22	644.02	0.27
637.82	0.05	639.90	0.16	641.98	0.22	644.06	0.27
637.86	0.06	639.94	0.16	642.02	0.22	644.10	0.27
637.90	0.06	639.98	0.16	642.06	0.22	644.14	0.27
637.94	0.06	640.02	0.16	642.10	0.22	644.18	0.27
637.98	0.07	640.06	0.17	642.14	0.22	644.22	0.27
638.02	0.07	640.10	0.17	642.18	0.23	644.26	0.27
638.06	0.07	640.14	0.17	642.22	0.23	644.30	0.27
638.10	0.08	640.18	0.17	642.26	0.23	644.34	0.27
638.14	0.08	640.22	0.17	642.30	0.23	644.38	0.27
638.18	0.08	640.26	0.17	642.34	0.23	644.42	0.27
638.22	0.08	640.30	0.17	642.38	0.23	644.46	0.28
638.26	0.09	640.34	0.17	642.42	0.23	644.50	0.28
638.30	0.09	640.38	0.18	642.46	0.23	644.54	0.28
638.34	0.09	640.42	0.18	642.50	0.23	644.58	0.28
638.38	0.09	640.46	0.18	642.54	0.23	644.62	0.28
638.42	0.10	640.50	0.18	642.58	0.23	644.66	**0.28**
638.46	0.10	640.54	0.18	642.62	0.24		
638.50	0.10	640.58	0.18	642.66	0.24		
638.54	0.10	640.62	0.18	642.70	0.24		
638.58	0.10	640.66	0.18	642.74	0.24		
638.62	0.11	640.70	0.19	642.78	0.24		
638.66	0.11	640.74	0.19	642.82	0.24		
638.70	0.11	640.78	0.19	642.86	0.24		
638.74	0.11	640.82	0.19	642.90	0.24		
638.78	0.11	640.86	0.19	642.94	0.24		
638.82	0.12	640.90	0.19	642.98	0.24		
638.86	0.12	640.94	0.19	643.02	0.24		
638.90	0.12	640.98	0.19	643.06	0.25		
638.94	0.12	641.02	0.19	643.10	0.25		
638.98	0.12	641.06	0.20	643.14	0.25		
639.02	0.13	641.10	0.20	643.18	0.25		
639.06	0.13	641.14	0.20	643.22	0.25		
639.10	0.13	641.18	0.20	643.26	0.25		
639.14	0.13	641.22	0.20	643.30	0.25		
639.18	0.13	641.26	0.20	643.34	0.25		
639.22	0.13	641.30	0.20	643.38	0.25		
639.26	0.14	641.34	0.20	643.42	0.25		
639.30	0.14	641.38	0.20	643.46	0.25		
639.34	0.14	641.42	0.21	643.50	0.26		
639.38	0.14	641.46	0.21	643.54	0.26		
639.42	0.14	641.50	0.21	643.58	0.26		
639.46	0.14	641.54	0.21	643.62	0.26		
639.50	0.15	641.58	0.21	643.66	0.26		
639.54	0.15	641.62	0.21	643.70	0.26		

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac,	72.22% Impervious,	Inflow Depth =	0.25"	for 1" WQV event
Inflow =	0.04 cfs @	3.16 hrs,	Volume=	0.007 af	
Outflow =	0.04 cfs @	3.16 hrs,	Volume=	0.007 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.04 cfs @	3.16 hrs,	Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

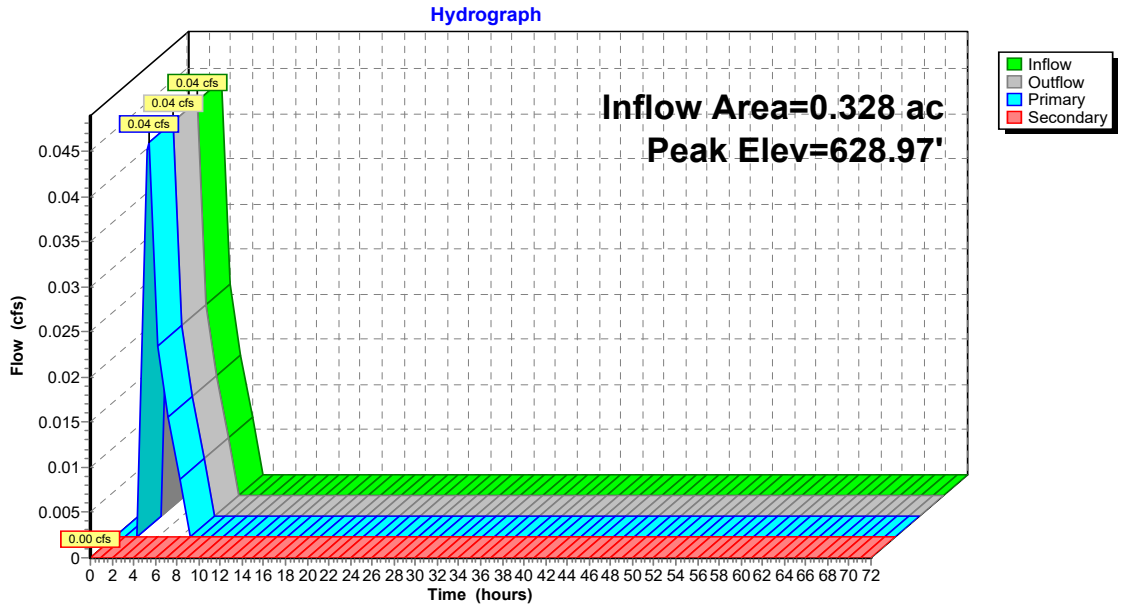
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 628.97' @ 3.26 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**5.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 622.00' S= 0.0285 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.14 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.04 cfs @ 3.16 hrs HW=628.96' TW=622.96' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.04 cfs @ 1.39 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=628.85' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond ICS-3: ICS-3



Stage-Discharge for Pond ICS-3: ICS-3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
628.85	0.00	0.00	0.00
628.90	0.01	0.01	0.00
628.95	0.03	0.03	0.00
629.00	0.07	0.07	0.00
629.05	0.12	0.12	0.00
629.10	0.19	0.18	0.01
629.15	0.28	0.24	0.03
629.20	0.38	0.31	0.07
629.25	0.48	0.36	0.12
629.30	0.58	0.40	0.18
629.35	0.69	0.44	0.25
629.40	0.81	0.48	0.33
629.45	0.93	0.51	0.41
629.50	1.06	0.55	0.51
629.55	1.19	0.58	0.62
629.60	1.33	0.60	0.73
629.65	1.48	0.63	0.85
629.70	1.63	0.66	0.97
629.75	1.78	**0.68**	1.10
629.80	1.92	0.68	1.24
629.85	2.06	0.68	1.38
629.90	2.20	0.68	1.52
629.95	2.34	0.68	1.66
630.00	2.48	0.68	1.80
630.05	2.62	0.68	1.94
630.10	2.76	0.68	2.08
630.15	2.90	0.68	2.22
630.20	3.03	0.68	2.35
630.25	3.15	0.68	2.47
630.30	3.26	0.68	2.58
630.35	3.35	0.68	2.67
630.40	3.43	0.68	2.75
630.45	3.51	0.68	2.83
630.50	3.59	0.68	2.91
630.55	3.67	0.68	2.99
630.60	3.74	0.68	3.06
630.65	3.81	0.68	3.13
630.70	3.88	0.68	3.20
630.75	3.95	0.68	3.27
630.80	4.02	0.68	3.34
630.85	4.08	0.68	3.40
630.90	4.15	0.68	3.47
630.95	4.21	0.68	3.53
631.00	4.28	0.68	3.60
631.05	4.34	0.68	3.66
631.10	4.40	0.68	3.72
631.15	4.46	0.68	3.78
631.20	4.52	0.68	3.83
631.25	4.57	0.68	3.89
631.30	4.63	0.68	3.95
631.35	4.69	0.68	4.01
631.40	4.74	0.68	4.06
631.45	4.80	0.68	4.12
631.50	4.85	0.68	4.17
631.55	4.90	0.68	4.22
631.60	4.95	0.68	4.27
631.65	5.01	0.68	4.33
631.70	5.06	0.68	4.38
631.75	5.11	0.68	4.43
631.80	5.16	0.68	4.48
631.85	5.21	0.68	4.53
631.90	5.26	0.68	4.58
631.95	5.31	0.68	4.63
632.00	5.35	0.68	4.67
632.05	5.40	0.68	4.72
632.10	5.45	0.68	4.77
632.15	5.49	0.68	4.81
632.20	5.54	0.68	4.86
632.25	5.59	0.68	4.91
632.30	5.63	0.68	4.95
632.35	5.68	0.68	5.00
632.40	5.72	0.68	5.04
632.45	5.76	0.68	5.08
632.50	**5.81**	0.68	**5.13**

Summary for Pond ICS-4: ICS-4

Inflow Area = 1.068 ac, 93.43% Impervious, Inflow Depth = 0.63" for 1" WQV event
Inflow = 0.43 cfs @ 3.07 hrs, Volume= 0.056 af
Outflow = 0.43 cfs @ 3.07 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 3.07 hrs, Volume= 0.056 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

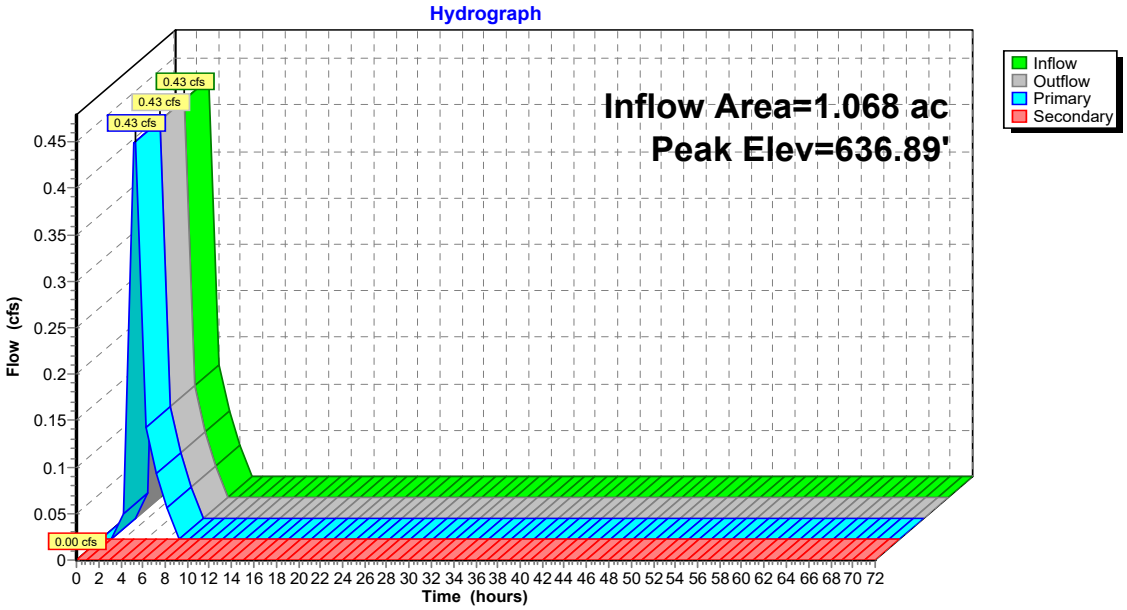
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 636.89' @ 3.10 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.40 cfs @ 3.07 hrs HW=636.87' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.40 cfs @ 2.59 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=636.50' (Free Discharge)
└─**3=Culvert** (Controls 0.00 cfs)
  └─**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond ICS-4: ICS-4



Stage-Discharge for Pond ICS-4: ICS-4

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
636.50	0.00	0.00	0.00
636.55	0.01	0.01	0.00
636.60	0.04	0.04	0.00
636.65	0.08	0.08	0.00
636.70	0.14	0.14	0.00
636.75	0.21	0.21	0.00
636.80	0.29	0.29	0.00
636.85	0.37	0.37	0.00
636.90	0.45	0.45	0.00
636.95	0.53	0.53	0.00
637.00	0.59	0.59	0.00
637.05	0.65	0.65	0.00
637.10	0.70	0.70	0.00
637.15	0.75	0.75	0.00
637.20	0.79	0.79	0.00
637.25	0.84	0.84	0.00
637.30	0.88	0.88	0.00
637.35	0.89	0.89	0.00
637.40	0.89	0.89	0.00
637.45	0.90	0.90	0.00
637.50	0.90	0.90	0.00
637.55	0.91	0.91	0.00
637.60	0.91	0.91	0.00
637.65	0.92	0.92	0.00
637.70	0.92	0.92	0.00
637.75	0.93	0.93	0.00
637.80	0.94	0.94	0.00
637.85	0.94	0.94	0.00
637.90	0.95	0.95	0.00
637.95	0.95	0.95	0.00
638.00	0.96	0.96	0.00
638.05	0.96	0.96	0.00
638.10	0.97	0.97	0.00
638.15	0.97	0.97	0.00
638.20	0.98	0.98	0.00
638.25	0.98	0.98	0.00
638.30	0.99	0.99	0.00
638.35	0.99	0.99	0.00
638.40	1.00	1.00	0.00
638.45	1.00	1.00	0.00
638.50	1.01	1.01	0.00
638.55	1.01	1.01	0.00
638.60	1.02	1.02	0.00
638.65	1.02	1.02	0.00
638.70	1.03	1.03	0.00
638.75	1.03	1.03	0.00
638.80	1.04	1.04	0.00
638.85	1.04	1.04	0.00
638.90	1.05	1.05	0.00
638.95	1.05	1.05	0.00
639.00	1.06	1.06	0.00
639.05	1.06	1.06	0.00
639.10	1.07	1.07	0.00
639.15	1.07	1.07	0.00
639.20	1.08	1.08	0.00
639.25	1.08	1.08	0.00
639.30	1.13	1.09	0.04
639.35	1.35	1.09	0.26
639.40	1.68	1.10	0.58
639.45	2.08	1.10	0.98
639.50	2.56	1.11	1.45
639.55	3.10	1.11	1.99
639.60	3.71	1.11	2.60
639.65	4.38	1.12	3.27
639.70	5.12	1.12	4.00
639.75	5.92	1.13	4.79
639.80	6.79	1.13	5.65
639.85	7.71	1.14	6.58
639.90	8.18	1.14	7.04
639.95	8.26	1.15	7.11
640.00	**8.34**	**1.15**	**7.19**

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac, 62.40% Impervious, Inflow Depth = 0.15" for 1" WQV event				
Inflow =	0.05 cfs @	3.26 hrs,	Volume=	0.009 af	
Outflow =	0.05 cfs @	3.26 hrs,	Volume=	0.009 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.05 cfs @	3.26 hrs,	Volume=	0.009 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

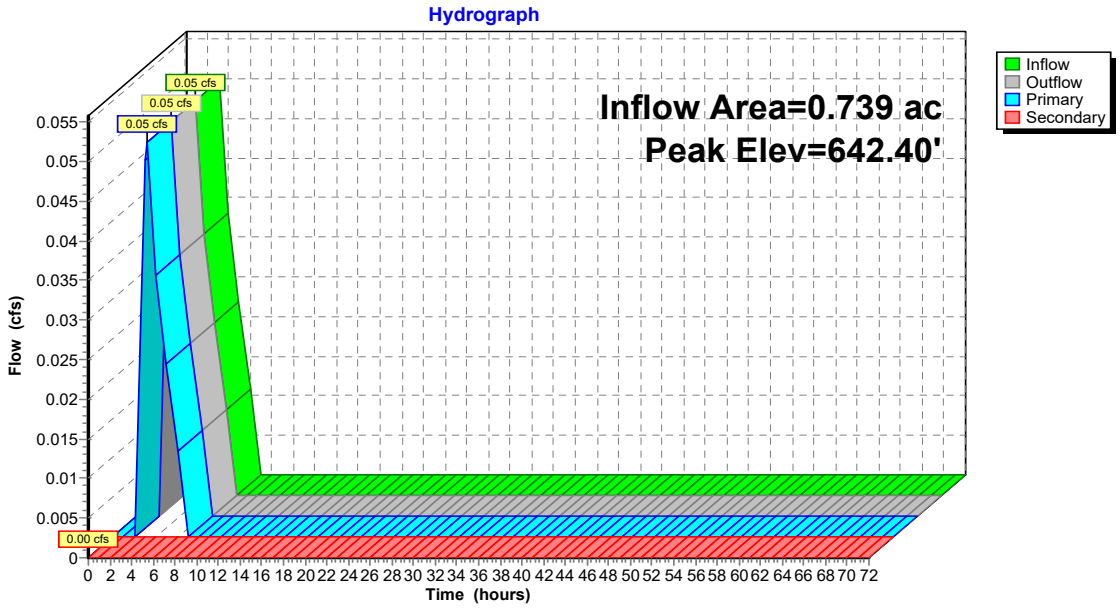
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 642.40' @ 3.34 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 636.00' S= 0.0781 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.04 cfs @ 3.26 hrs HW=642.39' TW=636.39' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.04 cfs @ 1.57 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=642.25' TW=636.25' (TW follows 6.00' below HW)
└─**2=Culvert** (Controls 0.00 cfs)

Pond ICS-5: ICS-5



Stage-Discharge for Pond ICS-5: ICS-5

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
642.25	0.00	0.00	0.00
642.30	0.01	0.01	0.00
642.35	0.02	0.02	0.00
642.40	0.05	0.05	0.00
642.45	0.08	0.08	0.00
642.50	0.10	0.10	0.00
642.55	0.12	0.12	0.00
642.60	0.15	0.14	0.01
642.65	0.19	0.15	0.03
642.70	0.25	0.17	0.08
642.75	0.32	0.18	0.14
642.80	0.41	0.19	0.22
642.85	0.51	0.20	0.30
642.90	0.62	0.21	0.40
642.95	0.74	0.22	0.52
643.00	0.87	0.23	0.64
643.05	1.02	0.24	0.77
643.10	1.17	0.25	0.91
643.15	1.33	0.26	1.07
643.20	1.49	0.27	1.22
643.25	1.66	0.28	1.39
643.30	1.84	0.28	1.56
643.35	2.02	**0.29**	1.73
643.40	2.21	**0.30**	1.91
643.45	2.39	0.30	2.09
643.50	2.57	0.30	2.27
643.55	2.75	0.30	2.45
643.60	2.93	0.30	2.63
643.65	3.10	0.30	2.80
643.70	3.27	0.30	2.97
643.75	3.42	0.30	3.13
643.80	3.57	0.30	3.27
643.85	3.69	0.30	3.39
643.90	3.78	0.30	3.48
643.95	3.99	0.30	3.69
644.00	4.19	0.30	3.89
644.05	4.38	0.30	4.08
644.10	4.56	0.30	4.26
644.15	4.73	0.30	4.44
644.20	4.90	0.30	4.60
644.25	5.06	0.30	4.77
644.30	5.22	0.30	4.92
644.35	5.37	0.30	5.07
644.40	5.52	0.30	5.22
644.45	5.66	0.30	5.36
644.50	5.80	0.30	5.50
644.55	5.94	0.30	5.64
644.60	6.07	0.30	5.77
644.65	6.20	0.30	5.90
644.70	6.32	0.30	6.03
644.75	6.44	0.30	6.15
644.80	6.53	0.30	6.24
644.85	6.62	0.30	6.32
644.90	6.71	0.30	6.41
644.95	6.79	0.30	6.50
645.00	6.88	0.30	6.58
645.05	6.96	0.30	6.67
645.10	7.05	0.30	6.75
645.15	7.13	0.30	6.83
645.20	7.21	0.30	6.92
645.25	7.29	0.30	7.00
645.30	7.37	0.30	7.07
645.35	7.45	0.30	7.15
645.40	7.53	0.30	7.23
645.45	7.60	0.30	7.31
645.50	**7.68**	0.30	**7.38**

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth = 0.25" for 1" WQV event
Inflow = 0.01 cfs @ 3.16 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.001 af, Atten= 53%, Lag= 0.0 min
Primary = 0.00 cfs @ 3.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 653.12' @ 4.26 hrs Surf.Area= 259 sf Storage= 12 cf

Plug-Flow detention time= 43.9 min calculated for 0.001 af (99% of inflow)
Center-of-Mass det. time= 43.9 min (271.9 - 228.0)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

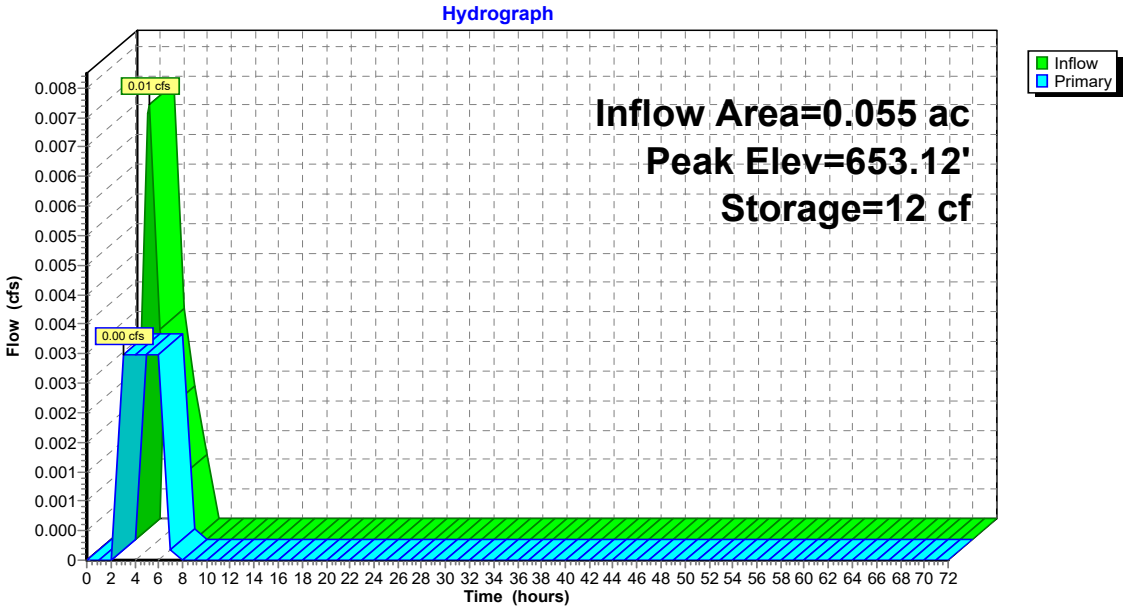
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 3.00 hrs HW=653.05' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Pond RG-7B: RG-7B



Stage-Discharge for Pond RG-7B: RG-7B

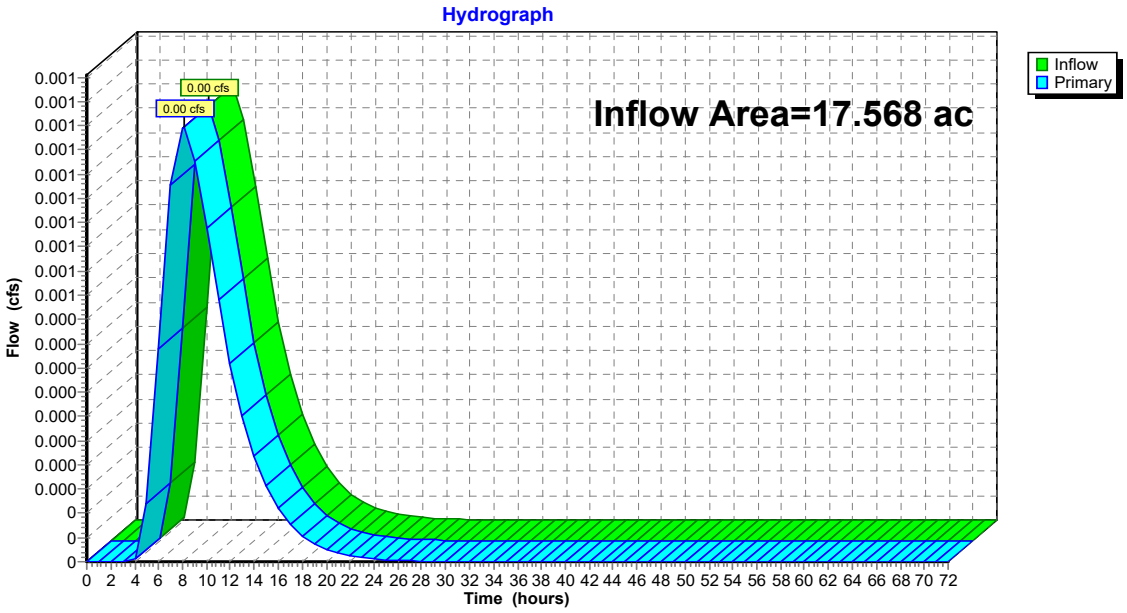
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
653.00	0.00	653.52	0.00	654.04	0.00	654.56	0.01
653.01	0.00	653.53	0.00	654.05	0.00	654.57	0.01
653.02	0.00	653.54	0.00	654.06	0.00	654.58	0.01
653.03	0.00	653.55	0.00	654.07	0.00	654.59	0.01
653.04	0.00	653.56	0.00	654.08	0.00	654.60	0.01
653.05	0.00	653.57	0.00	654.09	0.00	654.61	0.01
653.06	0.00	653.58	0.00	654.10	0.00	654.62	0.01
653.07	0.00	653.59	0.00	654.11	0.00	654.63	0.01
653.08	0.00	653.60	0.00	654.12	0.00	654.64	0.01
653.09	0.00	653.61	0.00	654.13	0.00	654.65	0.01
653.10	0.00	653.62	0.00	654.14	0.00	654.66	0.01
653.11	0.00	653.63	0.00	654.15	0.00	654.67	0.01
653.12	0.00	653.64	0.00	654.16	0.00	654.68	0.01
653.13	0.00	653.65	0.00	654.17	0.00	654.69	0.01
653.14	0.00	653.66	0.00	654.18	0.00	654.70	0.01
653.15	0.00	653.67	0.00	654.19	0.00	654.71	0.01
653.16	0.00	653.68	0.00	654.20	0.00	654.72	0.01
653.17	0.00	653.69	0.00	654.21	0.00	654.73	0.01
653.18	0.00	653.70	0.00	654.22	0.00	654.74	0.01
653.19	0.00	653.71	0.00	654.23	0.00	654.75	0.01
653.20	0.00	653.72	0.00	654.24	0.00	654.76	0.01
653.21	0.00	653.73	0.00	654.25	0.00	654.77	0.01
653.22	0.00	653.74	0.00	654.26	0.00	654.78	0.01
653.23	0.00	653.75	0.00	654.27	0.00	654.79	0.01
653.24	0.00	653.76	0.00	654.28	0.00	654.80	0.01
653.25	0.00	653.77	0.00	654.29	0.00	654.81	0.01
653.26	0.00	653.78	0.00	654.30	0.00	654.82	0.01
653.27	0.00	653.79	0.00	654.31	0.00	654.83	0.01
653.28	0.00	653.80	0.00	654.32	0.00	654.84	0.01
653.29	0.00	653.81	0.00	654.33	0.00	654.85	0.01
653.30	0.00	653.82	0.00	654.34	0.00	654.86	0.01
653.31	0.00	653.83	0.00	654.35	0.00	654.87	0.01
653.32	0.00	653.84	0.00	654.36	0.00	654.88	0.01
653.33	0.00	653.85	0.00	654.37	0.00	654.89	0.01
653.34	0.00	653.86	0.00	654.38	0.00	654.90	0.01
653.35	0.00	653.87	0.00	654.39	0.00	654.91	0.03
653.36	0.00	653.88	0.00	654.40	0.00	654.92	0.08
653.37	0.00	653.89	0.00	654.41	0.00	654.93	0.14
653.38	0.00	653.90	0.00	654.42	0.00	654.94	0.21
653.39	0.00	653.91	0.00	654.43	0.00	654.95	0.29
653.40	0.00	653.92	0.00	654.44	0.00	654.96	0.38
653.41	0.00	653.93	0.00	654.45	0.00	654.97	0.48
653.42	0.00	653.94	0.00	654.46	0.00	654.98	0.58
653.43	0.00	653.95	0.00	654.47	0.00	654.99	0.69
653.44	0.00	653.96	0.00	654.48	0.00	655.00	**0.81**
653.45	0.00	653.97	0.00	654.49	0.01		
653.46	0.00	653.98	0.00	654.50	0.01		
653.47	0.00	653.99	0.00	654.51	0.01		
653.48	0.00	654.00	0.00	654.52	0.01		
653.49	0.00	654.01	0.00	654.53	0.01		
653.50	0.00	654.02	0.00	654.54	0.01		
653.51	0.00	654.03	0.00	654.55	0.01		

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 8.13 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 8.13 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

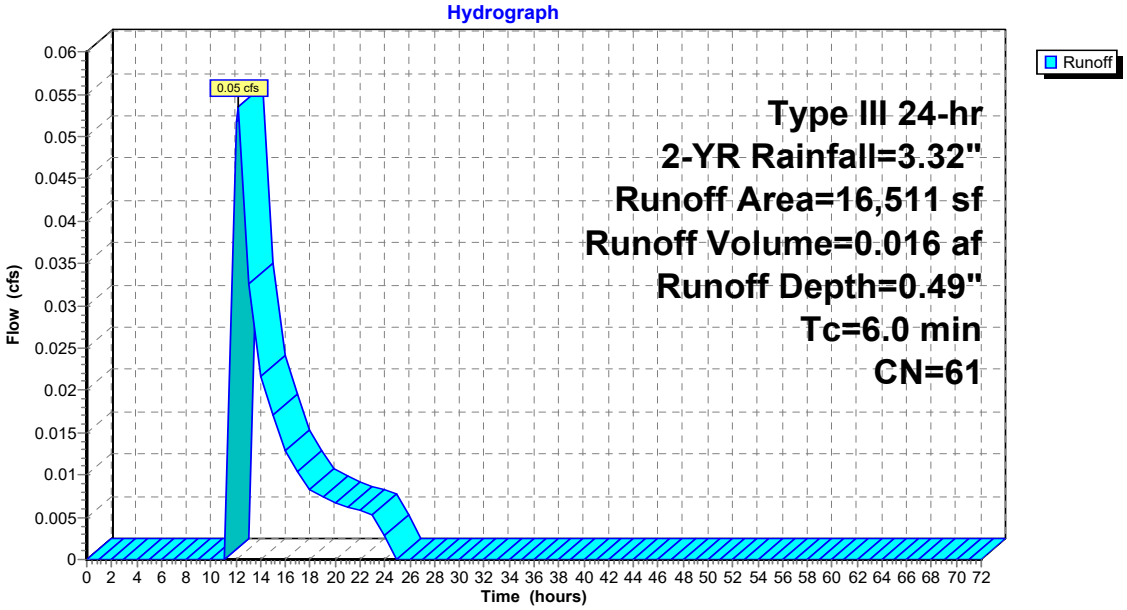
Runoff = 0.05 cfs @ 12.23 hrs, Volume= 0.016 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

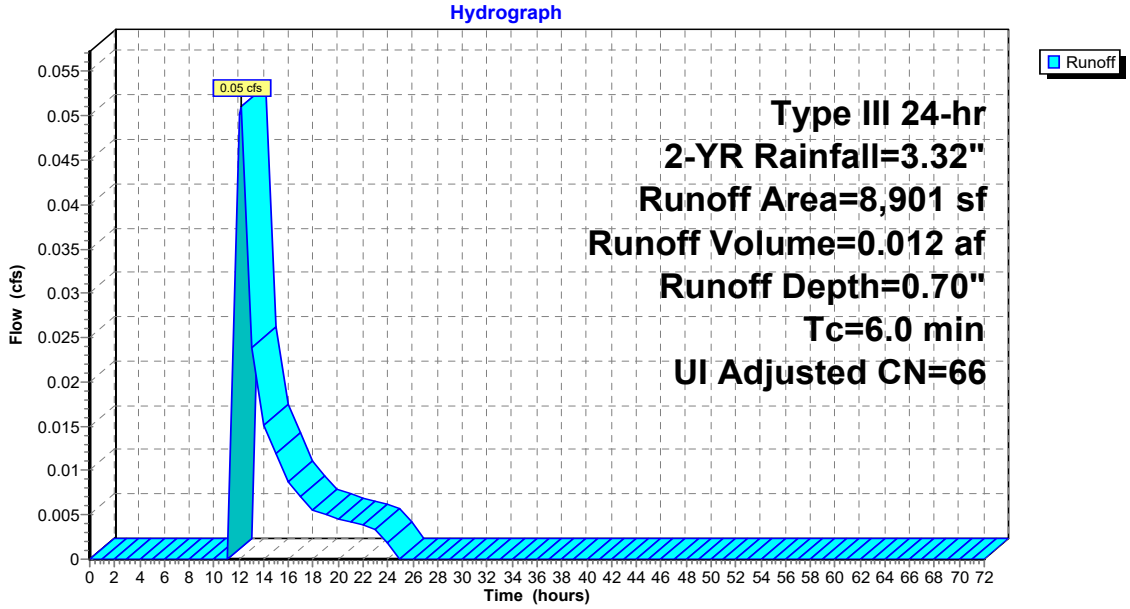
Runoff = 0.05 cfs @ 12.16 hrs, Volume= 0.012 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

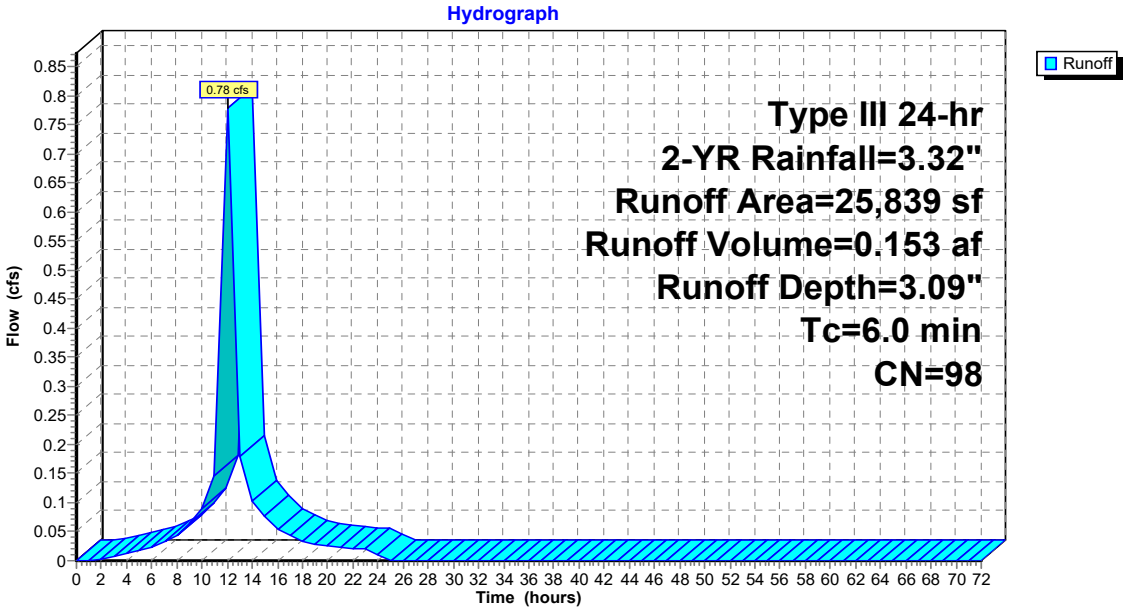
Runoff = 0.78 cfs @ 12.01 hrs, Volume= 0.153 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

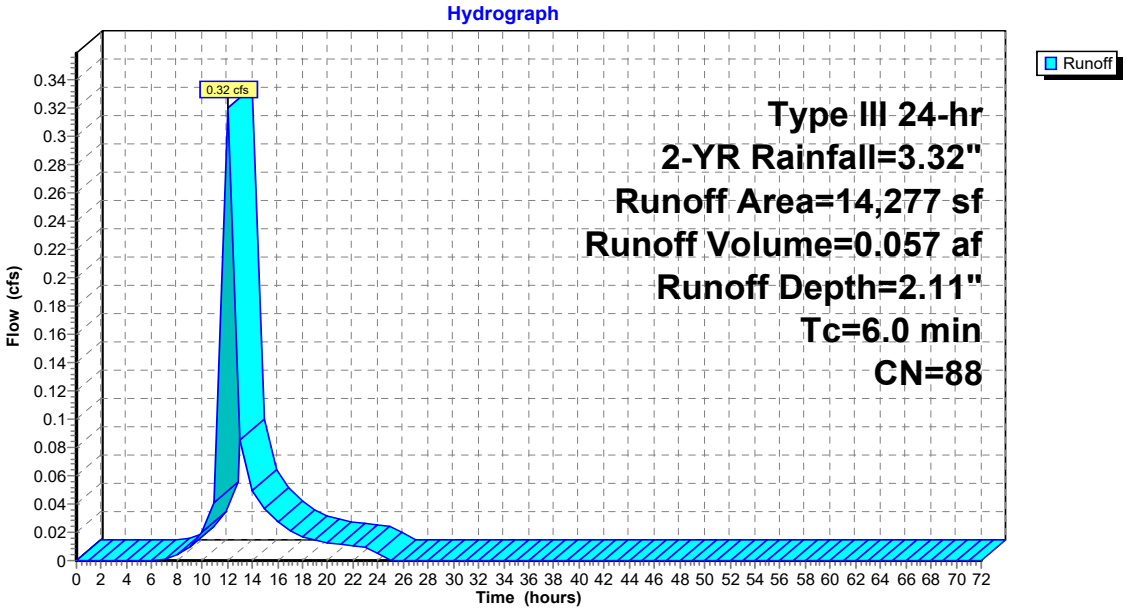
Runoff = 0.32 cfs @ 12.04 hrs, Volume= 0.057 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

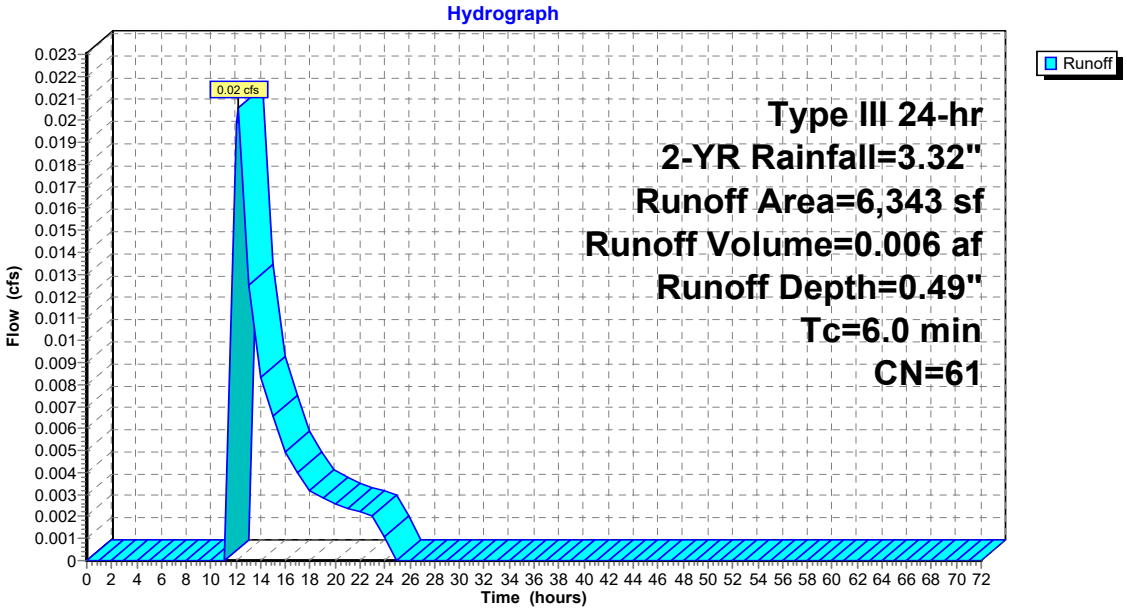
Runoff = 0.02 cfs @ 12.23 hrs, Volume= 0.006 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

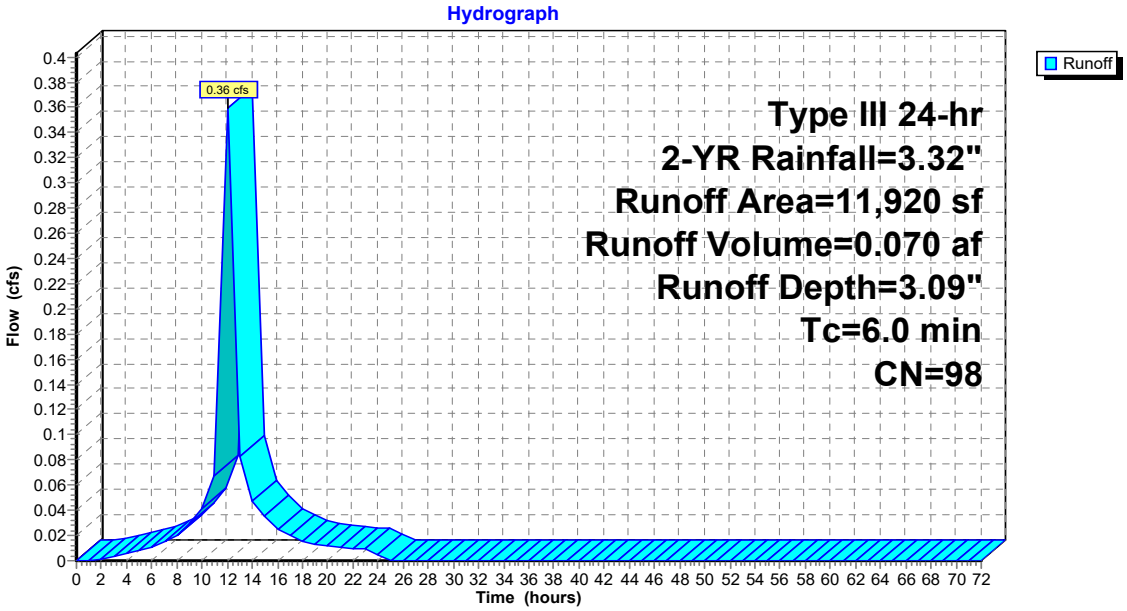
Runoff = 0.36 cfs @ 12.01 hrs, Volume= 0.070 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

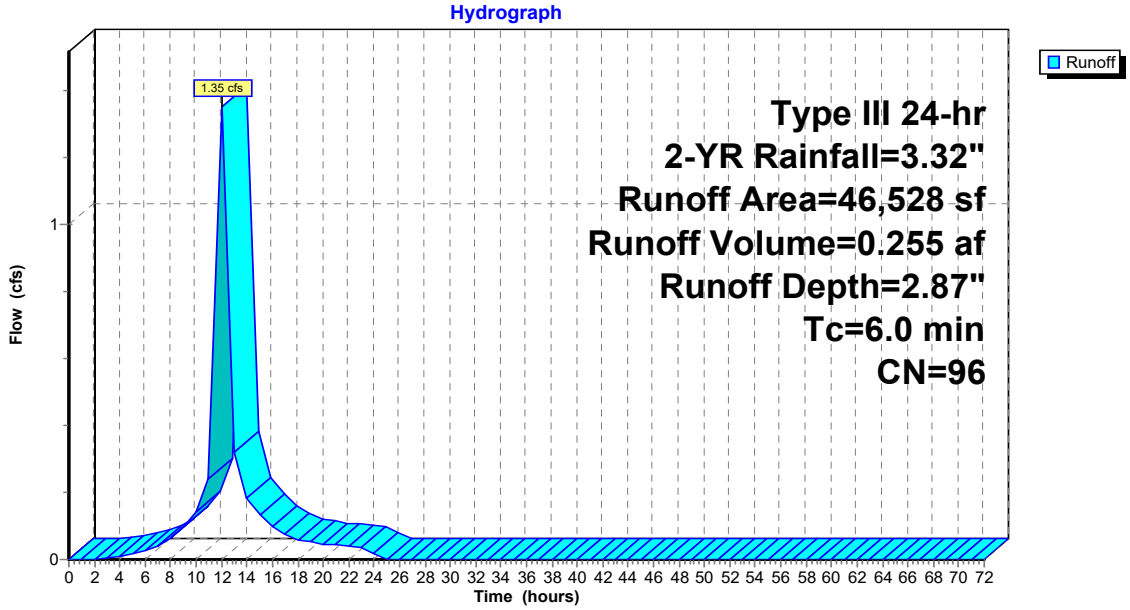
Runoff = 1.35 cfs @ 12.02 hrs, Volume= 0.255 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

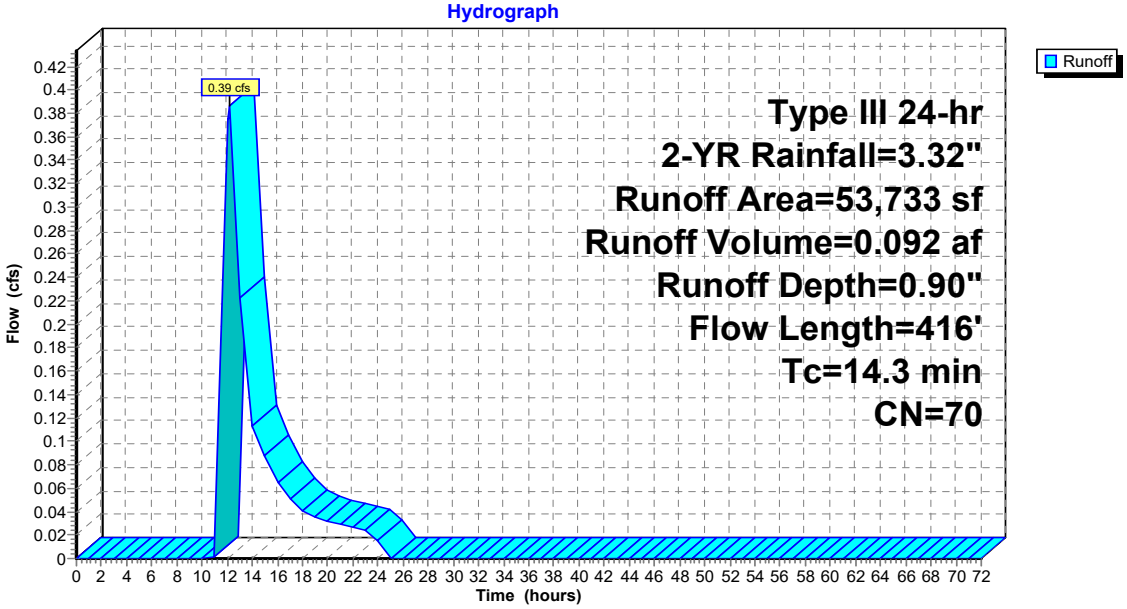
Runoff = 0.39 cfs @ 12.21 hrs, Volume= 0.092 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

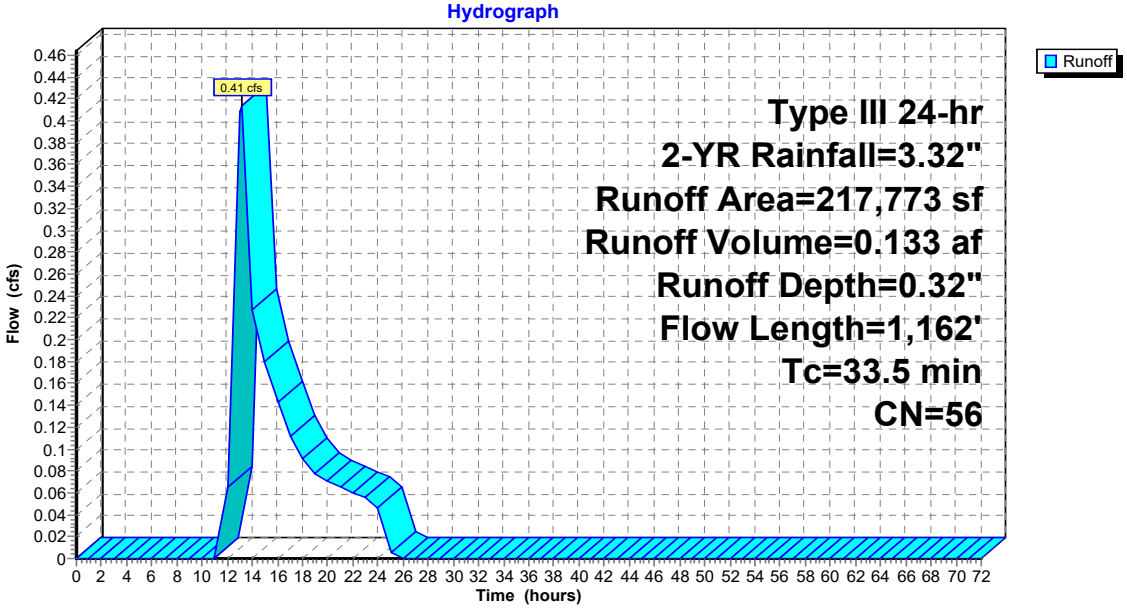
Runoff = 0.41 cfs @ 13.15 hrs, Volume= 0.133 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

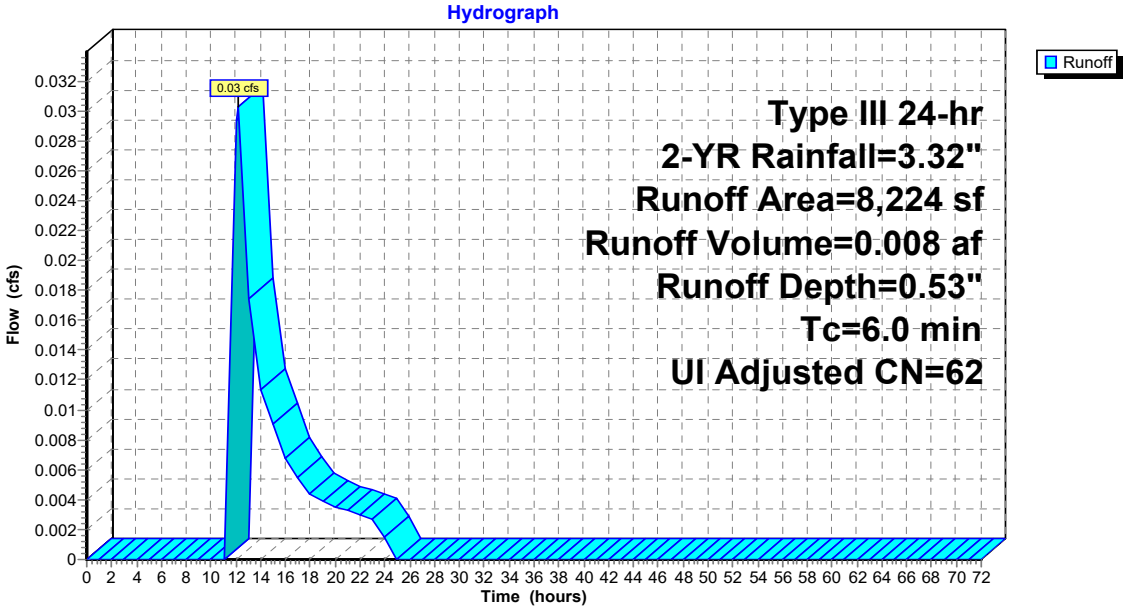
Runoff = 0.03 cfs @ 12.21 hrs, Volume= 0.008 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

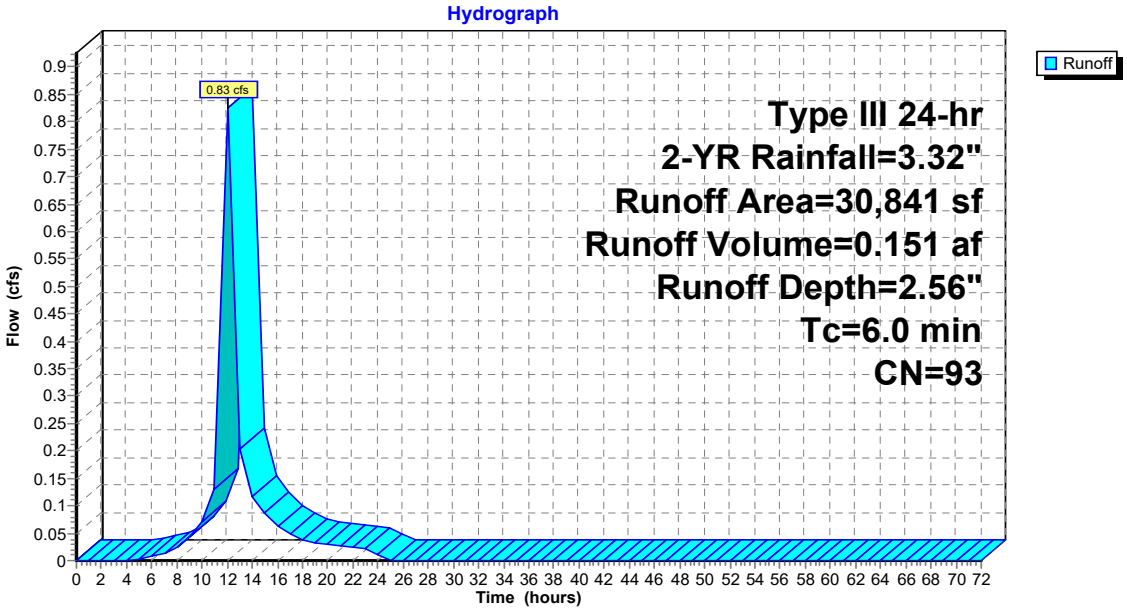
Runoff = 0.83 cfs @ 12.03 hrs, Volume= 0.151 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

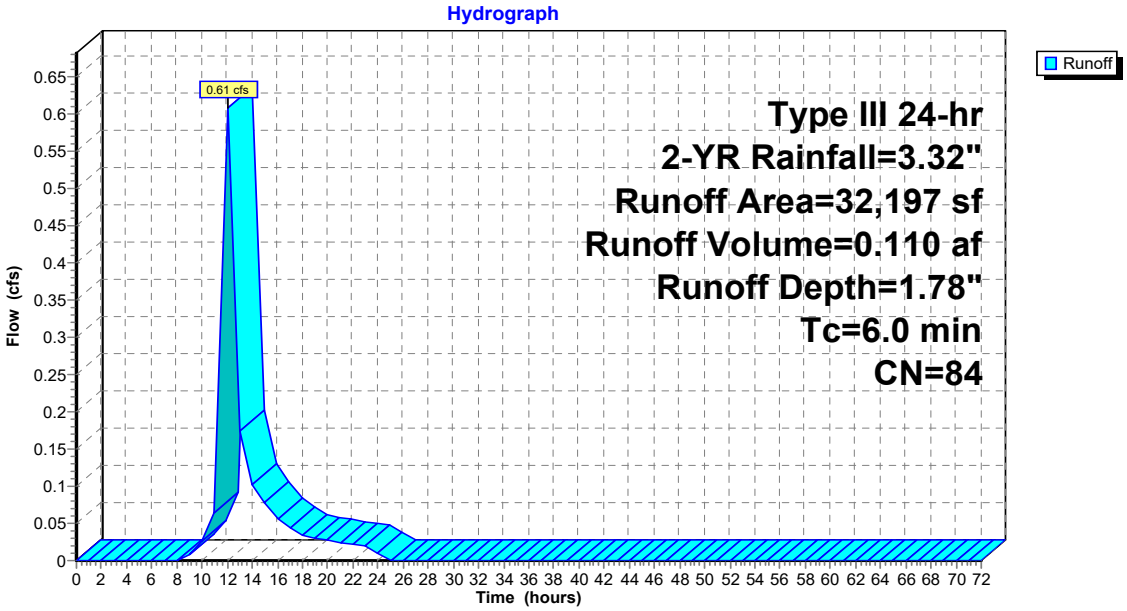
Runoff = 0.61 cfs @ 12.06 hrs, Volume= 0.110 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

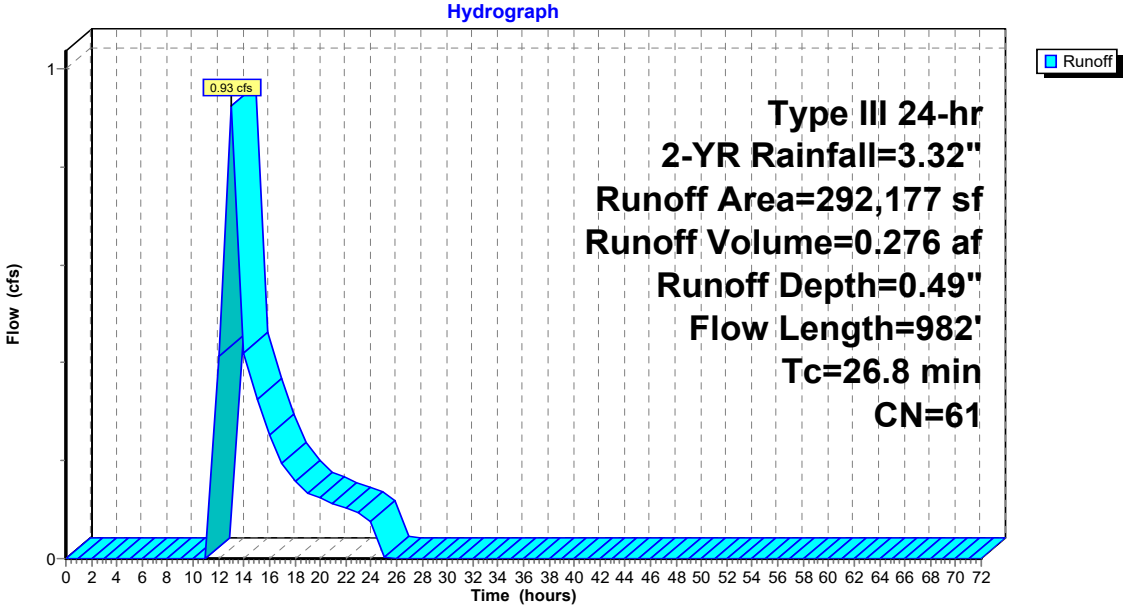
Runoff = 0.93 cfs @ 13.00 hrs, Volume= 0.276 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

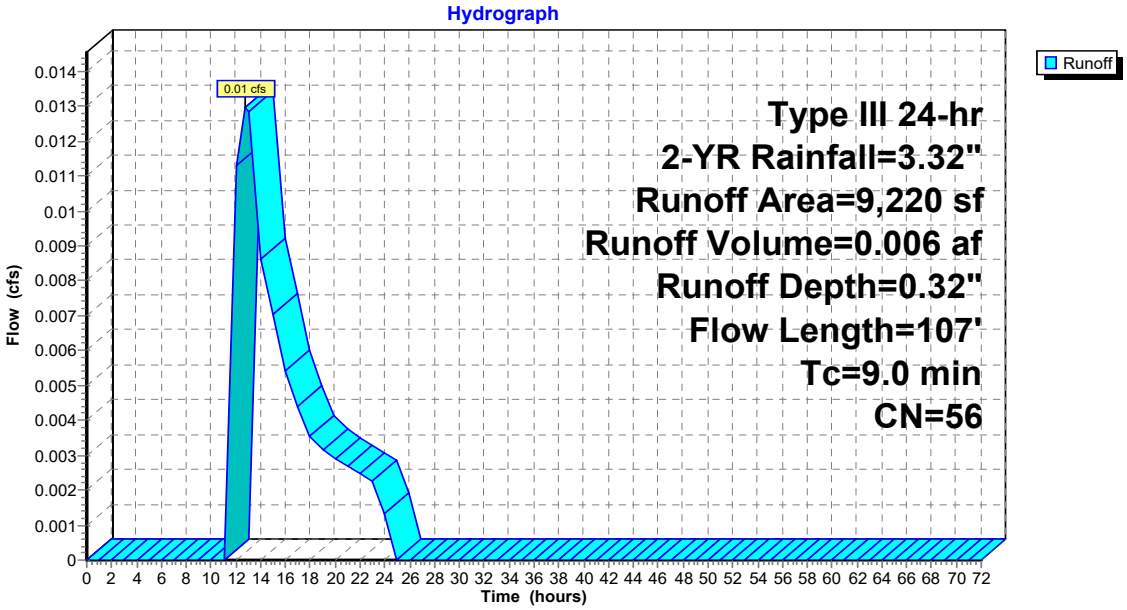
Runoff = 0.01 cfs @ 12.77 hrs, Volume= 0.006 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

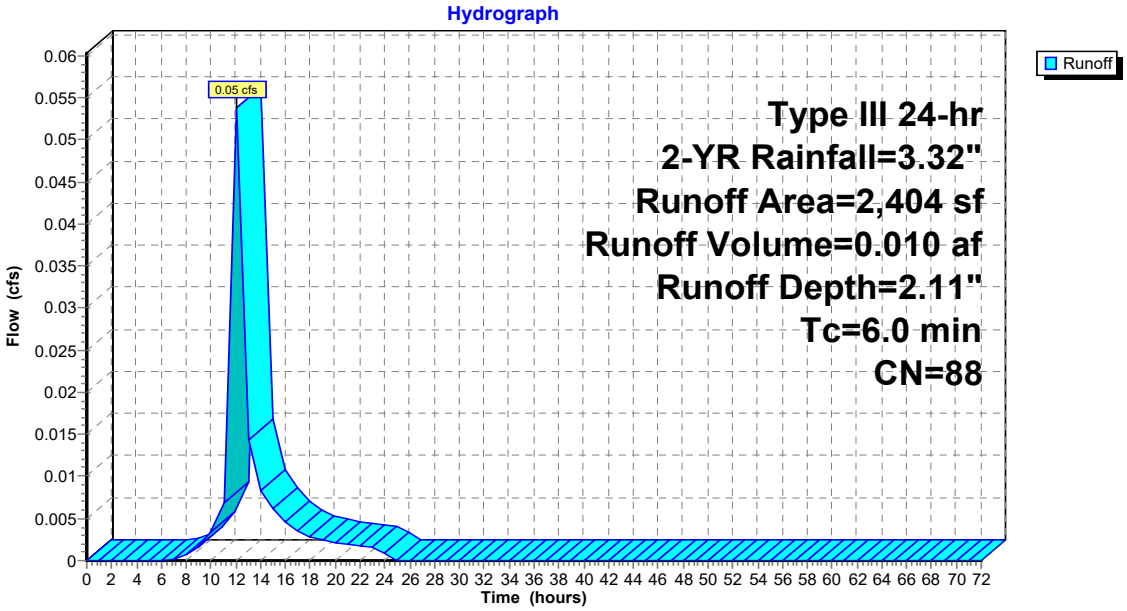
Runoff = 0.05 cfs @ 12.04 hrs, Volume= 0.010 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

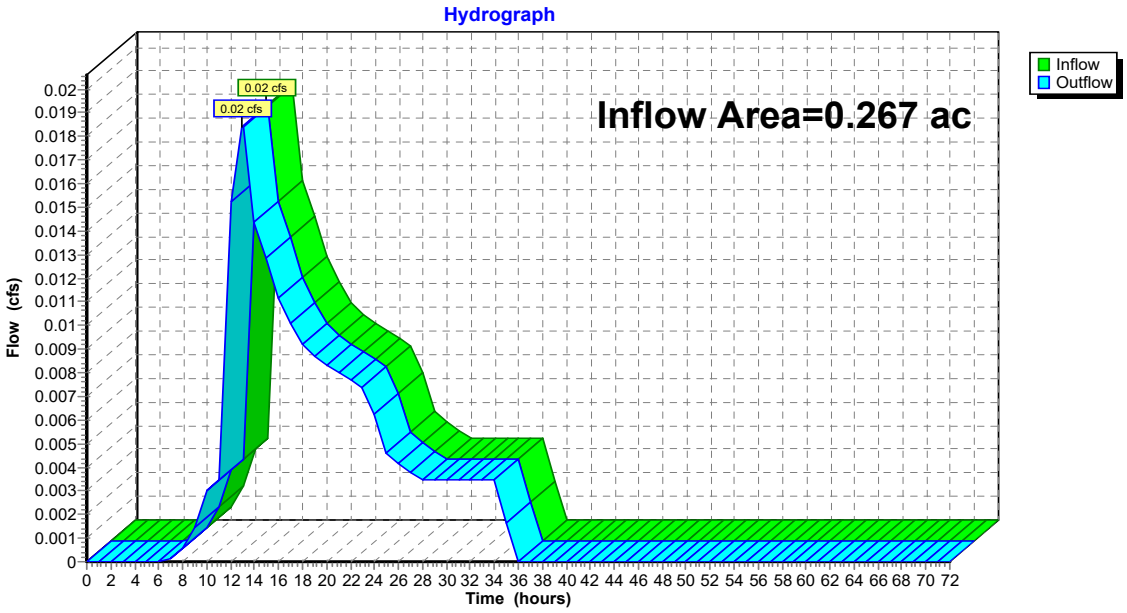


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth = 0.69" for 2-YR event
Inflow = 0.02 cfs @ 12.94 hrs, Volume= 0.015 af
Outflow = 0.02 cfs @ 12.94 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

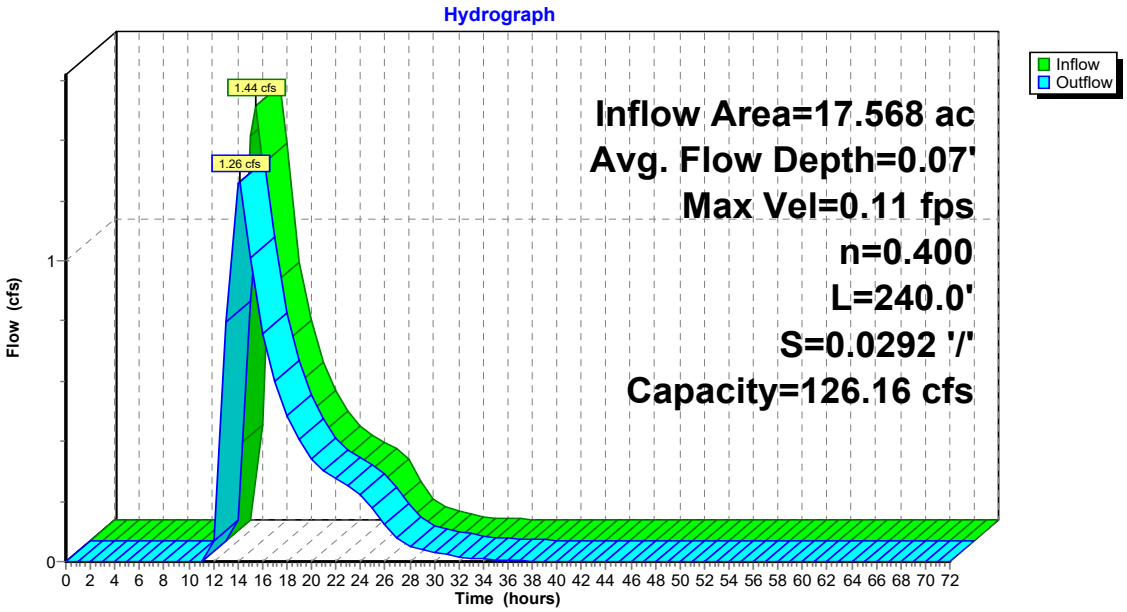
Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 0.41" for 2-YR event
Inflow = 1.44 cfs @ 13.42 hrs, Volume= 0.608 af
Outflow = 1.26 cfs @ 14.15 hrs, Volume= 0.607 af, Atten= 13%, Lag= 44.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.11 fps, Min. Travel Time= 37.9 min
Avg. Velocity = 0.04 fps, Avg. Travel Time= 93.5 min

Peak Storage= 2,867 cf @ 14.16 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

Reach PDP-4: Design Point 4



Stage-Discharge for Reach PDP-4: Design Point 4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
625.00	0.00	0.00	625.52	0.37	38.60
625.01	0.03	0.05	625.53	0.37	39.92
625.02	0.05	0.15	625.54	0.37	41.26
625.03	0.06	0.30	625.55	0.38	42.62
625.04	0.07	0.49	625.56	0.38	44.01
625.05	0.08	0.72	625.57	0.39	45.42
625.06	0.10	0.97	625.58	0.39	46.84
625.07	0.11	1.26	625.59	0.39	48.29
625.08	0.12	1.57	625.60	0.40	49.76
625.09	0.12	1.92	625.61	0.40	51.25
625.10	0.13	2.29	625.62	0.41	52.76
625.11	0.14	2.69	625.63	0.41	54.29
625.12	0.15	3.11	625.64	0.41	55.85
625.13	0.16	3.56	625.65	0.42	57.42
625.14	0.16	4.04	625.66	0.42	59.02
625.15	0.17	4.54	625.67	0.42	60.64
625.16	0.18	5.06	625.68	0.43	62.27
625.17	0.19	5.61	625.69	0.43	63.93
625.18	0.19	6.18	625.70	0.43	65.62
625.19	0.20	6.78	625.71	0.44	67.32
625.20	0.21	7.40	625.72	0.44	69.04
625.21	0.21	8.04	625.73	0.44	70.79
625.22	0.22	8.70	625.74	0.45	72.55
625.23	0.22	9.39	625.75	0.45	74.34
625.24	0.23	10.09	625.76	0.46	76.15
625.25	0.24	10.82	625.77	0.46	77.98
625.26	0.24	11.58	625.78	0.46	79.84
625.27	0.25	12.35	625.79	0.47	81.71
625.28	0.25	13.15	625.80	0.47	83.61
625.29	0.26	13.96	625.81	0.47	85.53
625.30	0.26	14.80	625.82	0.48	87.47
625.31	0.27	15.66	625.83	0.48	89.43
625.32	0.27	16.54	625.84	0.48	91.41
625.33	0.28	17.45	625.85	0.48	93.42
625.34	0.28	18.37	625.86	0.49	95.44
625.35	0.29	19.31	625.87	0.49	97.49
625.36	0.29	20.28	625.88	0.49	99.56
625.37	0.30	21.27	625.89	0.50	101.66
625.38	0.30	22.28	625.90	0.50	103.77
625.39	0.31	23.31	625.91	0.50	105.91
625.40	0.31	24.36	625.92	0.51	108.07
625.41	0.32	25.43	625.93	0.51	110.25
625.42	0.32	26.52	625.94	0.51	112.46
625.43	0.33	27.63	625.95	0.52	114.69
625.44	0.33	28.77	625.96	0.52	116.94
625.45	0.34	29.92	625.97	0.52	119.21
625.46	0.34	31.10	625.98	0.53	121.50
625.47	0.35	32.30	625.99	0.53	123.82
625.48	0.35	33.51	626.00	**0.53**	**126.16**
625.49	0.35	34.75			
625.50	0.36	36.01			
625.51	0.36	37.29			

Summary for Reach PDP-5: Design Point 5

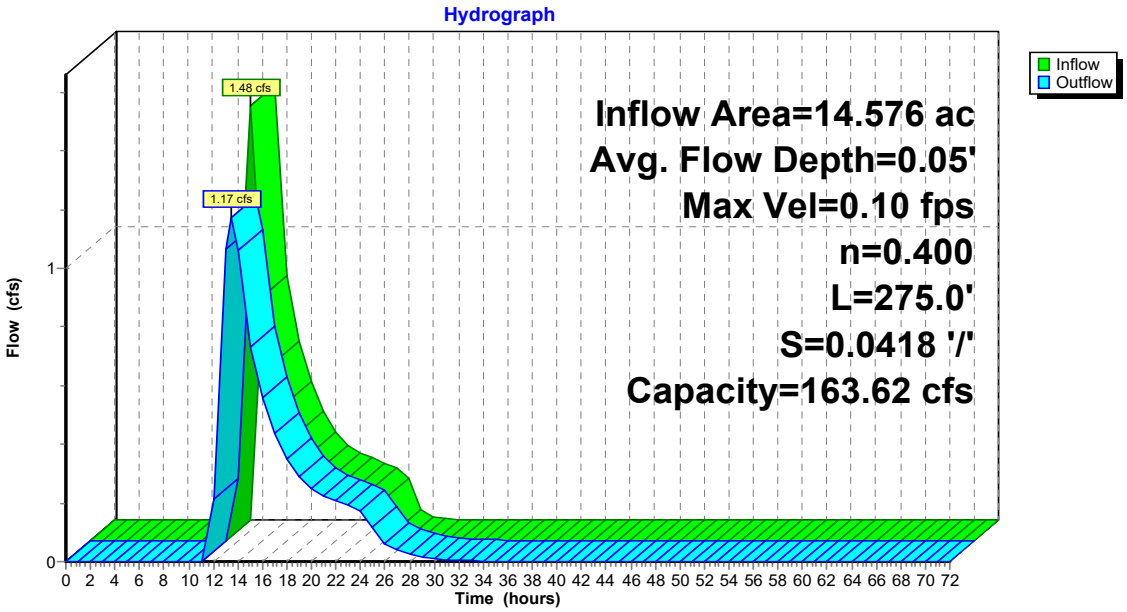
Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth = 0.41" for 2-YR event
Inflow = 1.48 cfs @ 13.03 hrs, Volume= 0.502 af
Outflow = 1.17 cfs @ 13.49 hrs, Volume= 0.501 af, Atten= 21%, Lag= 27.6 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.10 fps, Min. Travel Time= 44.1 min
Avg. Velocity = 0.05 fps, Avg. Travel Time= 96.1 min

Peak Storage= 3,043 cf @ 13.50 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

Reach PDP-5: Design Point 5



Stage-Discharge for Reach PDP-5: Design Point 5

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
636.50	0.00	0.00	637.02	0.46	52.98
636.51	0.04	0.07	637.03	0.47	54.73
636.52	0.06	0.22	637.04	0.48	56.50
636.53	0.07	0.44	637.05	0.48	58.30
636.54	0.09	0.71	637.06	0.49	60.12
636.55	0.10	1.03	637.07	0.49	61.97
636.56	0.12	1.40	637.08	0.50	63.84
636.57	0.13	1.81	637.09	0.50	65.74
636.58	0.14	2.27	637.10	0.51	67.66
636.59	0.15	2.76	637.11	0.51	69.60
636.60	0.16	3.29	637.12	0.52	71.57
636.61	0.17	3.86	637.13	0.52	73.56
636.62	0.18	4.47	637.14	0.53	75.57
636.63	0.19	5.11	637.15	0.53	77.61
636.64	0.20	5.79	637.16	0.54	79.67
636.65	0.21	6.50	637.17	0.54	81.76
636.66	0.22	7.24	637.18	0.55	83.87
636.67	0.23	8.01	637.19	0.55	86.00
636.68	0.24	8.82	637.20	0.56	88.16
636.69	0.25	9.66	637.21	0.56	90.34
636.70	0.25	10.53	637.22	0.57	92.54
636.71	0.26	11.43	637.23	0.57	94.77
636.72	0.27	12.36	637.24	0.58	97.02
636.73	0.28	13.32	637.25	0.58	99.29
636.74	0.29	14.31	637.26	0.58	101.58
636.75	0.29	15.33	637.27	0.59	103.90
636.76	0.30	16.37	637.28	0.59	106.25
636.77	0.31	17.45	637.29	0.60	108.61
636.78	0.31	18.55	637.30	0.60	111.00
636.79	0.32	19.68	637.31	0.61	113.41
636.80	0.33	20.84	637.32	0.61	115.85
636.81	0.34	22.03	637.33	0.62	118.31
636.82	0.34	23.24	637.34	0.62	120.79
636.83	0.35	24.48	637.35	0.63	123.29
636.84	0.36	25.75	637.36	0.63	125.82
636.85	0.36	27.04	637.37	0.63	128.37
636.86	0.37	28.36	637.38	0.64	130.95
636.87	0.38	29.71	637.39	0.64	133.54
636.88	0.38	31.08	637.40	0.65	136.16
636.89	0.39	32.48	637.41	0.65	138.80
636.90	0.39	33.91	637.42	0.66	141.47
636.91	0.40	35.36	637.43	0.66	144.16
636.92	0.41	36.83	637.44	0.66	146.87
636.93	0.41	38.34	637.45	0.67	149.60
636.94	0.42	39.86	637.46	0.67	152.36
636.95	0.42	41.42	637.47	0.68	155.14
636.96	0.43	42.99	637.48	0.68	157.94
636.97	0.44	44.59	637.49	0.68	160.77
636.98	0.44	46.22	637.50	**0.69**	**163.62**
636.99	0.45	47.87			
637.00	0.45	49.55			
637.01	0.46	51.25			

Summary for Reach PDP-6: Design Point 6

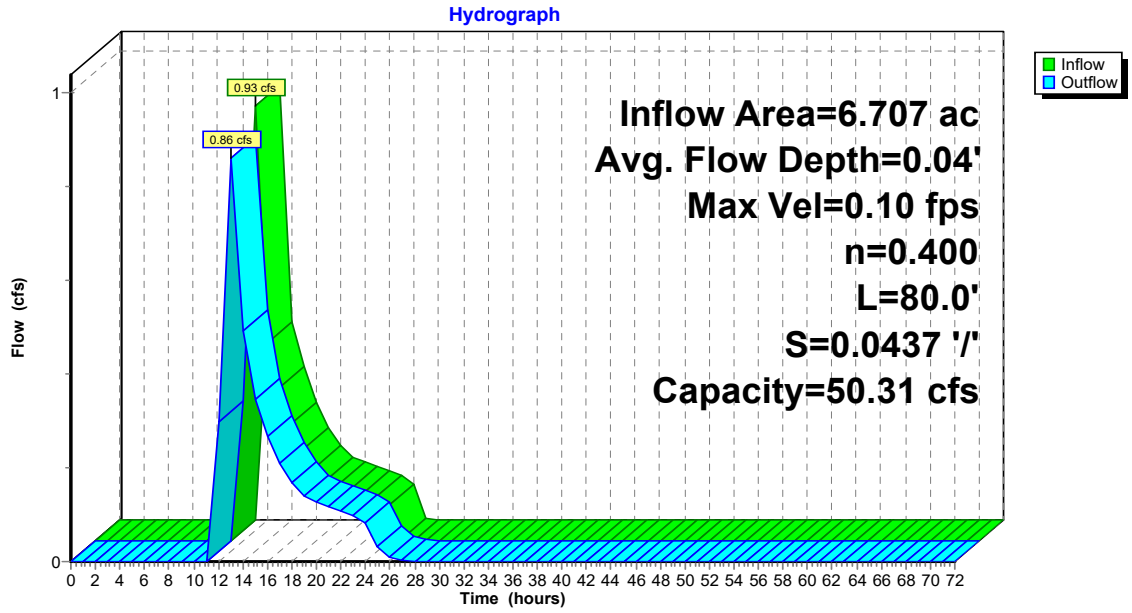
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth = 0.49" for 2-YR event
Inflow = 0.93 cfs @ 13.00 hrs, Volume= 0.276 af
Outflow = 0.86 cfs @ 13.11 hrs, Volume= 0.277 af, Atten= 7%, Lag= 6.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.10 fps, Min. Travel Time= 13.8 min
Avg. Velocity = 0.04 fps, Avg. Travel Time= 31.9 min

Peak Storage= 712 cf @ 13.12 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Discharge for Reach PDP-6: Design Point 6

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
642.50	0.00	0.00
642.51	0.04	0.07
642.52	0.06	0.23
642.53	0.07	0.45
642.54	0.09	0.73
642.55	0.10	1.06
642.56	0.12	1.43
642.57	0.13	1.85
642.58	0.14	2.32
642.59	0.15	2.82
642.60	0.17	3.37
642.61	0.18	3.95
642.62	0.19	4.57
642.63	0.20	5.22
642.64	0.21	5.91
642.65	0.22	6.63
642.66	0.23	7.39
642.67	0.23	8.18
642.68	0.24	9.00
642.69	0.25	9.86
642.70	0.26	10.74
642.71	0.27	11.66
642.72	0.28	12.60
642.73	0.29	13.58
642.74	0.29	14.59
642.75	0.30	15.62
642.76	0.31	16.69
642.77	0.32	17.78
642.78	0.32	18.90
642.79	0.33	20.05
642.80	0.34	21.23
642.81	0.35	22.43
642.82	0.35	23.67
642.83	0.36	24.92
642.84	0.37	26.21
642.85	0.37	27.52
642.86	0.38	28.86
642.87	0.39	30.23
642.88	0.39	31.62
642.89	0.40	33.04
642.90	0.41	34.48
642.91	0.41	35.95
642.92	0.42	37.45
642.93	0.43	38.97
642.94	0.43	40.51
642.95	0.44	42.08
642.96	0.44	43.68
642.97	0.45	45.30
642.98	0.46	46.94
642.99	0.46	48.61
643.00	**0.47**	**50.31**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 2.37" for 2-YR event
Inflow = 0.42 cfs @ 12.13 hrs, Volume= 0.222 af
Outflow = 0.25 cfs @ 13.20 hrs, Volume= 0.215 af, Atten= 39%, Lag= 63.9 min
Discarded = 0.06 cfs @ 13.00 hrs, Volume= 0.132 af
Primary = 0.19 cfs @ 13.20 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 622.09' @ 13.00 hrs Surf.Area= 1,295 sf Storage= 1,003 cf
Flood Elev= 623.50' Surf.Area= 2,450 sf Storage= 3,580 cf

Plug-Flow detention time= 184.1 min calculated for 0.212 af (95% of inflow)
Center-of-Mass det. time= 148.9 min (1,240.6 - 1,091.7)

Volume	Invert	Avail.Storage	Storage Description
#1	620.00'	3,306 cf	**Overall storage (Prismatic)** Listed below (Recalc) 4,263 cf Overall - 957 cf Embedded = 3,306 cf
#2	620.00'	211 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 638 cf Overall x 33.0% Voids
#3	621.00'	64 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 319 cf Overall x 20.0% Voids
		3,580 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638
622.00	1,230	934	1,572
623.00	1,951	1,591	3,163
623.50	2,450	1,100	4,263

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638

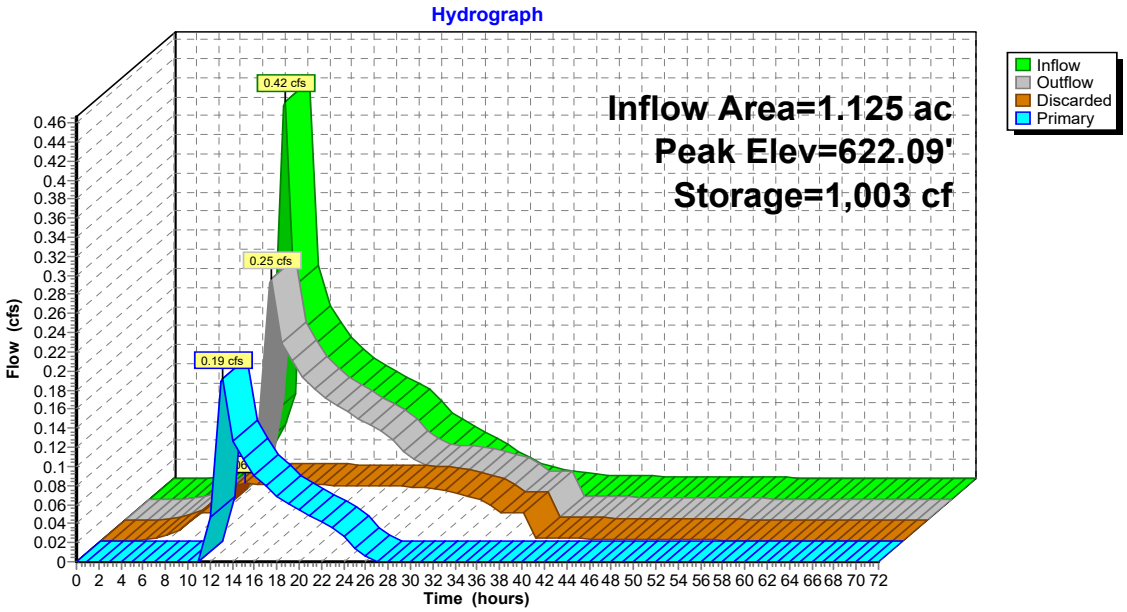
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
621.00	638	0	0
621.50	638	319	319

Device	Routing	Invert	Outlet Devices
#1	Discarded	620.00'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.14'	**8.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.14' / 620.00' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	622.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 13.00 hrs HW=622.09' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.17 cfs @ 13.20 hrs HW=622.09' (Free Discharge)
└─**2=Culvert** (Passes 0.17 cfs of 1.69 cfs potential flow)
└─**3=Orifice/Grate** (Weir Controls 0.17 cfs @ 0.96 fps)

Pond 3: SFB-3



Stage-Discharge for Pond 3: SFB-3

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
620.00	0.00	0.00	0.00
620.05	0.03	0.03	0.00
620.10	0.03	0.03	0.00
620.15	0.03	0.03	0.00
620.20	0.03	0.03	0.00
620.25	0.03	0.03	0.00
620.30	0.03	0.03	0.00
620.35	0.03	0.03	0.00
620.40	0.03	0.03	0.00
620.45	0.03	0.03	0.00
620.50	0.03	0.03	0.00
620.55	0.03	0.03	0.00
620.60	0.03	0.03	0.00
620.65	0.03	0.03	0.00
620.70	0.03	0.03	0.00
620.75	0.03	0.03	0.00
620.80	0.03	0.03	0.00
620.85	0.03	0.03	0.00
620.90	0.03	0.03	0.00
620.95	0.03	0.03	0.00
621.00	0.03	0.03	0.00
621.05	0.03	0.03	0.00
621.10	0.03	0.03	0.00
621.15	0.03	0.03	0.00
621.20	0.04	0.04	0.00
621.25	0.04	0.04	0.00
621.30	0.04	0.04	0.00
621.35	0.04	0.04	0.00
621.40	0.04	0.04	0.00
621.45	0.04	0.04	0.00
621.50	0.04	0.04	0.00
621.55	0.04	0.04	0.00
621.60	0.05	0.05	0.00
621.65	0.05	0.05	0.00
621.70	0.05	0.05	0.00
621.75	0.05	0.05	0.00
621.80	0.05	0.05	0.00
621.85	0.05	0.05	0.00
621.90	0.05	0.05	0.00
621.95	0.06	0.06	0.00
622.00	0.06	0.06	0.00
622.05	0.14	0.06	0.08
622.10	0.28	0.06	0.22
622.15	0.46	0.06	0.40
622.20	0.68	0.06	0.61
622.25	0.91	0.07	0.84
622.30	0.99	0.07	0.92
622.35	1.06	0.07	0.99
622.40	1.13	0.07	1.06
622.45	1.20	0.07	1.13
622.50	1.26	0.07	1.19
622.55	1.32	0.08	1.25
622.60	1.38	0.08	1.30
622.65	1.43	0.08	1.36
622.70	1.49	0.08	1.41
622.75	1.54	0.08	1.46
622.80	1.59	0.08	1.50
622.85	1.64	0.09	1.55
622.90	1.68	0.09	1.59
622.95	1.73	0.09	1.64
623.00	1.77	0.09	1.68
623.05	1.82	0.09	1.72
623.10	1.86	0.10	1.76
623.15	1.90	0.10	1.80
623.20	1.94	0.10	1.84
623.25	1.98	0.10	1.88
623.30	2.02	0.10	1.92
623.35	2.06	0.11	1.95
623.40	2.10	0.11	1.99
623.45	2.14	0.11	2.02
623.50	**2.17**	**0.11**	**2.06**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac,	85.51% Impervious,	Inflow Depth =	2.68"	for 2-YR event
Inflow =	1.18 cfs @	12.05 hrs,	Volume=	0.332 af	
Outflow =	0.48 cfs @	13.29 hrs,	Volume=	0.331 af,	Atten= 59%, Lag= 74.4 min
Discarded =	0.42 cfs @	13.29 hrs,	Volume=	0.322 af	
Primary =	0.06 cfs @	13.29 hrs,	Volume=	0.008 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 632.42' @ 13.29 hrs Surf.Area= 2,768 sf Storage= 3,012 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,373 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 50.4 min (918.4 - 868.0)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	542 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,643 cf Overall x 33.0% Voids
#3	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,373 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.25' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

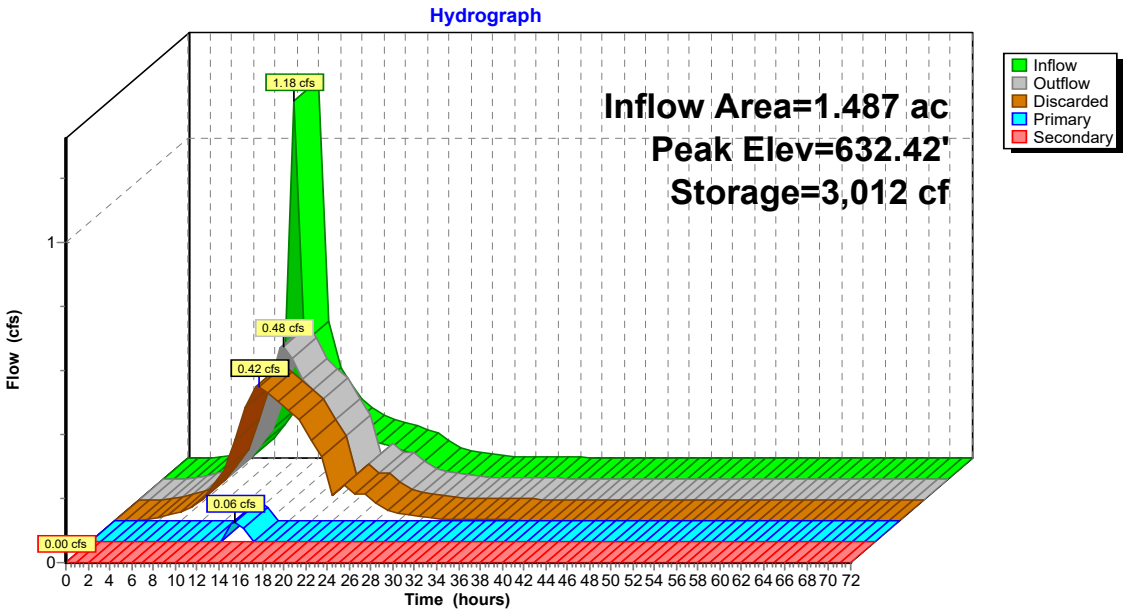
#5 Secondary 633.30' **50.0' long x 1.0' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.41 cfs @ 13.29 hrs HW=632.35' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.05 cfs @ 13.29 hrs HW=632.35' (Free Discharge)
└─**2=Culvert** (Passes 0.05 cfs of 1.88 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 2.48 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Discharge for Pond 4: SFB-4

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
630.00	0.00	0.00	0.00	0.00
630.10	0.25	0.25	0.00	0.00
630.20	0.25	0.25	0.00	0.00
630.30	0.25	0.25	0.00	0.00
630.40	0.25	0.25	0.00	0.00
630.50	0.25	0.25	0.00	0.00
630.60	0.25	0.25	0.00	0.00
630.70	0.25	0.25	0.00	0.00
630.80	0.25	0.25	0.00	0.00
630.90	0.25	0.25	0.00	0.00
631.00	0.25	0.25	0.00	0.00
631.10	0.26	0.26	0.00	0.00
631.20	0.27	0.27	0.00	0.00
631.30	0.29	0.29	0.00	0.00
631.40	0.30	0.30	0.00	0.00
631.50	0.31	0.31	0.00	0.00
631.60	0.32	0.32	0.00	0.00
631.70	0.33	0.33	0.00	0.00
631.80	0.35	0.35	0.00	0.00
631.90	0.36	0.36	0.00	0.00
632.00	0.37	0.37	0.00	0.00
632.10	0.40	0.38	0.01	0.00
632.20	0.43	0.39	0.04	0.00
632.30	0.46	0.41	0.05	0.00
632.40	0.48	0.42	0.06	0.00
632.50	0.50	0.43	0.07	0.00
632.60	0.52	0.44	0.08	0.00
632.70	0.57	0.45	0.12	0.00
632.80	0.72	0.47	0.25	0.00
632.90	0.78	0.48	0.31	0.00
633.00	0.84	0.49	0.35	0.00
633.10	0.89	0.50	0.39	0.00
633.20	0.94	0.51	0.42	0.00
633.30	0.98	0.52	0.45	0.00
633.40	5.27	0.54	0.48	4.25
633.50	13.09	0.55	0.51	12.03
633.60	23.32	0.56	0.54	22.22
633.70	35.54	0.57	0.56	34.41
633.80	49.52	0.58	0.59	48.35
633.90	65.11	0.60	0.61	63.90
634.00	**83.23**	**0.61**	**0.63**	**81.99**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac,	65.78% Impervious,	Inflow Depth =	1.98"	for 2-YR event
Inflow =	0.36 cfs @	12.32 hrs,	Volume=	0.270 af	
Outflow =	0.19 cfs @	16.63 hrs,	Volume=	0.270 af,	Atten= 49%, Lag= 258.5 min
Discarded =	0.19 cfs @	16.63 hrs,	Volume=	0.270 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 634.10' @ 16.63 hrs Surf.Area= 2,815 sf Storage= 1,985 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,589 cf

Plug-Flow detention time= 134.2 min calculated for 0.266 af (99% of inflow)
Center-of-Mass det. time= 133.6 min (1,181.8 - 1,048.2)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	497 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,505 cf Overall x 33.0% Voids
#3	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,589 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.00	1,505	1,505	1,505

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**6.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir**

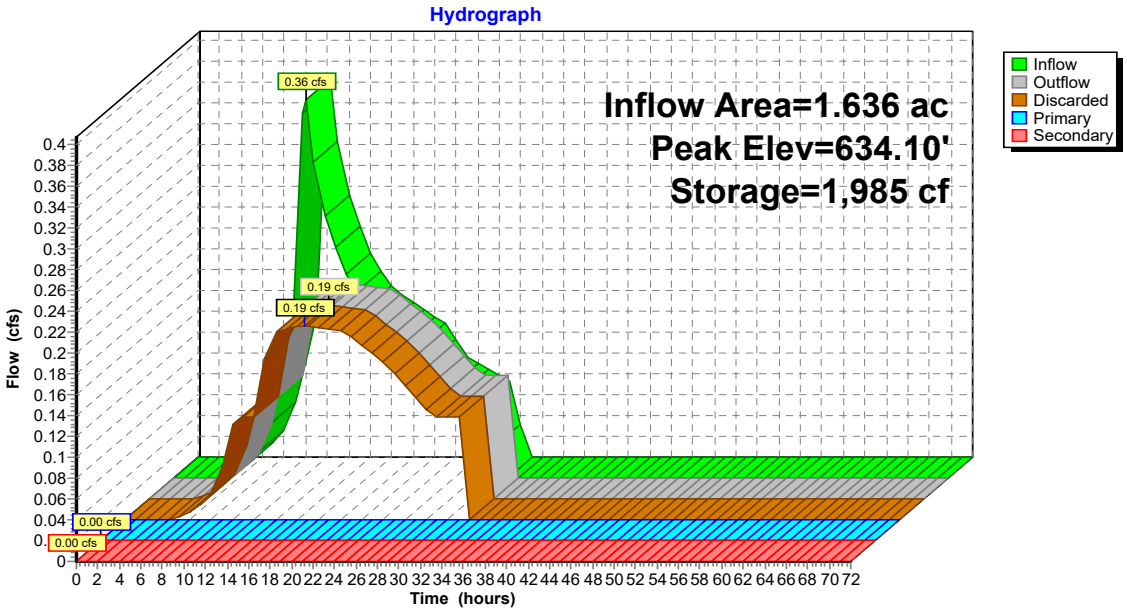
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.18 cfs @ 16.63 hrs HW=634.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Discharge for Pond 5: SFB-5

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
632.00	0.00	0.00	0.00	0.00
632.10	0.10	0.10	0.00	0.00
632.20	0.10	0.10	0.00	0.00
632.30	0.10	0.10	0.00	0.00
632.40	0.10	0.10	0.00	0.00
632.50	0.10	0.10	0.00	0.00
632.60	0.10	0.10	0.00	0.00
632.70	0.10	0.10	0.00	0.00
632.80	0.10	0.10	0.00	0.00
632.90	0.10	0.10	0.00	0.00
633.00	0.10	0.10	0.00	0.00
633.10	0.10	0.10	0.00	0.00
633.20	0.10	0.10	0.00	0.00
633.30	0.10	0.10	0.00	0.00
633.40	0.10	0.10	0.00	0.00
633.50	0.10	0.10	0.00	0.00
633.60	0.12	0.12	0.00	0.00
633.70	0.13	0.13	0.00	0.00
633.80	0.15	0.15	0.00	0.00
633.90	0.16	0.16	0.00	0.00
634.00	0.18	0.18	0.00	0.00
634.10	0.19	0.19	0.00	0.00
634.20	0.19	0.19	0.00	0.00
634.30	0.19	0.19	0.00	0.00
634.40	0.20	0.20	0.00	0.00
634.50	0.20	0.20	0.00	0.00
634.60	0.22	0.21	0.01	0.00
634.70	0.25	0.21	0.04	0.00
634.80	0.27	0.22	0.05	0.00
634.90	0.28	0.22	0.06	0.00
635.00	0.30	0.23	0.07	0.00
635.10	7.11	0.23	0.08	6.81
635.20	19.57	0.24	0.08	19.25
635.30	35.89	0.24	0.09	35.56
635.40	55.39	0.24	0.09	55.05
635.50	77.71	0.25	0.10	77.36
635.60	102.60	0.25	0.11	102.25
635.70	131.55	0.26	0.11	131.19
635.80	163.52	0.26	0.12	163.14
635.90	199.49	0.26	0.12	199.11
636.00	**238.79**	**0.27**	**0.13**	**238.40**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth = 3.16" for 2-YR event
Inflow = 0.83 cfs @ 12.01 hrs, Volume= 0.156 af
Outflow = 0.12 cfs @ 14.01 hrs, Volume= 0.156 af, Atten= 86%, Lag= 119.6 min
Primary = 0.12 cfs @ 14.01 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 627.31' @ 14.01 hrs Surf.Area= 0.081 ac Storage= 0.090 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 453.1 min calculated for 0.156 af (100% of inflow)
Center-of-Mass det. time= 447.9 min (1,201.4 - 753.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**8.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 622.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.12 cfs @ 14.01 hrs HW=627.31' (Free Discharge)
└─**1=Culvert** (Passes 0.12 cfs of 1.31 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.32 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

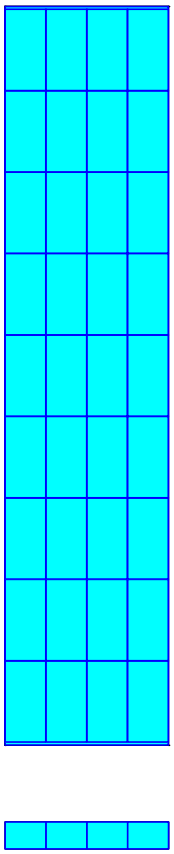
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

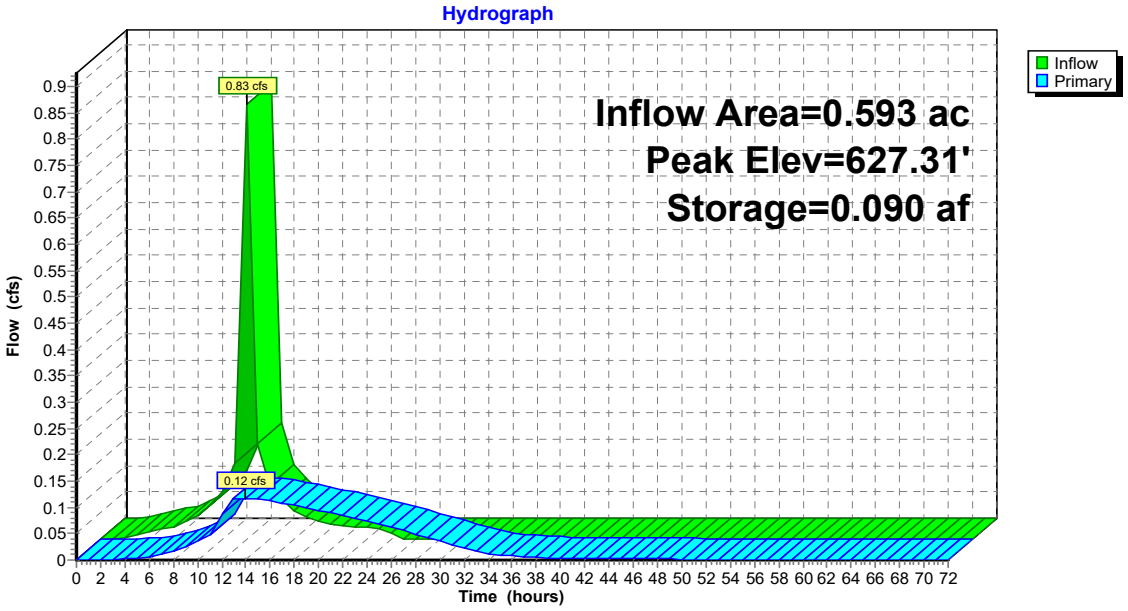
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow
Primary
0.83 cfs
0.12 cfs
Inflow Area=0.593 ac
Peak Elev=627.31'
Storage=0.090 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-3: DB-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
626.00	0.00	628.60	0.17
626.05	0.00	628.65	0.17
626.10	0.01	628.70	0.17
626.15	0.03	628.75	0.17
626.20	0.04	628.80	0.17
626.25	0.04	628.85	0.17
626.30	0.05	628.90	0.18
626.35	0.05	628.95	0.18
626.40	0.06	629.00	0.18
626.45	0.06	629.05	0.18
626.50	0.07	629.10	0.18
626.55	0.07	629.15	0.18
626.60	0.08	629.20	0.19
626.65	0.08	629.25	0.19
626.70	0.08	629.30	0.19
626.75	0.09	629.35	0.19
626.80	0.09	629.40	0.19
626.85	0.09	629.45	0.19
626.90	0.09	629.50	0.19
626.95	0.10	629.55	0.20
627.00	0.10	629.60	0.20
627.05	0.10	629.65	0.20
627.10	0.11	629.70	0.20
627.15	0.11	629.75	0.20
627.20	0.11	629.80	0.20
627.25	0.11	629.85	0.20
627.30	0.12	629.90	0.21
627.35	0.12	629.95	0.21
627.40	0.12	630.00	0.21
627.45	0.12	630.05	0.21
627.50	0.13	630.10	0.21
627.55	0.13	630.15	0.21
627.60	0.13	630.20	0.21
627.65	0.13	630.25	0.21
627.70	0.13	630.30	0.22
627.75	0.14	630.35	0.22
627.80	0.14	630.40	0.22
627.85	0.14	630.45	0.22
627.90	0.14	630.50	0.22
627.95	0.14	630.55	0.22
628.00	0.15	630.60	0.22
628.05	0.15	630.65	**0.22**
628.10	0.15		
628.15	0.15		
628.20	0.15		
628.25	0.15		
628.30	0.16		
628.35	0.16		
628.40	0.16		
628.45	0.16		
628.50	0.16		
628.55	0.16		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth = 4.03" for 2-YR event
Inflow = 0.62 cfs @ 12.01 hrs, Volume= 0.092 af
Outflow = 0.10 cfs @ 13.41 hrs, Volume= 0.092 af, Atten= 84%, Lag= 84.3 min
Primary = 0.10 cfs @ 13.41 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 634.94' @ 13.40 hrs Surf.Area= 0.072 ac Storage= 0.058 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 358.2 min calculated for 0.092 af (100% of inflow)
Center-of-Mass det. time= 352.0 min (1,098.2 - 746.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.09 cfs @ 13.41 hrs HW=634.90' (Free Discharge)
└─**1=Culvert** (Passes 0.09 cfs of 0.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.34 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

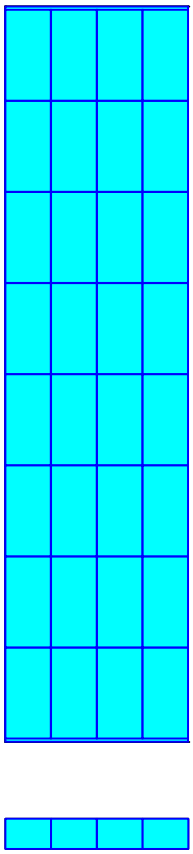
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

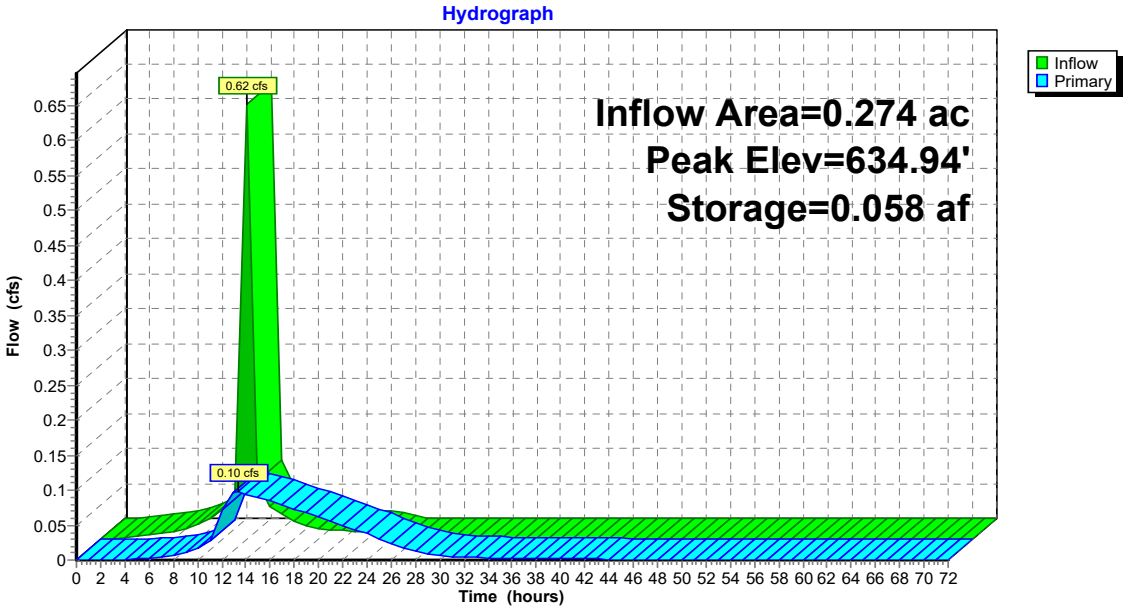
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow
Primary
0.62 cfs
0.10 cfs
Inflow Area=0.274 ac
Peak Elev=634.94'
Storage=0.058 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-4: DB-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
634.00	0.00	636.60	0.44
634.05	0.00	636.65	0.46
634.10	0.01	636.70	0.48
634.15	0.03	636.75	0.49
634.20	0.04	636.80	0.51
634.25	0.04	636.85	0.52
634.30	0.05	636.90	0.54
634.35	0.05	636.95	0.55
634.40	0.06	637.00	0.56
634.45	0.06	637.05	0.58
634.50	0.07	637.10	0.61
634.55	0.07	637.15	0.65
634.60	0.08	637.20	0.70
634.65	0.08	637.25	0.74
634.70	0.08	637.30	0.79
634.75	0.09	637.35	0.83
634.80	0.09	637.40	0.86
634.85	0.09	637.45	0.89
634.90	0.09	637.50	0.92
634.95	0.10	637.55	0.95
635.00	0.10	637.60	0.98
635.05	0.10	637.65	1.00
635.10	0.11	637.70	1.03
635.15	0.11	637.75	1.05
635.20	0.11	637.80	1.07
635.25	0.11	637.85	1.10
635.30	0.12	637.90	1.12
635.35	0.12	637.95	1.14
635.40	0.12	638.00	1.16
635.45	0.12	638.05	1.18
635.50	0.13	638.10	1.20
635.55	0.13	638.15	1.22
635.60	0.13	638.20	1.24
635.65	0.13	638.25	1.25
635.70	0.13	638.30	1.26
635.75	0.14	638.35	1.26
635.80	0.14	638.40	1.27
635.85	0.14	638.45	1.27
635.90	0.14	638.50	1.28
635.95	0.14	638.55	1.29
636.00	0.15	638.60	1.29
636.05	0.15	638.65	**1.30**
636.10	0.17		
636.15	0.20		
636.20	0.24		
636.25	0.27		
636.30	0.31		
636.35	0.34		
636.40	0.36		
636.45	0.39		
636.50	0.41		
636.55	0.43		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth = 3.15" for 2-YR event
Inflow = 1.22 cfs @ 12.02 hrs, Volume= 0.186 af
Outflow = 0.14 cfs @ 14.02 hrs, Volume= 0.186 af, Atten= 89%, Lag= 119.6 min
Primary = 0.14 cfs @ 14.02 hrs, Volume= 0.186 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Peak Elev= 639.27' @ 14.02 hrs Surf.Area= 0.090 ac Storage= 0.104 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= 346.0 min calculated for 0.184 af (99% of inflow)
Center-of-Mass det. time= 348.2 min (1,125.7 - 777.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.14 cfs @ 14.02 hrs HW=639.27' (Free Discharge)
└─**1=Culvert** (Passes 0.14 cfs of 0.96 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.26 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

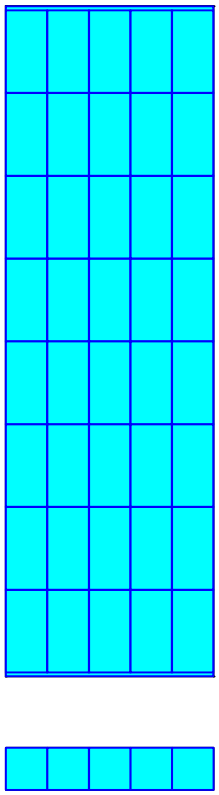
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

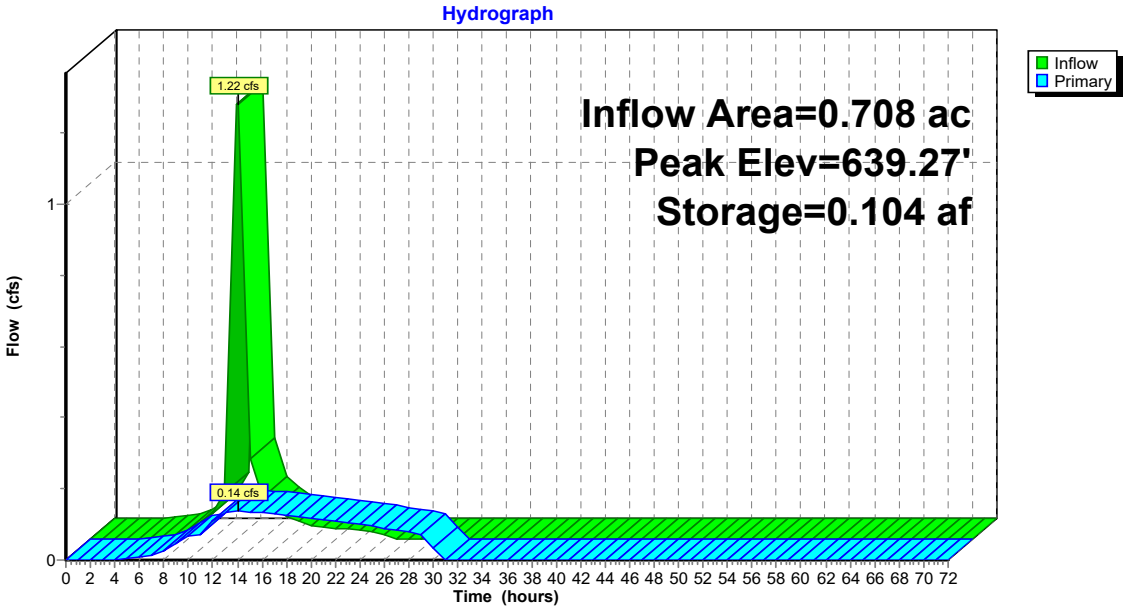
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow
Primary
1.22 cfs
0.14 cfs
Inflow Area=0.708 ac
Peak Elev=639.27'
Storage=0.104 af
Flow (cfs)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-5: DB-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
637.50	0.00	639.58	0.15	641.66	0.21	643.74	0.26
637.54	0.00	639.62	0.15	641.70	0.21	643.78	0.26
637.58	0.01	639.66	0.15	641.74	0.21	643.82	0.26
637.62	0.02	639.70	0.15	641.78	0.22	643.86	0.26
637.66	0.03	639.74	0.15	641.82	0.22	643.90	0.26
637.70	0.04	639.78	0.16	641.86	0.22	643.94	0.26
637.74	0.04	639.82	0.16	641.90	0.22	643.98	0.27
637.78	0.05	639.86	0.16	641.94	0.22	644.02	0.27
637.82	0.05	639.90	0.16	641.98	0.22	644.06	0.27
637.86	0.06	639.94	0.16	642.02	0.22	644.10	0.27
637.90	0.06	639.98	0.16	642.06	0.22	644.14	0.27
637.94	0.06	640.02	0.16	642.10	0.22	644.18	0.27
637.98	0.07	640.06	0.17	642.14	0.22	644.22	0.27
638.02	0.07	640.10	0.17	642.18	0.23	644.26	0.27
638.06	0.07	640.14	0.17	642.22	0.23	644.30	0.27
638.10	0.08	640.18	0.17	642.26	0.23	644.34	0.27
638.14	0.08	640.22	0.17	642.30	0.23	644.38	0.27
638.18	0.08	640.26	0.17	642.34	0.23	644.42	0.27
638.22	0.08	640.30	0.17	642.38	0.23	644.46	0.28
638.26	0.09	640.34	0.17	642.42	0.23	644.50	0.28
638.30	0.09	640.38	0.18	642.46	0.23	644.54	0.28
638.34	0.09	640.42	0.18	642.50	0.23	644.58	0.28
638.38	0.09	640.46	0.18	642.54	0.23	644.62	0.28
638.42	0.10	640.50	0.18	642.58	0.23	644.66	**0.28**
638.46	0.10	640.54	0.18	642.62	0.24		
638.50	0.10	640.58	0.18	642.66	0.24		
638.54	0.10	640.62	0.18	642.70	0.24		
638.58	0.10	640.66	0.18	642.74	0.24		
638.62	0.11	640.70	0.19	642.78	0.24		
638.66	0.11	640.74	0.19	642.82	0.24		
638.70	0.11	640.78	0.19	642.86	0.24		
638.74	0.11	640.82	0.19	642.90	0.24		
638.78	0.11	640.86	0.19	642.94	0.24		
638.82	0.12	640.90	0.19	642.98	0.24		
638.86	0.12	640.94	0.19	643.02	0.24		
638.90	0.12	640.98	0.19	643.06	0.25		
638.94	0.12	641.02	0.19	643.10	0.25		
638.98	0.12	641.06	0.20	643.14	0.25		
639.02	0.13	641.10	0.20	643.18	0.25		
639.06	0.13	641.14	0.20	643.22	0.25		
639.10	0.13	641.18	0.20	643.26	0.25		
639.14	0.13	641.22	0.20	643.30	0.25		
639.18	0.13	641.26	0.20	643.34	0.25		
639.22	0.13	641.30	0.20	643.38	0.25		
639.26	0.14	641.34	0.20	643.42	0.25		
639.30	0.14	641.38	0.20	643.46	0.25		
639.34	0.14	641.42	0.21	643.50	0.26		
639.38	0.14	641.46	0.21	643.54	0.26		
639.42	0.14	641.50	0.21	643.58	0.26		
639.46	0.14	641.54	0.21	643.62	0.26		
639.50	0.15	641.58	0.21	643.66	0.26		
639.54	0.15	641.62	0.21	643.70	0.26		

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac, 72.22% Impervious, Inflow Depth = 2.11" for 2-YR event				
Inflow =	0.32 cfs @	12.04 hrs,	Volume=	0.057 af	
Outflow =	0.32 cfs @	12.04 hrs,	Volume=	0.057 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.27 cfs @	12.05 hrs,	Volume=	0.054 af	
Secondary =	0.05 cfs @	12.00 hrs,	Volume=	0.004 af	

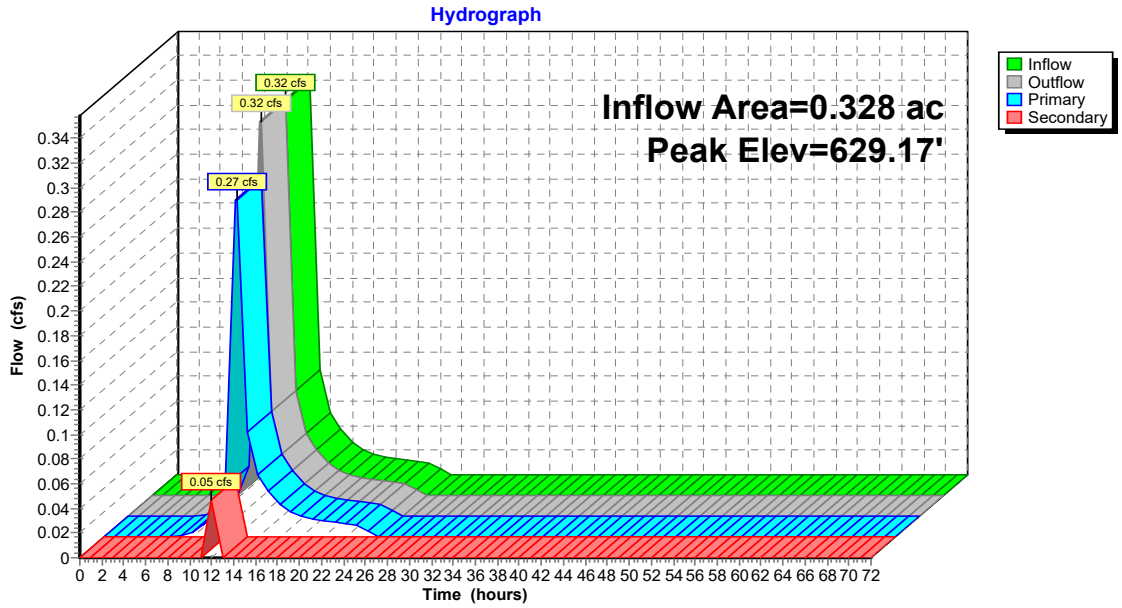
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 629.17' @ 12.07 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**5.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 622.00' S= 0.0285 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.14 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.26 cfs @ 12.05 hrs HW=629.16' TW=623.16' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.26 cfs @ 2.38 fps)

Secondary OutFlow Max=0.05 cfs @ 12.00 hrs HW=629.17' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.05 cfs @ 1.28 fps)

Pond ICS-3: ICS-3



Stage-Discharge for Pond ICS-3: ICS-3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
628.85	0.00	0.00	0.00
628.90	0.01	0.01	0.00
628.95	0.03	0.03	0.00
629.00	0.07	0.07	0.00
629.05	0.12	0.12	0.00
629.10	0.19	0.18	0.01
629.15	0.28	0.24	0.03
629.20	0.38	0.31	0.07
629.25	0.48	0.36	0.12
629.30	0.58	0.40	0.18
629.35	0.69	0.44	0.25
629.40	0.81	0.48	0.33
629.45	0.93	0.51	0.41
629.50	1.06	0.55	0.51
629.55	1.19	0.58	0.62
629.60	1.33	0.60	0.73
629.65	1.48	0.63	0.85
629.70	1.63	0.66	0.97
629.75	1.78	**0.68**	1.10
629.80	1.92	0.68	1.24
629.85	2.06	0.68	1.38
629.90	2.20	0.68	1.52
629.95	2.34	0.68	1.66
630.00	2.48	0.68	1.80
630.05	2.62	0.68	1.94
630.10	2.76	0.68	2.08
630.15	2.90	0.68	2.22
630.20	3.03	0.68	2.35
630.25	3.15	0.68	2.47
630.30	3.26	0.68	2.58
630.35	3.35	0.68	2.67
630.40	3.43	0.68	2.75
630.45	3.51	0.68	2.83
630.50	3.59	0.68	2.91
630.55	3.67	0.68	2.99
630.60	3.74	0.68	3.06
630.65	3.81	0.68	3.13
630.70	3.88	0.68	3.20
630.75	3.95	0.68	3.27
630.80	4.02	0.68	3.34
630.85	4.08	0.68	3.40
630.90	4.15	0.68	3.47
630.95	4.21	0.68	3.53
631.00	4.28	0.68	3.60
631.05	4.34	0.68	3.66
631.10	4.40	0.68	3.72
631.15	4.46	0.68	3.78
631.20	4.52	0.68	3.83
631.25	4.57	0.68	3.89
631.30	4.63	0.68	3.95
631.35	4.69	0.68	4.01
631.40	4.74	0.68	4.06
631.45	4.80	0.68	4.12
631.50	4.85	0.68	4.17
631.55	4.90	0.68	4.22
631.60	4.95	0.68	4.27
631.65	5.01	0.68	4.33
631.70	5.06	0.68	4.38
631.75	5.11	0.68	4.43
631.80	5.16	0.68	4.48
631.85	5.21	0.68	4.53
631.90	5.26	0.68	4.58
631.95	5.31	0.68	4.63
632.00	5.35	0.68	4.67
632.05	5.40	0.68	4.72
632.10	5.45	0.68	4.77
632.15	5.49	0.68	4.81
632.20	5.54	0.68	4.86
632.25	5.59	0.68	4.91
632.30	5.63	0.68	4.95
632.35	5.68	0.68	5.00
632.40	5.72	0.68	5.04
632.45	5.76	0.68	5.08
632.50	**5.81**	0.68	**5.13**

Summary for Pond ICS-4: ICS-4

Inflow Area = 1.068 ac, 93.43% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 1.35 cfs @ 12.02 hrs, Volume= 0.255 af
Outflow = 1.35 cfs @ 12.02 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.03 hrs, Volume= 0.234 af
Secondary = 0.26 cfs @ 12.00 hrs, Volume= 0.022 af

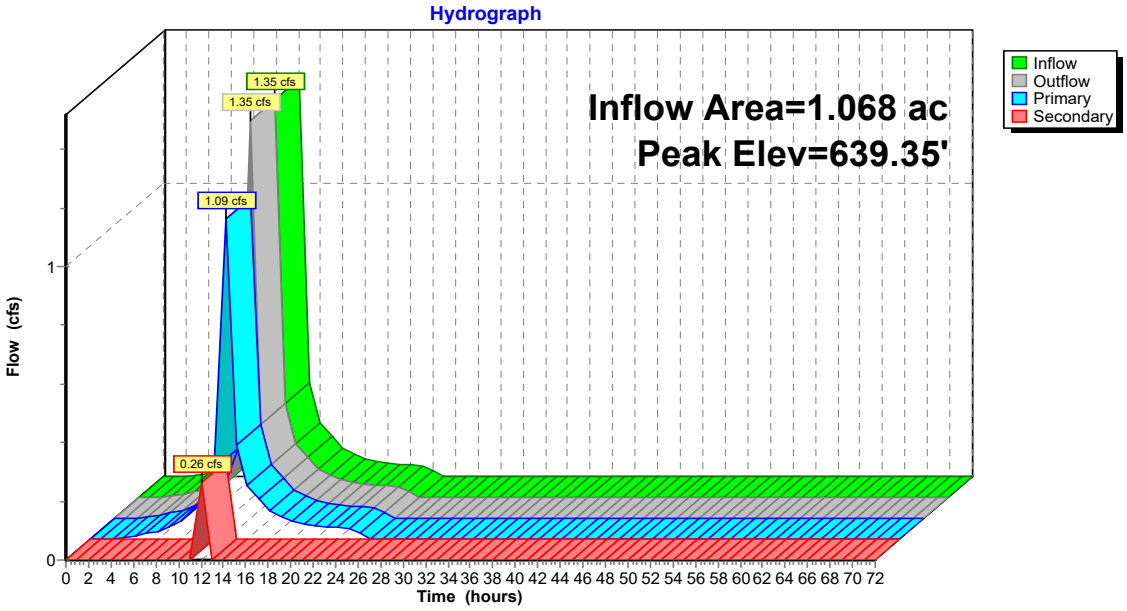
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 639.35' @ 12.00 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.09 cfs @ 12.03 hrs HW=639.29' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.09 cfs @ 5.53 fps)

Secondary OutFlow Max=0.26 cfs @ 12.00 hrs HW=639.35' (Free Discharge)
└─**3=Culvert** (Passes 0.26 cfs of 6.13 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.26 cfs @ 0.74 fps)

Pond ICS-4: ICS-4



Stage-Discharge for Pond ICS-4: ICS-4

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
636.50	0.00	0.00	0.00
636.55	0.01	0.01	0.00
636.60	0.04	0.04	0.00
636.65	0.08	0.08	0.00
636.70	0.14	0.14	0.00
636.75	0.21	0.21	0.00
636.80	0.29	0.29	0.00
636.85	0.37	0.37	0.00
636.90	0.45	0.45	0.00
636.95	0.53	0.53	0.00
637.00	0.59	0.59	0.00
637.05	0.65	0.65	0.00
637.10	0.70	0.70	0.00
637.15	0.75	0.75	0.00
637.20	0.79	0.79	0.00
637.25	0.84	0.84	0.00
637.30	0.88	0.88	0.00
637.35	0.89	0.89	0.00
637.40	0.89	0.89	0.00
637.45	0.90	0.90	0.00
637.50	0.90	0.90	0.00
637.55	0.91	0.91	0.00
637.60	0.91	0.91	0.00
637.65	0.92	0.92	0.00
637.70	0.92	0.92	0.00
637.75	0.93	0.93	0.00
637.80	0.94	0.94	0.00
637.85	0.94	0.94	0.00
637.90	0.95	0.95	0.00
637.95	0.95	0.95	0.00
638.00	0.96	0.96	0.00
638.05	0.96	0.96	0.00
638.10	0.97	0.97	0.00
638.15	0.97	0.97	0.00
638.20	0.98	0.98	0.00
638.25	0.98	0.98	0.00
638.30	0.99	0.99	0.00
638.35	0.99	0.99	0.00
638.40	1.00	1.00	0.00
638.45	1.00	1.00	0.00
638.50	1.01	1.01	0.00
638.55	1.01	1.01	0.00
638.60	1.02	1.02	0.00
638.65	1.02	1.02	0.00
638.70	1.03	1.03	0.00
638.75	1.03	1.03	0.00
638.80	1.04	1.04	0.00
638.85	1.04	1.04	0.00
638.90	1.05	1.05	0.00
638.95	1.05	1.05	0.00
639.00	1.06	1.06	0.00
639.05	1.06	1.06	0.00
639.10	1.07	1.07	0.00
639.15	1.07	1.07	0.00
639.20	1.08	1.08	0.00
639.25	1.08	1.08	0.00
639.30	1.13	1.09	0.04
639.35	1.35	1.09	0.26
639.40	1.68	1.10	0.58
639.45	2.08	1.10	0.98
639.50	2.56	1.11	1.45
639.55	3.10	1.11	1.99
639.60	3.71	1.11	2.60
639.65	4.38	1.12	3.27
639.70	5.12	1.12	4.00
639.75	5.92	1.13	4.79
639.80	6.79	1.13	5.65
639.85	7.71	1.14	6.58
639.90	8.18	1.14	7.04
639.95	8.26	1.15	7.11
640.00	**8.34**	**1.15**	**7.19**

Summary for Pond ICS-5: ICS-5

Inflow Area = 0.739 ac, 62.40% Impervious, Inflow Depth = 1.78" for 2-YR event
Inflow = 0.61 cfs @ 12.06 hrs, Volume= 0.110 af
Outflow = 0.61 cfs @ 12.06 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 12.20 hrs, Volume= 0.075 af
Secondary = 0.39 cfs @ 12.02 hrs, Volume= 0.035 af

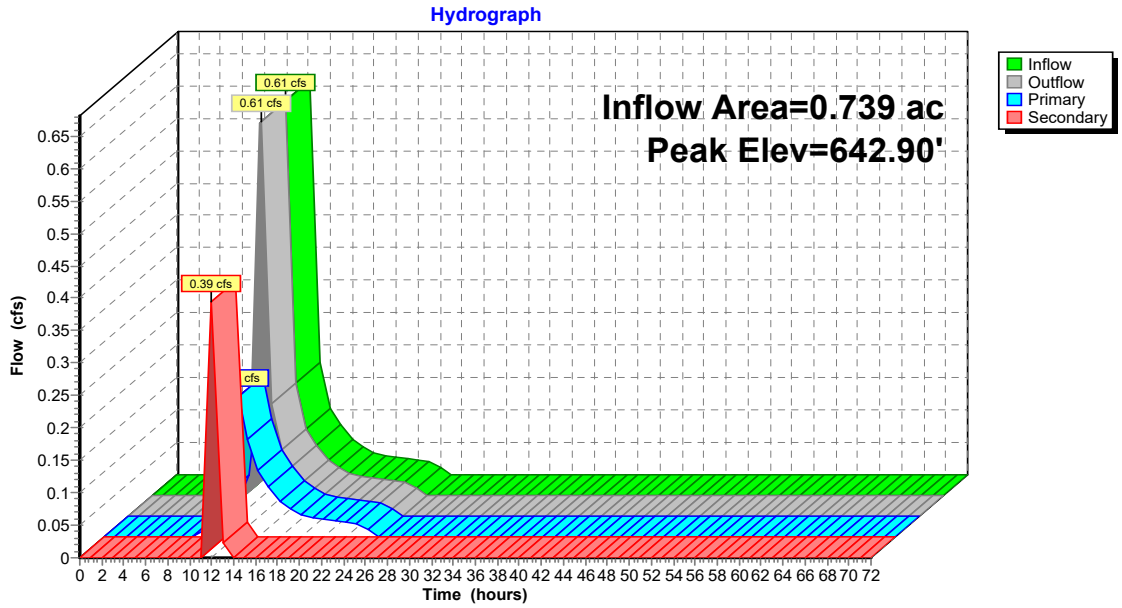
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 642.90' @ 12.14 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 636.00' S= 0.0781 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 12.20 hrs HW=642.84' TW=636.84' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.20 cfs @ 4.11 fps)

Secondary OutFlow Max=0.39 cfs @ 12.02 hrs HW=642.89' TW=636.89' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 0.39 cfs @ 2.54 fps)

Pond ICS-5: ICS-5



Stage-Discharge for Pond ICS-5: ICS-5

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
642.25	0.00	0.00	0.00
642.30	0.01	0.01	0.00
642.35	0.02	0.02	0.00
642.40	0.05	0.05	0.00
642.45	0.08	0.08	0.00
642.50	0.10	0.10	0.00
642.55	0.12	0.12	0.00
642.60	0.15	0.14	0.01
642.65	0.19	0.15	0.03
642.70	0.25	0.17	0.08
642.75	0.32	0.18	0.14
642.80	0.41	0.19	0.22
642.85	0.51	0.20	0.30
642.90	0.62	0.21	0.40
642.95	0.74	0.22	0.52
643.00	0.87	0.23	0.64
643.05	1.02	0.24	0.77
643.10	1.17	0.25	0.91
643.15	1.33	0.26	1.07
643.20	1.49	0.27	1.22
643.25	1.66	0.28	1.39
643.30	1.84	0.28	1.56
643.35	2.02	**0.29**	1.73
643.40	2.21	**0.30**	1.91
643.45	2.39	0.30	2.09
643.50	2.57	0.30	2.27
643.55	2.75	0.30	2.45
643.60	2.93	0.30	2.63
643.65	3.10	0.30	2.80
643.70	3.27	0.30	2.97
643.75	3.42	0.30	3.13
643.80	3.57	0.30	3.27
643.85	3.69	0.30	3.39
643.90	3.78	0.30	3.48
643.95	3.99	0.30	3.69
644.00	4.19	0.30	3.89
644.05	4.38	0.30	4.08
644.10	4.56	0.30	4.26
644.15	4.73	0.30	4.44
644.20	4.90	0.30	4.60
644.25	5.06	0.30	4.77
644.30	5.22	0.30	4.92
644.35	5.37	0.30	5.07
644.40	5.52	0.30	5.22
644.45	5.66	0.30	5.36
644.50	5.80	0.30	5.50
644.55	5.94	0.30	5.64
644.60	6.07	0.30	5.77
644.65	6.20	0.30	5.90
644.70	6.32	0.30	6.03
644.75	6.44	0.30	6.15
644.80	6.53	0.30	6.24
644.85	6.62	0.30	6.32
644.90	6.71	0.30	6.41
644.95	6.79	0.30	6.50
645.00	6.88	0.30	6.58
645.05	6.96	0.30	6.67
645.10	7.05	0.30	6.75
645.15	7.13	0.30	6.83
645.20	7.21	0.30	6.92
645.25	7.29	0.30	7.00
645.30	7.37	0.30	7.07
645.35	7.45	0.30	7.15
645.40	7.53	0.30	7.23
645.45	7.60	0.30	7.31
645.50	**7.68**	0.30	**7.38**

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth = 2.11" for 2-YR event
Inflow = 0.05 cfs @ 12.04 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 15.30 hrs, Volume= 0.010 af, Atten= 89%, Lag= 195.6 min
Primary = 0.01 cfs @ 15.30 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 654.71' @ 15.30 hrs Surf.Area= 430 sf Storage= 236 cf

Plug-Flow detention time= 462.6 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 460.8 min (1,272.7 - 811.8)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

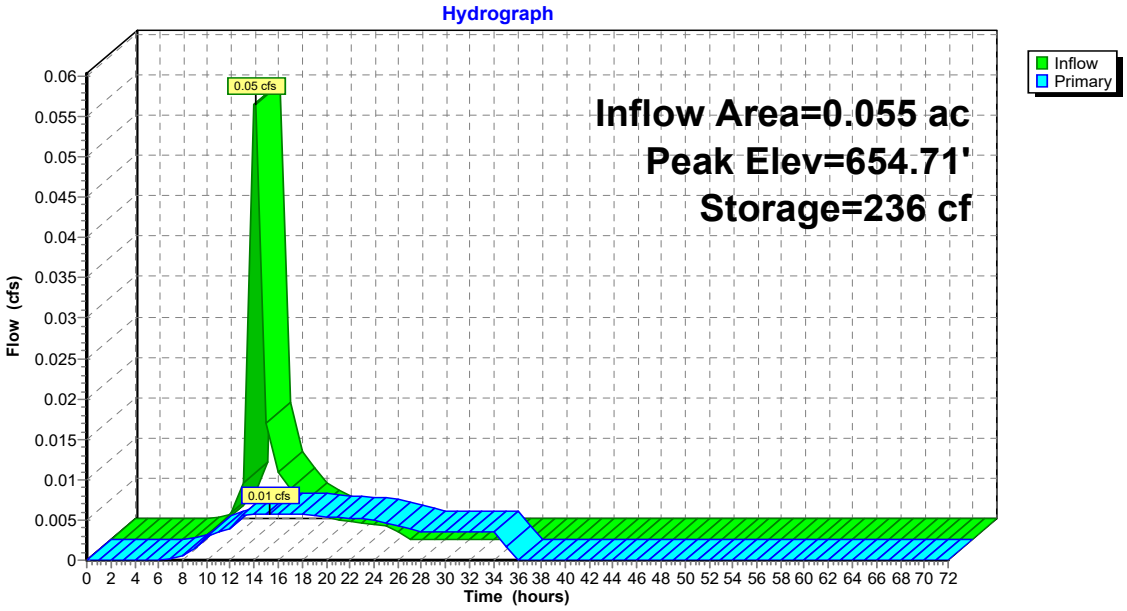
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 15.30 hrs HW=654.71' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Discharge for Pond RG-7B: RG-7B

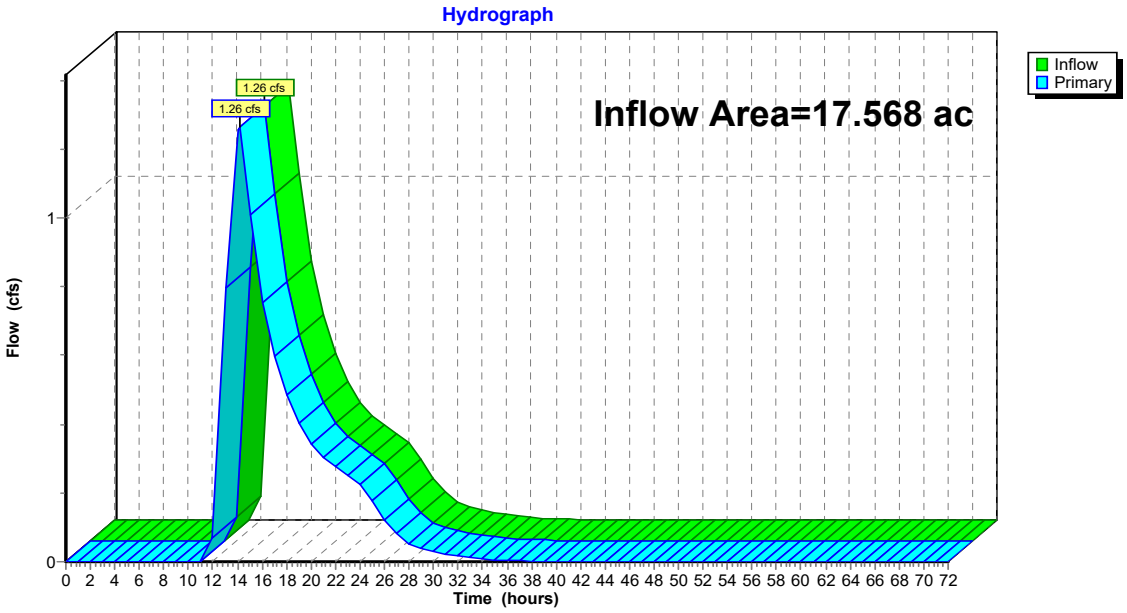
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
653.00	0.00	653.52	0.00	654.04	0.00	654.56	0.01
653.01	0.00	653.53	0.00	654.05	0.00	654.57	0.01
653.02	0.00	653.54	0.00	654.06	0.00	654.58	0.01
653.03	0.00	653.55	0.00	654.07	0.00	654.59	0.01
653.04	0.00	653.56	0.00	654.08	0.00	654.60	0.01
653.05	0.00	653.57	0.00	654.09	0.00	654.61	0.01
653.06	0.00	653.58	0.00	654.10	0.00	654.62	0.01
653.07	0.00	653.59	0.00	654.11	0.00	654.63	0.01
653.08	0.00	653.60	0.00	654.12	0.00	654.64	0.01
653.09	0.00	653.61	0.00	654.13	0.00	654.65	0.01
653.10	0.00	653.62	0.00	654.14	0.00	654.66	0.01
653.11	0.00	653.63	0.00	654.15	0.00	654.67	0.01
653.12	0.00	653.64	0.00	654.16	0.00	654.68	0.01
653.13	0.00	653.65	0.00	654.17	0.00	654.69	0.01
653.14	0.00	653.66	0.00	654.18	0.00	654.70	0.01
653.15	0.00	653.67	0.00	654.19	0.00	654.71	0.01
653.16	0.00	653.68	0.00	654.20	0.00	654.72	0.01
653.17	0.00	653.69	0.00	654.21	0.00	654.73	0.01
653.18	0.00	653.70	0.00	654.22	0.00	654.74	0.01
653.19	0.00	653.71	0.00	654.23	0.00	654.75	0.01
653.20	0.00	653.72	0.00	654.24	0.00	654.76	0.01
653.21	0.00	653.73	0.00	654.25	0.00	654.77	0.01
653.22	0.00	653.74	0.00	654.26	0.00	654.78	0.01
653.23	0.00	653.75	0.00	654.27	0.00	654.79	0.01
653.24	0.00	653.76	0.00	654.28	0.00	654.80	0.01
653.25	0.00	653.77	0.00	654.29	0.00	654.81	0.01
653.26	0.00	653.78	0.00	654.30	0.00	654.82	0.01
653.27	0.00	653.79	0.00	654.31	0.00	654.83	0.01
653.28	0.00	653.80	0.00	654.32	0.00	654.84	0.01
653.29	0.00	653.81	0.00	654.33	0.00	654.85	0.01
653.30	0.00	653.82	0.00	654.34	0.00	654.86	0.01
653.31	0.00	653.83	0.00	654.35	0.00	654.87	0.01
653.32	0.00	653.84	0.00	654.36	0.00	654.88	0.01
653.33	0.00	653.85	0.00	654.37	0.00	654.89	0.01
653.34	0.00	653.86	0.00	654.38	0.00	654.90	0.01
653.35	0.00	653.87	0.00	654.39	0.00	654.91	0.03
653.36	0.00	653.88	0.00	654.40	0.00	654.92	0.08
653.37	0.00	653.89	0.00	654.41	0.00	654.93	0.14
653.38	0.00	653.90	0.00	654.42	0.00	654.94	0.21
653.39	0.00	653.91	0.00	654.43	0.00	654.95	0.29
653.40	0.00	653.92	0.00	654.44	0.00	654.96	0.38
653.41	0.00	653.93	0.00	654.45	0.00	654.97	0.48
653.42	0.00	653.94	0.00	654.46	0.00	654.98	0.58
653.43	0.00	653.95	0.00	654.47	0.00	654.99	0.69
653.44	0.00	653.96	0.00	654.48	0.00	655.00	**0.81**
653.45	0.00	653.97	0.00	654.49	0.01		
653.46	0.00	653.98	0.00	654.50	0.01		
653.47	0.00	653.99	0.00	654.51	0.01		
653.48	0.00	654.00	0.00	654.52	0.01		
653.49	0.00	654.01	0.00	654.53	0.01		
653.50	0.00	654.02	0.00	654.54	0.01		
653.51	0.00	654.03	0.00	654.55	0.01		

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 0.41" for 2-YR event
Inflow = 1.26 cfs @ 14.15 hrs, Volume= 0.607 af
Primary = 1.26 cfs @ 14.15 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

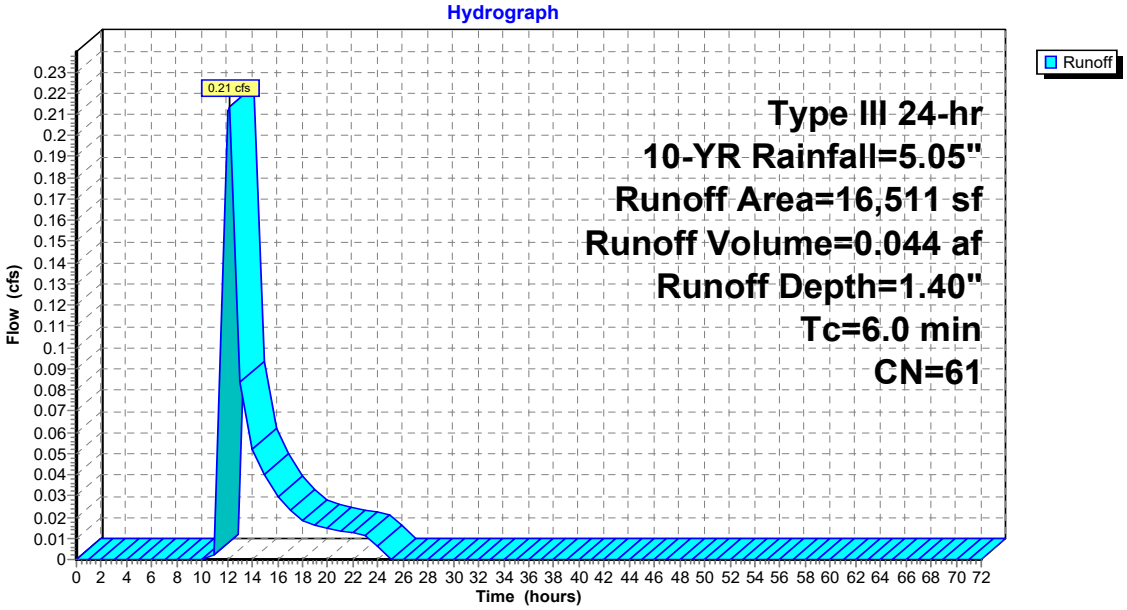
Runoff = 0.21 cfs @ 12.12 hrs, Volume= 0.044 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

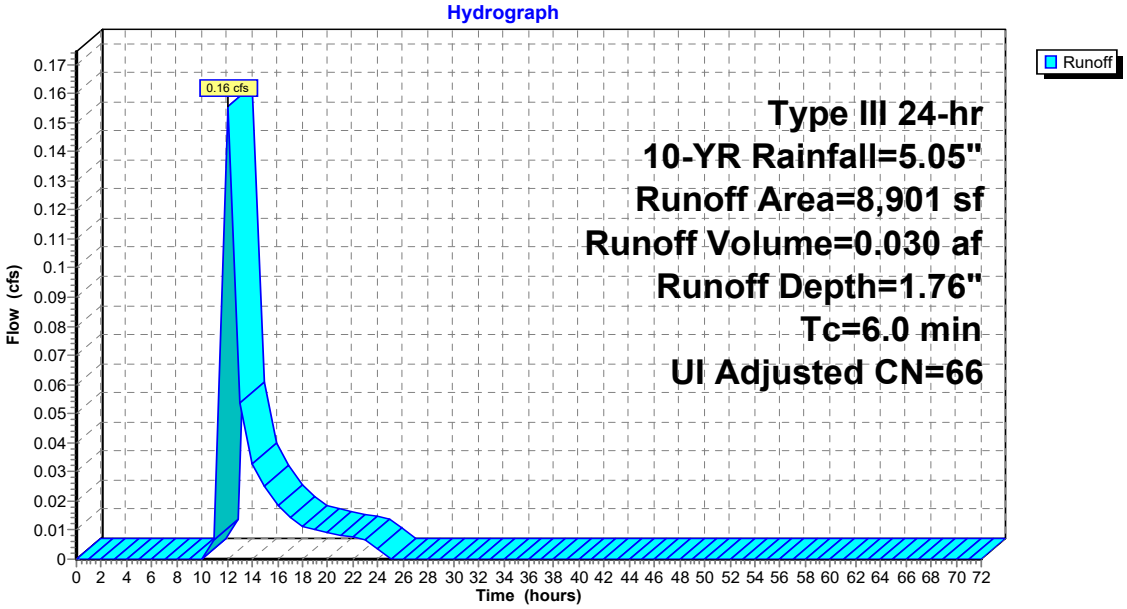
Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

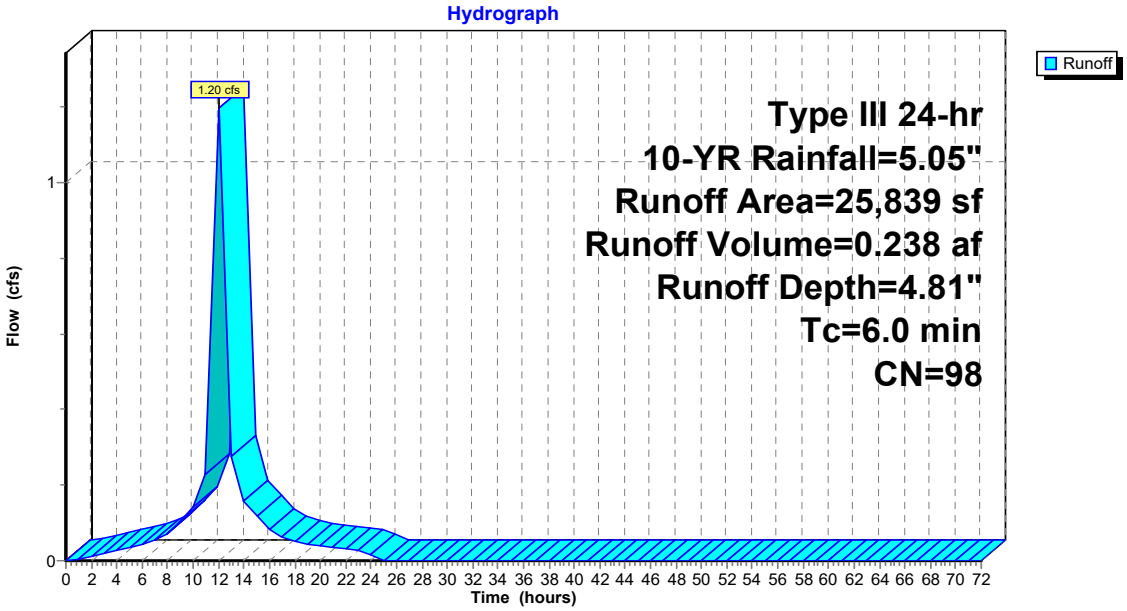
Runoff = 1.20 cfs @ 12.01 hrs, Volume= 0.238 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

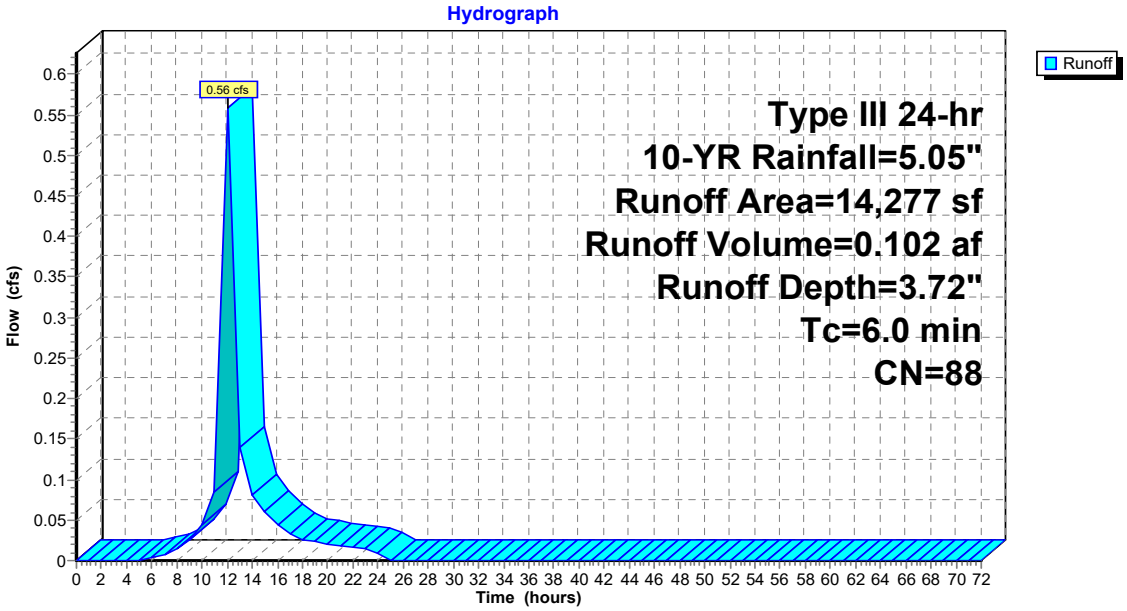
Runoff = 0.56 cfs @ 12.03 hrs, Volume= 0.102 af, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

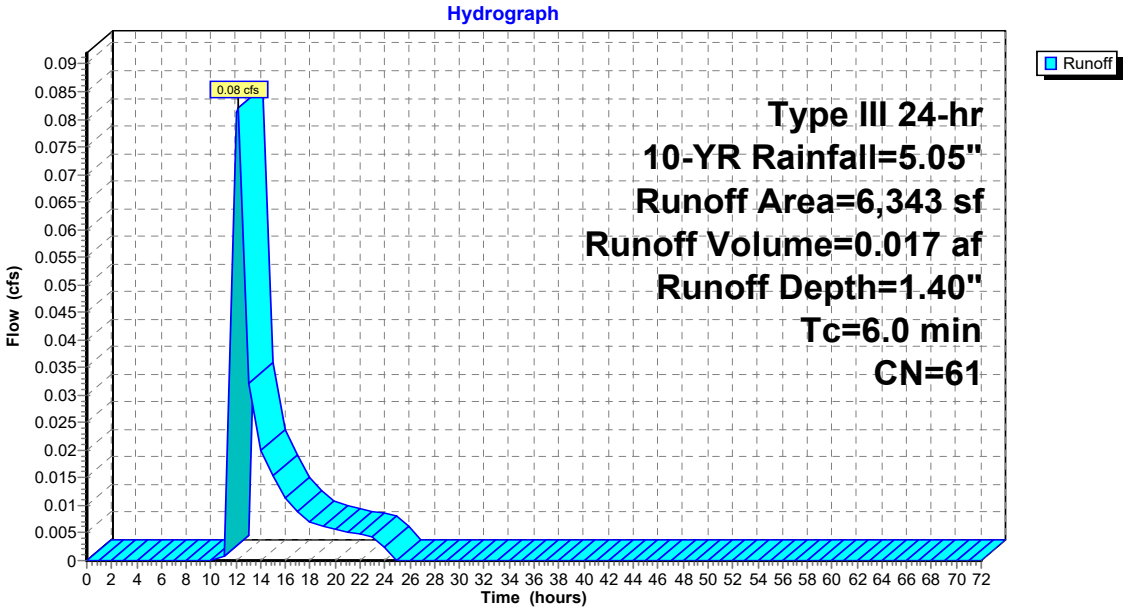
Runoff = 0.08 cfs @ 12.12 hrs, Volume= 0.017 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

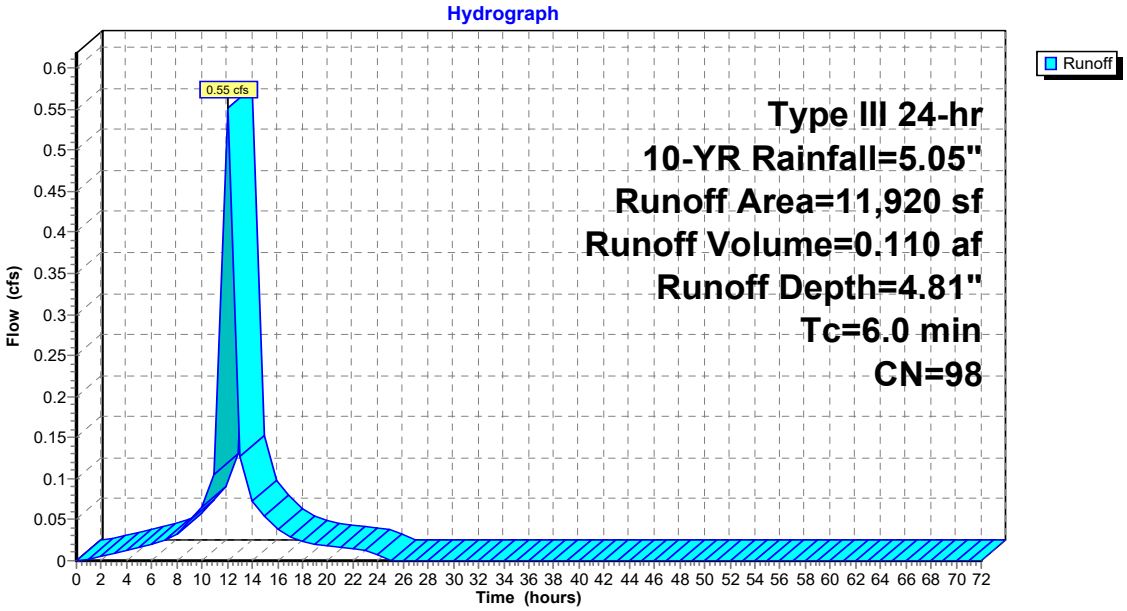
Runoff = 0.55 cfs @ 12.01 hrs, Volume= 0.110 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

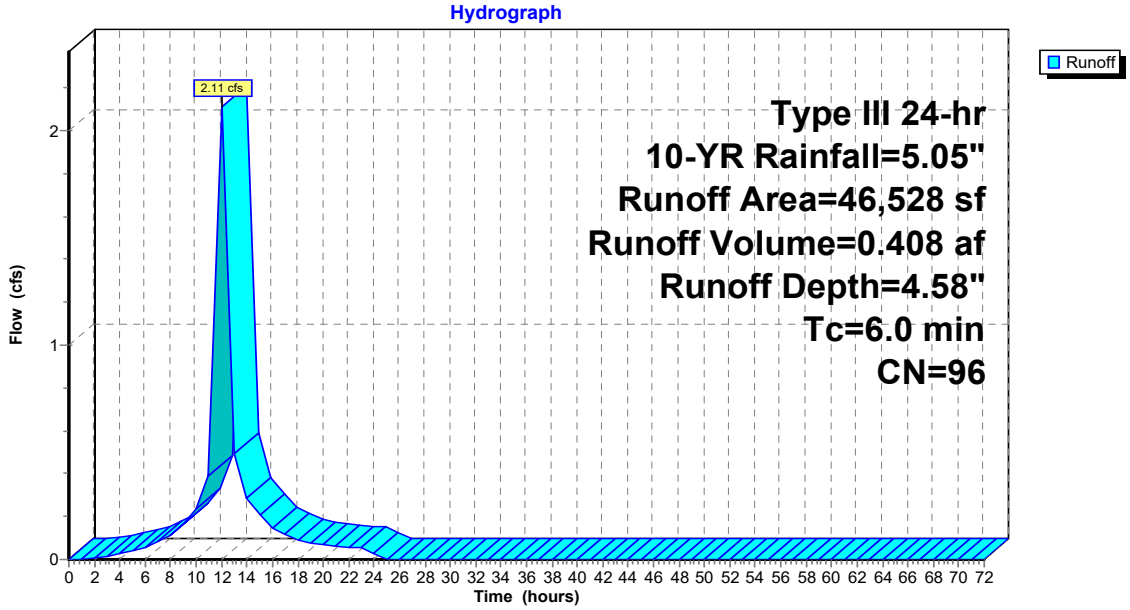
Runoff = 2.11 cfs @ 12.02 hrs, Volume= 0.408 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

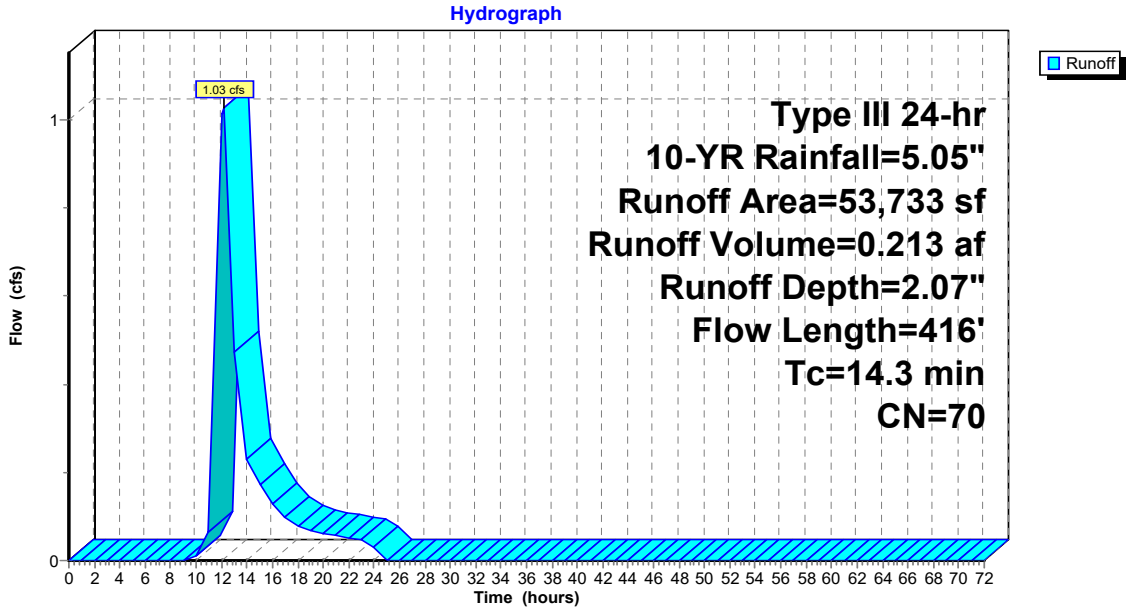
Runoff = 1.03 cfs @ 12.14 hrs, Volume= 0.213 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

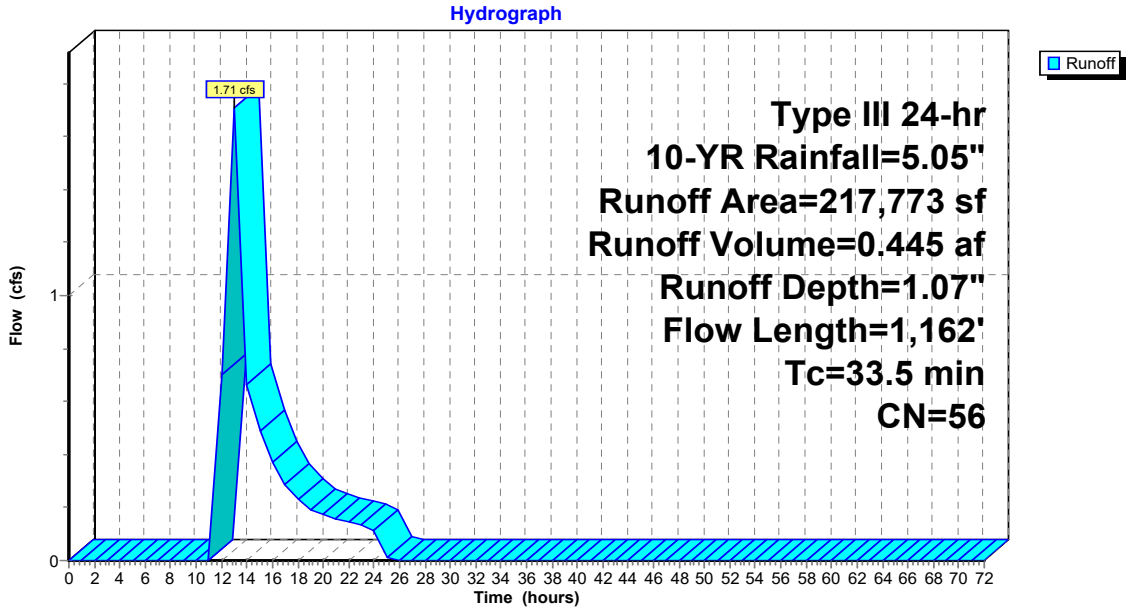
Runoff = 1.71 cfs @ 12.99 hrs, Volume= 0.445 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

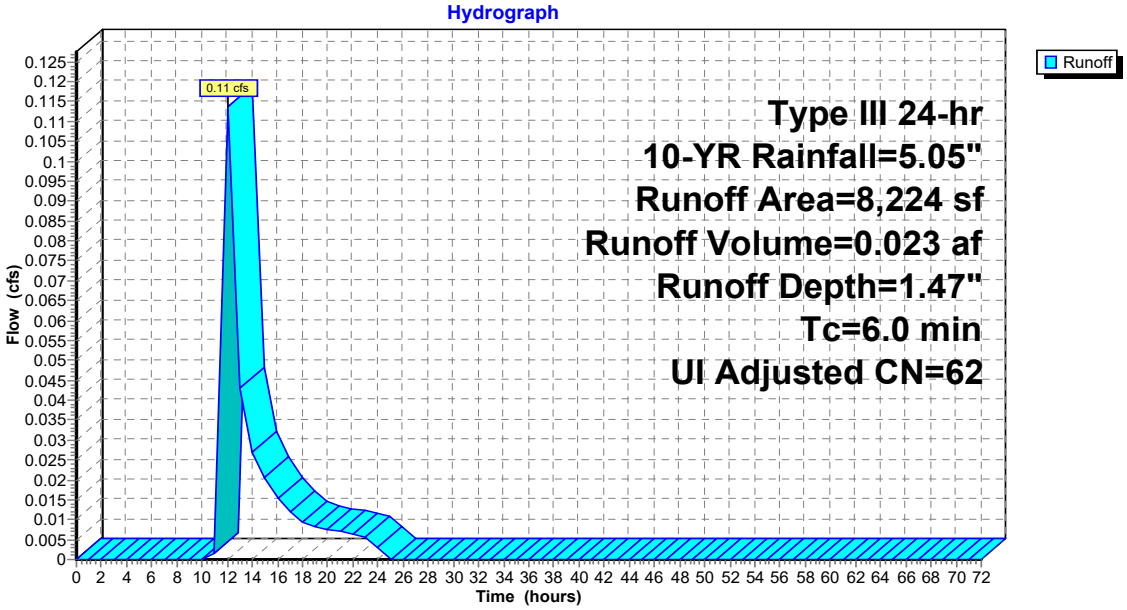
Runoff = 0.11 cfs @ 12.12 hrs, Volume= 0.023 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

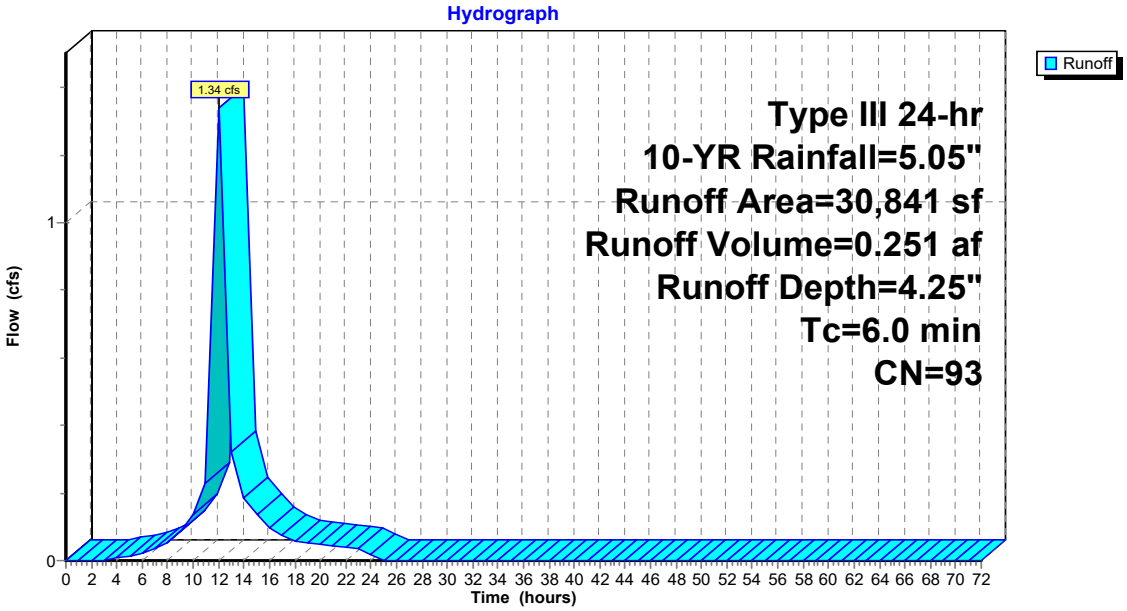
Runoff = 1.34 cfs @ 12.02 hrs, Volume= 0.251 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

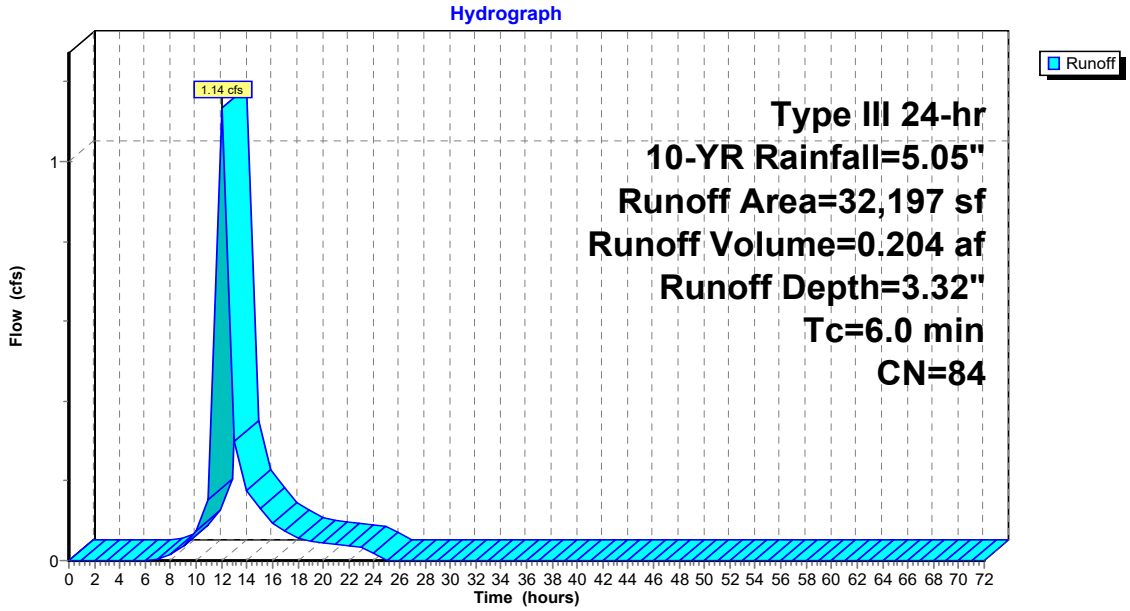
Runoff = 1.14 cfs @ 12.04 hrs, Volume= 0.204 af, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

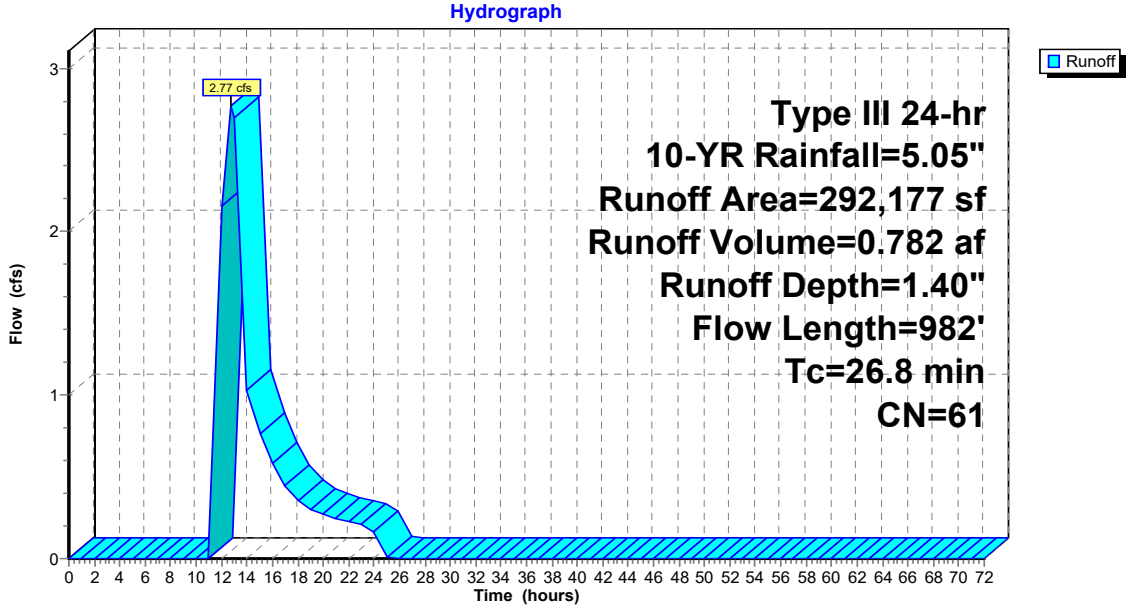
Runoff = 2.77 cfs @ 12.74 hrs, Volume= 0.782 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

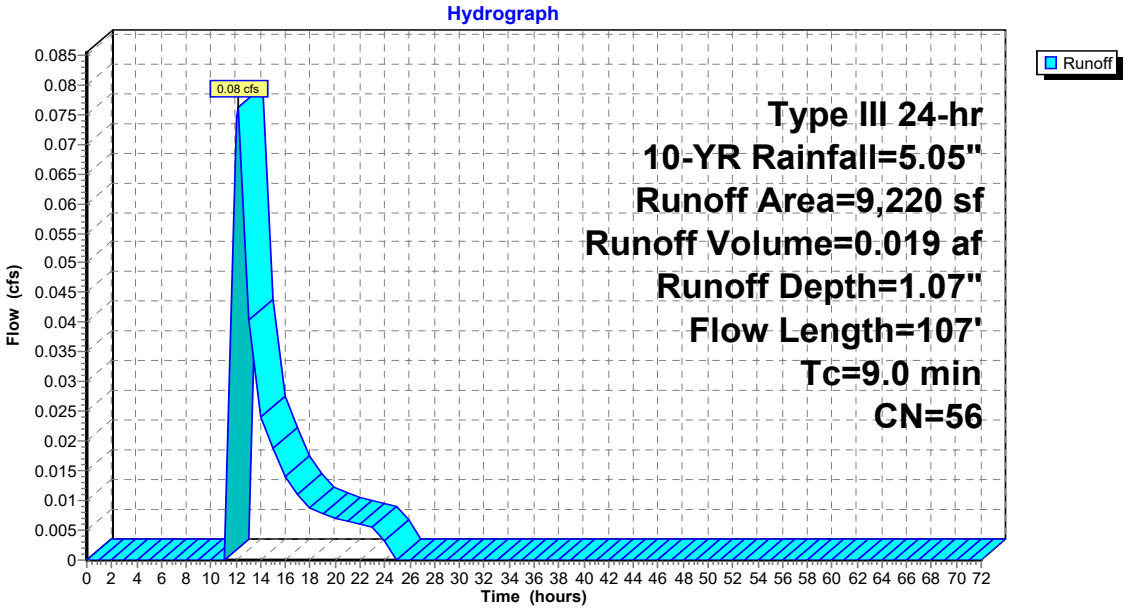
Runoff = 0.08 cfs @ 12.19 hrs, Volume= 0.019 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

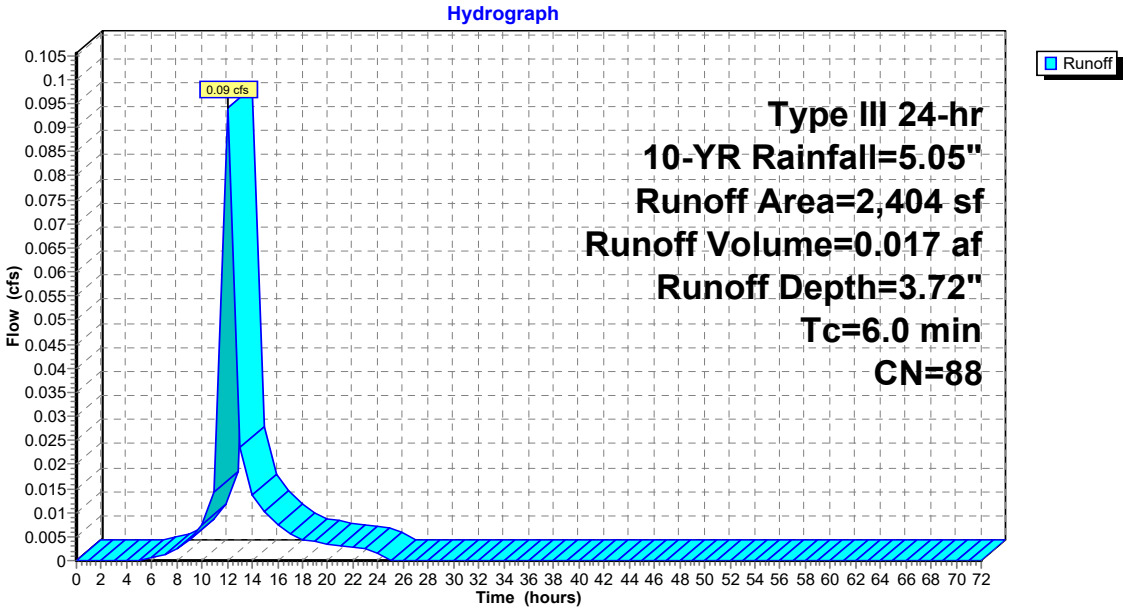
Runoff = 0.09 cfs @ 12.03 hrs, Volume= 0.017 af, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

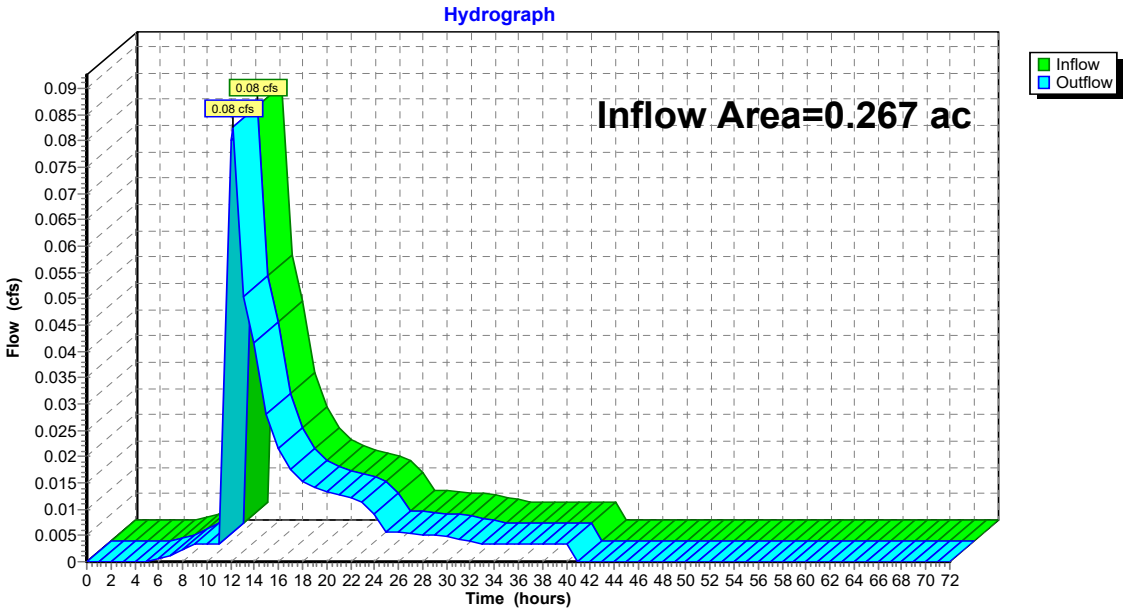


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth = 1.52" for 10-YR event
Inflow = 0.08 cfs @ 12.22 hrs, Volume= 0.034 af
Outflow = 0.08 cfs @ 12.22 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 1.21" for 10-YR event
Inflow = 5.14 cfs @ 13.03 hrs, Volume= 1.768 af
Outflow = 4.72 cfs @ 13.27 hrs, Volume= 1.770 af, Atten= 8%, Lag= 14.2 min

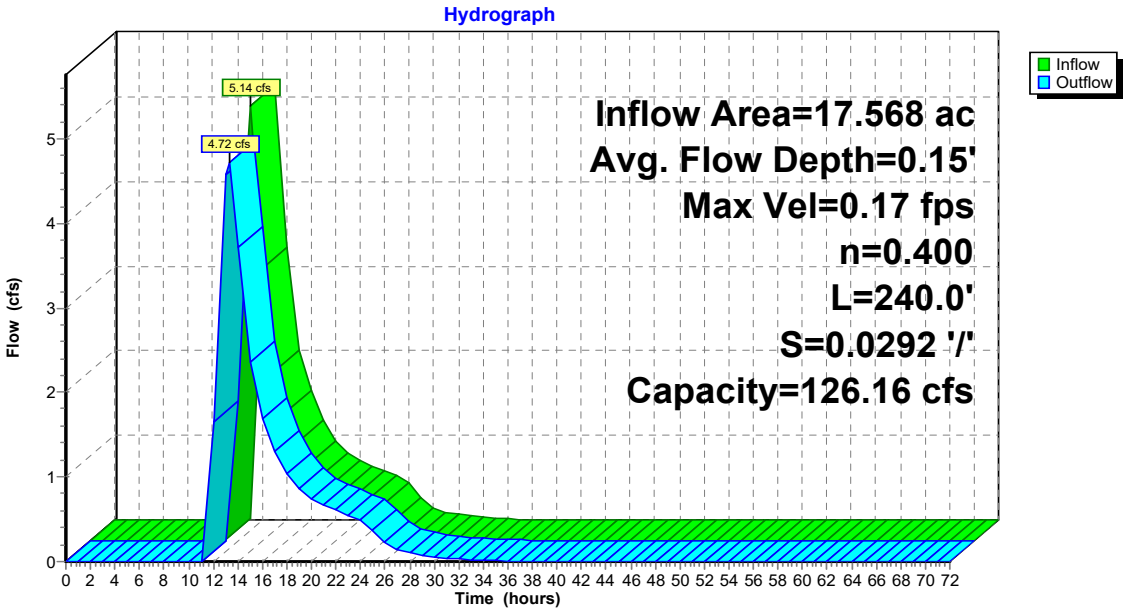
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.17 fps, Min. Travel Time= 23.2 min
Avg. Velocity = 0.05 fps, Avg. Travel Time= 74.5 min

Peak Storage= 6,524 cf @ 13.29 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Discharge for Reach PDP-4: Design Point 4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
625.00	0.00	0.00	625.52	0.37	38.60
625.01	0.03	0.05	625.53	0.37	39.92
625.02	0.05	0.15	625.54	0.37	41.26
625.03	0.06	0.30	625.55	0.38	42.62
625.04	0.07	0.49	625.56	0.38	44.01
625.05	0.08	0.72	625.57	0.39	45.42
625.06	0.10	0.97	625.58	0.39	46.84
625.07	0.11	1.26	625.59	0.39	48.29
625.08	0.12	1.57	625.60	0.40	49.76
625.09	0.12	1.92	625.61	0.40	51.25
625.10	0.13	2.29	625.62	0.41	52.76
625.11	0.14	2.69	625.63	0.41	54.29
625.12	0.15	3.11	625.64	0.41	55.85
625.13	0.16	3.56	625.65	0.42	57.42
625.14	0.16	4.04	625.66	0.42	59.02
625.15	0.17	4.54	625.67	0.42	60.64
625.16	0.18	5.06	625.68	0.43	62.27
625.17	0.19	5.61	625.69	0.43	63.93
625.18	0.19	6.18	625.70	0.43	65.62
625.19	0.20	6.78	625.71	0.44	67.32
625.20	0.21	7.40	625.72	0.44	69.04
625.21	0.21	8.04	625.73	0.44	70.79
625.22	0.22	8.70	625.74	0.45	72.55
625.23	0.22	9.39	625.75	0.45	74.34
625.24	0.23	10.09	625.76	0.46	76.15
625.25	0.24	10.82	625.77	0.46	77.98
625.26	0.24	11.58	625.78	0.46	79.84
625.27	0.25	12.35	625.79	0.47	81.71
625.28	0.25	13.15	625.80	0.47	83.61
625.29	0.26	13.96	625.81	0.47	85.53
625.30	0.26	14.80	625.82	0.48	87.47
625.31	0.27	15.66	625.83	0.48	89.43
625.32	0.27	16.54	625.84	0.48	91.41
625.33	0.28	17.45	625.85	0.48	93.42
625.34	0.28	18.37	625.86	0.49	95.44
625.35	0.29	19.31	625.87	0.49	97.49
625.36	0.29	20.28	625.88	0.49	99.56
625.37	0.30	21.27	625.89	0.50	101.66
625.38	0.30	22.28	625.90	0.50	103.77
625.39	0.31	23.31	625.91	0.50	105.91
625.40	0.31	24.36	625.92	0.51	108.07
625.41	0.32	25.43	625.93	0.51	110.25
625.42	0.32	26.52	625.94	0.51	112.46
625.43	0.33	27.63	625.95	0.52	114.69
625.44	0.33	28.77	625.96	0.52	116.94
625.45	0.34	29.92	625.97	0.52	119.21
625.46	0.34	31.10	625.98	0.53	121.50
625.47	0.35	32.30	625.99	0.53	123.82
625.48	0.35	33.51	626.00	**0.53**	**126.16**
625.49	0.35	34.75			
625.50	0.36	36.01			
625.51	0.36	37.29			

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth = 1.21" for 10-YR event
Inflow = 4.90 cfs @ 12.79 hrs, Volume= 1.472 af
Outflow = 4.53 cfs @ 13.09 hrs, Volume= 1.473 af, Atten= 7%, Lag= 18.1 min

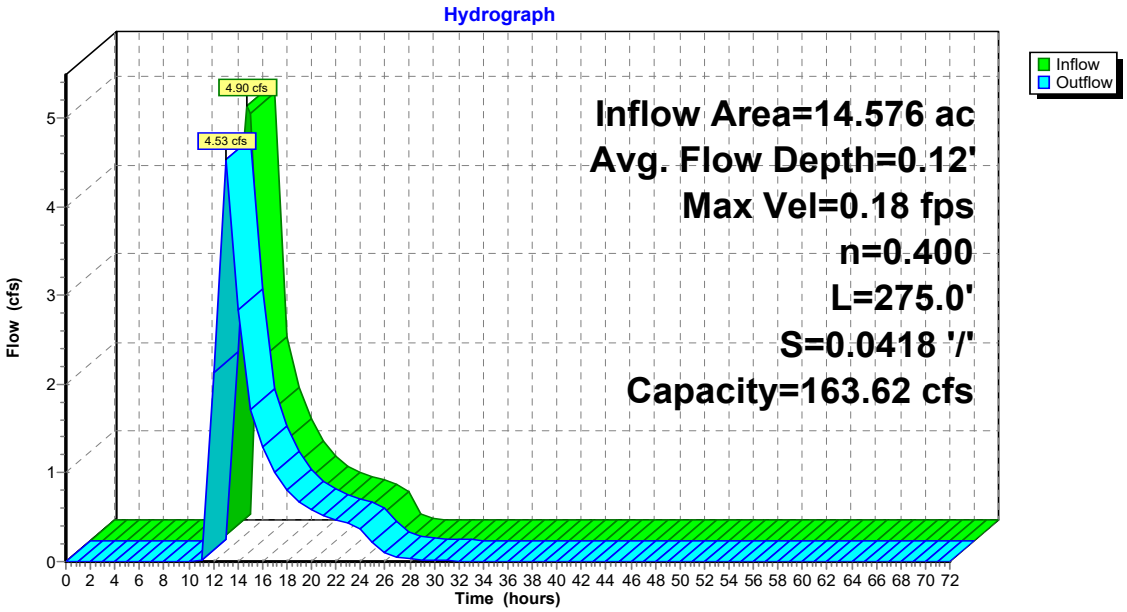
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.18 fps, Min. Travel Time= 25.1 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 77.4 min

Peak Storage= 6,813 cf @ 13.10 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Discharge for Reach PDP-5: Design Point 5

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
636.50	0.00	0.00	637.02	0.46	52.98
636.51	0.04	0.07	637.03	0.47	54.73
636.52	0.06	0.22	637.04	0.48	56.50
636.53	0.07	0.44	637.05	0.48	58.30
636.54	0.09	0.71	637.06	0.49	60.12
636.55	0.10	1.03	637.07	0.49	61.97
636.56	0.12	1.40	637.08	0.50	63.84
636.57	0.13	1.81	637.09	0.50	65.74
636.58	0.14	2.27	637.10	0.51	67.66
636.59	0.15	2.76	637.11	0.51	69.60
636.60	0.16	3.29	637.12	0.52	71.57
636.61	0.17	3.86	637.13	0.52	73.56
636.62	0.18	4.47	637.14	0.53	75.57
636.63	0.19	5.11	637.15	0.53	77.61
636.64	0.20	5.79	637.16	0.54	79.67
636.65	0.21	6.50	637.17	0.54	81.76
636.66	0.22	7.24	637.18	0.55	83.87
636.67	0.23	8.01	637.19	0.55	86.00
636.68	0.24	8.82	637.20	0.56	88.16
636.69	0.25	9.66	637.21	0.56	90.34
636.70	0.25	10.53	637.22	0.57	92.54
636.71	0.26	11.43	637.23	0.57	94.77
636.72	0.27	12.36	637.24	0.58	97.02
636.73	0.28	13.32	637.25	0.58	99.29
636.74	0.29	14.31	637.26	0.58	101.58
636.75	0.29	15.33	637.27	0.59	103.90
636.76	0.30	16.37	637.28	0.59	106.25
636.77	0.31	17.45	637.29	0.60	108.61
636.78	0.31	18.55	637.30	0.60	111.00
636.79	0.32	19.68	637.31	0.61	113.41
636.80	0.33	20.84	637.32	0.61	115.85
636.81	0.34	22.03	637.33	0.62	118.31
636.82	0.34	23.24	637.34	0.62	120.79
636.83	0.35	24.48	637.35	0.63	123.29
636.84	0.36	25.75	637.36	0.63	125.82
636.85	0.36	27.04	637.37	0.63	128.37
636.86	0.37	28.36	637.38	0.64	130.95
636.87	0.38	29.71	637.39	0.64	133.54
636.88	0.38	31.08	637.40	0.65	136.16
636.89	0.39	32.48	637.41	0.65	138.80
636.90	0.39	33.91	637.42	0.66	141.47
636.91	0.40	35.36	637.43	0.66	144.16
636.92	0.41	36.83	637.44	0.66	146.87
636.93	0.41	38.34	637.45	0.67	149.60
636.94	0.42	39.86	637.46	0.67	152.36
636.95	0.42	41.42	637.47	0.68	155.14
636.96	0.43	42.99	637.48	0.68	157.94
636.97	0.44	44.59	637.49	0.68	160.77
636.98	0.44	46.22	637.50	**0.69**	**163.62**
636.99	0.45	47.87			
637.00	0.45	49.55			
637.01	0.46	51.25			

Summary for Reach PDP-6: Design Point 6

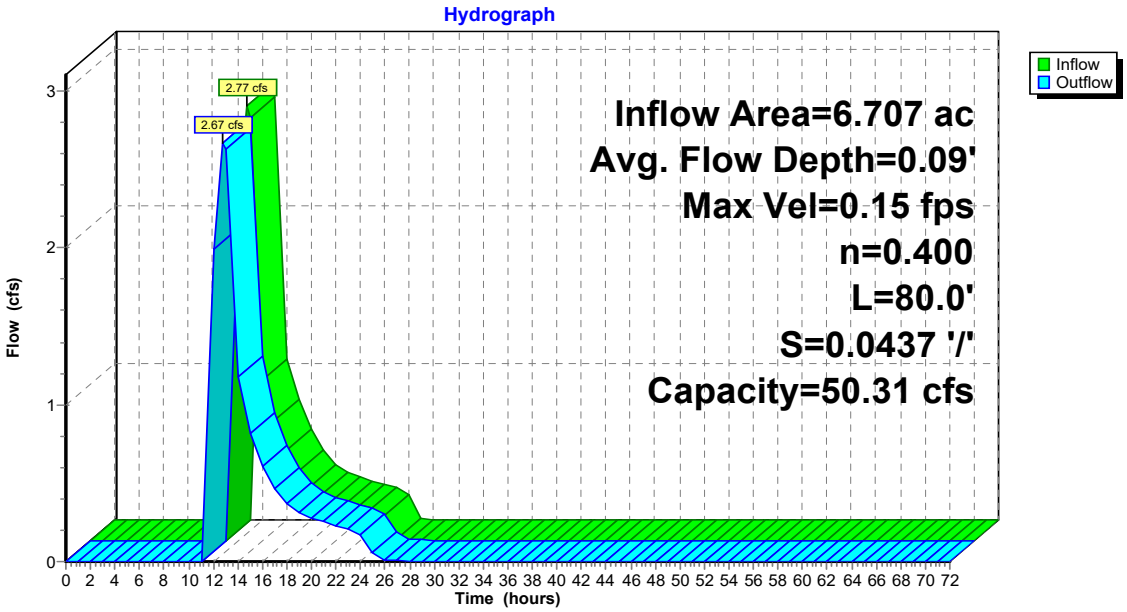
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth = 1.40" for 10-YR event
Inflow = 2.77 cfs @ 12.74 hrs, Volume= 0.782 af
Outflow = 2.67 cfs @ 12.80 hrs, Volume= 0.794 af, Atten= 4%, Lag= 3.6 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.15 fps, Min. Travel Time= 8.9 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 24.0 min

Peak Storage= 1,415 cf @ 12.79 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Discharge for Reach PDP-6: Design Point 6

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
642.50	0.00	0.00
642.51	0.04	0.07
642.52	0.06	0.23
642.53	0.07	0.45
642.54	0.09	0.73
642.55	0.10	1.06
642.56	0.12	1.43
642.57	0.13	1.85
642.58	0.14	2.32
642.59	0.15	2.82
642.60	0.17	3.37
642.61	0.18	3.95
642.62	0.19	4.57
642.63	0.20	5.22
642.64	0.21	5.91
642.65	0.22	6.63
642.66	0.23	7.39
642.67	0.23	8.18
642.68	0.24	9.00
642.69	0.25	9.86
642.70	0.26	10.74
642.71	0.27	11.66
642.72	0.28	12.60
642.73	0.29	13.58
642.74	0.29	14.59
642.75	0.30	15.62
642.76	0.31	16.69
642.77	0.32	17.78
642.78	0.32	18.90
642.79	0.33	20.05
642.80	0.34	21.23
642.81	0.35	22.43
642.82	0.35	23.67
642.83	0.36	24.92
642.84	0.37	26.21
642.85	0.37	27.52
642.86	0.38	28.86
642.87	0.39	30.23
642.88	0.39	31.62
642.89	0.40	33.04
642.90	0.41	34.48
642.91	0.41	35.95
642.92	0.42	37.45
642.93	0.43	38.97
642.94	0.43	40.51
642.95	0.44	42.08
642.96	0.44	43.68
642.97	0.45	45.30
642.98	0.46	46.94
642.99	0.46	48.61
643.00	**0.47**	**50.31**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 3.94" for 10-YR event
Inflow = 0.67 cfs @ 12.11 hrs, Volume= 0.369 af
Outflow = 0.65 cfs @ 12.19 hrs, Volume= 0.376 af, Atten= 3%, Lag= 4.8 min
Discarded = 0.06 cfs @ 12.36 hrs, Volume= 0.169 af
Primary = 0.59 cfs @ 12.19 hrs, Volume= 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 622.22' @ 12.37 hrs Surf.Area= 1,392 sf Storage= 1,184 cf
Flood Elev= 623.50' Surf.Area= 2,450 sf Storage= 3,580 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 97.1 min (1,239.0 - 1,141.8)

Volume	Invert	Avail.Storage	Storage Description
#1	620.00'	3,306 cf	**Overall storage (Prismatic)** Listed below (Recalc) 4,263 cf Overall - 957 cf Embedded = 3,306 cf
#2	620.00'	211 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 638 cf Overall x 33.0% Voids
#3	621.00'	64 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 319 cf Overall x 20.0% Voids
		3,580 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638
622.00	1,230	934	1,572
623.00	1,951	1,591	3,163
623.50	2,450	1,100	4,263

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638

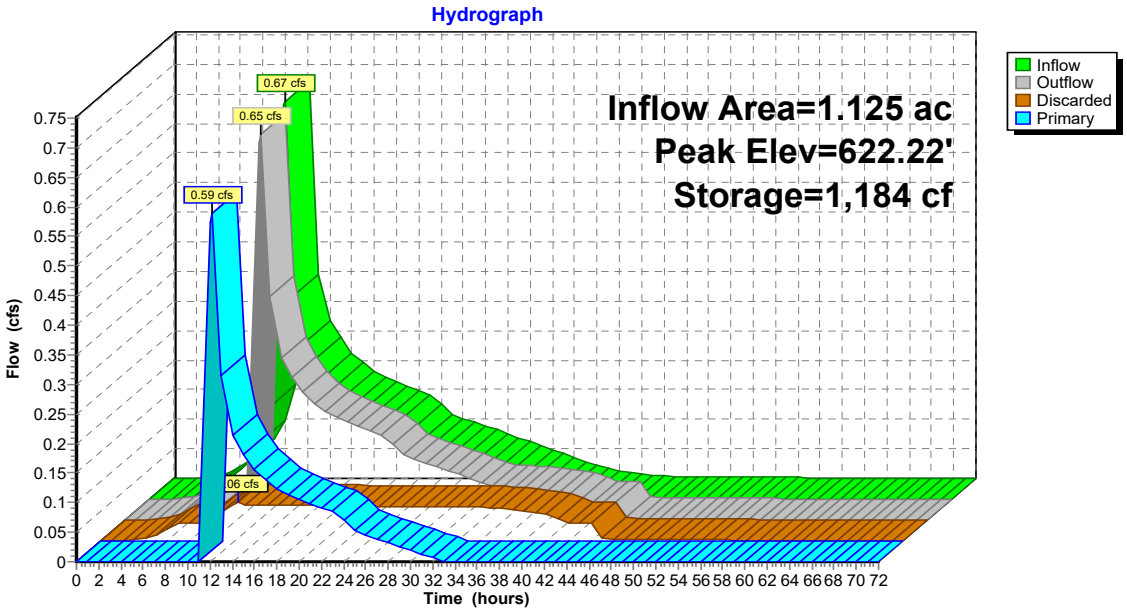
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
621.00	638	0	0
621.50	638	319	319

Device	Routing	Invert	Outlet Devices
#1	Discarded	620.00'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.14'	**8.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.14' / 620.00' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	622.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.36 hrs HW=622.17' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.52 cfs @ 12.19 hrs HW=622.18' (Free Discharge)
└─**2=Culvert** (Passes 0.52 cfs of 1.73 cfs potential flow)
└─**3=Orifice/Grate** (Weir Controls 0.52 cfs @ 1.38 fps)

Pond 3: SFB-3



Stage-Discharge for Pond 3: SFB-3

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
620.00	0.00	0.00	0.00
620.05	0.03	0.03	0.00
620.10	0.03	0.03	0.00
620.15	0.03	0.03	0.00
620.20	0.03	0.03	0.00
620.25	0.03	0.03	0.00
620.30	0.03	0.03	0.00
620.35	0.03	0.03	0.00
620.40	0.03	0.03	0.00
620.45	0.03	0.03	0.00
620.50	0.03	0.03	0.00
620.55	0.03	0.03	0.00
620.60	0.03	0.03	0.00
620.65	0.03	0.03	0.00
620.70	0.03	0.03	0.00
620.75	0.03	0.03	0.00
620.80	0.03	0.03	0.00
620.85	0.03	0.03	0.00
620.90	0.03	0.03	0.00
620.95	0.03	0.03	0.00
621.00	0.03	0.03	0.00
621.05	0.03	0.03	0.00
621.10	0.03	0.03	0.00
621.15	0.03	0.03	0.00
621.20	0.04	0.04	0.00
621.25	0.04	0.04	0.00
621.30	0.04	0.04	0.00
621.35	0.04	0.04	0.00
621.40	0.04	0.04	0.00
621.45	0.04	0.04	0.00
621.50	0.04	0.04	0.00
621.55	0.04	0.04	0.00
621.60	0.05	0.05	0.00
621.65	0.05	0.05	0.00
621.70	0.05	0.05	0.00
621.75	0.05	0.05	0.00
621.80	0.05	0.05	0.00
621.85	0.05	0.05	0.00
621.90	0.05	0.05	0.00
621.95	0.06	0.06	0.00
622.00	0.06	0.06	0.00
622.05	0.14	0.06	0.08
622.10	0.28	0.06	0.22
622.15	0.46	0.06	0.40
622.20	0.68	0.06	0.61
622.25	0.91	0.07	0.84
622.30	0.99	0.07	0.92
622.35	1.06	0.07	0.99
622.40	1.13	0.07	1.06
622.45	1.20	0.07	1.13
622.50	1.26	0.07	1.19
622.55	1.32	0.08	1.25
622.60	1.38	0.08	1.30
622.65	1.43	0.08	1.36
622.70	1.49	0.08	1.41
622.75	1.54	0.08	1.46
622.80	1.59	0.08	1.50
622.85	1.64	0.09	1.55
622.90	1.68	0.09	1.59
622.95	1.73	0.09	1.64
623.00	1.77	0.09	1.68
623.05	1.82	0.09	1.72
623.10	1.86	0.10	1.76
623.15	1.90	0.10	1.80
623.20	1.94	0.10	1.84
623.25	1.98	0.10	1.88
623.30	2.02	0.10	1.92
623.35	2.06	0.11	1.95
623.40	2.10	0.11	1.99
623.45	2.14	0.11	2.02
623.50	**2.17**	**0.11**	**2.06**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 4.31" for 10-YR event				
Inflow =	1.30 cfs @	12.11 hrs,	Volume=	0.535 af	
Outflow =	0.70 cfs @	13.22 hrs,	Volume=	0.532 af,	Atten= 47%, Lag= 66.4 min
Discarded =	0.47 cfs @	13.40 hrs,	Volume=	0.488 af	
Primary =	0.23 cfs @	13.17 hrs,	Volume=	0.044 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 632.83' @ 13.40 hrs Surf.Area= 3,089 sf Storage= 4,216 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,373 cf

Plug-Flow detention time= 64.6 min calculated for 0.525 af (98% of inflow)
Center-of-Mass det. time= 59.0 min (985.0 - 926.0)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	542 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,643 cf Overall x 33.0% Voids
#3	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,373 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.25' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

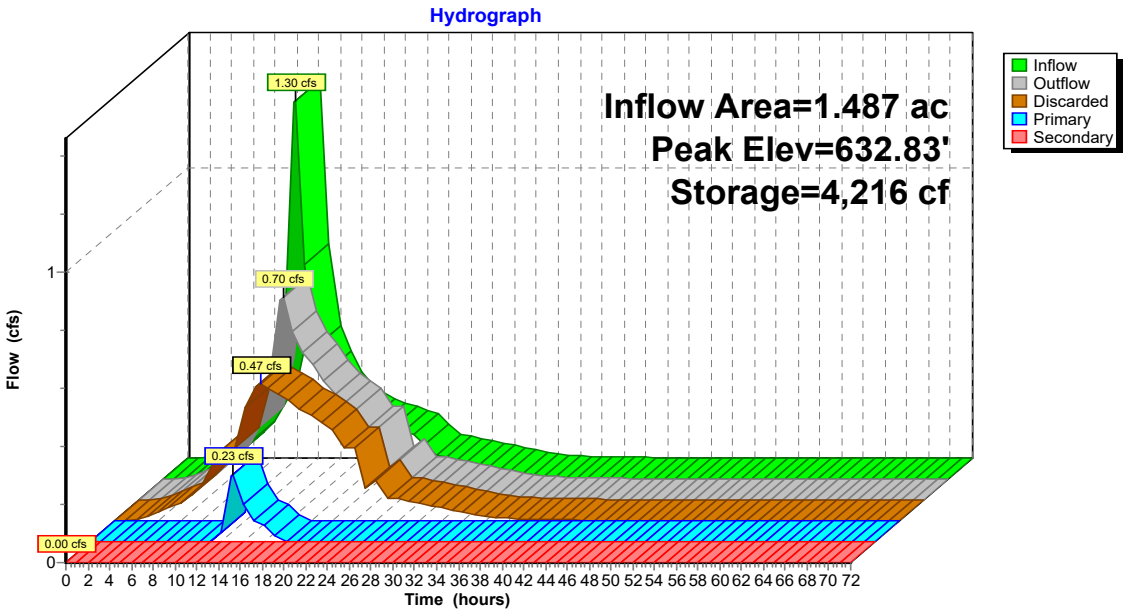
#5 Secondary 633.30' **50.0' long x 1.0' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.46 cfs @ 13.40 hrs HW=632.75' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=0.21 cfs @ 13.17 hrs HW=632.76' (Free Discharge)
└─**2=Culvert** (Passes 0.21 cfs of 2.07 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 3.96 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.13 cfs @ 1.09 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Discharge for Pond 4: SFB-4

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
630.00	0.00	0.00	0.00	0.00
630.10	0.25	0.25	0.00	0.00
630.20	0.25	0.25	0.00	0.00
630.30	0.25	0.25	0.00	0.00
630.40	0.25	0.25	0.00	0.00
630.50	0.25	0.25	0.00	0.00
630.60	0.25	0.25	0.00	0.00
630.70	0.25	0.25	0.00	0.00
630.80	0.25	0.25	0.00	0.00
630.90	0.25	0.25	0.00	0.00
631.00	0.25	0.25	0.00	0.00
631.10	0.26	0.26	0.00	0.00
631.20	0.27	0.27	0.00	0.00
631.30	0.29	0.29	0.00	0.00
631.40	0.30	0.30	0.00	0.00
631.50	0.31	0.31	0.00	0.00
631.60	0.32	0.32	0.00	0.00
631.70	0.33	0.33	0.00	0.00
631.80	0.35	0.35	0.00	0.00
631.90	0.36	0.36	0.00	0.00
632.00	0.37	0.37	0.00	0.00
632.10	0.40	0.38	0.01	0.00
632.20	0.43	0.39	0.04	0.00
632.30	0.46	0.41	0.05	0.00
632.40	0.48	0.42	0.06	0.00
632.50	0.50	0.43	0.07	0.00
632.60	0.52	0.44	0.08	0.00
632.70	0.57	0.45	0.12	0.00
632.80	0.72	0.47	0.25	0.00
632.90	0.78	0.48	0.31	0.00
633.00	0.84	0.49	0.35	0.00
633.10	0.89	0.50	0.39	0.00
633.20	0.94	0.51	0.42	0.00
633.30	0.98	0.52	0.45	0.00
633.40	5.27	0.54	0.48	4.25
633.50	13.09	0.55	0.51	12.03
633.60	23.32	0.56	0.54	22.22
633.70	35.54	0.57	0.56	34.41
633.80	49.52	0.58	0.59	48.35
633.90	65.11	0.60	0.61	63.90
634.00	**83.23**	**0.61**	**0.63**	**81.99**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth = 3.49" for 10-YR event				
Inflow =	0.51 cfs @	12.23 hrs,	Volume=	0.476 af	
Outflow =	0.25 cfs @	17.55 hrs,	Volume=	0.480 af,	Atten= 51%, Lag= 318.9 min
Discarded =	0.21 cfs @	17.55 hrs,	Volume=	0.460 af	
Primary =	0.04 cfs @	17.55 hrs,	Volume=	0.020 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 634.71' @ 17.55 hrs Surf.Area= 3,267 sf Storage= 3,831 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,589 cf

Plug-Flow detention time= 196.6 min calculated for 0.473 af (99% of inflow)
Center-of-Mass det. time= 203.3 min (1,383.4 - 1,180.1)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	497 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,505 cf Overall x 33.0% Voids
#3	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,589 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.00	1,505	1,505	1,505

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**6.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir**

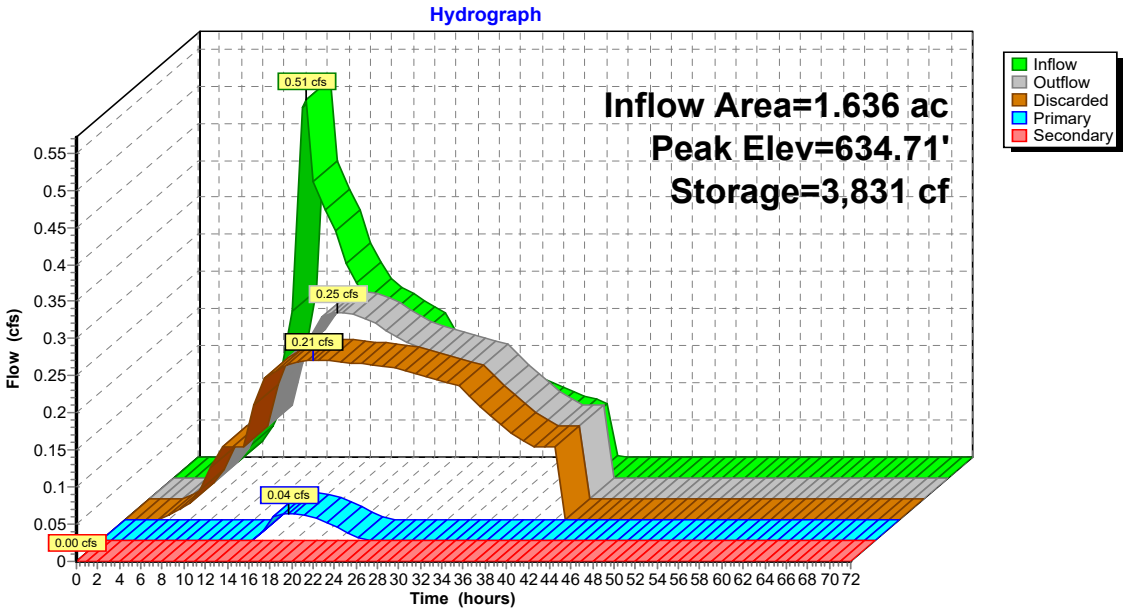
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 17.55 hrs HW=634.70' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.04 cfs @ 17.55 hrs HW=634.70' (Free Discharge)
└─**2=Culvert** (Passes 0.04 cfs of 0.60 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.68 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Discharge for Pond 5: SFB-5

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
632.00	0.00	0.00	0.00	0.00
632.10	0.10	0.10	0.00	0.00
632.20	0.10	0.10	0.00	0.00
632.30	0.10	0.10	0.00	0.00
632.40	0.10	0.10	0.00	0.00
632.50	0.10	0.10	0.00	0.00
632.60	0.10	0.10	0.00	0.00
632.70	0.10	0.10	0.00	0.00
632.80	0.10	0.10	0.00	0.00
632.90	0.10	0.10	0.00	0.00
633.00	0.10	0.10	0.00	0.00
633.10	0.10	0.10	0.00	0.00
633.20	0.10	0.10	0.00	0.00
633.30	0.10	0.10	0.00	0.00
633.40	0.10	0.10	0.00	0.00
633.50	0.10	0.10	0.00	0.00
633.60	0.12	0.12	0.00	0.00
633.70	0.13	0.13	0.00	0.00
633.80	0.15	0.15	0.00	0.00
633.90	0.16	0.16	0.00	0.00
634.00	0.18	0.18	0.00	0.00
634.10	0.19	0.19	0.00	0.00
634.20	0.19	0.19	0.00	0.00
634.30	0.19	0.19	0.00	0.00
634.40	0.20	0.20	0.00	0.00
634.50	0.20	0.20	0.00	0.00
634.60	0.22	0.21	0.01	0.00
634.70	0.25	0.21	0.04	0.00
634.80	0.27	0.22	0.05	0.00
634.90	0.28	0.22	0.06	0.00
635.00	0.30	0.23	0.07	0.00
635.10	7.11	0.23	0.08	6.81
635.20	19.57	0.24	0.08	19.25
635.30	35.89	0.24	0.09	35.56
635.40	55.39	0.24	0.09	55.05
635.50	77.71	0.25	0.10	77.36
635.60	102.60	0.25	0.11	102.25
635.70	131.55	0.26	0.11	131.19
635.80	163.52	0.26	0.12	163.14
635.90	199.49	0.26	0.12	199.11
636.00	**238.79**	**0.27**	**0.13**	**238.40**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth = 5.09" for 10-YR event
Inflow = 1.36 cfs @ 12.01 hrs, Volume= 0.252 af
Outflow = 0.15 cfs @ 14.30 hrs, Volume= 0.251 af, Atten= 89%, Lag= 137.4 min
Primary = 0.15 cfs @ 14.30 hrs, Volume= 0.251 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 628.22' @ 14.30 hrs Surf.Area= 0.081 ac Storage= 0.154 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 552.7 min calculated for 0.251 af (100% of inflow)
Center-of-Mass det. time= 547.8 min (1,292.9 - 745.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**8.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 622.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.15 cfs @ 14.30 hrs HW=628.21' (Free Discharge)
└─**1=Culvert** (Passes 0.15 cfs of 1.82 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 7.03 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

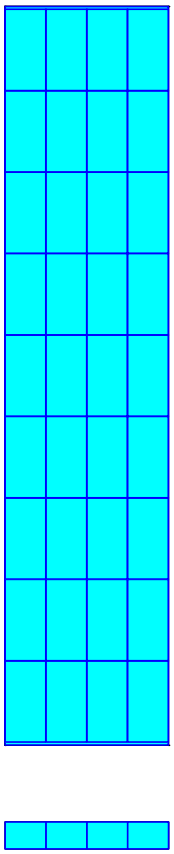
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

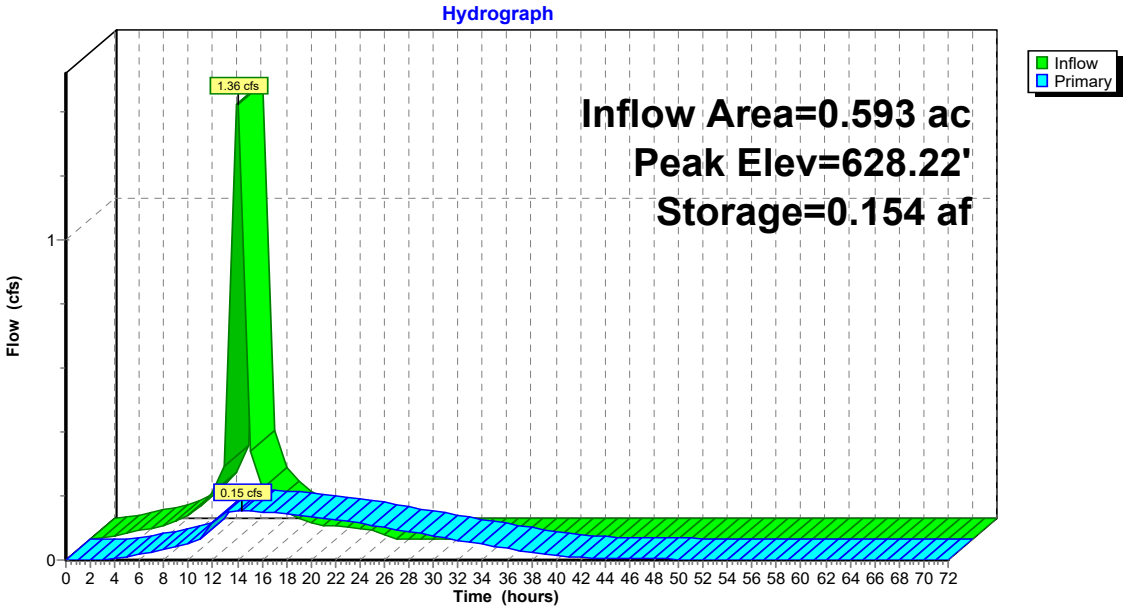
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow
Primary
1.36 cfs
0.15 cfs
Inflow Area=0.593 ac
Peak Elev=628.22'
Storage=0.154 af
Flow (cfs)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-3: DB-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
626.00	0.00	628.60	0.17
626.05	0.00	628.65	0.17
626.10	0.01	628.70	0.17
626.15	0.03	628.75	0.17
626.20	0.04	628.80	0.17
626.25	0.04	628.85	0.17
626.30	0.05	628.90	0.18
626.35	0.05	628.95	0.18
626.40	0.06	629.00	0.18
626.45	0.06	629.05	0.18
626.50	0.07	629.10	0.18
626.55	0.07	629.15	0.18
626.60	0.08	629.20	0.19
626.65	0.08	629.25	0.19
626.70	0.08	629.30	0.19
626.75	0.09	629.35	0.19
626.80	0.09	629.40	0.19
626.85	0.09	629.45	0.19
626.90	0.09	629.50	0.19
626.95	0.10	629.55	0.20
627.00	0.10	629.60	0.20
627.05	0.10	629.65	0.20
627.10	0.11	629.70	0.20
627.15	0.11	629.75	0.20
627.20	0.11	629.80	0.20
627.25	0.11	629.85	0.20
627.30	0.12	629.90	0.21
627.35	0.12	629.95	0.21
627.40	0.12	630.00	0.21
627.45	0.12	630.05	0.21
627.50	0.13	630.10	0.21
627.55	0.13	630.15	0.21
627.60	0.13	630.20	0.21
627.65	0.13	630.25	0.21
627.70	0.13	630.30	0.22
627.75	0.14	630.35	0.22
627.80	0.14	630.40	0.22
627.85	0.14	630.45	0.22
627.90	0.14	630.50	0.22
627.95	0.14	630.55	0.22
628.00	0.15	630.60	0.22
628.05	0.15	630.65	**0.22**
628.10	0.15		
628.15	0.15		
628.20	0.15		
628.25	0.15		
628.30	0.16		
628.35	0.16		
628.40	0.16		
628.45	0.16		
628.50	0.16		
628.55	0.16		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth = 8.48" for 10-YR event
Inflow = 1.56 cfs @ 12.00 hrs, Volume= 0.193 af
Outflow = 0.22 cfs @ 13.13 hrs, Volume= 0.193 af, Atten= 86%, Lag= 67.4 min
Primary = 0.22 cfs @ 13.13 hrs, Volume= 0.193 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 636.25' @ 13.39 hrs Surf.Area= 0.072 ac Storage= 0.138 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 461.1 min calculated for 0.193 af (100% of inflow)
Center-of-Mass det. time= 455.1 min (1,190.2 - 735.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.21 cfs @ 13.13 hrs HW=636.16' (Free Discharge)
└─**1=Culvert** (Passes 0.21 cfs of 0.93 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.93 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.35 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

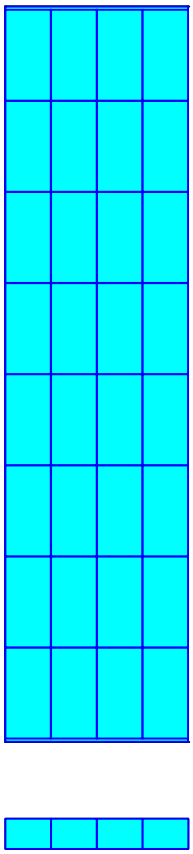
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

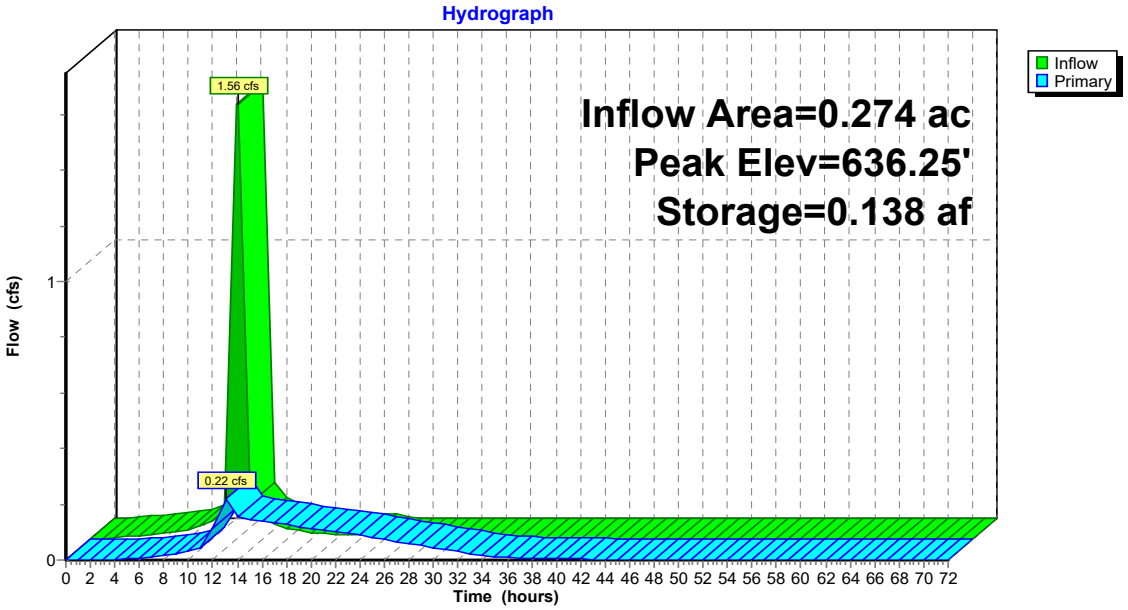
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow
Primary
1.56 cfs
0.22 cfs
Inflow Area=0.274 ac
Peak Elev=636.25'
Storage=0.138 af
Flow (cfs)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-4: DB-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
634.00	0.00	636.60	0.44
634.05	0.00	636.65	0.46
634.10	0.01	636.70	0.48
634.15	0.03	636.75	0.49
634.20	0.04	636.80	0.51
634.25	0.04	636.85	0.52
634.30	0.05	636.90	0.54
634.35	0.05	636.95	0.55
634.40	0.06	637.00	0.56
634.45	0.06	637.05	0.58
634.50	0.07	637.10	0.61
634.55	0.07	637.15	0.65
634.60	0.08	637.20	0.70
634.65	0.08	637.25	0.74
634.70	0.08	637.30	0.79
634.75	0.09	637.35	0.83
634.80	0.09	637.40	0.86
634.85	0.09	637.45	0.89
634.90	0.09	637.50	0.92
634.95	0.10	637.55	0.95
635.00	0.10	637.60	0.98
635.05	0.10	637.65	1.00
635.10	0.11	637.70	1.03
635.15	0.11	637.75	1.05
635.20	0.11	637.80	1.07
635.25	0.11	637.85	1.10
635.30	0.12	637.90	1.12
635.35	0.12	637.95	1.14
635.40	0.12	638.00	1.16
635.45	0.12	638.05	1.18
635.50	0.13	638.10	1.20
635.55	0.13	638.15	1.22
635.60	0.13	638.20	1.24
635.65	0.13	638.25	1.25
635.70	0.13	638.30	1.26
635.75	0.14	638.35	1.26
635.80	0.14	638.40	1.27
635.85	0.14	638.45	1.27
635.90	0.14	638.50	1.28
635.95	0.14	638.55	1.29
636.00	0.15	638.60	1.29
636.05	0.15	638.65	**1.30**
636.10	0.17		
636.15	0.20		
636.20	0.24		
636.25	0.27		
636.30	0.31		
636.35	0.34		
636.40	0.36		
636.45	0.39		
636.50	0.41		
636.55	0.43		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth = 5.70" for 10-YR event
Inflow = 2.23 cfs @ 12.03 hrs, Volume= 0.336 af
Outflow = 0.18 cfs @ 14.43 hrs, Volume= 0.335 af, Atten= 92%, Lag= 143.9 min
Primary = 0.18 cfs @ 14.43 hrs, Volume= 0.335 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Peak Elev= 640.64' @ 14.42 hrs Surf.Area= 0.090 ac Storage= 0.216 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 548.3 min (1,312.7 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.18 cfs @ 14.43 hrs HW=640.63' (Free Discharge)
└─**1=Culvert** (Passes 0.18 cfs of 1.17 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.40 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

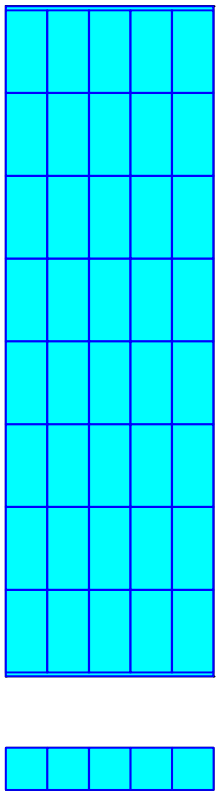
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

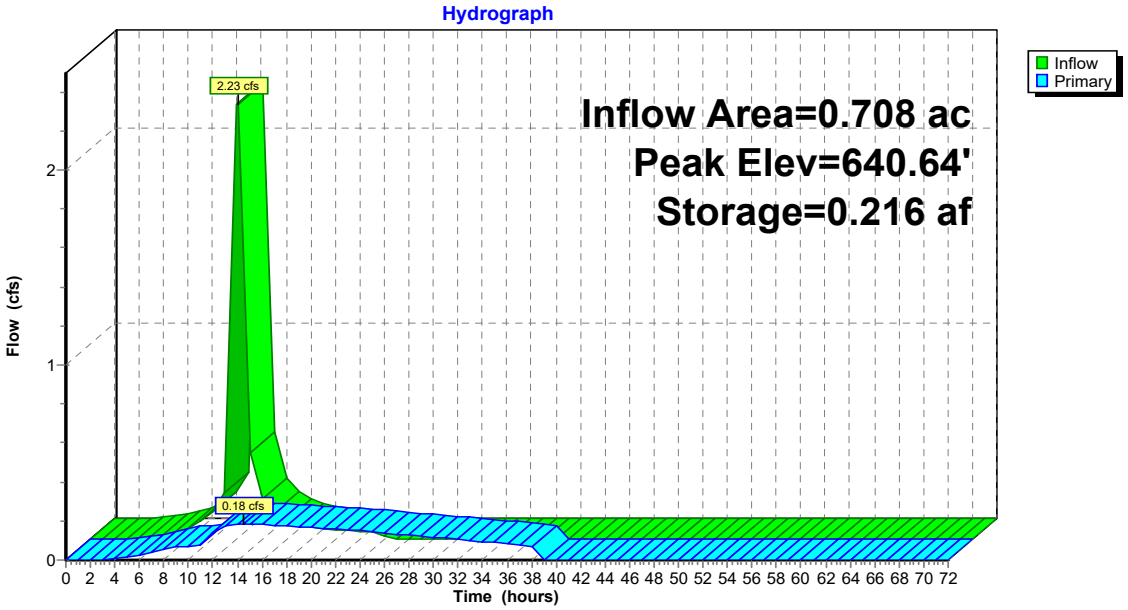
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow
Primary
2.23 cfs
0.18 cfs
Inflow Area=0.708 ac
Peak Elev=640.64'
Storage=0.216 af
Flow (cfs)
0
1
2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-5: DB-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
637.50	0.00	639.58	0.15	641.66	0.21	643.74	0.26
637.54	0.00	639.62	0.15	641.70	0.21	643.78	0.26
637.58	0.01	639.66	0.15	641.74	0.21	643.82	0.26
637.62	0.02	639.70	0.15	641.78	0.22	643.86	0.26
637.66	0.03	639.74	0.15	641.82	0.22	643.90	0.26
637.70	0.04	639.78	0.16	641.86	0.22	643.94	0.26
637.74	0.04	639.82	0.16	641.90	0.22	643.98	0.27
637.78	0.05	639.86	0.16	641.94	0.22	644.02	0.27
637.82	0.05	639.90	0.16	641.98	0.22	644.06	0.27
637.86	0.06	639.94	0.16	642.02	0.22	644.10	0.27
637.90	0.06	639.98	0.16	642.06	0.22	644.14	0.27
637.94	0.06	640.02	0.16	642.10	0.22	644.18	0.27
637.98	0.07	640.06	0.17	642.14	0.22	644.22	0.27
638.02	0.07	640.10	0.17	642.18	0.23	644.26	0.27
638.06	0.07	640.14	0.17	642.22	0.23	644.30	0.27
638.10	0.08	640.18	0.17	642.26	0.23	644.34	0.27
638.14	0.08	640.22	0.17	642.30	0.23	644.38	0.27
638.18	0.08	640.26	0.17	642.34	0.23	644.42	0.27
638.22	0.08	640.30	0.17	642.38	0.23	644.46	0.28
638.26	0.09	640.34	0.17	642.42	0.23	644.50	0.28
638.30	0.09	640.38	0.18	642.46	0.23	644.54	0.28
638.34	0.09	640.42	0.18	642.50	0.23	644.58	0.28
638.38	0.09	640.46	0.18	642.54	0.23	644.62	0.28
638.42	0.10	640.50	0.18	642.58	0.23	644.66	**0.28**
638.46	0.10	640.54	0.18	642.62	0.24		
638.50	0.10	640.58	0.18	642.66	0.24		
638.54	0.10	640.62	0.18	642.70	0.24		
638.58	0.10	640.66	0.18	642.74	0.24		
638.62	0.11	640.70	0.19	642.78	0.24		
638.66	0.11	640.74	0.19	642.82	0.24		
638.70	0.11	640.78	0.19	642.86	0.24		
638.74	0.11	640.82	0.19	642.90	0.24		
638.78	0.11	640.86	0.19	642.94	0.24		
638.82	0.12	640.90	0.19	642.98	0.24		
638.86	0.12	640.94	0.19	643.02	0.24		
638.90	0.12	640.98	0.19	643.06	0.25		
638.94	0.12	641.02	0.19	643.10	0.25		
638.98	0.12	641.06	0.20	643.14	0.25		
639.02	0.13	641.10	0.20	643.18	0.25		
639.06	0.13	641.14	0.20	643.22	0.25		
639.10	0.13	641.18	0.20	643.26	0.25		
639.14	0.13	641.22	0.20	643.30	0.25		
639.18	0.13	641.26	0.20	643.34	0.25		
639.22	0.13	641.30	0.20	643.38	0.25		
639.26	0.14	641.34	0.20	643.42	0.25		
639.30	0.14	641.38	0.20	643.46	0.25		
639.34	0.14	641.42	0.21	643.50	0.26		
639.38	0.14	641.46	0.21	643.54	0.26		
639.42	0.14	641.50	0.21	643.58	0.26		
639.46	0.14	641.54	0.21	643.62	0.26		
639.50	0.15	641.58	0.21	643.66	0.26		
639.54	0.15	641.62	0.21	643.70	0.26		

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac,	72.22% Impervious,	Inflow Depth =	3.72"	for 10-YR event
Inflow =	0.56 cfs @	12.03 hrs,	Volume=	0.102 af	
Outflow =	0.56 cfs @	12.03 hrs,	Volume=	0.102 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.40 cfs @	12.05 hrs,	Volume=	0.088 af	
Secondary =	0.16 cfs @	12.00 hrs,	Volume=	0.014 af	

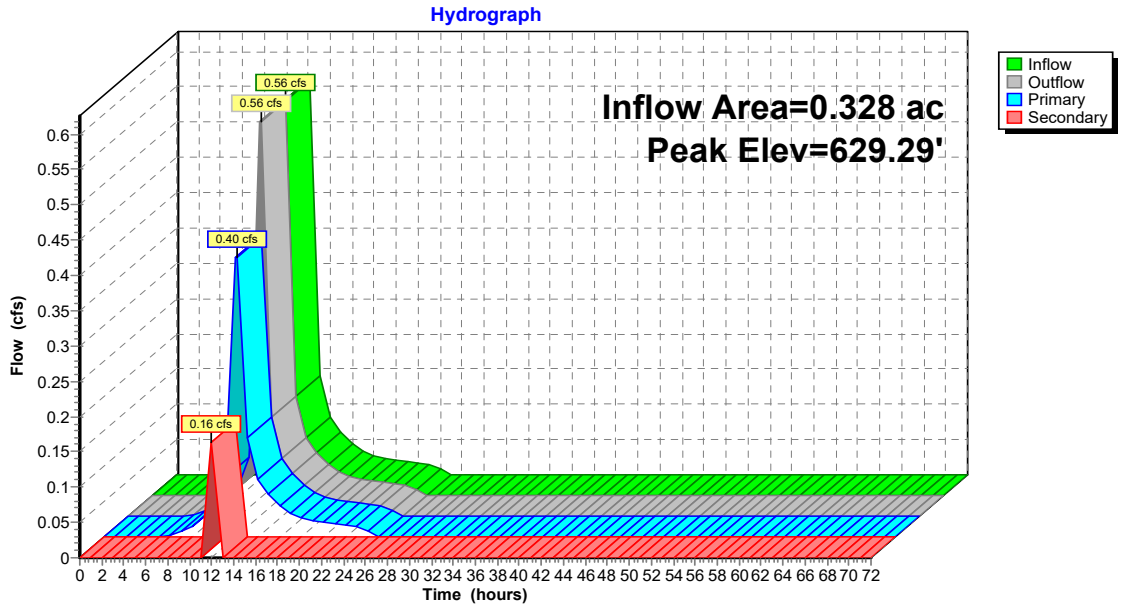
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 629.29' @ 12.05 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**5.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 622.00' S= 0.0285 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.14 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 12.05 hrs HW=629.28' TW=623.28' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.39 cfs @ 2.83 fps)

Secondary OutFlow Max=0.16 cfs @ 12.00 hrs HW=629.29' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.16 cfs @ 1.70 fps)

Pond ICS-3: ICS-3



Stage-Discharge for Pond ICS-3: ICS-3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
628.85	0.00	0.00	0.00
628.90	0.01	0.01	0.00
628.95	0.03	0.03	0.00
629.00	0.07	0.07	0.00
629.05	0.12	0.12	0.00
629.10	0.19	0.18	0.01
629.15	0.28	0.24	0.03
629.20	0.38	0.31	0.07
629.25	0.48	0.36	0.12
629.30	0.58	0.40	0.18
629.35	0.69	0.44	0.25
629.40	0.81	0.48	0.33
629.45	0.93	0.51	0.41
629.50	1.06	0.55	0.51
629.55	1.19	0.58	0.62
629.60	1.33	0.60	0.73
629.65	1.48	0.63	0.85
629.70	1.63	0.66	0.97
629.75	1.78	**0.68**	1.10
629.80	1.92	0.68	1.24
629.85	2.06	0.68	1.38
629.90	2.20	0.68	1.52
629.95	2.34	0.68	1.66
630.00	2.48	0.68	1.80
630.05	2.62	0.68	1.94
630.10	2.76	0.68	2.08
630.15	2.90	0.68	2.22
630.20	3.03	0.68	2.35
630.25	3.15	0.68	2.47
630.30	3.26	0.68	2.58
630.35	3.35	0.68	2.67
630.40	3.43	0.68	2.75
630.45	3.51	0.68	2.83
630.50	3.59	0.68	2.91
630.55	3.67	0.68	2.99
630.60	3.74	0.68	3.06
630.65	3.81	0.68	3.13
630.70	3.88	0.68	3.20
630.75	3.95	0.68	3.27
630.80	4.02	0.68	3.34
630.85	4.08	0.68	3.40
630.90	4.15	0.68	3.47
630.95	4.21	0.68	3.53
631.00	4.28	0.68	3.60
631.05	4.34	0.68	3.66
631.10	4.40	0.68	3.72
631.15	4.46	0.68	3.78
631.20	4.52	0.68	3.83
631.25	4.57	0.68	3.89
631.30	4.63	0.68	3.95
631.35	4.69	0.68	4.01
631.40	4.74	0.68	4.06
631.45	4.80	0.68	4.12
631.50	4.85	0.68	4.17
631.55	4.90	0.68	4.22
631.60	4.95	0.68	4.27
631.65	5.01	0.68	4.33
631.70	5.06	0.68	4.38
631.75	5.11	0.68	4.43
631.80	5.16	0.68	4.48
631.85	5.21	0.68	4.53
631.90	5.26	0.68	4.58
631.95	5.31	0.68	4.63
632.00	5.35	0.68	4.67
632.05	5.40	0.68	4.72
632.10	5.45	0.68	4.77
632.15	5.49	0.68	4.81
632.20	5.54	0.68	4.86
632.25	5.59	0.68	4.91
632.30	5.63	0.68	4.95
632.35	5.68	0.68	5.00
632.40	5.72	0.68	5.04
632.45	5.76	0.68	5.08
632.50	**5.81**	0.68	**5.13**

Summary for Pond ICS-4: ICS-4

Inflow Area = 1.068 ac, 93.43% Impervious, Inflow Depth = 4.58" for 10-YR event
Inflow = 2.11 cfs @ 12.02 hrs, Volume= 0.408 af
Outflow = 2.11 cfs @ 12.02 hrs, Volume= 0.408 af, Atten= 0%, Lag= 0.0 min
Primary = 1.10 cfs @ 12.04 hrs, Volume= 0.324 af
Secondary = 1.01 cfs @ 12.00 hrs, Volume= 0.084 af

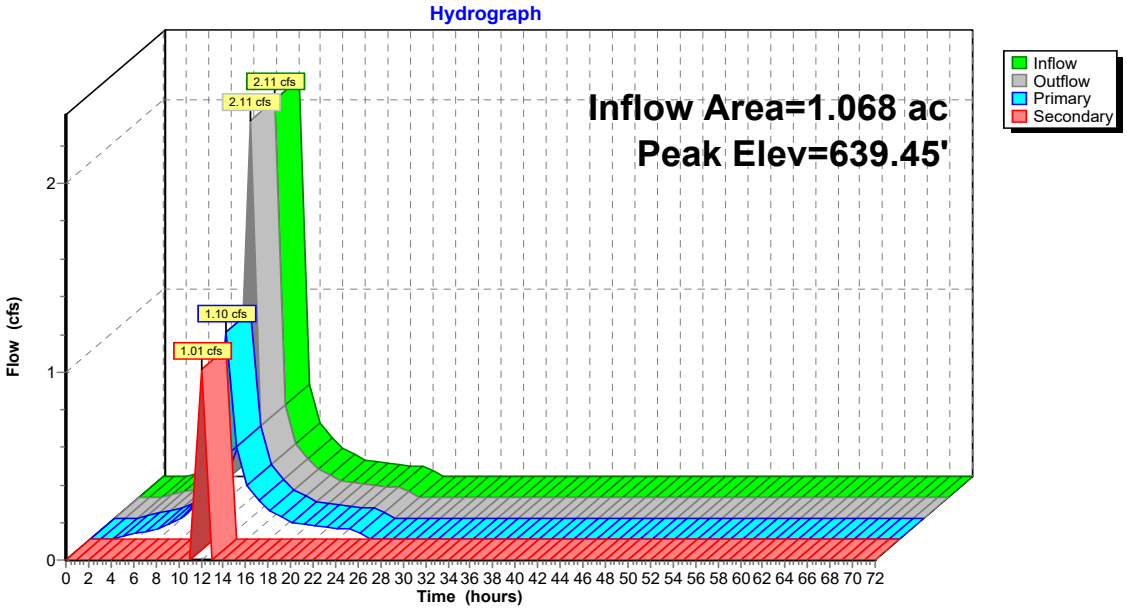
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 639.45' @ 12.01 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.09 cfs @ 12.04 hrs HW=639.35' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.09 cfs @ 5.56 fps)

Secondary OutFlow Max=1.01 cfs @ 12.00 hrs HW=639.45' (Free Discharge)
└─**3=Culvert** (Passes 1.01 cfs of 6.31 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.01 cfs @ 1.17 fps)

Pond ICS-4: ICS-4



Stage-Discharge for Pond ICS-4: ICS-4

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
636.50	0.00	0.00	0.00
636.55	0.01	0.01	0.00
636.60	0.04	0.04	0.00
636.65	0.08	0.08	0.00
636.70	0.14	0.14	0.00
636.75	0.21	0.21	0.00
636.80	0.29	0.29	0.00
636.85	0.37	0.37	0.00
636.90	0.45	0.45	0.00
636.95	0.53	0.53	0.00
637.00	0.59	0.59	0.00
637.05	0.65	0.65	0.00
637.10	0.70	0.70	0.00
637.15	0.75	0.75	0.00
637.20	0.79	0.79	0.00
637.25	0.84	0.84	0.00
637.30	0.88	0.88	0.00
637.35	0.89	0.89	0.00
637.40	0.89	0.89	0.00
637.45	0.90	0.90	0.00
637.50	0.90	0.90	0.00
637.55	0.91	0.91	0.00
637.60	0.91	0.91	0.00
637.65	0.92	0.92	0.00
637.70	0.92	0.92	0.00
637.75	0.93	0.93	0.00
637.80	0.94	0.94	0.00
637.85	0.94	0.94	0.00
637.90	0.95	0.95	0.00
637.95	0.95	0.95	0.00
638.00	0.96	0.96	0.00
638.05	0.96	0.96	0.00
638.10	0.97	0.97	0.00
638.15	0.97	0.97	0.00
638.20	0.98	0.98	0.00
638.25	0.98	0.98	0.00
638.30	0.99	0.99	0.00
638.35	0.99	0.99	0.00
638.40	1.00	1.00	0.00
638.45	1.00	1.00	0.00
638.50	1.01	1.01	0.00
638.55	1.01	1.01	0.00
638.60	1.02	1.02	0.00
638.65	1.02	1.02	0.00
638.70	1.03	1.03	0.00
638.75	1.03	1.03	0.00
638.80	1.04	1.04	0.00
638.85	1.04	1.04	0.00
638.90	1.05	1.05	0.00
638.95	1.05	1.05	0.00
639.00	1.06	1.06	0.00
639.05	1.06	1.06	0.00
639.10	1.07	1.07	0.00
639.15	1.07	1.07	0.00
639.20	1.08	1.08	0.00
639.25	1.08	1.08	0.00
639.30	1.13	1.09	0.04
639.35	1.35	1.09	0.26
639.40	1.68	1.10	0.58
639.45	2.08	1.10	0.98
639.50	2.56	1.11	1.45
639.55	3.10	1.11	1.99
639.60	3.71	1.11	2.60
639.65	4.38	1.12	3.27
639.70	5.12	1.12	4.00
639.75	5.92	1.13	4.79
639.80	6.79	1.13	5.65
639.85	7.71	1.14	6.58
639.90	8.18	1.14	7.04
639.95	8.26	1.15	7.11
640.00	**8.34**	**1.15**	**7.19**

Summary for Pond ICS-5: ICS-5

Inflow Area = 0.739 ac, 62.40% Impervious, Inflow Depth = 3.32" for 10-YR event
Inflow = 1.14 cfs @ 12.04 hrs, Volume= 0.204 af
Outflow = 1.14 cfs @ 12.04 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 12.10 hrs, Volume= 0.118 af
Secondary = 0.89 cfs @ 12.03 hrs, Volume= 0.086 af

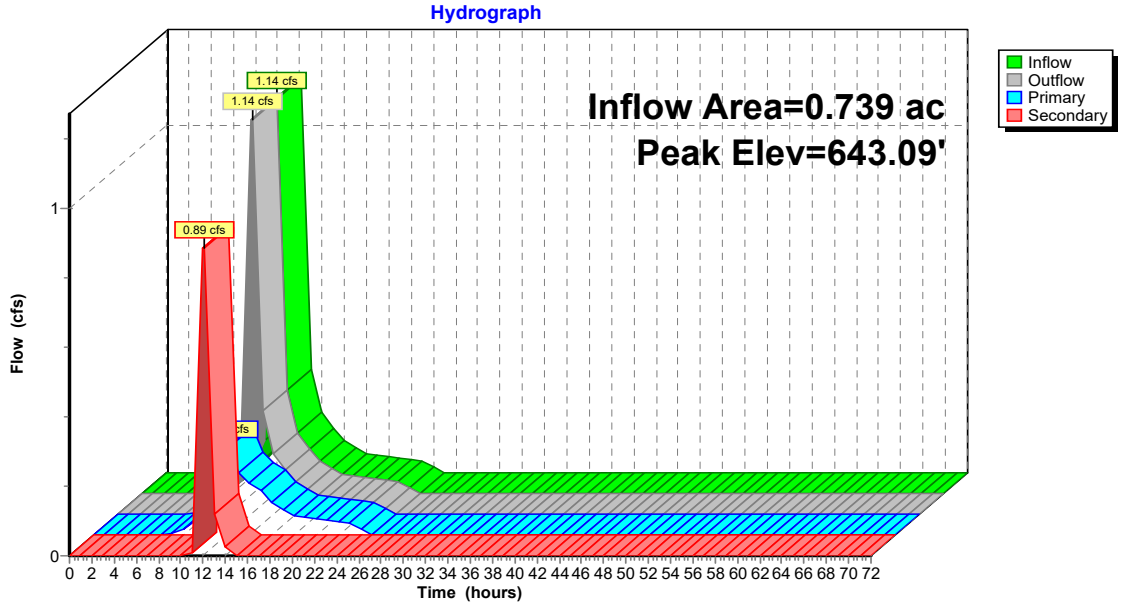
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 643.09' @ 12.08 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 636.00' S= 0.0781 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.24 cfs @ 12.10 hrs HW=643.06' TW=637.06' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.24 cfs @ 4.96 fps)

Secondary OutFlow Max=0.85 cfs @ 12.03 hrs HW=643.08' TW=637.08' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 0.85 cfs @ 3.02 fps)

Pond ICS-5: ICS-5



Stage-Discharge for Pond ICS-5: ICS-5

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
642.25	0.00	0.00	0.00
642.30	0.01	0.01	0.00
642.35	0.02	0.02	0.00
642.40	0.05	0.05	0.00
642.45	0.08	0.08	0.00
642.50	0.10	0.10	0.00
642.55	0.12	0.12	0.00
642.60	0.15	0.14	0.01
642.65	0.19	0.15	0.03
642.70	0.25	0.17	0.08
642.75	0.32	0.18	0.14
642.80	0.41	0.19	0.22
642.85	0.51	0.20	0.30
642.90	0.62	0.21	0.40
642.95	0.74	0.22	0.52
643.00	0.87	0.23	0.64
643.05	1.02	0.24	0.77
643.10	1.17	0.25	0.91
643.15	1.33	0.26	1.07
643.20	1.49	0.27	1.22
643.25	1.66	0.28	1.39
643.30	1.84	0.28	1.56
643.35	2.02	**0.29**	1.73
643.40	2.21	**0.30**	1.91
643.45	2.39	0.30	2.09
643.50	2.57	0.30	2.27
643.55	2.75	0.30	2.45
643.60	2.93	0.30	2.63
643.65	3.10	0.30	2.80
643.70	3.27	0.30	2.97
643.75	3.42	0.30	3.13
643.80	3.57	0.30	3.27
643.85	3.69	0.30	3.39
643.90	3.78	0.30	3.48
643.95	3.99	0.30	3.69
644.00	4.19	0.30	3.89
644.05	4.38	0.30	4.08
644.10	4.56	0.30	4.26
644.15	4.73	0.30	4.44
644.20	4.90	0.30	4.60
644.25	5.06	0.30	4.77
644.30	5.22	0.30	4.92
644.35	5.37	0.30	5.07
644.40	5.52	0.30	5.22
644.45	5.66	0.30	5.36
644.50	5.80	0.30	5.50
644.55	5.94	0.30	5.64
644.60	6.07	0.30	5.77
644.65	6.20	0.30	5.90
644.70	6.32	0.30	6.03
644.75	6.44	0.30	6.15
644.80	6.53	0.30	6.24
644.85	6.62	0.30	6.32
644.90	6.71	0.30	6.41
644.95	6.79	0.30	6.50
645.00	6.88	0.30	6.58
645.05	6.96	0.30	6.67
645.10	7.05	0.30	6.75
645.15	7.13	0.30	6.83
645.20	7.21	0.30	6.92
645.25	7.29	0.30	7.00
645.30	7.37	0.30	7.07
645.35	7.45	0.30	7.15
645.40	7.53	0.30	7.23
645.45	7.60	0.30	7.31
645.50	**7.68**	0.30	**7.38**

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth = 3.72" for 10-YR event
Inflow = 0.09 cfs @ 12.03 hrs, Volume= 0.017 af
Outflow = 0.02 cfs @ 13.97 hrs, Volume= 0.015 af, Atten= 81%, Lag= 116.3 min
Primary = 0.02 cfs @ 13.97 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 654.90' @ 14.00 hrs Surf.Area= 485 sf Storage= 324 cf

Plug-Flow detention time= 565.8 min calculated for 0.015 af (87% of inflow)
Center-of-Mass det. time= 522.3 min (1,318.3 - 796.0)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

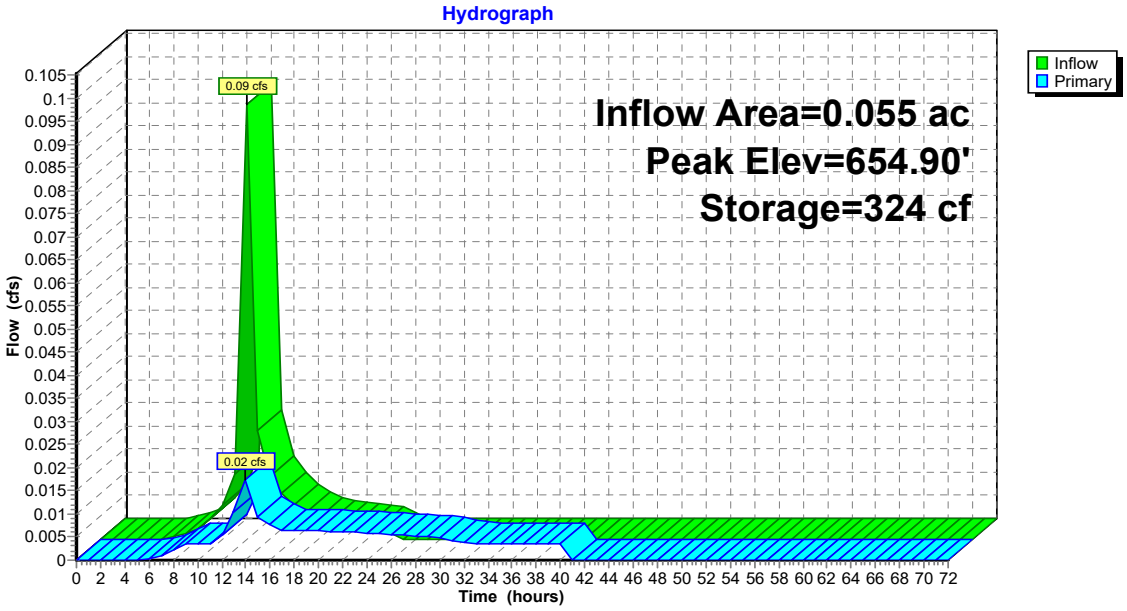
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 13.97 hrs HW=654.90' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.14 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Discharge for Pond RG-7B: RG-7B

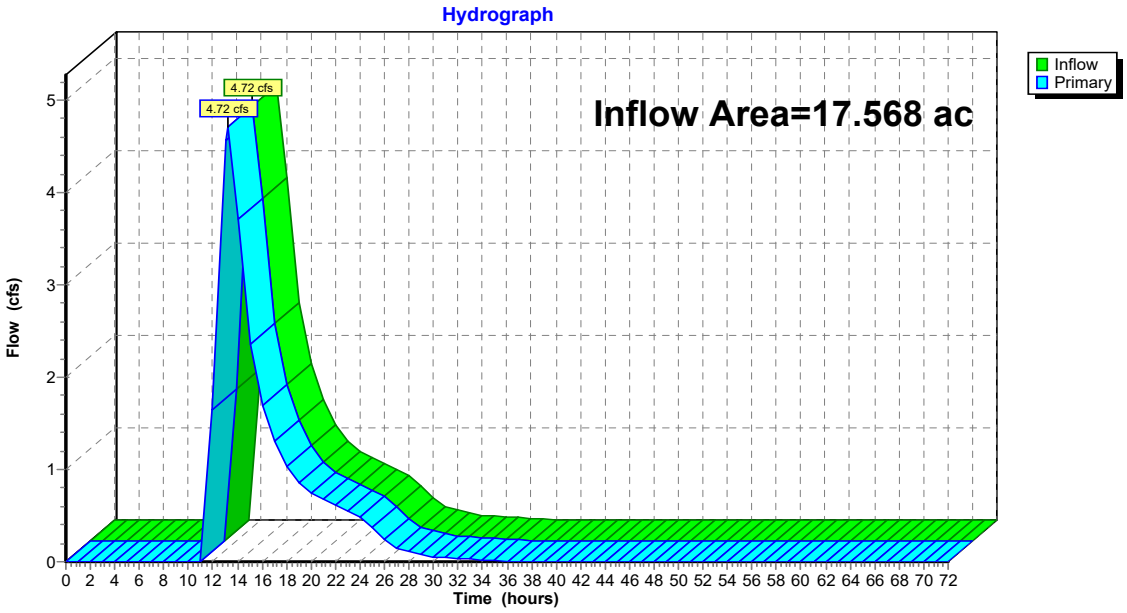
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
653.00	0.00	653.52	0.00	654.04	0.00	654.56	0.01
653.01	0.00	653.53	0.00	654.05	0.00	654.57	0.01
653.02	0.00	653.54	0.00	654.06	0.00	654.58	0.01
653.03	0.00	653.55	0.00	654.07	0.00	654.59	0.01
653.04	0.00	653.56	0.00	654.08	0.00	654.60	0.01
653.05	0.00	653.57	0.00	654.09	0.00	654.61	0.01
653.06	0.00	653.58	0.00	654.10	0.00	654.62	0.01
653.07	0.00	653.59	0.00	654.11	0.00	654.63	0.01
653.08	0.00	653.60	0.00	654.12	0.00	654.64	0.01
653.09	0.00	653.61	0.00	654.13	0.00	654.65	0.01
653.10	0.00	653.62	0.00	654.14	0.00	654.66	0.01
653.11	0.00	653.63	0.00	654.15	0.00	654.67	0.01
653.12	0.00	653.64	0.00	654.16	0.00	654.68	0.01
653.13	0.00	653.65	0.00	654.17	0.00	654.69	0.01
653.14	0.00	653.66	0.00	654.18	0.00	654.70	0.01
653.15	0.00	653.67	0.00	654.19	0.00	654.71	0.01
653.16	0.00	653.68	0.00	654.20	0.00	654.72	0.01
653.17	0.00	653.69	0.00	654.21	0.00	654.73	0.01
653.18	0.00	653.70	0.00	654.22	0.00	654.74	0.01
653.19	0.00	653.71	0.00	654.23	0.00	654.75	0.01
653.20	0.00	653.72	0.00	654.24	0.00	654.76	0.01
653.21	0.00	653.73	0.00	654.25	0.00	654.77	0.01
653.22	0.00	653.74	0.00	654.26	0.00	654.78	0.01
653.23	0.00	653.75	0.00	654.27	0.00	654.79	0.01
653.24	0.00	653.76	0.00	654.28	0.00	654.80	0.01
653.25	0.00	653.77	0.00	654.29	0.00	654.81	0.01
653.26	0.00	653.78	0.00	654.30	0.00	654.82	0.01
653.27	0.00	653.79	0.00	654.31	0.00	654.83	0.01
653.28	0.00	653.80	0.00	654.32	0.00	654.84	0.01
653.29	0.00	653.81	0.00	654.33	0.00	654.85	0.01
653.30	0.00	653.82	0.00	654.34	0.00	654.86	0.01
653.31	0.00	653.83	0.00	654.35	0.00	654.87	0.01
653.32	0.00	653.84	0.00	654.36	0.00	654.88	0.01
653.33	0.00	653.85	0.00	654.37	0.00	654.89	0.01
653.34	0.00	653.86	0.00	654.38	0.00	654.90	0.01
653.35	0.00	653.87	0.00	654.39	0.00	654.91	0.03
653.36	0.00	653.88	0.00	654.40	0.00	654.92	0.08
653.37	0.00	653.89	0.00	654.41	0.00	654.93	0.14
653.38	0.00	653.90	0.00	654.42	0.00	654.94	0.21
653.39	0.00	653.91	0.00	654.43	0.00	654.95	0.29
653.40	0.00	653.92	0.00	654.44	0.00	654.96	0.38
653.41	0.00	653.93	0.00	654.45	0.00	654.97	0.48
653.42	0.00	653.94	0.00	654.46	0.00	654.98	0.58
653.43	0.00	653.95	0.00	654.47	0.00	654.99	0.69
653.44	0.00	653.96	0.00	654.48	0.00	655.00	**0.81**
653.45	0.00	653.97	0.00	654.49	0.01		
653.46	0.00	653.98	0.00	654.50	0.01		
653.47	0.00	653.99	0.00	654.51	0.01		
653.48	0.00	654.00	0.00	654.52	0.01		
653.49	0.00	654.01	0.00	654.53	0.01		
653.50	0.00	654.02	0.00	654.54	0.01		
653.51	0.00	654.03	0.00	654.55	0.01		

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 1.21" for 10-YR event
Inflow = 4.72 cfs @ 13.27 hrs, Volume= 1.770 af
Primary = 4.72 cfs @ 13.27 hrs, Volume= 1.770 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

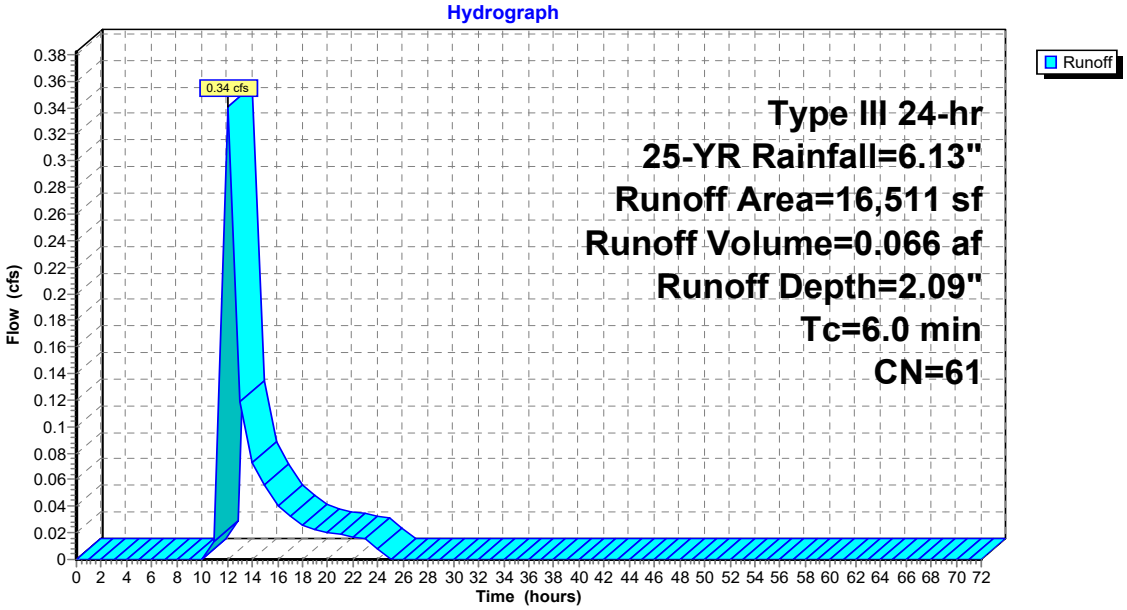
Runoff = 0.34 cfs @ 12.10 hrs, Volume= 0.066 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

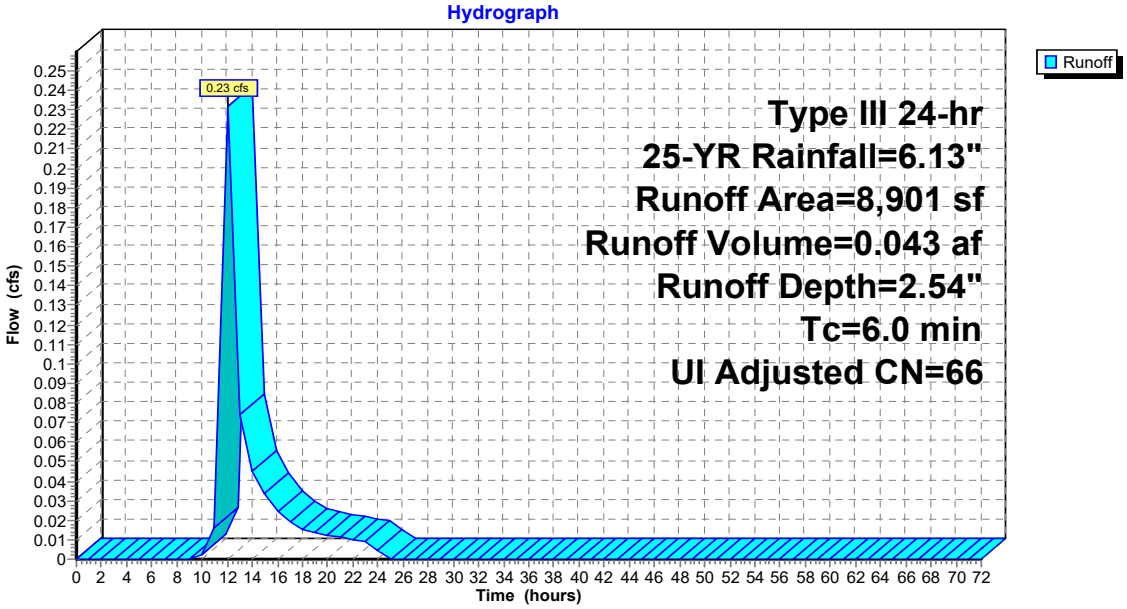
Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.043 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

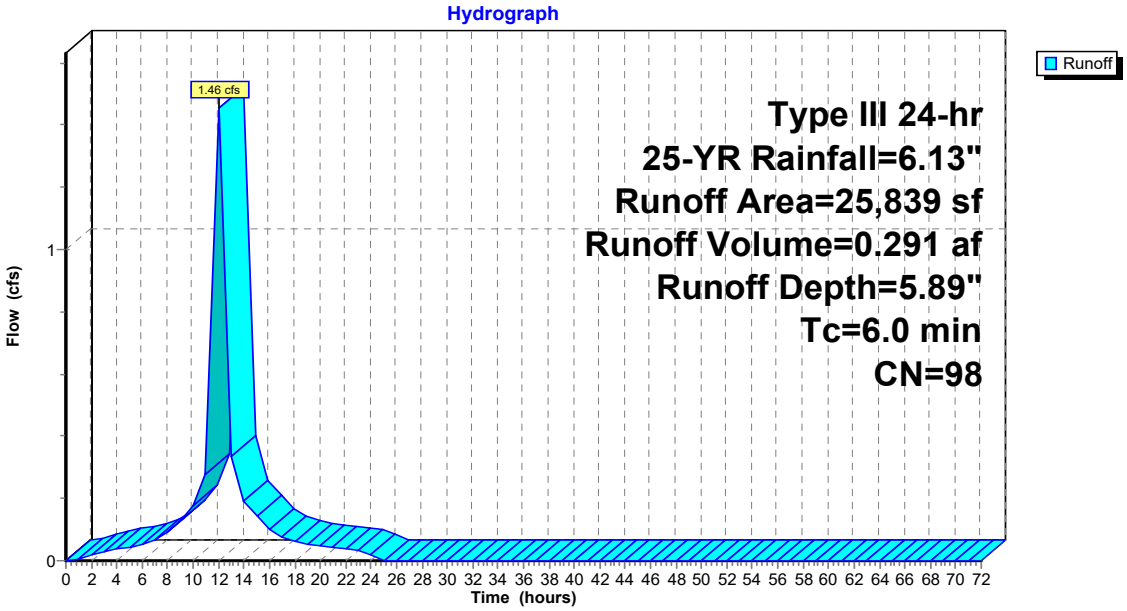
Runoff = 1.46 cfs @ 12.01 hrs, Volume= 0.291 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

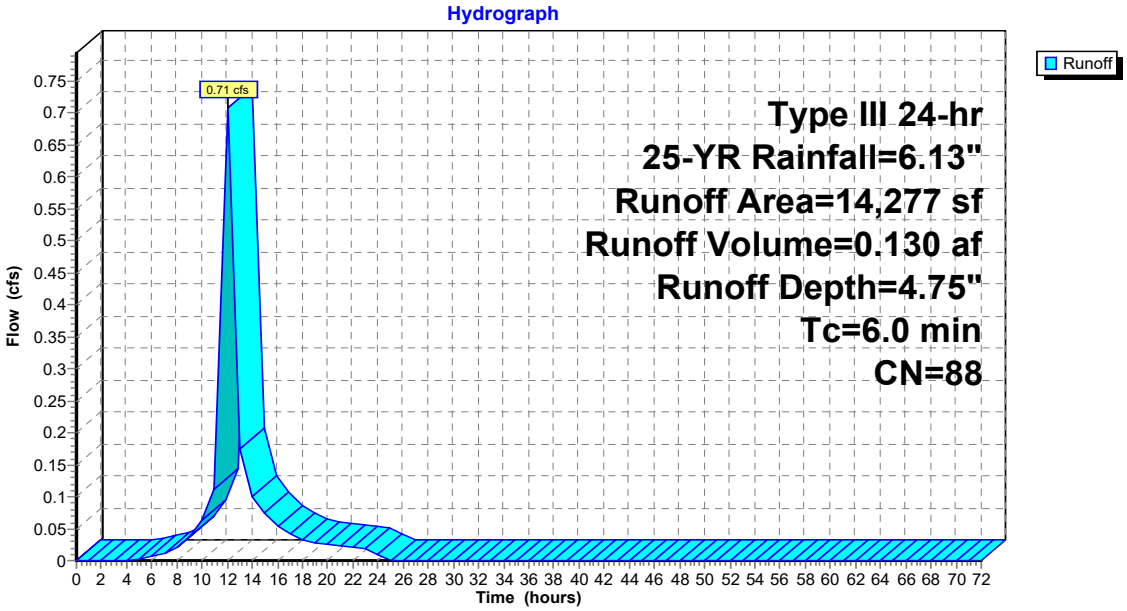
Runoff = 0.71 cfs @ 12.03 hrs, Volume= 0.130 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

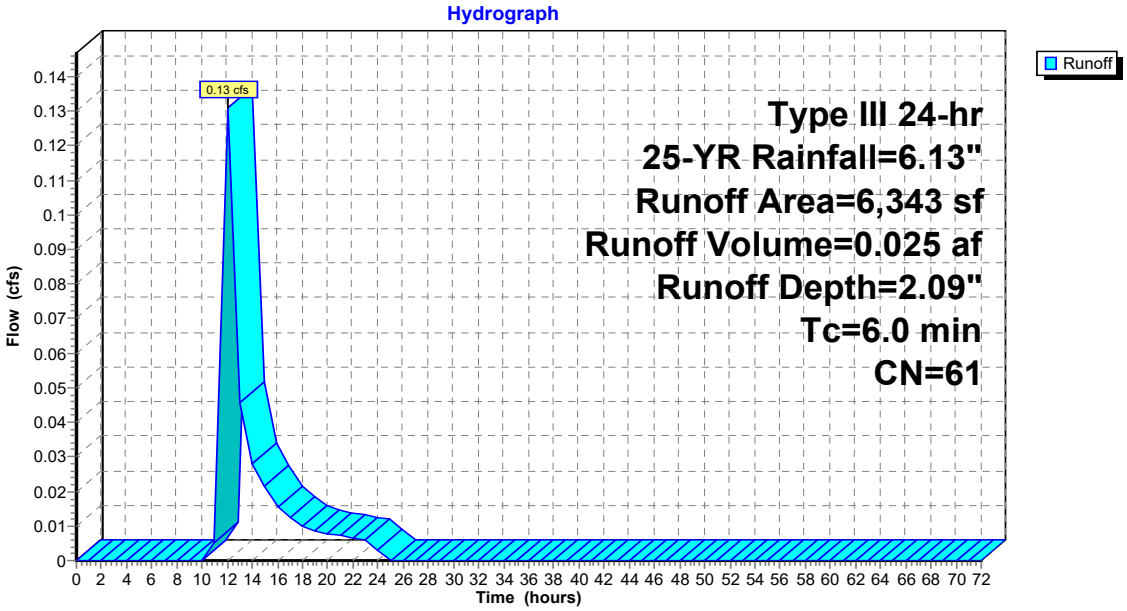
Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

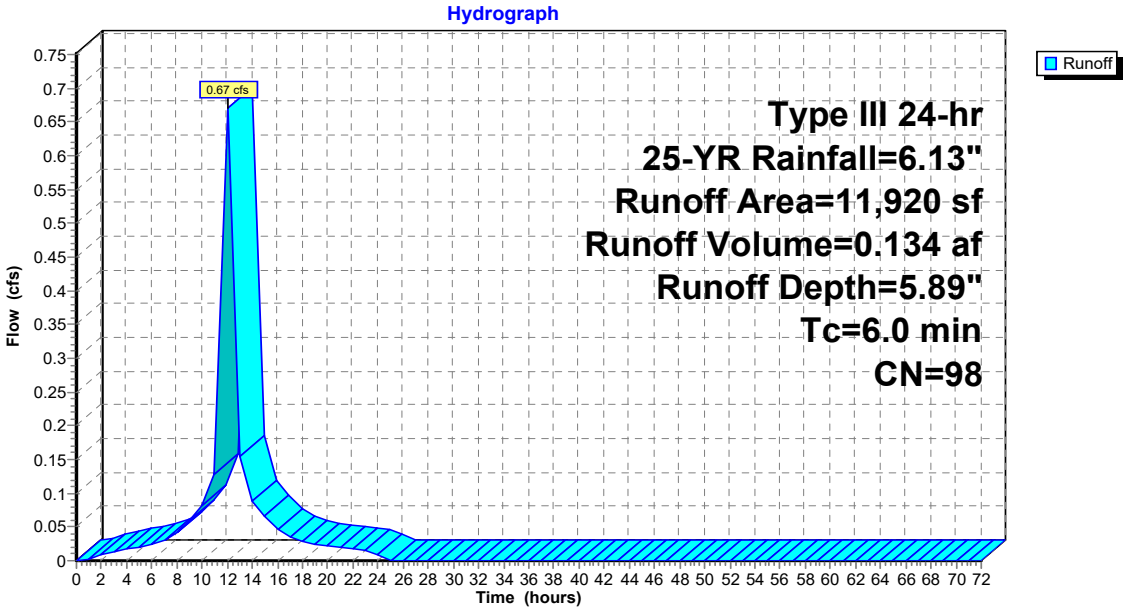
Runoff = 0.67 cfs @ 12.01 hrs, Volume= 0.134 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

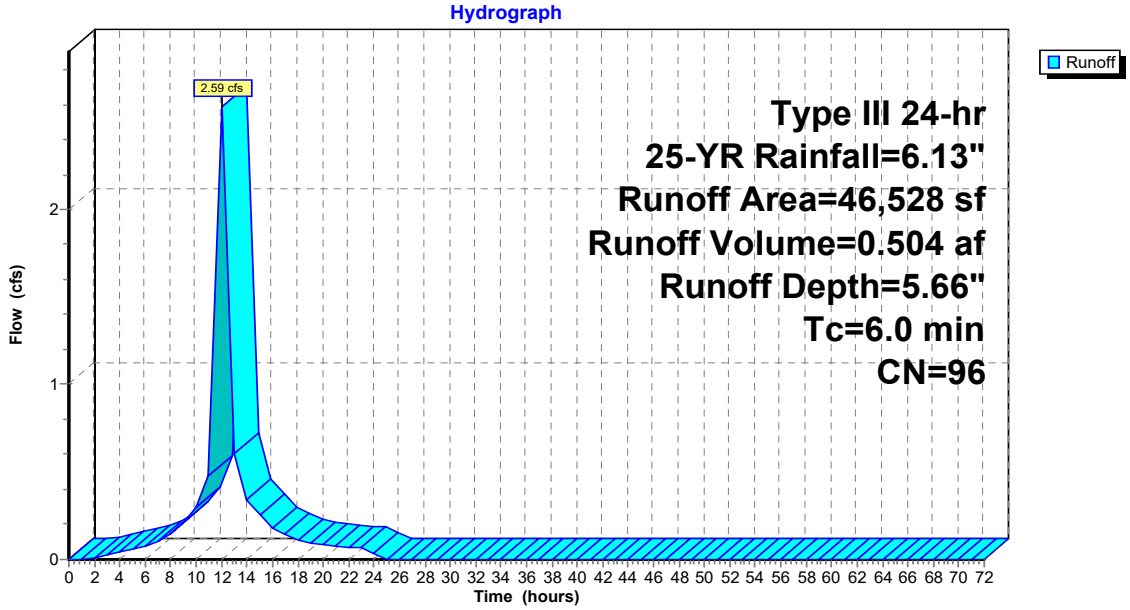
Runoff = 2.59 cfs @ 12.01 hrs, Volume= 0.504 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

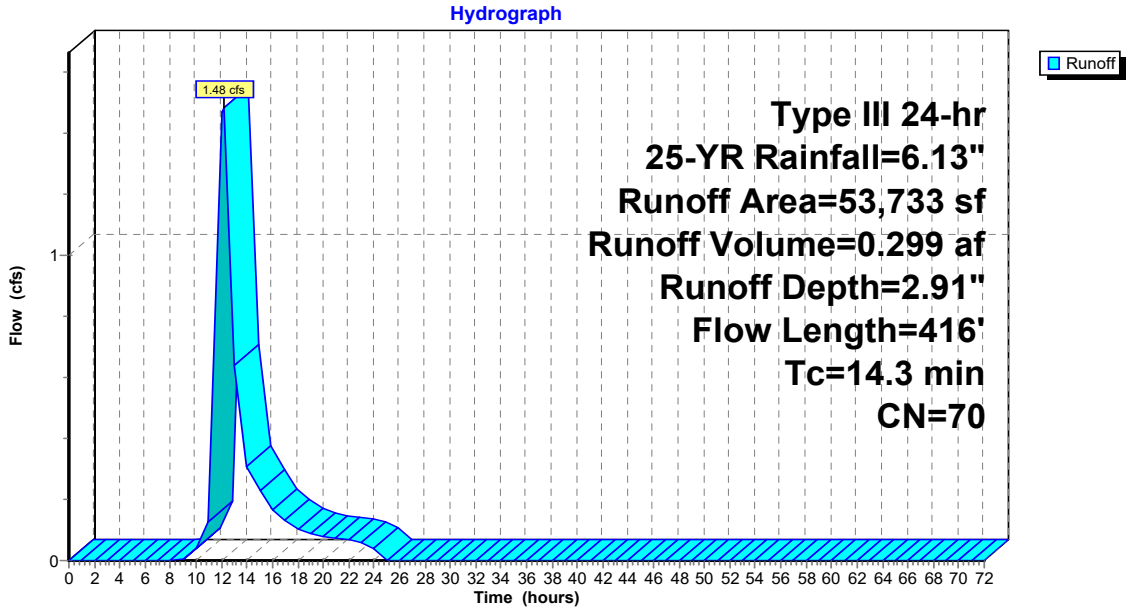
Runoff = 1.48 cfs @ 12.12 hrs, Volume= 0.299 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

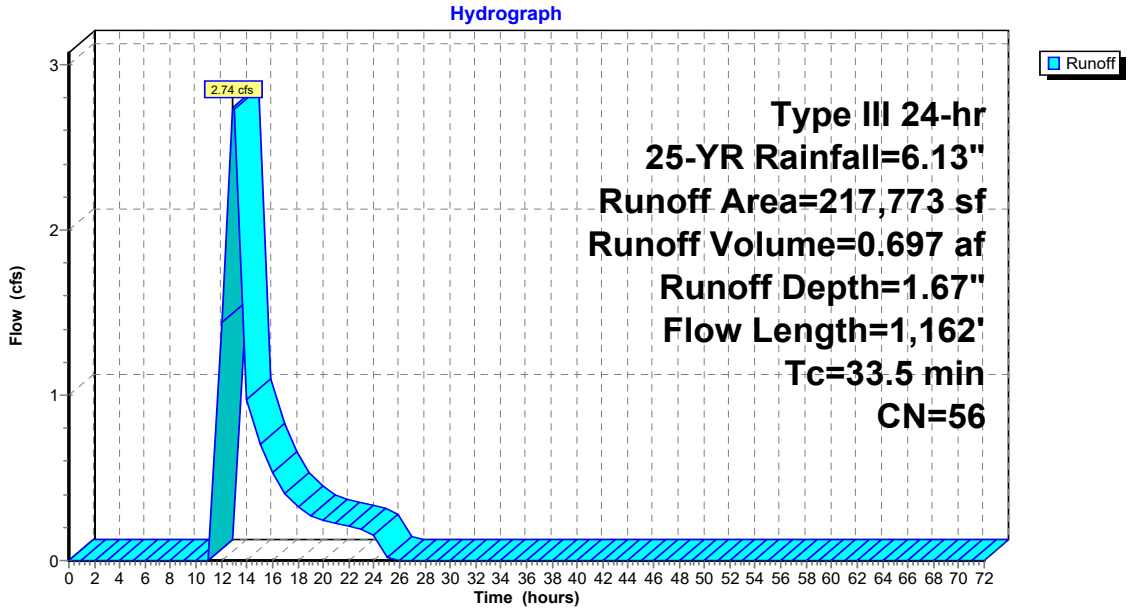
Runoff = 2.74 cfs @ 12.92 hrs, Volume= 0.697 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

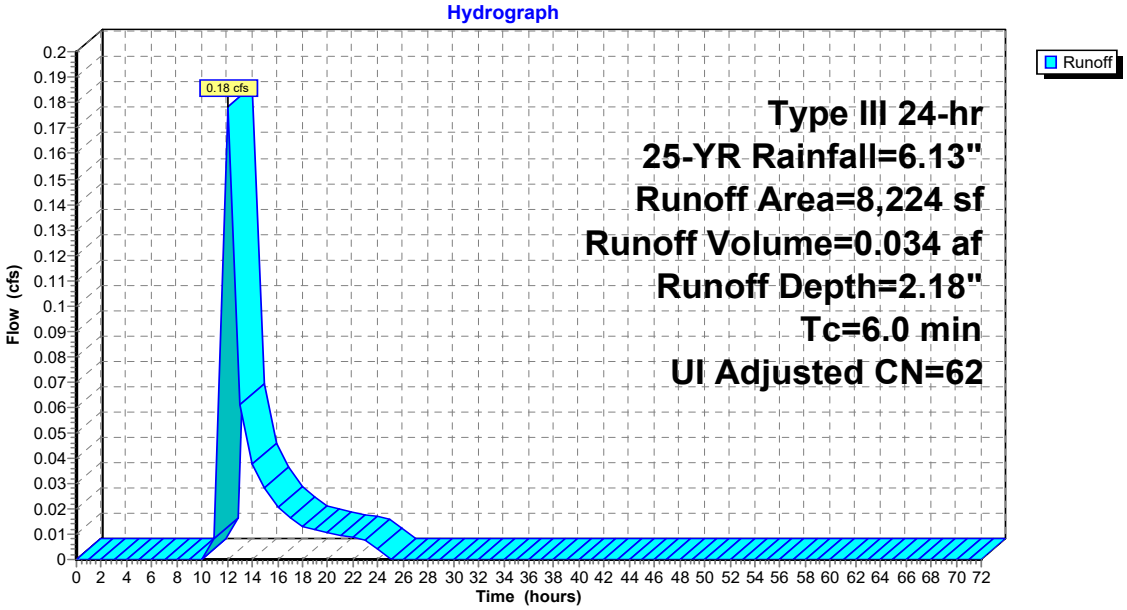
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

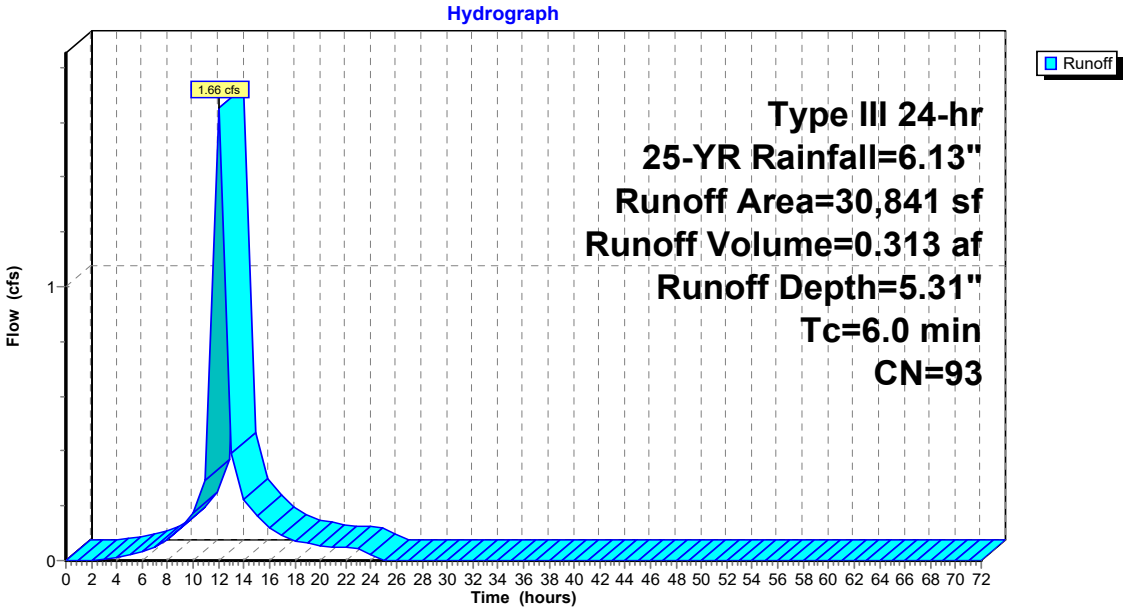
Runoff = 1.66 cfs @ 12.02 hrs, Volume= 0.313 af, Depth= 5.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

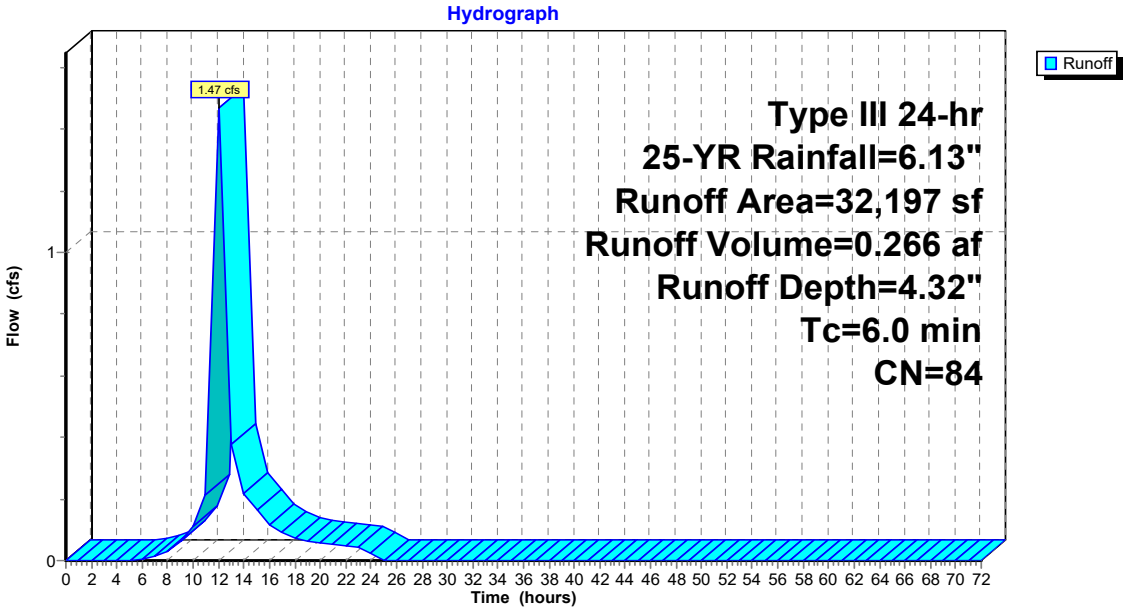
Runoff = 1.47 cfs @ 12.03 hrs, Volume= 0.266 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

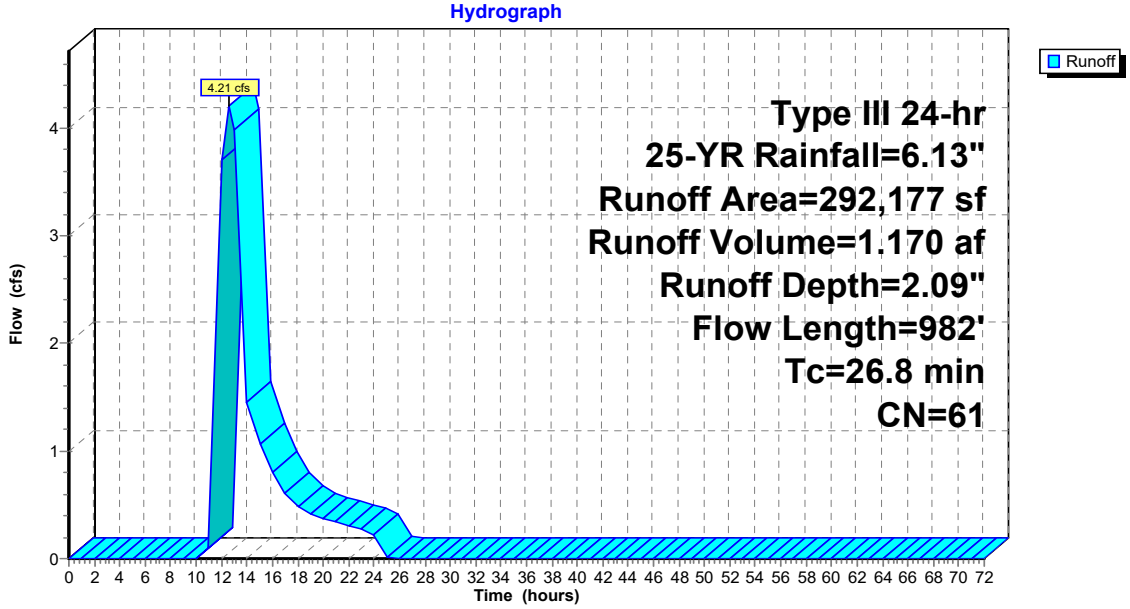
Runoff = 4.21 cfs @ 12.60 hrs, Volume= 1.170 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

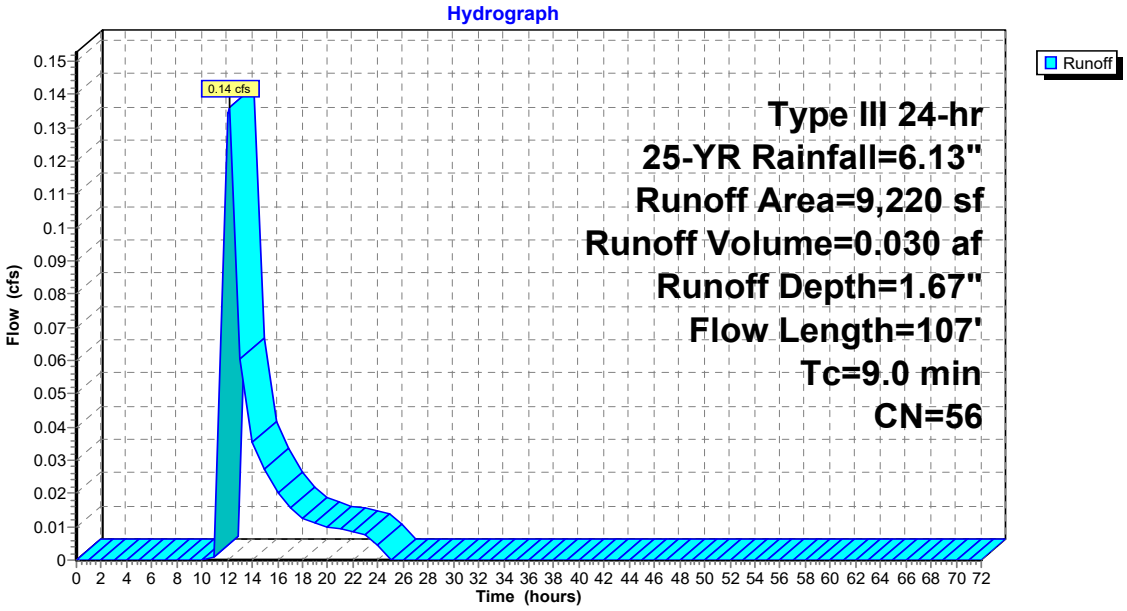
Runoff = 0.14 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

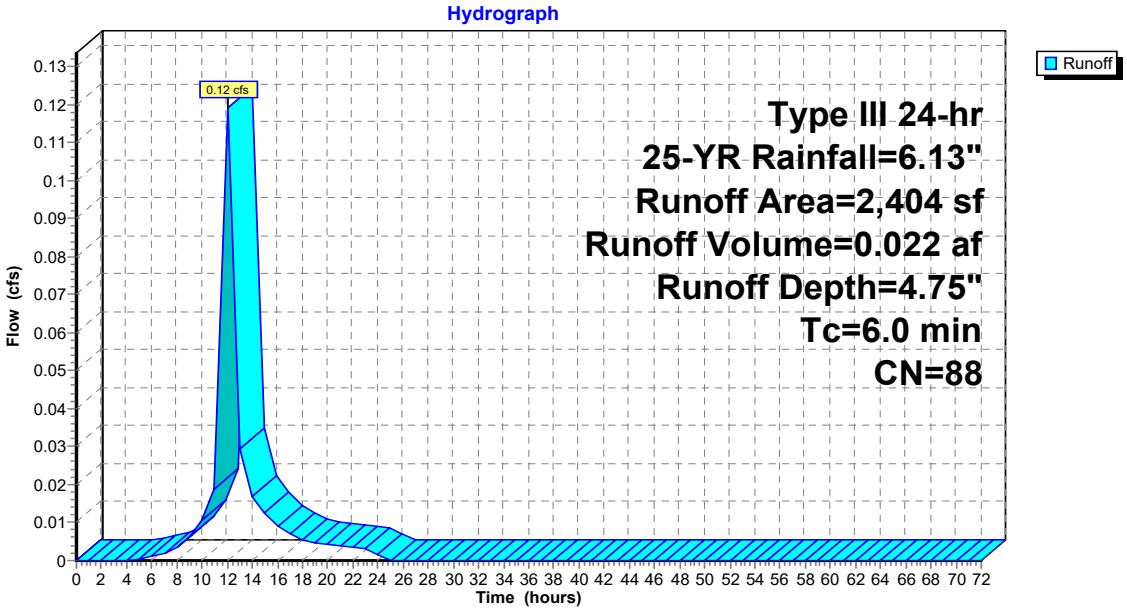
Runoff = 0.12 cfs @ 12.03 hrs, Volume= 0.022 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

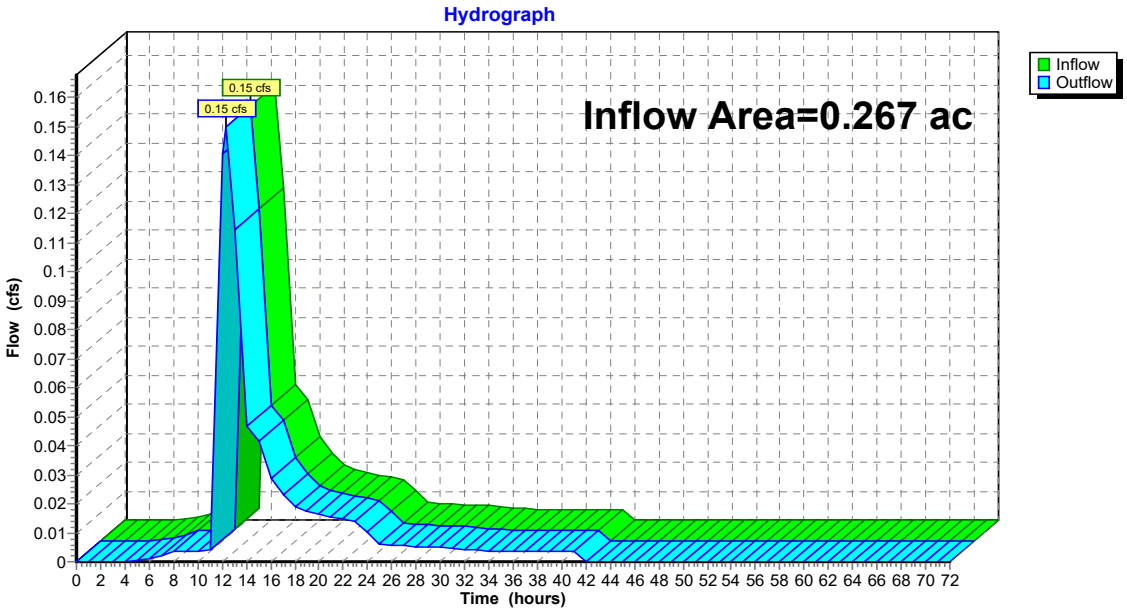


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth = 2.21" for 25-YR event
Inflow = 0.15 cfs @ 12.34 hrs, Volume= 0.049 af
Outflow = 0.15 cfs @ 12.34 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 1.84" for 25-YR event
Inflow = 8.01 cfs @ 12.94 hrs, Volume= 2.689 af
Outflow = 7.53 cfs @ 13.16 hrs, Volume= 2.696 af, Atten= 6%, Lag= 13.0 min

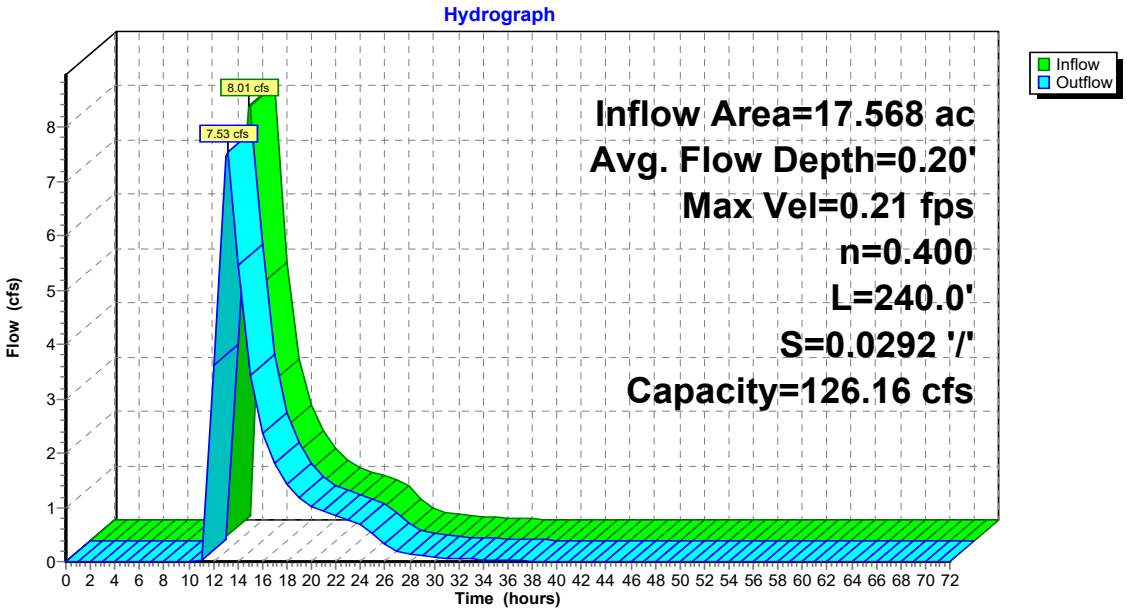
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.21 fps, Min. Travel Time= 19.4 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 68.6 min

Peak Storage= 8,729 cf @ 13.17 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Discharge for Reach PDP-4: Design Point 4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
625.00	0.00	0.00	625.52	0.37	38.60
625.01	0.03	0.05	625.53	0.37	39.92
625.02	0.05	0.15	625.54	0.37	41.26
625.03	0.06	0.30	625.55	0.38	42.62
625.04	0.07	0.49	625.56	0.38	44.01
625.05	0.08	0.72	625.57	0.39	45.42
625.06	0.10	0.97	625.58	0.39	46.84
625.07	0.11	1.26	625.59	0.39	48.29
625.08	0.12	1.57	625.60	0.40	49.76
625.09	0.12	1.92	625.61	0.40	51.25
625.10	0.13	2.29	625.62	0.41	52.76
625.11	0.14	2.69	625.63	0.41	54.29
625.12	0.15	3.11	625.64	0.41	55.85
625.13	0.16	3.56	625.65	0.42	57.42
625.14	0.16	4.04	625.66	0.42	59.02
625.15	0.17	4.54	625.67	0.42	60.64
625.16	0.18	5.06	625.68	0.43	62.27
625.17	0.19	5.61	625.69	0.43	63.93
625.18	0.19	6.18	625.70	0.43	65.62
625.19	0.20	6.78	625.71	0.44	67.32
625.20	0.21	7.40	625.72	0.44	69.04
625.21	0.21	8.04	625.73	0.44	70.79
625.22	0.22	8.70	625.74	0.45	72.55
625.23	0.22	9.39	625.75	0.45	74.34
625.24	0.23	10.09	625.76	0.46	76.15
625.25	0.24	10.82	625.77	0.46	77.98
625.26	0.24	11.58	625.78	0.46	79.84
625.27	0.25	12.35	625.79	0.47	81.71
625.28	0.25	13.15	625.80	0.47	83.61
625.29	0.26	13.96	625.81	0.47	85.53
625.30	0.26	14.80	625.82	0.48	87.47
625.31	0.27	15.66	625.83	0.48	89.43
625.32	0.27	16.54	625.84	0.48	91.41
625.33	0.28	17.45	625.85	0.48	93.42
625.34	0.28	18.37	625.86	0.49	95.44
625.35	0.29	19.31	625.87	0.49	97.49
625.36	0.29	20.28	625.88	0.49	99.56
625.37	0.30	21.27	625.89	0.50	101.66
625.38	0.30	22.28	625.90	0.50	103.77
625.39	0.31	23.31	625.91	0.50	105.91
625.40	0.31	24.36	625.92	0.51	108.07
625.41	0.32	25.43	625.93	0.51	110.25
625.42	0.32	26.52	625.94	0.51	112.46
625.43	0.33	27.63	625.95	0.52	114.69
625.44	0.33	28.77	625.96	0.52	116.94
625.45	0.34	29.92	625.97	0.52	119.21
625.46	0.34	31.10	625.98	0.53	121.50
625.47	0.35	32.30	625.99	0.53	123.82
625.48	0.35	33.51	626.00	**0.53**	**126.16**
625.49	0.35	34.75			
625.50	0.36	36.01			
625.51	0.36	37.29			

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth = 1.84" for 25-YR event
Inflow = 7.59 cfs @ 12.66 hrs, Volume= 2.239 af
Outflow = 7.11 cfs @ 12.97 hrs, Volume= 2.246 af, Atten= 6%, Lag= 18.5 min

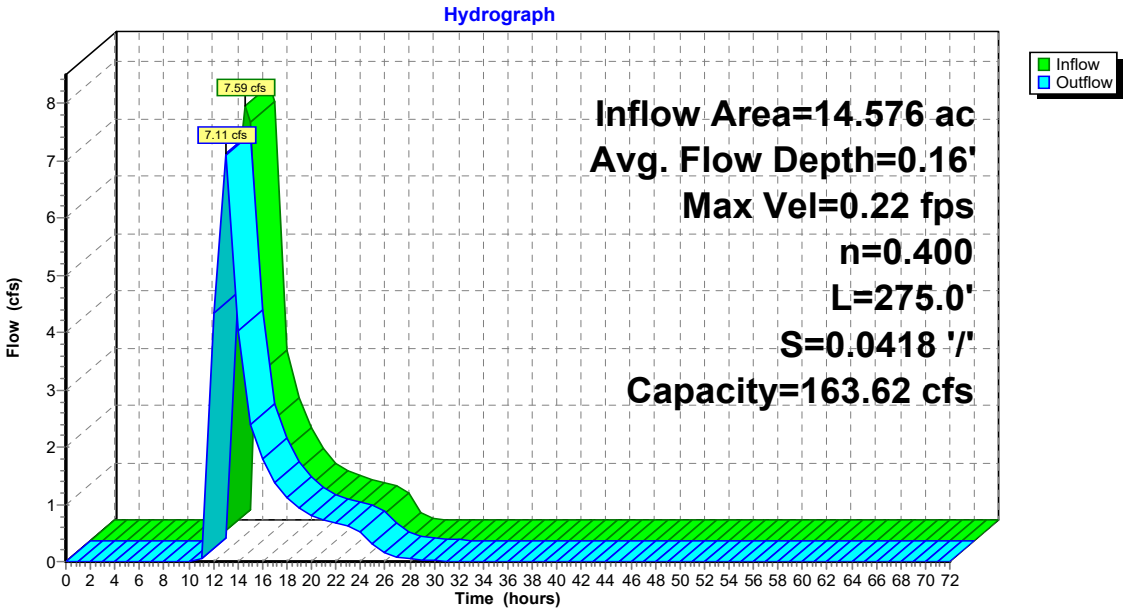
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.22 fps, Min. Travel Time= 21.0 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 70.8 min

Peak Storage= 8,966 cf @ 12.97 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Discharge for Reach PDP-5: Design Point 5

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
636.50	0.00	0.00	637.02	0.46	52.98
636.51	0.04	0.07	637.03	0.47	54.73
636.52	0.06	0.22	637.04	0.48	56.50
636.53	0.07	0.44	637.05	0.48	58.30
636.54	0.09	0.71	637.06	0.49	60.12
636.55	0.10	1.03	637.07	0.49	61.97
636.56	0.12	1.40	637.08	0.50	63.84
636.57	0.13	1.81	637.09	0.50	65.74
636.58	0.14	2.27	637.10	0.51	67.66
636.59	0.15	2.76	637.11	0.51	69.60
636.60	0.16	3.29	637.12	0.52	71.57
636.61	0.17	3.86	637.13	0.52	73.56
636.62	0.18	4.47	637.14	0.53	75.57
636.63	0.19	5.11	637.15	0.53	77.61
636.64	0.20	5.79	637.16	0.54	79.67
636.65	0.21	6.50	637.17	0.54	81.76
636.66	0.22	7.24	637.18	0.55	83.87
636.67	0.23	8.01	637.19	0.55	86.00
636.68	0.24	8.82	637.20	0.56	88.16
636.69	0.25	9.66	637.21	0.56	90.34
636.70	0.25	10.53	637.22	0.57	92.54
636.71	0.26	11.43	637.23	0.57	94.77
636.72	0.27	12.36	637.24	0.58	97.02
636.73	0.28	13.32	637.25	0.58	99.29
636.74	0.29	14.31	637.26	0.58	101.58
636.75	0.29	15.33	637.27	0.59	103.90
636.76	0.30	16.37	637.28	0.59	106.25
636.77	0.31	17.45	637.29	0.60	108.61
636.78	0.31	18.55	637.30	0.60	111.00
636.79	0.32	19.68	637.31	0.61	113.41
636.80	0.33	20.84	637.32	0.61	115.85
636.81	0.34	22.03	637.33	0.62	118.31
636.82	0.34	23.24	637.34	0.62	120.79
636.83	0.35	24.48	637.35	0.63	123.29
636.84	0.36	25.75	637.36	0.63	125.82
636.85	0.36	27.04	637.37	0.63	128.37
636.86	0.37	28.36	637.38	0.64	130.95
636.87	0.38	29.71	637.39	0.64	133.54
636.88	0.38	31.08	637.40	0.65	136.16
636.89	0.39	32.48	637.41	0.65	138.80
636.90	0.39	33.91	637.42	0.66	141.47
636.91	0.40	35.36	637.43	0.66	144.16
636.92	0.41	36.83	637.44	0.66	146.87
636.93	0.41	38.34	637.45	0.67	149.60
636.94	0.42	39.86	637.46	0.67	152.36
636.95	0.42	41.42	637.47	0.68	155.14
636.96	0.43	42.99	637.48	0.68	157.94
636.97	0.44	44.59	637.49	0.68	160.77
636.98	0.44	46.22	637.50	**0.69**	**163.62**
636.99	0.45	47.87			
637.00	0.45	49.55			
637.01	0.46	51.25			

Summary for Reach PDP-6: Design Point 6

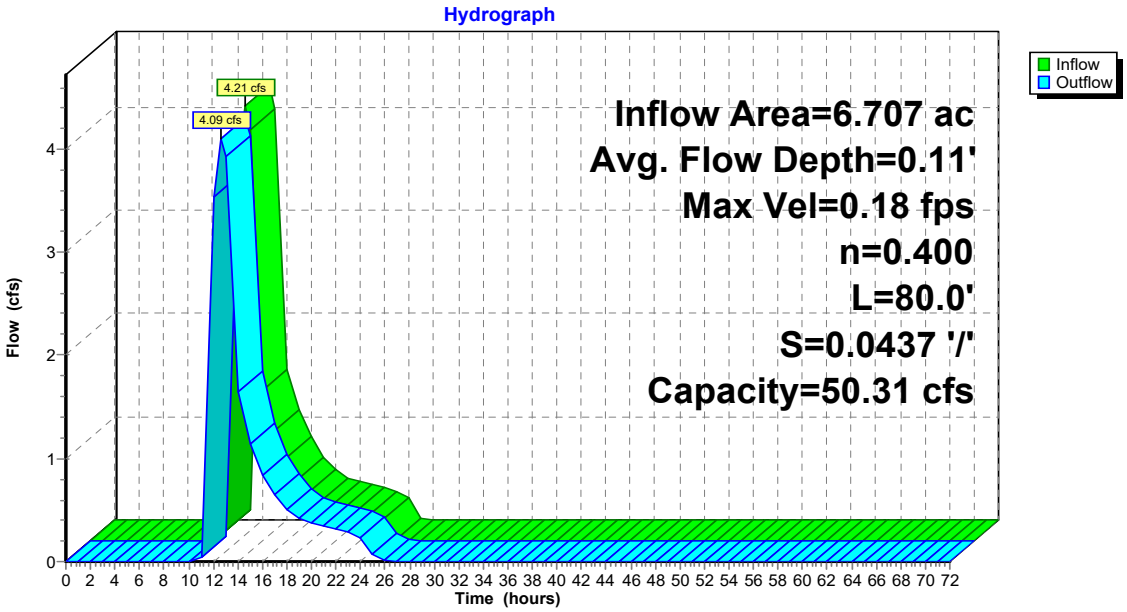
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth = 2.09" for 25-YR event
Inflow = 4.21 cfs @ 12.60 hrs, Volume= 1.170 af
Outflow = 4.09 cfs @ 12.65 hrs, Volume= 1.188 af, Atten= 3%, Lag= 2.7 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.18 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 21.2 min

Peak Storage= 1,841 cf @ 12.63 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Discharge for Reach PDP-6: Design Point 6

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
642.50	0.00	0.00
642.51	0.04	0.07
642.52	0.06	0.23
642.53	0.07	0.45
642.54	0.09	0.73
642.55	0.10	1.06
642.56	0.12	1.43
642.57	0.13	1.85
642.58	0.14	2.32
642.59	0.15	2.82
642.60	0.17	3.37
642.61	0.18	3.95
642.62	0.19	4.57
642.63	0.20	5.22
642.64	0.21	5.91
642.65	0.22	6.63
642.66	0.23	7.39
642.67	0.23	8.18
642.68	0.24	9.00
642.69	0.25	9.86
642.70	0.26	10.74
642.71	0.27	11.66
642.72	0.28	12.60
642.73	0.29	13.58
642.74	0.29	14.59
642.75	0.30	15.62
642.76	0.31	16.69
642.77	0.32	17.78
642.78	0.32	18.90
642.79	0.33	20.05
642.80	0.34	21.23
642.81	0.35	22.43
642.82	0.35	23.67
642.83	0.36	24.92
642.84	0.37	26.21
642.85	0.37	27.52
642.86	0.38	28.86
642.87	0.39	30.23
642.88	0.39	31.62
642.89	0.40	33.04
642.90	0.41	34.48
642.91	0.41	35.95
642.92	0.42	37.45
642.93	0.43	38.97
642.94	0.43	40.51
642.95	0.44	42.08
642.96	0.44	43.68
642.97	0.45	45.30
642.98	0.46	46.94
642.99	0.46	48.61
643.00	**0.47**	**50.31**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 4.95" for 25-YR event
Inflow = 0.82 cfs @ 12.10 hrs, Volume= 0.464 af
Outflow = 0.78 cfs @ 12.19 hrs, Volume= 0.461 af, Atten= 5%, Lag= 5.3 min
Discarded = 0.06 cfs @ 12.25 hrs, Volume= 0.189 af
Primary = 0.72 cfs @ 12.19 hrs, Volume= 0.273 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 622.23' @ 12.25 hrs Surf.Area= 1,393 sf Storage= 1,186 cf
Flood Elev= 623.50' Surf.Area= 2,450 sf Storage= 3,580 cf

Plug-Flow detention time= 113.5 min calculated for 0.461 af (99% of inflow)
Center-of-Mass det. time= 96.1 min (1,271.0 - 1,174.9)

Volume	Invert	Avail.Storage	Storage Description
#1	620.00'	3,306 cf	**Overall storage (Prismatic)** Listed below (Recalc) 4,263 cf Overall - 957 cf Embedded = 3,306 cf
#2	620.00'	211 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 638 cf Overall x 33.0% Voids
#3	621.00'	64 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 319 cf Overall x 20.0% Voids
		3,580 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638
622.00	1,230	934	1,572
623.00	1,951	1,591	3,163
623.50	2,450	1,100	4,263

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638

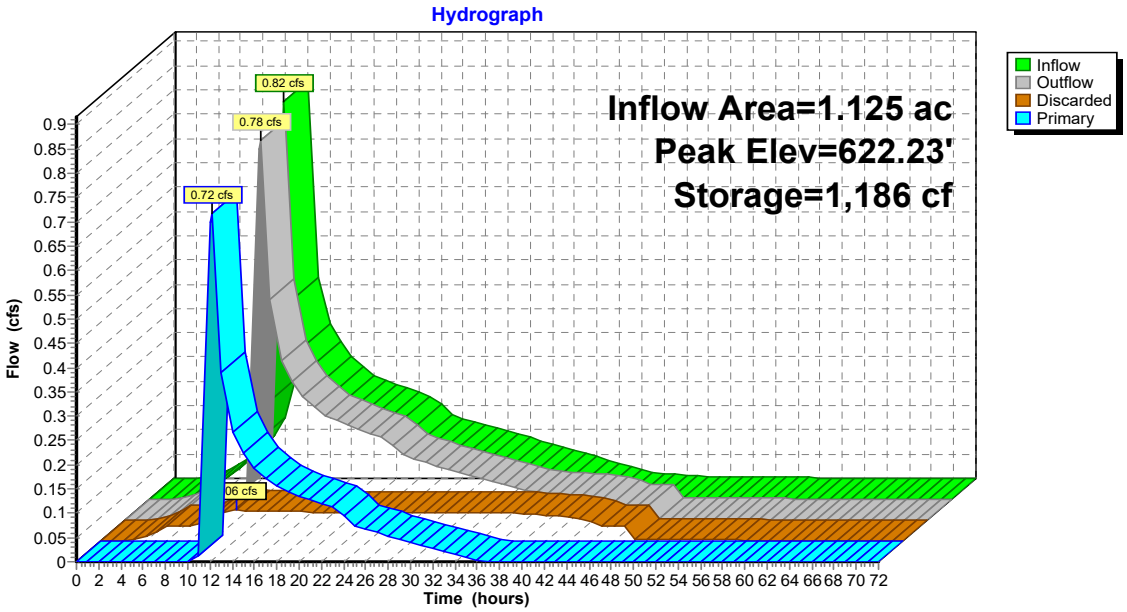
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
621.00	638	0	0
621.50	638	319	319

Device	Routing	Invert	Outlet Devices
#1	Discarded	620.00'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.14'	**8.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.14' / 620.00' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	622.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.25 hrs HW=622.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.63 cfs @ 12.19 hrs HW=622.20' (Free Discharge)
└─**2=Culvert** (Passes 0.63 cfs of 1.75 cfs potential flow)
└─**3=Orifice/Grate** (Weir Controls 0.63 cfs @ 1.48 fps)

Pond 3: SFB-3



Stage-Discharge for Pond 3: SFB-3

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
620.00	0.00	0.00	0.00
620.05	0.03	0.03	0.00
620.10	0.03	0.03	0.00
620.15	0.03	0.03	0.00
620.20	0.03	0.03	0.00
620.25	0.03	0.03	0.00
620.30	0.03	0.03	0.00
620.35	0.03	0.03	0.00
620.40	0.03	0.03	0.00
620.45	0.03	0.03	0.00
620.50	0.03	0.03	0.00
620.55	0.03	0.03	0.00
620.60	0.03	0.03	0.00
620.65	0.03	0.03	0.00
620.70	0.03	0.03	0.00
620.75	0.03	0.03	0.00
620.80	0.03	0.03	0.00
620.85	0.03	0.03	0.00
620.90	0.03	0.03	0.00
620.95	0.03	0.03	0.00
621.00	0.03	0.03	0.00
621.05	0.03	0.03	0.00
621.10	0.03	0.03	0.00
621.15	0.03	0.03	0.00
621.20	0.04	0.04	0.00
621.25	0.04	0.04	0.00
621.30	0.04	0.04	0.00
621.35	0.04	0.04	0.00
621.40	0.04	0.04	0.00
621.45	0.04	0.04	0.00
621.50	0.04	0.04	0.00
621.55	0.04	0.04	0.00
621.60	0.05	0.05	0.00
621.65	0.05	0.05	0.00
621.70	0.05	0.05	0.00
621.75	0.05	0.05	0.00
621.80	0.05	0.05	0.00
621.85	0.05	0.05	0.00
621.90	0.05	0.05	0.00
621.95	0.06	0.06	0.00
622.00	0.06	0.06	0.00
622.05	0.14	0.06	0.08
622.10	0.28	0.06	0.22
622.15	0.46	0.06	0.40
622.20	0.68	0.06	0.61
622.25	0.91	0.07	0.84
622.30	0.99	0.07	0.92
622.35	1.06	0.07	0.99
622.40	1.13	0.07	1.06
622.45	1.20	0.07	1.13
622.50	1.26	0.07	1.19
622.55	1.32	0.08	1.25
622.60	1.38	0.08	1.30
622.65	1.43	0.08	1.36
622.70	1.49	0.08	1.41
622.75	1.54	0.08	1.46
622.80	1.59	0.08	1.50
622.85	1.64	0.09	1.55
622.90	1.68	0.09	1.59
622.95	1.73	0.09	1.64
623.00	1.77	0.09	1.68
623.05	1.82	0.09	1.72
623.10	1.86	0.10	1.76
623.15	1.90	0.10	1.80
623.20	1.94	0.10	1.84
623.25	1.98	0.10	1.88
623.30	2.02	0.10	1.92
623.35	2.06	0.11	1.95
623.40	2.10	0.11	1.99
623.45	2.14	0.11	2.02
623.50	**2.17**	**0.11**	**2.06**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 5.35" for 25-YR event				
Inflow =	1.42 cfs @	12.30 hrs,	Volume=	0.663 af	
Outflow =	0.91 cfs @	13.64 hrs,	Volume=	0.663 af,	Atten= 36%, Lag= 80.5 min
Discarded =	0.50 cfs @	13.65 hrs,	Volume=	0.559 af	
Primary =	0.40 cfs @	13.64 hrs,	Volume=	0.104 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 633.13' @ 13.65 hrs Surf.Area= 3,325 sf Storage= 5,189 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,373 cf

Plug-Flow detention time= 69.2 min calculated for 0.663 af (100% of inflow)
Center-of-Mass det. time= 64.2 min (977.3 - 913.1)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	542 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,643 cf Overall x 33.0% Voids
#3	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,373 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.25' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

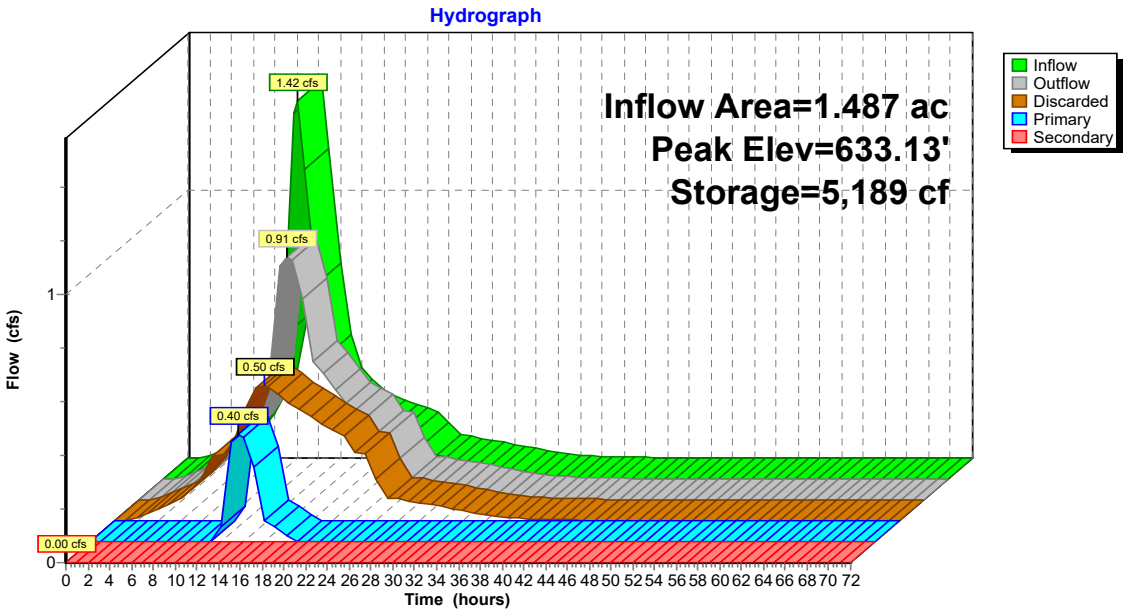
#5 Secondary 633.30' **50.0' long x 1.0' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.50 cfs @ 13.65 hrs HW=633.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.50 cfs)

Primary OutFlow Max=0.39 cfs @ 13.64 hrs HW=633.09' (Free Discharge)
└─**2=Culvert** (Passes 0.39 cfs of 2.20 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 4.84 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.28 cfs @ 3.21 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Discharge for Pond 4: SFB-4

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
630.00	0.00	0.00	0.00	0.00
630.10	0.25	0.25	0.00	0.00
630.20	0.25	0.25	0.00	0.00
630.30	0.25	0.25	0.00	0.00
630.40	0.25	0.25	0.00	0.00
630.50	0.25	0.25	0.00	0.00
630.60	0.25	0.25	0.00	0.00
630.70	0.25	0.25	0.00	0.00
630.80	0.25	0.25	0.00	0.00
630.90	0.25	0.25	0.00	0.00
631.00	0.25	0.25	0.00	0.00
631.10	0.26	0.26	0.00	0.00
631.20	0.27	0.27	0.00	0.00
631.30	0.29	0.29	0.00	0.00
631.40	0.30	0.30	0.00	0.00
631.50	0.31	0.31	0.00	0.00
631.60	0.32	0.32	0.00	0.00
631.70	0.33	0.33	0.00	0.00
631.80	0.35	0.35	0.00	0.00
631.90	0.36	0.36	0.00	0.00
632.00	0.37	0.37	0.00	0.00
632.10	0.40	0.38	0.01	0.00
632.20	0.43	0.39	0.04	0.00
632.30	0.46	0.41	0.05	0.00
632.40	0.48	0.42	0.06	0.00
632.50	0.50	0.43	0.07	0.00
632.60	0.52	0.44	0.08	0.00
632.70	0.57	0.45	0.12	0.00
632.80	0.72	0.47	0.25	0.00
632.90	0.78	0.48	0.31	0.00
633.00	0.84	0.49	0.35	0.00
633.10	0.89	0.50	0.39	0.00
633.20	0.94	0.51	0.42	0.00
633.30	0.98	0.52	0.45	0.00
633.40	5.27	0.54	0.48	4.25
633.50	13.09	0.55	0.51	12.03
633.60	23.32	0.56	0.54	22.22
633.70	35.54	0.57	0.56	34.41
633.80	49.52	0.58	0.59	48.35
633.90	65.11	0.60	0.61	63.90
634.00	**83.23**	**0.61**	**0.63**	**81.99**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac,	65.78% Impervious,	Inflow Depth =	4.50"	for 25-YR event
Inflow =	0.61 cfs @	12.20 hrs,	Volume=	0.613 af	
Outflow =	0.29 cfs @	17.89 hrs,	Volume=	0.616 af,	Atten= 52%, Lag= 341.4 min
Discarded =	0.23 cfs @	17.89 hrs,	Volume=	0.561 af	
Primary =	0.06 cfs @	17.89 hrs,	Volume=	0.055 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 634.97' @ 17.89 hrs Surf.Area= 3,460 sf Storage= 4,705 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,589 cf

Plug-Flow detention time= 208.7 min calculated for 0.608 af (99% of inflow)
Center-of-Mass det. time= 213.4 min (1,476.3 - 1,262.9)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	497 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,505 cf Overall x 33.0% Voids
#3	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,589 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.00	1,505	1,505	1,505

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**6.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir**

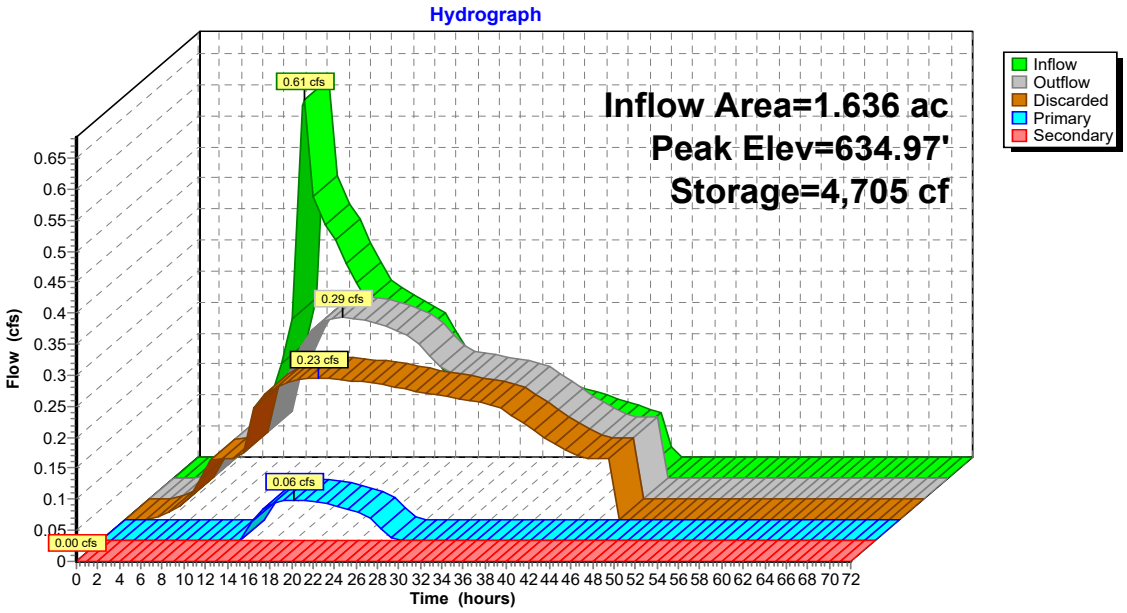
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.23 cfs @ 17.89 hrs HW=634.97' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.06 cfs @ 17.89 hrs HW=634.97' (Free Discharge)
└─**2=Culvert** (Passes 0.06 cfs of 0.71 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.98 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Discharge for Pond 5: SFB-5

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
632.00	0.00	0.00	0.00	0.00
632.10	0.10	0.10	0.00	0.00
632.20	0.10	0.10	0.00	0.00
632.30	0.10	0.10	0.00	0.00
632.40	0.10	0.10	0.00	0.00
632.50	0.10	0.10	0.00	0.00
632.60	0.10	0.10	0.00	0.00
632.70	0.10	0.10	0.00	0.00
632.80	0.10	0.10	0.00	0.00
632.90	0.10	0.10	0.00	0.00
633.00	0.10	0.10	0.00	0.00
633.10	0.10	0.10	0.00	0.00
633.20	0.10	0.10	0.00	0.00
633.30	0.10	0.10	0.00	0.00
633.40	0.10	0.10	0.00	0.00
633.50	0.10	0.10	0.00	0.00
633.60	0.12	0.12	0.00	0.00
633.70	0.13	0.13	0.00	0.00
633.80	0.15	0.15	0.00	0.00
633.90	0.16	0.16	0.00	0.00
634.00	0.18	0.18	0.00	0.00
634.10	0.19	0.19	0.00	0.00
634.20	0.19	0.19	0.00	0.00
634.30	0.19	0.19	0.00	0.00
634.40	0.20	0.20	0.00	0.00
634.50	0.20	0.20	0.00	0.00
634.60	0.22	0.21	0.01	0.00
634.70	0.25	0.21	0.04	0.00
634.80	0.27	0.22	0.05	0.00
634.90	0.28	0.22	0.06	0.00
635.00	0.30	0.23	0.07	0.00
635.10	7.11	0.23	0.08	6.81
635.20	19.57	0.24	0.08	19.25
635.30	35.89	0.24	0.09	35.56
635.40	55.39	0.24	0.09	55.05
635.50	77.71	0.25	0.10	77.36
635.60	102.60	0.25	0.11	102.25
635.70	131.55	0.26	0.11	131.19
635.80	163.52	0.26	0.12	163.14
635.90	199.49	0.26	0.12	199.11
636.00	**238.79**	**0.27**	**0.13**	**238.40**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth = 6.33" for 25-YR event
Inflow = 1.71 cfs @ 12.01 hrs, Volume= 0.313 af
Outflow = 0.17 cfs @ 14.42 hrs, Volume= 0.313 af, Atten= 90%, Lag= 144.7 min
Primary = 0.17 cfs @ 14.42 hrs, Volume= 0.313 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 628.84' @ 14.42 hrs Surf.Area= 0.081 ac Storage= 0.197 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 611.6 min calculated for 0.313 af (100% of inflow)
Center-of-Mass det. time= 606.7 min (1,348.8 - 742.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**8.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 622.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.17 cfs @ 14.42 hrs HW=628.83' (Free Discharge)
└─**1=Culvert** (Passes 0.17 cfs of 2.08 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.98 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

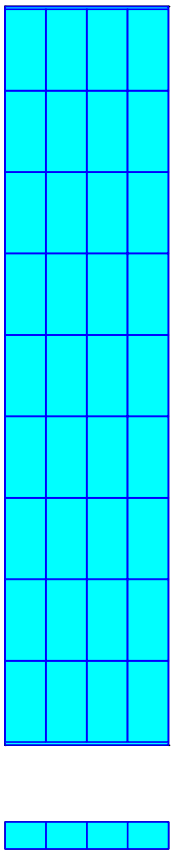
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

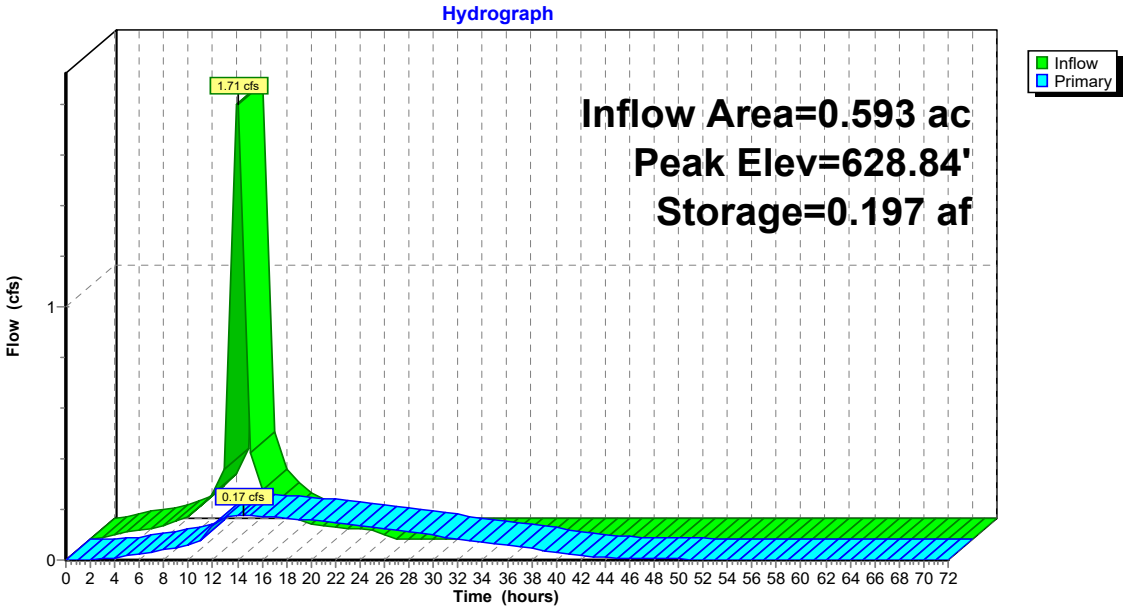
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow
Primary
1.71 cfs
0.17 cfs
Inflow Area=0.593 ac
Peak Elev=628.84'
Storage=0.197 af
Flow (cfs)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-3: DB-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
626.00	0.00	628.60	0.17
626.05	0.00	628.65	0.17
626.10	0.01	628.70	0.17
626.15	0.03	628.75	0.17
626.20	0.04	628.80	0.17
626.25	0.04	628.85	0.17
626.30	0.05	628.90	0.18
626.35	0.05	628.95	0.18
626.40	0.06	629.00	0.18
626.45	0.06	629.05	0.18
626.50	0.07	629.10	0.18
626.55	0.07	629.15	0.18
626.60	0.08	629.20	0.19
626.65	0.08	629.25	0.19
626.70	0.08	629.30	0.19
626.75	0.09	629.35	0.19
626.80	0.09	629.40	0.19
626.85	0.09	629.45	0.19
626.90	0.09	629.50	0.19
626.95	0.10	629.55	0.20
627.00	0.10	629.60	0.20
627.05	0.10	629.65	0.20
627.10	0.11	629.70	0.20
627.15	0.11	629.75	0.20
627.20	0.11	629.80	0.20
627.25	0.11	629.85	0.20
627.30	0.12	629.90	0.21
627.35	0.12	629.95	0.21
627.40	0.12	630.00	0.21
627.45	0.12	630.05	0.21
627.50	0.13	630.10	0.21
627.55	0.13	630.15	0.21
627.60	0.13	630.20	0.21
627.65	0.13	630.25	0.21
627.70	0.13	630.30	0.22
627.75	0.14	630.35	0.22
627.80	0.14	630.40	0.22
627.85	0.14	630.45	0.22
627.90	0.14	630.50	0.22
627.95	0.14	630.55	0.22
628.00	0.15	630.60	0.22
628.05	0.15	630.65	**0.22**
628.10	0.15		
628.15	0.15		
628.20	0.15		
628.25	0.15		
628.30	0.16		
628.35	0.16		
628.40	0.16		
628.45	0.16		
628.50	0.16		
628.55	0.16		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth = 11.26" for 25-YR event
Inflow = 2.15 cfs @ 12.00 hrs, Volume= 0.257 af
Outflow = 0.52 cfs @ 13.21 hrs, Volume= 0.257 af, Atten= 76%, Lag= 72.6 min
Primary = 0.52 cfs @ 13.21 hrs, Volume= 0.257 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 636.86' @ 13.22 hrs Surf.Area= 0.072 ac Storage= 0.176 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 408.3 min calculated for 0.257 af (100% of inflow)
Center-of-Mass det. time= 401.7 min (1,134.1 - 732.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.49 cfs @ 13.21 hrs HW=636.73' (Free Discharge)
└─**1=Culvert** (Passes 0.49 cfs of 1.03 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.83 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.61 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

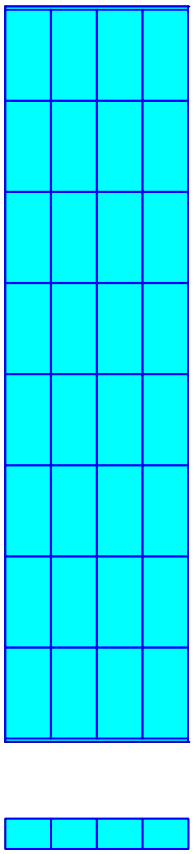
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

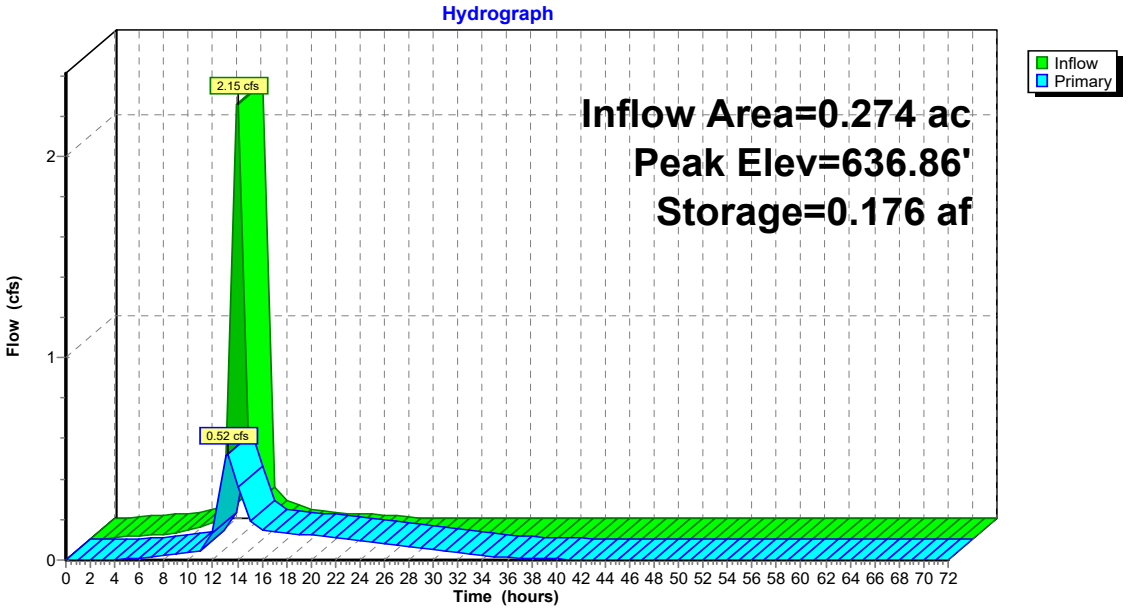
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow
Primary
2.15 cfs
0.52 cfs
Inflow Area=0.274 ac
Peak Elev=636.86'
Storage=0.176 af
Flow (cfs)
0
1
2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-4: DB-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
634.00	0.00	636.60	0.44
634.05	0.00	636.65	0.46
634.10	0.01	636.70	0.48
634.15	0.03	636.75	0.49
634.20	0.04	636.80	0.51
634.25	0.04	636.85	0.52
634.30	0.05	636.90	0.54
634.35	0.05	636.95	0.55
634.40	0.06	637.00	0.56
634.45	0.06	637.05	0.58
634.50	0.07	637.10	0.61
634.55	0.07	637.15	0.65
634.60	0.08	637.20	0.70
634.65	0.08	637.25	0.74
634.70	0.08	637.30	0.79
634.75	0.09	637.35	0.83
634.80	0.09	637.40	0.86
634.85	0.09	637.45	0.89
634.90	0.09	637.50	0.92
634.95	0.10	637.55	0.95
635.00	0.10	637.60	0.98
635.05	0.10	637.65	1.00
635.10	0.11	637.70	1.03
635.15	0.11	637.75	1.05
635.20	0.11	637.80	1.07
635.25	0.11	637.85	1.10
635.30	0.12	637.90	1.12
635.35	0.12	637.95	1.14
635.40	0.12	638.00	1.16
635.45	0.12	638.05	1.18
635.50	0.13	638.10	1.20
635.55	0.13	638.15	1.22
635.60	0.13	638.20	1.24
635.65	0.13	638.25	1.25
635.70	0.13	638.30	1.26
635.75	0.14	638.35	1.26
635.80	0.14	638.40	1.27
635.85	0.14	638.45	1.27
635.90	0.14	638.50	1.28
635.95	0.14	638.55	1.29
636.00	0.15	638.60	1.29
636.05	0.15	638.65	**1.30**
636.10	0.17		
636.15	0.20		
636.20	0.24		
636.25	0.27		
636.30	0.31		
636.35	0.34		
636.40	0.36		
636.45	0.39		
636.50	0.41		
636.55	0.43		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth = 7.43" for 25-YR event
Inflow = 2.86 cfs @ 12.02 hrs, Volume= 0.439 af
Outflow = 0.21 cfs @ 14.76 hrs, Volume= 0.438 af, Atten= 93%, Lag= 164.4 min
Primary = 0.21 cfs @ 14.76 hrs, Volume= 0.438 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Peak Elev= 641.59' @ 14.77 hrs Surf.Area= 0.090 ac Storage= 0.293 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 663.7 min (1,423.5 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.21 cfs @ 14.76 hrs HW=641.58' (Free Discharge)
└─**1=Culvert** (Passes 0.21 cfs of 1.30 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.63 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

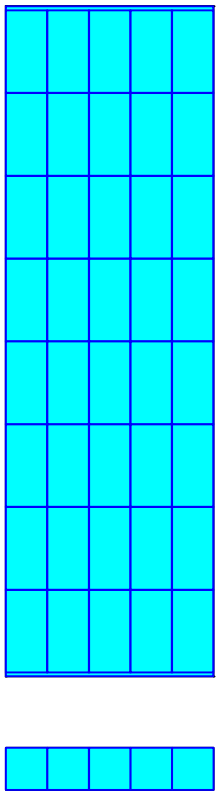
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

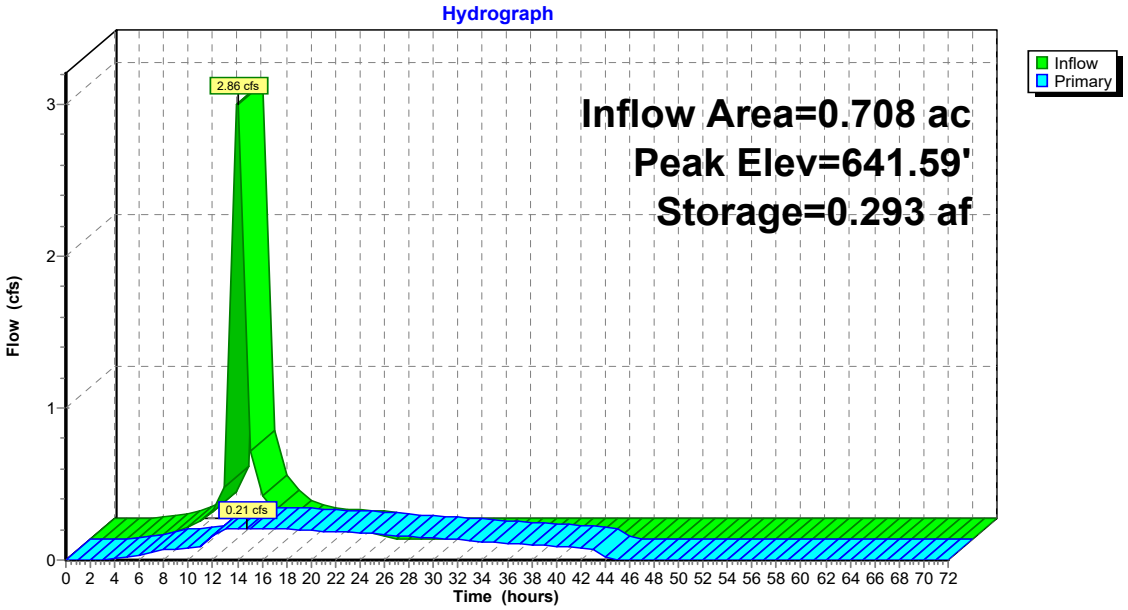
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow
Primary
2.86 cfs
0.21 cfs
Inflow Area=0.708 ac
Peak Elev=641.59'
Storage=0.293 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-5: DB-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
637.50	0.00	639.58	0.15	641.66	0.21	643.74	0.26
637.54	0.00	639.62	0.15	641.70	0.21	643.78	0.26
637.58	0.01	639.66	0.15	641.74	0.21	643.82	0.26
637.62	0.02	639.70	0.15	641.78	0.22	643.86	0.26
637.66	0.03	639.74	0.15	641.82	0.22	643.90	0.26
637.70	0.04	639.78	0.16	641.86	0.22	643.94	0.26
637.74	0.04	639.82	0.16	641.90	0.22	643.98	0.27
637.78	0.05	639.86	0.16	641.94	0.22	644.02	0.27
637.82	0.05	639.90	0.16	641.98	0.22	644.06	0.27
637.86	0.06	639.94	0.16	642.02	0.22	644.10	0.27
637.90	0.06	639.98	0.16	642.06	0.22	644.14	0.27
637.94	0.06	640.02	0.16	642.10	0.22	644.18	0.27
637.98	0.07	640.06	0.17	642.14	0.22	644.22	0.27
638.02	0.07	640.10	0.17	642.18	0.23	644.26	0.27
638.06	0.07	640.14	0.17	642.22	0.23	644.30	0.27
638.10	0.08	640.18	0.17	642.26	0.23	644.34	0.27
638.14	0.08	640.22	0.17	642.30	0.23	644.38	0.27
638.18	0.08	640.26	0.17	642.34	0.23	644.42	0.27
638.22	0.08	640.30	0.17	642.38	0.23	644.46	0.28
638.26	0.09	640.34	0.17	642.42	0.23	644.50	0.28
638.30	0.09	640.38	0.18	642.46	0.23	644.54	0.28
638.34	0.09	640.42	0.18	642.50	0.23	644.58	0.28
638.38	0.09	640.46	0.18	642.54	0.23	644.62	0.28
638.42	0.10	640.50	0.18	642.58	0.23	644.66	**0.28**
638.46	0.10	640.54	0.18	642.62	0.24		
638.50	0.10	640.58	0.18	642.66	0.24		
638.54	0.10	640.62	0.18	642.70	0.24		
638.58	0.10	640.66	0.18	642.74	0.24		
638.62	0.11	640.70	0.19	642.78	0.24		
638.66	0.11	640.74	0.19	642.82	0.24		
638.70	0.11	640.78	0.19	642.86	0.24		
638.74	0.11	640.82	0.19	642.90	0.24		
638.78	0.11	640.86	0.19	642.94	0.24		
638.82	0.12	640.90	0.19	642.98	0.24		
638.86	0.12	640.94	0.19	643.02	0.24		
638.90	0.12	640.98	0.19	643.06	0.25		
638.94	0.12	641.02	0.19	643.10	0.25		
638.98	0.12	641.06	0.20	643.14	0.25		
639.02	0.13	641.10	0.20	643.18	0.25		
639.06	0.13	641.14	0.20	643.22	0.25		
639.10	0.13	641.18	0.20	643.26	0.25		
639.14	0.13	641.22	0.20	643.30	0.25		
639.18	0.13	641.26	0.20	643.34	0.25		
639.22	0.13	641.30	0.20	643.38	0.25		
639.26	0.14	641.34	0.20	643.42	0.25		
639.30	0.14	641.38	0.20	643.46	0.25		
639.34	0.14	641.42	0.21	643.50	0.26		
639.38	0.14	641.46	0.21	643.54	0.26		
639.42	0.14	641.50	0.21	643.58	0.26		
639.46	0.14	641.54	0.21	643.62	0.26		
639.50	0.15	641.58	0.21	643.66	0.26		
639.54	0.15	641.62	0.21	643.70	0.26		

Summary for Pond ICS-3: ICS-3

Inflow Area = 0.328 ac, 72.22% Impervious, Inflow Depth = 4.75" for 25-YR event
Inflow = 0.71 cfs @ 12.03 hrs, Volume= 0.130 af
Outflow = 0.71 cfs @ 12.03 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.0 min
Primary = 0.45 cfs @ 12.05 hrs, Volume= 0.108 af
Secondary = 0.26 cfs @ 12.01 hrs, Volume= 0.022 af

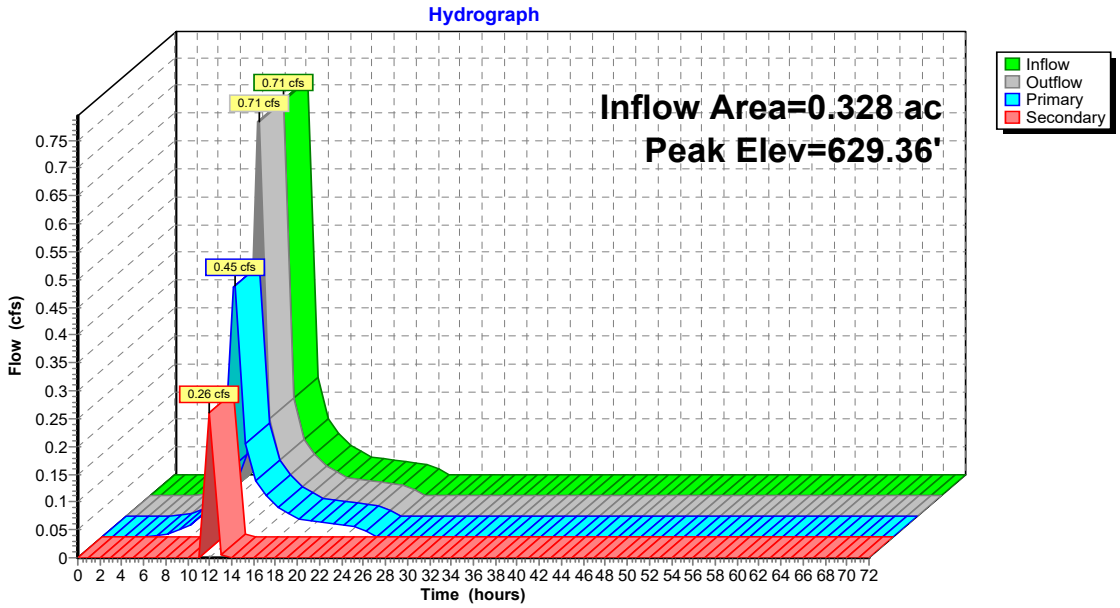
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 629.36' @ 12.04 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**5.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 622.00' S= 0.0285 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.14 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.44 cfs @ 12.05 hrs HW=629.35' TW=623.35' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.44 cfs @ 3.23 fps)

Secondary OutFlow Max=0.26 cfs @ 12.01 hrs HW=629.36' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.26 cfs @ 1.88 fps)

Pond ICS-3: ICS-3



Stage-Discharge for Pond ICS-3: ICS-3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
628.85	0.00	0.00	0.00
628.90	0.01	0.01	0.00
628.95	0.03	0.03	0.00
629.00	0.07	0.07	0.00
629.05	0.12	0.12	0.00
629.10	0.19	0.18	0.01
629.15	0.28	0.24	0.03
629.20	0.38	0.31	0.07
629.25	0.48	0.36	0.12
629.30	0.58	0.40	0.18
629.35	0.69	0.44	0.25
629.40	0.81	0.48	0.33
629.45	0.93	0.51	0.41
629.50	1.06	0.55	0.51
629.55	1.19	0.58	0.62
629.60	1.33	0.60	0.73
629.65	1.48	0.63	0.85
629.70	1.63	0.66	0.97
629.75	1.78	**0.68**	1.10
629.80	1.92	0.68	1.24
629.85	2.06	0.68	1.38
629.90	2.20	0.68	1.52
629.95	2.34	0.68	1.66
630.00	2.48	0.68	1.80
630.05	2.62	0.68	1.94
630.10	2.76	0.68	2.08
630.15	2.90	0.68	2.22
630.20	3.03	0.68	2.35
630.25	3.15	0.68	2.47
630.30	3.26	0.68	2.58
630.35	3.35	0.68	2.67
630.40	3.43	0.68	2.75
630.45	3.51	0.68	2.83
630.50	3.59	0.68	2.91
630.55	3.67	0.68	2.99
630.60	3.74	0.68	3.06
630.65	3.81	0.68	3.13
630.70	3.88	0.68	3.20
630.75	3.95	0.68	3.27
630.80	4.02	0.68	3.34
630.85	4.08	0.68	3.40
630.90	4.15	0.68	3.47
630.95	4.21	0.68	3.53
631.00	4.28	0.68	3.60
631.05	4.34	0.68	3.66
631.10	4.40	0.68	3.72
631.15	4.46	0.68	3.78
631.20	4.52	0.68	3.83
631.25	4.57	0.68	3.89
631.30	4.63	0.68	3.95
631.35	4.69	0.68	4.01
631.40	4.74	0.68	4.06
631.45	4.80	0.68	4.12
631.50	4.85	0.68	4.17
631.55	4.90	0.68	4.22
631.60	4.95	0.68	4.27
631.65	5.01	0.68	4.33
631.70	5.06	0.68	4.38
631.75	5.11	0.68	4.43
631.80	5.16	0.68	4.48
631.85	5.21	0.68	4.53
631.90	5.26	0.68	4.58
631.95	5.31	0.68	4.63
632.00	5.35	0.68	4.67
632.05	5.40	0.68	4.72
632.10	5.45	0.68	4.77
632.15	5.49	0.68	4.81
632.20	5.54	0.68	4.86
632.25	5.59	0.68	4.91
632.30	5.63	0.68	4.95
632.35	5.68	0.68	5.00
632.40	5.72	0.68	5.04
632.45	5.76	0.68	5.08
632.50	**5.81**	0.68	**5.13**

Summary for Pond ICS-4: ICS-4

Inflow Area = 1.068 ac, 93.43% Impervious, Inflow Depth = 5.66" for 25-YR event
Inflow = 2.59 cfs @ 12.01 hrs, Volume= 0.504 af
Outflow = 2.59 cfs @ 12.01 hrs, Volume= 0.504 af, Atten= 0%, Lag= 0.0 min
Primary = 1.11 cfs @ 12.05 hrs, Volume= 0.381 af
Secondary = 1.48 cfs @ 12.00 hrs, Volume= 0.122 af

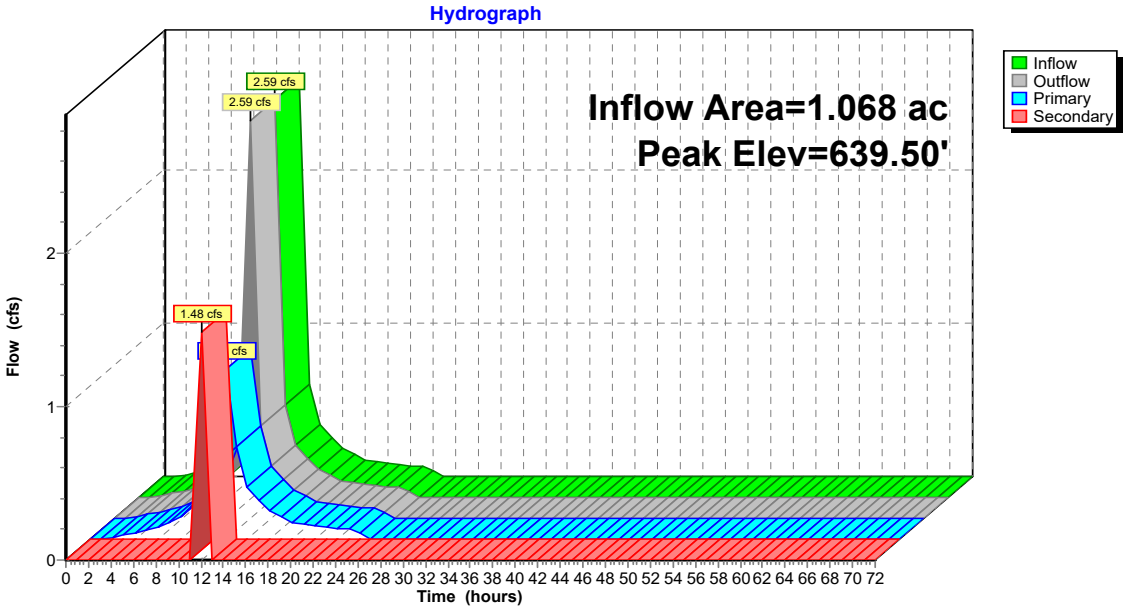
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 639.50' @ 12.01 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.09 cfs @ 12.05 hrs HW=639.37' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.09 cfs @ 5.57 fps)

Secondary OutFlow Max=1.48 cfs @ 12.00 hrs HW=639.50' (Free Discharge)
└─**3=Culvert** (Passes 1.48 cfs of 6.39 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.48 cfs @ 1.33 fps)

Pond ICS-4: ICS-4



Stage-Discharge for Pond ICS-4: ICS-4

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
636.50	0.00	0.00	0.00
636.55	0.01	0.01	0.00
636.60	0.04	0.04	0.00
636.65	0.08	0.08	0.00
636.70	0.14	0.14	0.00
636.75	0.21	0.21	0.00
636.80	0.29	0.29	0.00
636.85	0.37	0.37	0.00
636.90	0.45	0.45	0.00
636.95	0.53	0.53	0.00
637.00	0.59	0.59	0.00
637.05	0.65	0.65	0.00
637.10	0.70	0.70	0.00
637.15	0.75	0.75	0.00
637.20	0.79	0.79	0.00
637.25	0.84	0.84	0.00
637.30	0.88	0.88	0.00
637.35	0.89	0.89	0.00
637.40	0.89	0.89	0.00
637.45	0.90	0.90	0.00
637.50	0.90	0.90	0.00
637.55	0.91	0.91	0.00
637.60	0.91	0.91	0.00
637.65	0.92	0.92	0.00
637.70	0.92	0.92	0.00
637.75	0.93	0.93	0.00
637.80	0.94	0.94	0.00
637.85	0.94	0.94	0.00
637.90	0.95	0.95	0.00
637.95	0.95	0.95	0.00
638.00	0.96	0.96	0.00
638.05	0.96	0.96	0.00
638.10	0.97	0.97	0.00
638.15	0.97	0.97	0.00
638.20	0.98	0.98	0.00
638.25	0.98	0.98	0.00
638.30	0.99	0.99	0.00
638.35	0.99	0.99	0.00
638.40	1.00	1.00	0.00
638.45	1.00	1.00	0.00
638.50	1.01	1.01	0.00
638.55	1.01	1.01	0.00
638.60	1.02	1.02	0.00
638.65	1.02	1.02	0.00
638.70	1.03	1.03	0.00
638.75	1.03	1.03	0.00
638.80	1.04	1.04	0.00
638.85	1.04	1.04	0.00
638.90	1.05	1.05	0.00
638.95	1.05	1.05	0.00
639.00	1.06	1.06	0.00
639.05	1.06	1.06	0.00
639.10	1.07	1.07	0.00
639.15	1.07	1.07	0.00
639.20	1.08	1.08	0.00
639.25	1.08	1.08	0.00
639.30	1.13	1.09	0.04
639.35	1.35	1.09	0.26
639.40	1.68	1.10	0.58
639.45	2.08	1.10	0.98
639.50	2.56	1.11	1.45
639.55	3.10	1.11	1.99
639.60	3.71	1.11	2.60
639.65	4.38	1.12	3.27
639.70	5.12	1.12	4.00
639.75	5.92	1.13	4.79
639.80	6.79	1.13	5.65
639.85	7.71	1.14	6.58
639.90	8.18	1.14	7.04
639.95	8.26	1.15	7.11
640.00	**8.34**	**1.15**	**7.19**

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac,	62.40% Impervious,	Inflow Depth =	4.32"	for 25-YR event
Inflow =	1.47 cfs @	12.03 hrs,	Volume=	0.266 af	
Outflow =	1.47 cfs @	12.03 hrs,	Volume=	0.266 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.27 cfs @	12.07 hrs,	Volume=	0.141 af	
Secondary =	1.20 cfs @	12.03 hrs,	Volume=	0.125 af	

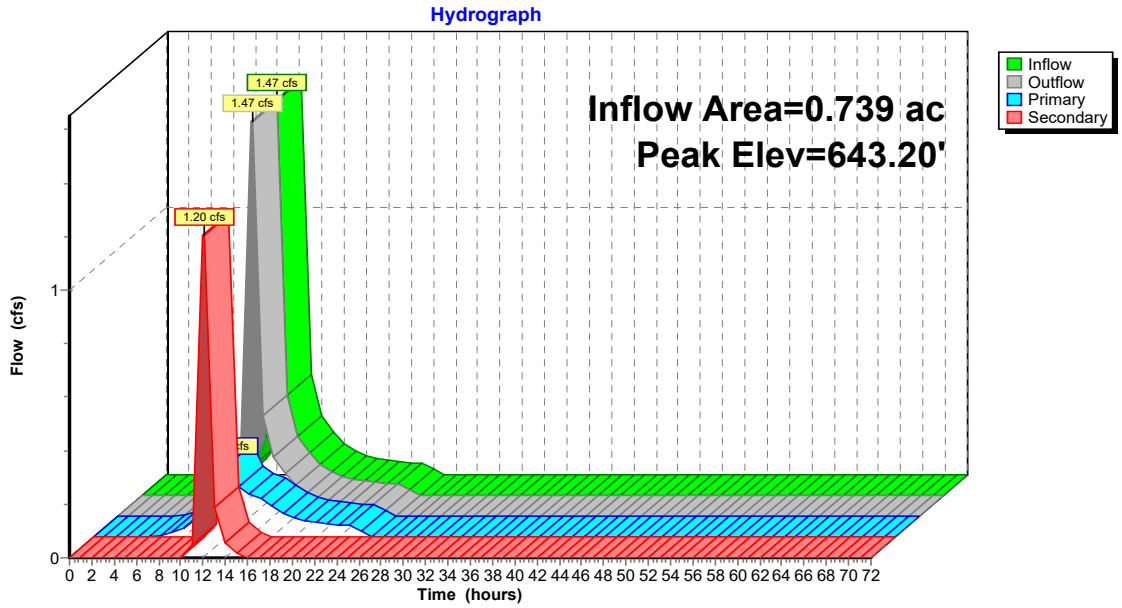
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 643.20' @ 12.06 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 636.00' S= 0.0781 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.26 cfs @ 12.07 hrs HW=643.16' TW=637.16' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.26 cfs @ 5.34 fps)

Secondary OutFlow Max=1.16 cfs @ 12.03 hrs HW=643.18' TW=637.18' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 1.16 cfs @ 3.24 fps)

Pond ICS-5: ICS-5



Stage-Discharge for Pond ICS-5: ICS-5

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
642.25	0.00	0.00	0.00
642.30	0.01	0.01	0.00
642.35	0.02	0.02	0.00
642.40	0.05	0.05	0.00
642.45	0.08	0.08	0.00
642.50	0.10	0.10	0.00
642.55	0.12	0.12	0.00
642.60	0.15	0.14	0.01
642.65	0.19	0.15	0.03
642.70	0.25	0.17	0.08
642.75	0.32	0.18	0.14
642.80	0.41	0.19	0.22
642.85	0.51	0.20	0.30
642.90	0.62	0.21	0.40
642.95	0.74	0.22	0.52
643.00	0.87	0.23	0.64
643.05	1.02	0.24	0.77
643.10	1.17	0.25	0.91
643.15	1.33	0.26	1.07
643.20	1.49	0.27	1.22
643.25	1.66	0.28	1.39
643.30	1.84	0.28	1.56
643.35	2.02	**0.29**	1.73
643.40	2.21	**0.30**	1.91
643.45	2.39	0.30	2.09
643.50	2.57	0.30	2.27
643.55	2.75	0.30	2.45
643.60	2.93	0.30	2.63
643.65	3.10	0.30	2.80
643.70	3.27	0.30	2.97
643.75	3.42	0.30	3.13
643.80	3.57	0.30	3.27
643.85	3.69	0.30	3.39
643.90	3.78	0.30	3.48
643.95	3.99	0.30	3.69
644.00	4.19	0.30	3.89
644.05	4.38	0.30	4.08
644.10	4.56	0.30	4.26
644.15	4.73	0.30	4.44
644.20	4.90	0.30	4.60
644.25	5.06	0.30	4.77
644.30	5.22	0.30	4.92
644.35	5.37	0.30	5.07
644.40	5.52	0.30	5.22
644.45	5.66	0.30	5.36
644.50	5.80	0.30	5.50
644.55	5.94	0.30	5.64
644.60	6.07	0.30	5.77
644.65	6.20	0.30	5.90
644.70	6.32	0.30	6.03
644.75	6.44	0.30	6.15
644.80	6.53	0.30	6.24
644.85	6.62	0.30	6.32
644.90	6.71	0.30	6.41
644.95	6.79	0.30	6.50
645.00	6.88	0.30	6.58
645.05	6.96	0.30	6.67
645.10	7.05	0.30	6.75
645.15	7.13	0.30	6.83
645.20	7.21	0.30	6.92
645.25	7.29	0.30	7.00
645.30	7.37	0.30	7.07
645.35	7.45	0.30	7.15
645.40	7.53	0.30	7.23
645.45	7.60	0.30	7.31
645.50	**7.68**	0.30	**7.38**

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth = 4.75" for 25-YR event
Inflow = 0.12 cfs @ 12.03 hrs, Volume= 0.022 af
Outflow = 0.05 cfs @ 13.03 hrs, Volume= 0.020 af, Atten= 55%, Lag= 60.0 min
Primary = 0.05 cfs @ 13.03 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 654.91' @ 13.00 hrs Surf.Area= 488 sf Storage= 329 cf

Plug-Flow detention time= 477.1 min calculated for 0.019 af (88% of inflow)
Center-of-Mass det. time= 439.2 min (1,228.5 - 789.3)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

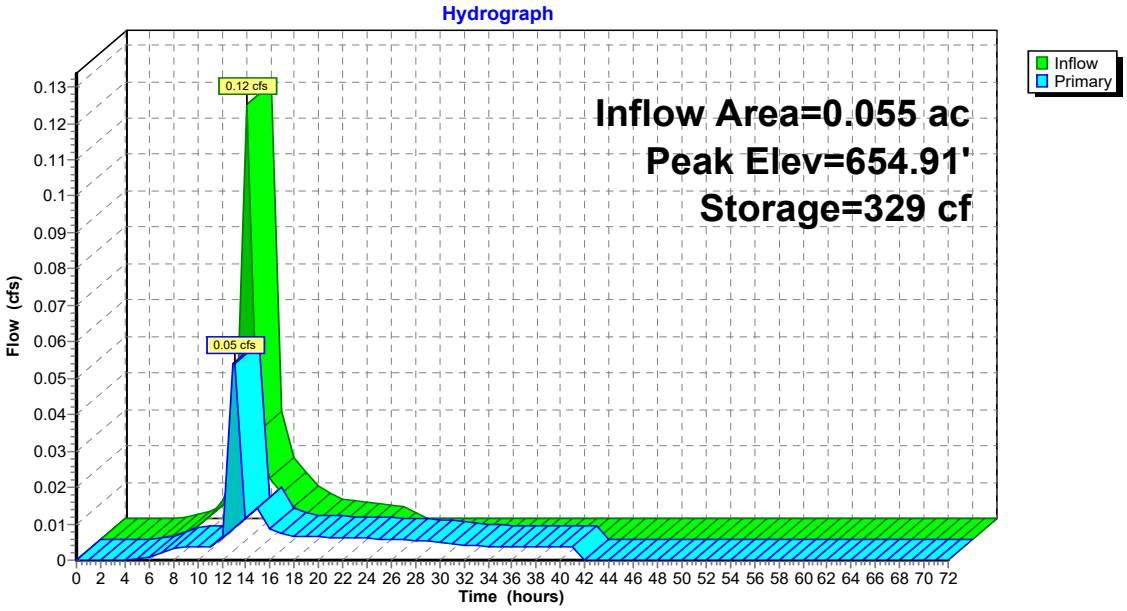
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.04 cfs @ 13.03 hrs HW=654.91' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.29 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Discharge for Pond RG-7B: RG-7B

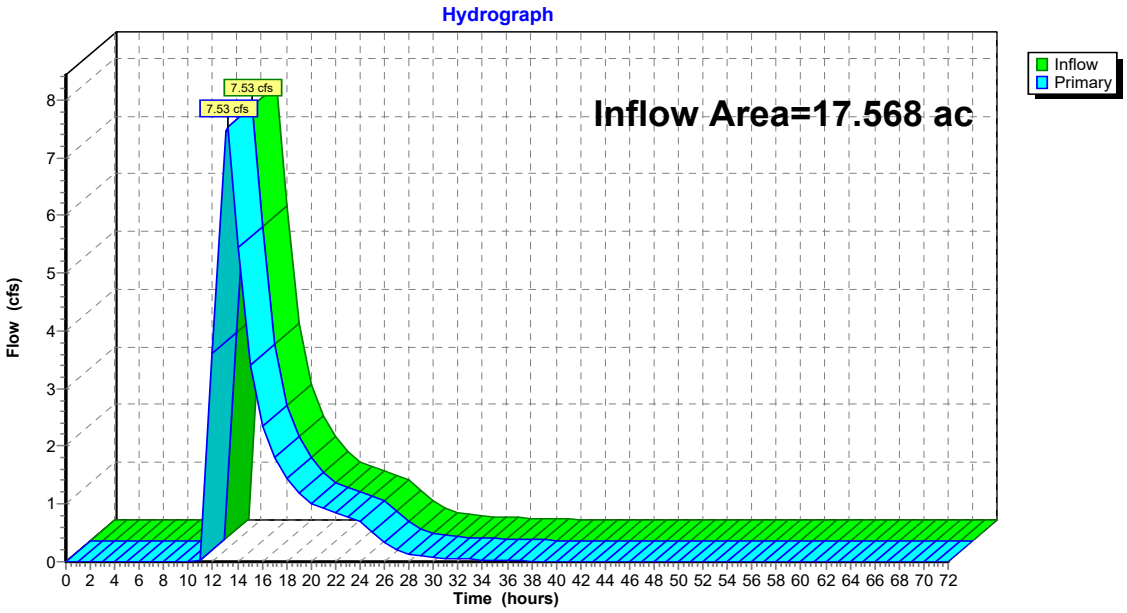
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
653.00	0.00	653.52	0.00	654.04	0.00	654.56	0.01
653.01	0.00	653.53	0.00	654.05	0.00	654.57	0.01
653.02	0.00	653.54	0.00	654.06	0.00	654.58	0.01
653.03	0.00	653.55	0.00	654.07	0.00	654.59	0.01
653.04	0.00	653.56	0.00	654.08	0.00	654.60	0.01
653.05	0.00	653.57	0.00	654.09	0.00	654.61	0.01
653.06	0.00	653.58	0.00	654.10	0.00	654.62	0.01
653.07	0.00	653.59	0.00	654.11	0.00	654.63	0.01
653.08	0.00	653.60	0.00	654.12	0.00	654.64	0.01
653.09	0.00	653.61	0.00	654.13	0.00	654.65	0.01
653.10	0.00	653.62	0.00	654.14	0.00	654.66	0.01
653.11	0.00	653.63	0.00	654.15	0.00	654.67	0.01
653.12	0.00	653.64	0.00	654.16	0.00	654.68	0.01
653.13	0.00	653.65	0.00	654.17	0.00	654.69	0.01
653.14	0.00	653.66	0.00	654.18	0.00	654.70	0.01
653.15	0.00	653.67	0.00	654.19	0.00	654.71	0.01
653.16	0.00	653.68	0.00	654.20	0.00	654.72	0.01
653.17	0.00	653.69	0.00	654.21	0.00	654.73	0.01
653.18	0.00	653.70	0.00	654.22	0.00	654.74	0.01
653.19	0.00	653.71	0.00	654.23	0.00	654.75	0.01
653.20	0.00	653.72	0.00	654.24	0.00	654.76	0.01
653.21	0.00	653.73	0.00	654.25	0.00	654.77	0.01
653.22	0.00	653.74	0.00	654.26	0.00	654.78	0.01
653.23	0.00	653.75	0.00	654.27	0.00	654.79	0.01
653.24	0.00	653.76	0.00	654.28	0.00	654.80	0.01
653.25	0.00	653.77	0.00	654.29	0.00	654.81	0.01
653.26	0.00	653.78	0.00	654.30	0.00	654.82	0.01
653.27	0.00	653.79	0.00	654.31	0.00	654.83	0.01
653.28	0.00	653.80	0.00	654.32	0.00	654.84	0.01
653.29	0.00	653.81	0.00	654.33	0.00	654.85	0.01
653.30	0.00	653.82	0.00	654.34	0.00	654.86	0.01
653.31	0.00	653.83	0.00	654.35	0.00	654.87	0.01
653.32	0.00	653.84	0.00	654.36	0.00	654.88	0.01
653.33	0.00	653.85	0.00	654.37	0.00	654.89	0.01
653.34	0.00	653.86	0.00	654.38	0.00	654.90	0.01
653.35	0.00	653.87	0.00	654.39	0.00	654.91	0.03
653.36	0.00	653.88	0.00	654.40	0.00	654.92	0.08
653.37	0.00	653.89	0.00	654.41	0.00	654.93	0.14
653.38	0.00	653.90	0.00	654.42	0.00	654.94	0.21
653.39	0.00	653.91	0.00	654.43	0.00	654.95	0.29
653.40	0.00	653.92	0.00	654.44	0.00	654.96	0.38
653.41	0.00	653.93	0.00	654.45	0.00	654.97	0.48
653.42	0.00	653.94	0.00	654.46	0.00	654.98	0.58
653.43	0.00	653.95	0.00	654.47	0.00	654.99	0.69
653.44	0.00	653.96	0.00	654.48	0.00	655.00	**0.81**
653.45	0.00	653.97	0.00	654.49	0.01		
653.46	0.00	653.98	0.00	654.50	0.01		
653.47	0.00	653.99	0.00	654.51	0.01		
653.48	0.00	654.00	0.00	654.52	0.01		
653.49	0.00	654.01	0.00	654.53	0.01		
653.50	0.00	654.02	0.00	654.54	0.01		
653.51	0.00	654.03	0.00	654.55	0.01		

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 1.84" for 25-YR event
Inflow = 7.53 cfs @ 13.16 hrs, Volume= 2.696 af
Primary = 7.53 cfs @ 13.16 hrs, Volume= 2.696 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

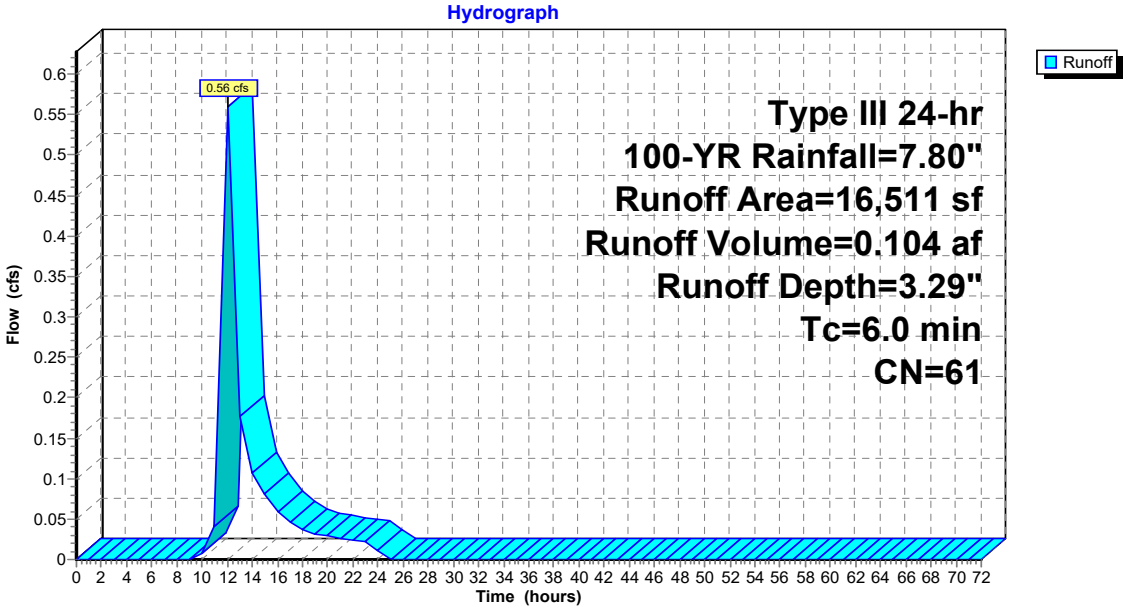
Runoff = 0.56 cfs @ 12.08 hrs, Volume= 0.104 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

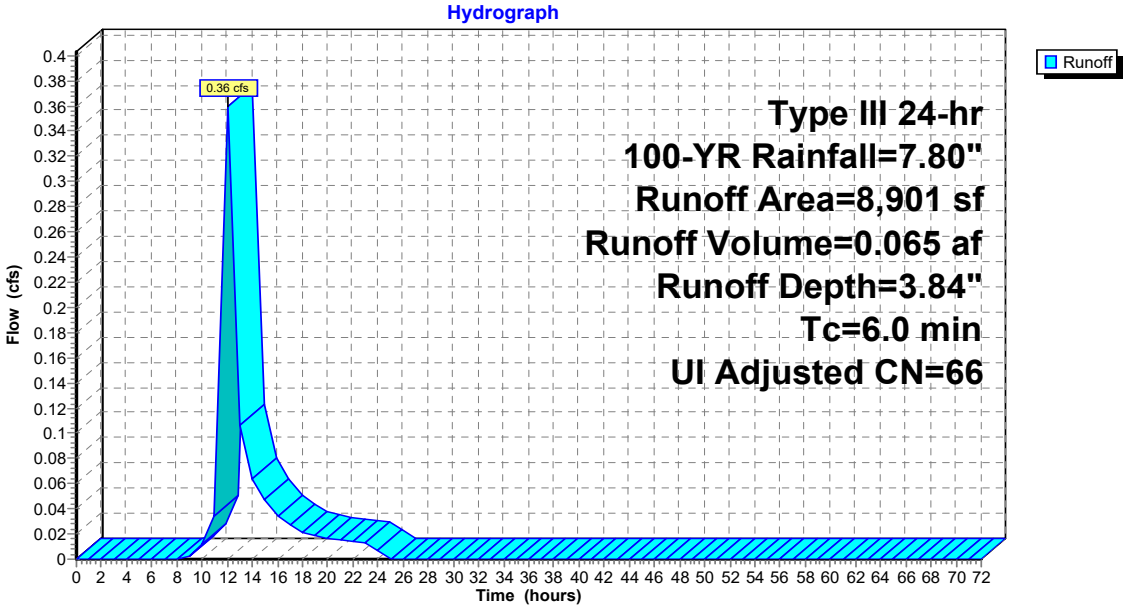
Runoff = 0.36 cfs @ 12.06 hrs, Volume= 0.065 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

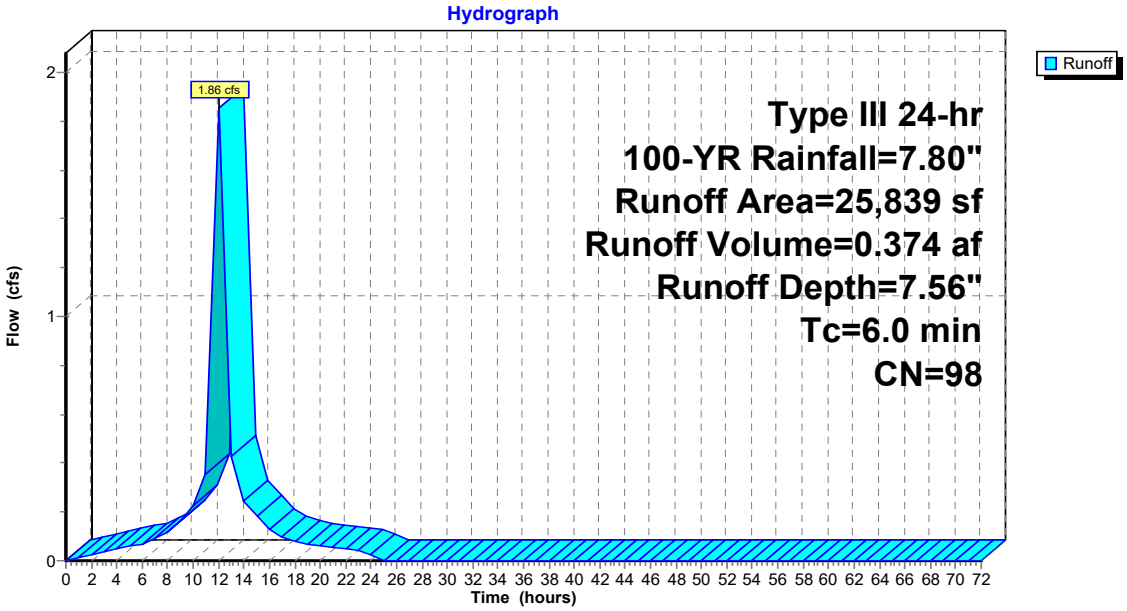
Runoff = 1.86 cfs @ 12.01 hrs, Volume= 0.374 af, Depth= 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

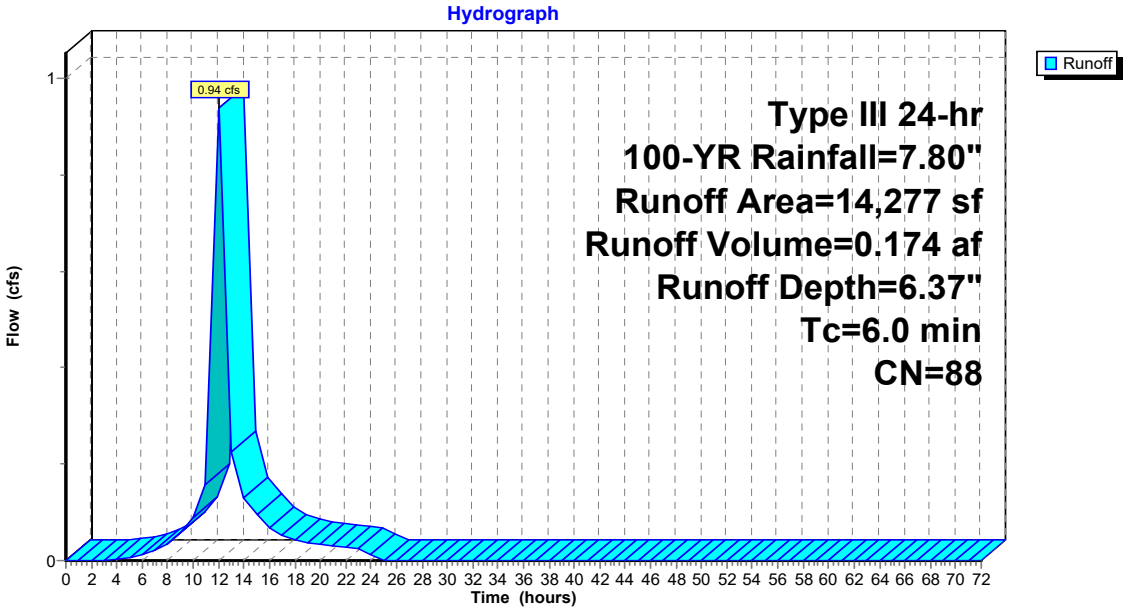
Runoff = 0.94 cfs @ 12.02 hrs, Volume= 0.174 af, Depth= 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

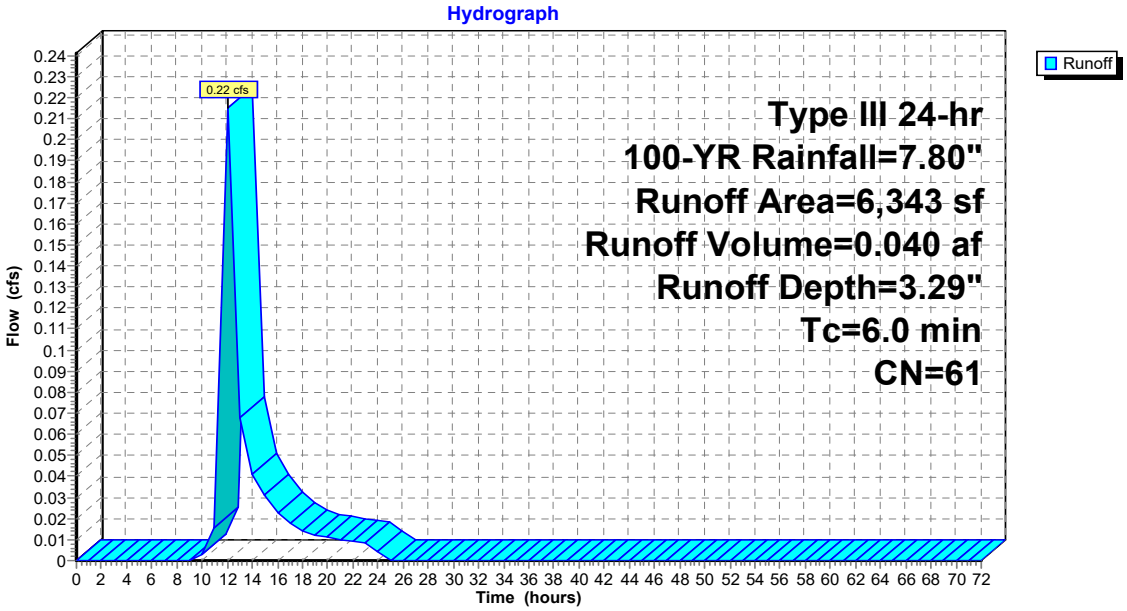
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.040 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

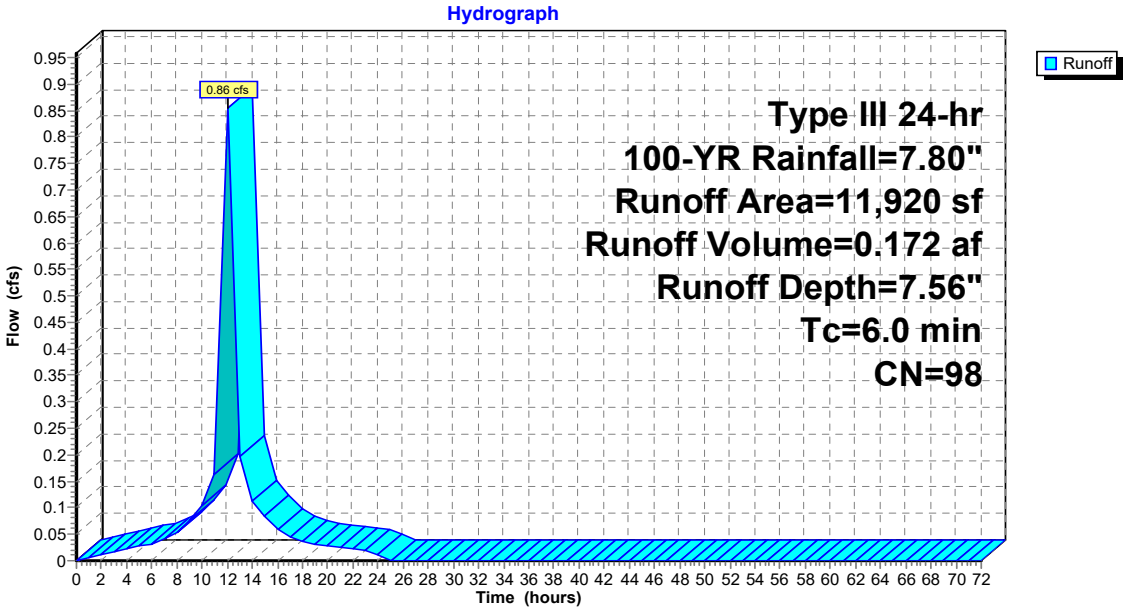
Runoff = 0.86 cfs @ 12.01 hrs, Volume= 0.172 af, Depth= 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

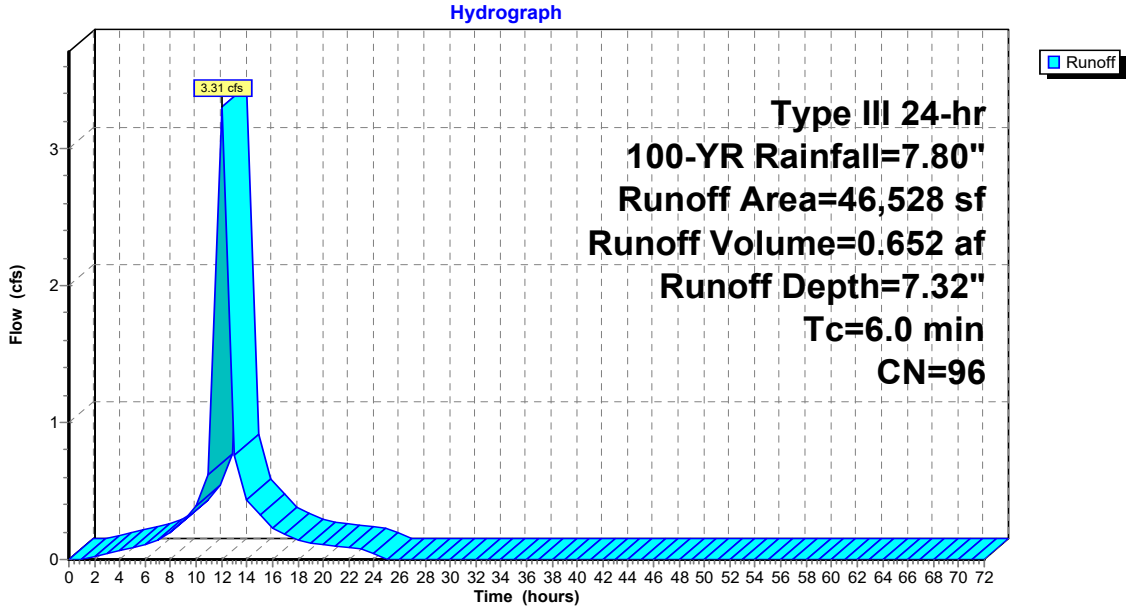
Runoff = 3.31 cfs @ 12.01 hrs, Volume= 0.652 af, Depth= 7.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

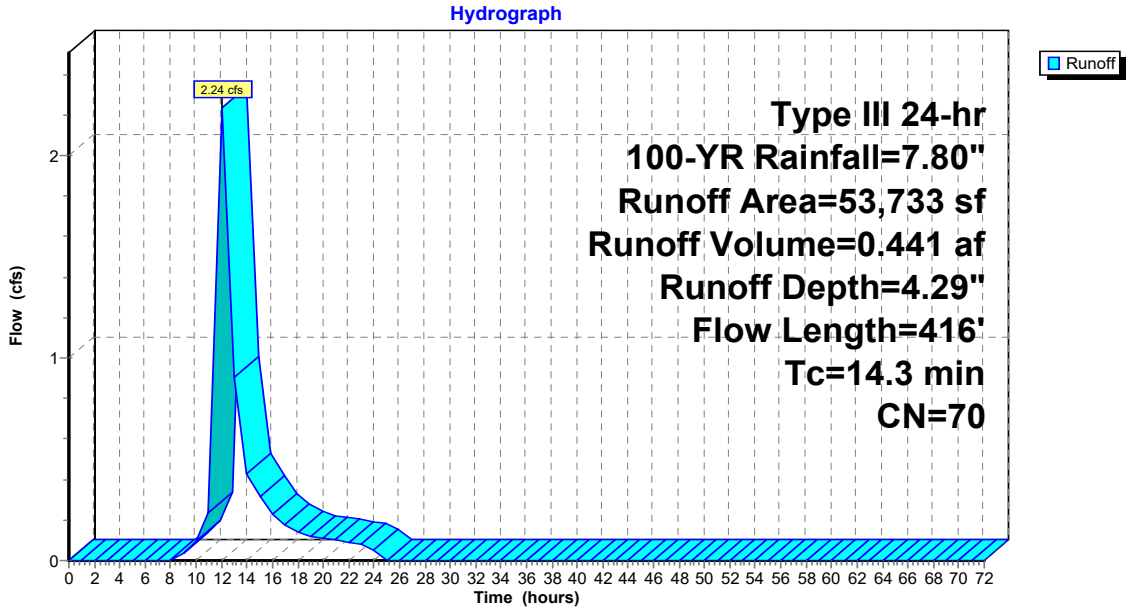
Runoff = 2.24 cfs @ 12.10 hrs, Volume= 0.441 af, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

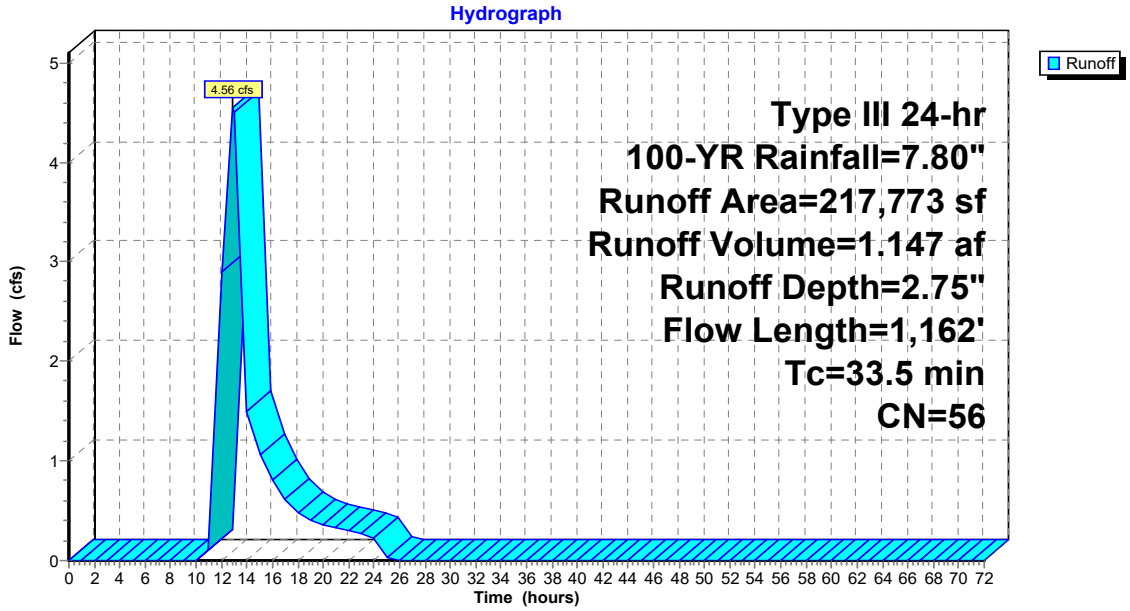
Runoff = 4.56 cfs @ 12.85 hrs, Volume= 1.147 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

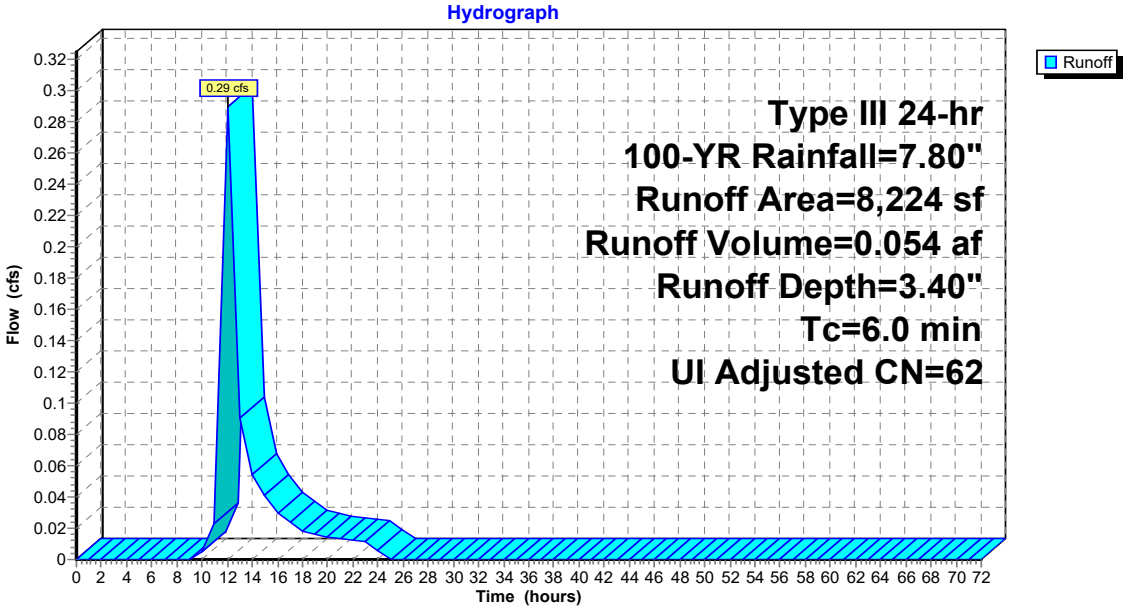
Runoff = 0.29 cfs @ 12.07 hrs, Volume= 0.054 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

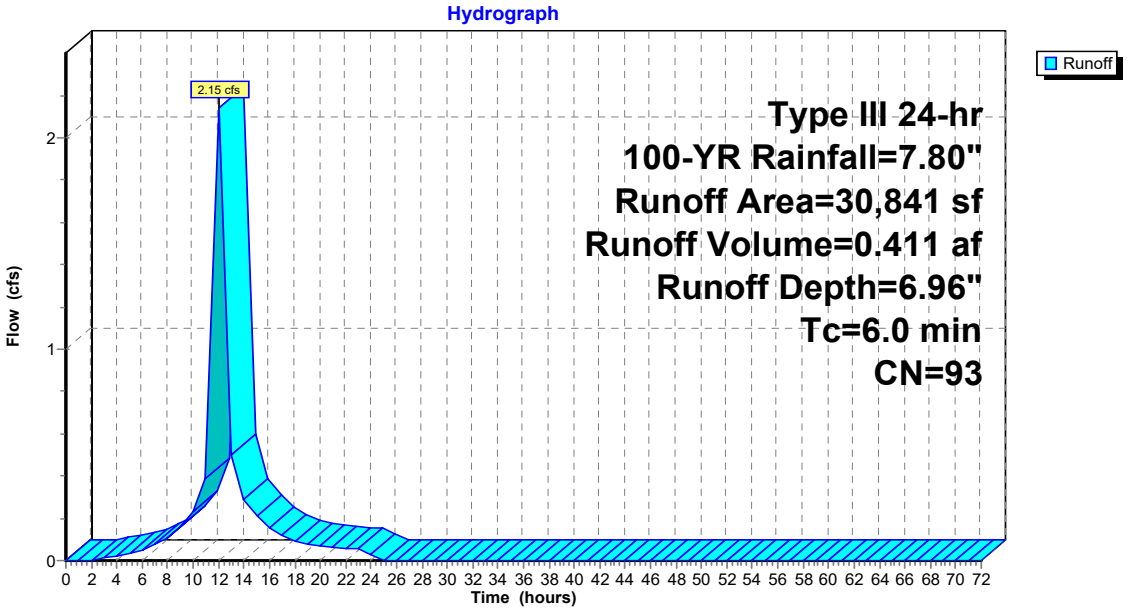
Runoff = 2.15 cfs @ 12.02 hrs, Volume= 0.411 af, Depth= 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

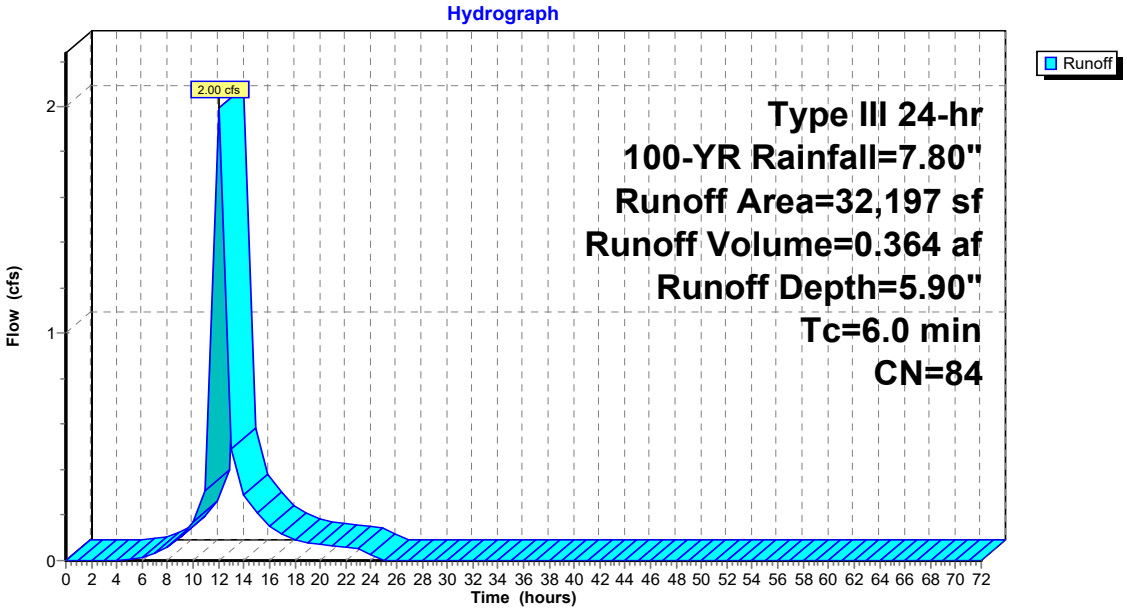
Runoff = 2.00 cfs @ 12.03 hrs, Volume= 0.364 af, Depth= 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

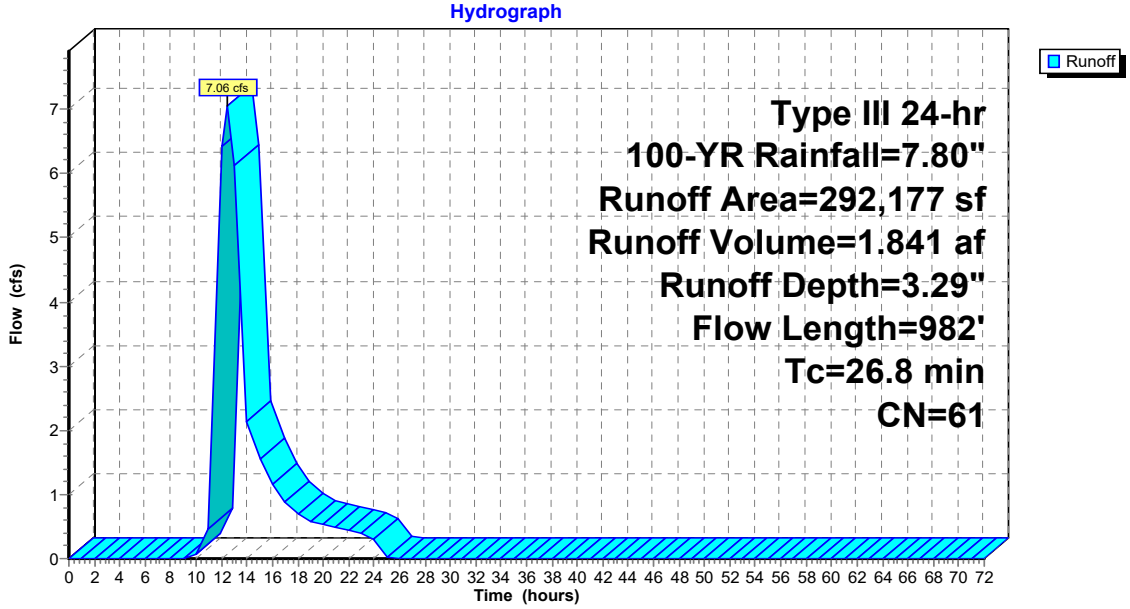
Runoff = 7.06 cfs @ 12.45 hrs, Volume= 1.841 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

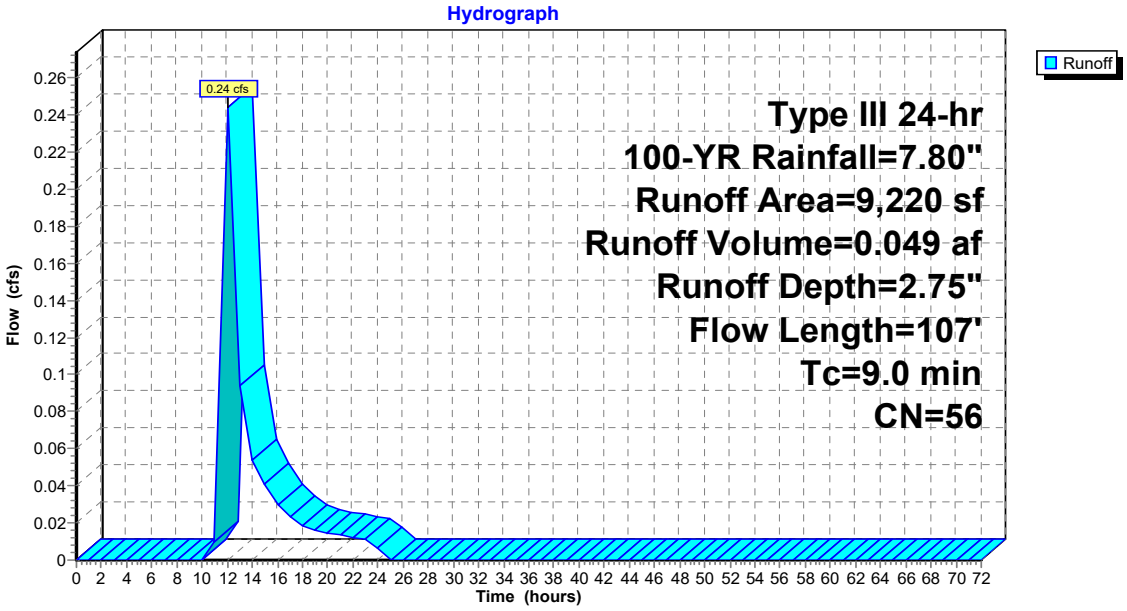
Runoff = 0.24 cfs @ 12.11 hrs, Volume= 0.049 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

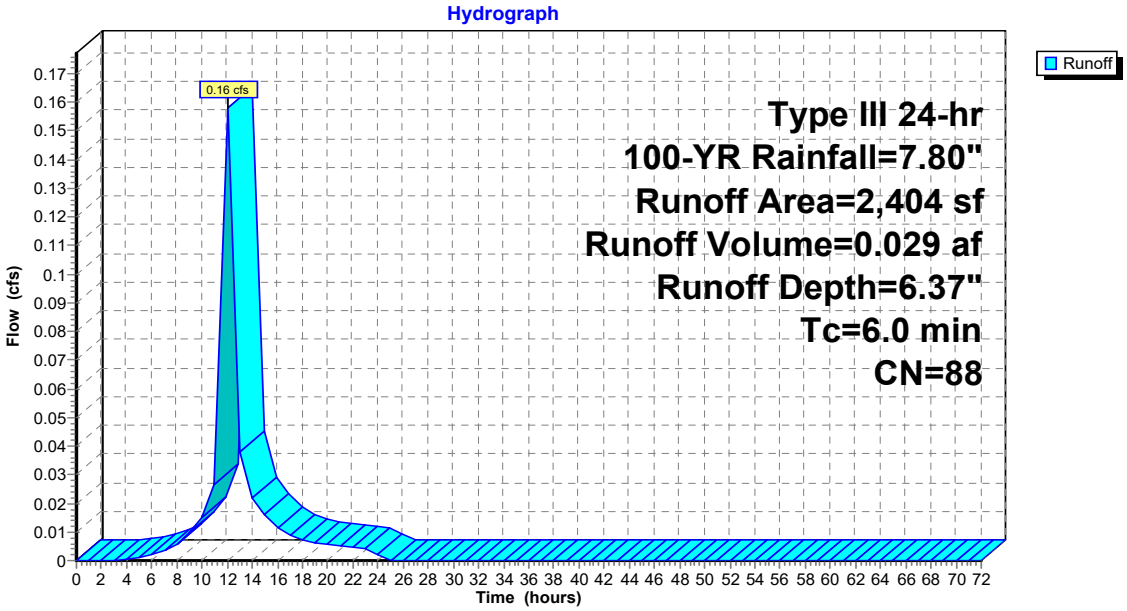
Runoff = 0.16 cfs @ 12.02 hrs, Volume= 0.029 af, Depth= 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

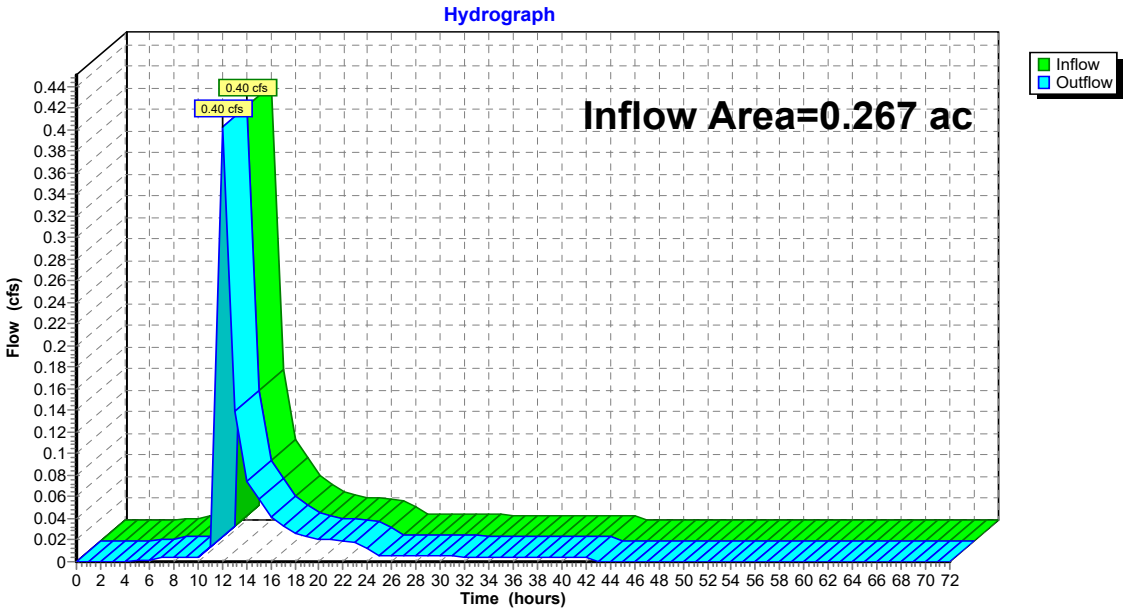


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth = 3.70" for 100-YR event
Inflow = 0.40 cfs @ 12.10 hrs, Volume= 0.082 af
Outflow = 0.40 cfs @ 12.10 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 2.97" for 100-YR event
Inflow = 13.66 cfs @ 12.82 hrs, Volume= 4.352 af
Outflow = 12.94 cfs @ 13.00 hrs, Volume= 4.367 af, Atten= 5%, Lag= 11.1 min

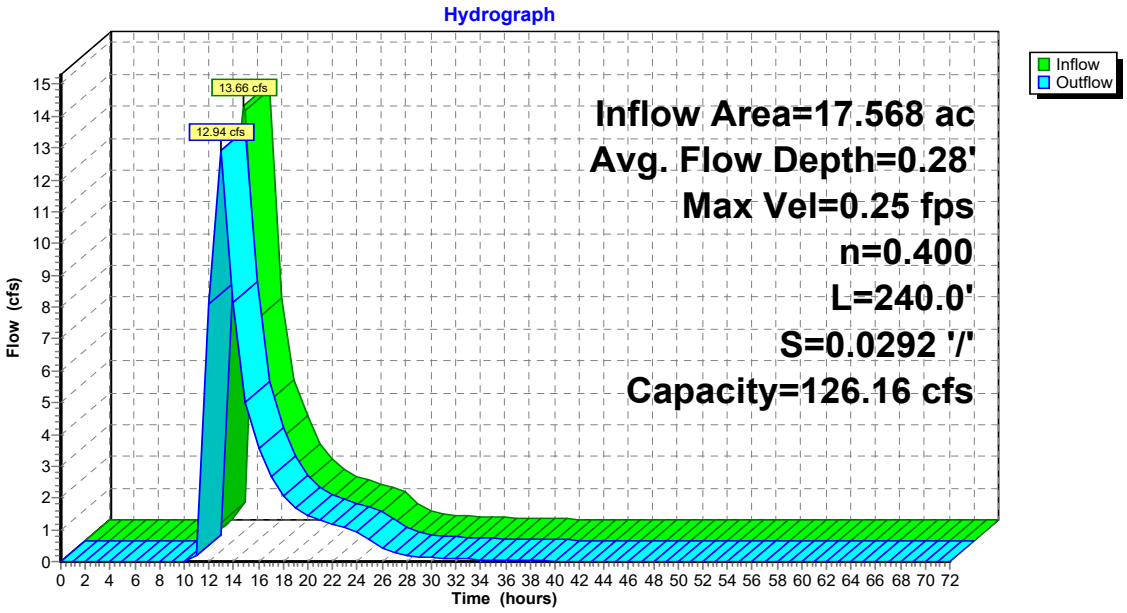
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 15.9 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 63.6 min

Peak Storage= 12,323 cf @ 13.00 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Discharge for Reach PDP-4: Design Point 4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
625.00	0.00	0.00	625.52	0.37	38.60
625.01	0.03	0.05	625.53	0.37	39.92
625.02	0.05	0.15	625.54	0.37	41.26
625.03	0.06	0.30	625.55	0.38	42.62
625.04	0.07	0.49	625.56	0.38	44.01
625.05	0.08	0.72	625.57	0.39	45.42
625.06	0.10	0.97	625.58	0.39	46.84
625.07	0.11	1.26	625.59	0.39	48.29
625.08	0.12	1.57	625.60	0.40	49.76
625.09	0.12	1.92	625.61	0.40	51.25
625.10	0.13	2.29	625.62	0.41	52.76
625.11	0.14	2.69	625.63	0.41	54.29
625.12	0.15	3.11	625.64	0.41	55.85
625.13	0.16	3.56	625.65	0.42	57.42
625.14	0.16	4.04	625.66	0.42	59.02
625.15	0.17	4.54	625.67	0.42	60.64
625.16	0.18	5.06	625.68	0.43	62.27
625.17	0.19	5.61	625.69	0.43	63.93
625.18	0.19	6.18	625.70	0.43	65.62
625.19	0.20	6.78	625.71	0.44	67.32
625.20	0.21	7.40	625.72	0.44	69.04
625.21	0.21	8.04	625.73	0.44	70.79
625.22	0.22	8.70	625.74	0.45	72.55
625.23	0.22	9.39	625.75	0.45	74.34
625.24	0.23	10.09	625.76	0.46	76.15
625.25	0.24	10.82	625.77	0.46	77.98
625.26	0.24	11.58	625.78	0.46	79.84
625.27	0.25	12.35	625.79	0.47	81.71
625.28	0.25	13.15	625.80	0.47	83.61
625.29	0.26	13.96	625.81	0.47	85.53
625.30	0.26	14.80	625.82	0.48	87.47
625.31	0.27	15.66	625.83	0.48	89.43
625.32	0.27	16.54	625.84	0.48	91.41
625.33	0.28	17.45	625.85	0.48	93.42
625.34	0.28	18.37	625.86	0.49	95.44
625.35	0.29	19.31	625.87	0.49	97.49
625.36	0.29	20.28	625.88	0.49	99.56
625.37	0.30	21.27	625.89	0.50	101.66
625.38	0.30	22.28	625.90	0.50	103.77
625.39	0.31	23.31	625.91	0.50	105.91
625.40	0.31	24.36	625.92	0.51	108.07
625.41	0.32	25.43	625.93	0.51	110.25
625.42	0.32	26.52	625.94	0.51	112.46
625.43	0.33	27.63	625.95	0.52	114.69
625.44	0.33	28.77	625.96	0.52	116.94
625.45	0.34	29.92	625.97	0.52	119.21
625.46	0.34	31.10	625.98	0.53	121.50
625.47	0.35	32.30	625.99	0.53	123.82
625.48	0.35	33.51	626.00	**0.53**	**126.16**
625.49	0.35	34.75			
625.50	0.36	36.01			
625.51	0.36	37.29			

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth = 3.03" for 100-YR event
Inflow = 13.29 cfs @ 12.64 hrs, Volume= 3.677 af
Outflow = 12.47 cfs @ 12.86 hrs, Volume= 3.691 af, Atten= 6%, Lag= 13.6 min

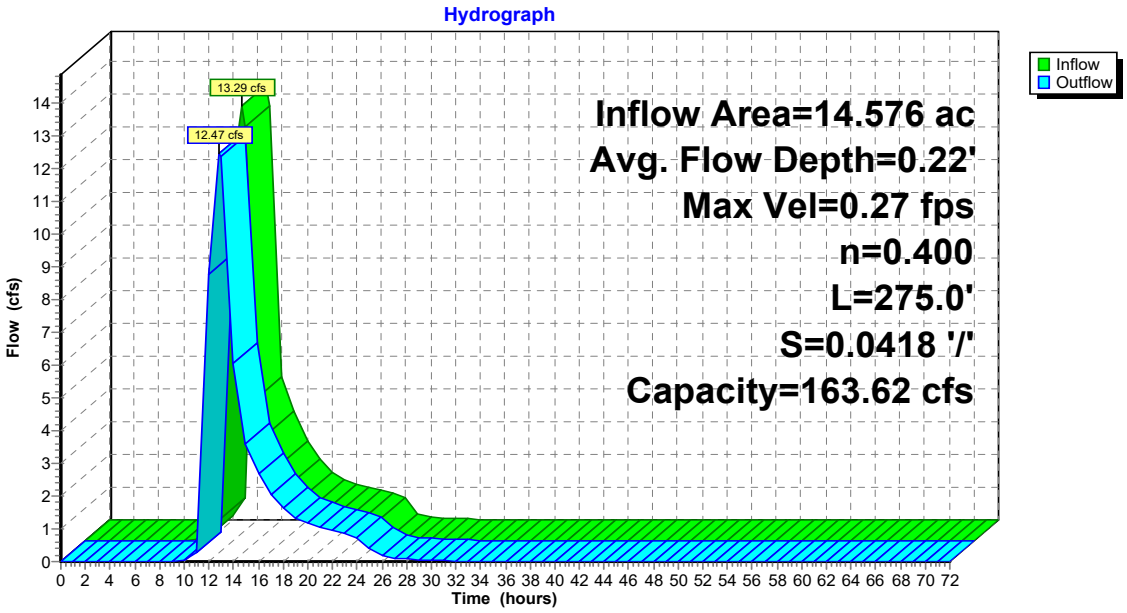
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.27 fps, Min. Travel Time= 17.0 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 64.7 min

Peak Storage= 12,686 cf @ 12.85 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Discharge for Reach PDP-5: Design Point 5

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
636.50	0.00	0.00	637.02	0.46	52.98
636.51	0.04	0.07	637.03	0.47	54.73
636.52	0.06	0.22	637.04	0.48	56.50
636.53	0.07	0.44	637.05	0.48	58.30
636.54	0.09	0.71	637.06	0.49	60.12
636.55	0.10	1.03	637.07	0.49	61.97
636.56	0.12	1.40	637.08	0.50	63.84
636.57	0.13	1.81	637.09	0.50	65.74
636.58	0.14	2.27	637.10	0.51	67.66
636.59	0.15	2.76	637.11	0.51	69.60
636.60	0.16	3.29	637.12	0.52	71.57
636.61	0.17	3.86	637.13	0.52	73.56
636.62	0.18	4.47	637.14	0.53	75.57
636.63	0.19	5.11	637.15	0.53	77.61
636.64	0.20	5.79	637.16	0.54	79.67
636.65	0.21	6.50	637.17	0.54	81.76
636.66	0.22	7.24	637.18	0.55	83.87
636.67	0.23	8.01	637.19	0.55	86.00
636.68	0.24	8.82	637.20	0.56	88.16
636.69	0.25	9.66	637.21	0.56	90.34
636.70	0.25	10.53	637.22	0.57	92.54
636.71	0.26	11.43	637.23	0.57	94.77
636.72	0.27	12.36	637.24	0.58	97.02
636.73	0.28	13.32	637.25	0.58	99.29
636.74	0.29	14.31	637.26	0.58	101.58
636.75	0.29	15.33	637.27	0.59	103.90
636.76	0.30	16.37	637.28	0.59	106.25
636.77	0.31	17.45	637.29	0.60	108.61
636.78	0.31	18.55	637.30	0.60	111.00
636.79	0.32	19.68	637.31	0.61	113.41
636.80	0.33	20.84	637.32	0.61	115.85
636.81	0.34	22.03	637.33	0.62	118.31
636.82	0.34	23.24	637.34	0.62	120.79
636.83	0.35	24.48	637.35	0.63	123.29
636.84	0.36	25.75	637.36	0.63	125.82
636.85	0.36	27.04	637.37	0.63	128.37
636.86	0.37	28.36	637.38	0.64	130.95
636.87	0.38	29.71	637.39	0.64	133.54
636.88	0.38	31.08	637.40	0.65	136.16
636.89	0.39	32.48	637.41	0.65	138.80
636.90	0.39	33.91	637.42	0.66	141.47
636.91	0.40	35.36	637.43	0.66	144.16
636.92	0.41	36.83	637.44	0.66	146.87
636.93	0.41	38.34	637.45	0.67	149.60
636.94	0.42	39.86	637.46	0.67	152.36
636.95	0.42	41.42	637.47	0.68	155.14
636.96	0.43	42.99	637.48	0.68	157.94
636.97	0.44	44.59	637.49	0.68	160.77
636.98	0.44	46.22	637.50	**0.69**	**163.62**
636.99	0.45	47.87			
637.00	0.45	49.55			
637.01	0.46	51.25			

Summary for Reach PDP-6: Design Point 6

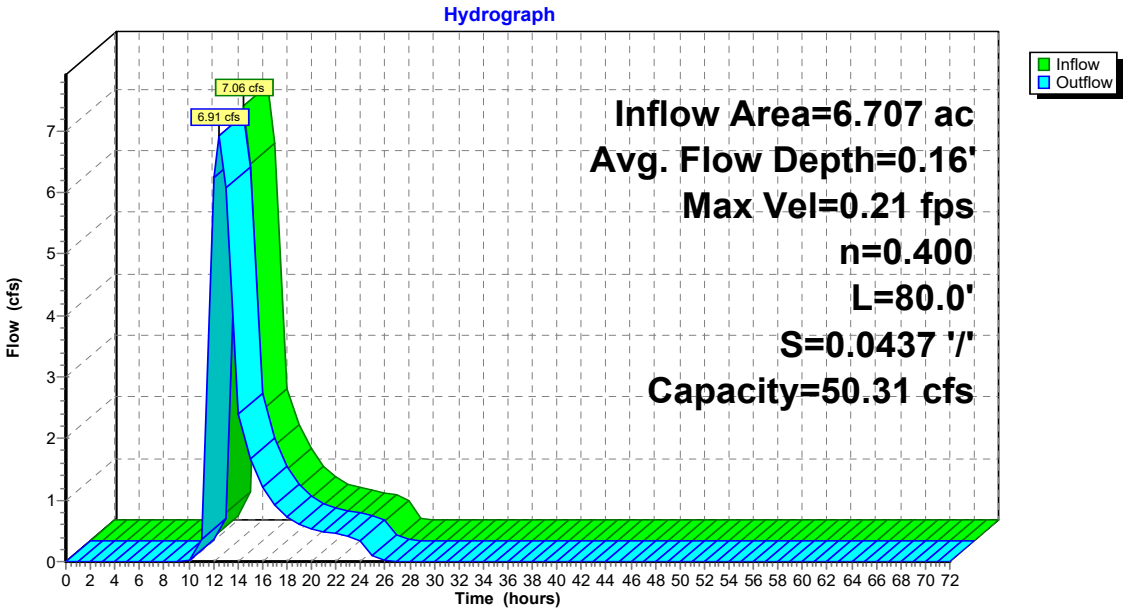
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth = 3.29" for 100-YR event
Inflow = 7.06 cfs @ 12.45 hrs, Volume= 1.841 af
Outflow = 6.91 cfs @ 12.47 hrs, Volume= 1.865 af, Atten= 2%, Lag= 1.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Max. Velocity= 0.21 fps, Min. Travel Time= 6.3 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 18.7 min

Peak Storage= 2,593 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Discharge for Reach PDP-6: Design Point 6

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
642.50	0.00	0.00
642.51	0.04	0.07
642.52	0.06	0.23
642.53	0.07	0.45
642.54	0.09	0.73
642.55	0.10	1.06
642.56	0.12	1.43
642.57	0.13	1.85
642.58	0.14	2.32
642.59	0.15	2.82
642.60	0.17	3.37
642.61	0.18	3.95
642.62	0.19	4.57
642.63	0.20	5.22
642.64	0.21	5.91
642.65	0.22	6.63
642.66	0.23	7.39
642.67	0.23	8.18
642.68	0.24	9.00
642.69	0.25	9.86
642.70	0.26	10.74
642.71	0.27	11.66
642.72	0.28	12.60
642.73	0.29	13.58
642.74	0.29	14.59
642.75	0.30	15.62
642.76	0.31	16.69
642.77	0.32	17.78
642.78	0.32	18.90
642.79	0.33	20.05
642.80	0.34	21.23
642.81	0.35	22.43
642.82	0.35	23.67
642.83	0.36	24.92
642.84	0.37	26.21
642.85	0.37	27.52
642.86	0.38	28.86
642.87	0.39	30.23
642.88	0.39	31.62
642.89	0.40	33.04
642.90	0.41	34.48
642.91	0.41	35.95
642.92	0.42	37.45
642.93	0.43	38.97
642.94	0.43	40.51
642.95	0.44	42.08
642.96	0.44	43.68
642.97	0.45	45.30
642.98	0.46	46.94
642.99	0.46	48.61
643.00	**0.47**	**50.31**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 6.53" for 100-YR event
Inflow = 1.03 cfs @ 12.09 hrs, Volume= 0.613 af
Outflow = 0.95 cfs @ 12.14 hrs, Volume= 0.609 af, Atten= 8%, Lag= 2.6 min
Discarded = 0.07 cfs @ 12.14 hrs, Volume= 0.218 af
Primary = 0.88 cfs @ 12.14 hrs, Volume= 0.392 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 622.27' @ 12.14 hrs Surf.Area= 1,428 sf Storage= 1,254 cf
Flood Elev= 623.50' Surf.Area= 2,450 sf Storage= 3,580 cf

Plug-Flow detention time= 98.1 min calculated for 0.601 af (98% of inflow)
Center-of-Mass det. time= 90.1 min (1,314.9 - 1,224.8)

Volume	Invert	Avail.Storage	Storage Description
#1	620.00'	3,306 cf	**Overall storage (Prismatic)** Listed below (Recalc) 4,263 cf Overall - 957 cf Embedded = 3,306 cf
#2	620.00'	211 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 638 cf Overall x 33.0% Voids
#3	621.00'	64 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 319 cf Overall x 20.0% Voids
		3,580 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638
622.00	1,230	934	1,572
623.00	1,951	1,591	3,163
623.50	2,450	1,100	4,263

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.00	638	0	0
621.00	638	638	638

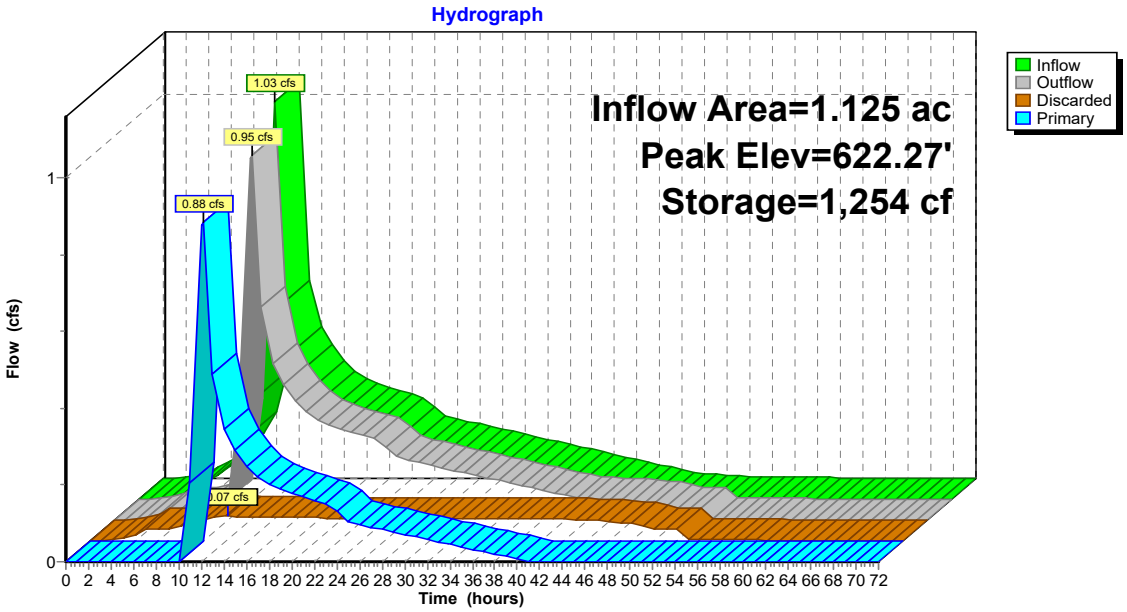
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
621.00	638	0	0
621.50	638	319	319

Device	Routing	Invert	Outlet Devices
#1	Discarded	620.00'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.14'	**8.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.14' / 620.00' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	622.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 12.14 hrs HW=622.26' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.85 cfs @ 12.14 hrs HW=622.26' (Free Discharge)
└─**2=Culvert** (Passes 0.85 cfs of 1.77 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.85 cfs @ 2.45 fps)

Pond 3: SFB-3



Stage-Discharge for Pond 3: SFB-3

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
620.00	0.00	0.00	0.00
620.05	0.03	0.03	0.00
620.10	0.03	0.03	0.00
620.15	0.03	0.03	0.00
620.20	0.03	0.03	0.00
620.25	0.03	0.03	0.00
620.30	0.03	0.03	0.00
620.35	0.03	0.03	0.00
620.40	0.03	0.03	0.00
620.45	0.03	0.03	0.00
620.50	0.03	0.03	0.00
620.55	0.03	0.03	0.00
620.60	0.03	0.03	0.00
620.65	0.03	0.03	0.00
620.70	0.03	0.03	0.00
620.75	0.03	0.03	0.00
620.80	0.03	0.03	0.00
620.85	0.03	0.03	0.00
620.90	0.03	0.03	0.00
620.95	0.03	0.03	0.00
621.00	0.03	0.03	0.00
621.05	0.03	0.03	0.00
621.10	0.03	0.03	0.00
621.15	0.03	0.03	0.00
621.20	0.04	0.04	0.00
621.25	0.04	0.04	0.00
621.30	0.04	0.04	0.00
621.35	0.04	0.04	0.00
621.40	0.04	0.04	0.00
621.45	0.04	0.04	0.00
621.50	0.04	0.04	0.00
621.55	0.04	0.04	0.00
621.60	0.05	0.05	0.00
621.65	0.05	0.05	0.00
621.70	0.05	0.05	0.00
621.75	0.05	0.05	0.00
621.80	0.05	0.05	0.00
621.85	0.05	0.05	0.00
621.90	0.05	0.05	0.00
621.95	0.06	0.06	0.00
622.00	0.06	0.06	0.00
622.05	0.14	0.06	0.08
622.10	0.28	0.06	0.22
622.15	0.46	0.06	0.40
622.20	0.68	0.06	0.61
622.25	0.91	0.07	0.84
622.30	0.99	0.07	0.92
622.35	1.06	0.07	0.99
622.40	1.13	0.07	1.06
622.45	1.20	0.07	1.13
622.50	1.26	0.07	1.19
622.55	1.32	0.08	1.25
622.60	1.38	0.08	1.30
622.65	1.43	0.08	1.36
622.70	1.49	0.08	1.41
622.75	1.54	0.08	1.46
622.80	1.59	0.08	1.50
622.85	1.64	0.09	1.55
622.90	1.68	0.09	1.59
622.95	1.73	0.09	1.64
623.00	1.77	0.09	1.68
623.05	1.82	0.09	1.72
623.10	1.86	0.10	1.76
623.15	1.90	0.10	1.80
623.20	1.94	0.10	1.84
623.25	1.98	0.10	1.88
623.30	2.02	0.10	1.92
623.35	2.06	0.11	1.95
623.40	2.10	0.11	1.99
623.45	2.14	0.11	2.02
623.50	**2.17**	**0.11**	**2.06**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth = 6.97" for 100-YR event				
Inflow =	1.87 cfs @	12.68 hrs,	Volume=	0.864 af	
Outflow =	2.13 cfs @	13.06 hrs,	Volume=	0.890 af,	Atten= 0%, Lag= 22.6 min
Discarded =	0.54 cfs @	13.43 hrs,	Volume=	0.631 af	
Primary =	0.49 cfs @	13.45 hrs,	Volume=	0.164 af	
Secondary =	1.13 cfs @	13.00 hrs,	Volume=	0.094 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 633.40' @ 13.43 hrs Surf.Area= 3,531 sf Storage= 6,097 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,373 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 58.4 min (949.9 - 891.5)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	542 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,643 cf Overall x 33.0% Voids
#3	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,373 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.25' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

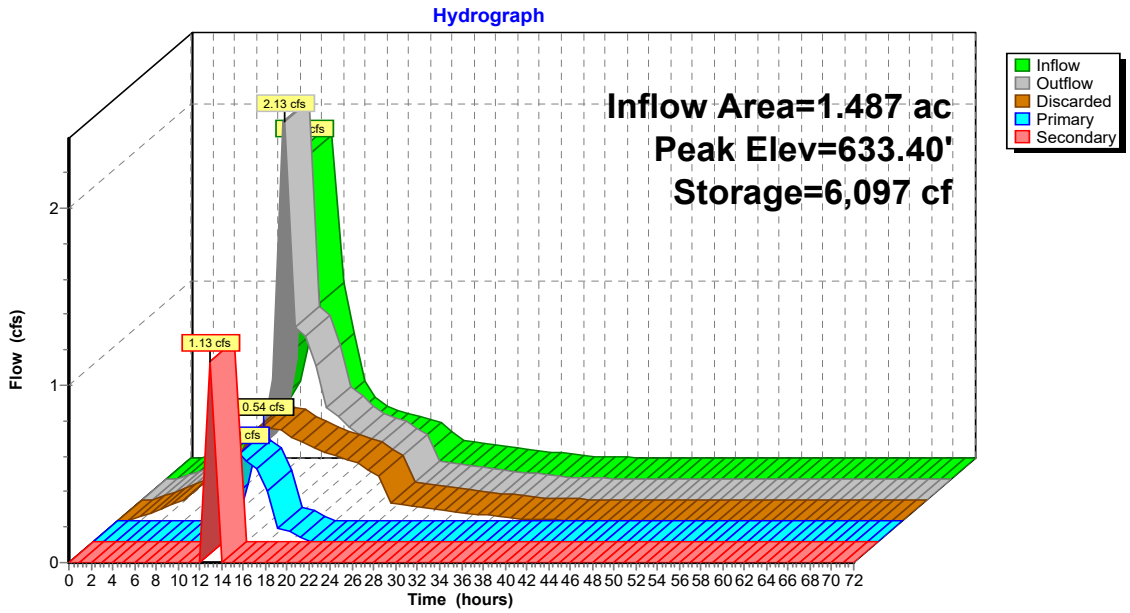
#5 Secondary 633.30' **50.0' long x 1.0' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.53 cfs @ 13.43 hrs HW=633.32' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.46 cfs @ 13.45 hrs HW=633.32' (Free Discharge)
└─**2=Culvert** (Passes 0.46 cfs of 2.29 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.35 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.34 cfs @ 3.94 fps)

Secondary OutFlow Max=1.03 cfs @ 13.00 hrs HW=633.34' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 1.03 cfs @ 0.53 fps)

Pond 4: SFB-4



Stage-Discharge for Pond 4: SFB-4

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
630.00	0.00	0.00	0.00	0.00
630.10	0.25	0.25	0.00	0.00
630.20	0.25	0.25	0.00	0.00
630.30	0.25	0.25	0.00	0.00
630.40	0.25	0.25	0.00	0.00
630.50	0.25	0.25	0.00	0.00
630.60	0.25	0.25	0.00	0.00
630.70	0.25	0.25	0.00	0.00
630.80	0.25	0.25	0.00	0.00
630.90	0.25	0.25	0.00	0.00
631.00	0.25	0.25	0.00	0.00
631.10	0.26	0.26	0.00	0.00
631.20	0.27	0.27	0.00	0.00
631.30	0.29	0.29	0.00	0.00
631.40	0.30	0.30	0.00	0.00
631.50	0.31	0.31	0.00	0.00
631.60	0.32	0.32	0.00	0.00
631.70	0.33	0.33	0.00	0.00
631.80	0.35	0.35	0.00	0.00
631.90	0.36	0.36	0.00	0.00
632.00	0.37	0.37	0.00	0.00
632.10	0.40	0.38	0.01	0.00
632.20	0.43	0.39	0.04	0.00
632.30	0.46	0.41	0.05	0.00
632.40	0.48	0.42	0.06	0.00
632.50	0.50	0.43	0.07	0.00
632.60	0.52	0.44	0.08	0.00
632.70	0.57	0.45	0.12	0.00
632.80	0.72	0.47	0.25	0.00
632.90	0.78	0.48	0.31	0.00
633.00	0.84	0.49	0.35	0.00
633.10	0.89	0.50	0.39	0.00
633.20	0.94	0.51	0.42	0.00
633.30	0.98	0.52	0.45	0.00
633.40	5.27	0.54	0.48	4.25
633.50	13.09	0.55	0.51	12.03
633.60	23.32	0.56	0.54	22.22
633.70	35.54	0.57	0.56	34.41
633.80	49.52	0.58	0.59	48.35
633.90	65.11	0.60	0.61	63.90
634.00	**83.23**	**0.61**	**0.63**	**81.99**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth = 6.09" for 100-YR event				
Inflow =	0.77 cfs @	12.17 hrs,	Volume=	0.830 af	
Outflow =	0.51 cfs @	15.15 hrs,	Volume=	0.826 af,	Atten= 33%, Lag= 178.9 min
Discarded =	0.23 cfs @	15.00 hrs,	Volume=	0.696 af	
Primary =	0.07 cfs @	15.00 hrs,	Volume=	0.085 af	
Secondary =	0.22 cfs @	15.15 hrs,	Volume=	0.045 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 635.00' @ 15.00 hrs Surf.Area= 3,488 sf Storage= 4,839 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,589 cf

Plug-Flow detention time= 214.6 min calculated for 0.826 af (100% of inflow)
Center-of-Mass det. time= 207.7 min (1,589.8 - 1,382.1)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	497 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 1,505 cf Overall x 33.0% Voids
#3	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,589 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.00	1,505	1,505	1,505

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**6.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir**

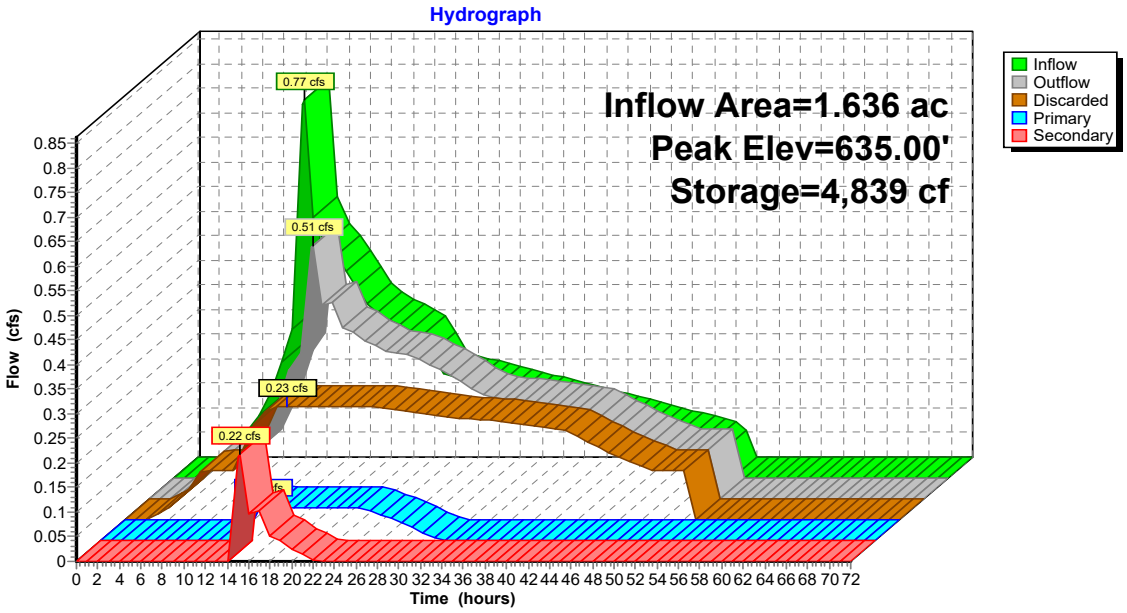
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.23 cfs @ 15.00 hrs HW=635.00' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.07 cfs @ 15.00 hrs HW=635.00' (Free Discharge)
└─**2=Culvert** (Passes 0.07 cfs of 0.73 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.13 fps)

Secondary OutFlow Max=0.07 cfs @ 15.15 hrs HW=635.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.18 fps)

Pond 5: SFB-5



Stage-Discharge for Pond 5: SFB-5

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
632.00	0.00	0.00	0.00	0.00
632.10	0.10	0.10	0.00	0.00
632.20	0.10	0.10	0.00	0.00
632.30	0.10	0.10	0.00	0.00
632.40	0.10	0.10	0.00	0.00
632.50	0.10	0.10	0.00	0.00
632.60	0.10	0.10	0.00	0.00
632.70	0.10	0.10	0.00	0.00
632.80	0.10	0.10	0.00	0.00
632.90	0.10	0.10	0.00	0.00
633.00	0.10	0.10	0.00	0.00
633.10	0.10	0.10	0.00	0.00
633.20	0.10	0.10	0.00	0.00
633.30	0.10	0.10	0.00	0.00
633.40	0.10	0.10	0.00	0.00
633.50	0.10	0.10	0.00	0.00
633.60	0.12	0.12	0.00	0.00
633.70	0.13	0.13	0.00	0.00
633.80	0.15	0.15	0.00	0.00
633.90	0.16	0.16	0.00	0.00
634.00	0.18	0.18	0.00	0.00
634.10	0.19	0.19	0.00	0.00
634.20	0.19	0.19	0.00	0.00
634.30	0.19	0.19	0.00	0.00
634.40	0.20	0.20	0.00	0.00
634.50	0.20	0.20	0.00	0.00
634.60	0.22	0.21	0.01	0.00
634.70	0.25	0.21	0.04	0.00
634.80	0.27	0.22	0.05	0.00
634.90	0.28	0.22	0.06	0.00
635.00	0.30	0.23	0.07	0.00
635.10	7.11	0.23	0.08	6.81
635.20	19.57	0.24	0.08	19.25
635.30	35.89	0.24	0.09	35.56
635.40	55.39	0.24	0.09	55.05
635.50	77.71	0.25	0.10	77.36
635.60	102.60	0.25	0.11	102.25
635.70	131.55	0.26	0.11	131.19
635.80	163.52	0.26	0.12	163.14
635.90	199.49	0.26	0.12	199.11
636.00	**238.79**	**0.27**	**0.13**	**238.40**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth = 8.30" for 100-YR event
Inflow = 2.28 cfs @ 12.01 hrs, Volume= 0.410 af
Outflow = 0.20 cfs @ 14.65 hrs, Volume= 0.410 af, Atten= 91%, Lag= 158.2 min
Primary = 0.20 cfs @ 14.65 hrs, Volume= 0.410 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 629.84' @ 14.65 hrs Surf.Area= 0.081 ac Storage= 0.266 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 696.7 min calculated for 0.410 af (100% of inflow)
Center-of-Mass det. time= 692.1 min (1,430.8 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**8.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 622.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.20 cfs @ 14.65 hrs HW=629.83' (Free Discharge)
└─**1=Culvert** (Passes 0.20 cfs of 2.24 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.33 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

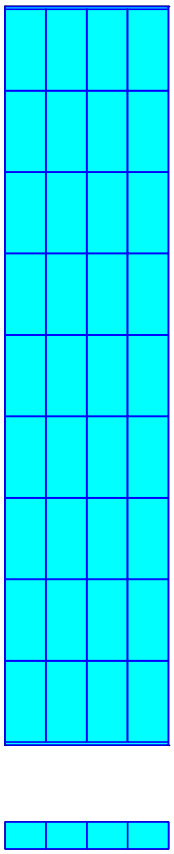
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

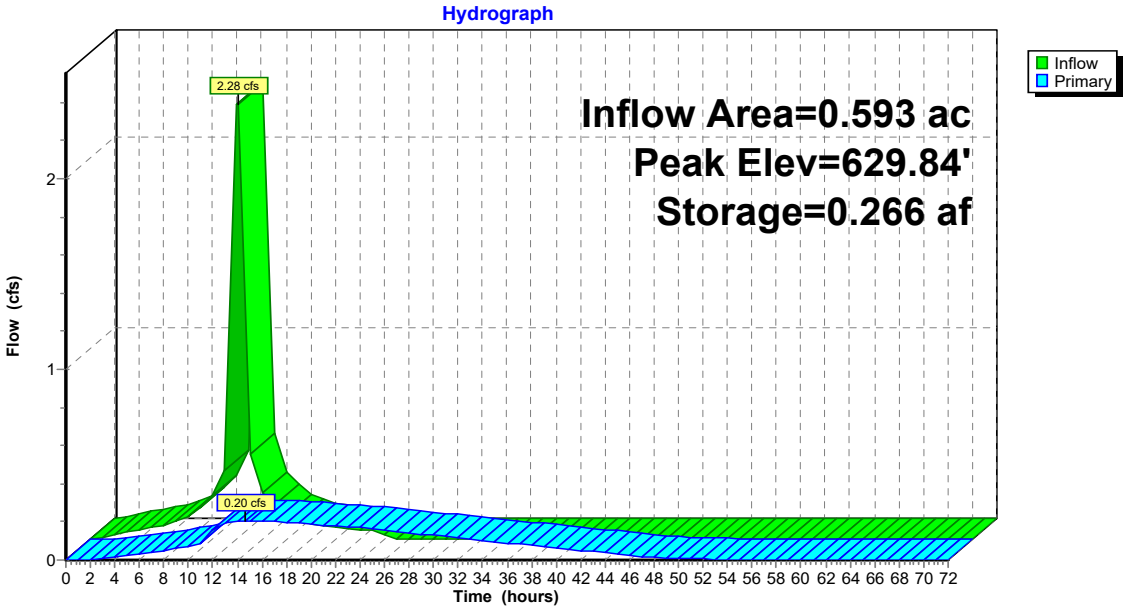
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow
Primary
2.28 cfs
0.20 cfs
Inflow Area=0.593 ac
Peak Elev=629.84'
Storage=0.266 af
Flow (cfs)
0
1
2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-3: DB-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
626.00	0.00	628.60	0.17
626.05	0.00	628.65	0.17
626.10	0.01	628.70	0.17
626.15	0.03	628.75	0.17
626.20	0.04	628.80	0.17
626.25	0.04	628.85	0.17
626.30	0.05	628.90	0.18
626.35	0.05	628.95	0.18
626.40	0.06	629.00	0.18
626.45	0.06	629.05	0.18
626.50	0.07	629.10	0.18
626.55	0.07	629.15	0.18
626.60	0.08	629.20	0.19
626.65	0.08	629.25	0.19
626.70	0.08	629.30	0.19
626.75	0.09	629.35	0.19
626.80	0.09	629.40	0.19
626.85	0.09	629.45	0.19
626.90	0.09	629.50	0.19
626.95	0.10	629.55	0.20
627.00	0.10	629.60	0.20
627.05	0.10	629.65	0.20
627.10	0.11	629.70	0.20
627.15	0.11	629.75	0.20
627.20	0.11	629.80	0.20
627.25	0.11	629.85	0.20
627.30	0.12	629.90	0.21
627.35	0.12	629.95	0.21
627.40	0.12	630.00	0.21
627.45	0.12	630.05	0.21
627.50	0.13	630.10	0.21
627.55	0.13	630.15	0.21
627.60	0.13	630.20	0.21
627.65	0.13	630.25	0.21
627.70	0.13	630.30	0.22
627.75	0.14	630.35	0.22
627.80	0.14	630.40	0.22
627.85	0.14	630.45	0.22
627.90	0.14	630.50	0.22
627.95	0.14	630.55	0.22
628.00	0.15	630.60	0.22
628.05	0.15	630.65	**0.22**
628.10	0.15		
628.15	0.15		
628.20	0.15		
628.25	0.15		
628.30	0.16		
628.35	0.16		
628.40	0.16		
628.45	0.16		
628.50	0.16		
628.55	0.16		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth = 15.53" for 100-YR event
Inflow = 3.06 cfs @ 12.00 hrs, Volume= 0.354 af
Outflow = 0.99 cfs @ 13.09 hrs, Volume= 0.354 af, Atten= 68%, Lag= 65.2 min
Primary = 0.99 cfs @ 13.09 hrs, Volume= 0.354 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs
Peak Elev= 637.63' @ 13.12 hrs Surf.Area= 0.072 ac Storage= 0.223 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 344.1 min calculated for 0.354 af (100% of inflow)
Center-of-Mass det. time= 336.6 min (1,066.5 - 729.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.95 cfs @ 13.09 hrs HW=637.54' (Free Discharge)
└─**1=Culvert** (Passes 0.95 cfs of 1.15 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 8.96 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.49 cfs @ 5.65 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.26 cfs @ 2.96 fps)

Pond DB-4: DB-4 - Chamber Wizard Field A

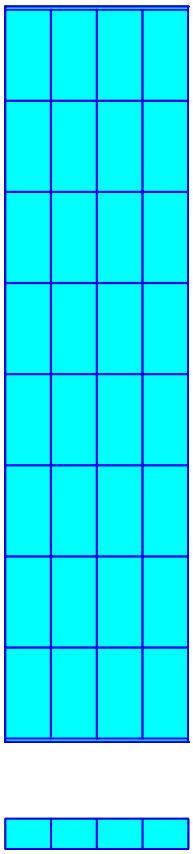
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

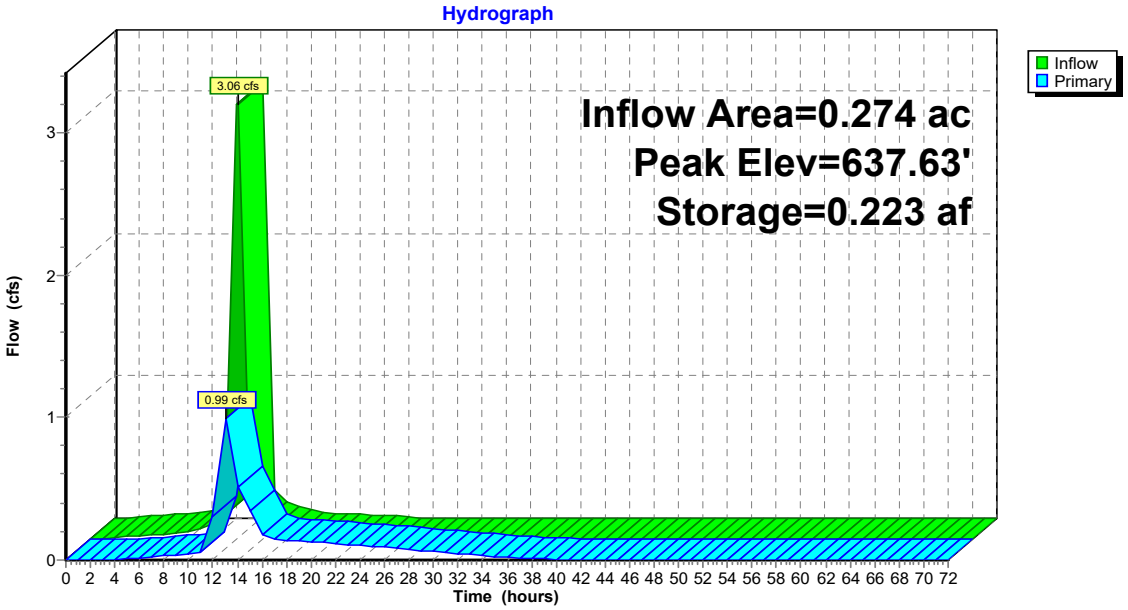
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow
Primary
3.06 cfs
0.99 cfs
Inflow Area=0.274 ac
Peak Elev=637.63'
Storage=0.223 af
Flow (cfs)
0
1
2
3
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Stage-Discharge for Pond DB-4: DB-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
634.00	0.00	636.60	0.44
634.05	0.00	636.65	0.46
634.10	0.01	636.70	0.48
634.15	0.03	636.75	0.49
634.20	0.04	636.80	0.51
634.25	0.04	636.85	0.52
634.30	0.05	636.90	0.54
634.35	0.05	636.95	0.55
634.40	0.06	637.00	0.56
634.45	0.06	637.05	0.58
634.50	0.07	637.10	0.61
634.55	0.07	637.15	0.65
634.60	0.08	637.20	0.70
634.65	0.08	637.25	0.74
634.70	0.08	637.30	0.79
634.75	0.09	637.35	0.83
634.80	0.09	637.40	0.86
634.85	0.09	637.45	0.89
634.90	0.09	637.50	0.92
634.95	0.10	637.55	0.95
635.00	0.10	637.60	0.98
635.05	0.10	637.65	1.00
635.10	0.11	637.70	1.03
635.15	0.11	637.75	1.05
635.20	0.11	637.80	1.07
635.25	0.11	637.85	1.10
635.30	0.12	637.90	1.12
635.35	0.12	637.95	1.14
635.40	0.12	638.00	1.16
635.45	0.12	638.05	1.18
635.50	0.13	638.10	1.20
635.55	0.13	638.15	1.22
635.60	0.13	638.20	1.24
635.65	0.13	638.25	1.25
635.70	0.13	638.30	1.26
635.75	0.14	638.35	1.26
635.80	0.14	638.40	1.27
635.85	0.14	638.45	1.27
635.90	0.14	638.50	1.28
635.95	0.14	638.55	1.29
636.00	0.15	638.60	1.29
636.05	0.15	638.65	**1.30**
636.10	0.17		
636.15	0.20		
636.20	0.24		
636.25	0.27		
636.30	0.31		
636.35	0.34		
636.40	0.36		
636.45	0.39		
636.50	0.41		
636.55	0.43		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth = 10.21" for 100-YR event
Inflow = 3.85 cfs @ 12.02 hrs, Volume= 0.602 af
Outflow = 0.25 cfs @ 15.21 hrs, Volume= 0.604 af, Atten= 94%, Lag= 191.0 min
Primary = 0.25 cfs @ 15.21 hrs, Volume= 0.604 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 2
Peak Elev= 643.17' @ 15.21 hrs Surf.Area= 0.090 ac Storage= 0.422 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= 811.4 min calculated for 0.596 af (99% of inflow)
Center-of-Mass det. time= 824.6 min (1,579.4 - 754.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.25 cfs @ 15.21 hrs HW=643.16' (Free Discharge)
└─**1=Culvert** (Passes 0.25 cfs of 1.49 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.37 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

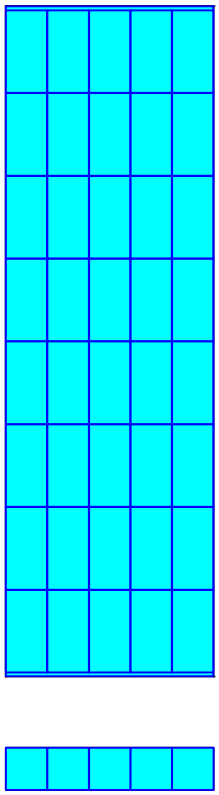
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

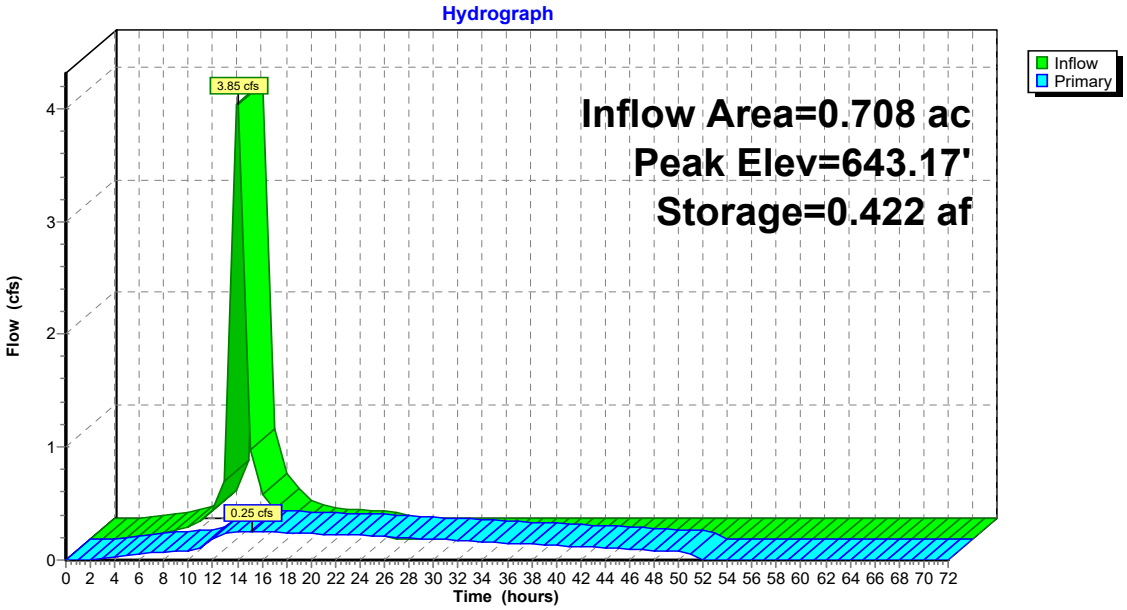
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow
Primary
3.85 cfs
0.25 cfs
Inflow Area=0.708 ac
Peak Elev=643.17'
Storage=0.422 af
Flow (cfs)
Time (hours)

Stage-Discharge for Pond DB-5: DB-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
637.50	0.00	639.58	0.15	641.66	0.21	643.74	0.26
637.54	0.00	639.62	0.15	641.70	0.21	643.78	0.26
637.58	0.01	639.66	0.15	641.74	0.21	643.82	0.26
637.62	0.02	639.70	0.15	641.78	0.22	643.86	0.26
637.66	0.03	639.74	0.15	641.82	0.22	643.90	0.26
637.70	0.04	639.78	0.16	641.86	0.22	643.94	0.26
637.74	0.04	639.82	0.16	641.90	0.22	643.98	0.27
637.78	0.05	639.86	0.16	641.94	0.22	644.02	0.27
637.82	0.05	639.90	0.16	641.98	0.22	644.06	0.27
637.86	0.06	639.94	0.16	642.02	0.22	644.10	0.27
637.90	0.06	639.98	0.16	642.06	0.22	644.14	0.27
637.94	0.06	640.02	0.16	642.10	0.22	644.18	0.27
637.98	0.07	640.06	0.17	642.14	0.22	644.22	0.27
638.02	0.07	640.10	0.17	642.18	0.23	644.26	0.27
638.06	0.07	640.14	0.17	642.22	0.23	644.30	0.27
638.10	0.08	640.18	0.17	642.26	0.23	644.34	0.27
638.14	0.08	640.22	0.17	642.30	0.23	644.38	0.27
638.18	0.08	640.26	0.17	642.34	0.23	644.42	0.27
638.22	0.08	640.30	0.17	642.38	0.23	644.46	0.28
638.26	0.09	640.34	0.17	642.42	0.23	644.50	0.28
638.30	0.09	640.38	0.18	642.46	0.23	644.54	0.28
638.34	0.09	640.42	0.18	642.50	0.23	644.58	0.28
638.38	0.09	640.46	0.18	642.54	0.23	644.62	0.28
638.42	0.10	640.50	0.18	642.58	0.23	644.66	**0.28**
638.46	0.10	640.54	0.18	642.62	0.24		
638.50	0.10	640.58	0.18	642.66	0.24		
638.54	0.10	640.62	0.18	642.70	0.24		
638.58	0.10	640.66	0.18	642.74	0.24		
638.62	0.11	640.70	0.19	642.78	0.24		
638.66	0.11	640.74	0.19	642.82	0.24		
638.70	0.11	640.78	0.19	642.86	0.24		
638.74	0.11	640.82	0.19	642.90	0.24		
638.78	0.11	640.86	0.19	642.94	0.24		
638.82	0.12	640.90	0.19	642.98	0.24		
638.86	0.12	640.94	0.19	643.02	0.24		
638.90	0.12	640.98	0.19	643.06	0.25		
638.94	0.12	641.02	0.19	643.10	0.25		
638.98	0.12	641.06	0.20	643.14	0.25		
639.02	0.13	641.10	0.20	643.18	0.25		
639.06	0.13	641.14	0.20	643.22	0.25		
639.10	0.13	641.18	0.20	643.26	0.25		
639.14	0.13	641.22	0.20	643.30	0.25		
639.18	0.13	641.26	0.20	643.34	0.25		
639.22	0.13	641.30	0.20	643.38	0.25		
639.26	0.14	641.34	0.20	643.42	0.25		
639.30	0.14	641.38	0.20	643.46	0.25		
639.34	0.14	641.42	0.21	643.50	0.26		
639.38	0.14	641.46	0.21	643.54	0.26		
639.42	0.14	641.50	0.21	643.58	0.26		
639.46	0.14	641.54	0.21	643.62	0.26		
639.50	0.15	641.58	0.21	643.66	0.26		
639.54	0.15	641.62	0.21	643.70	0.26		

Summary for Pond ICS-3: ICS-3

Inflow Area = 0.328 ac, 72.22% Impervious, Inflow Depth = 6.37" for 100-YR event
Inflow = 0.94 cfs @ 12.02 hrs, Volume= 0.174 af
Outflow = 0.94 cfs @ 12.02 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.04 hrs, Volume= 0.137 af
Secondary = 0.42 cfs @ 12.01 hrs, Volume= 0.037 af

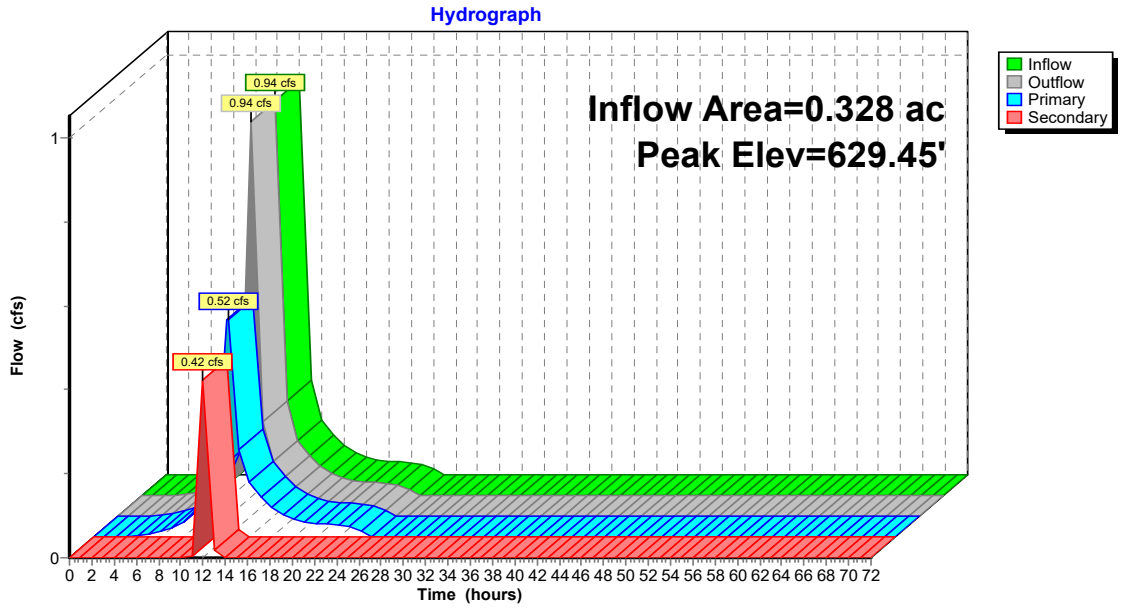
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 629.45' @ 12.03 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**5.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 622.00' S= 0.0285 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.14 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.51 cfs @ 12.04 hrs HW=629.44' TW=623.44' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.51 cfs @ 3.72 fps)

Secondary OutFlow Max=0.42 cfs @ 12.01 hrs HW=629.45' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.42 cfs @ 2.09 fps)

Pond ICS-3: ICS-3



Stage-Discharge for Pond ICS-3: ICS-3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
628.85	0.00	0.00	0.00
628.90	0.01	0.01	0.00
628.95	0.03	0.03	0.00
629.00	0.07	0.07	0.00
629.05	0.12	0.12	0.00
629.10	0.19	0.18	0.01
629.15	0.28	0.24	0.03
629.20	0.38	0.31	0.07
629.25	0.48	0.36	0.12
629.30	0.58	0.40	0.18
629.35	0.69	0.44	0.25
629.40	0.81	0.48	0.33
629.45	0.93	0.51	0.41
629.50	1.06	0.55	0.51
629.55	1.19	0.58	0.62
629.60	1.33	0.60	0.73
629.65	1.48	0.63	0.85
629.70	1.63	0.66	0.97
629.75	1.78	**0.68**	1.10
629.80	1.92	0.68	1.24
629.85	2.06	0.68	1.38
629.90	2.20	0.68	1.52
629.95	2.34	0.68	1.66
630.00	2.48	0.68	1.80
630.05	2.62	0.68	1.94
630.10	2.76	0.68	2.08
630.15	2.90	0.68	2.22
630.20	3.03	0.68	2.35
630.25	3.15	0.68	2.47
630.30	3.26	0.68	2.58
630.35	3.35	0.68	2.67
630.40	3.43	0.68	2.75
630.45	3.51	0.68	2.83
630.50	3.59	0.68	2.91
630.55	3.67	0.68	2.99
630.60	3.74	0.68	3.06
630.65	3.81	0.68	3.13
630.70	3.88	0.68	3.20
630.75	3.95	0.68	3.27
630.80	4.02	0.68	3.34
630.85	4.08	0.68	3.40
630.90	4.15	0.68	3.47
630.95	4.21	0.68	3.53
631.00	4.28	0.68	3.60
631.05	4.34	0.68	3.66
631.10	4.40	0.68	3.72
631.15	4.46	0.68	3.78
631.20	4.52	0.68	3.83
631.25	4.57	0.68	3.89
631.30	4.63	0.68	3.95
631.35	4.69	0.68	4.01
631.40	4.74	0.68	4.06
631.45	4.80	0.68	4.12
631.50	4.85	0.68	4.17
631.55	4.90	0.68	4.22
631.60	4.95	0.68	4.27
631.65	5.01	0.68	4.33
631.70	5.06	0.68	4.38
631.75	5.11	0.68	4.43
631.80	5.16	0.68	4.48
631.85	5.21	0.68	4.53
631.90	5.26	0.68	4.58
631.95	5.31	0.68	4.63
632.00	5.35	0.68	4.67
632.05	5.40	0.68	4.72
632.10	5.45	0.68	4.77
632.15	5.49	0.68	4.81
632.20	5.54	0.68	4.86
632.25	5.59	0.68	4.91
632.30	5.63	0.68	4.95
632.35	5.68	0.68	5.00
632.40	5.72	0.68	5.04
632.45	5.76	0.68	5.08
632.50	**5.81**	0.68	**5.13**

Summary for Pond ICS-4: ICS-4

Inflow Area =	1.068 ac, 93.43% Impervious, Inflow Depth = 7.32" for 100-YR event				
Inflow =	3.31 cfs @	12.01 hrs, Volume=	0.652 af		
Outflow =	3.31 cfs @	12.01 hrs, Volume=	0.652 af, Atten= 0%, Lag= 0.0 min		
Primary =	1.11 cfs @	12.09 hrs, Volume=	0.470 af		
Secondary =	2.20 cfs @	12.00 hrs, Volume=	0.182 af		

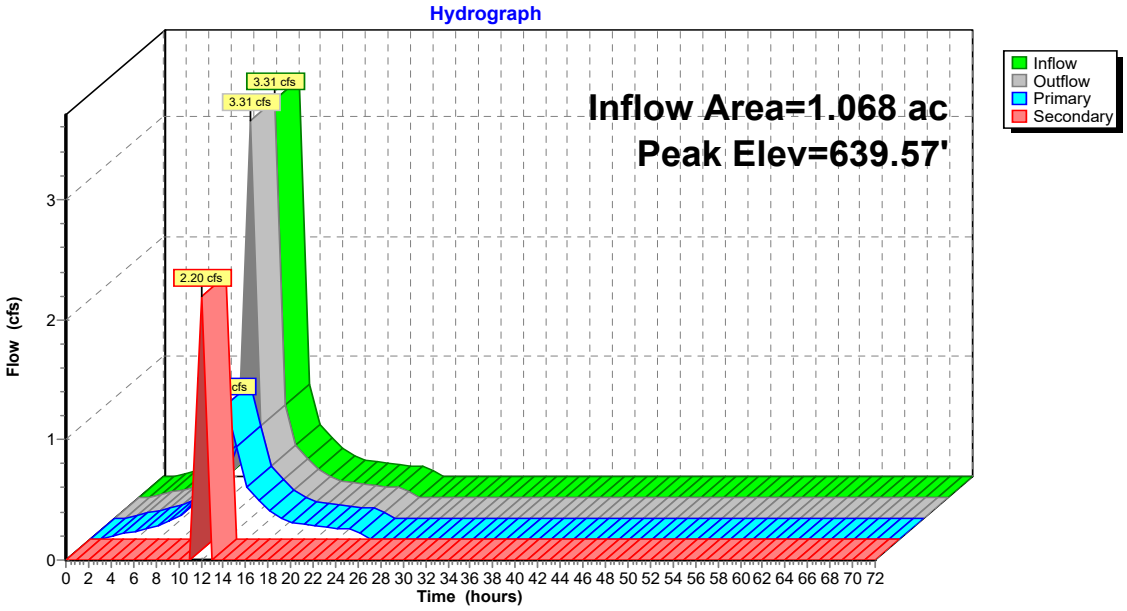
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 639.57' @ 12.01 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.09 cfs @ 12.09 hrs HW=639.36' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.09 cfs @ 5.56 fps)

Secondary OutFlow Max=2.20 cfs @ 12.00 hrs HW=639.57' (Free Discharge)
└─**3=Culvert** (Passes 2.20 cfs of 6.50 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 2.20 cfs @ 1.53 fps)

Pond ICS-4: ICS-4



Stage-Discharge for Pond ICS-4: ICS-4

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
636.50	0.00	0.00	0.00
636.55	0.01	0.01	0.00
636.60	0.04	0.04	0.00
636.65	0.08	0.08	0.00
636.70	0.14	0.14	0.00
636.75	0.21	0.21	0.00
636.80	0.29	0.29	0.00
636.85	0.37	0.37	0.00
636.90	0.45	0.45	0.00
636.95	0.53	0.53	0.00
637.00	0.59	0.59	0.00
637.05	0.65	0.65	0.00
637.10	0.70	0.70	0.00
637.15	0.75	0.75	0.00
637.20	0.79	0.79	0.00
637.25	0.84	0.84	0.00
637.30	0.88	0.88	0.00
637.35	0.89	0.89	0.00
637.40	0.89	0.89	0.00
637.45	0.90	0.90	0.00
637.50	0.90	0.90	0.00
637.55	0.91	0.91	0.00
637.60	0.91	0.91	0.00
637.65	0.92	0.92	0.00
637.70	0.92	0.92	0.00
637.75	0.93	0.93	0.00
637.80	0.94	0.94	0.00
637.85	0.94	0.94	0.00
637.90	0.95	0.95	0.00
637.95	0.95	0.95	0.00
638.00	0.96	0.96	0.00
638.05	0.96	0.96	0.00
638.10	0.97	0.97	0.00
638.15	0.97	0.97	0.00
638.20	0.98	0.98	0.00
638.25	0.98	0.98	0.00
638.30	0.99	0.99	0.00
638.35	0.99	0.99	0.00
638.40	1.00	1.00	0.00
638.45	1.00	1.00	0.00
638.50	1.01	1.01	0.00
638.55	1.01	1.01	0.00
638.60	1.02	1.02	0.00
638.65	1.02	1.02	0.00
638.70	1.03	1.03	0.00
638.75	1.03	1.03	0.00
638.80	1.04	1.04	0.00
638.85	1.04	1.04	0.00
638.90	1.05	1.05	0.00
638.95	1.05	1.05	0.00
639.00	1.06	1.06	0.00
639.05	1.06	1.06	0.00
639.10	1.07	1.07	0.00
639.15	1.07	1.07	0.00
639.20	1.08	1.08	0.00
639.25	1.08	1.08	0.00
639.30	1.13	1.09	0.04
639.35	1.35	1.09	0.26
639.40	1.68	1.10	0.58
639.45	2.08	1.10	0.98
639.50	2.56	1.11	1.45
639.55	3.10	1.11	1.99
639.60	3.71	1.11	2.60
639.65	4.38	1.12	3.27
639.70	5.12	1.12	4.00
639.75	5.92	1.13	4.79
639.80	6.79	1.13	5.65
639.85	7.71	1.14	6.58
639.90	8.18	1.14	7.04
639.95	8.26	1.15	7.11
640.00	**8.34**	**1.15**	**7.19**

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac,	62.40% Impervious,	Inflow Depth =	5.90"	for 100-YR event
Inflow =	2.00 cfs @	12.03 hrs,	Volume=	0.364 af	
Outflow =	2.00 cfs @	12.03 hrs,	Volume=	0.364 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.29 cfs @	12.06 hrs,	Volume=	0.172 af	
Secondary =	1.70 cfs @	12.03 hrs,	Volume=	0.192 af	

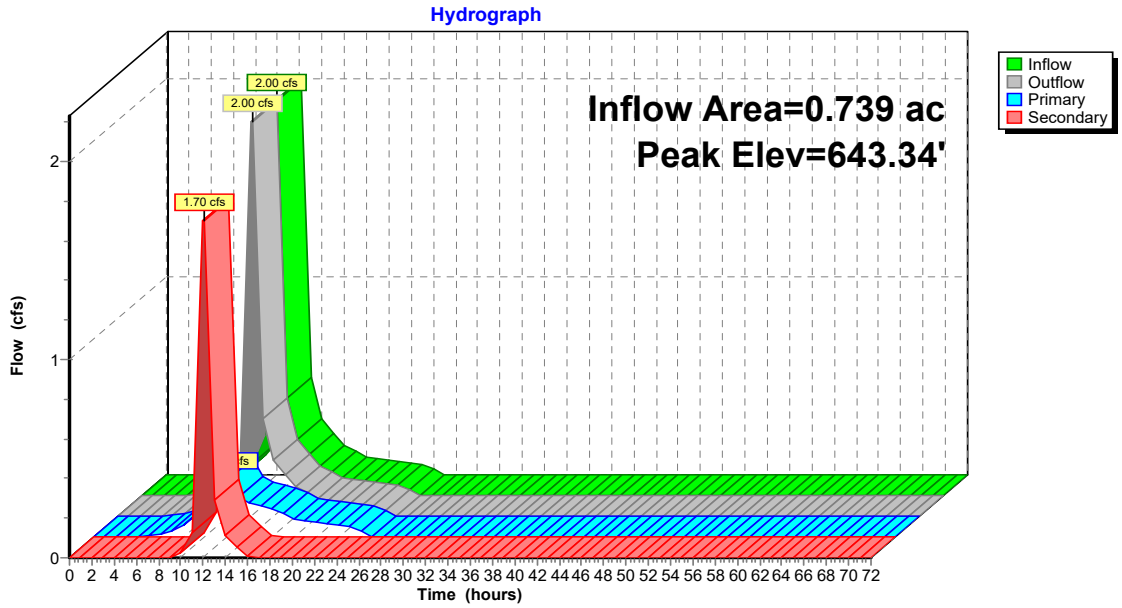
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 643.34' @ 12.05 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 636.00' S= 0.0781 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 12.06 hrs HW=643.31' TW=637.31' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.29 cfs @ 5.83 fps)

Secondary OutFlow Max=1.66 cfs @ 12.03 hrs HW=643.33' TW=637.33' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 1.66 cfs @ 3.53 fps)

Pond ICS-5: ICS-5



Stage-Discharge for Pond ICS-5: ICS-5

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
642.25	0.00	0.00	0.00
642.30	0.01	0.01	0.00
642.35	0.02	0.02	0.00
642.40	0.05	0.05	0.00
642.45	0.08	0.08	0.00
642.50	0.10	0.10	0.00
642.55	0.12	0.12	0.00
642.60	0.15	0.14	0.01
642.65	0.19	0.15	0.03
642.70	0.25	0.17	0.08
642.75	0.32	0.18	0.14
642.80	0.41	0.19	0.22
642.85	0.51	0.20	0.30
642.90	0.62	0.21	0.40
642.95	0.74	0.22	0.52
643.00	0.87	0.23	0.64
643.05	1.02	0.24	0.77
643.10	1.17	0.25	0.91
643.15	1.33	0.26	1.07
643.20	1.49	0.27	1.22
643.25	1.66	0.28	1.39
643.30	1.84	0.28	1.56
643.35	2.02	**0.29**	1.73
643.40	2.21	**0.30**	1.91
643.45	2.39	0.30	2.09
643.50	2.57	0.30	2.27
643.55	2.75	0.30	2.45
643.60	2.93	0.30	2.63
643.65	3.10	0.30	2.80
643.70	3.27	0.30	2.97
643.75	3.42	0.30	3.13
643.80	3.57	0.30	3.27
643.85	3.69	0.30	3.39
643.90	3.78	0.30	3.48
643.95	3.99	0.30	3.69
644.00	4.19	0.30	3.89
644.05	4.38	0.30	4.08
644.10	4.56	0.30	4.26
644.15	4.73	0.30	4.44
644.20	4.90	0.30	4.60
644.25	5.06	0.30	4.77
644.30	5.22	0.30	4.92
644.35	5.37	0.30	5.07
644.40	5.52	0.30	5.22
644.45	5.66	0.30	5.36
644.50	5.80	0.30	5.50
644.55	5.94	0.30	5.64
644.60	6.07	0.30	5.77
644.65	6.20	0.30	5.90
644.70	6.32	0.30	6.03
644.75	6.44	0.30	6.15
644.80	6.53	0.30	6.24
644.85	6.62	0.30	6.32
644.90	6.71	0.30	6.41
644.95	6.79	0.30	6.50
645.00	6.88	0.30	6.58
645.05	6.96	0.30	6.67
645.10	7.05	0.30	6.75
645.15	7.13	0.30	6.83
645.20	7.21	0.30	6.92
645.25	7.29	0.30	7.00
645.30	7.37	0.30	7.07
645.35	7.45	0.30	7.15
645.40	7.53	0.30	7.23
645.45	7.60	0.30	7.31
645.50	**7.68**	0.30	**7.38**

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth = 6.37" for 100-YR event
Inflow = 0.16 cfs @ 12.02 hrs, Volume= 0.029 af
Outflow = 0.16 cfs @ 12.08 hrs, Volume= 0.034 af, Atten= 0%, Lag= 3.2 min
Primary = 0.16 cfs @ 12.08 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs / 3
Peak Elev= 654.93' @ 12.00 hrs Surf.Area= 493 sf Storage= 338 cf

Plug-Flow detention time= 97.9 min calculated for 0.029 af (99% of inflow)
Center-of-Mass det. time= 260.4 min (1,041.8 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

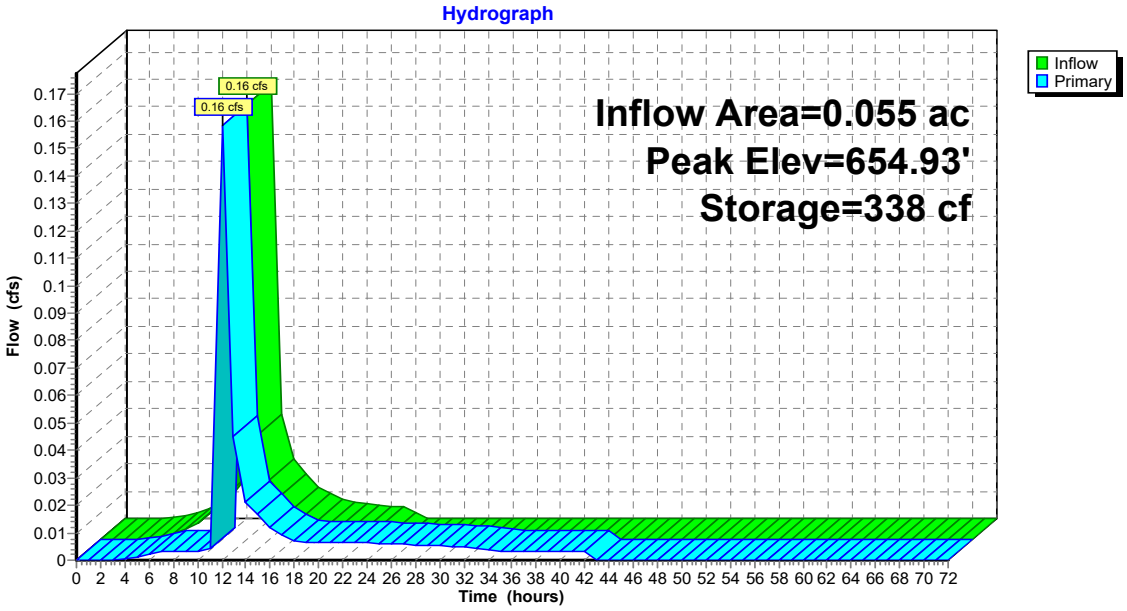
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.14 cfs @ 12.08 hrs HW=654.93' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.13 cfs @ 0.44 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Discharge for Pond RG-7B: RG-7B

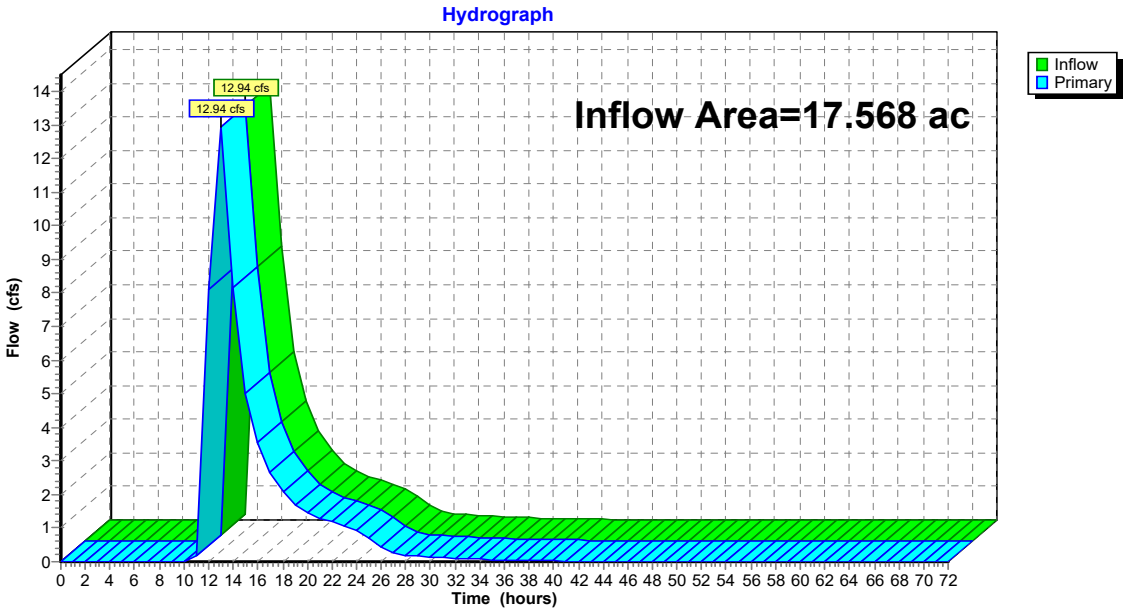
Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
653.00	0.00	653.52	0.00	654.04	0.00	654.56	0.01
653.01	0.00	653.53	0.00	654.05	0.00	654.57	0.01
653.02	0.00	653.54	0.00	654.06	0.00	654.58	0.01
653.03	0.00	653.55	0.00	654.07	0.00	654.59	0.01
653.04	0.00	653.56	0.00	654.08	0.00	654.60	0.01
653.05	0.00	653.57	0.00	654.09	0.00	654.61	0.01
653.06	0.00	653.58	0.00	654.10	0.00	654.62	0.01
653.07	0.00	653.59	0.00	654.11	0.00	654.63	0.01
653.08	0.00	653.60	0.00	654.12	0.00	654.64	0.01
653.09	0.00	653.61	0.00	654.13	0.00	654.65	0.01
653.10	0.00	653.62	0.00	654.14	0.00	654.66	0.01
653.11	0.00	653.63	0.00	654.15	0.00	654.67	0.01
653.12	0.00	653.64	0.00	654.16	0.00	654.68	0.01
653.13	0.00	653.65	0.00	654.17	0.00	654.69	0.01
653.14	0.00	653.66	0.00	654.18	0.00	654.70	0.01
653.15	0.00	653.67	0.00	654.19	0.00	654.71	0.01
653.16	0.00	653.68	0.00	654.20	0.00	654.72	0.01
653.17	0.00	653.69	0.00	654.21	0.00	654.73	0.01
653.18	0.00	653.70	0.00	654.22	0.00	654.74	0.01
653.19	0.00	653.71	0.00	654.23	0.00	654.75	0.01
653.20	0.00	653.72	0.00	654.24	0.00	654.76	0.01
653.21	0.00	653.73	0.00	654.25	0.00	654.77	0.01
653.22	0.00	653.74	0.00	654.26	0.00	654.78	0.01
653.23	0.00	653.75	0.00	654.27	0.00	654.79	0.01
653.24	0.00	653.76	0.00	654.28	0.00	654.80	0.01
653.25	0.00	653.77	0.00	654.29	0.00	654.81	0.01
653.26	0.00	653.78	0.00	654.30	0.00	654.82	0.01
653.27	0.00	653.79	0.00	654.31	0.00	654.83	0.01
653.28	0.00	653.80	0.00	654.32	0.00	654.84	0.01
653.29	0.00	653.81	0.00	654.33	0.00	654.85	0.01
653.30	0.00	653.82	0.00	654.34	0.00	654.86	0.01
653.31	0.00	653.83	0.00	654.35	0.00	654.87	0.01
653.32	0.00	653.84	0.00	654.36	0.00	654.88	0.01
653.33	0.00	653.85	0.00	654.37	0.00	654.89	0.01
653.34	0.00	653.86	0.00	654.38	0.00	654.90	0.01
653.35	0.00	653.87	0.00	654.39	0.00	654.91	0.03
653.36	0.00	653.88	0.00	654.40	0.00	654.92	0.08
653.37	0.00	653.89	0.00	654.41	0.00	654.93	0.14
653.38	0.00	653.90	0.00	654.42	0.00	654.94	0.21
653.39	0.00	653.91	0.00	654.43	0.00	654.95	0.29
653.40	0.00	653.92	0.00	654.44	0.00	654.96	0.38
653.41	0.00	653.93	0.00	654.45	0.00	654.97	0.48
653.42	0.00	653.94	0.00	654.46	0.00	654.98	0.58
653.43	0.00	653.95	0.00	654.47	0.00	654.99	0.69
653.44	0.00	653.96	0.00	654.48	0.00	655.00	**0.81**
653.45	0.00	653.97	0.00	654.49	0.01		
653.46	0.00	653.98	0.00	654.50	0.01		
653.47	0.00	653.99	0.00	654.51	0.01		
653.48	0.00	654.00	0.00	654.52	0.01		
653.49	0.00	654.01	0.00	654.53	0.01		
653.50	0.00	654.02	0.00	654.54	0.01		
653.51	0.00	654.03	0.00	654.55	0.01		

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth = 2.98" for 100-YR event
Inflow = 12.94 cfs @ 13.00 hrs, Volume= 4.367 af
Primary = 12.94 cfs @ 13.00 hrs, Volume= 4.367 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 1.00 hrs

Link PDP-3: Design Point 3



Hydrograph for Pond 1: SFB-1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	607.00	0.00	0.00	0.00
2.00	0.00	0	607.00	0.00	0.00	0.00
4.00	0.01	3	607.01	0.01	0.01	0.00
6.00	0.03	10	607.03	0.03	0.03	0.00
8.00	0.09	102	607.26	0.05	0.05	0.00
10.00	0.24	834	608.62	0.07	0.07	0.00
12.00	**1.36**	**3,945**	**609.98**	**0.72**	**0.11**	**0.60**
14.00	0.75	**3,993**	**609.99**	**0.80**	**0.12**	**0.68**
16.00	0.33	3,699	609.89	0.38	0.11	0.27
18.00	0.15	3,421	609.78	0.20	0.11	0.09
20.00	0.11	2,947	609.60	0.18	0.10	0.08
22.00	0.08	2,415	609.38	0.16	0.10	0.06
24.00	0.04	1,901	609.15	0.12	0.09	0.03
26.00	0.00	1,301	608.87	0.08	0.08	0.00
28.00	0.00	753	608.58	0.07	0.07	0.00
30.00	0.00	325	607.84	0.05	0.05	0.00
32.00	0.00	4	607.01	0.01	0.01	0.00
34.00	0.00	0	607.00	0.00	0.00	0.00
36.00	0.00	0	607.00	0.00	0.00	0.00
38.00	0.00	0	607.00	0.00	0.00	0.00
40.00	0.00	0	607.00	0.00	0.00	0.00
42.00	0.00	0	607.00	0.00	0.00	0.00
44.00	0.00	0	607.00	0.00	0.00	0.00
46.00	0.00	0	607.00	0.00	0.00	0.00
48.00	0.00	0	607.00	0.00	0.00	0.00
50.00	0.00	0	607.00	0.00	0.00	0.00
52.00	0.00	0	607.00	0.00	0.00	0.00
54.00	0.00	0	607.00	0.00	0.00	0.00
56.00	0.00	0	607.00	0.00	0.00	0.00
58.00	0.00	0	607.00	0.00	0.00	0.00
60.00	0.00	0	607.00	0.00	0.00	0.00
62.00	0.00	0	607.00	0.00	0.00	0.00
64.00	0.00	0	607.00	0.00	0.00	0.00
66.00	0.00	0	607.00	0.00	0.00	0.00
68.00	0.00	0	607.00	0.00	0.00	0.00
70.00	0.00	0	607.00	0.00	0.00	0.00
72.00	0.00	0	607.00	0.00	0.00	0.00

Hydrograph for Pond 2: SFB-2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	613.25	0.00	0.00	0.00
2.00	0.00	0	613.25	0.00	0.00	0.00
4.00	0.01	1	613.25	0.00	0.00	0.00
6.00	0.03	8	613.26	0.03	0.03	0.00
8.00	0.17	40	613.28	0.16	0.16	0.00
10.00	0.52	907	613.95	0.22	0.22	0.00
12.00	**2.33**	6,817	615.58	0.42	0.36	0.06
14.00	1.20	**12,826**	**616.40**	**1.16**	**0.45**	**0.71**
16.00	0.84	12,015	616.30	1.06	0.44	0.62
18.00	0.57	10,560	616.11	0.70	0.42	0.28
20.00	0.40	9,786	616.01	0.50	0.41	0.10
22.00	0.33	8,901	615.88	0.48	0.39	0.08
24.00	0.22	7,652	615.71	0.45	0.38	0.07
26.00	0.05	5,419	615.36	0.37	0.34	0.03
28.00	0.03	3,326	615.01	0.31	0.31	0.00
30.00	0.01	1,453	614.41	0.24	0.24	0.00
32.00	0.01	26	613.27	0.10	0.10	0.00
34.00	0.01	1	613.25	0.01	0.01	0.00
36.00	0.00	1	613.25	0.00	0.00	0.00
38.00	0.00	1	613.25	0.00	0.00	0.00
40.00	0.00	1	613.25	0.00	0.00	0.00
42.00	0.00	0	613.25	0.00	0.00	0.00
44.00	0.00	0	613.25	0.00	0.00	0.00
46.00	0.00	0	613.25	0.00	0.00	0.00
48.00	0.00	0	613.25	0.00	0.00	0.00
50.00	0.00	0	613.25	0.00	0.00	0.00
52.00	0.00	0	613.25	0.00	0.00	0.00
54.00	0.00	0	613.25	0.00	0.00	0.00
56.00	0.00	0	613.25	0.00	0.00	0.00
58.00	0.00	0	613.25	0.00	0.00	0.00
60.00	0.00	0	613.25	0.00	0.00	0.00
62.00	0.00	0	613.25	0.00	0.00	0.00
64.00	0.00	0	613.25	0.00	0.00	0.00
66.00	0.00	0	613.25	0.00	0.00	0.00
68.00	0.00	0	613.25	0.00	0.00	0.00
70.00	0.00	0	613.25	0.00	0.00	0.00
72.00	0.00	0	613.25	0.00	0.00	0.00

Hydrograph for Pond 3: SFB-3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	620.00	0.00	0.00	0.00
2.00	0.00	0	620.00	0.00	0.00	0.00
4.00	0.02	4	620.02	0.02	0.02	0.00
6.00	0.05	44	620.21	0.03	0.03	0.00
8.00	0.08	282	621.32	0.04	0.04	0.00
10.00	0.17	836	621.96	0.06	0.06	0.00
12.00	**1.03**	**1,250**	**622.27**	**0.94**	**0.07**	**0.87**
14.00	0.40	1,064	622.14	0.41	0.06	0.34
16.00	0.31	1,028	622.11	0.31	0.06	0.25
18.00	0.26	1,009	622.09	0.26	0.06	0.20
20.00	0.24	999	622.09	0.24	0.06	0.18
22.00	0.22	991	622.08	0.22	0.06	0.16
24.00	0.19	978	622.07	0.19	0.06	0.13
26.00	0.16	961	622.06	0.16	0.06	0.10
28.00	0.14	954	622.05	0.14	0.06	0.08
30.00	0.13	947	622.05	0.13	0.06	0.07
32.00	0.12	939	622.04	0.12	0.06	0.06
34.00	0.10	932	622.03	0.10	0.06	0.05
36.00	0.09	924	622.03	0.09	0.06	0.03
38.00	0.08	910	622.02	0.08	0.06	0.02
40.00	0.06	897	622.01	0.06	0.06	0.01
42.00	0.05	875	621.99	0.06	0.06	0.00
44.00	0.04	781	621.91	0.05	0.05	0.00
46.00	0.02	614	621.76	0.05	0.05	0.00
48.00	0.01	395	621.55	0.04	0.04	0.00
50.00	0.01	194	620.92	0.03	0.03	0.00
52.00	0.00	25	620.12	0.03	0.03	0.00
54.00	0.00	1	620.00	0.00	0.00	0.00
56.00	0.00	1	620.00	0.00	0.00	0.00
58.00	0.00	1	620.00	0.00	0.00	0.00
60.00	0.00	0	620.00	0.00	0.00	0.00
62.00	0.00	0	620.00	0.00	0.00	0.00
64.00	0.00	0	620.00	0.00	0.00	0.00
66.00	0.00	0	620.00	0.00	0.00	0.00
68.00	0.00	0	620.00	0.00	0.00	0.00
70.00	0.00	0	620.00	0.00	0.00	0.00
72.00	0.00	0	620.00	0.00	0.00	0.00

Hydrograph for Pond 4: SFB-4

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	630.00	0.00	0.00	0.00	0.00
2.00	0.02	2	630.00	0.02	0.02	0.00	0.00
4.00	0.07	6	630.01	0.07	0.07	0.00	0.00
6.00	0.12	10	630.02	0.12	0.12	0.00	0.00
8.00	0.22	19	630.04	0.22	0.22	0.00	0.00
10.00	0.44	561	631.05	0.26	0.26	0.00	0.00
12.00	**1.63**	**4,018**	**632.76**	**0.68**	**0.46**	**0.21**	**0.00**
14.00	**0.99**	**5,741**	**633.29**	**0.98**	**0.52**	**0.45**	**0.00**
16.00	0.43	4,317	632.86	0.76	0.47	0.28	0.00
18.00	0.29	2,882	632.37	0.47	0.41	0.06	0.00
20.00	0.25	1,838	631.96	0.37	0.37	0.00	0.00
22.00	0.22	1,028	631.61	0.32	0.32	0.00	0.00
24.00	0.15	370	630.68	0.25	0.25	0.00	0.00
26.00	0.09	8	630.01	0.09	0.09	0.00	0.00
28.00	0.07	6	630.01	0.07	0.07	0.00	0.00
30.00	0.06	5	630.01	0.06	0.06	0.00	0.00
32.00	0.04	4	630.01	0.04	0.04	0.00	0.00
34.00	0.03	3	630.00	0.03	0.03	0.00	0.00
36.00	0.02	1	630.00	0.02	0.02	0.00	0.00
38.00	0.01	1	630.00	0.01	0.01	0.00	0.00
40.00	0.01	0	630.00	0.01	0.01	0.00	0.00
42.00	0.00	0	630.00	0.00	0.00	0.00	0.00
44.00	0.00	0	630.00	0.00	0.00	0.00	0.00
46.00	0.00	0	630.00	0.00	0.00	0.00	0.00
48.00	0.00	0	630.00	0.00	0.00	0.00	0.00
50.00	0.00	0	630.00	0.00	0.00	0.00	0.00
52.00	0.00	0	630.00	0.00	0.00	0.00	0.00
54.00	0.00	0	630.00	0.00	0.00	0.00	0.00
56.00	0.00	0	630.00	0.00	0.00	0.00	0.00
58.00	0.00	0	630.00	0.00	0.00	0.00	0.00
60.00	0.00	0	630.00	0.00	0.00	0.00	0.00
62.00	0.00	0	630.00	0.00	0.00	0.00	0.00
64.00	0.00	0	630.00	0.00	0.00	0.00	0.00
66.00	0.00	0	630.00	0.00	0.00	0.00	0.00
68.00	0.00	0	630.00	0.00	0.00	0.00	0.00
70.00	0.00	0	630.00	0.00	0.00	0.00	0.00
72.00	0.00	0	630.00	0.00	0.00	0.00	0.00

Hydrograph for Pond 5: SFB-5

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	632.00	0.00	0.00	0.00	0.00
2.00	0.00	0	632.00	0.00	0.00	0.00	0.00
4.00	0.02	5	632.01	0.02	0.02	0.00	0.00
6.00	0.07	13	632.03	0.07	0.07	0.00	0.00
8.00	0.13	70	632.14	0.10	0.10	0.00	0.00
10.00	0.24	645	633.49	0.10	0.10	0.00	0.00
12.00	**0.76**	2,472	634.27	0.19	0.19	0.00	0.00
14.00	0.48	**4,799**	**634.99**	**0.30**	**0.23**	**0.07**	**0.00**
16.00	0.42	**4,829**	**635.00**	**0.39**	**0.23**	**0.07**	**0.10**
18.00	0.35	4,826	635.00	0.35	0.23	0.07	0.05
20.00	0.32	4,824	635.00	0.32	0.23	0.07	0.02
22.00	0.30	4,822	635.00	0.30	0.23	0.07	0.00
24.00	0.25	4,719	634.97	0.29	0.23	0.07	0.00
26.00	0.21	4,264	634.84	0.27	0.22	0.05	0.00
28.00	0.20	3,823	634.70	0.25	0.21	0.04	0.00
30.00	0.18	3,481	634.60	0.22	0.21	0.01	0.00
32.00	0.17	3,231	634.52	0.21	0.21	0.00	0.00
34.00	0.16	2,974	634.44	0.20	0.20	0.00	0.00
36.00	0.15	2,669	634.33	0.20	0.20	0.00	0.00
38.00	0.14	2,322	634.22	0.19	0.19	0.00	0.00
40.00	0.13	1,939	634.08	0.18	0.18	0.00	0.00
42.00	0.12	1,538	633.94	0.17	0.17	0.00	0.00
44.00	0.11	1,205	633.80	0.15	0.15	0.00	0.00
46.00	0.10	946	633.67	0.13	0.13	0.00	0.00
48.00	0.08	744	633.56	0.11	0.11	0.00	0.00
50.00	0.07	577	633.27	0.10	0.10	0.00	0.00
52.00	0.00	190	632.38	0.10	0.10	0.00	0.00
54.00	0.00	0	632.00	0.00	0.00	0.00	0.00
56.00	0.00	0	632.00	0.00	0.00	0.00	0.00
58.00	0.00	0	632.00	0.00	0.00	0.00	0.00
60.00	0.00	0	632.00	0.00	0.00	0.00	0.00
62.00	0.00	0	632.00	0.00	0.00	0.00	0.00
64.00	0.00	0	632.00	0.00	0.00	0.00	0.00
66.00	0.00	0	632.00	0.00	0.00	0.00	0.00
68.00	0.00	0	632.00	0.00	0.00	0.00	0.00
70.00	0.00	0	632.00	0.00	0.00	0.00	0.00
72.00	0.00	0	632.00	0.00	0.00	0.00	0.00

APPENDIX E: STORMWATER CALCULATIONS

- *NOAA RAINFALL DATA*
- *WATER QUALITY VOLUME CALCULATIONS*
- *GROUNDWATER RECHARGE VOLUME CALCULATION*
- *TSS REMOVAL*
- *PIPE SIZING CALCULATIONS*
- *RIPRAP SIZING*
- *LEVEL SPREADER CALCULATIONS*

NOAA Atlas 14, Volume 10, Version 3
Location name: Storrs Mansfield, Connecticut, USA*
Latitude: 41.8251°, Longitude: -72.2676°
Elevation: 640.98 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.328 (0.258-0.417)	0.394 (0.310-0.501)	0.502 (0.393-0.641)	0.592 (0.461-0.760)	0.715 (0.538-0.960)	0.808 (0.595-1.11)	0.905 (0.646-1.29)	1.01 (0.684-1.48)	1.17 (0.756-1.77)	1.29 (0.817-2.00)
10-min	0.465 (0.366-0.591)	0.559 (0.439-0.710)	0.712 (0.557-0.908)	0.839 (0.653-1.08)	1.01 (0.762-1.36)	1.15 (0.843-1.57)	1.28 (0.915-1.83)	1.44 (0.969-2.10)	1.65 (1.07-2.51)	1.83 (1.16-2.83)
15-min	0.547 (0.431-0.695)	0.657 (0.517-0.835)	0.837 (0.656-1.07)	0.986 (0.768-1.26)	1.19 (0.897-1.60)	1.35 (0.992-1.85)	1.51 (1.08-2.15)	1.69 (1.14-2.47)	1.94 (1.26-2.95)	2.15 (1.36-3.33)
30-min	0.749 (0.590-0.951)	0.900 (0.707-1.14)	1.15 (0.898-1.46)	1.35 (1.05-1.73)	1.63 (1.23-2.19)	1.84 (1.36-2.53)	2.07 (1.47-2.95)	2.31 (1.56-3.38)	2.66 (1.73-4.04)	2.95 (1.87-4.56)
60-min	0.951 (0.748-1.21)	1.14 (0.898-1.45)	1.46 (1.14-1.86)	1.72 (1.34-2.20)	2.07 (1.56-2.78)	2.34 (1.72-3.22)	2.62 (1.87-3.74)	2.94 (1.98-4.29)	3.38 (2.19-5.13)	3.74 (2.37-5.79)
2-hr	1.23 (0.969-1.55)	1.47 (1.16-1.86)	1.87 (1.47-2.37)	2.20 (1.72-2.80)	2.65 (2.01-3.55)	2.99 (2.22-4.10)	3.36 (2.42-4.80)	3.79 (2.56-5.51)	4.43 (2.88-6.68)	4.97 (3.16-7.66)
3-hr	1.42 (1.13-1.79)	1.70 (1.35-2.14)	2.16 (1.71-2.73)	2.54 (2.00-3.23)	3.07 (2.33-4.10)	3.46 (2.58-4.73)	3.88 (2.81-5.54)	4.39 (2.98-6.36)	5.17 (3.37-7.76)	5.83 (3.71-8.95)
6-hr	1.82 (1.45-2.27)	2.18 (1.74-2.73)	2.77 (2.20-3.48)	3.26 (2.57-4.12)	3.94 (3.01-5.23)	4.44 (3.32-6.05)	4.98 (3.63-7.09)	5.64 (3.84-8.13)	6.66 (4.35-9.95)	7.54 (4.81-11.5)
12-hr	2.29 (1.84-2.85)	2.76 (2.21-3.43)	3.52 (2.81-4.39)	4.15 (3.29-5.21)	5.01 (3.85-6.62)	5.66 (4.25-7.65)	6.35 (4.64-8.96)	7.19 (4.91-10.3)	8.46 (5.55-12.5)	9.54 (6.10-14.4)
24-hr	2.74 (2.20-3.38)	3.32 (2.67-4.10)	4.26 (3.42-5.29)	5.05 (4.02-6.31)	6.13 (4.73-8.05)	6.93 (5.24-9.32)	7.80 (5.73-10.9)	8.84 (6.06-12.6)	10.4 (6.86-15.4)	11.8 (7.56-17.7)
2-day	3.09 (2.50-3.79)	3.78 (3.06-4.65)	4.92 (3.97-6.07)	5.87 (4.70-7.28)	7.17 (5.56-9.37)	8.13 (6.18-10.9)	9.17 (6.79-12.8)	10.5 (7.20-14.8)	12.5 (8.22-18.3)	14.2 (9.13-21.2)
3-day	3.35 (2.72-4.09)	4.11 (3.34-5.04)	5.36 (4.34-6.60)	6.40 (5.14-7.92)	7.83 (6.10-10.2)	8.88 (6.78-11.9)	10.0 (7.45-14.0)	11.5 (7.91-16.2)	13.7 (9.06-20.0)	15.7 (10.1-23.3)
4-day	3.58 (2.91-4.37)	4.40 (3.58-5.38)	5.74 (4.65-7.04)	6.85 (5.51-8.45)	8.38 (6.53-10.9)	9.50 (7.26-12.7)	10.7 (7.99-15.0)	12.3 (8.48-17.3)	14.7 (9.73-21.4)	16.8 (10.8-24.9)
7-day	4.22 (3.45-5.13)	5.15 (4.21-6.27)	6.68 (5.44-8.15)	7.95 (6.43-9.76)	9.69 (7.59-12.5)	11.0 (8.42-14.6)	12.4 (9.25-17.2)	14.1 (9.79-19.8)	16.9 (11.2-24.5)	19.3 (12.5-28.5)
10-day	4.87 (3.99-5.90)	5.86 (4.81-7.11)	7.50 (6.12-9.12)	8.85 (7.18-10.8)	10.7 (8.40-13.8)	12.1 (9.28-15.9)	13.6 (10.1-18.7)	15.4 (10.7-21.5)	18.3 (12.2-26.4)	20.8 (13.5-30.5)
20-day	6.93 (5.72-8.34)	8.00 (6.59-9.64)	9.74 (8.00-11.8)	11.2 (9.13-13.6)	13.2 (10.4-16.8)	14.7 (11.3-19.1)	16.3 (12.1-21.9)	18.1 (12.6-24.9)	20.7 (13.8-29.5)	22.8 (14.8-33.3)
30-day	8.69 (7.19-10.4)	9.78 (8.09-11.7)	11.6 (9.52-13.9)	13.0 (10.7-15.8)	15.1 (11.9-19.0)	16.6 (12.8-21.4)	18.2 (13.4-24.2)	19.9 (13.9-27.3)	22.1 (14.8-31.5)	23.9 (15.6-34.8)
45-day	10.9 (9.05-13.0)	12.0 (9.96-14.4)	13.8 (11.4-16.6)	15.3 (12.6-18.5)	17.4 (13.7-21.7)	19.0 (14.6-24.2)	20.6 (15.1-27.0)	22.1 (15.5-30.2)	24.0 (16.1-34.0)	25.3 (16.5-36.7)
60-day	12.8 (10.6-15.2)	13.9 (11.5-16.6)	15.7 (13.0-18.8)	17.3 (14.2-20.8)	19.4 (15.3-24.1)	21.0 (16.1-26.6)	22.6 (16.6-29.4)	24.0 (16.9-32.6)	25.6 (17.3-36.2)	26.7 (17.5-38.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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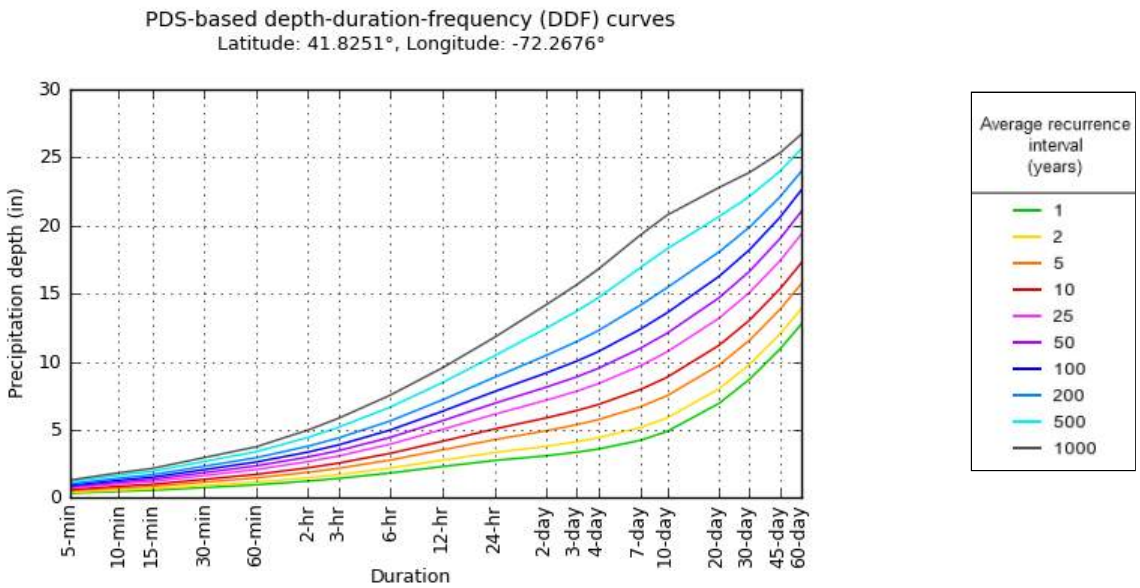
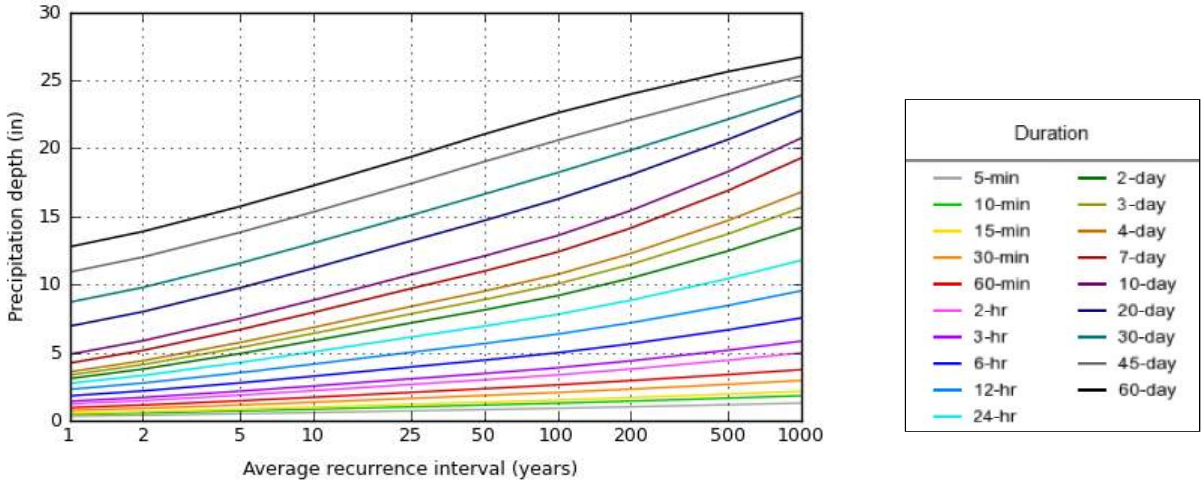
PF graphical





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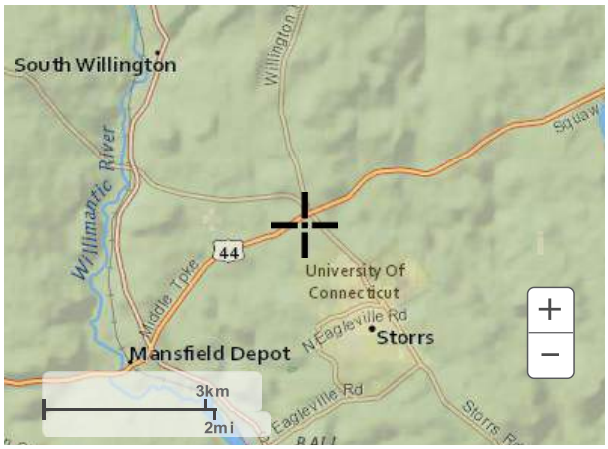
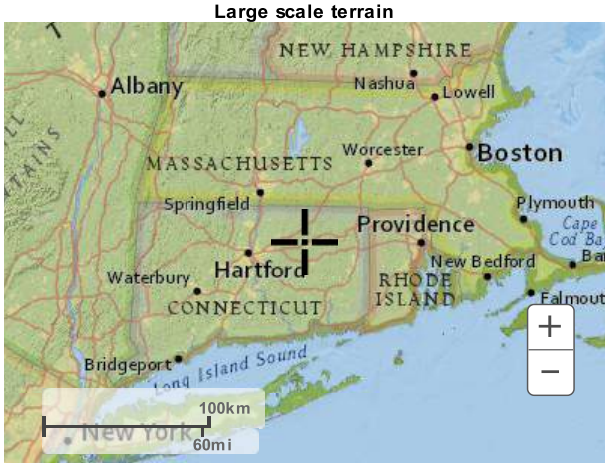
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map

Large scale aerial

Water Quality Calculations

From CT 2004 Stormwater Quality Manual:

$$WQV = \frac{(1'')(R)(A)}{12}$$

$$R = 0.05 + 0.009(I)$$

WQV = water quality volume (ac-ft)
R = volumetric runoff coefficient
I = percent impervious cover (pavement, sidewalks, parking garage)
A = site area in acres

Area	Treatment	Total Area		Impervious Area (not including clean roofs)		Impervious Cover	Volumetric Runoff Coefficient	Water Quality Volume Required (WQV)		WQV Provided
ID	Location	ac	ft^2	ac	ft^2	%	R	acre-feet	ft^3	ft^3
SFB-1	Sand Filter Basin	0.966	42,079	0.443	19,309	45.86	0.463	0.037	1,612	1,566
SFB-2	Sand Filter Basin	4.230	184,259	1.325	57,710	31.32	0.332	0.117	5,097	4,427
SFB-3	Sand Filter Basin	1.125	49,005	0.257	11,199	22.84	0.256	0.024	1,045	889
SFB-4	Sand Filter Basin	1.487	64,773	0.238	10,378	16.01	0.194	0.024	1,045	1,928
SFB-5	Sand Filter Basin	1.636	71,264	0.469	20,445	28.67	0.308	0.042	1,830	3,172
RG-703	Rain Garden	0.055	2,396	0.000	0	0.00	0.050	0.000	0	323
TOTAL		9.499	413,776	2.733	119,040	28.77	0.309	0.244	10,629	12,305

Groundwater Recharge Volume Calculations

Groundwater Recharge Volume

From CT 2004 Stormwater Quality Manual:

$$GVR = \frac{(D)(A)(I)}{12}$$

GRV Groundwater Recharge Volume (ac-ft)
D = Depth of Runoff to be Recharged (table 7-4)
A = site area in acres
I = impervious cover (decimal)

Table 7-4
Groundwater Recharge Depth

NRCS Hydrologic Soil Group	Average Annual Recharge	Groundwater Recharge Depth (D)
A	18 inches/year	0.4 inches
B	12 inches/year	0.25 inches
C	6 inches/year	0.10 inches
D	3 inches/year	0 inches (waived)

Source: MADEP, 1997.
NRCS – Natural Resources Conservation Service

	A									I				
	Total Developed Area (AC)	Site Area by NRCS Hydrologic Soil Group				Impervious Cover by NRCS Hydrologic Soil Group				Site Imperviousness (Decimal) by NRCS Hydrologic Soil Group				GRV Required (cubic-ft)
		A	B	C	D	A	B	C	D	A	B	C	D	
Proposed	9.63	0.00	6.58	3.051	0.00	0.00	4.00	1.84	0.00	0.00	0.61	0.60	0.00	4296

* Groundwater recharge volumes based upon the total developed areage of the site. See PD-Map for full site area delineation.

v

Location: Drainage System DP 1-4

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Street Sweeping - 5%	**0.05**	**1.00**	**0.05**	**0.95**
Deep Sump and Hooded Catch Basin	**0.25**	**0.95**	**0.24**	**0.71**
Infiltration Basin	**0.80**	**0.71**	**0.57**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**

Total TSS Removal = **86%**

Project: **Mansfield Res. Development**
Prepared By: **MAA**
Date: **8/22/2019**

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

Capstone Collegiate
1621 Storrs Road
Mansfield, CT
CT181007
December 30, 2019

Rational Pipe Sizing Calculations

Design Period Storm:		10	Year	Design Period Intensity*			5.78	in/hr									
LOCATION		IMPERVIOUS			OTHER												
FROM	TO	A	C	CA	A	C	CA	SUM CA	Tc (min)	I (in/hr)	Q (cfs)	D (in)	S (ft/ft)	Material	n	Q Full (cfs)	V Full (fps)
CB-111	CB-110	0.12	0.95	0.11	0.08	0.30	0.02	0.13	6	5.78	0.77	12	0.050	HDPE	0.012	8.63	10.99
CB-110	CB-109	0.15	0.95	0.14	0.04	0.30	0.01	0.15	6	5.78	0.89	12	0.028	HDPE	0.012	6.46	8.22
CB-109	CDS-108	0.10	0.95	0.09	0.06	0.30	0.02	0.11	6	5.78	1.51	12	0.011	HDPE	0.012	4.05	5.15
CDS-108	ICS-107	0.11	0.95	0.10	0.05	0.30	0.01	0.12	6	5.78	2.19	12	0.017	HDPE	0.012	4.99	6.35
OCS-105	YD-104	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.72	12	0.005	HDPE	0.012	2.73	3.47
YD-104	MH-103	0.00	0.95	0.00	0.06	0.30	0.02	0.02	6	5.78	0.83	12	0.005	HDPE	0.012	2.73	3.47
ROOF DRAIN	MH-103	0.03	0.95	0.03	0.00	0.30	0.00	0.03	6	5.78	0.15	6	0.005	HDPE	0.012	0.43	2.19
MH-103	FES-102	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.98	12	0.005	HDPE	0.012	2.73	3.47
CB-210	MH-209	0.22	0.95	0.21	0.08	0.30	0.02	0.23	6	5.78	1.35	12	0.005	HDPE	0.012	2.73	3.47
MH-209	MH-208	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.35	12	0.043	HDPE	0.012	8.00	10.19
MH-208	CDS-207	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.35	12	0.005	HDPE	0.012	2.73	3.47
CDS-207	ICS-206	0.20	0.95	0.19	0.10	0.30	0.03	0.22	6	5.78	2.63	12	0.010	HDPE	0.012	3.86	4.91
ROOF DRAIN	MH-203	0.11	0.95	0.10	0.00	0.30	0.00	0.10	6	5.78	0.59	8	0.053	HDPE	0.012	3.01	8.63
ICS-206	MH-203	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.41	12	0.010	HDPE	0.012	3.86	4.91
ICS-605	MH-211	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.26	4	0.078	HDPE	0.012	0.58	6.60
MH-211	MH-203	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.26	12	0.005	HDPE	0.012	2.73	3.47
OCS-204	MH-203	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.41	6	0.019	HDPE	0.012	0.84	4.27
MH-203	FES-202	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.67	15	0.005	HDPE	0.012	4.95	4.03
TD-311	MH-310	0.03	0.95	0.03	0.04	0.30	0.01	0.05	6	5.78	0.26	12	0.041	HDPE	0.012	7.82	9.95
MH-310	CDS-309	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.26	12	0.005	HDPE	0.012	2.73	3.47
CDS-309	ICS-308	0.20	0.95	0.19	0.05	0.30	0.01	0.21	6	5.78	1.46	12	0.013	HDPE	0.012	4.32	5.49
OCS-306	MH-304	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.93	10	0.005	HDPE	0.012	1.68	3.08
YD-305	MH-304	0.01	0.95	0.01	0.06	0.30	0.02	0.02	6	5.78	0.14	4	0.100	HDPE	0.012	0.65	7.47
MH-304	YD-303	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.14	6	0.100	HDPE	0.012	1.92	9.79
YD-303	FES-302	0.01	0.95	0.01	0.06	0.30	0.02	0.02	6	5.78	0.29	6	0.005	HDPE	0.012	0.43	2.19
RD-500	MH-312	0.27	0.95	0.26	0.00	0.30	0.00	0.26	6	5.78	1.50	12	0.010	HDPE	0.012	3.86	4.91
RD-1000B1	MH-312	0.32	0.95	0.30	0.00	0.30	0.00	0.30	6	5.78	1.76	12	0.005	HDPE	0.012	2.73	3.47
MH-312	UGB-307	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	3.26	12	0.032	HDPE	0.012	6.90	8.79
RD-1000B2	MH-411	0.77	0.95	0.73	0.00	0.30	0.00	0.73	6	5.78	4.21	15	0.005	HDPE	0.012	4.95	4.03
MH-411	CDS-410	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	4.21	15	0.005	HDPE	0.012	4.95	4.03
CDS-410	ICS-409	0.24	0.95	0.23	0.00	0.30	0.00	0.23	6	5.78	5.52	15	0.010	HDPE	0.012	7.00	5.70
ICS-409	OCS-407	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.20	12	0.005	HDPE	0.012	2.73	3.47
OCS-407	MH-405	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.50	12	0.005	HDPE	0.012	2.73	3.47
YD-406	MH-405	0.00	0.95	0.00	0.01	0.30	0.00	0.00	6	5.78	0.02	8	0.005	HDPE	0.012	0.93	2.65
MH-405	MH-404	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.52	12	0.010	HDPE	0.012	3.86	4.91
MH-404	FES-403	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.52	12	0.010	HDPE	0.012	3.86	4.91
YD-511	CB-510	0.11	0.95	0.11	0.01	0.30	0.00	0.11	6	5.78	0.65	8	0.010	HDPE	0.012	1.31	3.75
CB-510	CB-509	0.11	0.95	0.11	0.01	0.30	0.00	0.11	6	5.78	1.29	12	0.017	HDPE	0.012	5.03	6.41
CB-509	CDS-507	0.19	0.95	0.18	0.03	0.30	0.01	0.19	6	5.78	2.39	12	0.021	HDPE	0.012	5.59	7.12
YD-508	CDS-507	0.01	0.95	0.01	0.01	0.30	0.00	0.01	6	5.78	0.05	6	0.005	HDPE	0.012	0.43	2.19
CDS-507	ICS-506	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	2.44	12	0.005	HDPE	0.012	2.73	3.47
ICS-506	OCS-504	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.30	8	0.005	HDPE	0.012	0.93	2.65
OCS-504	FES-503	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.48	12	0.028	HDPE	0.012	6.46	8.22
CB-612	MH-611	0.09	0.95	0.08	0.01	0.30	0.00	0.08	6	5.78	0.48	12	0.048	HDPE	0.012	8.46	10.77
MH-611	CB-610	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.48	12	0.054	HDPE	0.012	8.97	11.42
CB-610	CB-609	0.10	0.95	0.09	0.27	0.30	0.08	0.17	6	5.78	1.47	12	0.045	HDPE	0.012	8.19	10.42
CB-609	CB-608	0.19	0.95	0.18	0.07	0.30	0.02	0.20	6	5.78	2.62	12	0.049	HDPE	0.012	8.54	10.88
CB-608	CDS-607	0.18	0.95	0.17	0.04	0.30	0.01	0.19	6	5.78	3.70	12	0.044	HDPE	0.012	8.10	10.31
CDS-607	ICS-605	0.09	0.95	0.09	0.01	0.30	0.00	0.09	6	5.78	4.22	12	0.057	HDPE	0.012	9.21	11.73

Prepared By:
Bohler Engineering
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 12/27/2019
Prepared By: BTJ

FES-102

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	0.98	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	9.666	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	6.8664	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	12.666	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.5	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	0.98	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.038937	ft	Median stone diameter in feet
	0.467243	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-102

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 12/27/2019
Prepared By: BTJ

FES-202

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	1.67	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	10.839	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	7.3356	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	13.839	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.5	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	1.67	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.079253	ft	Median stone diameter in feet
	0.951035	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-202

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 8/20/2019
Prepared By: DTB

FES-302

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	0.67	ft	Inside diameter of culvert
Q	0.29	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	6.258948	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	2.01	ft	Width of apron at the culvert (minimum)
W end	4.513579	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	2.01	ft	Width of apron at the culvert (minimum)
W end	8.268948	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	1	ft	Tailwater depth above the invert of the culvert
Do	0.67	ft	Inside diameter of culvert (defined in apron sizing)
Q	0.29	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.006548	ft	Median stone diameter in feet
	0.078579	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-302

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 8/20/2019
Prepared By: DTB

FES-403

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	1.52	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	10.584	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	7.2336	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	13.584	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.75	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	1.52	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.046604	ft	Median stone diameter in feet
	0.559253	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-403

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 12/27/2019
Prepared By: BTJ

FES-503

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	0.48	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	8.816	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	6.5264	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	11.816	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.75	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	0.48	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.010022	ft	Median stone diameter in feet
	0.120265	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-503

Level Spreader Calculations

Date: 2/5/2020 Calcs By: M.A.A.

Source: PA DEP Stormwater BMP Manual: Chapter 6 - Perforation Discharge

CT SWQM does not address the type of level spreader proposed

Requirements:

10 year/24-hour storm minimum		
Maximum discharge velocity (per down slope covers)	**0.67**	*2 fps * 33% (for flow concentrations)*
Minimum Distate between level spreader and down slope property boundary	**15 ft**	

Assumptions:

H	0.5	*feet (stone height above perforated pipe)*	*Manual's example = 0.418'*
A	0.000767	*ft^2 (0.375-in. diamater perforations / LF of 12" perforated pipe)*	
n	36	*(number of perforations/foot)*	
G	32.2	*ft/sec^2*	
C_d	0.6	*coefficient of discharge*	
Q_o	0.0026114	*cfs*	
Q_L	0.0940095	*cfs (36 perforations/foot)*	
FS	1.1	*(factor of safety from potential clogging)*	

L (length of level spreader pipe) = Q / Q_L

Q_L (discharge per linear foot) = Q_O * # of perforations per linear foot of pipe (provided by manufacturer, based on perforation diameter)

Q_O (perforation flow rate) = $C_d * A * (2 * g * H)^{0.5}$

Q_O = the free outfall flow rate through one perforation (ft^3/sec)
C_d = Coefficient of discharge (typically 0.60)
A = Cross sectional area of one perforation (ft^2)
g = 32.2 ft/sec^2
H = head, average height of water above perforation (ft) (provided by manufacturer)

$V = Q_{100}/(A*n*L_{100})$

Table 2. Maximum Velocities of Flow Across Level Spreader

Down Slope Ground Cover	Velocity at Level Spreader V (fps)	Driving Head H (feet)	"Equivalent" Water Height over Level Spreader, H*=2/3H
Grass/Thicket	1.33	0.09	0.058
Gravel	1.50	0.11	0.074
Mulch (Trees, Shrubs)	0.67	0.02	0.015

Source: *Designing Level Spreaders to Treat Stormwater Runoff*

		LS-100	LS-200	LS-300	LS-401		
10-yr storm	**Q_{10}** *(cfs)*	0.57	0.09	0.87	0.26		
	L_{10} *(lf)*	7	2	11	4		
100-yr storm	**Q_{100}** *(cfs)*	1.21	0.69	1.17	0.47		
	L_{100} *(lf)*	15	9	14	6		100-yr storm
	L provided	**65**	**80**	**65**	**40**		
	V_{100} *(f/s)*	0.67	0.31	0.65	0.43	≤ *0.67 fps*	(sandy loam soil, trees, shrubs)

Additional resources for allowable discharge velocities by ground cover:

Table 11-1
Allowable velocity for various soil textures

SOIL TEXTURE	ALLOWABLE VELOCITY ft./sec.
Sand	1.8
Sandy loam	2.5
Silt loam, loam	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale (non weathered shale)	6.0

Source: STANDARD FOR CHANNEL STABILIZATION; Standards for Soil Erosion and Sediment Control in New Jersey (2014)

TABLE 12-1 ALLOWABLE VELOCITIES FOR VARIOUS SOILS

SOIL TEXTURE	ALLOWABLE VELOCITY (ft./sec.)
Sand	1.8
Sandy loam	2.5
Silt loam (also high lime clay), loam	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale (non-weathered)	6.0

Source: STANDARD FOR CONDUIT OUTLET PROTECTION; Standards for Soil Erosion and Sediment Control in New Jersey (2014)

Figure OP-1 Allowable Velocities for Various Soils

Soil Texture	Allowable Velocity (ft./sec.)
Sand and sandy loam	2.5
Silt Loam	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale	6.0

Source: USDA-NRCS

APPENDIX F: OPERATION AND MAINTENANCE

STORMWATER OPERATION AND SITE MAINTENANCE PLAN

For

PROPOSED

Residential Community

1621 Storrs Road, Parcels 9.23.7 and 9.23.1
Town of Mansfield,
Tolland County,
Connecticut

Prepared by:

BOHLER ENGINEERING
16 Old Forge Road
Rocky Hill, CT 06067

December 30, 2019
#CT181007

CONTACT / RESPONSIBLE PARTY:

Ben Walker
Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

MANAGEMENT COMPANY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060
(Local contact information will be designated before project construction.)

(Note: The contact information for the Contact/ Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, the CTDEEP Construction General Permit and the Stormwater Pollution Prevention Plan (SWPPP) if applicable. Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Contact information of the OWNER and CONTRACTOR shall be listed in the SWPPP for this site. The SWPPP also includes information regarding construction period allowable, housekeeping and emergency response procedures.

Post Development Controls

Once construction is completed, the post development stormwater Best Management Practices (BMP's) are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. **Litter and Debris Removal:** Litter/Debris to be removed and disposed of weekly.

2. **Parking lots and on-site driveways:** Sweep at least four (4) times per year and on a more frequent basis depending on operations. All resulting sweepings shall be collected and properly disposed of off-site in accordance with CTDEEP and other applicable requirements.

3. **Catch basins, yard drains, trench drains, manholes and piping:** Inspect four (4) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned four (4) times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the catch basin or underground system. Accumulated sediment and hydrocarbons present must be removed

and properly disposed of off-site in accordance with CTDEEP and other applicable requirements.

4. **Water Quality Unit (Proprietary Separator):** Twice per year (Spring and Fall), Per manufacturers recommendations (attached).

5. **Water Quality Filtration Basin:** Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. Remove trash and debris at inlet riprap stilling pad, mow and remove grass clippings and accumulated organic matter. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

6. **Underground Detention Basins:** Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

7. **Rain Gardens:** shall be inspected and cleared of trash monthly; mowed 2 to 12 times per year; mulched annually; fertilized annually; dead vegetation removed annually; pruned annually; replace entire media and all vegetation as needed. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

8. **Landscape Replacement/ Restoration of Eroded Areas:** Landscaped areas shall be monitored, maintained and mulched as necessary, but at a minimum of twice annually. Plants shall be replaced as needed.

9. **Maintenance Access Roads:** Maintenance access roads shall be kept clear of debris and litter. Area shall be inspected annually, and woodchips shall be replaced as necessary to maintain a functional pathway.

10. **Trash Removal Procedures:** Exterior waste areas shall be cleaned weekly and waste screening will be inspected quarterly and repair on an as needed basis.

11. **Integrated Pest Management:** Operator will contract with a licensed pest management company to review the proposed site conditions and provide appropriate measures, procedures and controls to minimize potential pest issues.

Overall Site Operation and BMP Maintenance Schedule			
BMP	**Maintenance Protocol**	**Frequency of Maintenance**	**Responsible Party**
General	Litter & Debris Removal	Weekly	Management Company
Parking Lot sweeping	Sweep parking lots, collect and properly dispose	Minimum 4 times annually	3rd Party/ Management Company
General	Inspect and Clean stormwater structures and piping	Minimum 4 times annually	3rd Party/ Management Company
Water Quality Separator	Follow Manufacturer's Recommendations	2 times annually (Spring & Fall)	CDS Engineered Solutions/ Management Company
Water Quality Filter Basin	Inspection and Preventative maintenance. Rake bottom, remove trash and debris, mow and remove glass clippings and accumulated organic matter	After every major storm event for the first 3 months of install, and minimum 2 times annually, thereafter	Management Company
Underground Detention Basins	Outlet of basin to be inspected for erosion and sedimentation. Sediment collecting in the bottom of the basin shall be vacuumed and removed when sediment reaches a depth of six inches.	After every major storm event for the first 3 months of install, and minimum 2 times annually, thereafter	3rd Party/ Management Company
Rain Garden	Shall be inspected and cleared of trash	Monthly	Management Company
	Mowed	2-12 times per year	
	Dead debris removed, mulched, fertilized, pruned	Annually	
General	Landscaped areas to be maintained and mulched as necessary. Plants shall be replaced as needed	Minimum 2 times annually	Management Company
General	Exterior trash enclosure areas shall be inspected and cleaned	Weekly	Management Company

LONG-TERM POLLUTION PREVENTION PLAN

CONTACT / RESPONSIBLE PARTY:

Ben Walker
Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

MANAGEMENT COMPANY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- No outdoor maintenance or washing of vehicles allowed.
- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.
- Proper storage and removal of solid waste (dumpsters). Disposal of debris, trash, sediment, and other waste material should be done at a suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations. Exterior waste areas will be cleaned weekly and waste screen
- Sweeping of driveways, a minimum of four times per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".
- Landscape Plantings shall be monitored a minimum of four times per year and are to be replaced as necessary.
- Snow removal and ice management shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in forebays, water quality filtration basins, rain gardens or similar stormwater controls. Salting of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals. Sanding is not recommended due to the use of pervious pavements. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt shall be utilized to the minimum extent practical.

OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house and 3rd-Party Management training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Storm Water Pollution Prevention Plan (SWPPP). Annual training will include the following:

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures
- Explain goals and requirements of Landscaping program:
    - Reseed any bare areas as soon as they occur. Erosion control measures shall be installed in these areas to prevent deposits of sediment from entering the drainage system.
    - Grass shall be maintained at a minimum blade height of two to three inches and only 1/3 of the plant height shall be removed at a time. Clippings shall not be disposed of within stormwater management areas or adjacent resource areas.
    - Plants shall be pruned as necessary.
    - The use of fertilizers will be by licensed professionals and shall be employed only to the extent necessary to maintain healthy landscaping.
    - The use of pesticides will be by licensed professionals and shall be employed only to the extent necessary to maintain healthy landscaping. Where possible mechanical methods (i.e. pest traps) or biological methods (i.e. beneficial insects) of pest control shall be implemented.
- Explain the Snow Removal requirements of the Snow Removal program:
    - Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter in to the soil.
    - In no case shall snow be disposed of or stored in resource areas (wetlands, floodplain, streams or other water bodies).
    - In no case shall snow be disposed of or stored in the infiltration basins.
    - If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.
    - The amount of deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.

STORMWATER MANAGEMENT SYSTEM

POST-CONSTRUCTION INSPECTION REPORT

LOCATION:

1621 Storrs Road, Parcel 9.23.1 & 9.23.7
Mansfield, Connecticut

RESPONSIBLE PARTY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060
(Local contact information will be designated before project construction.)

NAME OF INSPECTOR:	INSPECTION DATE:
Note Condition of the Following (sediment depth, debris, standing water, damage, etc.):	
Litter & Debris removal:	
Parking lots and on-site driveways:	
Catch basins, yard drains, trench drains, manholes and piping:	
Water Quality Unit (Proprietary Separator):	
Water Quality Filtration Basin:	

Underground Detention Basins:
Rain Gardens:
Landscape Replacement/ Restoration of Eroded Areas:
Maintenance Access Roads:
Trash Removal Procedures:
Other
Comments:

STORMWATER INSPECTION AND MAINTENANCE LOG FORM

1621 Storrs Road, Parcel 9.23.1 & 9.23.7
Mansfield, Connecticut

Stormwater Management Practice	Responsible Party	Frequency	Maintenance Activity Performed

LANDTECH

Civil Engineering · Site Planning
Environmental Science & Engineering
Structural Engineering · Land Surveying
Permit Coordination & Management
Construction Management & Financing

February 13, 2020

Jennifer Kaufman, AICP
Senior Planner/Inland Wetlands Agent
Town of Mansfield
4 South Eaglesville Road
Mansfield, CT 06268

RE: Mansfield Inland Wetlands Application Review
Application W1611-1
1621 Storrs Road and Middle Turnpike

Dear Ms. Kaufman:

We have reviewed supplemental application documents recently submitted by the applicant in response to our peer review letter dated January 16, 2020 and in response to a Notice of Intervention by the University of Connecticut.

Reviewed documents include:

- *Site Development Plans* (25 sheets) prepared by Bohler Engineering, dated December 30, 2019 and revised February 6, 2020.
- *Stormwater Management Report*, with Appendices A through F, prepared by Bohler Engineering, dated December 30, 2019 and revised February 6, 2020.
- Letter from Bohler Engineering to Jennifer Kaufman, dated February 6, 2020 regarding *Response to Mansfield Inland Wetlands Application Review, Residential Development, 1621 Storrs Road & Middle Turnpike, Mansfield*.
- Letter from Robinson & Cole to Mr. Paul Aho, dated February 6, 2020 regarding Application for Inland Wetlands Permit W1611-1, The J.E. Shepard Company and Capstone Collegiate Communities, Applications, *1621 Storrs Road and Adjacent Land, and Property on Middle Turnpike, Response to Notice of Intervention by University of Connecticut*.
- Letter from Halloran & Sage, LLP to Jennifer Kaufman dated January 27, 2020 with attached *Notice of Intervention by the University of Connecticut.*

Our comments regarding our review of the current applications documents are provided below.

Stormwater Management

The applicant has addressed our technical comments regarding the stormwater management system. The modifications made will help to ensure that the proposed stormwater management elements will function as designed.

We believe that the client has addressed our comments regarding the proposed footing drain/underdrain system. We believe that the potential effects to groundwater have been minimized to the extent practicable based on the site conditions and the extent of the proposed development.

Soil Erosion and Sediment Control

The applicant has addressed our comments regarding recommended revisions to the proposed soil erosion and sediment controls in the current plan set including the use of additional temporary diversions swales to direct runoff to the temporary sediment traps during construction.

Wetland Impacts and Mitigation Measures

Wetland Hydrologic Impacts

It is our opinion that the applicant has provided the information requested to demonstrate that potential impacts to wetland hydrology have been minimized to the extent practicable. The plans have been revised to enhance the infiltrative capacity of the level spreader outlets by increasing the amount of storage available within the level spreaders to minimize surface discharge and maximize groundwater recharge.

Vernal Pool

As requested, the applicant has agreed to provide a Conservation Easement that includes undeveloped and restored habitat areas within the vernal pool Critical Terrestrial Habitat, as well as all wetland areas on the property and wetland buffers between the wetlands and the proposed development.

It is our opinion that the applicant has demonstrated compliance with the Best Management Practices contained in the Calhoun and Klemens (2002) technical paper cited in previous letters.

Notice of Intervention

The Notice of Intervention contains many of the same concerns that were contained in our peer review of the development proposal including lack of sufficient field data to demonstrate that the stormwater management system would function as proposed, potential wetland hydrologic impacts, and potential impacts to off-site vernal pools and associated breeding amphibians. Based on the comments provided in our Memorandum dated September 27, 2019 and letters dated November, 4, 2019, November 11, 2019, and January 16, 2020, the applicant conducted additional field testing, revised the site plans and provided additional support documentation to address these concerns.

Based on our review of the revised application documents and the applicant's responses to the peer review comments and Notice of Intervention, it is our professional opinion that the applicant has demonstrated that the potential for impacts to wetlands and watercourses have been minimized to the extent practicable and that the development will not have a significant impact on these resources.

If you have any questions or require further assistance, please call us.

Yours truly,
Land-Tech Consultants

Christopher P. Allan
Professional Wetland Scientist
Certified Soil Scientist

Robert Pryor, P.E., L.S.
Director of Site Planning & Engineering

LANDTECH

February 19, 2020

Jennifer Kaufman AICP
Senior Planner/Inland Wetlands Agent
Town of Mansfield
4 South Eaglesville Road
Mansfield, CT 06268

Re: W1611-1 Application of J.E. Shepard Company and Capstone Collegiate Communities

Dear Ms. Kaufman:

We have been preparing a response to a memo that the Applicant submitted to the Chairman of the Inland Wetlands Agency (dated 2/6/2020). The Applicant's memo dismisses each of the points raised in a Notice of Intervention submitted on 1/27/2020. This letter is an interim response provided to the Conservation Commission while we prepare a more detailed response that will be submitted to the Inland Wetlands Agency. Based on our review of past plans, we anticipate identifying additional issues which we will bring to the attention of the Town and the Applicant as promptly as possible.

After reviewing the Applicant's memo and revised plans carefully, we agree with several of the Applicant's contentions based on the explanation and/or information provided. We will acknowledge these areas of agreement in the final response. However, we still stand by a number of our points as valid and identify some of these points in this memo in order to reinforce our positions.

Furthermore, Land-Tech's memo addressed to the Inland Wetlands Agent (dated 2/13/2020), generally supports our positions. The memo, which was written in response to the Applicant's submission of revised plans, recognizes that the Notice of Intervention: "contains many of the same concerns that were contained in our peer review of the development proposal, including lack of sufficient field data to demonstrate that the stormwater management system would function as proposed, potential wetland hydrologic impacts, and potential impacts to off-site vernal pools and associated breeding amphibians." This statement, made by the Inland Wetland Agency's professionals, affirms the general nature of our findings of insufficiencies in the design of the stormwater management system—insufficiencies that are likely to have significant adverse impacts on the hydrology of wetlands and vernal pools.

Land-Tech's memo further states: "Based on our review of the revised application documents and the applicant's responses to the peer review comments and Notice of Intervention, it is our professional opinion that the applicant has demonstrated that the potential for impacts to wetlands and watercourses have been minimized to the extent practicable and that the development will not have a significant impact on these resources."

However, having reviewed the Applicant's revised plans, <u>we contend that there are still a number of issues that could lead to unreasonable, adverse impacts on wetlands and vernal pools and that such impacts have not been "minimized to the extent practical."</u>

Land-Tech appears to be accepting the Applicant's proposal as an absolute "all-or-nothing" development, which is not the correct standard to apply. This is evidenced by Land-Tech's statement on the first page of

its above-referenced memo (dated 2/13/2020) under the "Stormwater Management" heading: "We believe that the potential effects to groundwater have been minimized to the extent practicable based on the site conditions **and the extent of the proposed development.**" (Emphasis added).

We believe that the "extent of the proposed development" is excessive for this fragile parcel of land and that the development should be scaled down to avoid foreseeable adverse impacts on wetlands and watercourses.

We also contend that there are more fundamental issues pertaining to the wetland and the integrity of the on-site 150-foot upland review area. The wetland is a headwater wetland containing a headwater stream. The upland review area plays a critical role in protecting the wetland. The Applicant's site plans show much of the upland review area being developed. While the regulations do not require the Applicant to demonstrate no adverse impacts on the upland review area, the Town should understand the adverse impacts on the wetland if the upland review area is developed to such an extent. Furthermore, the wetland, the upland review area, and the forested areas potentially support a federally-listed species, according to the U.S. Fish & Wildlife Service's IPaC and on our on-site observations. The wetland and the upland review area together serve as a corridor for federally-protected migratory birds.

Finally, while cumulative impacts are not specifically discussed in the Inland Wetlands and Watercourses Regulations, the Town should recognize and anticipate cumulative impacts on-site and on downstream wetlands and watercourses. The Conservation Commission's review is not confined solely to inland wetlands issues. It also can address broader environmental issues that are raised by the Applicant's development plans. Even if one specific area of wetland loss might not significantly impair downstream water quality, the cumulative impacts of the loss of multiple wetlands within a basin through development over time could be significant. Approval of such a large amount of construction within the upland review area sets a poor precedent and opens the door to future developments downstream that result in cumulative modifications and adverse impacts upon the watercourse and associated wetlands.

We summarize specific aspects of the Applicant's plans where such issues still exist, and we will explain them with reference to the Applicant's plans at the Conservation Commission meeting on February 19, 2020. These issues include design deficiencies, inconsistencies or omissions, and areas where more information is needed in order to more definitively determine the effectiveness of the proposed stormwater management system.

Summary of Issues

The following are some of the aspects of the Applicant's plans where we contend that these issues still exist:

1. **Significant Issues Pertaining to Wetlands and the Vernal Pool.**

    a. The 150-foot upland review area line appears to be approximated or averaged because the line demarcating the upland review area does not follow the shape of the line of the inland wetlands from which it is drawn.

    b. The Applicant has not supplied a site plan accurately depicting off-site wetlands and their associated 150-foot upland review areas in accordance with Section 7.4H of the Wetlands and Watercourses Regulations.

c. Nearly all of the forested 150-foot upland review area along an approximately 1,000 linear foot distance will be removed for the development. The resulting "edge effect" from this disturbance can extend into the adjacent forest, resulting in significant physical and biological modifications and impairment of resources.

d. Section 7.4G of the Inland Wetlands and Watercourses Regulations requires providing alternatives that would cause less or no environmental impact to wetlands or watercourses and explaining the rationale for selecting the alternative submitted. The Applicant has not provided an alternatives analysis. It also did not implement a recommendation from a prior Land-Tech memo (dated 9/27/2019) about "exploring alternatives to increase the width of the wetland buffer to provide greater protection to the adjacent wetland."

e. The Applicant still needs to demonstrate that the walking trail will not result in adverse impacts on the wetland and should supply more details about it.

2. Technical Issues Pertaining to the Design of the Stormwater Management System.

a. It is critical that the design infiltration rate is determined accurately. Only 5 of the 22 test pits performed on-site are located within the limits of the proposed sand filter/infiltration basins. The remaining test pits are located outside of the limits of the basin. Given the significant variations in the test pit data within the limit of the basins, it would be prudent to perform at least one additional test pit and associated testing within each of the basins. Also note that the location of test pit 14 is not accurately depicted on Sand Filter 4 Basin Detail shown on Construction Detail Sheet (Sheet Number 21). Test pit 14 should be shown in the berm.

b. We still observe issues with seasonal high ground water table (SHGWT) that merit further clarification. It appears the SHGWT will intercept the sand filter layer in Basins 1 and 5. The SHGWT will be directly below the sand filter layer in Basins 2 and 3. In addition, it appears the observed groundwater table will be within 3 feet of the bottom of all or a portion of basins 1, 3 and 5. Adding perforated pipes in basin 1, 2 and 3 will eliminate the potential for the basins to remain wet longer than necessary. However, the Applicant should clarify the impact they will have on the infiltration of the water quality flows/volumes.

c. Additional test pits should be performed at the proposed level spreaders to more accurately determine the SHGWT and hydraulic conductivity rates. The level spreaders, as detailed on the plans and described in Bohler's response letter (dated February 2, 2020) are intended to function as infiltration trenches and should be designed in accordance with CT DEEP recommendations. Based on the information from the closet test pits, the pipe for the level spreader for basin 1 will be in the SHGWT, and the soils in the vicinity of the level spreaders for basins 1, 2 and 3 have low hydraulic conductivity rates. If water in the level spreader cannot infiltrate into the ground due to the SHGWT or low conductivity rates, it will fill voids in the stone and eventually discharge to the surface.

d. Design details for the underdrain system are not provided and, therefore, their mechanisms for collecting and distributing excess water cannot be assessed.

3. Issues Pertaining to Impacts on Amphibians

a. The upland forest habitat is critical for the survival of wood frogs and salamanders that utilize the vernal pool located in proximity to the site. It is where they spend the majority of the time when they are not in the vernal pool. The development will remove this habitat. The proposed 25 percent mitigated upland area will be planted with trees. However, they will not be mature trees, which currently occupy the upland area. Furthermore, the new trees will be planted in different locations.

b. We stand by our statement that the amphibian barrier as currently designed will lead animals toward the road, which will significantly increase the likelihood of mortality.

i. The fence has no turn-around angles to direct the animals back toward undeveloped portions of the site. When not in their breeding pools, the animals will encounter the fence and follow it in order to reach their ancestral habitats. Without an angled turn-around, animals are likely to follow this fence to the end and be directed onto the road.

ii. The fence is not back-filled in many locations, making it susceptible to flooding and damage by foot. Furthermore, the fence is above grade, so it will likely be repeatedly damaged. The Applicant has not presented an appropriate plan for repairs of damage. If repairs are not performed with appropriate materials and in a timely manner, animals will be able to enter the area.

In closing, the items in this letter are highlights of a longer list of issues that remain which we will detail in our final response. The Conservation Commission should have complete information before it makes a recommendation to other Town agencies. The Applicant has made certain adjustments to the plans in response to prior review comments, but the scale and intensity of the proposed project remains the same. There are feasible and prudent alternatives that the Applicant should explore that will significantly reduce impacts to the environment.

Sincerely,

NV5 – Connecticut, LLC

Stephen Normandin, P.E.
Managing Director
(203) 956-0515 x3202
Stephen.Normandin@nv5.com

cc: Mark Branse, Esq., Halloran & Sage LLP
Thomas P. Cody, Esq., Robinson & Cole LLP

A few comments on the Davison Environmental Report on the “Wetlands Functions and Values Assessment” as submitted to Capstone Collegiate Communities, dated December 30, 2019, for discussion at the Mansfield Conservation Commission meeting scheduled for February 19, 2020, in lieu of my absence. I have gone over this report in detail and wish to bring to the attention of fellow commission members several observations. Firstly, the Davison Environmental report comprised of some 8 pages of text and 11 figures and photos, strikes me as rather slim on site details with a number of things lacking. This contrasts with a similar report completed in 2016 by REMA Ecological Services done for a similar development nearby (Storrs Lodges) that comprised over 100 pages with detailed biotic inventories conducted over the entire year (with over 50 photographs of the wetland attributes and their biota made over 4 seasons). Also included were chemical water quality analyses, accurate and detailed assessments of all the wetland classes and subclasses present, detailed assessments of the potential impact of the development on the wetlands along with detailed mitigation plans for potential impacts on the wetlands, etc. I was surprised not to find similar, detailed characterizations and analyses completed by Davison Environmental. I note that the wetlands involved in both sites are indeed strikingly similar. The REMA team correctly identified prime features of their wetlands as “seasonal headwaters… that drain toward Cedar Swamp Brook” along with “on-site stream segment… an unnamed tributary of Eagleville Brook”, a “semi-perennial stream” and “a vernal pool habitat”. For the development being considered here, I would contend (based on a site visit and subsequent analyses), that there are at least 2 or 3 seasonal stream headwater (shown as yellow arrows on figure 1) as well as semi-perennial streams and stream segments, not so characterized in the Davison Environmental report. These headwaters clearly drain to semi-intermittent to semi-perennial streams and stream segments that subsequently drain into Cedar Swamp Brook, as shown in figures 1, 3 and 4. Note that the same detailed digital image also from 2016 for the Storrs Lodges site (figure 2), shows almost identical surface and wetland features as shown in figure 1. Note that figure 1 of the Davison Environmental wetlands report shows a flowing stream taken sometime in the spring, not far from my photo 3. My photo #1 (location shown on Figure 1) shows a bridge over an obvious stream. Moreover, the owner of this home says that the bridge was put in because water flows here typically for much of the year. My photo #2 (taken November 21, 2019) shows a clear stream segment at point # 2 on Figure 1. My photo #3 (shown as #3 on figure 1) shows the stream course continuing down close to where it enters the culvert under Route 44. My photo #4 (shown as #4 on figure 1) shows a substantial stream channel continuing north on the other side of Route 44. This stream continues north to an open body of water (shown on Figures 3 and 4) where it merges to form a tributary of Cedar Swamp Brook. I would like to see a more complete characterization of wetlands on site and a more detailed and accurate species list (note that at least one wetland tree species present is misidentified, and I am sure many other significant wetland indicator species present were not noted). Species of plants and animals present provide important biotic indicators of wetland and water quality attributes. To judge the impact of the proposed development on the wetlands and water quality, a baseline water quality assessment should be made along with more detailed mitigation plans. In light of these missing components, I urge that the wetlands functions and values be re-assessed. All of these items were done in a more complete and thorough manner in the REMA wetlands assessment report for the Storrs Lodges proposed development in 2016. I expected as much here.

John Silander, Ph.D. Research Professor of Ecology and Evolutionary Biology, University of Connecticut, Storrs
And Conservation Commission Member.

Figure 1. Copied from Figure 2 of Davison Environmental Report

Figure 2. Copied from Figure 3 of REMA report for Storrs Lodges proposed development.

Photo 1. Taken (November 21, 2019) of bridge (red arrow) over stream section through lot (9.23.4 1641 STORRS RD) adjacent to proposed development (noted approximately as #1 on figures 1, 2 and 3); note stream is visible and continues on left.

Photo 2. Stream section noted as approximately #2 on figures 1, 3 and 4. Note evidence of a semi-persistent stream course here. Photo taken November 21, 2019

Photo 3. Stream section located near entrance to culvert under Route 44 (noted as approximately #3 on figures 1, 3 and 4); photo taken November 21, 2019

Photo 4. Well-developed stream channel that continues stream section shown in photo #3 which continues to flow north as a tributary of Cedar Swamp Brook cf. figures 3 and 4). This photo is referenced as located approximately at #4 shown on figures 1, 3 and 4. Photo from November 21, 2019.

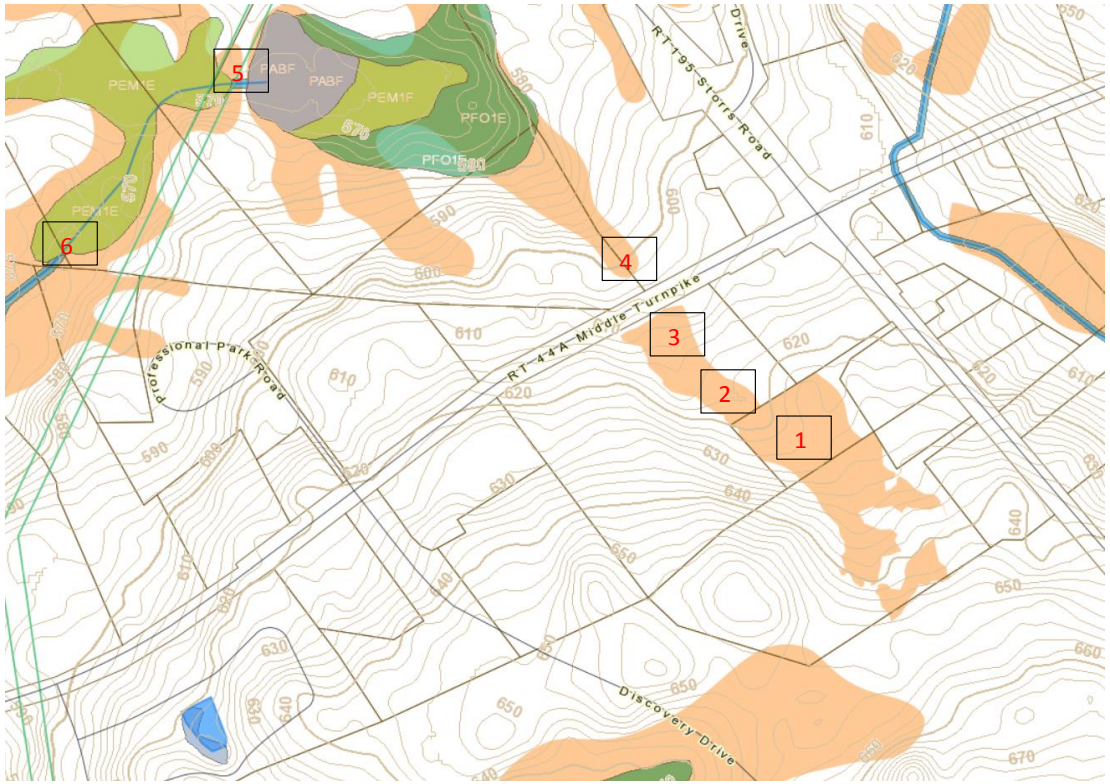


Figure 3. GIS overview of proposed development site showing wetlands from various Mansfield town GIS overlays, 2-foot contours, and mapped streams and water bodies. Cedar Swamp Brook is mapped here from just below the open body of water (#5), then west and southwest (#6) beyond the edge of the map. Photos 1 to 4 are also indicated as such on this figure.

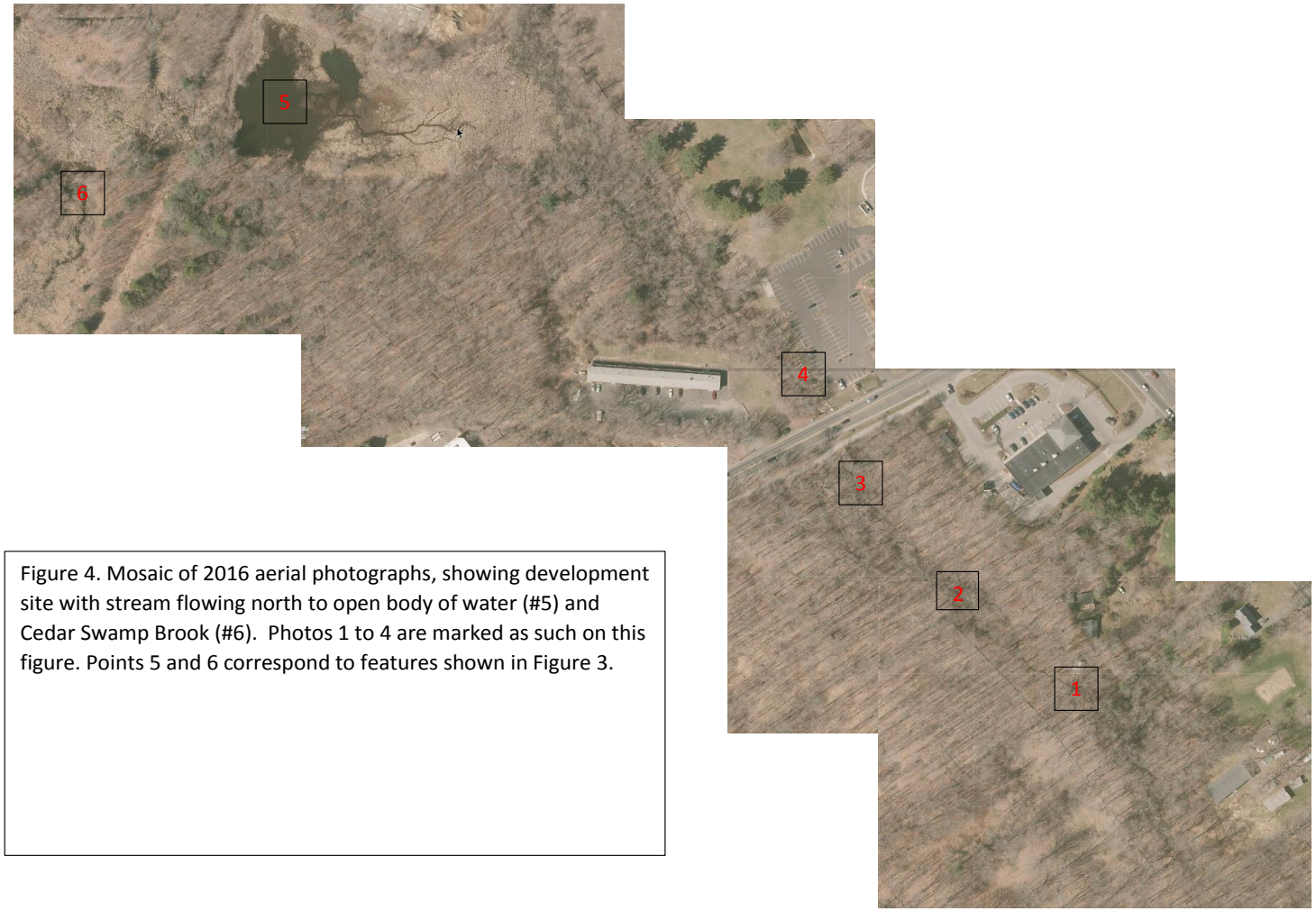


Figure 4. Mosaic of 2016 aerial photographs, showing development site with stream flowing north to open body of water (#5) and Cedar Swamp Brook (#6). Photos 1 to 4 are marked as such on this figure. Points 5 and 6 correspond to features shown in Figure 3.

February 18, 2020

Jennifer Kaufman, AICP
Inland Wetland Agent/ Environmental Planner
Town of Mansfield
4 S Eagleville Road
Storrs, Mansfield, CT 06268

RE: Inland Wetlands Agency application W1611-1 Application of J.E. Shepard Co. and Capstone Collegiate Communities, Construction of a 358-Unit Multi-Family Development at 1621 Storrs Road and Middle Turnpike (Assessor Parcel IDS 9.23.1.9.23.7 and 93.23.8)

Dear Ms. Kaufman:

I am a 26-year resident of the Town of Mansfield and have come to love this town and the benefits of having the University of Connecticut nearby. Formed in 1701 the Town of Mansfield has been a model town in the State of Connecticut with excellent schools, attention to the preservation of our natural resources, and deliberate about the sustainable growth of our town.

Formed in 1881, the University of Connecticut has grown and evolved to meet the needs of its students and the State of Connecticut. However, the petition for intervention into the J.E. Shepard Company and Capstone Collegiate Communities application for the construction of a 358-unit multi-family development is both inappropriate and invasive, as we encourage the smart development of the Four Corners Area.

In 2018, after nearly a decade of debate and negotiation, a sewer and water expansion project was begun to address groundwater pollution due to faulty septic systems and leaks from nearby gasoline stations. At a cost of more than $6 million to the Town, much of which will be paid for by users of the new sewer and water systems, we now have the capacity to embark on projects that will enhance the quality of life for our residents, including students at UConn who may wish to live off campus. After all the years of discussion and planning, we now need to move forward with Mansfield's goals of more affordable housing, increased real estate taxes and improved quality of life in residential neighborhoods.

The applicant took great care to design a plan that has no direct impacts on wetlands, in addition to including a large conservation easement to protect the wetlands as well as an off-site vernal pool. Not only is the plan protective of wetlands during construction, but it has a comprehensive storm water management plan and has been responsibly researched to document that it will work as designed. It is evident that this developer has shown due diligence in the engineering and design of this project and has used highly qualified experts to ensure that the highest standards of environmental responsibility were met.

In reviewing the extraordinary efforts that UConn has gone to secure legal services and environmental consultants to present an opposition petition to the Inlands Wetlands Agent, it occurs to me that spending State money and State employee resources to fight economic development in Mansfield that is consistent with the Town's own Plan of Conservation and Development is an inappropriate use of those funds. The University made clear its opposition to this project on the basis that some students might move off campus and leave a financial gap that would need to be filled by

raising tuition. As a taxpayer, this might be of concern to me, however, the offset of significant tax revenue to the Town of Mansfield from this new development negates the reasonability of this argument.

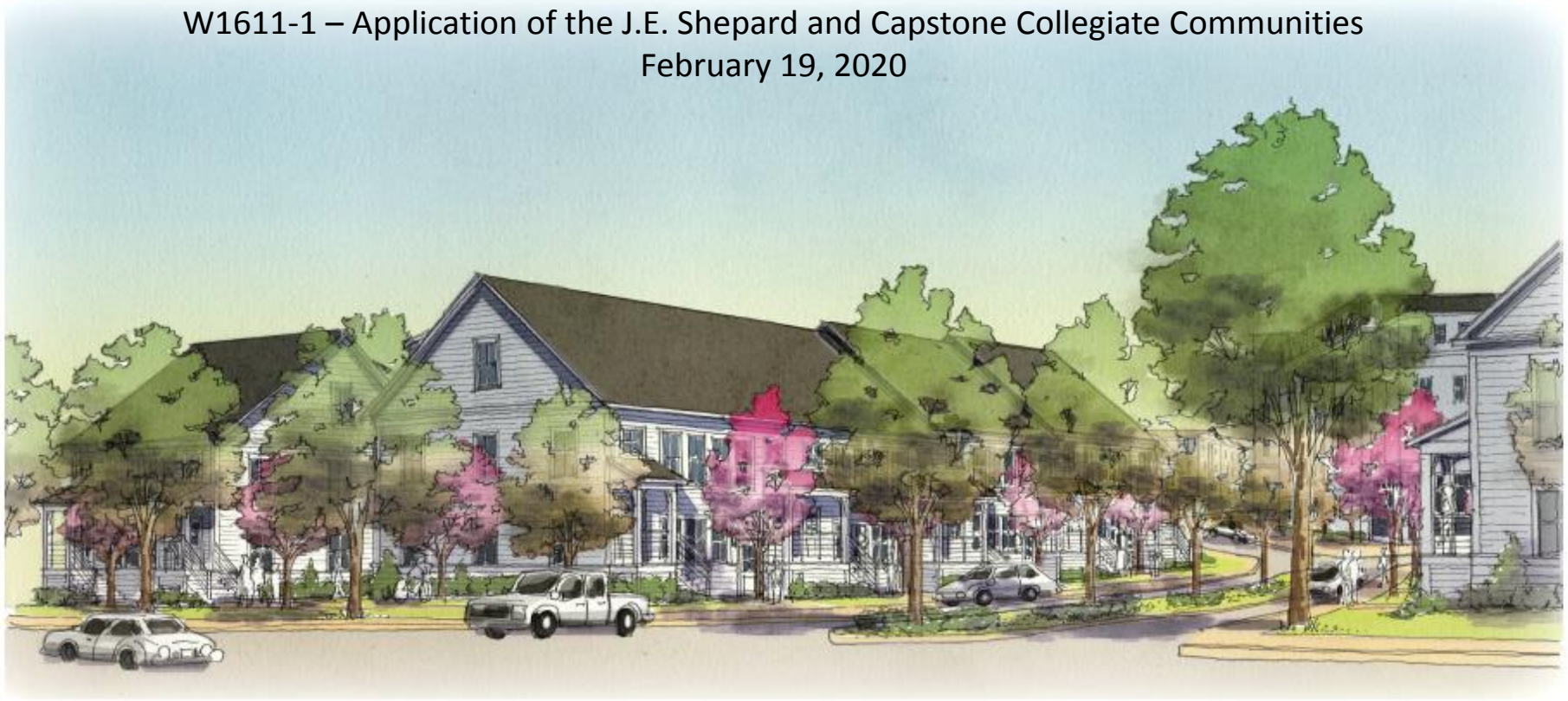
I feel strongly that UConn needs to adopt a position of cooperation and collaboration, not competition. We cannot be bullied into forfeiting what appears to be a residential development that fits Mansfield's Plan of Conservation and Development and the development of affordable housing for our community. To the contrary, UConn is now taking aggressive actions that go well beyond the concerns expressed by Mayor Moran in a proposed February 10, 2020 letter to the University. In fact, UConn is actively opposing specific applications for development under Town jurisdiction that will be served by Town sewers.

I urge the members of the Inlands Wetlands Commission to work closely with this developer who has invested an impressive amount of time and money to create a plan that addresses important long-term town goals for this critical location and respects and protects the natural resources. Not to do so will be irresponsible and unfair to the rest of the residents of our town. We have invested over a decade of time and money to the responsible development of the Four Corners area of town and the time is now to move forward with this plan.

Sincerely,

Mona Friedland
35 Beech Mountain Road
Mansfield, CT 06250-1604

Town of Mansfield - Conservation Commission
W1611-1 – Application of the J.E. Shepard and Capstone Collegiate Communities
February 19, 2020



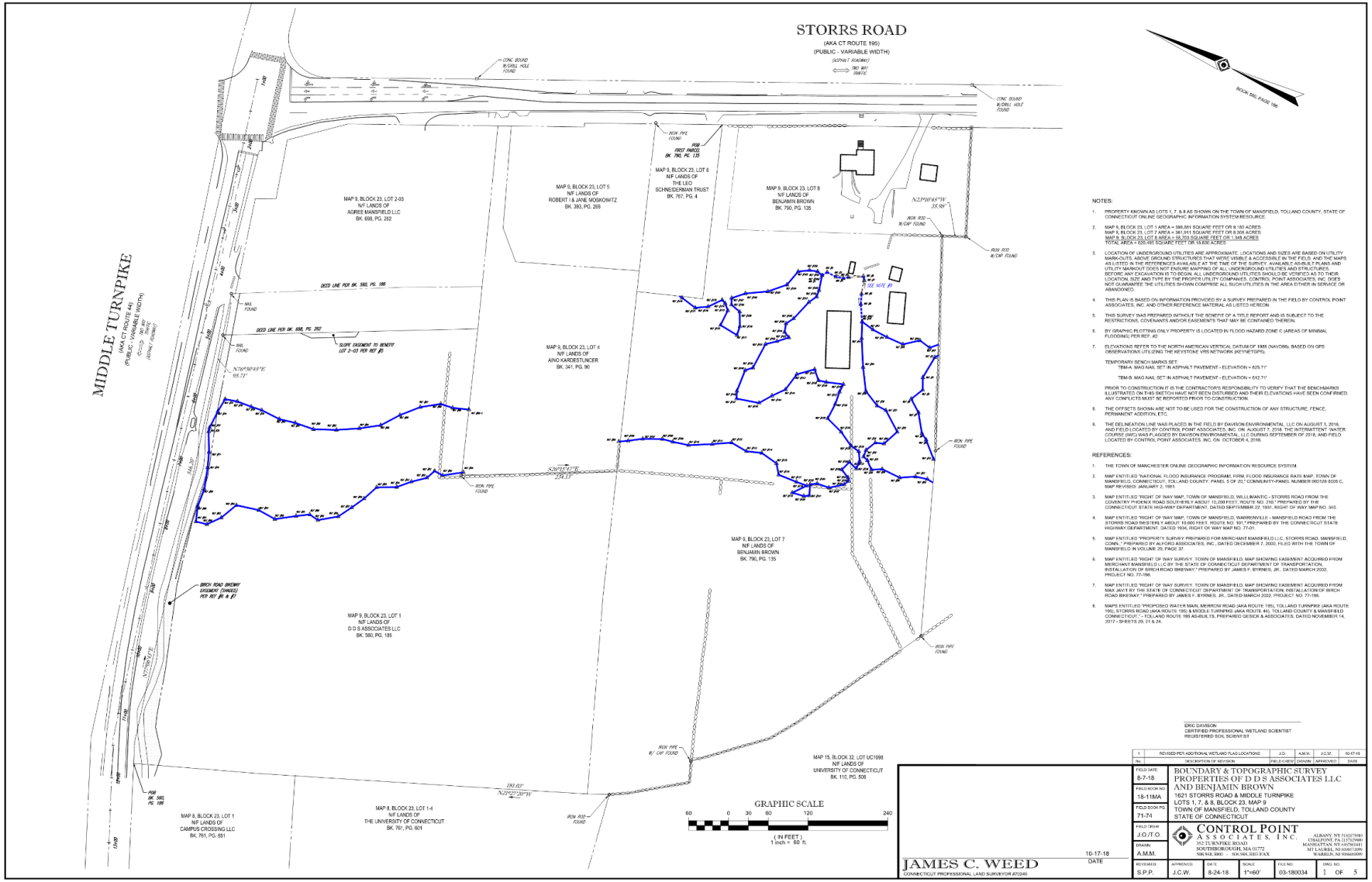
PERSPECTIVE VIEW FROM ROUTE 44
FEBRUARY 10, 2020

UNION STUDIO

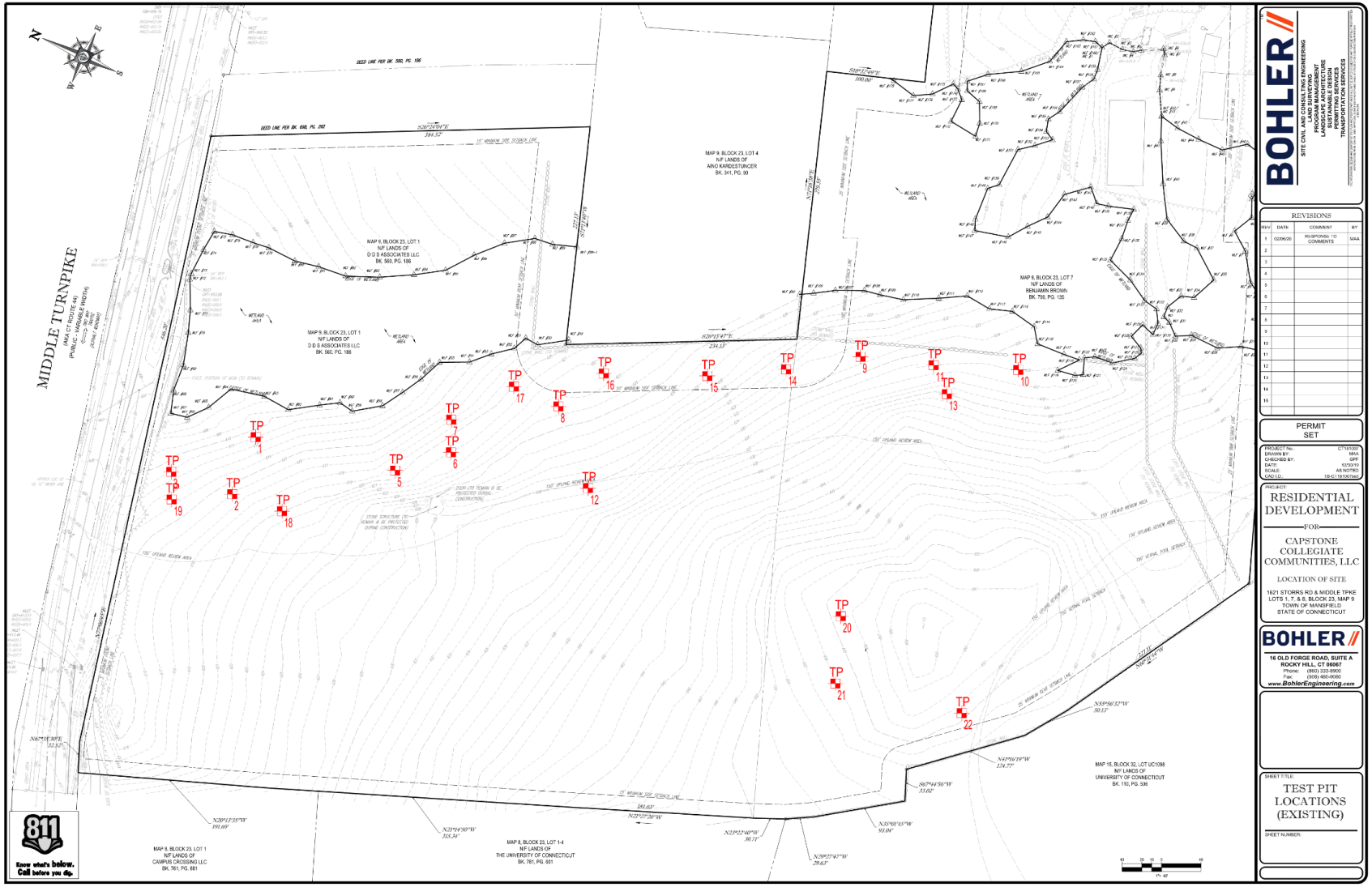
ROUTE 44
ROUTE 195
DISCOVERY DR
ROUTE 44
N. EAGLEVILLE RD
S. EAGLEVILLE RD

Aerial of Four Corners Area

Wetland Delineation Map



Test Pit Locations



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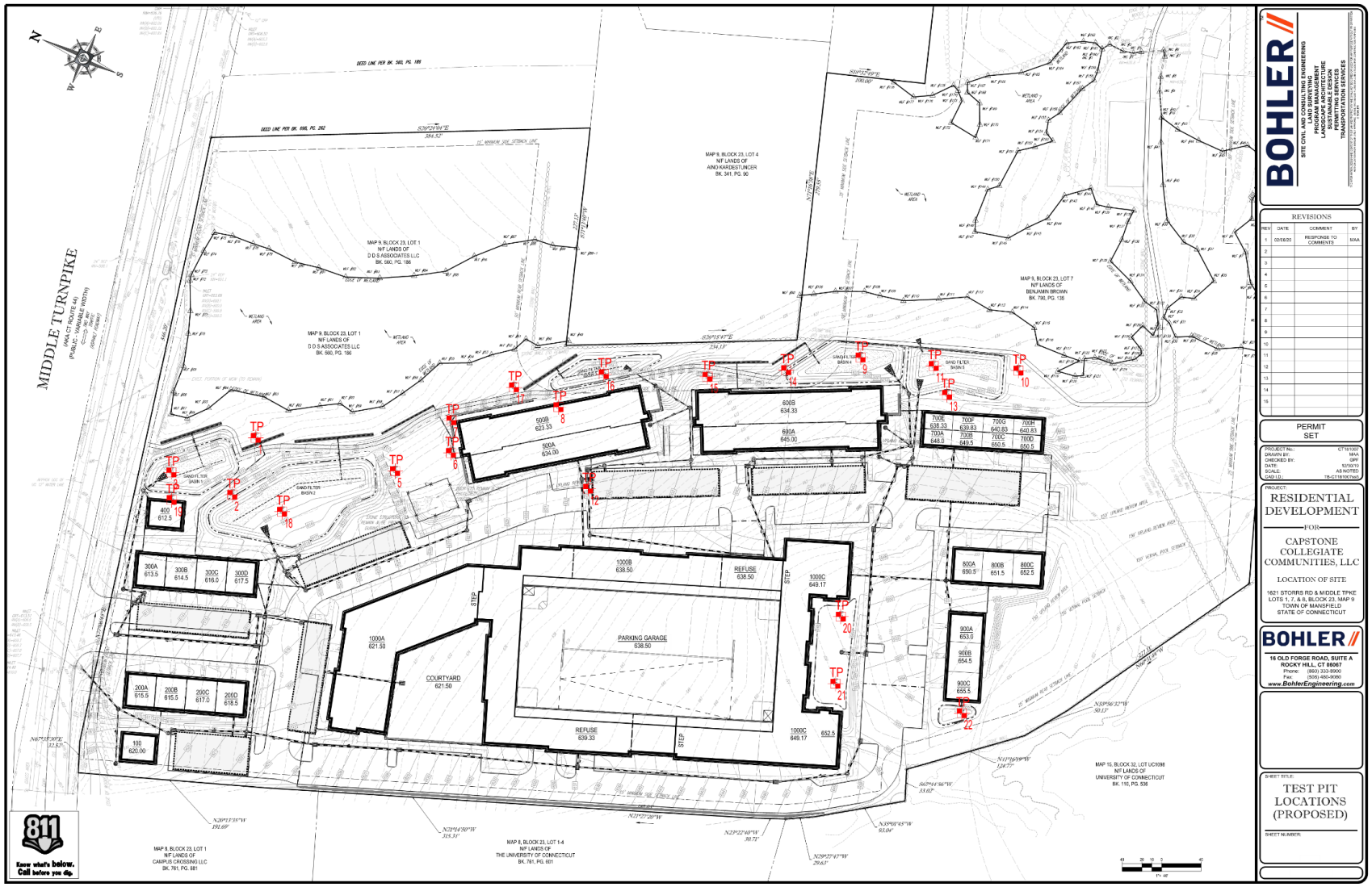

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND DEVELOPMENT
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SURVEYING
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	BY
1	03/06/20	RESPONSE TO COMMENTS	MAA
2			
3			
4			
5			
6			
7			
8			
9			
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11			
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13			
14			
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PERMIT SET

PROJECT No.: CT16100
DRAWN BY: MAA
CHECKED BY: GPF
DATE: 12/30/19
SCALE: AS NOTED
CAD I.D.: TB-CT16100(Test)

PROJECT:
RESIDENTIAL DEVELOPMENT
FOR
CAPSTONE COLLEGIATE COMMUNITIES, LLC

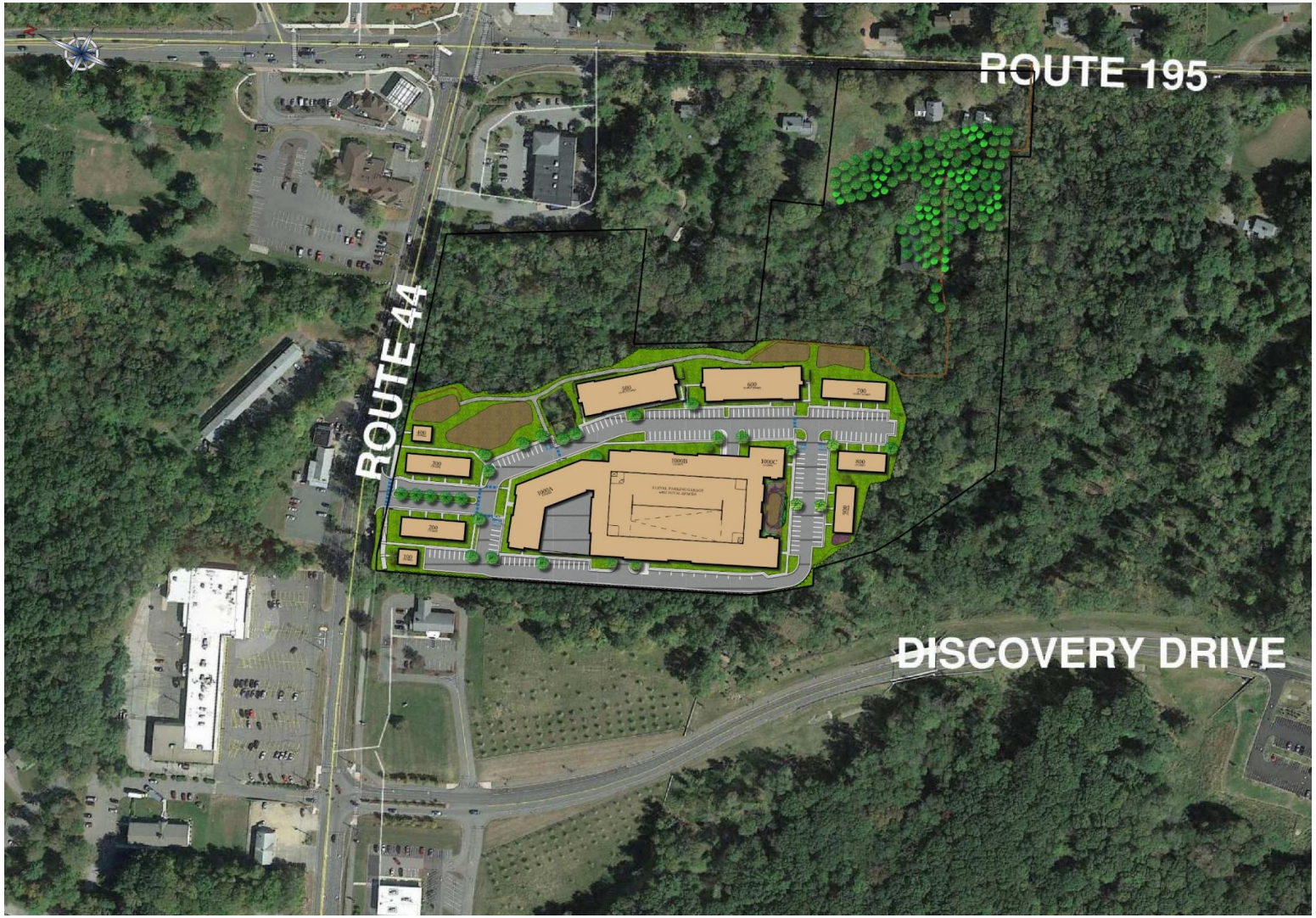
LOCATION OF SITE
1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER
16 OLD FORGE ROAD, SUITE A
ROCKY HILL, CT 06067
Phone: (860) 333-9900
Fax: (508) 480-9080
www.BohlerEngineering.com

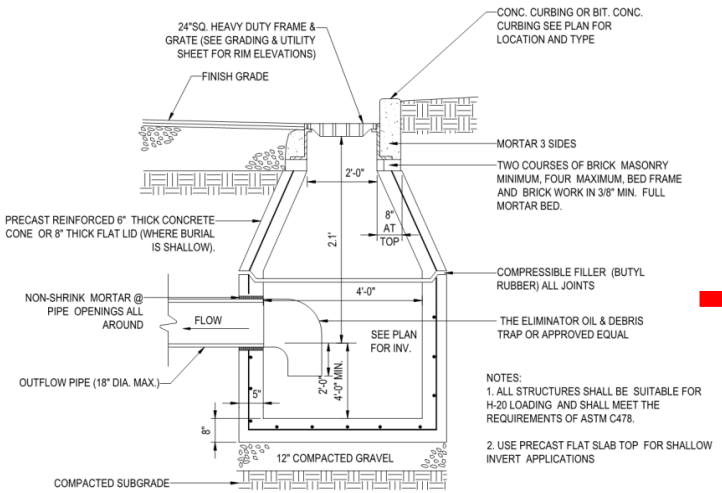
SHEET TITLE:
TEST PIT LOCATIONS (PROPOSED)

SHEET NUMBER:

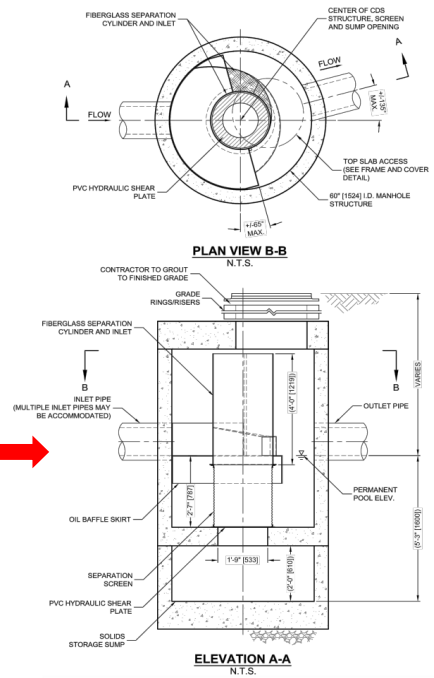
Site Plan



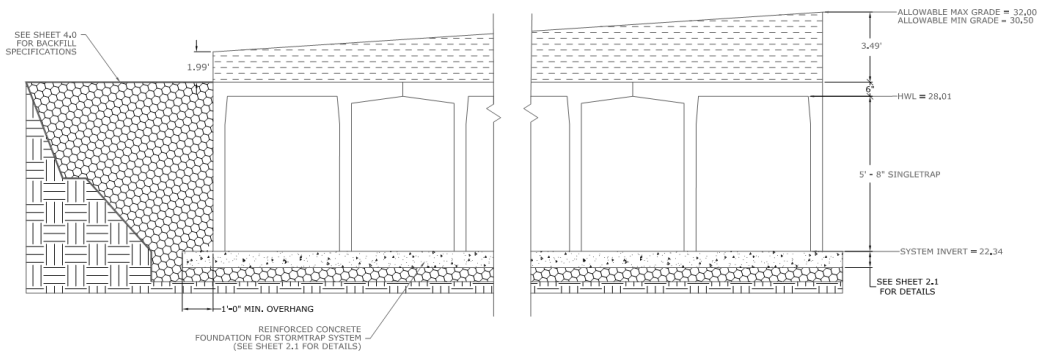
Stormwater Treatment Train



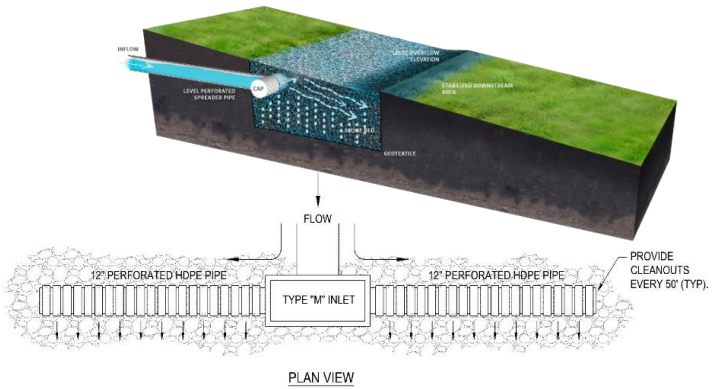
CONCRETE HOODED DEEP SUMP CATCH BASIN DETAIL

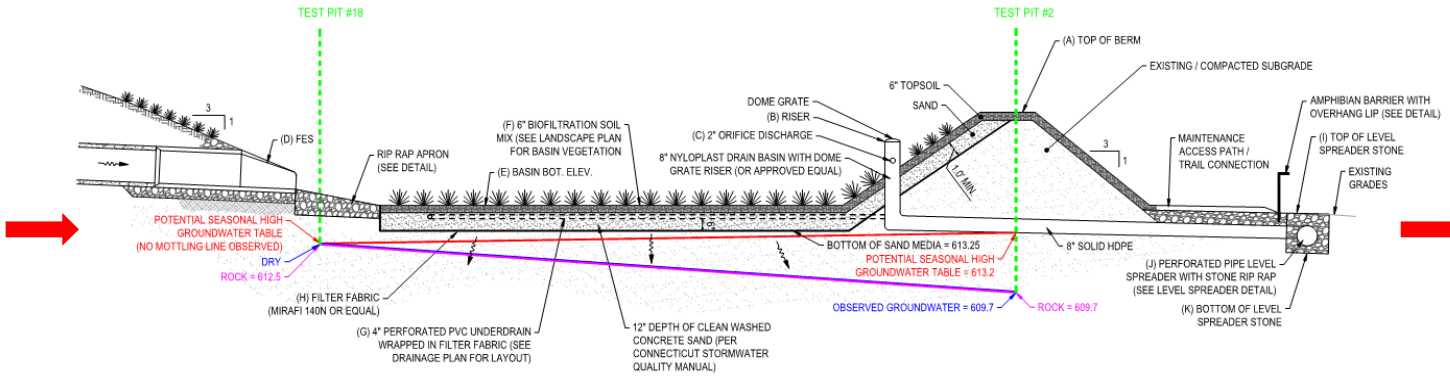


CONTECH CDS UNIT 2020-5-C DETAIL

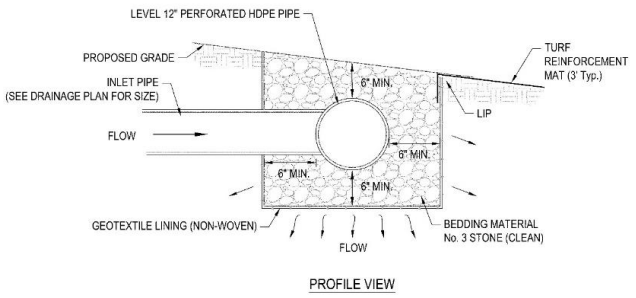


STORMTRAP UNDERGROUND DETENTION



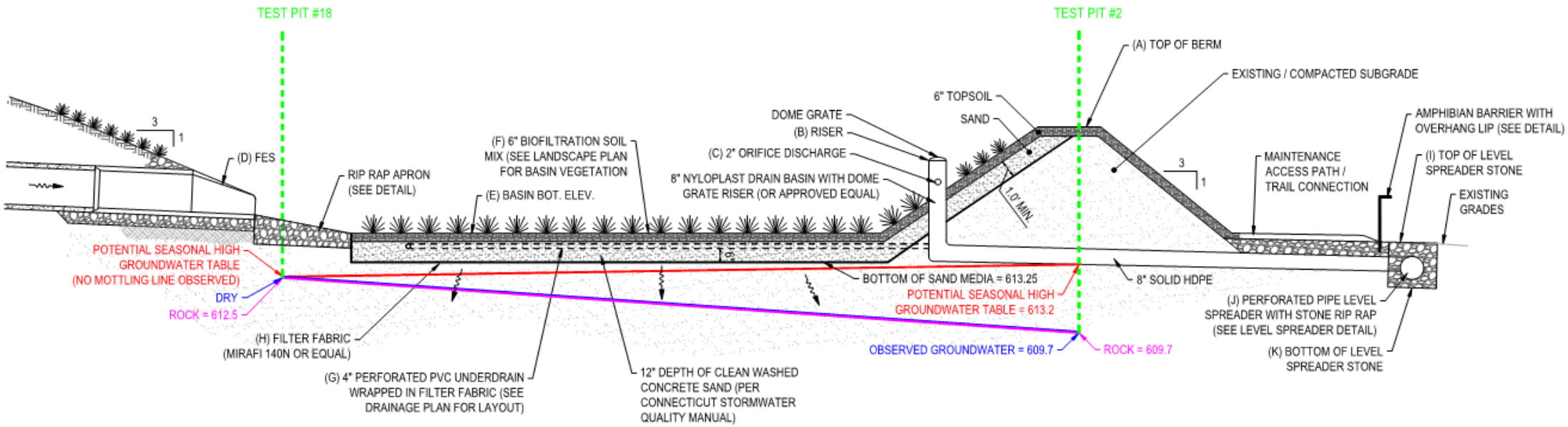


SAND FILTER BASIN

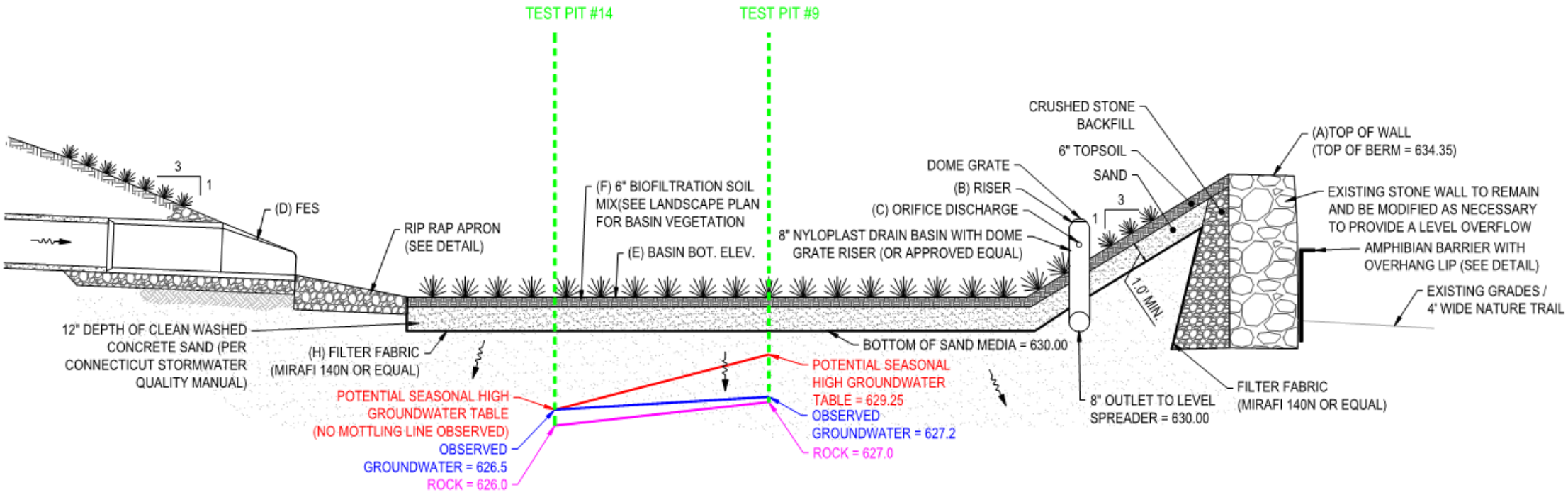


LEVEL SPREADER

Sand Filter Example



Leaky Stone Wall Example



Filter Basin Examples

Root Cellar

Root Cellar Plan

CONTRACTOR TO REMOVE (2) TREES TAGGED WITH PINK TAPE AND (1) TREE IN FRONT OF THE ROOT CELLAR ENTRANCE. STUMPS TO BE GROUNDED AND FULLY REMOVED.

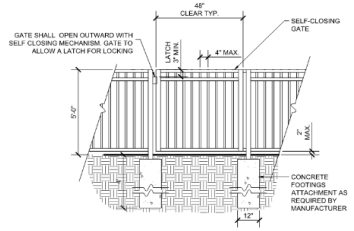
CONTRACTOR TO REMOVE PLASTIC TARP IN BETWEEN THE TOP SLABS. CONTRACTOR TO REPOINT TOP SLAB

CONTRACTOR TO REPLACE FIELD STONE THAT IS MISSING FROM THE RIGHT SIDE OF THE ROOT CELLAR ENTRANCE. WORK TO BE APPROVED BY CT STATE ARCHEOLOGIST

CONTRACTOR TO GROUT ALL JOINTS. WORK TO BE APPROVED BY CT STATE ARCHEOLOGIST

CONTRACTOR TO GENTLY REMOVE ROOTS AND INVASIVE PLANTS AROUND STRUCTURE.

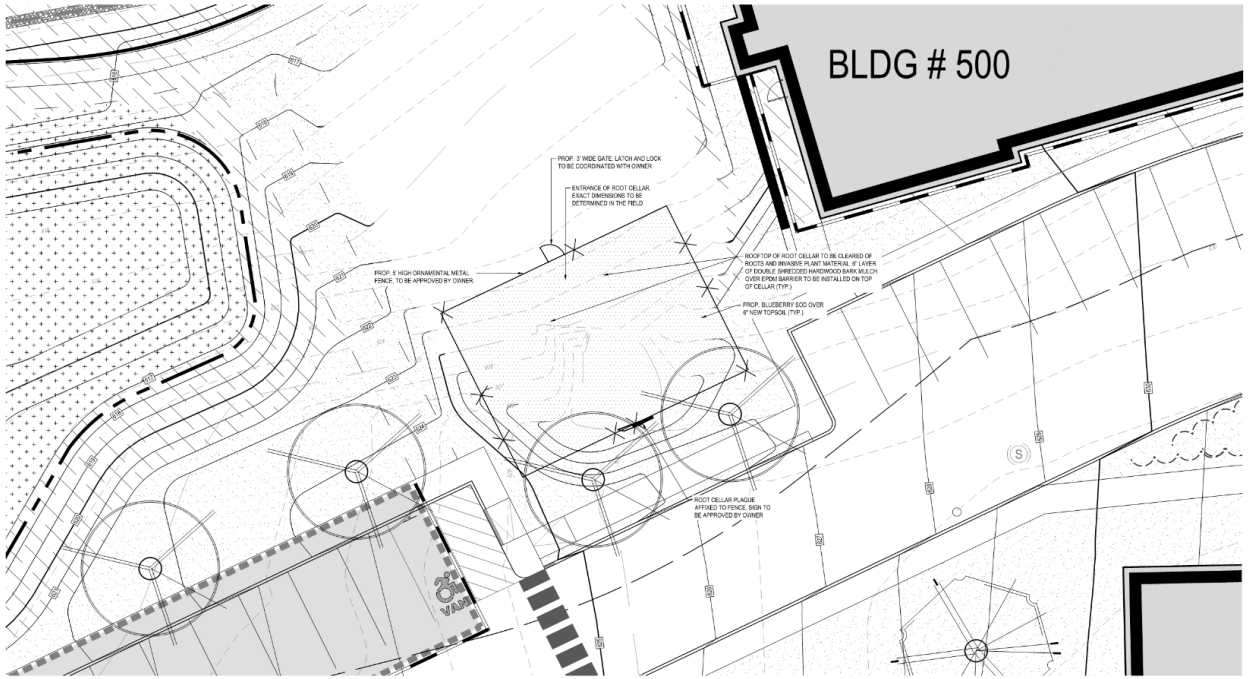
EXISTING ROOT CELLAR



NOTES:
1. ALUMINUM FENCE, GATE, AND ALL HARDWARE SHALL BE BLACK IN COLOR
2. CONTRACTOR SHALL VERIFY THAT ALL FENCING MEETS APPLICABLE STATE, LOCAL, AND FEDERAL CODES
3. SUBMIT SHOP DRAWINGS/SAMPLES TO BE APPROVED BY OWNER.

ORNAMENTAL FENCE

SCALE: NTS



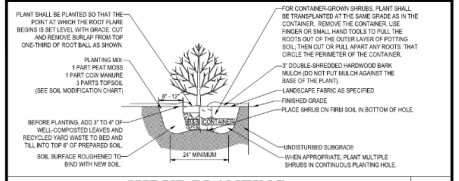
STANDARD FOR PERMANENT STABILIZATION WITH BLUEBERRY SOD

METHODS AND MATERIALS
1. BLUEBERRY SOD SHOULD BE FREE OF WEEDS AND UNDESIRABLE COARSE WEEDY GRASSES. SOD VARIETY SHOULD BE VACCINIUM AUGUSTIFOLIUM OR APPROVED EQUAL
2. BLUEBERRY SOD SHOULD NOT EXHIBIT HOLES GREATER THAN 6".
3. SOD SHOULD BE VIGOROUS AND DENSE. BROKEN PADS OR TORN AND UNEVEN ENDS WILL NOT BE ACCEPTABLE.
4. ONLY MOIST, FRESH, UNHEATED BLUEBERRY SOD SHOULD BE USED. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

I. SITE PREPARATION
A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR LIMING, FERTILIZING, AND SOIL PREPARATION. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARD FOR LAND GRADING.

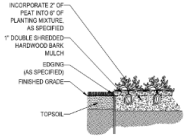
II. SOIL PREPARATION
A. CONTRACTOR SHALL CONTACT BLUEBERRY SOD VENDOR AND AMEND SOIL PER THEIR RECOMMENDATION

III. SOD PLACEMENT
A. SOD STRIPS SHOULD BE LAID ON THE CONTOUR, NEVER UP AND DOWN THE SLOPE, STARTING AT THE BOTTOM OF THE SLOPE AND WORKING UP. ON STEEP SLOPES, THE USE OF LADDERS WILL FACILITATE THE WORK AND PREVENT DAMAGE TO THE SOD. DURING PERIODS OF HIGH TEMPERATURE, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY PRIOR TO LAYING THE SOD.
B. PLACE SOD STRIPS WITH TIGHT, EVEN JOINTS THAT ARE STAGGERED. OPEN SPACES INVITE EROSION.
C. ROLL OR TAMP SOD IMMEDIATELY FOLLOWING PLACEMENT TO INSURE SOLID CONTACT OF ROOT MAT AND SOIL SURFACE. DO NOT OVERLAP SOD. ALL JOINTS SHOULD BE BUTTED TIGHTLY IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS.
D. ON SLOPES GREATER THAN 3 TO 1, SECURE SOD TO SURFACE SOIL WITH WOOD PEGS, WIRE STAPLES, OR SPLIT SHINGLES (8 TO 10 INCHES LONG BY 3/4 INCH WIDE).
E. SURFACE WATER CANNOT ALWAYS BE DIVERTED FROM FLOWING OVER THE FACE OF THE SLOPE, BUT A CAPPING STRIP OF HEAVY JUTE OR PLASTIC NETTING, PROPERLY SECURED, ALONG THE CROWN OF THE SLOPE AND EDGES WILL PROVIDE EXTRA PROTECTION AGAINST LIFTING AND UNDERCUTTING OF SOD. THE SAME TECHNIQUE CAN BE USED TO ANCHOR SOD IN WATER CARRYING CHANNELS AND OTHER CRITICAL AREAS. WIRE STAPLES MUST BE USED TO ANCHOR NETTING IN CHANNEL WORK.
F. IMMEDIATELY FOLLOWING INSTALLATION, SOD SHOULD BE WATERED UNTIL MOISTURE PENETRATES THE SOIL LAYER BENEATH SOD TO A DEPTH OF 4 INCHES. MAINTAIN OPTIMUM MOISTURE FOR AT LEAST TWO WEEKS, AND CONTINUE IRRIGATION THROUGHOUT ENTIRE SEASON.



SHRUB PLANTING DETAIL

N.T.S.



GROUNDCOVER PLANTING

N.T.S.

UConn Office of State Archaeology

UCONN
UNIVERSITY OF CONNECTICUT

12 February 2020

David Fresk
J.E Shepard Company
200 Sullivan Avenue
South Windsor, CT 06074

RE: Root Cellar Landscape Plan
Capstone Collegiate, LLC
1621 Storrs Road, Route 44
Mansfield, Connecticut

Dear David,

The Office of Connecticut State Archaeology has had the opportunity to review the root cellar plan for the above-named proposed development. Our office appreciates your effort to preserve in place this wonderful example of a historic late 18th and 19th centuries stone root cellar structure. These features would have been used as historical "refrigerators" allowing for vegetable and fruit produce to be preserved for household and commercial use. This particular structure is relatively large and has great integrity. It is an excellent example of the Town of Mansfield's agrarian past and worthy of preservation.

Our office approves the proposed preservation plan. Fencing is appropriate for security and liability purposes. The proposed cleanup and plantings will enhance the site and the plaque marker narrating the history of the root cellar will help create awareness of the town's history. We would be pleased to provide input for the interpretive marker and develop public educational programs associated with the root cellar for students and town residents.

We appreciate the efforts you have made, first working with former State Archaeologist Brian Jones, and later, myself, in conducting field and plan reviews for the root cellar's preservation.

Please feel free to contact me at the university should you have any questions.

Sincere regards,

Nicholas F. Bellantoni, PhD

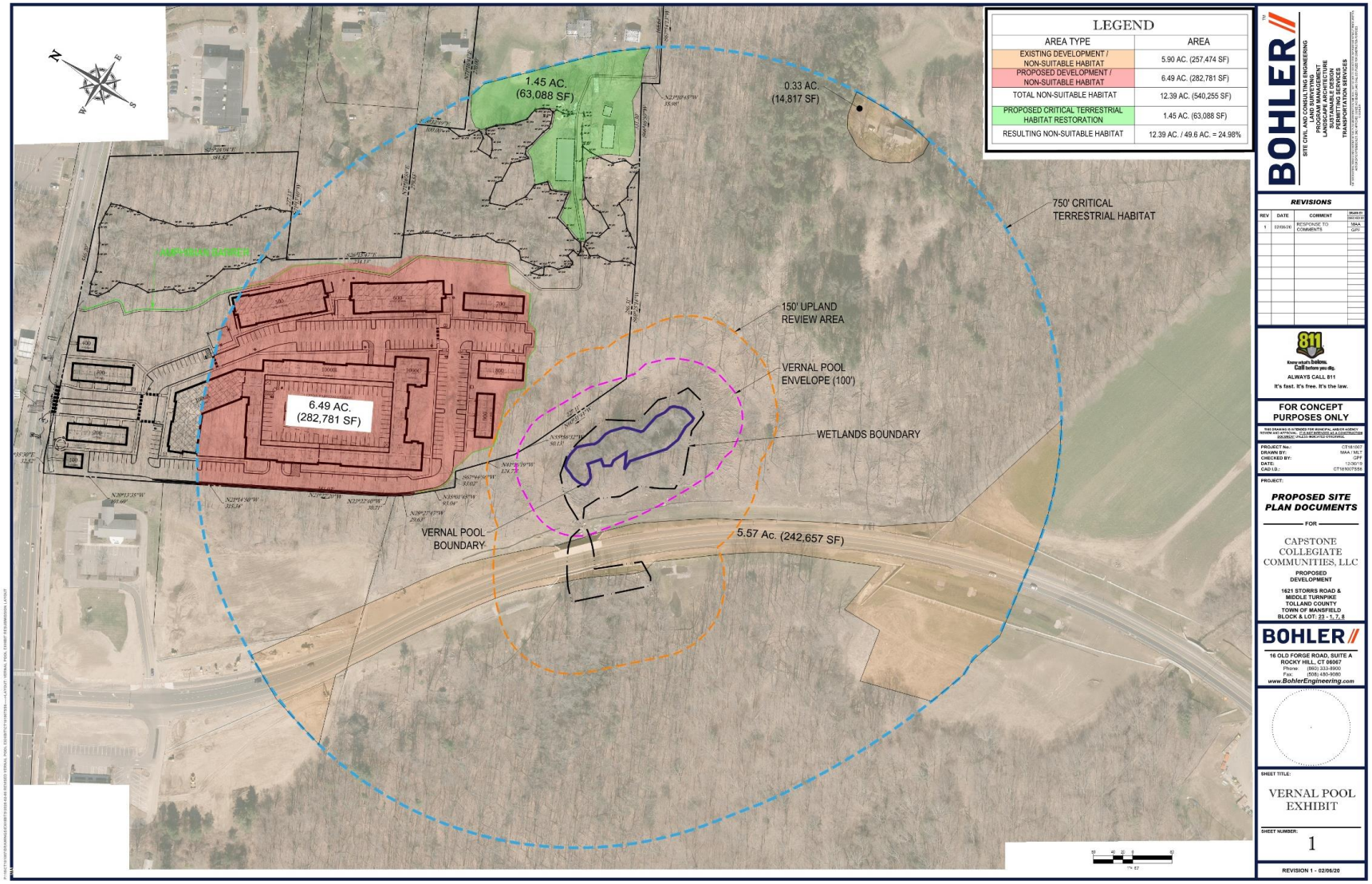
Emeritus and Interim Connecticut State Archaeologist

Office of State Archaeology
Connecticut State Museum of Natural History
2019 HILLSIDE ROAD, UNIT 1023
STORRS, CT 06269-1023
Brian.Jones@uconn.edu
PHONE 860.486.5248

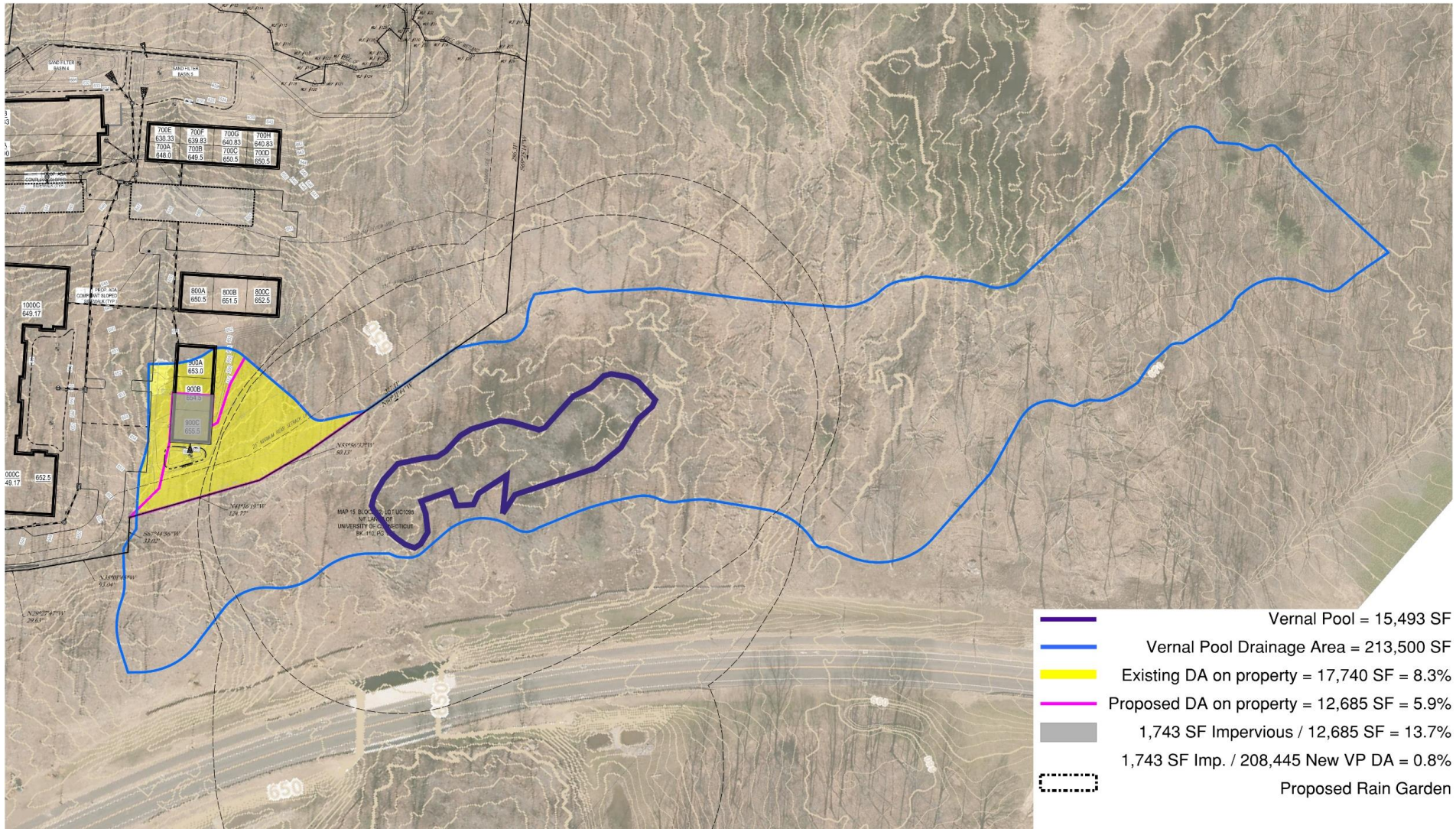
Off-Site Vernal Pool

Project Site – Landscape Context

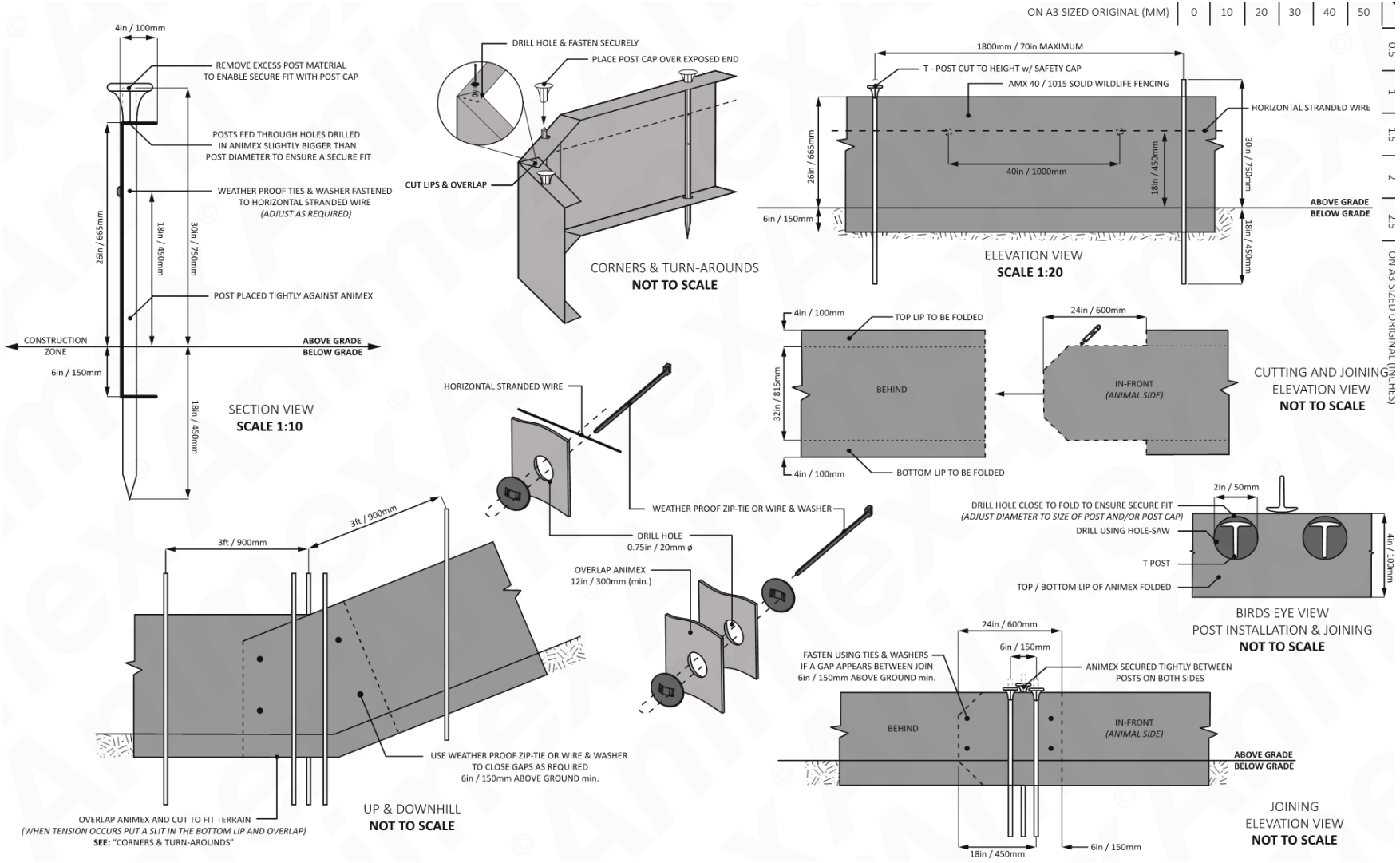
Vernal Pool – Critical Terrestrial Habitat (CTH) Area



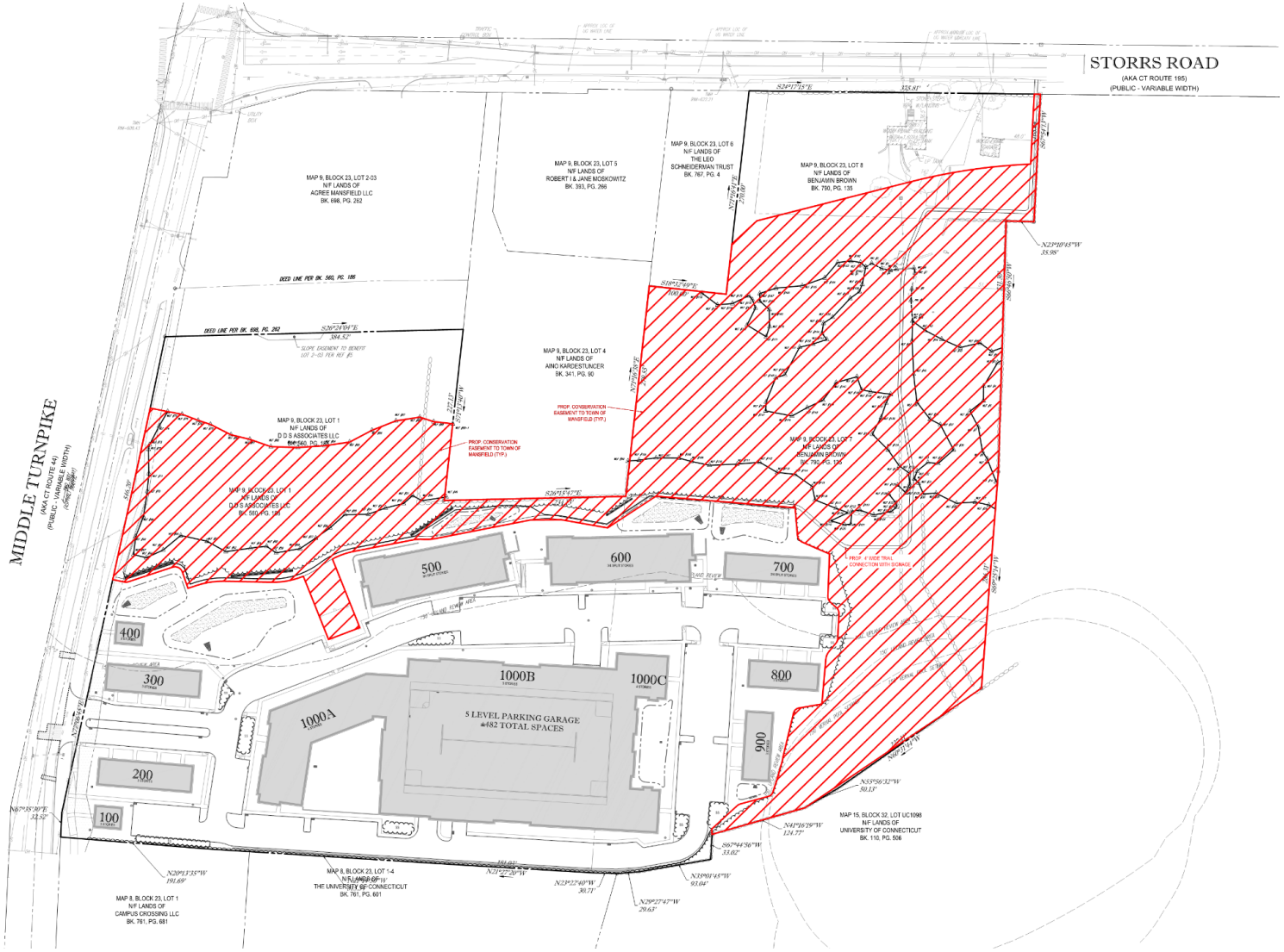
Vernal Pool – Contributing Drainage Area



Conservation Actions: Amphibian Barrier



Conservation Actions: Conservation Easement



MEMO

To: Mansfield Inland Wetlands Agency

From: Jennifer Kaufman, AICP, Senior Planner/Inland Wetlands Agent

Date: November 25, 2019

Subject: Application of the Mansfield Non-Profit Housing Development Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd (Parcel ID 16.57.5)(IWA File W-1612)

PROJECT OVERVIEW

☐ The project includes work in wetlands.

☒ The project includes work in the 150-foot upland review area.

☒ The project is located in a Public Water Supply watershed.

The Mansfield Non-Profit Housing Development Corporation is proposing to construct a multi-family housing development consisting of seven (7) buildings, 81 parking spaces and other associated site improvements on a 5.2- acre property located at 113-121 S. Eagleville Rd (Parcel ID 16.57.5). There is no proposed development in the wetlands. There will be approximately 1.14-acres of disturbance in the upland review with the closest disturbance being 10 feet from the edge of wetlands.

While there is no proposed development within wetlands, because of the amount of disturbance within the upland review area a public hearing is warranted pursuant to section 9.0 of the Regulations. Staff recommends that the Agency engage the services of an independent consultant to provide technical review of the project. Section 8.6 of Mansfield's Inland Wetlands and Watercourses Regulations and the Fee Schedule established in Article V, Chapter 122, Section 122-12 of the Mansfield Code of Ordinances authorizes the Agency to hire independent consultants at the expense of an applicant when the Agency deems it necessary to do so.
On November 15, 2019, staff sent a request for proposals to the Agency's list of approved on-call technical consultants. The following firms have submitted proposals that are included for your review.

Staff will provide the IWA with a recommended firm at your meeting.

PLANNING MANAGEMENT

View

PROJECT

Case Name: Mansfield Non-Profit Housing Development Corporation Mult

PROPERTY INFORMATION

Properties: **Primary:** 113-121 SO EAGLEVILLE RD CT (16.57.5) (16.57.5)

INFORMATION

Approval #:		Status:	Created
Case #:	W-19-0068	Application Date:	11/25/2019
Case Type:	Wetlands Activity	Issued Date:	
Subcases:	Inland Wetlands - IWA	Expiration Date:	
Online Authentication Code:			

Description Of Work: The proposed project is located on approximately 5.2 acres of property at 113-121 South Eagleville Road. The property generally consists of the construction of multi-story mixed-housing in seven (7) buildings, surface parking for approximately 81 vehicles spaces, and other "typical" site improvements to support the proposed building program. These other site improvements consist of but are not limited to, drainage and grading, utility design, and landscape enhancements. Proposed access to the Site is via two driveways intersecting South Eagleville Road.

ADDITIONAL INFORMATION

IWA File No: W1612

ACTION DATES AND DEADLINES

Date Application Filed:	11/25/2019	Deadline for Decision:	
Decision Date:		Deadline to Advertise Decisions:	
Date Decision Advertised:			

NOTIFICATION DATES AND DEADLINES

Deadline for Abutter Notification:		Date of Abutter Notification:	
Deadline of DPH Notification:		Date of DPH Notification:	

Planning Management (W-19-0068)

Case Type: Wetlands Activity Inland Wetlands - IWA
Start Date: 11/25/2019
Status: Created
Issued Date:

ee Charges (3)

Item: Admin Fee
Amount: $2.00
Fee Assessed By: Jennifer Kaufman

Item: Land Use Fee
Amount: $58.00
Fee Assessed By: Jennifer Kaufman

Item: Wetlands Agency Fee
Amount: $1,000.00
Fee Assessed By: Jennifer Kaufman

Total Amount: $1,060.00
Amount Paid: $1,060.00
Amount Due: $0.00

ontacts (3)

Property Owner
Rebecca Fields (Mansfield Nonprofit Housing Development Corporation)
309 Maple Road Storrs, CT 06268
EDIT

Applicant
Rebecca Fields (Mansfield Nonprofit Housin Development Corporation)
309 Maple Road Storrs, CT 06268
EDIT

Property Owner
MANSFIELD NON-PROFIT HOUSING DEVELOPMENT
309 MAPLE RD STORRS, CT 06268
EDIT

roperties (1)

[16.57.5]
113-121 SO EAGLEVILLE RD CT

Historic District?	No
Within 150' of a wetland or watercourse?	Yes
Historic Village	N/A
Public Water Supply Watershed	Yes
Scenic Road?	No
Parcel ID	16.57.5
Zone	RAR-90
Map	16
Acreage	4.49
Subregional Drainage Basin	Fenton River
Block	57
USGS Quadrangle	Spring Hill
Natural Diversity Database (NDDB)	No

nspections (1)

Wetlands Inspection
Date:
Status: Unscheduled
Inspector:
Results: Pending

Deadline of Water Company Notification:		Date of Water Company Notification:	
Deadline for Adjoining Municipality Notification:		Date of Adjoining Municipality Notification:	

PUBLIC HEARING DATES AND DEADLINES

Advertising Date 1:		Advertising Date 2:	
Deadline To Open Public Hearing:		Deadline To Close Public Hearing:	
Date Public Hearing Opened:		Date Public Hearing Closed:	

PARCEL DATA

Zoning Classification:	RAR-90	Natural Diversity Database (NDDB):	No
USGS Quadrangle:	Spring Hill	Public Water Supply Watershed:	Yes
Subregional Drainage Basin:	Fenton River	Acreage:	4.49

PROJECT CRITERIA

1. How close will the proposed activity be from the edge of wetlands/watercourses? (feet):	10	2. Does the area of activity drain towards the wetlands/watercourses?:	Yes
3. Quantify the area of disturbance in the wetlands/watercourses (square feet):	0	4. Quantify the area of disturbance within 150 feet of wetlands/watercourse (square feet):	49807
5. Equipment/machinery used:	Bulldozers, excavators,		
6.1a Quantify the volume of materials being extracted in the wetlands/watercourses(cubic yards):	0	6.1b Quantify the volume of materials being deposited in the wetlands/watercourses(cubic yards):	0
6.1c Quantify the volume of materials being dispersed throughout the site in the wetlands/watercourses(cubic yards):	0		

ocuments (1)

fees_receipt_434_1575_434_11-26-2019-0.pdf
No Description
uploaded on 11/26/2019

agged Cases (0)

There are no Tagged Cases at this time.

Add Tag

ctivities (25)

Payment Applied.
jenniferk has applied a payment for Wetlands Agency Fee via Check Ck#11134
09:47:23 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Payment Applied.
jenniferk has applied a payment for Land Use Fee via Check Ck#11134
09:47:23 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Payment Applied.
jenniferk has applied a payment for Admin Fee via Check Ck#11134
09:47:22 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Fee Updated.
jenniferk has updated the fee Wetlands Agency Fee
09:46:26 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Planning Management Case Updated.
Jennifer Kaufman has updated planning management case #W-19-0068.
09:45:43 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Show all 25 Activities

6.2a Quantify the volume of materials being extracted within 150 feet of wetlands/watercourse(cubic yards): 1845

6.2b Quantify the volume of materials being deposited within 150 feet of wetlands/watercourse(cubic yards): 514

6.2c Quantify the volume of materials being dispersed throughout the site within 150 feet of wetlands/watercourse(cubic yards):

7.1 Describe the material deposited in the wetlands: None

7.2 Describe the material deposited within 150 feet of the wetlands: General Fill

8. Erosion and sedimentation controls proposed: Silt Fence

9. Are there other measures proposed to protect the wetlands/watercourses: No

10. Will the proposed activities impact the wetlands/watercourses of an adjoining property:	No	**11. What alternatives have you considered that would have less impact to the wetlands/watercour**	There were many considerations made to create less of an impact to the wetlands during design. For starters, we decreased the parking on the eastern side of the site in order to keep from grading into, as well as increasing impervious near the wetlands. Additionally, gardens were originally proposed next to the wetlands, but were eliminated in our design to enhance our efforts in creating as little disturbance on the border of the wetlands. The play area was formerly larger in size and the grading was therefore spread to the wetlands. The play area was greatly reduced in size allowing the grading to be tucked back towards the
12. Are the activities that you propose within 500 ft. of the adjoining municipality:	No	**13. Do the activities that you propose have the potential to cause traffic impacts to the adjacent municipality:**	No
14. Do the activities that you propose have the potential to cause water run-off impacts to the adjoining municipality:	No	**Conditions of Approval:**	
Held For:			

BSC GROUP
Transportation ▪ Energy ▪ Land Development

300 Winding Brook Drive
Glastonbury, CT 06033

Tel: 860-652-8227
800-288-8123

www.bscgroup.com

November 25, 2019

Planning and Development Department
Mansfield Town Hall
4 South Eagleville Road
Stors, CT 06268

RE: Site Plan Application and Wetlands Application Submission

To Whom It May Concern:

We are pleased to submit this package for your review. Please find enclosed the following documents as part of this submission:

Application Package

- Site Plan Application Form
- Site Plan Checklist
- Geotechnical Report
- Wetland Characterization Report
- Affordability Plan
- Windham Water Works Notification
- CT State IWW Activity Reporting Form
- Drainage Easement
- Connecticut Water Letter
- Traffic Summary
- IWW Application (Submitted Online)
- IWW Checklist (Found Online)
- Stormwater Management Report

Drawing Package – 1 Full Size Set and 2 Full Size Copies

- T-1.0 Title Sheet
- Sheet 1 Survey
- Sheet 1of 1 Survey
- Sheet 2 of 2 Survey
- EC-1.0 Existing Conditions Plan
- OV-1.0 Overall Site Improvements
- G-1.0 General Notes
- C-1.0 Erosion and Sedimentation Control Plan
- C-2.0 Site Preparation Plan
- C-3.0 Layout and Materials Plan
- C-4.0 Grading and Drainage Plan
- C-5.0 Utility Plan
- C-5.1 Sanitary Sewer Plan and Profile
- C-6.0-6.5 Details
- C-7.0 Intersection Sight Distance Plan
- L-1.0 Planting Plan
- L-1.1 Planting Ratios
- L-1.2 Shade Study
- L-2.0 Photometrics Plan
- A-1.1 Site Plan
- A-1.1A Site Information
- A-1.2 Overall First Floor Plan
- A-1.3 Overall Second Floor Plan
- A-2-1-2,3 Unit Type Plans
- A-3-1-3,7 Exterior Elevations

Please do not hesitate to contact Rob Newton at rnewton@bscgroup.com or 617-896-4564 with any inquiries you may have.

Very truly yours,
BSC Group-Connecticut, Inc.

Rachel Salch, PLA

Engineers
Environmental Scientists
Custom Software Developers
Landscape Architects
Planners
Surveyors

BSC GROUP
Transportation ▪ Energy ▪ Land Development

300 Winding Brook Drive
Glastonbury, CT 06033

Tel: 860-652-8227
800-288-8123

www.bscgroup.com

September 13, 2019

Ms. Kathleen A. Dorgan, FAIA, LEED-AP
Principal
Dorgan Architecture & Planning
10 Eastwood Road
Storrs, CT 06268

RE: Wetland Characterization of Wetland System adjacent to Proposed South Eagleville Road Housing Project
113-121 South Eagleville Road (SR 275)
Mansfield, Connecticut

Dear Ms. Dorgan:

BSC Group-Connecticut, Inc. (BSC) is pleased to provide the results of the wetland characterization of the wetland system adjacent to the proposed South Eagleville Road Housing Project located at 113-121 South Eagleville Road (SR 275) in Mansfield, Connecticut. The purpose of this report is to provide the results of the assessment of the wetland system located on site, summarize the observations of the environmental scientist, and provide general determinations of how the housing development may affect or enhance the ecological communities and functions of the wetland. BSC has also included some recommended management practices and other mitigative measures for the development to reduce potential impacts to the wetland system.

No wetland delineations were conducted.

Site Setting and Wetland Characterization

On September 4, 2019, BSC's wetland scientist Melissa Kaplan conducted a pedestrian survey of the wetland system perimeter to characterize the wetland and observe the general quality and function of the wetland system. The wetland is located south of South Eagleville Road and west of Knollwood Road in Storrs, Mansfield, Connecticut. A residence and associated maintained lawn are located to the west and the Knollwood Apartment complex is located to the south.

Surface water appears to flow into the wetland from a stream located to the south (off-property), as well as from South Eagleville Road to the north and from the yards of the residences to the west. Surface water then flows through a culverted outlet in the southeast corner (located off-property) of the wetland to a stream and additional wetlands located to the east. Eventually, the water flows to Tift Pond. No outlet was observed under South Eagleville Road, but the Property/Boundary Survey indicates an outlet is buried.

Engineers
Environmental Scientists
Custom Software Developers
Landscape Architects
Planners
Surveyors

The wetland is predominantly a scrub-shrub/herbaceous mixed wetland dominated with a red maple (*Acer rubrum*) and snag tree canopy in the center. Many of the trees in the wetland appear to be stressed or dead. The edges contained ash (*Fraxinus pennsylvanica*), red maple, willow (*Salix nigra*), and cottonwood (*Populus deltoides*) trees in the canopy. The shrub layer is dominated by highbush blueberry (*Vaccinium corymbosum*), meadowsweet (*Spirea alba*), steeplebush (*Spirea tomentosa*), speckled alder (*Alnus incana*), sweet-pepperbush (*Clethra alnifolia*), and spicebush (*Lindera benzoin*). The groundcover is dominated by many species of sedges, rushes, and grasses including tussock sedge (*Carex stricta*), woolgrass (*Scirpus cyperinus*), arrowhead (*Sagittaria latifoli*a), skunk cabbage (*Symplocarpus foetidus*), jewelweed (*Impatiens capensis*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), duckweed (*Lemna minor*), rice cut grass (*Leersia oryzoides*), and cattails (*Typha* sp.).

Minimal invasive species were observed along the edges of the wetland including Japanese knotweed (*Fallopia japonica*), oriental bittersweet (*Celastrus orbiculatus*), and multifora rose (*Rosa multiflora*). An ornamental burning bush (*Euonymus alatus*) was observed in the adjacent uplands to the northwest of the wetland.

Overall the wetland has high species diversity and abundance. Many birds, frogs, dragonflies, squirrels, and other small mammals were observed using the wetland or the wetland edges. However, high nutrients and sedimentation were evident in the wetland. A thick algal, mineral surface was observed on top of the water in the wetland and the wetland is dominated by duckweed, both strong indicators of nutrients.

Additionally, high water levels appear evident from staining on vegetation and the presence of standing water throughout the wetland during a more dryer time of the year. The high water levels likely affected the trees within the wetland, stressing them and ultimately leading to their death in many areas of the wetland. The high water levels appears to have led to a higher dominance of more water tolerant shrub/herbaceous/grassy species.

Site Plan and Potential Effects

The proposed project includes the construction of multi-story mixed housing in seven (7) buildings, surface parking for approximately 81 vehicle spaces, and other standard site improvements necessary for the development. An appropriate stormwater management system that meets the requirements of CT DEEP and the CT Stormwater Quality Manual will be constructed. An above-ground detention basin/rain garden and an underground detention facility will be constructed to capture and fully treat stormwater.

An outfall to the assessed wetland is proposed as part of the stormwater management system, bringing the potential for some nutrients to enter the wetland. However, the discharge will be pre-treated and will meet the requirements of the CT stormwater manual. In addition, the project will include the removal of the septic systems from the adjacent residential houses, reducing some of the potential nutrient input that may be currently entering the wetland system.

Nutrient enriched environments often include higher numbers of species tolerant of high nutrient loadings such as cattails. Structural indications of nutrient enrichment also include biomass and stem height. The adjacent wetland did contain some large patches of cattails, thick vegetated patches of shrubby species and mats of thick forbs and graminoids. Due to

the lack of trees, presence of cattails, and biomass of vegetation, it could be said that the wetland currently contains plants that are tolerant to nutrients. However, the lack of invasive species such as Phragmites and large amounts of cattails indicate the wetland is not so eutrophic where it is causing detriment to the vegetation, but suggests the vegetation is tolerant of some levels of nutrient loads. The addition of a new treated stormwater input to the system is therefore not expected to change or diminish the ecological communities and functions of the wetland.

Along with nutrients, the development will direct stormwater flows into the wetland. However, the stormwater system is being designed such that that stormwater flows will match pre-construction conditions, as required under the stormwater guidelines. Under current conditions, stormwater generally flows across the proposed development property from the north, across the yard of the residences in a south to southeast direction, eventually entering the wetland beyond the property line. Under the development, stormwater will be directed into the two detention basins and piped to outfalls to the east and to the south, in generally the same direction as the current stormwater flows on the site. In addition, the proposed development will reduce peak flows, reducing the flashiness of the on-site flow into the wetland.

The development also has the potential to bring sedimentation into the wetland. However, the stormwater will be treated through the detention basin/rain garden which will settle out most sediment or be treated in the underground detention facility. Either way, the stormwater system will remove at least 80% of the average annual total suspended solids (TSS) load and 80% floatable debris, as required in the CT Stormwater Manual. The outfalls will also flow through swales or have overland flow before they enter the wetland, providing a form of secondary stormwater treatment to further reduce any sediments that may be present.

At the time of the assessment, the wetland did appear to have evidence of sedimentation, most likely from the adjacent roads but also from the land proposed for the development. The topography on the site leading to the east towards the wetland and the steep slopes from South Eagleville Road likely result in flashy stormwater inputs that bring sediment into the wetland. The proposed development, as stated above, will reduce peak flows and the overall the flashiness of the on-site flow into the wetland. A reduction in the flashiness and flow into the wetland could also reduce the potential for sedimentation within the wetland.

Management Recommendations

Specific management practices and mitigation measures can be implemented that could help reduce potential impacts of the development on the wetland. Some of these recommendations that could be implemented include:

- Using native plantings and seed mixes in landscape design throughout the development
- Requiring only native plantings and seed mixes to be used in the future. This can be included in the housing documents/bylaws.
- Planting the slopes of the development adjacent to the wetland with native shrubs and ground cover
- No use of fertilizers, pesticides and herbicides in vicinity of the wetland
- Adequate and enclosed trash receptacles throughout the development to prevent dumping

Conclusion

Overall, a new development will be constructed in proximity to the wetland. However, with the implementation of mitigation and management measures as well as fully treated stormwater, impacts to the wetland system are not expected. The current vegetation within the wetland consist of hardy, nutrient tolerant species and the proposed development is not expected to change the diversity or abundance of the ecological community or its functions and values.

Very truly yours,

BSC Group-Connecticut, Inc.

Melissa Kaplan

Melissa Kaplan, PWS
Manager of Ecological Sciences - CT

cc:

Photo #1: View of the wetland from Knollwood Road. Facing southwest. Cattails and stressed, dead trees present.

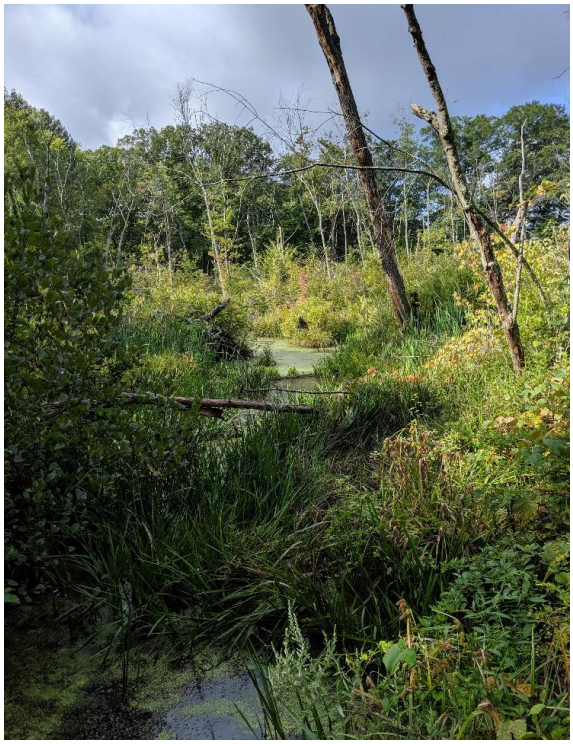


Photo #2: View of the nutrients and thick vegetation of the wetland system. Facing southwest.

Photo #3: More cattails, thick shrub and herbaceous species, and stresses/dead trees in the wetland. Facing west.

Photo #4: View of the layer of duckweed present in the wetland near South Eagleville Road. Facing southeast from South Eagleville Road.

Photo #5: View of the wetland from South Eagleville Road. Stressed red maple trees evident in wetland. Thick shrubby vegetation present. Facing southeast.

Photo #6: Thick algal/mineral surface of the wetland. Facing east.

Photo #7: View of the wetland from the western side, facing east/northeast. High species abundance and diversity present with high water levels and duckweed present.

Photo #8: View of the wetland near the property boundary, facing east. Thick grass and herbaceous ground cover evident.

Photo #9: General overview of the wetland from the western side, facing east/northeast.

Photo #10: View of the adjacent yard and wetland edge, just to the west of the existing 2-story wood frame house/garage. Facing west..

STORMWATER MANAGEMENT REPORT

Eagleville Green
113-121 South Eagleville Road
Mansfield, Connecticut

October 2019
Revised February 2020

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1.0 INTRODUCTION

This Stormwater Management Report contains the engineering design of the stormwater management systems for the proposed development of the Eagleville Green, located at 113-121 South Eagleville Road in Mansfield, Connecticut. (Figure 1 – Site Location Map). The development will consist of seven (7) multi-story housing buildings, surface parking for approximately 87 vehicle spaces, and other "typical" site improvements to support the proposed building program. The engineering design and report are prepared in accordance with Town of Mansfield Regulations, the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, the 2004 Connecticut Department of Energy & Environmental Protection (CT DEEP) Water Quality Manual, and the 2000 Connecticut Department of Transportation (ConnDOT) Drainage Manual.

2.0 EXECUTIVE SUMMARY

This report is prepared for Mansfield Housing Authority in support of the Eagleville Green proposed development. It addresses the impacts and drainage mitigation for the increase in site impervious caused by the new building complex and its appurtenances.

The following stormwater management facilities are designed in accordance with the Town of Mansfield in coordination with their engineering department, the Mansfield Zoning Regulations, CT DEEP, and ConnDOT Drainage Standards:

- As part of the construction, total site impervious area has been increased. Therefore, peak flows for the ,2-, 10-, 25-, and 100-year design storms have been mitigated.
- In accordance with the Town of Mansfield Regulations, the peak flow generated during the 2-year design storm has been reduced to 50% of the pre-development rate.
- On-site stormwater collection and conveyance is accomplished by a series of catch basins, manholes, piping, above-ground detention pond, water quality units and underground detention facilities.
- Short-term erosion control is achieved through use of construction entrances, inlet protection, silt fence and hay bale barriers.
- A stormwater treatment train is provided, including parking lot sweeping, catch basins with two (2) foot sumps for sediment collection, hydrodynamic separator, above-ground dry detention basin, and open bottom infiltrating underground detention units. All stormwater runoff from the proposed development will be directed to the proposed site drainage and management system, where it will pass through detention systems before ultimately discharging to the adjacent wetland onsite.
- Stormwater drainage piping has been designed to convey the 10-year design storm in accordance with the 2000 ConnDOT Drainage Manual.

3.0 PROJECT DESCRIPTION

This project involves the construction of a residential development containing 7 residential buildings spread over a 5.2-acre parcel. In addition to the constructed building complex, the site will include access via two driveways, an exterior play area for increase in activity and an improved sense of community, and a stone dust walking path through the middle of the site. The total area of construction activity (disturbed area) is approximately 3.2 acres.

Storm drainage and runoff control will be accomplished by directing site overland runoff to a series of area drains and catch basins, then via underground piping to either the above-ground detention basin or the underground detention system. The discharge of the collected stormwater from the site

will drain to the east, through outlet protection aprons, and into the adjacent onsite wetland. The roof runoff will be directed to roof leaders, then via underground piping to either the above-ground detention basin or dedicated infiltration units designed to hold and infiltrate the 100-year storm. See Section 4.6 for a more detailed discussion.

EXISTING CONDITIONS

3.1 Characteristics

The project site consists of an approximately 5.2-acre parcel located off of South Eagleville Road in Mansfield, Connecticut, with two (2) existing single-family residential buildings developed at the front of the site with a paved driveway, and grass area/wetlands surrounding. The property is bound by South Eagleville Road to the north, Oakwood Apartments across South Eagleville Road, Knollwood Apartments to the south, Knollwood Road to the east, and an Eversource Natural Gas facility to the west. Existing property access is off South Eagleville Road.

The site generally slopes downward to the southeast throughout the entire property. The highest elevation onsite is at South Eagleville Road at elevation ±622, adjacent to 121 South Eagleville Road, at which point it begins to slope down toward elevation ±612 over approximately 310 feet.

3.2 Soil

Following research of the USDA-NRCS Web-soil Survey online database, approximately 90 percent of the site is recorded as Agawam Fine Sandy Loam, 0 to 3 Percent Slopes. Agawam Fine Sandy Loam is suited for community development. This nearly level, well-drained soil is found in areas of irregular shape. Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is yellowish brown, reddish yellow and light yellowish brown sandy loam 25 inches thick. The substratum extends to a depth of 60 inches or more. It is pale brown sand to a depth of 31 inches and gravelly sand at a depth of more than 31 inches. Slopes of more that 3 percent make up 10 percent of this unit. According to the online database, Agawam Fine Sandy Loam, 0 to 3 percent slopes is generally considered a Hydrologic Soil Group B.

The remaining 10 percent of the site, located along the southeast border of the site, is identified as Sudbury Sandy Loam, 0 to 3 Percent Slope and Timakwa and Natchaug Soils, 0 to 2 Percent Slopes. This complex is identified to have a hydrologic soil group range between B and D. For the purposes of this analysis, the site will be considered hydrologic group B for consistency.

3.3 Wetlands

Upon review of the Mansfield Geographic Information System (GIS) Mapping, there are wetlands located on the property to the east, adjacent to Knollwood Road. The proximity of the wetlands to the project site will put a portion of the site (± 3.41 Ac – 65.5% of the property) located within a designated Upland Review Area. Approximately 1.09 acres of this Upland Review Area will be located within the limits of disturbance for the project. We do not anticipate that the site improvements will have any impact on the regulated areas on or off site. A detailed description of the onsite wetlands can be found in the Wetlands Report, dated September 13, 2019, prepared by BSC Group.

3.4 Hydrology

The existing conditions for the site were modeled as two (2) distinct discharges from the property:

1. Overland sheet flow runoff on the west portion of the site. This area sheet flows offsite before ultimately discharging to the southwest grassy area. The tributary area for this discharge will be modeled as Existing Subwatershed "E1". This area ultimately discharges to the onsite wetland located to the east.

2. Overland sheet flow runoff on the east portion of the site. This area sheet flows offsite before ultimately discharging to the onsite wetland. The tributary area for this discharge will be modeled as Existing Subwatershed "E2".

The Existing Watershed Area Map has been included as Figure 2.

4.0 STORMWATER MANAGEMENT

4.1 Design Objective

The intent of the project hydrologic study is to determine rates of runoff for maximum storm frequencies of two, ten, twenty-five, and one hundred-year intervals under existing and proposed conditions for the designated design points. From this analysis, the proposed stormwater collection and management system is designed to mitigate the post development increase in the peak rates of runoff for the above-mentioned storm events associated with the construction of new buildings, driveways, and sidewalks.

4.2 Design Criteria

This project has been designed in accordance with the Town of Mansfield requirements.

The following rainfall volumes for hydrologic analysis were used for each storm event for a 24-hour Type III distribution Storm:

2-year – 3.33 in
10-year – 5.05 in
25-year – 6.12 in
100-year – 7.78 in

* Source: NOAA Atlas 14 Point Precipitation Frequency/Volume Estimates

4.3 Design Methodology

This study was prepared using methods contained in the USDA Soil Conservation Service Publication TR-55 "Urban Hydrology for Small Watersheds". TR-55 outlines procedures for calculating peak rates of runoff resulting from precipitation events and procedures for developing runoff hydrographs.

The watershed was simulated as a series of contributing subcatchments, and inflow and outflow structures. A value for area, curve number (CN) and time of concentration (Tc) was calculated for each contributing subcatchment.

The curve number is a land sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. Based on the coverage of soil groups and land use in the watershed, an average CN was determined for each subcatchment under existing and proposed conditions.

The time of concentration is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a point of interest. Values for the time of concentration were determined for existing and proposed conditions based on land cover and slope of the flow path using methods described in TR-55.

Values for time of concentration (Tc) and curve numbers (CN) were then entered into the "HydroCAD 10.0" computer program (which is based on TR-20 and TR-55) where subcatchment hydrographs were calculated. The hydrological analysis consists of developing an existing conditions model to first establish existing peak rates of runoff for the various storm events mentioned above. Second, an evaluation is then conducted of the proposed condition to determine the effect of the development on the sites peak rates of runoff.

4.4 Existing Conditions

Area, Curve Number, and Tc of the existing subwatersheds can be seen in the table below:

Watershed	Area (ac)	C	Tc (min.)
E1	0.60	61	15
E2	2.96	59	15.3
TOTAL	**3.56**	**59.3**	**-**

Existing stormwater discharge computations are located in Appendix A.

4.5 Proposed Conditions

The intent of the hydrologic design was to maintain or reduce the peak flow rate exiting the site. To achieve mitigation of the peak flow rates, the proposed site was divided into four (4) subwatersheds.

P1: This subwatershed is composed of the western most exterior portion of the site. Runoff in this subwatershed bypasses the drainage system and discharges via overland sheet flow offsite.

P2-1: This subwatershed is composed of the interior portion of the site. Roof runoff from Buildings 1, 2, and 3, as well as runoff from the land surrounding these buildings is directed to the above ground detention basin. This runoff is directed into the new drainage system, which discharges out of a flared pipe, through a vegetated stabilized outlet, and ultimately to the wetland at the east of the site.

P2-2: This subwatershed comprises of the majority of the developed site and includes the contributing drainage area that is directed to the three underground detention systems. The roof runoff from buildings 4, 5, 6, and 7 drains to either detention 3P or 4P. These systems are infiltration units designed to hold and infiltrate the 100-year storm. The remanding runoff in this subwatershed is

directed into the new drainage system, flows to the underground detention system 2P, out of a flared pipe, through a vegetated stabilized outlet and ultimately off the property to the southeast.

P2-3: This subwatershed is composed of the northern and eastern exterior portions of the site. Runoff in this area bypasses the drainage system and discharges via overland sheet flow offsite.

Cover characteristics of each proposed subwatershed can be seen in the table below:

Subwatershed	Area (ac)	CN	Tc (min.)
P1	0.14	61	6.0
P2-1	0.60	79	6.0
P2-2	1.14	89	6.0
P2-3	1.26	56	6.0
BLDG 4	0.099	89	6.0
BLDG 5	0.118	89	6.0
BLDG 6	0.090	89	6.0
BLDG 7	0.120	89	6.0
Total	**3.56**	**63.9**	**-**

Proposed stormwater discharge computations are represented in Appendix A. The proposed subwatershed areas are depicted in Figure 3.

4.6 Stormwater Detention

Following completion of the analysis, the cumulative storage shall be ±22,600 cubic feet of available storage. A combination of above-ground and underground storage systems will be utilized to create this storage volume. Below is a detailed description of each system:

Detention P1

- Type: Above-ground dry pond
- Bottom Elevation: 613.00
- Observed Restrictive Layer: 611.83’
- Top of Berm Elevation: 616.50
- Design Storm: 100-Year
- Design Stage Elevation: 615.83
- Required WQV: 788 cf
- Storage Provided Below Outlet: 1,664 cf

- Outlets: Low flow 6" orifice @ 614.30, high flow 15" pipe @ 616.00
- Drawdown Computations:
  - Lowest Outlet Elevation = 614.30
  - Depth of Stored Water = 614.30 – 613.00 = 1.30 ft
  - Soil Type: Sandy Loam (Hydrologic Soil Group B)
  - Rawl's Rate: 1.02 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 1.30 ft / 1.02 in/hr x 12 in/ft = 15.3 hrs
- Description: The above-ground pond receives flow from Subcatchment Area P2-1, which includes Buildings 4 – 7, as well as the surrounding "inner" portion of the site. The discharge from the pond is controlled by Outlet Control Structure #1, which has a vertical riser pipe for high flows and an orifice cored into the side for lower flows. Based on the project boring logs, the receiving soils in the pond are mostly find sands with little silt. Pond routing calculations do not account for infiltration, however it is anticipated that the pond will drain within a 24-hour period. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

<u>Detention P2</u>

- Type: 36" Perforated Corrugated HDPE Pipe
- Bottom of Stone Elevation: 613.25
- Observed Restrictive Layer: 611.75'
- Invert Elevation: 613.75
- Top of Pipe Elevation: 616.75
- Design Storm: 100-Year
- Design Stage Elevation: 616.68
- Required WQV: 2,246 cf
- Storage Provided Below Outlet: 2,541 cf
- Outlets: Low flow 6" orifice @ 614.72, high flow 8" orifice @ 615.33, overflow 10" pipe @ 617.00
- Drawdown Computations:
  - Lowest Outlet Elevation = 614.72
  - Depth of Stored Water = 614.72 – 613.25 = 1.47 ft
  - Soil Type: Gray Glacial Till (Hydrologic Soil Group C)
  - Rawl's Rate: 0.27 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 1.47 ft / 0.27 in/hr x 12 in/ft = 65.33 hrs
- Description: The below-ground pipe storage receives flow from Subcatchment Area P2-2, which includes the site driveway, parking, and lawn areas. The discharge from the system is controlled by Outlet Control Structure #2, which has a vertical riser pipe for high flows, an orifice cored into the side for medium flows, and an orifice cored into the side for lower flows. Based on the project boring logs, the receiving soils under the stone base are mostly find sands with little silt. An in-situ percolation test was performed (PT-B, see Plan Sheet G-1.0) and an effective infiltration rate of 6 in/hr was measured. A Rawl's Rate for the given soil type of 0.27 in/hr was used for drawdown computations. Pond routing calculations do not account for infiltration, however it is anticipated that the system will drain within a 72-hour period. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

<u>Detention P3</u>

- Type: 90"W x 60"H open-bottom plastic arch chambers
- Bottom of Stone Elevation: 611.50
- Observed Restrictive Layer: 609.50'

- Invert Elevation: 610.75
- Top of Chamber Elevation: 617.25
- Top of Stone Elevation: 618.25
- Design Storm: 100-Year
- Design Stage Elevation: 617.59
- Required WQV: None
- Outlets: 8" overflow pipe @ 617.50
- Drawdown Computations:
  - Lowest Outlet Elevation = 617.50
  - Depth of Stored Water = 617.50 – 611.50 = 6.00 ft
  - Soil Type: Sandy Loam (Hydrologic Soil Group B)
  - Rawl's Rate: 1.02 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 6.00 ft / 1.02 in/hr x 12 in/ft = 70.6 hrs
- Description: The open-bottom plastic arch chamber storage receives flow from Building #4 Roof via underground roof leader piping. Based on the project boring logs, the receiving soils under the stone base are mostly find sands with little silt. An in-situ percolation test was performed (PT-C, see Plan Sheet G-1.0) and an effective infiltration rate of 7.5 in/hr was measured. A Rawl's Rate for the given soil type of 1.02 in/hr was used for drawdown computations. Pond routing calculations do not account for infiltration, however it is anticipated that the system will drain within a 72-hour period. A maintenance access manhole to grade will be provided for periodic cleaning at the end of every row. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

<u>Detention P4</u>

- Type: 90"W x 60"H open-bottom plastic arch chambers
- Bottom of Stone Elevation: 612.17
- Observed Restrictive Layer: 610.67'
- Invert Elevation: 617.00
- Top of Chamber Elevation: 617.92
- Top of Stone Elevation: 618.92
- Design Storm: 100-Year
- Design Stage Elevation: 617.23
- Required WQV: None
- Outlets: 8" overflow @ 617.00
- Drawdown Computations:
  - Lowest Outlet Elevation = 617.00
  - Depth of Stored Water = 617.00 – 612.17 = 4.83 ft
  - Soil Type: Sandy Loam (Hydrologic Soil Group B)
  - Rawl's Rate: 1.02 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 4.83 ft / 1.02 in/hr x 12 in/ft = 56.8 hrs
- Description: The open-bottom plastic arch chamber storage receives flow from Building #5, 6, 7, and 8 roofs via underground roof leader piping. Based on the project boring logs, the receiving soils under the stone base are mostly find sands with little silt. An in-situ percolation test was performed (PT-A, see Plan Sheet G-1.0) and an effective infiltration rate of 30 in/hr was measured. A Rawl's Rate for the given soil type of 1.02 in/hr was used for drawdown computations. Pond routing calculations do not account for infiltration, however it is anticipated that the system will drain within a 72-hour period.

A maintenance access manhole to grade will be provided for periodic cleaning at the end of every row. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

Pre- and Post-Development Comparison

Peak flows at the off-site analysis point are shown in the following table:

STORMWATER DISCHARGE COMPARISON				
Design Point	Storm Event	Existing (cfs)	Proposed (cfs)	Difference (cfs)
1 (Off-Site Flow, West)	2-year	0.18	0.05	-0.13
	10-year	0.67	0.21	-0.46
	25-year	1.05	0.33	-0.72
	100-year	1.71	0.53	-1.18
2 (Flow to On-Site Wetland)	2-year	0.66	0.34	-0.32
	10-year	2.87	2.27	-0.60
	25-year	4.65	3.99	-0.66
	100-year	7.76	6.97	-0.79
Total Site	2-year	0.83	0.34	-0.49
	10-year	3.54	2.37	-1.17
	25-year	5.70	4.27	-1.43
	100-year	9.47	7.49	-1.98

The data summarized above indicates that the total peak stormwater discharge offsite will be reduced from the existing condition to the proposed conditions for all design storms. The 2-year discharge has been reduced to 50% of the pre-development rate.

5.0 STORMWATER DRAINAGE SYSTEM

5.1 Design Criteria

Design of the storm drainage system was performed in accordance with the standards and procedures specified in the 2000 ConnDOT Drainage Manual. The capacity within the site driveways and parking lots were designed to safely accommodate the 10-year, 24-hour design storm.

5.2 Design Methodology

The storm drain collection system was analyzed using the Rational Method for estimating runoff for a 10-year design storm. The project site was divided into catchment areas, with each contributing runoff to an individual catch basin or area drain inlet. A value for acreage area, time of concentration, and a runoff coefficient was calculated for each contributing catchment area.

Values for time of concentration were chosen based on land cover and slope of the flow path from the hydraulically most distant point in the sub-area to the appropriate inlet. Per Rational Method, the minimum time of concentration value is assumed to be 5 minutes for paved surfaces and 10 minutes

for unpaved surfaces. Using the time of concentration, rainfall intensities were determined using the Rainfall-Duration-Frequency Relationships for Connecticut (NOAA Atlas 14 Precipitation Frequency Estimates).

The average runoff coefficient, which is the ratio of peak runoff rate to the average rainfall rate for the period known as the time of concentration, was chosen using the following values:

Condition	C
Grass/Landscaped Areas	0.30
Pavement/Impervious Areas	0.90

Storm drainage pipes were then sized based upon calculated flows using Manning's Equation and the pipe sizes verified by solving for the hydraulic grade line. The drainage pipe materials proposed for this project are high density polyethylene pipe (HDPE) and reinforced concrete pipe (RCP).

Per the ConnDOT Drainage Manual (Table 6.C.1), the friction factor (n) utilized in the design is 0.011 for HDPE pipe and 0.013 for RCP.

Detailed calculations for the on-site stormwater sizing are included in this report in Appendix C. A Catchment Area Map has also been included (Figure 4) to detail the tributary area for each drainage structure.

6.0 STORMWATER QUALITY

The project has been designed to address both the short-term and long-term storm water quality. During construction, stormwater runoff is a concern due to the excess amount of exposed areas that do not have vegetation or other cover to prevent the removal and transportation of sediment to resource areas. The project addresses the short-term concerns by providing erosion control measures in the form of Erosion & Sediment Control Plans and a "During Construction" Operation and Maintenance Plan (Section 8.0).

The primary function of erosion and sediment control, as defined by the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control is to "absorb erosional energies and reduce runoff velocities that force the detachment and transport of soil and/or encourage the deposition of eroded soil particles before they reach any sensitive area." The short-term project erosion measures were designed per the 2002 manual.

After construction, stormwater runoff is a concern because it may contain contaminants such as suspended solids, petroleum hydrocarbons, nutrients, heavy metals, and salts that may have adverse effects on water quality. The sources of the pollutants are generally associated with urban land use, including automobile exhaust, mechanical wear of vehicles, leaf litter, deicing salts and atmospheric deposition. The pollutants accumulate on the land surfaces and are washed off during storm events into the receiving waterways and wetlands.

The objective of the stormwater management system designed for the proposed development is to effectively remove the contaminant loading from the site runoff and to provide long-term protection of the quality and use of downstream water resources. The long-term stormwater quality measures were designed per the 2004 Connecticut Stormwater Quality Manual.

6.1 Temporary Control of Sediment and Erosion

The objective of temporary erosion control during construction is to minimize the area of exposed soil, control runoff rate and direction, and provide for rapid stabilization of exposed areas. Prior to any construction activity, trenched silt fence and/or staked hay bales will be placed down gradient of the proposed work areas. The fence/barrier will provide some sediment control, as well as provide a limit of construction activity.

Construction entrances will be utilized to remove sediment from construction vehicle tires and prevent it from being tracked onto adjoining paved roadway areas.

Any excavated and stockpiled topsoil will be contained within staked silt fence. Erosion-prone areas left exposed for extended periods (>30 days) will be mulched and seeded for temporary vegetative cover. After construction, all exposed areas will be graded, mulched and re-vegetated with appropriate ground cover. The silt fence and/or hay bales will remain in place until groundcover is established.

Catch basin filter inserts will be used to collect sediment that may be carried in the storm runoff during construction. Filter inserts will be placed in each existing catch basin, yard drain, and in each new catch basin, during construction and until all disturbed areas of the site have been stabilized. Replacement of the filter inserts shall be as often as necessary to prevent excessive ponding due to clogged fabric.

Dewatering settling basins will be utilized where groundwater is encountered in trenching, foundation excavation, or any other excavation. The dewatering wastewaters will be infiltrated into the ground or discharged, after filtration into the nearest catch basin.

Throughout all phases of construction, the erosion control measures will be routinely inspected and cleaned, repaired, and replaced as necessary by the Contractor. See Section 8.0 entitled “Operation and Maintenance Plan” for more details.

Throughout the construction process, extra stocks of hay bales and silt fence will be kept on-site to replace those that become damaged and/or deteriorated.

Any erosion and sediment control measures, which upon inspection are found to be damaged, deteriorated, or not functioning properly, will be repaired, replaced, and corrected immediately after inspection.

Areas mulched or seeded for temporary vegetative cover will be inspected for proper cover at the end of each workday if precipitation is forecast and also prior to weekends. Additional seeding or mulch will be placed as necessary.

The temporary erosion and sediment control systems will not be removed until all stormwater drainage system components are in place, cleaned and working properly and until permanent vegetative cover and other stabilization measures are established.

6.2 Permanent Control of Stormwater Quality

The design intent of the 2004 Connecticut Stormwater Quality Manual is to provide a "stormwater treatment train," where stormwater quality is achieved through a series of treatment measures. Harmful pollutants, such as sediment, pathogens, organic material, hydrocarbons, metals, synthetic organic chemicals and deicing compounds, are carried by the low-flow storms. Many of these pollutants are associated with vehicular exhaust, engine leaks and deicing, therefore key areas of on-site treatment include parking lots and access drives. Since pollutants typically attach themselves to solid particles, treatment practices are designed to remove suspended solids.

The treatment train for this site includes:

- Parking lot sweeping
- Catch basins with two (2) foot sumps
- Hydrodynamic Separator prior to the underground detention system.
- Stormwater infiltration within the open-bottom detention galleries

The hydrodynamic separator unit will be designed to treat the Water Quality Flow in accordance with the 2004 manual, effectively removing floatables, captured sediment solids, and hydrocarbons to achieve a TSS removal rate of 80% (and often 90% or better).

7.0 OPERATION AND MAINTENANCE PLAN

7.1 During Construction

The following maintenance procedures shall be followed by the Contractor for temporary and permanent erosion and sedimentation measures and stormwater treatment systems installed during the construction period:

a. Dust Control: Moisten disturbed soil areas with water periodically, or use a non-asphaltic soil tacifier to minimize dust.

b. Temporary Seeding: Inspect weekly and within 24 hours of a storm generating a discharge. Continue inspection until vegetation is firmly established.

c. Permanent Seeding: Inspect seeded areas weekly and within 24 hours after a storm generating a discharge. Continue inspection until vegetation is firmly established.

d. Temporary Soil Protection: Inspect seeded areas weekly and within 24 hours after a storm generating a discharge.

e. Temporary Erosion Control Mat: Inspect mats weekly and within 24 hours after a storm generating a discharge.

f. Catch Basin Filter Inserts: Inspect the fabric at least once a week and within 24 hours after the end of a storm generating a discharge. Check the fabric for structural soundness (i.e. tears), proper anchoring/alignment within the grate and ability to drain runoff (i.e. percent of clogging by sediment). Remove the sediment every week, or sooner if ponding is excessive. Each time the sediment is removed, replace the section of fabric removed with a new section. Do not remove the sediment and reuse the same section of fabric.

g. Hay Bale/ Silt Fence Barrier: Inspect the barrier at least once a week and within 24 hours after the end of a storm generating a discharge. For dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits when the depth reaches one half the barrier heights. Repair or replace a barrier within 24 hours of observed failure. Maintain the barrier until the contributing disturbed area is stabilized.

h. Construction Entrance/Exit Pad: Maintain the pad in a condition that will prevent tracking and washing of sediment onto paved surfaces. Place additional clean gravel on top of gravel that has become silted, or remove the silted gravel and replace the gravel to the depth removed with clean gravel, as conditions warrant. Remove immediately all sediment spilled, dropped, washed or tracked onto paved surfaces. Roads adjacent to the construction site shall be cleaned at the end of each day by hand sweeping or sweeper truck.

i. Dewatering Settling Basin (if used): Inspect the basin at least every two hours during periods of use. Remove accumulated sediments when the volume equals one half the provided storage volume.

j. Existing Catch Basins and Sumps: Inspect the sediment traps as specified in "f" above. After final removal of the sediment traps at the end of construction, clean the sump of all silt and debris.

k. New Catch Basins and Sumps: As new catch basins are constructed, a filter insert shall be installed in the unit and a sediment barrier installed around the grate. Inspect the filter and barrier weekly and within 24 hours after a storm generating a discharge. After stabilization of the drainage area entering the catch basin, remove the filter and barrier and clean the basin sump of all silt and debris.

l. Stone or Hay Bale Check Dams: Inspect the check dam at least once a week and within 24 hours after the end of a storm generating a discharge. Remove the sediment deposits when the depth reaches one half the check dam heights. Repair or replace a check dam within 24 hours of observed failure. Maintain the check dam until the contributing disturbed area is stabilized.

m. Temporary Stockpiles: Inspect temporary stockpiles at the end of each workday to ensure that tarps are in place and secured. Temporary stockpiles that are expected to be inactive for more than 30 days should be temporarily seeded (see above).

n. Temporary Sediment Traps: Inspect monthly and within 24 hours after a storm generating a discharge. Sediment and oil shall be removed when the storage volume is reduced by one half, or at least every 6 months during construction.

During construction, the Contractor shall be required to remove accumulated sediment from sediment control measures and water quality measures. Sediment shall be disposed of off-site in a manner and location approved by local and state agencies. Temporary storage of sediment on-site is permissible if it is protected from erosion and stockpiled in a manner that will prevent it from being carried by erosion into adjacent properties or resource areas.

Temporary sediment traps may be removed if the contributing drainage area is stabilized. The area shall be re-graded to match original grades or proposed grades as shown on the plans. The disturbed area shall be temporarily, or permanently seeded and mulched if the area is not to be paved.

Upon the stabilization of the contributing drainage area, silt fence shall be inspected for sediment accumulation prior to removal. For sediment depths greater than 6", the sediment shall be re-graded or removed. The silt fence shall be removed by pulling the support posts and cutting the geotextile at the ground level. Re-grade or remove the sediment as necessary and stabilize the disturbed soils by placing temporary or permanent seeding and mulch.

When dewatering has been completed, remove the hay bale barrier, sediment and stone, as appropriate, and re-grade the area to original or proposed grade. Stabilize the disturbed area with temporary or permanent seed and mulch.

After the drainage areas to the new and existing catch basins have been stabilized, the Contractor shall be required to clean all sumps and hoods of debris and silt. In addition, within the limits of work, the Contractor shall clean all storm drain piping of collected silt and debris by flushing with water. If the storm system discharges to ground, a hay bale and silt fence barrier must remain in place at each outfall to capture any sediment or debris carried down by the flushing. If the storm drain system discharges into a public or private drainage collection system, the Contractor must install a means of collecting debris and filtering the sediment from the flushing water in the on-site storm system before discharge to the existing storm system.

7.2 After Construction

After construction is completed and accepted by the Owner, it shall be the responsibility of the Owner to maintain all drainage structures. In addition, the following inspection and maintenance guidelines shall be the responsibility of the Owner, or the Owner's representative, beginning the first year period following construction completion and acceptance, and shall be followed each year thereafter:

a) Parking Lot and Site Cleanup: Inspect on a regular basis not to exceed weekly for litter and debris.

b) Parking Lot and Driveway Sweeping: At least twice a year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.

c) Catch Basin Sumps: Shall be inspected semi-annually and cleaned when the sump is one half full of silt and / or debris.

d) Hydrodynamic Separator: Shall be inspected and cleaned annually.

e) Landscaped Areas: Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.

f) Above-ground Detention Basin: Shall be inspected semi-annually and cleaned of any sediment and/or debris. Shall be mowed annually.

g) Underground Detention Systems: Shall be inspected semi-annually and cleaned of any sediment and/or debris.

8.0 CONCLUSION

The project has been designed to meet Town and State requirements for stormwater management, drainage sizing, and stormwater quality. Peak flows generated by the site for the 2-, 10-, 25-, and 100-year design storms have been mitigated to less than peak flows under existing conditions. The drainage system has been designed to convey the 10-year design storm and stormwater quality has been provided which meets both the State erosion sedimentation guidelines and the State stormwater quality requirements. There are no anticipated negative impacts on any of the upland review areas identified on this property.

LIST OF FIGURES/DRAWINGS

Figure 1 – Site Location Map

Figure 2 – Existing Watershed Area Map

Figure 3 – Proposed Watershed Area Map

Figure 4 – Catchment Area Map

FIGURE 1
Site Location Map

Figure 1 – Site Location Map

Eagleville Green

113-121 South Eagleville Road

Mansfield, Connecticut

Scale = 1:24,000

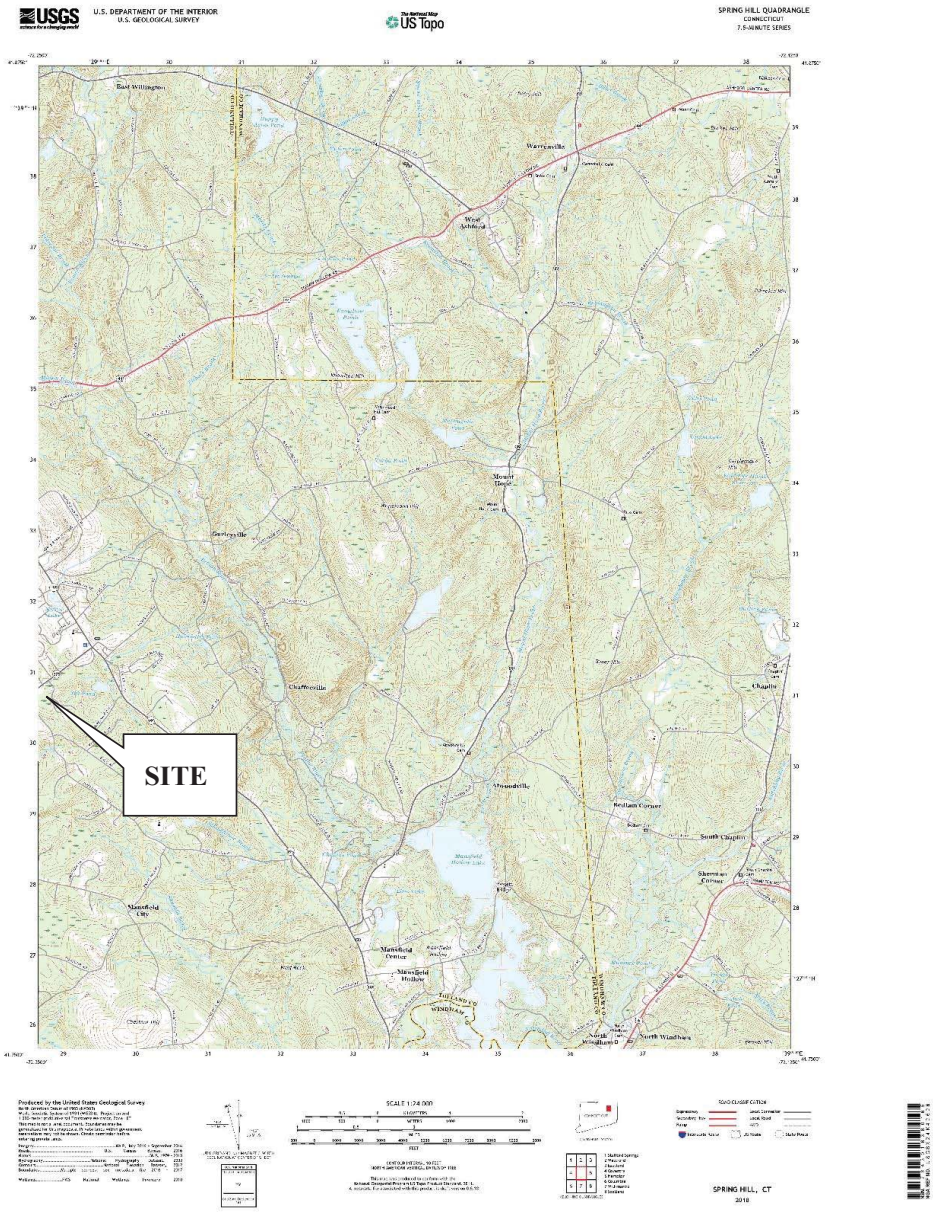
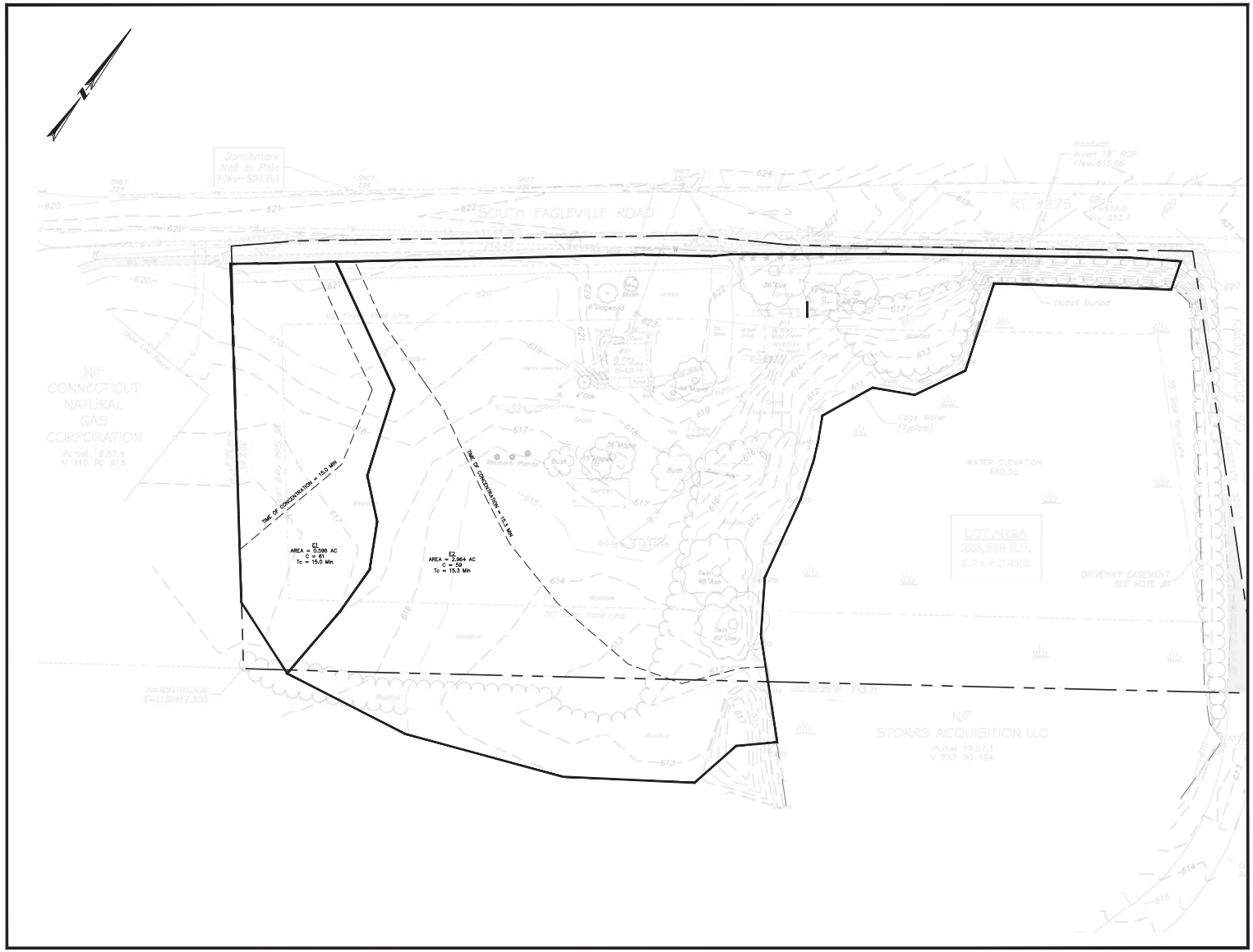


FIGURE 2
Existing Watershed Area Map



EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH
EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

EXISTING WATERSHED
AREA MAP

NOVEMBER 25, 2019

REVISIONS:

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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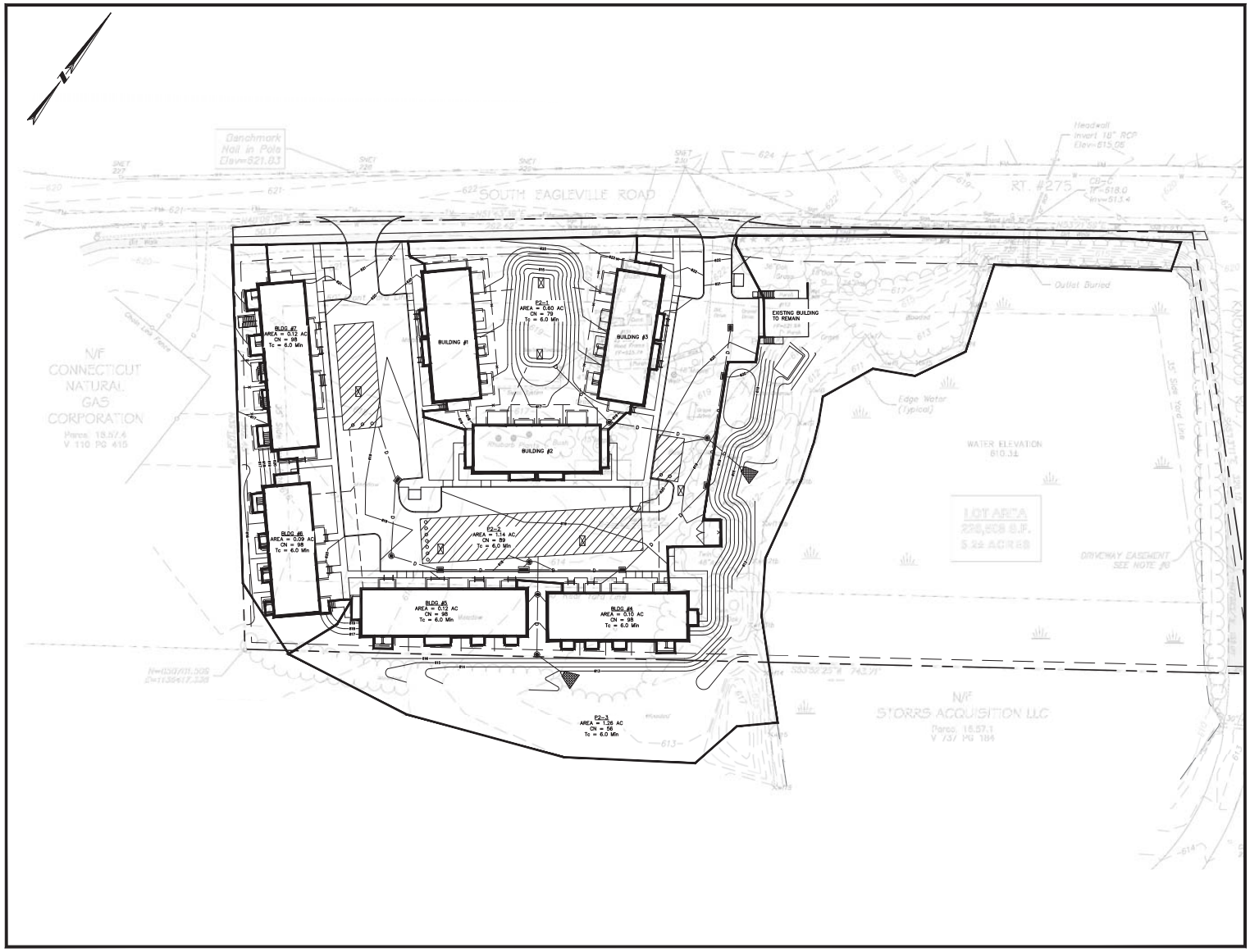
SCALE: 1" = 30'
0 15 30 60 FEET

FILE: B374900-EWAM.DWG
DWG. NO:
JOB. NO: B3749.00

FIGURE 2

FIGURE 3
Proposed Watershed Area Map



EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

PROPOSED WATERSHED AREA MAP

FEBRUARY 12, 2020

REVISIONS:

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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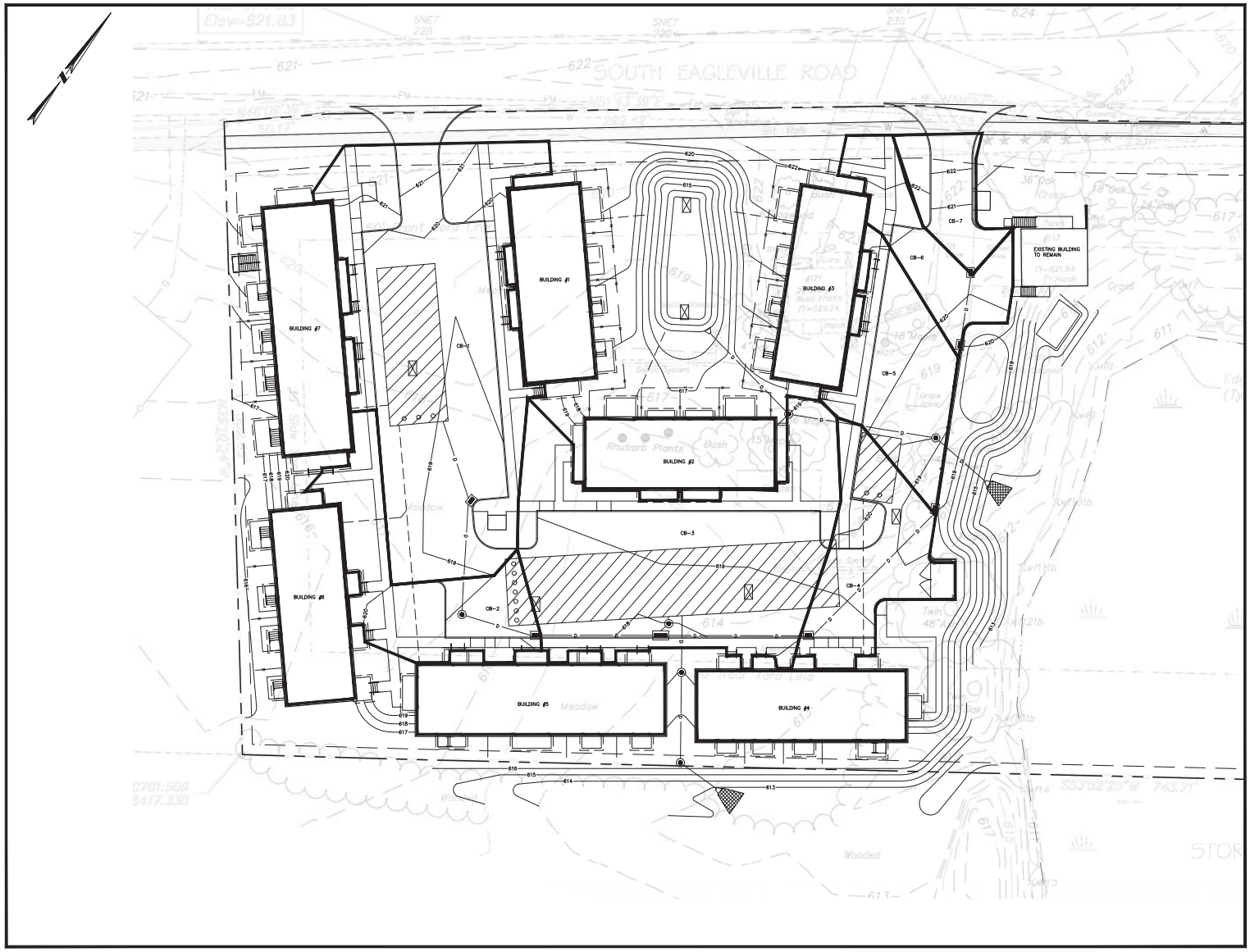
SCALE: 1" = 30'
0 15 30 60 FEET

FILE: 8374900-PWAM.DWG
DWG. NO:
JOB. NO: 83749.00

FIGURE 3

EAGLEVILLE GREEN - NOVEMBER 25, 2019

FIGURE 4
Catchment Area Map



EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

CATCHMENT AREA MAP

FEBRUARY 12, 2020

REVISIONS:

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
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STORRS, CT 06268

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Glastonbury, Connecticut 06033
860 652 8227

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SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-CAM.DWG
DWG. NO:
JOB. NO: 83749.00

FIGURE 4

EAGLEVILLE GREEN - NOVEMBER 25, 2019

LIST OF APPENDICES

Appendix A – Existing Stormwater Discharge Computations

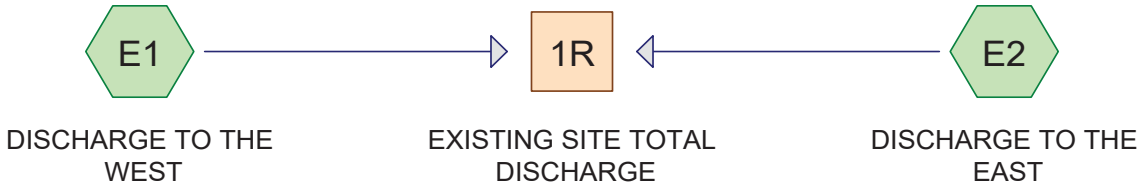
Appendix B – Proposed Stormwater Discharge Computations

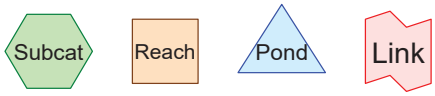
Appendix C – Proposed Hydraulic Sizing Computations

Appendix D – Water Quality Computations

APPENDIX A

Existing Stormwater Discharge Computations





Routing Diagram for 8374900-HYDRO
Prepared by {enter your company name here}, Printed 11/25/2019
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.580	61	>75% Grass cover, Good, HSG B (E1, E2)
0.870	48	Brush, Good, HSG B (E2)
0.110	98	Paved parking, HSG B (E2)
3.560	**59**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.560	HSG B	E1, E2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.560		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.580	0.000	0.000	0.000	2.580	>75% Grass cover, Good	E1, E2
0.000	0.870	0.000	0.000	0.000	0.870	Brush, Good	E2
0.000	0.110	0.000	0.000	0.000	0.110	Paved parking	E2
0.000	**3.560**	**0.000**	**0.000**	**0.000**	**3.560**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>0.50"
Flow Length=251' Tc=15.0 min CN=61 Runoff=0.18 cfs 0.025 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>0.42"
Flow Length=457' Tc=15.3 min CN=59 Runoff=0.66 cfs 0.104 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=0.83 cfs 0.129 af
Outflow=0.83 cfs 0.129 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.129 af Average Runoff Depth = 0.43"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

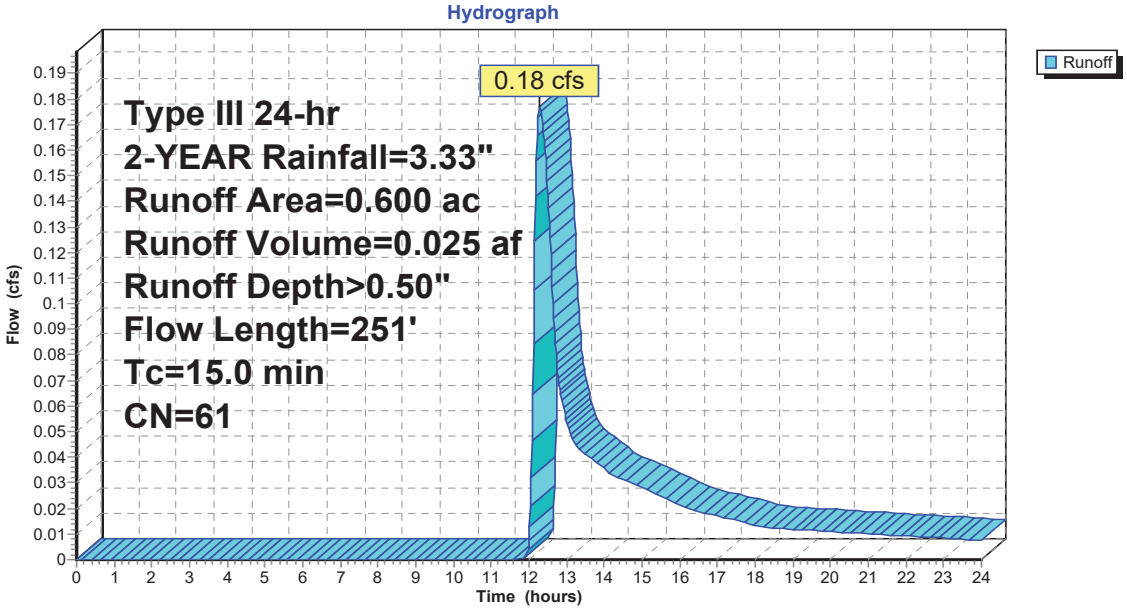
Runoff = 0.18 cfs @ 12.28 hrs, Volume= 0.025 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

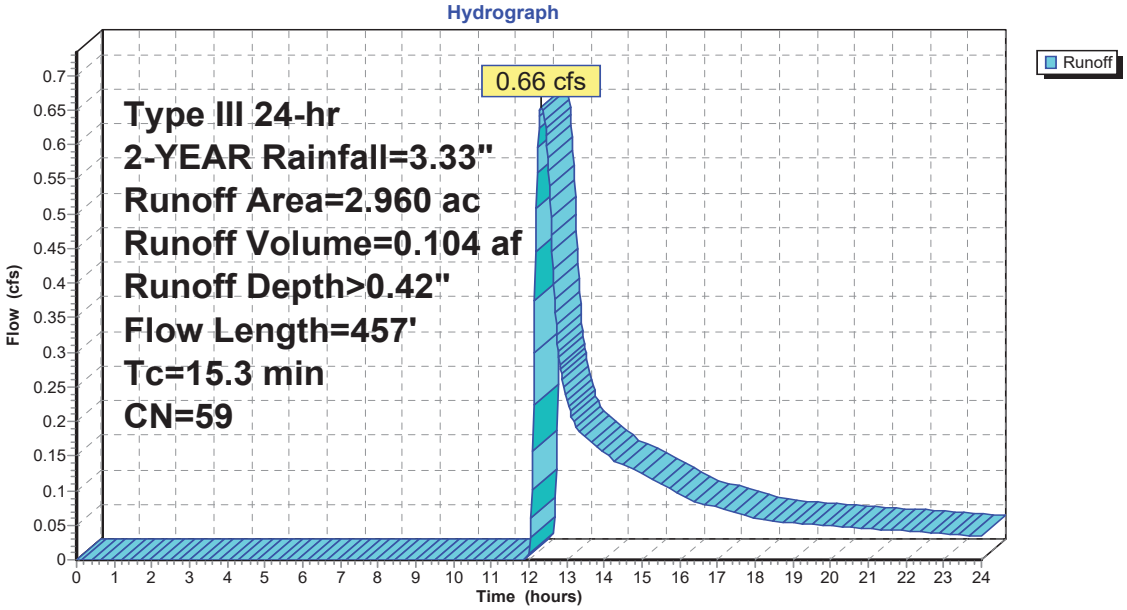
Runoff = 0.66 cfs @ 12.33 hrs, Volume= 0.104 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



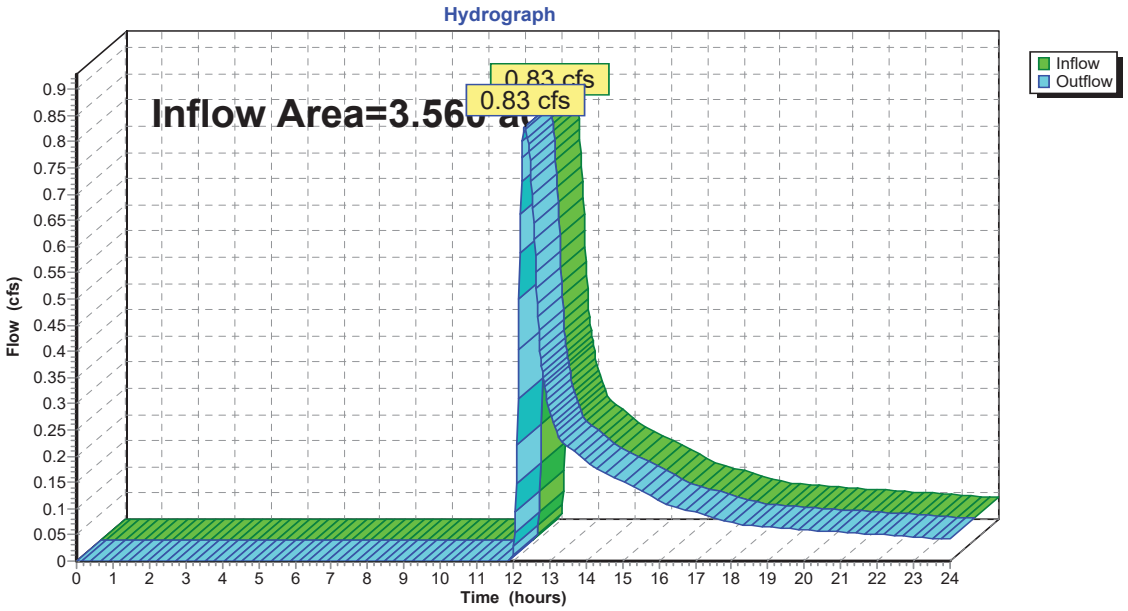
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

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

Inflow Area =	3.560 ac,	3.09% Impervious,	Inflow Depth >	0.43"	for 2-YEAR event
Inflow =	0.83 cfs @	12.32 hrs,	Volume=	0.129 af	
Outflow =	0.83 cfs @	12.32 hrs,	Volume=	0.129 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>1.39"
Flow Length=251' Tc=15.0 min CN=61 Runoff=0.67 cfs 0.070 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>1.26"
Flow Length=457' Tc=15.3 min CN=59 Runoff=2.87 cfs 0.310 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=3.54 cfs 0.380 af
Outflow=3.54 cfs 0.380 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.380 af Average Runoff Depth = 1.28"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

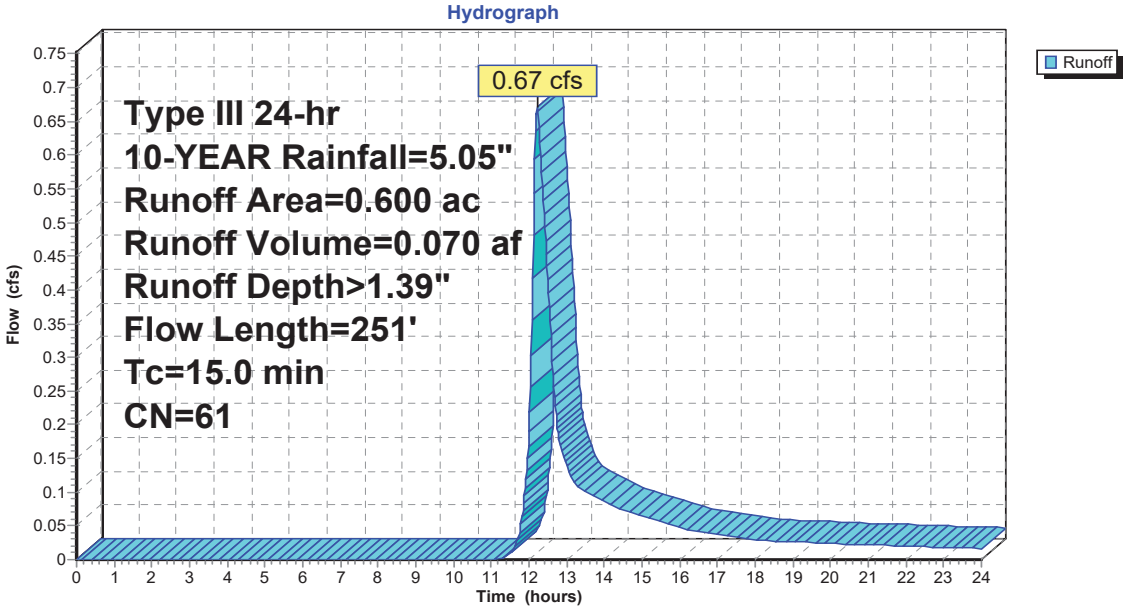
Runoff = 0.67 cfs @ 12.23 hrs, Volume= 0.070 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

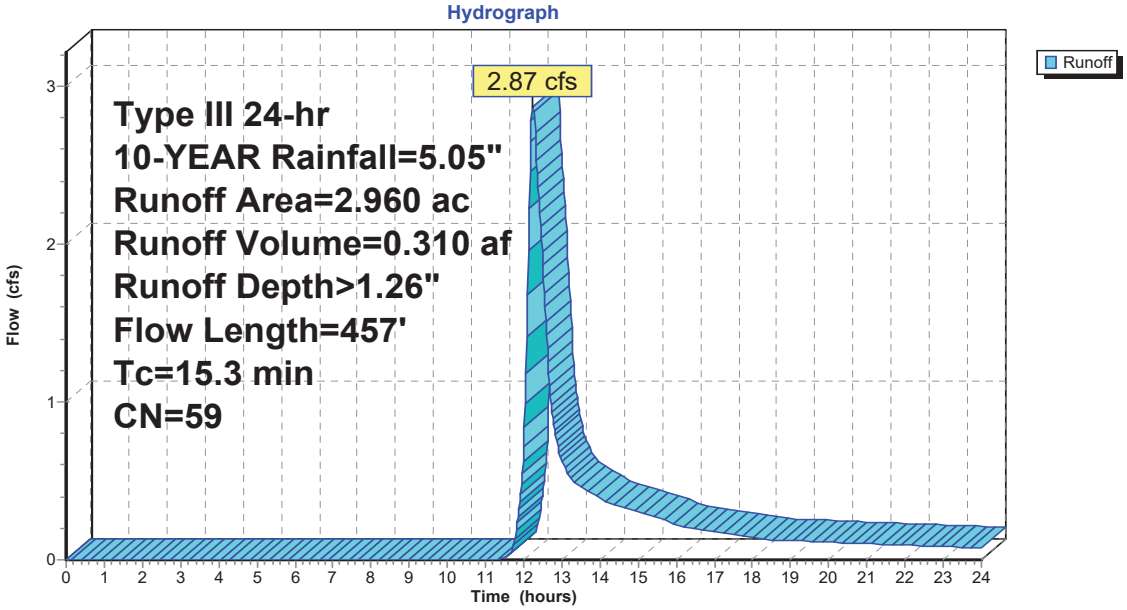
Runoff = 2.87 cfs @ 12.24 hrs, Volume= 0.310 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



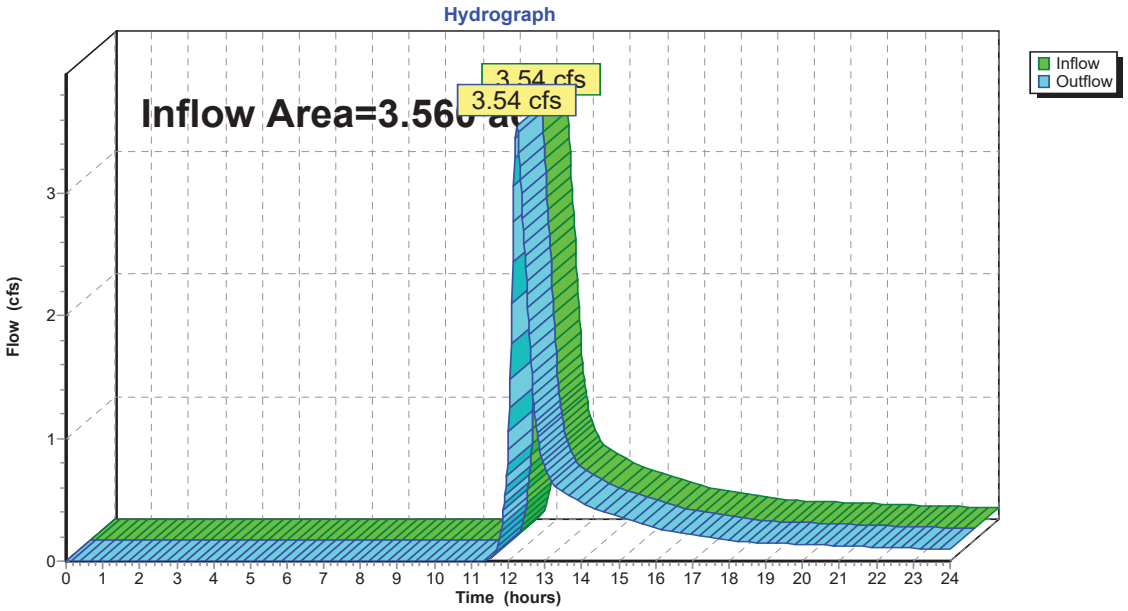
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

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

Inflow Area =	3.560 ac,	3.09% Impervious,	Inflow Depth >	1.28"	for 10-YEAR event
Inflow =	3.54 cfs @	12.24 hrs,	Volume=	0.380 af	
Outflow =	3.54 cfs @	12.24 hrs,	Volume=	0.380 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>2.08"
Flow Length=251' Tc=15.0 min CN=61 Runoff=1.05 cfs 0.104 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>1.91"
Flow Length=457' Tc=15.3 min CN=59 Runoff=4.65 cfs 0.471 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=5.70 cfs 0.575 af
Outflow=5.70 cfs 0.575 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.575 af Average Runoff Depth = 1.94"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

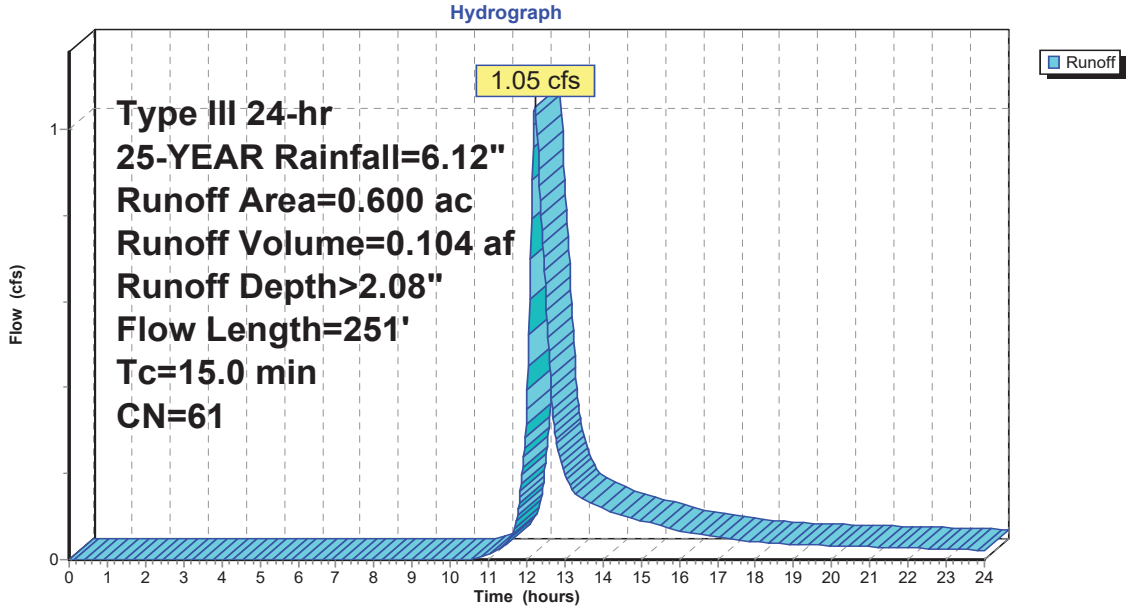
Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.104 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

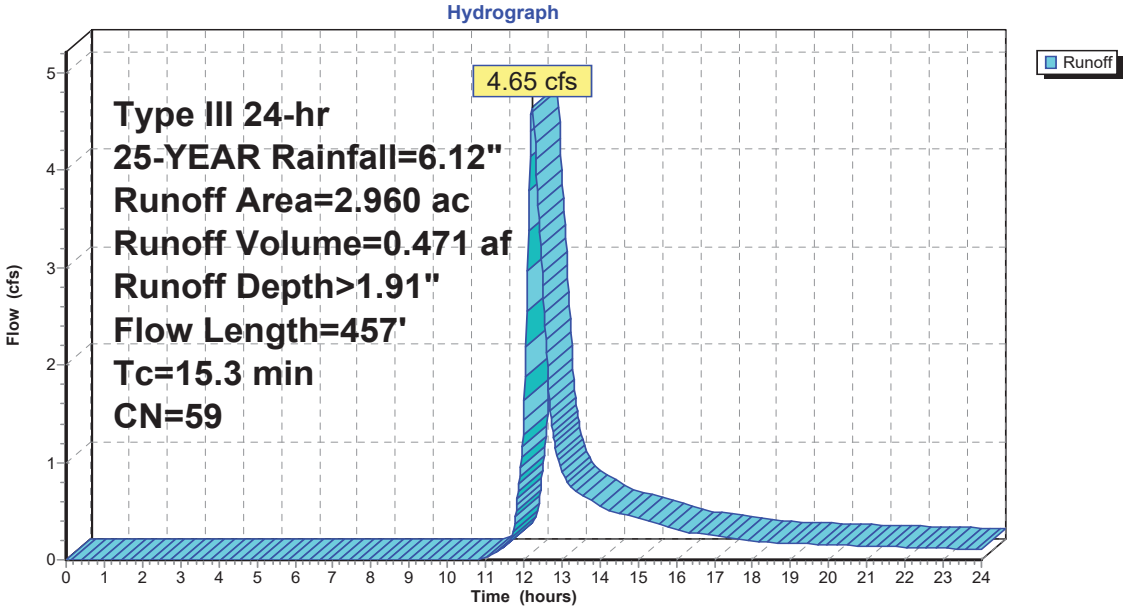
Runoff = 4.65 cfs @ 12.23 hrs, Volume= 0.471 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



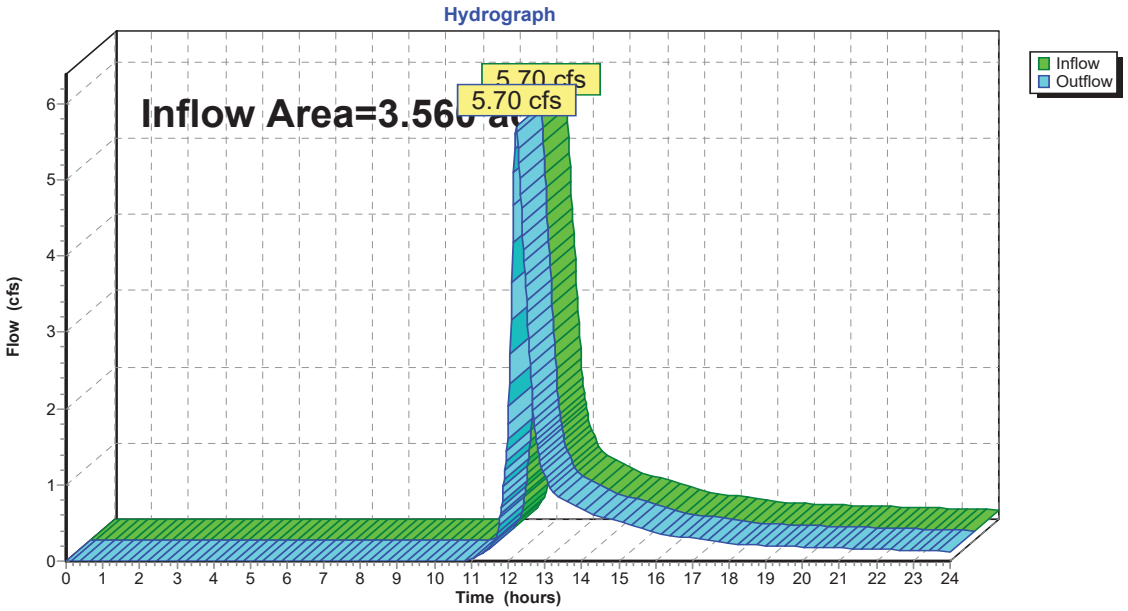
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

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

Inflow Area =	3.560 ac,	3.09% Impervious,	Inflow Depth >	1.94"	for 25-YEAR event
Inflow =	5.70 cfs @	12.23 hrs,	Volume=	0.575 af	
Outflow =	5.70 cfs @	12.23 hrs,	Volume=	0.575 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>3.27"
Flow Length=251' Tc=15.0 min CN=61 Runoff=1.71 cfs 0.163 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>3.05"
Flow Length=457' Tc=15.3 min CN=59 Runoff=7.76 cfs 0.752 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=9.47 cfs 0.916 af
Outflow=9.47 cfs 0.916 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.916 af Average Runoff Depth = 3.09"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

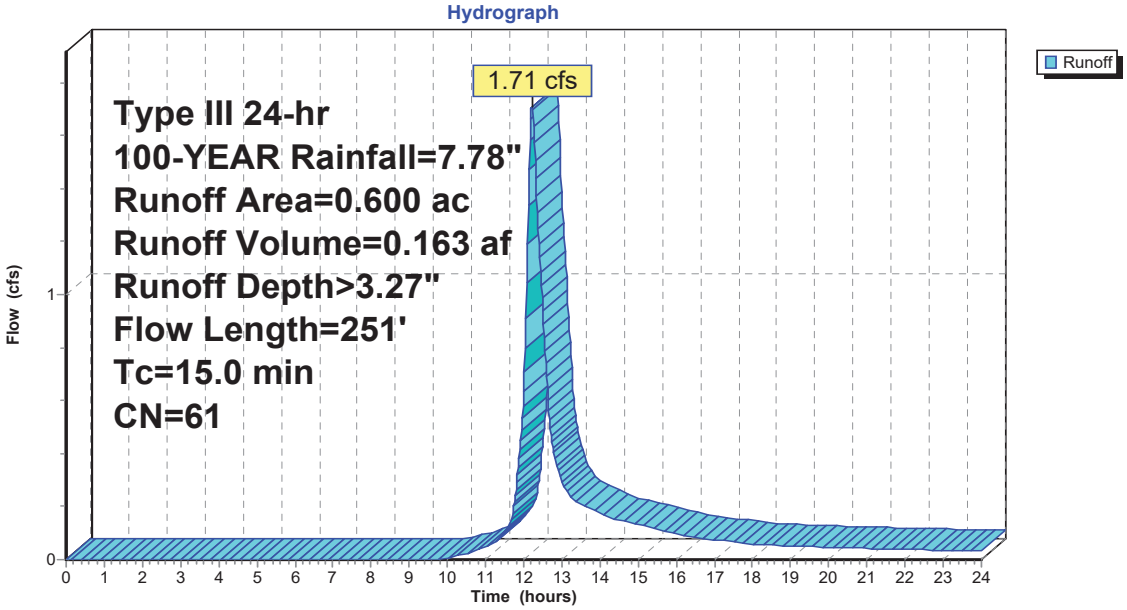
Runoff = 1.71 cfs @ 12.21 hrs, Volume= 0.163 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

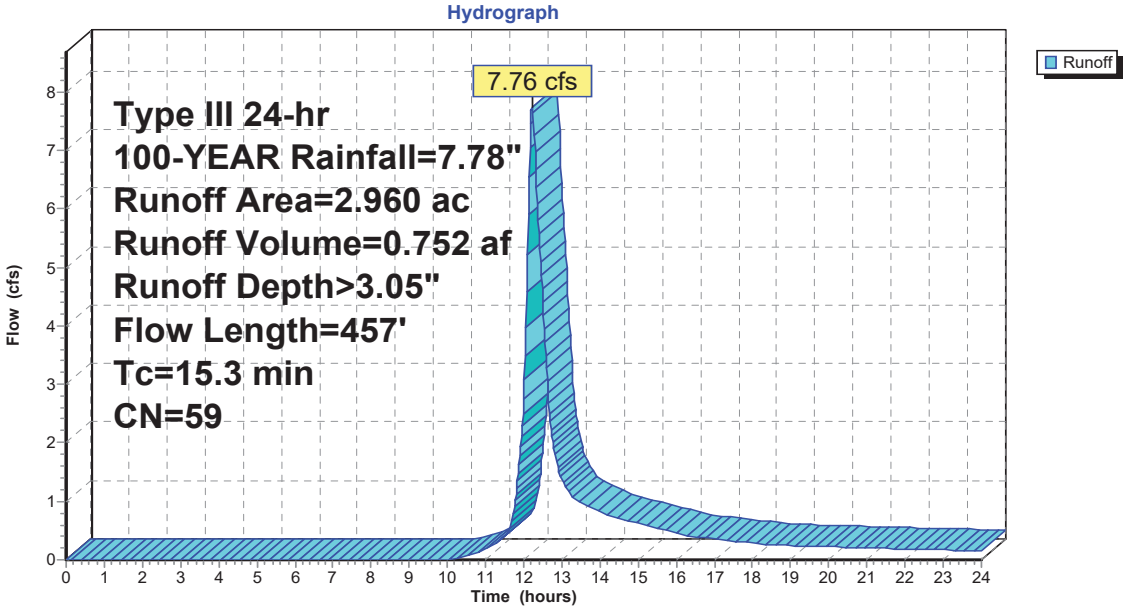
Runoff = 7.76 cfs @ 12.22 hrs, Volume= 0.752 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



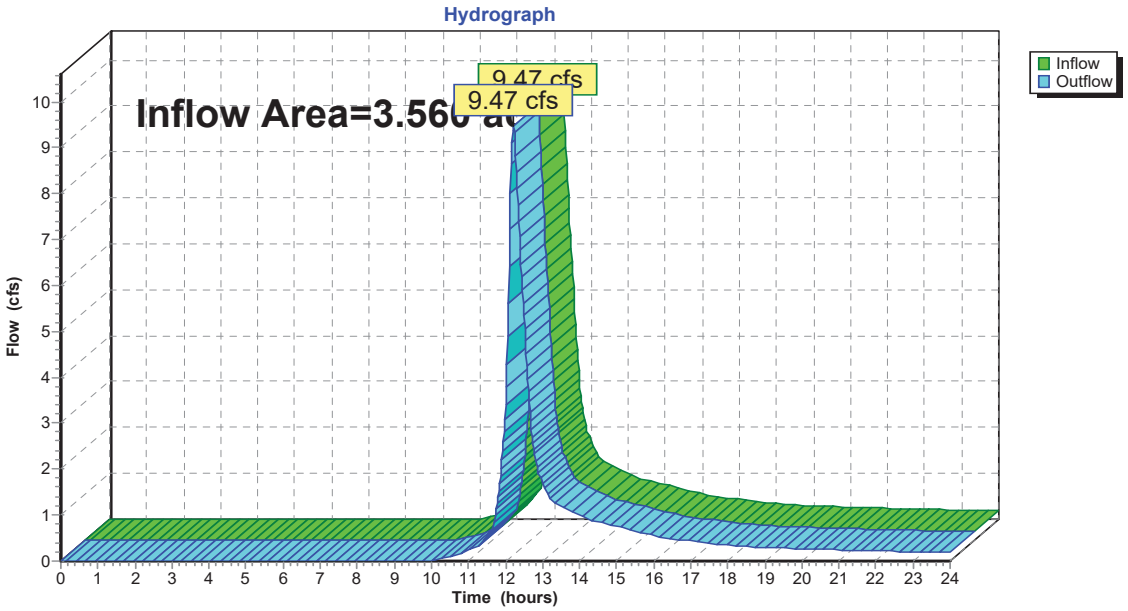
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

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

Inflow Area =	3.560 ac,	3.09% Impervious,	Inflow Depth >	3.09"	for 100-YEAR event
Inflow =	9.47 cfs @	12.22 hrs,	Volume=	0.916 af	
Outflow =	9.47 cfs @	12.22 hrs,	Volume=	0.916 af,	Atten= 0%, Lag= 0.0 min

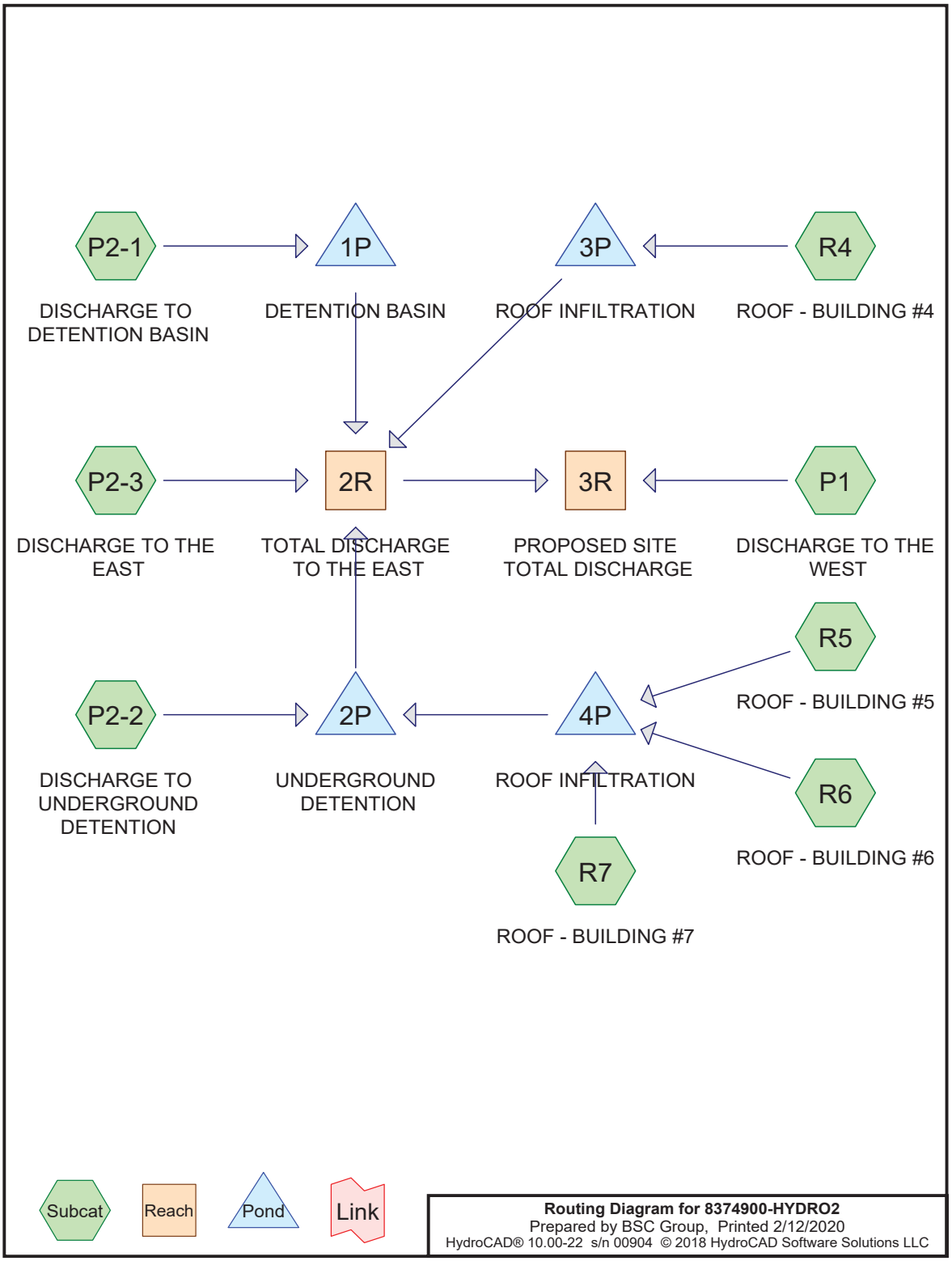
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



APPENDIX B

Proposed Stormwater Discharge Computations


P2-1
DISCHARGE TO DETENTION BASIN
1P
DETENTION BASIN
3P
ROOF INFILTRATION
R4
ROOF - BUILDING #4
P2-3
DISCHARGE TO THE EAST
2R
TOTAL DISCHARGE TO THE EAST
3R
PROPOSED SITE TOTAL DISCHARGE
P1
DISCHARGE TO THE WEST
R5
ROOF - BUILDING #5
P2-2
DISCHARGE TO UNDERGROUND DETENTION
2P
UNDERGROUND DETENTION
4P
ROOF INFILTRATION
R6
ROOF - BUILDING #6
R7
ROOF - BUILDING #7
Subcat
Reach
Pond
Link
Routing Diagram for 8374900-HYDRO2
Prepared by BSC Group, Printed 2/12/2020
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.400	61	>75% Grass cover, Good, HSG B (P1, P2-1, P2-2, P2-3)
0.550	48	Brush, Good, HSG B (P2-3)
1.180	98	Paved parking, HSG B (P2-1, P2-2, P2-3)
0.427	98	Unconnected roofs, HSG B (R4, R5, R6, R7)
3.557	**76**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.557	HSG B	P1, P2-1, P2-2, P2-3, R4, R5, R6, R7
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.557		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.400	0.000	0.000	0.000	1.400	>75% Grass cover, Good	P1, P2-1, P2-2, P2-3
0.000	0.550	0.000	0.000	0.000	0.550	Brush, Good	P2-3
0.000	1.180	0.000	0.000	0.000	1.180	Paved parking	P2-1, P2-2, P2-3
0.000	0.427	0.000	0.000	0.000	0.427	Unconnected roofs	R4, R5, R6, R7
0.000	**3.557**	**0.000**	**0.000**	**0.000**	**3.557**	**TOTAL AREA**	

Pipe Listing (selected 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	1P	614.05	613.00	105.0	0.0100	0.011	15.0	0.0	0.0
2	2P	613.75	613.75	18.0	0.0000	0.011	15.0	0.0	0.0
3	3P	617.50	616.00	15.0	0.1000	0.010	8.0	0.0	0.0
4	4P	617.00	617.00	33.0	0.0000	0.010	8.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>0.50"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.006 af

Subcatchment P2-1: DISCHARGE TO Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>1.43"
Tc=6.0 min CN=79 Runoff=1.00 cfs 0.072 af

Subcatchment P2-2: DISCHARGE TO Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>2.20"
Tc=6.0 min CN=89 Runoff=2.91 cfs 0.209 af

Subcatchment P2-3: DISCHARGE TO THE Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>0.32"
Tc=6.0 min CN=56 Runoff=0.19 cfs 0.033 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.030 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.031 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=0.34 cfs 0.162 af
Outflow=0.34 cfs 0.162 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=0.34 cfs 0.168 af
Outflow=0.34 cfs 0.168 af

Pond 1P: DETENTION BASIN Peak Elev=614.45' Storage=1,915 cf Inflow=1.00 cfs 0.072 af
Outflow=0.07 cfs 0.031 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=615.01' Storage=5,591 cf Inflow=2.91 cfs 0.209 af
Outflow=0.22 cfs 0.098 af

Pond 3P: ROOF INFILTRATION Peak Elev=614.22' Storage=1,112 cf Inflow=0.32 cfs 0.026 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=614.63' Storage=0.085 af Inflow=1.06 cfs 0.085 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 0.430 af Average Runoff Depth = 1.45"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

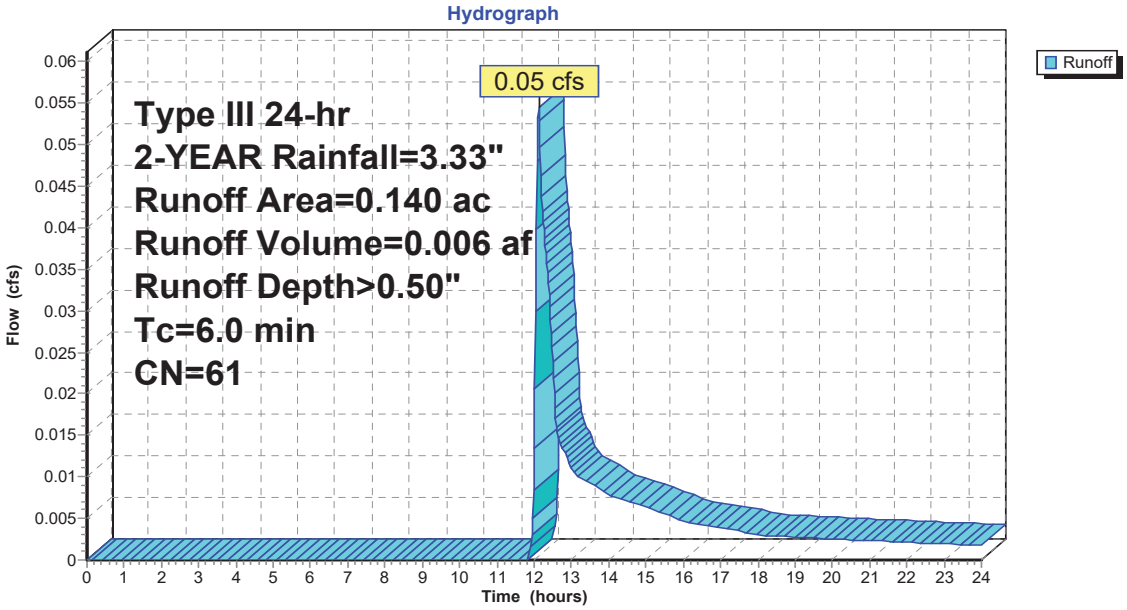
Runoff = 0.05 cfs @ 12.12 hrs, Volume= 0.006 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

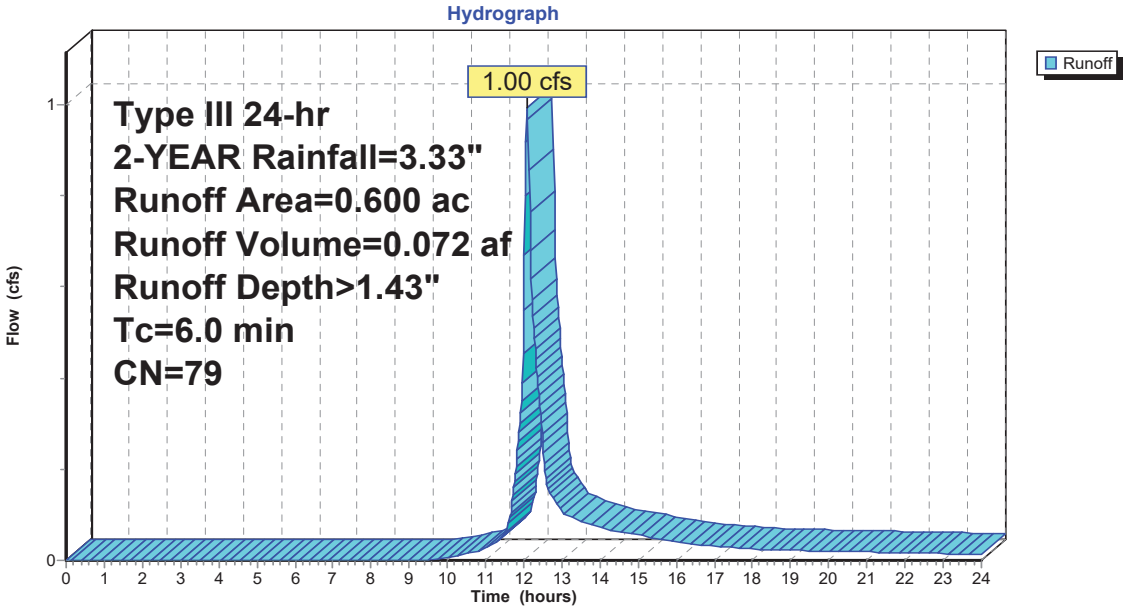
Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.072 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

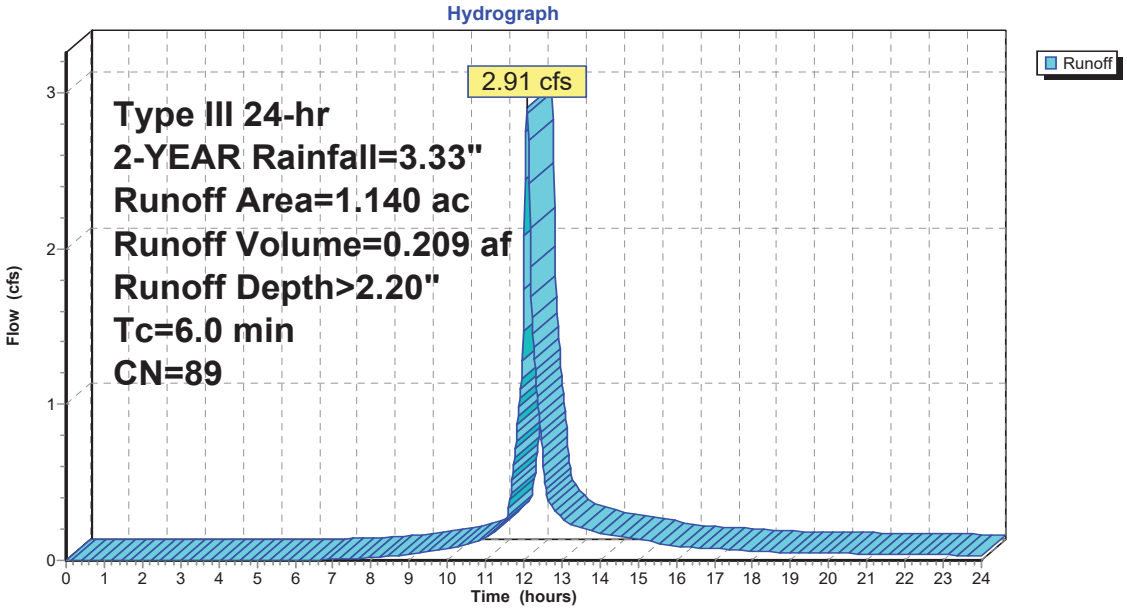
Runoff = 2.91 cfs @ 12.09 hrs, Volume= 0.209 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

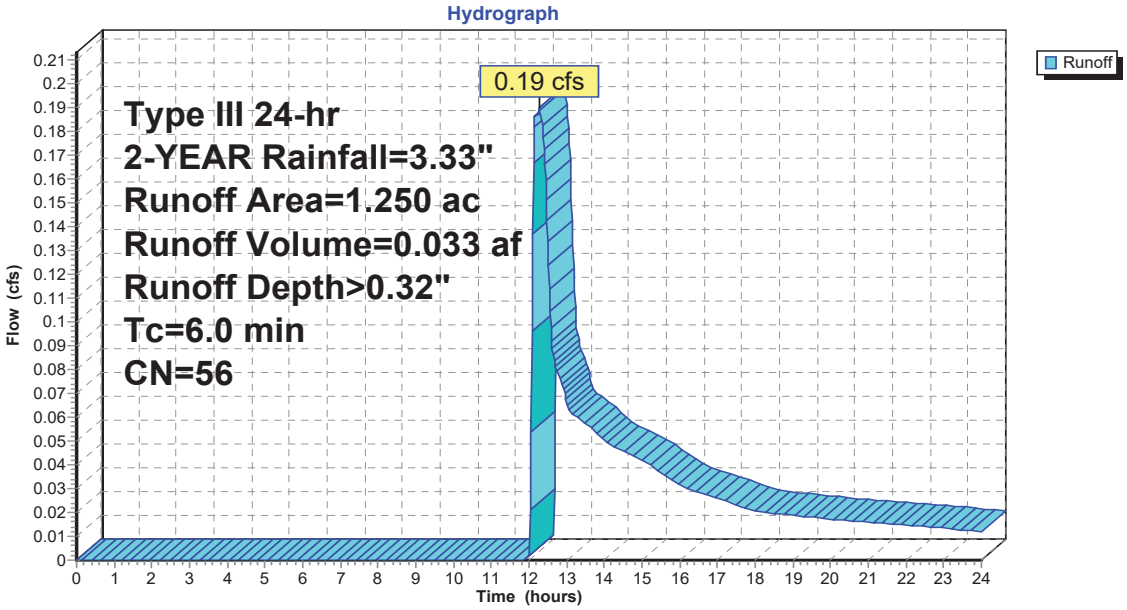
Runoff = 0.19 cfs @ 12.28 hrs, Volume= 0.033 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

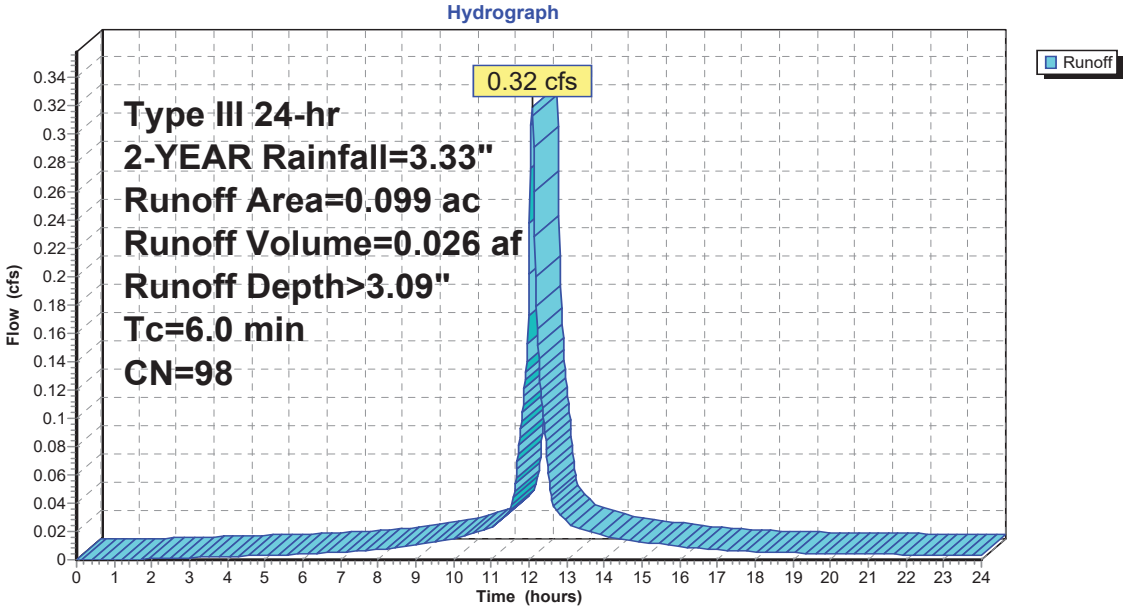
Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

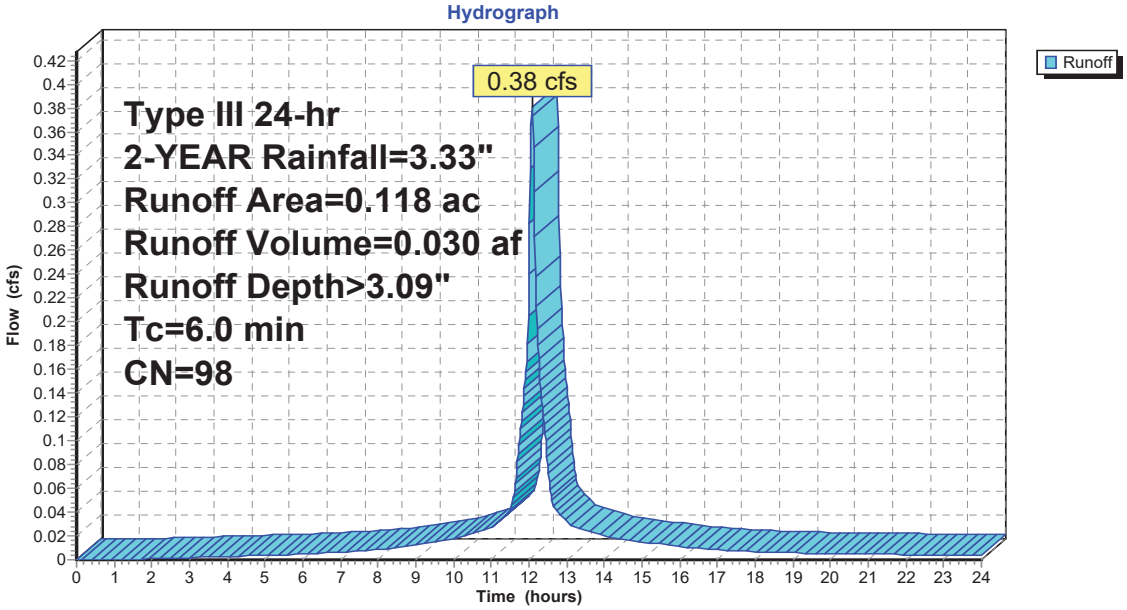
Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.030 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

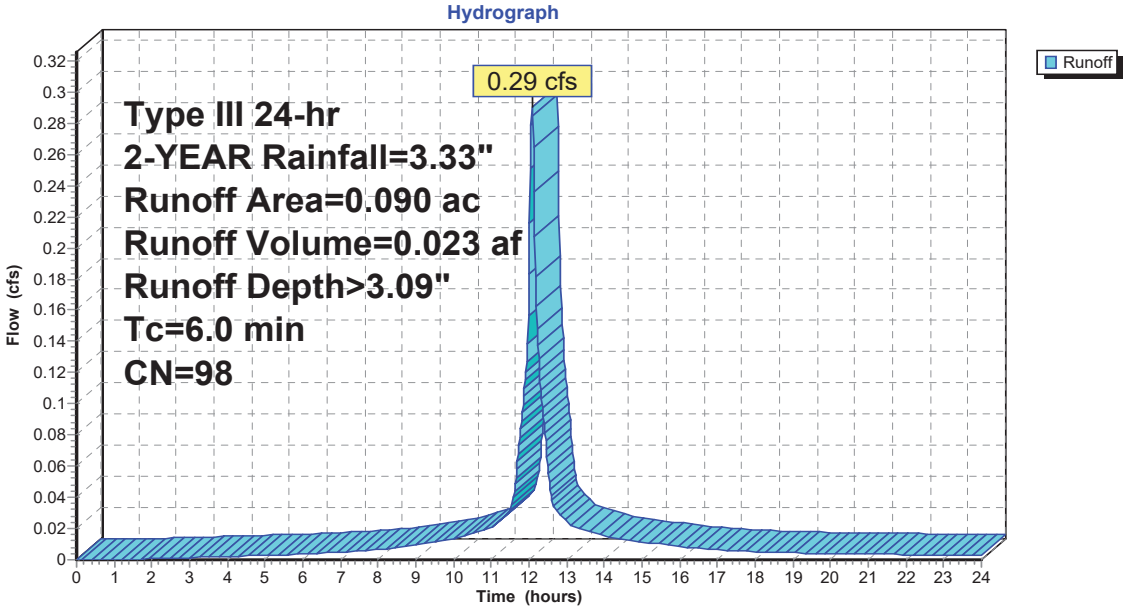
Runoff = 0.29 cfs @ 12.08 hrs, Volume= 0.023 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

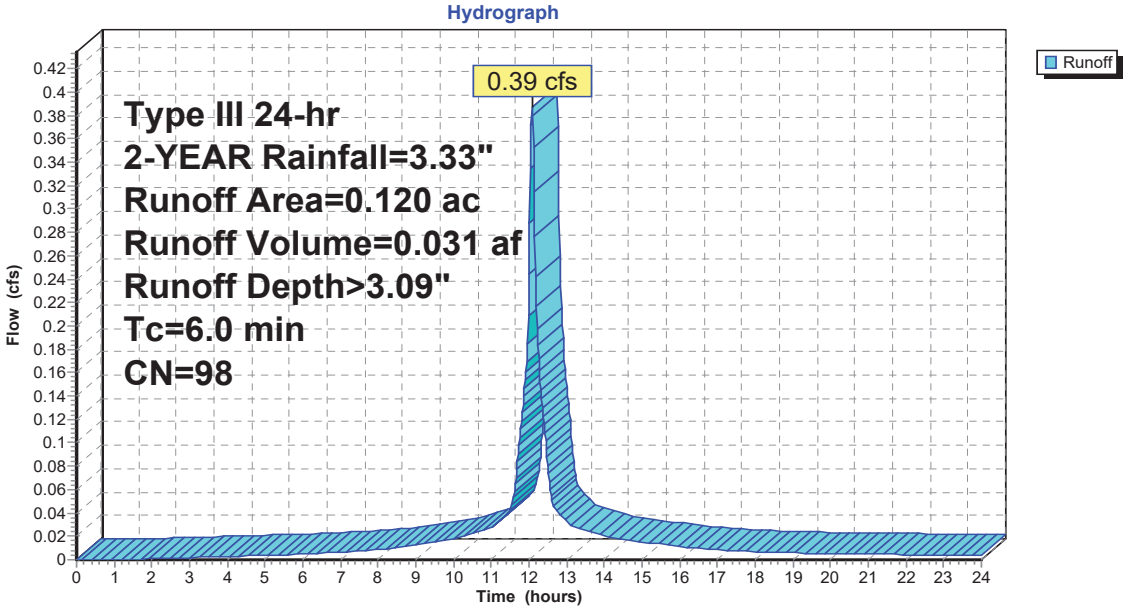
Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.031 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



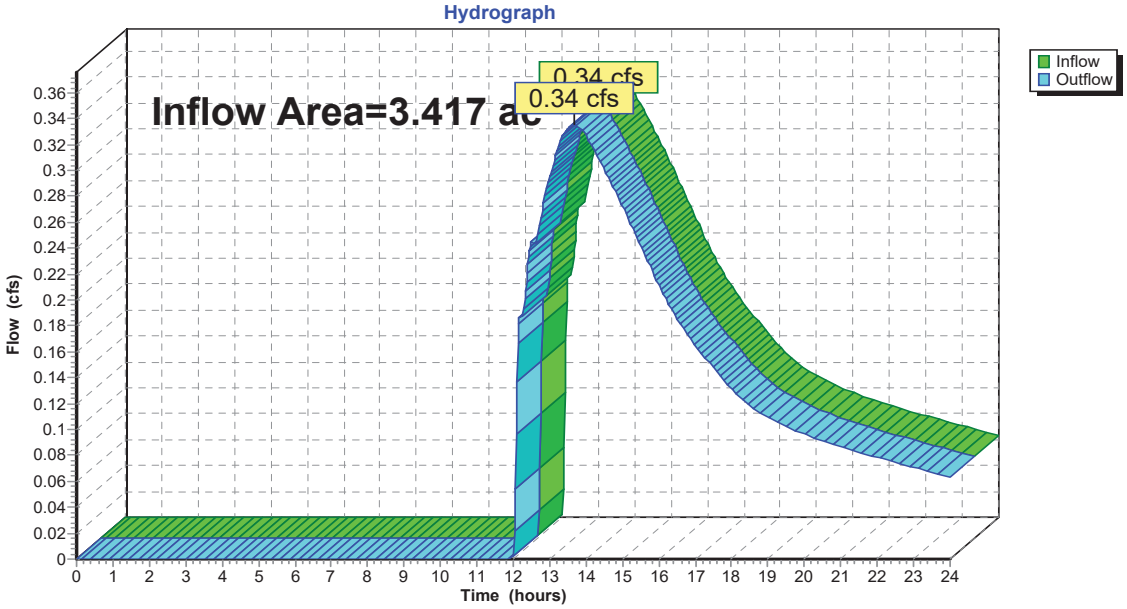
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

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

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 0.57" for 2-YEAR event
Inflow = 0.34 cfs @ 13.67 hrs, Volume= 0.162 af
Outflow = 0.34 cfs @ 13.67 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



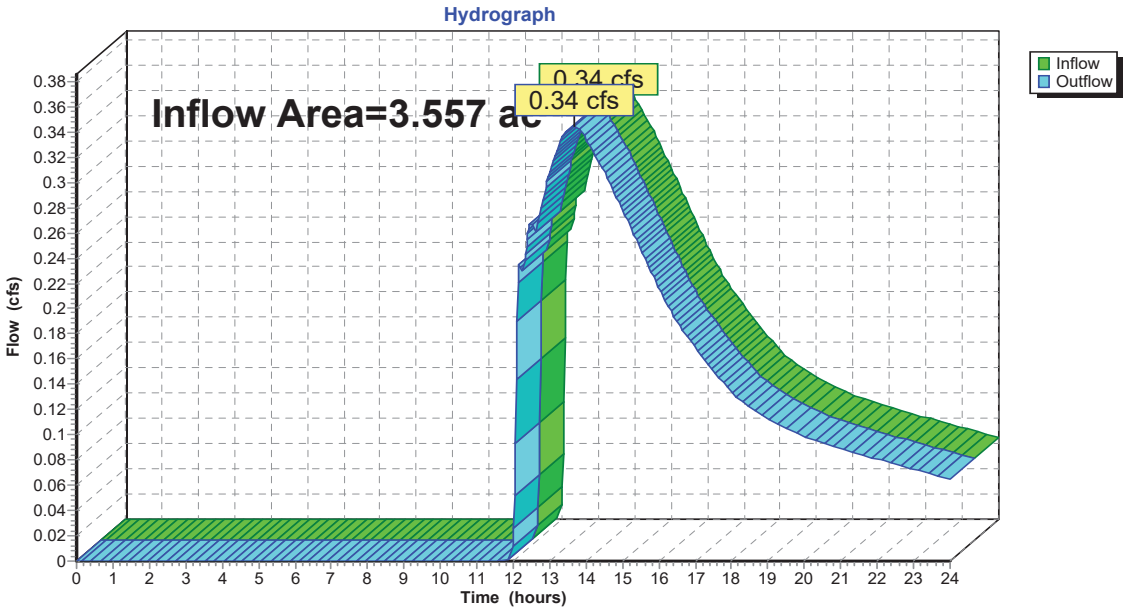
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

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

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 0.57" for 2-YEAR event
Inflow = 0.34 cfs @ 13.66 hrs, Volume= 0.168 af
Outflow = 0.34 cfs @ 13.66 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 1.43" for 2-YEAR event
Inflow = 1.00 cfs @ 12.09 hrs, Volume= 0.072 af
Outflow = 0.07 cfs @ 14.13 hrs, Volume= 0.031 af, Atten= 93%, Lag= 122.0 min
Primary = 0.07 cfs @ 14.13 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.45' @ 14.13 hrs Surf.Area= 1,679 sf Storage= 1,915 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 306.2 min calculated for 0.031 af (43% of inflow)
Center-of-Mass det. time= 180.6 min (1,023.7 - 843.1)

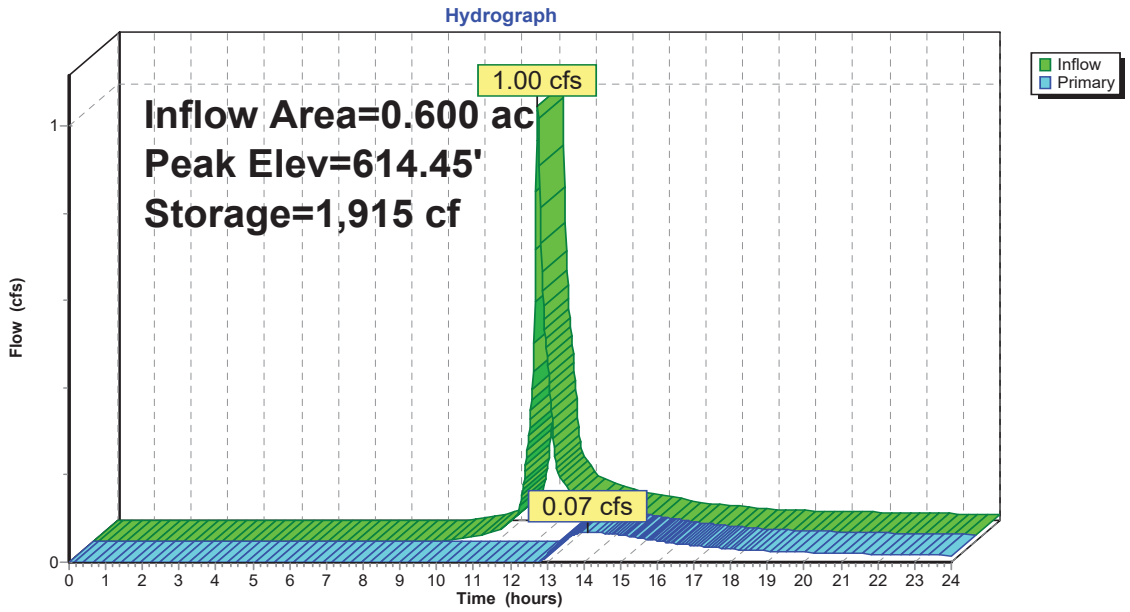
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

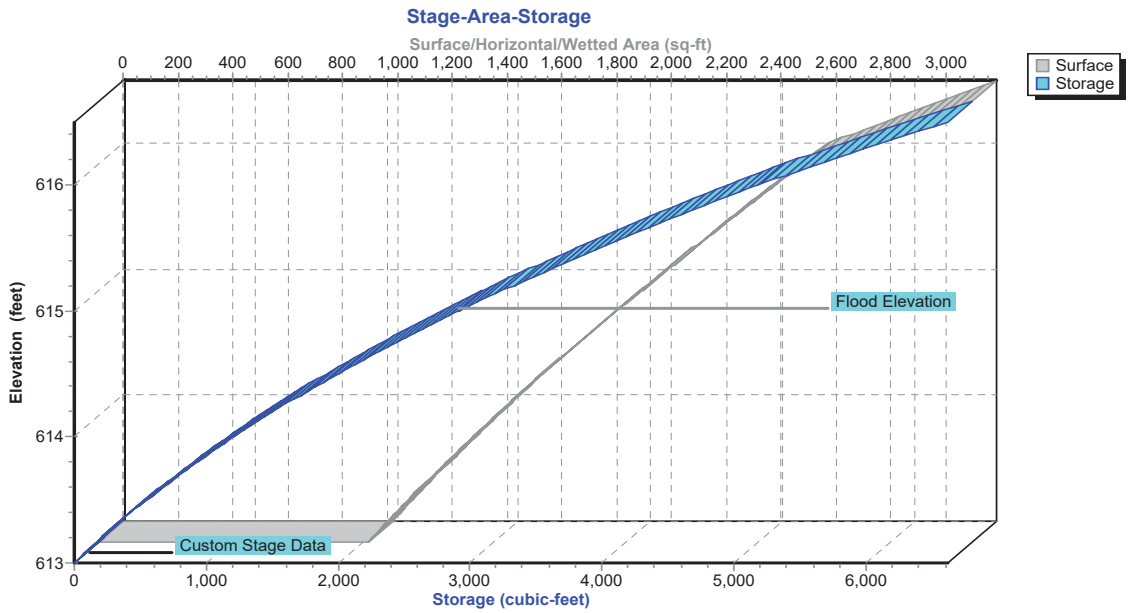
Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 14.13 hrs HW=614.45' (Free Discharge)
└─**1=Culvert** (Passes 0.07 cfs of 0.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.33 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 1.71" for 2-YEAR event
Inflow = 2.91 cfs @ 12.09 hrs, Volume= 0.209 af
Outflow = 0.22 cfs @ 13.38 hrs, Volume= 0.098 af, Atten= 92%, Lag= 77.7 min
Primary = 0.22 cfs @ 13.38 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.01' @ 13.38 hrs Surf.Area= 5,184 sf Storage= 5,591 cf

Plug-Flow detention time= 287.5 min calculated for 0.097 af (47% of inflow)
Center-of-Mass det. time= 172.8 min (981.7 - 808.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.25'	6,164 cf	**32.00'W x 162.00'L x 4.50'H Field A** 23,328 cf Overall - 7,917 cf Embedded = 15,411 cf x 40.0% Voids
#2A	613.75'	7,917 cf	**CMP Round 36** x 56 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L 7 Rows of 8 Chambers
#3	613.75'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		14,112 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.75' / 613.75' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.72'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 13.38 hrs HW=615.01' (Free Discharge)
└─**1=Culvert** (Passes 0.22 cfs of 3.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 1.85 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L

36.0" Wide + 18.0" Spacing = 54.0" C-C Row Spacing

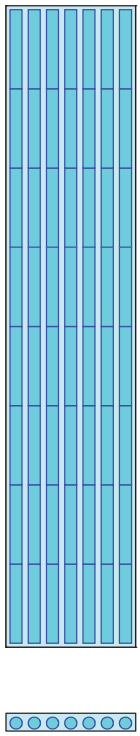
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
7 Rows x 36.0" Wide + 18.0" Spacing x 6 + 12.0" Side Stone x 2 = 32.00' Base Width
6.0" Base + 36.0" Chamber Height + 12.0" Cover = 4.50' Field Height

56 Chambers x 141.4 cf = 7,916.8 cf Chamber Storage

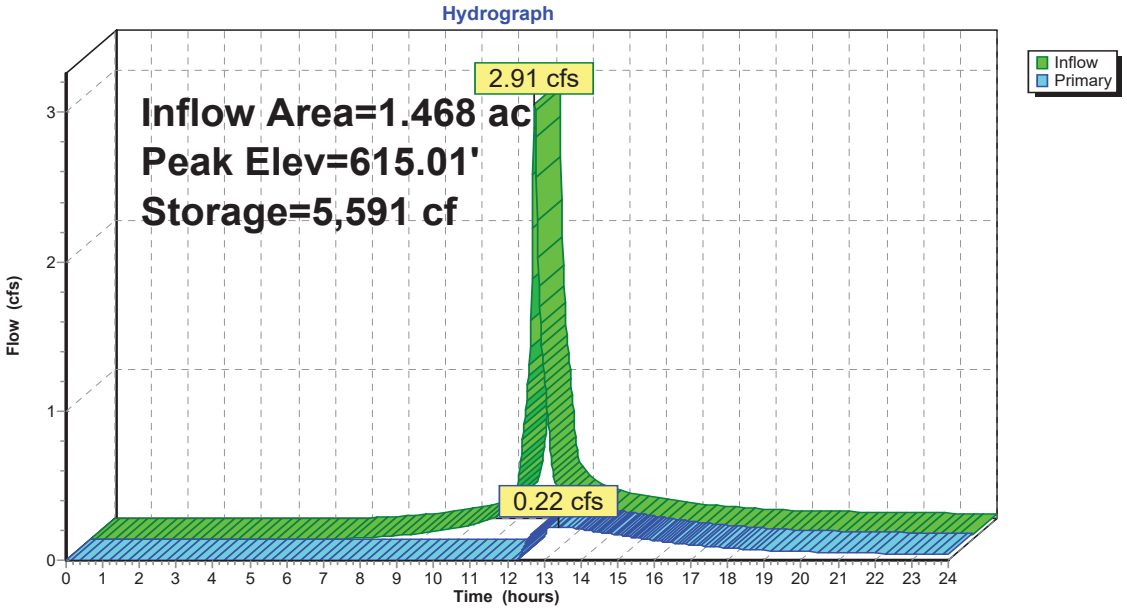
23,328.0 cf Field - 7,916.8 cf Chambers = 15,411.2 cf Stone x 40.0% Voids = 6,164.5 cf Stone Storage

Chamber Storage + Stone Storage = 14,081.3 cf = 0.323 af
Overall Storage Efficiency = 60.4%
Overall System Size = 162.00' x 32.00' x 4.50'

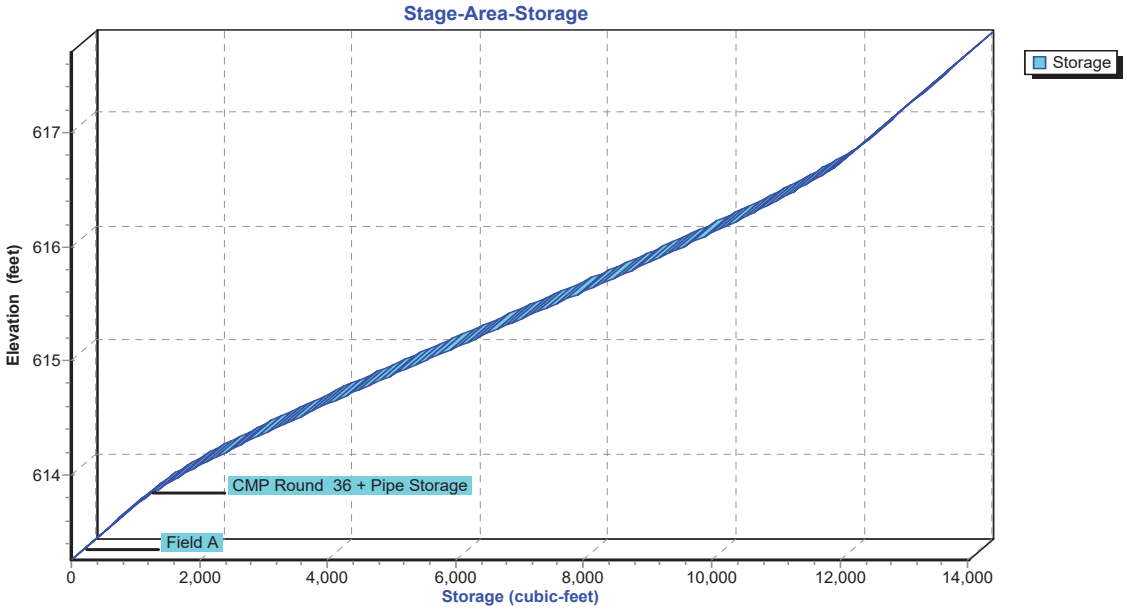
56 Chambers
864.0 cy Field
570.8 cy Stone



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 3.09" for 2-YEAR event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.22' @ 24.00 hrs Surf.Area= 607 sf Storage= 1,112 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

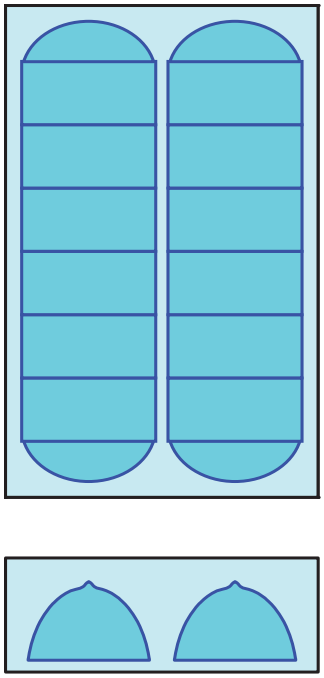
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

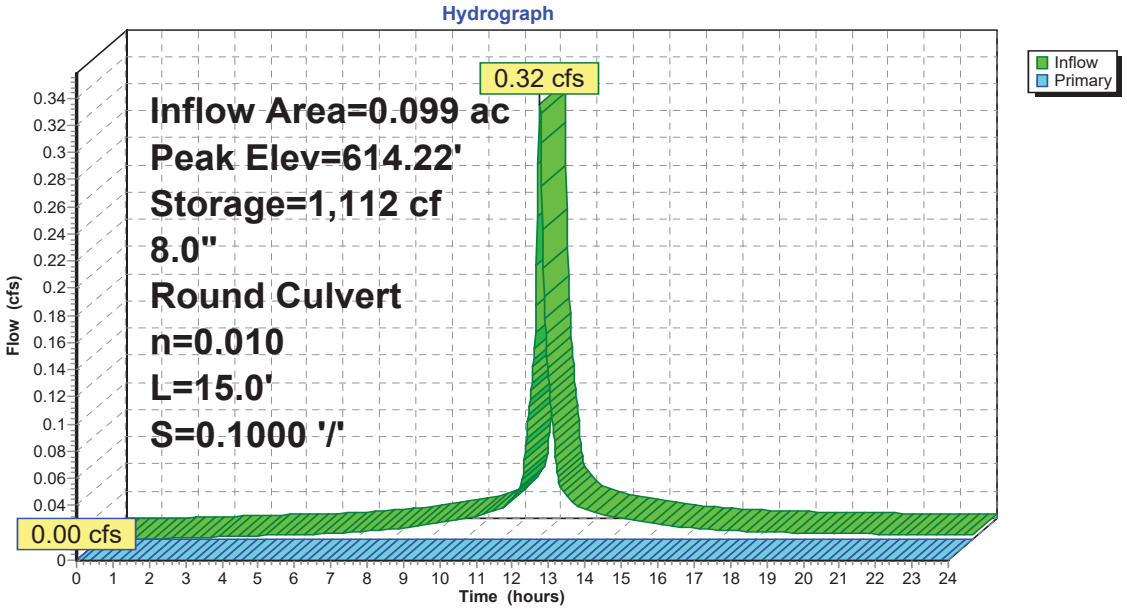
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

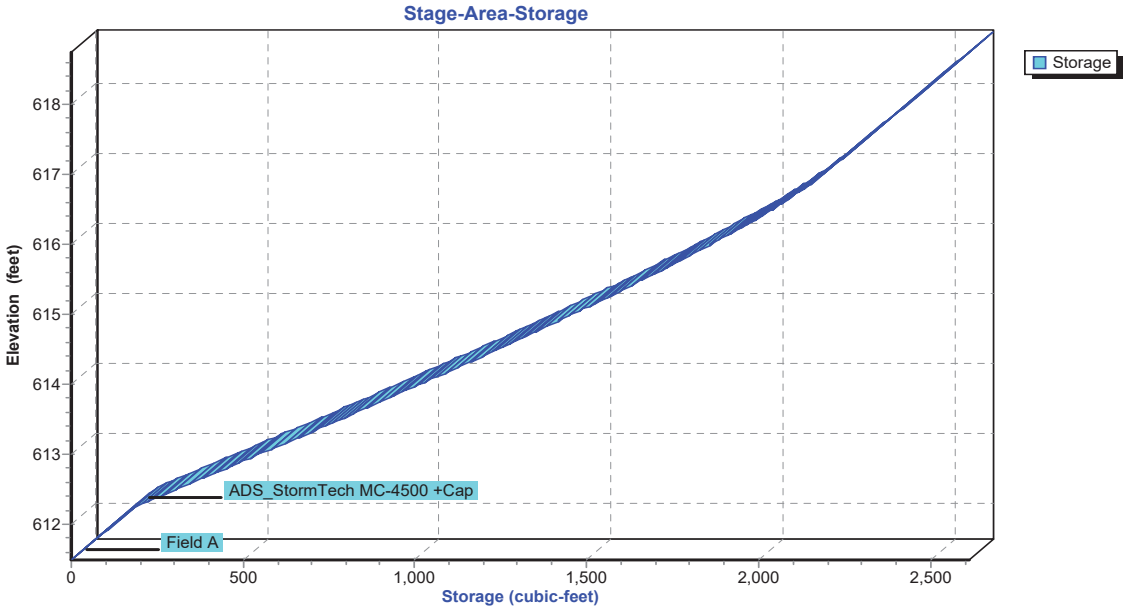
12 Chambers
163.0 cy Field
110.4 cy Stone



Pond 3P: ROOF INFILTRATION



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 3.09" for 2-YEAR event
Inflow = 1.06 cfs @ 12.08 hrs, Volume= 0.085 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.63' @ 24.00 hrs Surf.Area= 0.049 ac Storage= 0.085 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	612.17'	0.082 af	**28.50'W x 75.54'L x 6.75'H Field A** 0.334 af Overall - 0.130 af Embedded = 0.204 af x 40.0% Voids
#2A	612.92'	0.130 af	**ADS_StormTech MC-4500 +Cap** x 51 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 17 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.211 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=612.17' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

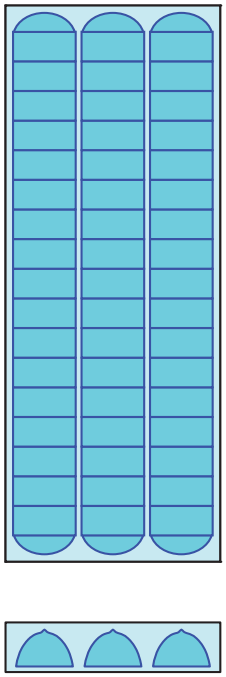
17 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 73.54' Row Length +12.0" End Stone x 2 = 75.54' Base Length
3 Rows x 100.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 28.50' Base Width
9.0" Base + 60.0" Chamber Height + 12.0" Cover = 6.75' Field Height

51 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 3 Rows = 5,645.2 cf Chamber Storage

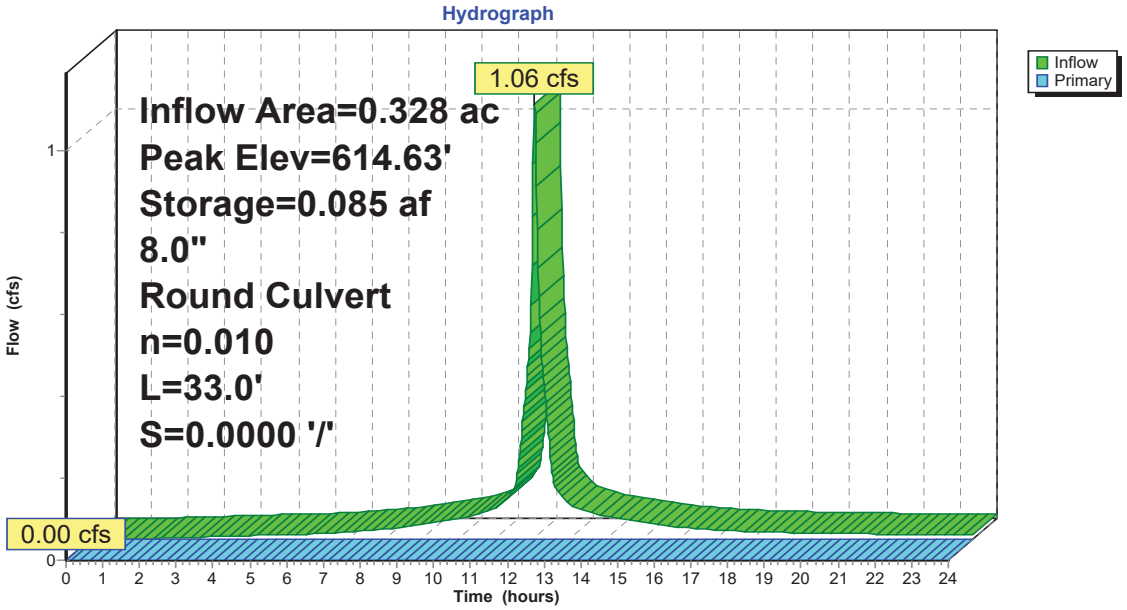
14,532.3 cf Field - 5,645.2 cf Chambers = 8,887.1 cf Stone x 40.0% Voids = 3,554.8 cf Stone Storage

Chamber Storage + Stone Storage = 9,200.1 cf = 0.211 af
Overall Storage Efficiency = 63.3%
Overall System Size = 75.54' x 28.50' x 6.75'

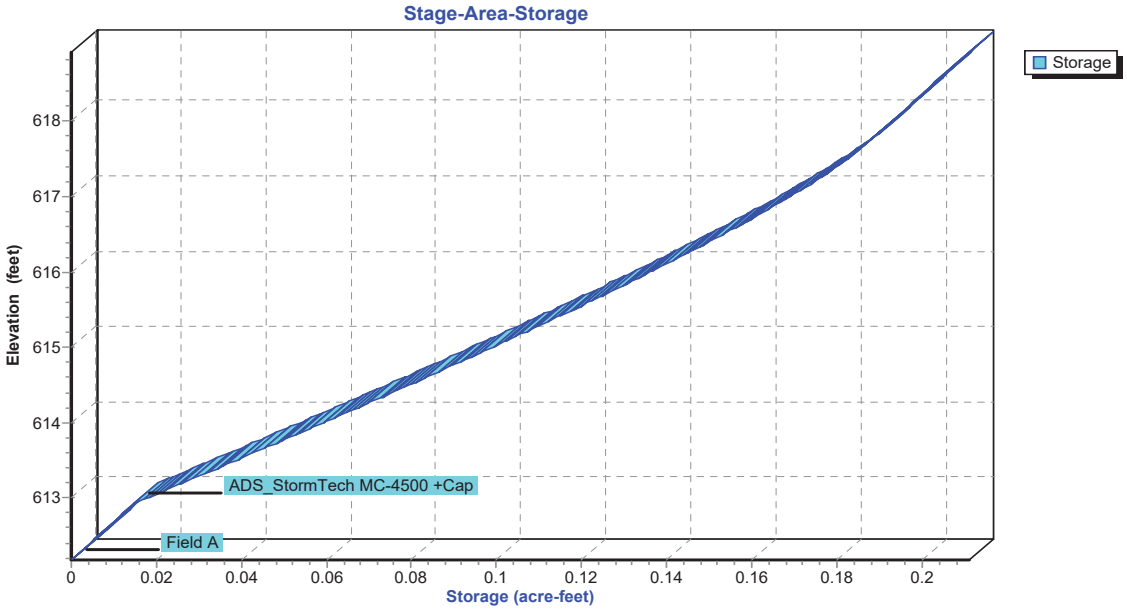
51 Chambers
538.2 cy Field
329.2 cy Stone



Pond 4P: ROOF INFILTRATION



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>1.40"
Tc=6.0 min CN=61 Runoff=0.21 cfs 0.016 af

Subcatchment P2-1: DISCHARGE TO Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>2.84"
Tc=6.0 min CN=79 Runoff=2.00 cfs 0.142 af

Subcatchment P2-2: DISCHARGE TO Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>3.82"
Tc=6.0 min CN=89 Runoff=4.95 cfs 0.363 af

Subcatchment P2-3: DISCHARGE TO THE Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>1.07"
Tc=6.0 min CN=56 Runoff=1.29 cfs 0.111 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.040 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.047 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.036 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.048 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=2.27 cfs 0.460 af
Outflow=2.27 cfs 0.460 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=2.37 cfs 0.476 af
Outflow=2.37 cfs 0.476 af

Pond 1P: DETENTION BASIN Peak Elev=614.89' Storage=2,704 cf Inflow=2.00 cfs 0.142 af
Outflow=0.55 cfs 0.101 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=615.67' Storage=8,262 cf Inflow=4.95 cfs 0.363 af
Outflow=1.15 cfs 0.249 af

Pond 3P: ROOF INFILTRATION Peak Elev=615.66' Storage=1,728 cf Inflow=0.49 cfs 0.040 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=615.86' Storage=0.131 af Inflow=1.62 cfs 0.131 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 0.803 af Average Runoff Depth = 2.71"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

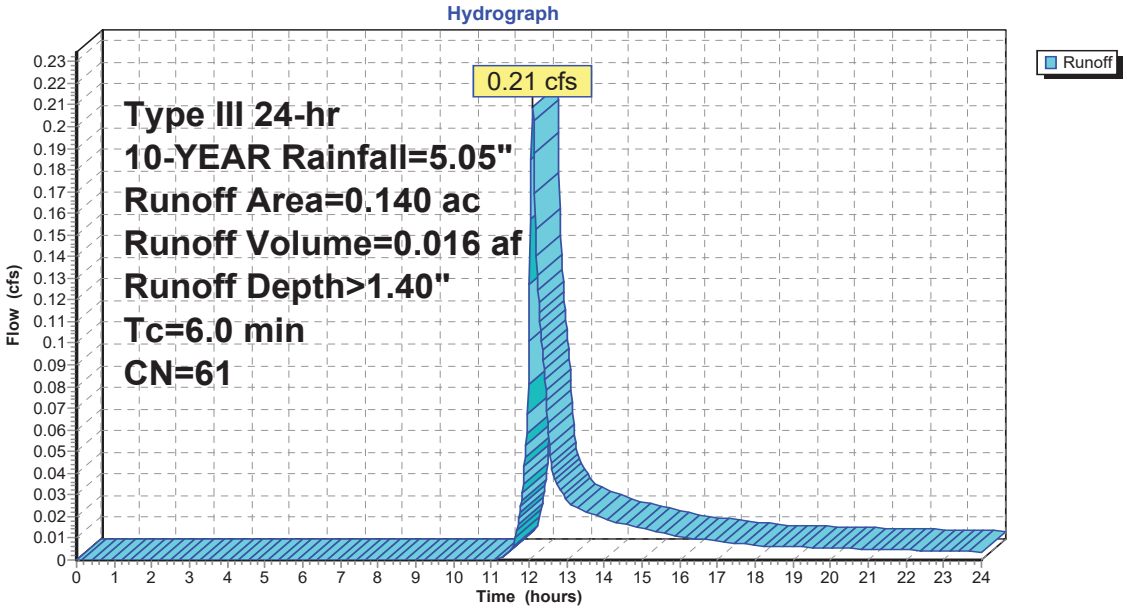
Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

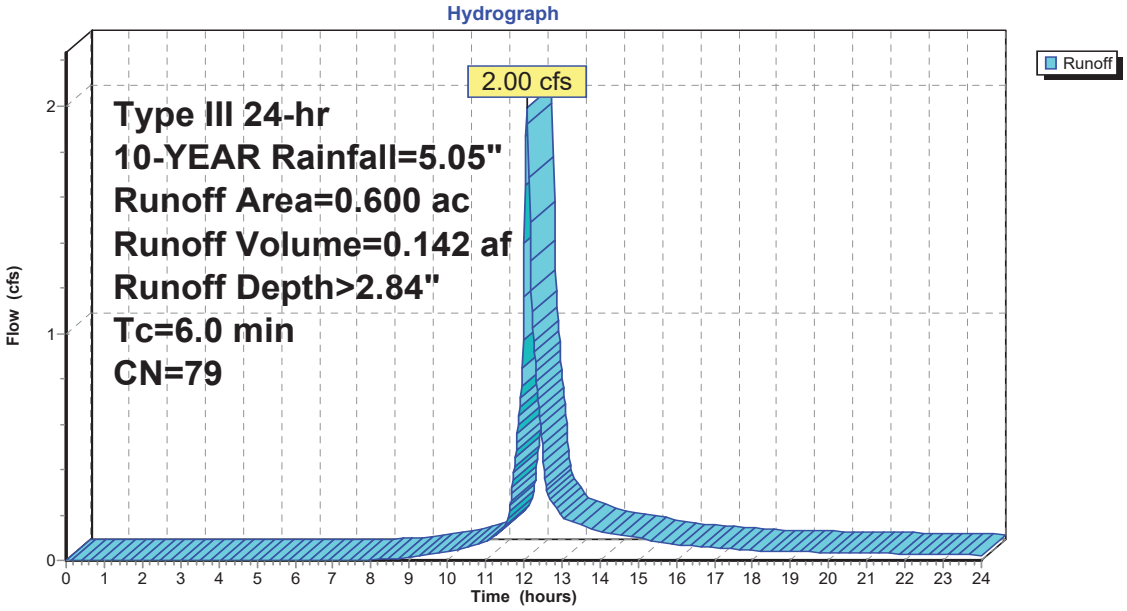
Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

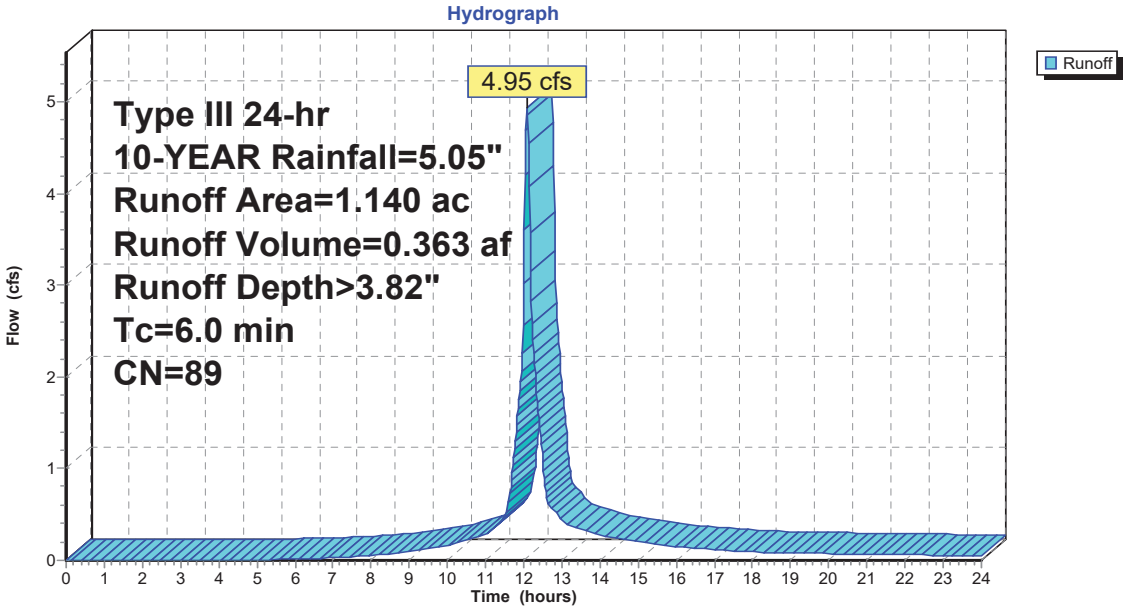
Runoff = 4.95 cfs @ 12.09 hrs, Volume= 0.363 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

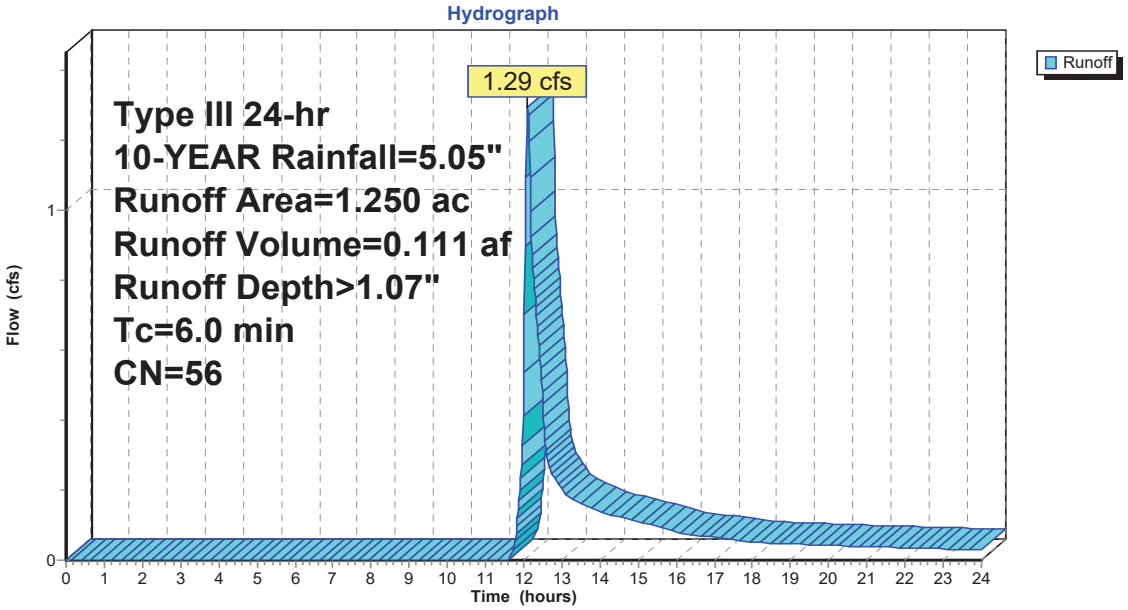
Runoff = 1.29 cfs @ 12.11 hrs, Volume= 0.111 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

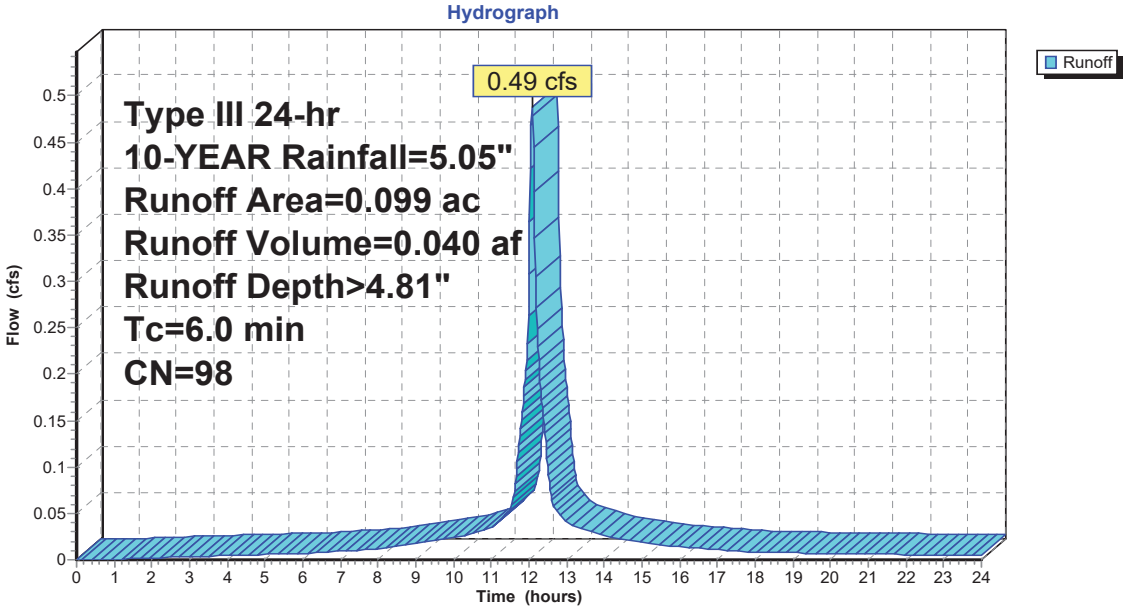
Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

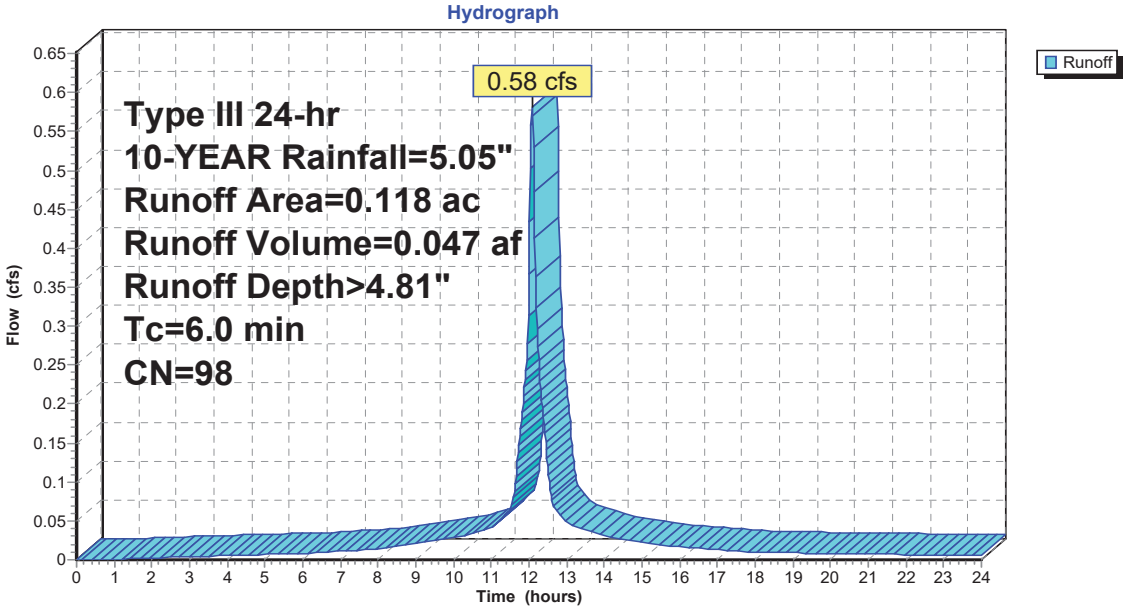
Runoff = 0.58 cfs @ 12.08 hrs, Volume= 0.047 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

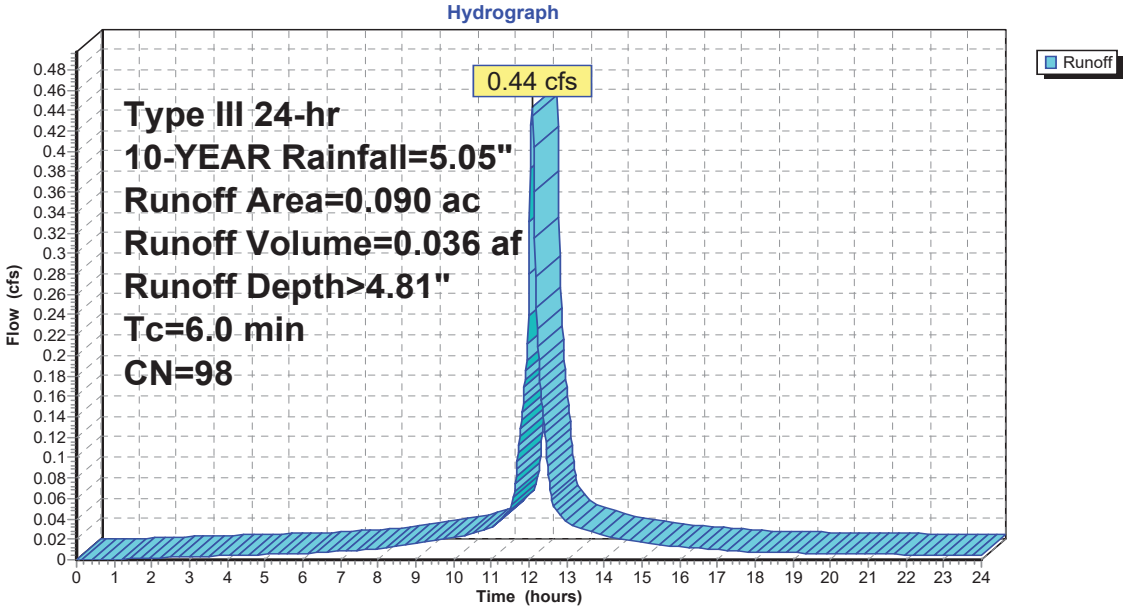
Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.036 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

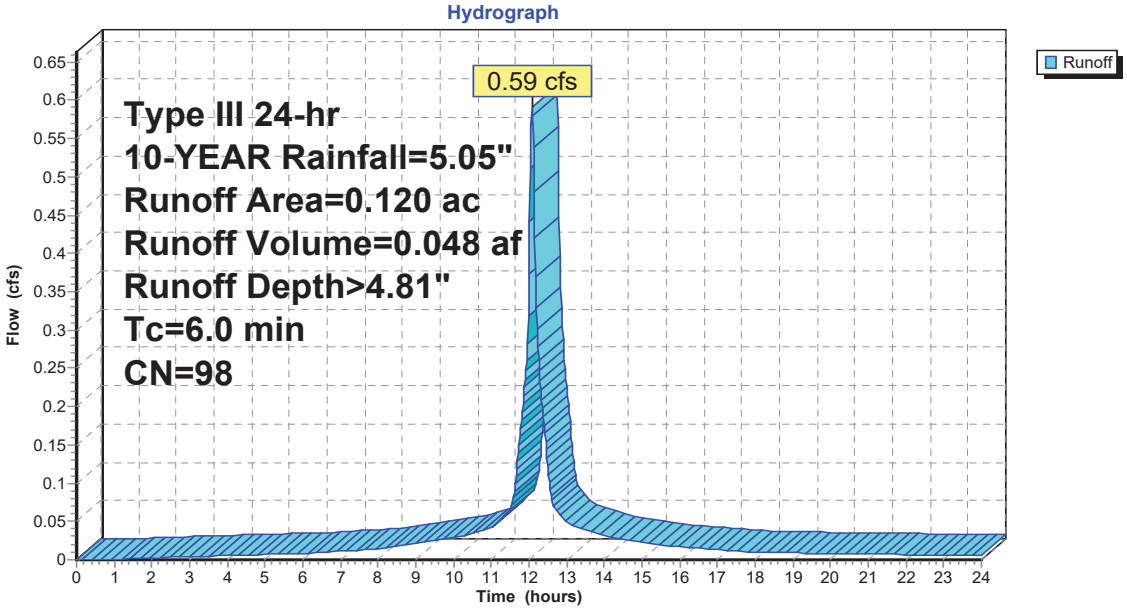
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



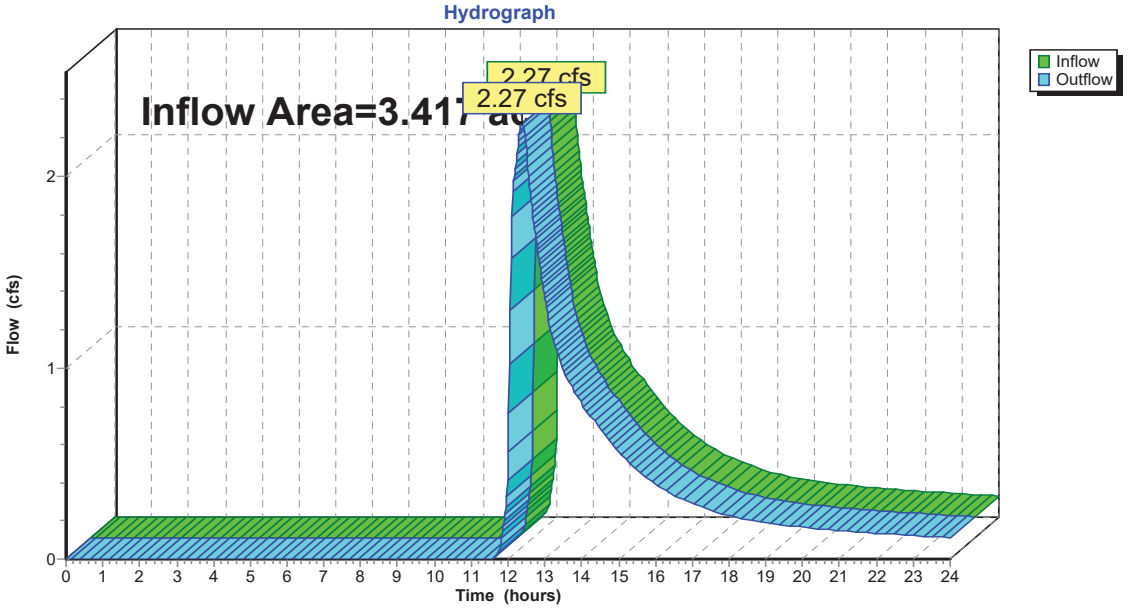
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

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

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 1.62" for 10-YEAR event
Inflow = 2.27 cfs @ 12.38 hrs, Volume= 0.460 af
Outflow = 2.27 cfs @ 12.38 hrs, Volume= 0.460 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



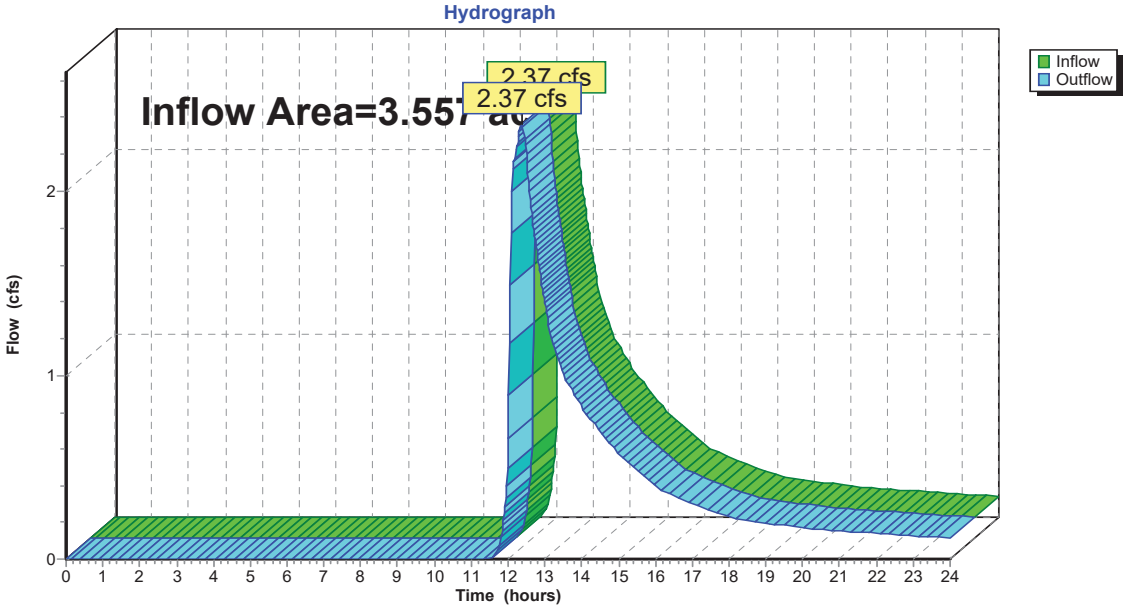
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

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

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 1.61" for 10-YEAR event
Inflow = 2.37 cfs @ 12.37 hrs, Volume= 0.476 af
Outflow = 2.37 cfs @ 12.37 hrs, Volume= 0.476 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 2.84" for 10-YEAR event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.142 af
Outflow = 0.55 cfs @ 12.46 hrs, Volume= 0.101 af, Atten= 72%, Lag= 22.3 min
Primary = 0.55 cfs @ 12.46 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.89' @ 12.46 hrs Surf.Area= 1,921 sf Storage= 2,704 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 172.5 min calculated for 0.101 af (71% of inflow)
Center-of-Mass det. time= 78.2 min (901.5 - 823.4)

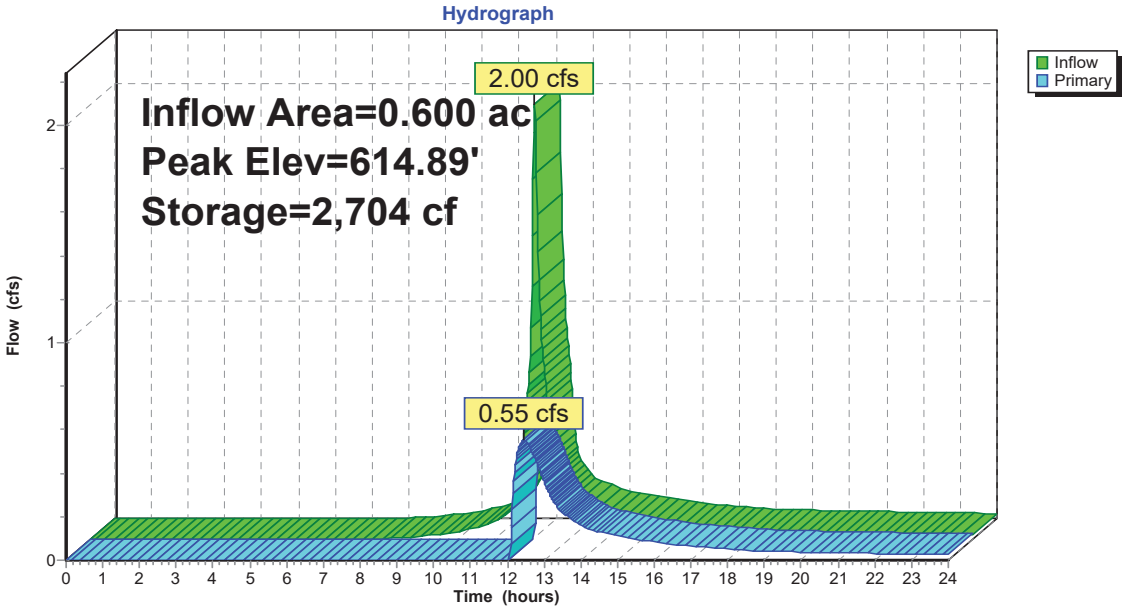
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

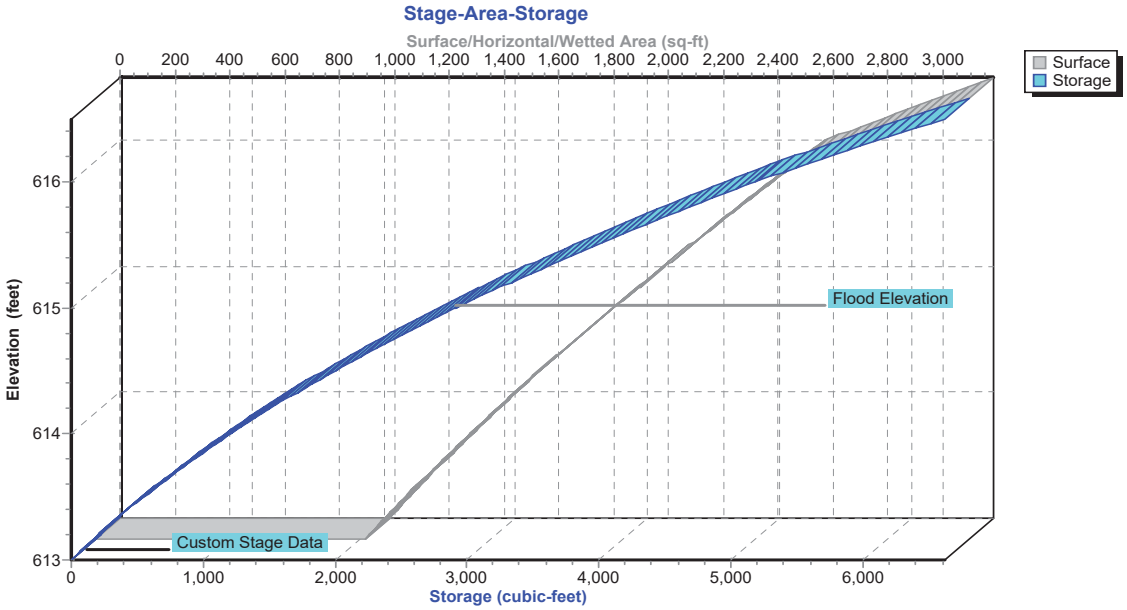
Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.55 cfs @ 12.46 hrs HW=614.89' (Free Discharge)
└─**1=Culvert** (Passes 0.55 cfs of 2.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.81 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 2.96" for 10-YEAR event
Inflow = 4.95 cfs @ 12.09 hrs, Volume= 0.363 af
Outflow = 1.15 cfs @ 12.48 hrs, Volume= 0.249 af, Atten= 77%, Lag= 23.9 min
Primary = 1.15 cfs @ 12.48 hrs, Volume= 0.249 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.67' @ 12.48 hrs Surf.Area= 5,184 sf Storage= 8,262 cf

Plug-Flow detention time= 203.6 min calculated for 0.248 af (69% of inflow)
Center-of-Mass det. time= 110.5 min (904.0 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.25'	6,164 cf	**32.00'W x 162.00'L x 4.50'H Field A** 23,328 cf Overall - 7,917 cf Embedded = 15,411 cf x 40.0% Voids
#2A	613.75'	7,917 cf	**CMP Round 36** x 56 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L 7 Rows of 8 Chambers
#3	613.75'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		14,112 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.75' / 613.75' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.72'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.15 cfs @ 12.48 hrs HW=615.67' (Free Discharge)
└─**1=Culvert** (Passes 1.15 cfs of 6.01 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.79 cfs @ 4.03 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.36 cfs @ 1.99 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L

36.0" Wide + 18.0" Spacing = 54.0" C-C Row Spacing

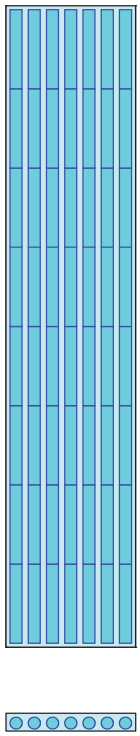
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
7 Rows x 36.0" Wide + 18.0" Spacing x 6 + 12.0" Side Stone x 2 = 32.00' Base Width
6.0" Base + 36.0" Chamber Height + 12.0" Cover = 4.50' Field Height

56 Chambers x 141.4 cf = 7,916.8 cf Chamber Storage

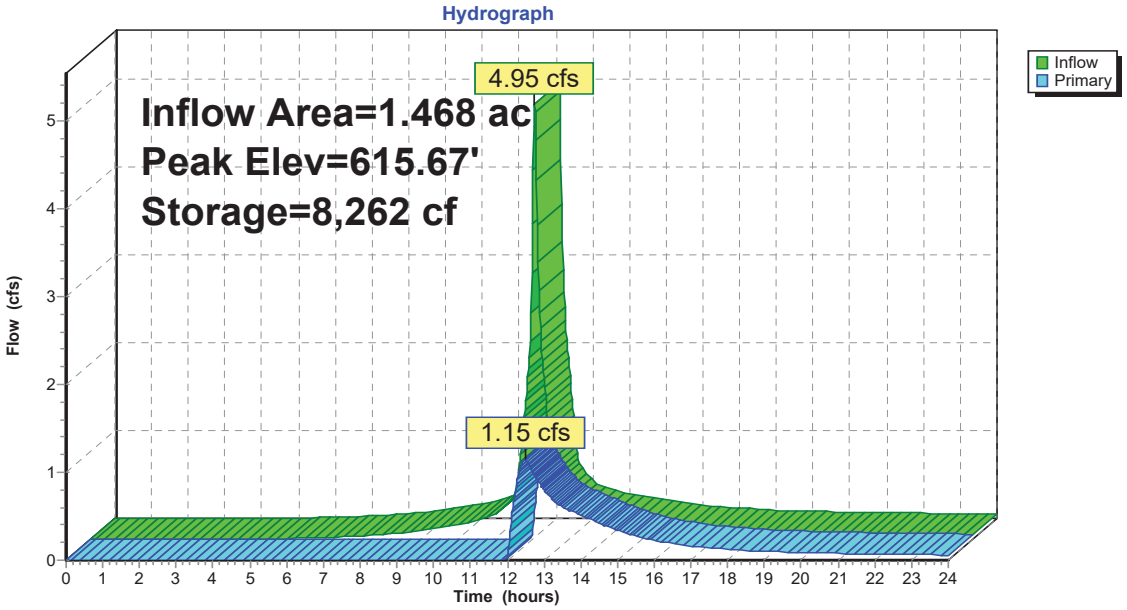
23,328.0 cf Field - 7,916.8 cf Chambers = 15,411.2 cf Stone x 40.0% Voids = 6,164.5 cf Stone Storage

Chamber Storage + Stone Storage = 14,081.3 cf = 0.323 af
Overall Storage Efficiency = 60.4%
Overall System Size = 162.00' x 32.00' x 4.50'

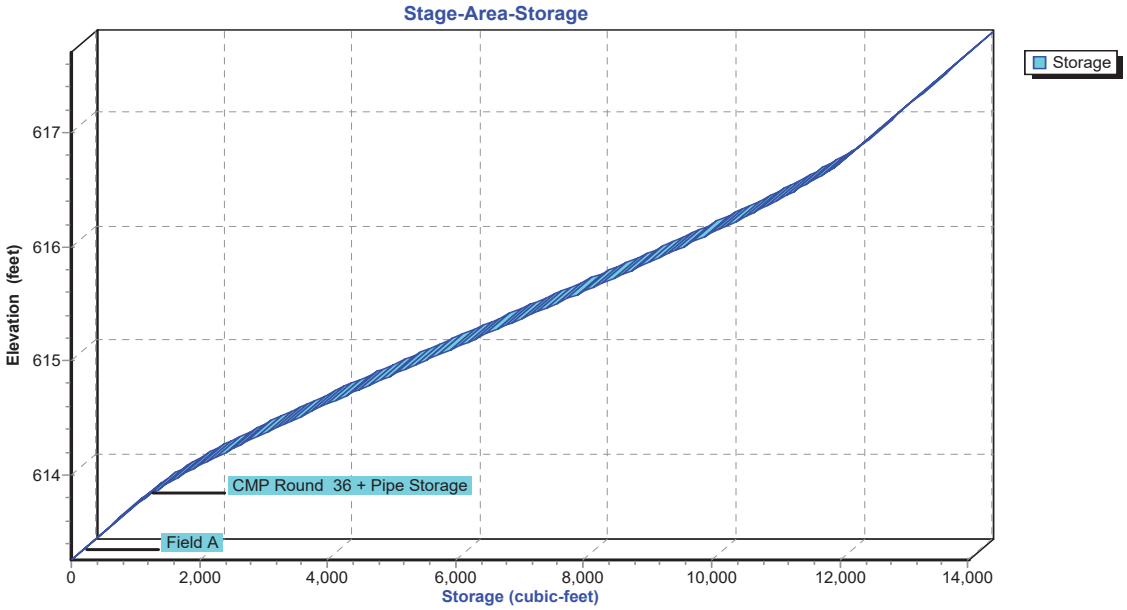
56 Chambers
864.0 cy Field
570.8 cy Stone



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 4.81" for 10-YEAR event
Inflow = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.66' @ 24.00 hrs Surf.Area= 607 sf Storage= 1,728 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

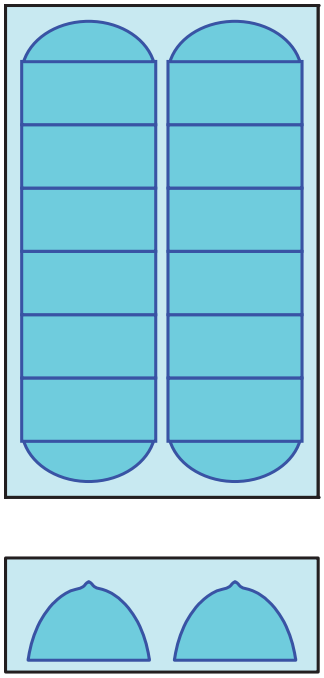
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

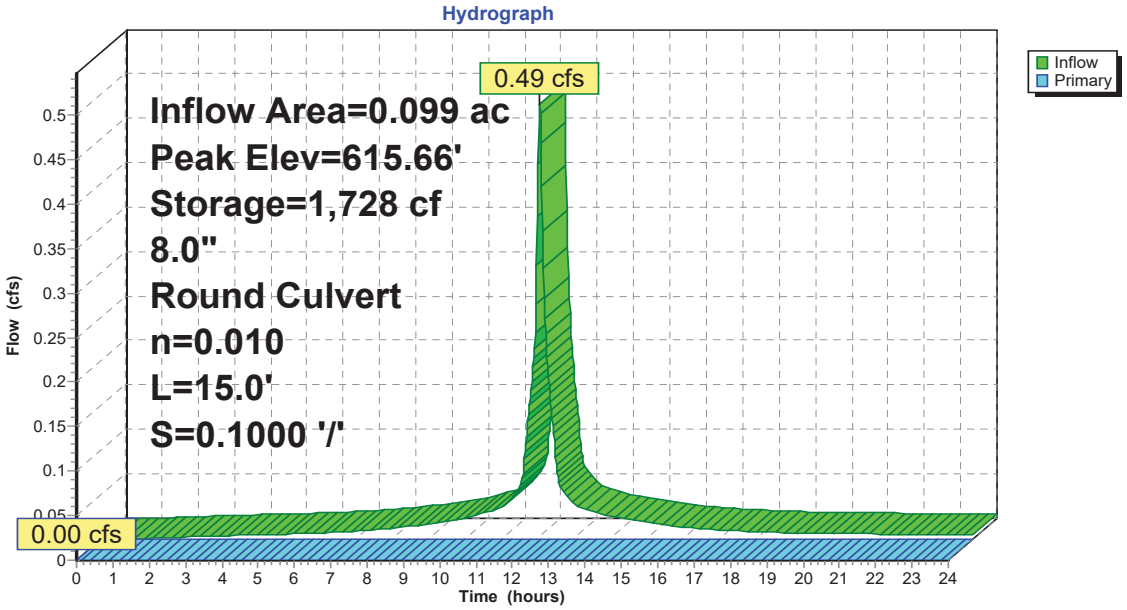
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

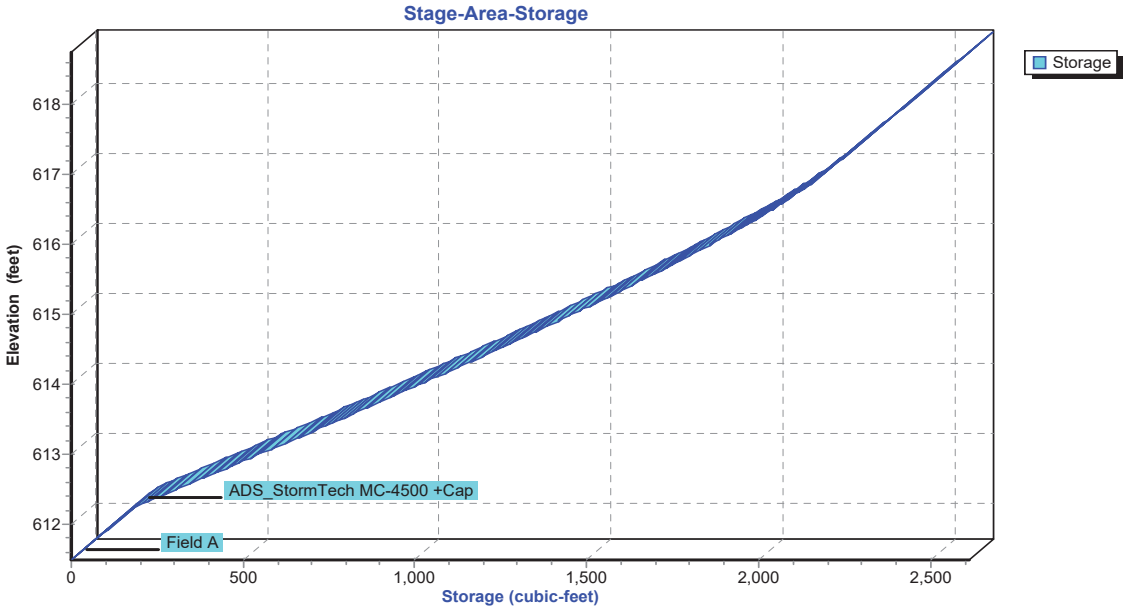
12 Chambers
163.0 cy Field
110.4 cy Stone



Pond 3P: ROOF INFILTRATION



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 4.81" for 10-YEAR event
Inflow = 1.62 cfs @ 12.08 hrs, Volume= 0.131 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.86' @ 24.00 hrs Surf.Area= 0.049 ac Storage= 0.131 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	612.17'	0.082 af	**28.50'W x 75.54'L x 6.75'H Field A** 0.334 af Overall - 0.130 af Embedded = 0.204 af x 40.0% Voids
#2A	612.92'	0.130 af	**ADS_StormTech MC-4500 +Cap** x 51 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 17 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.211 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=612.17' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

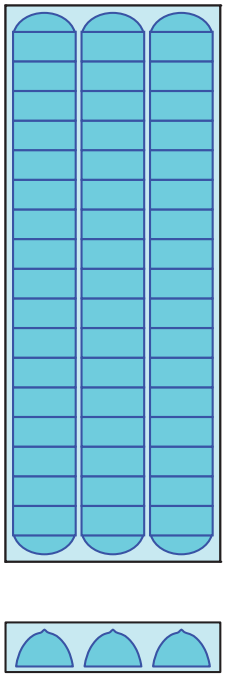
17 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 73.54' Row Length +12.0" End Stone x 2 = 75.54' Base Length
3 Rows x 100.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 28.50' Base Width
9.0" Base + 60.0" Chamber Height + 12.0" Cover = 6.75' Field Height

51 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 3 Rows = 5,645.2 cf Chamber Storage

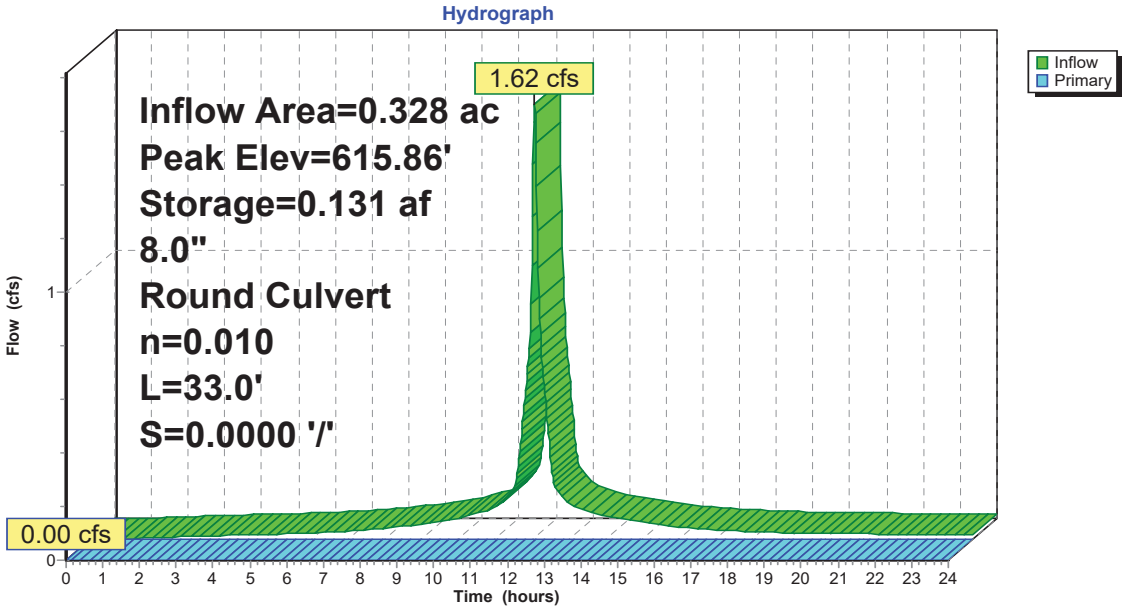
14,532.3 cf Field - 5,645.2 cf Chambers = 8,887.1 cf Stone x 40.0% Voids = 3,554.8 cf Stone Storage

Chamber Storage + Stone Storage = 9,200.1 cf = 0.211 af
Overall Storage Efficiency = 63.3%
Overall System Size = 75.54' x 28.50' x 6.75'

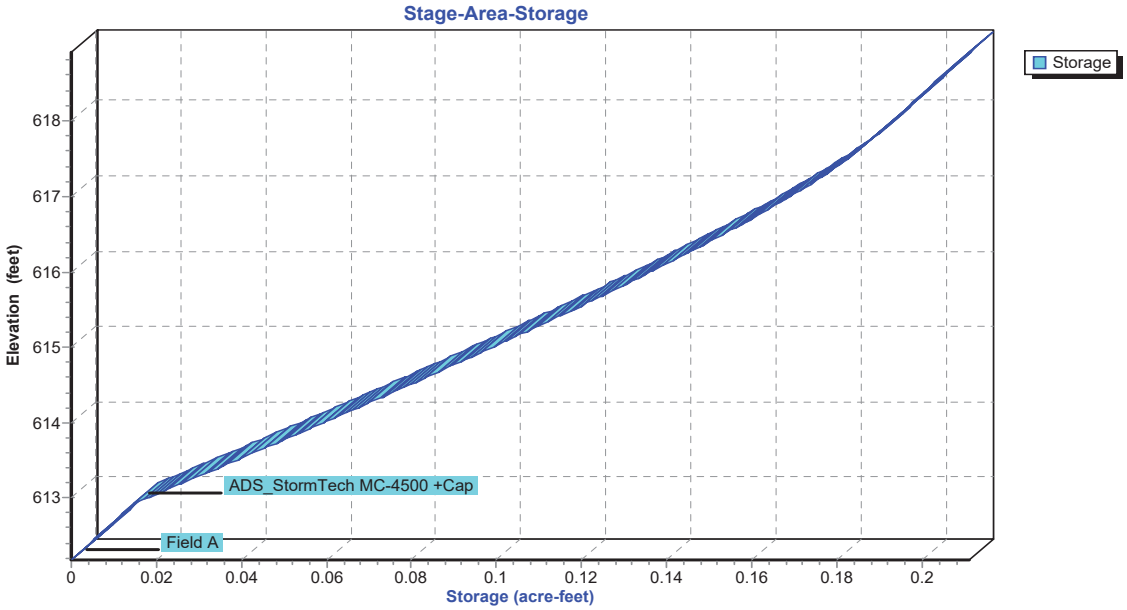
51 Chambers
538.2 cy Field
329.2 cy Stone



Pond 4P: ROOF INFILTRATION



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.33 cfs 0.024 af

Subcatchment P2-1: DISCHARGE TO Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>3.78"
Tc=6.0 min CN=79 Runoff=2.65 cfs 0.189 af

Subcatchment P2-2: DISCHARGE TO Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>4.85"
Tc=6.0 min CN=89 Runoff=6.21 cfs 0.461 af

Subcatchment P2-3: DISCHARGE TO THE Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>1.67"
Tc=6.0 min CN=56 Runoff=2.22 cfs 0.173 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.048 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.71 cfs 0.058 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.54 cfs 0.044 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.72 cfs 0.059 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=3.99 cfs 0.666 af
Outflow=3.99 cfs 0.666 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=4.27 cfs 0.690 af
Outflow=4.27 cfs 0.690 af

Pond 1P: DETENTION BASIN Peak Elev=615.27' Storage=3,461 cf Inflow=2.65 cfs 0.189 af
Outflow=0.80 cfs 0.147 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=616.02' Storage=9,648 cf Inflow=6.21 cfs 0.461 af
Outflow=1.98 cfs 0.345 af

Pond 3P: ROOF INFILTRATION Peak Elev=616.73' Storage=2,112 cf Inflow=0.59 cfs 0.048 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=616.73' Storage=0.161 af Inflow=1.96 cfs 0.161 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 1.057 af Average Runoff Depth = 3.56"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

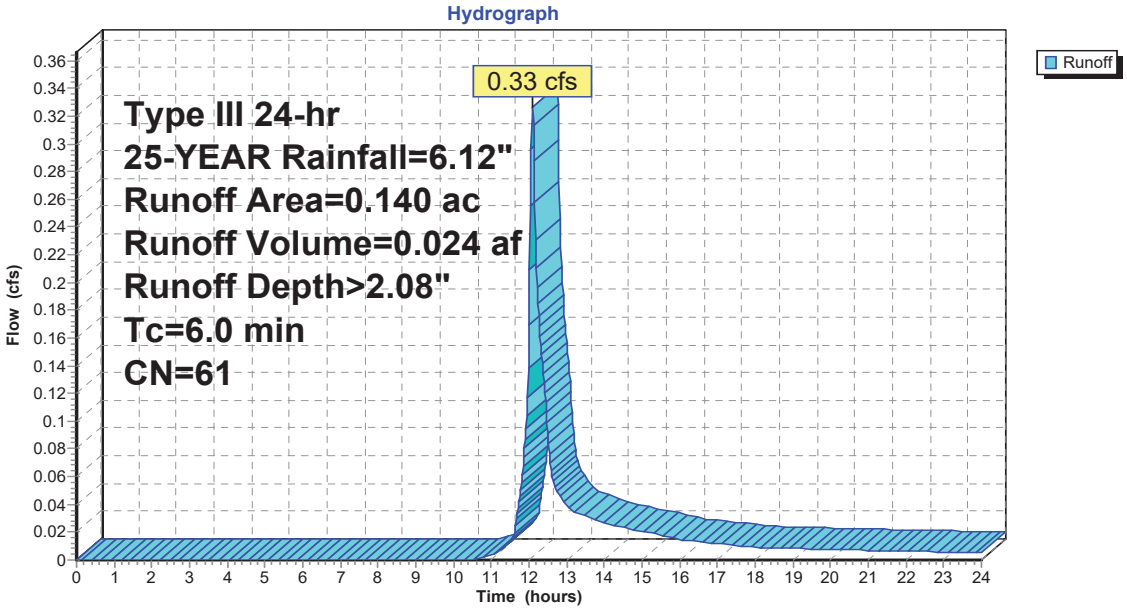
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.024 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

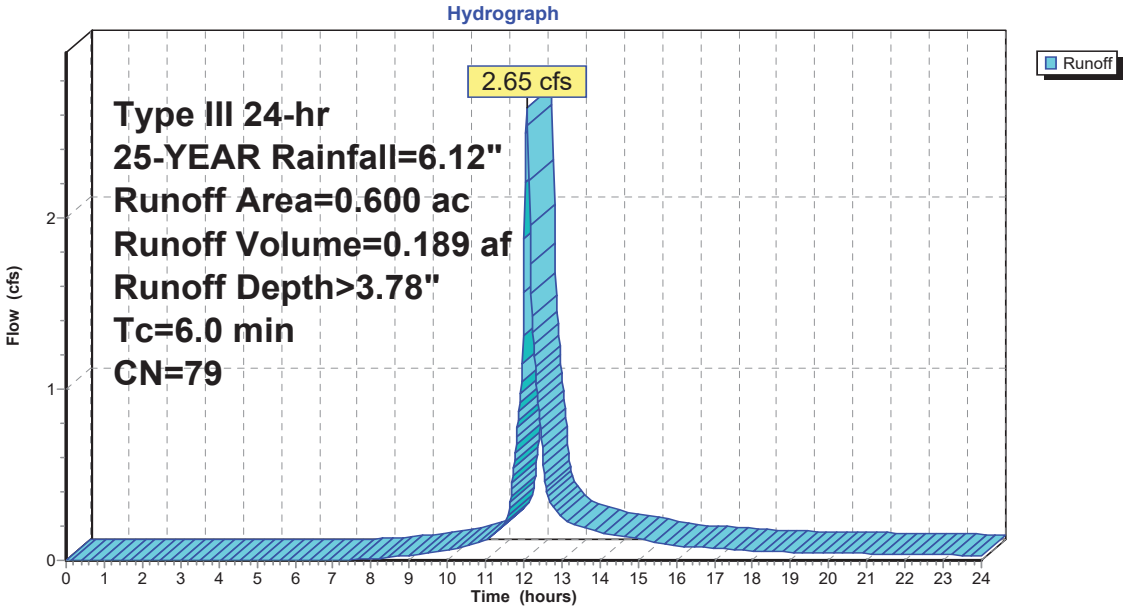
Runoff = 2.65 cfs @ 12.09 hrs, Volume= 0.189 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

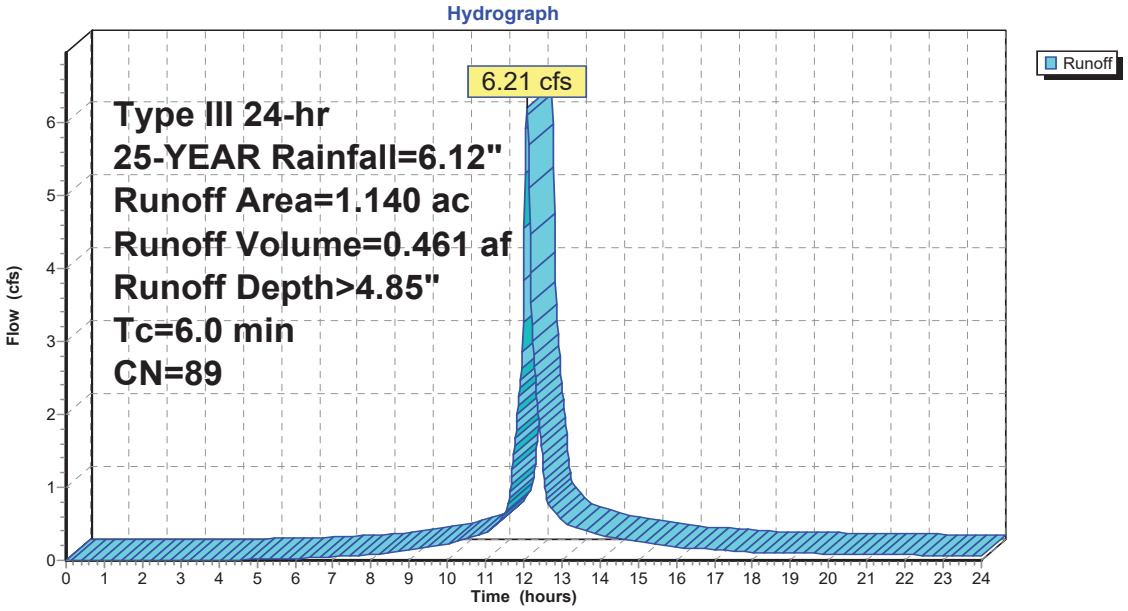
Runoff = 6.21 cfs @ 12.08 hrs, Volume= 0.461 af, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

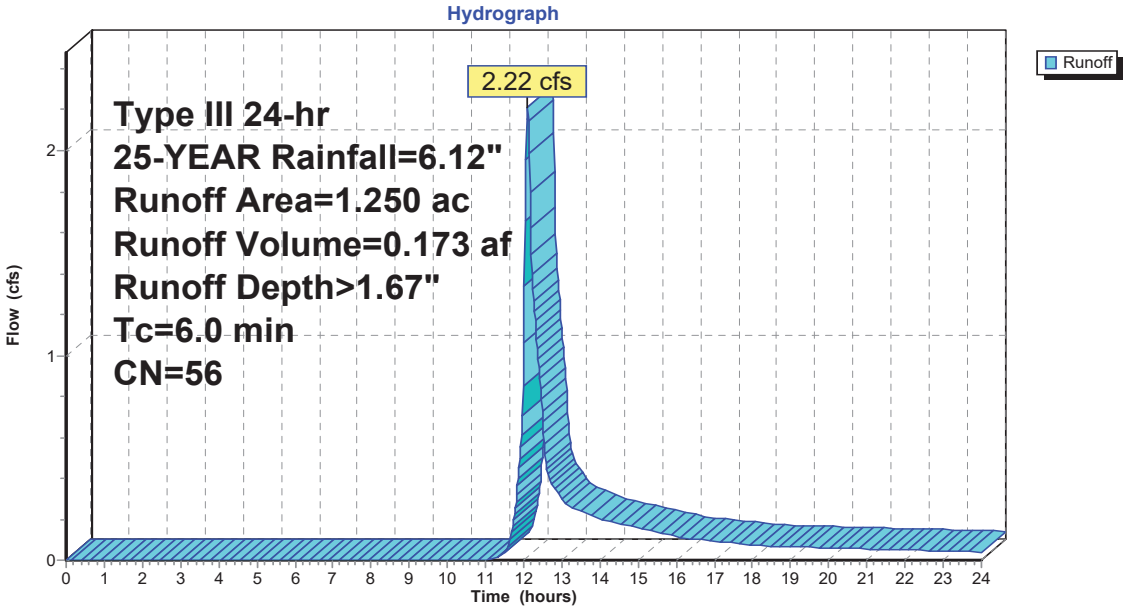
Runoff = 2.22 cfs @ 12.10 hrs, Volume= 0.173 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

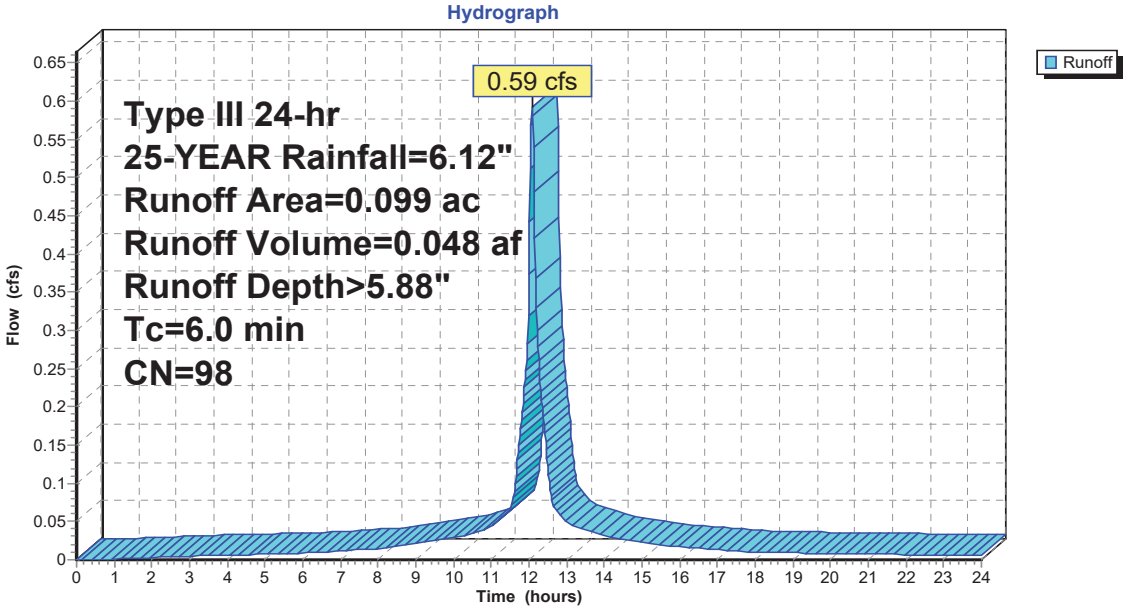
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

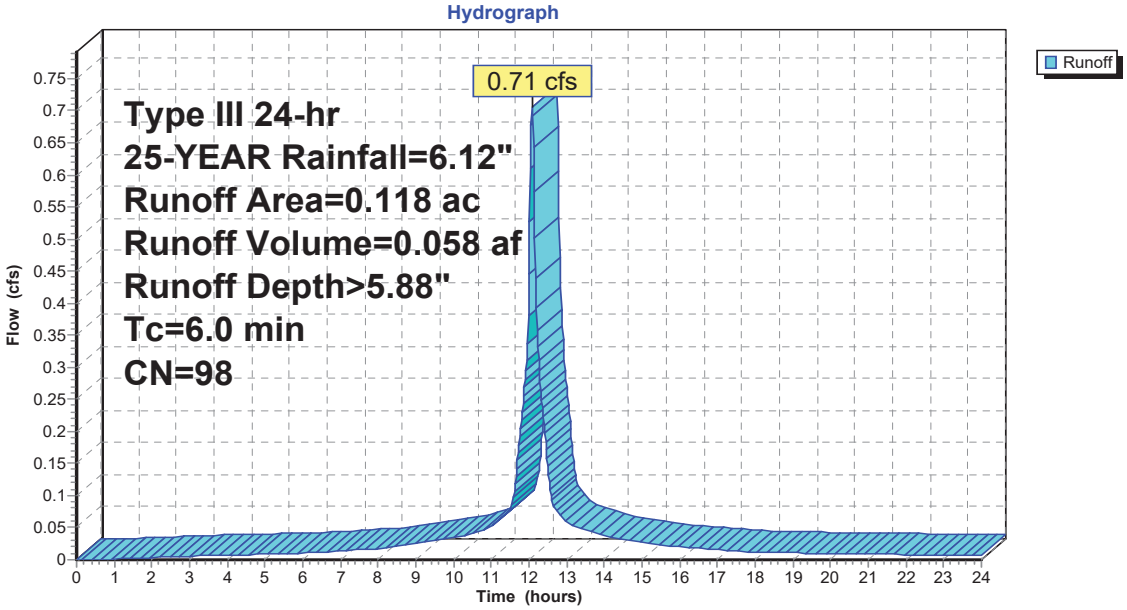
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 0.058 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

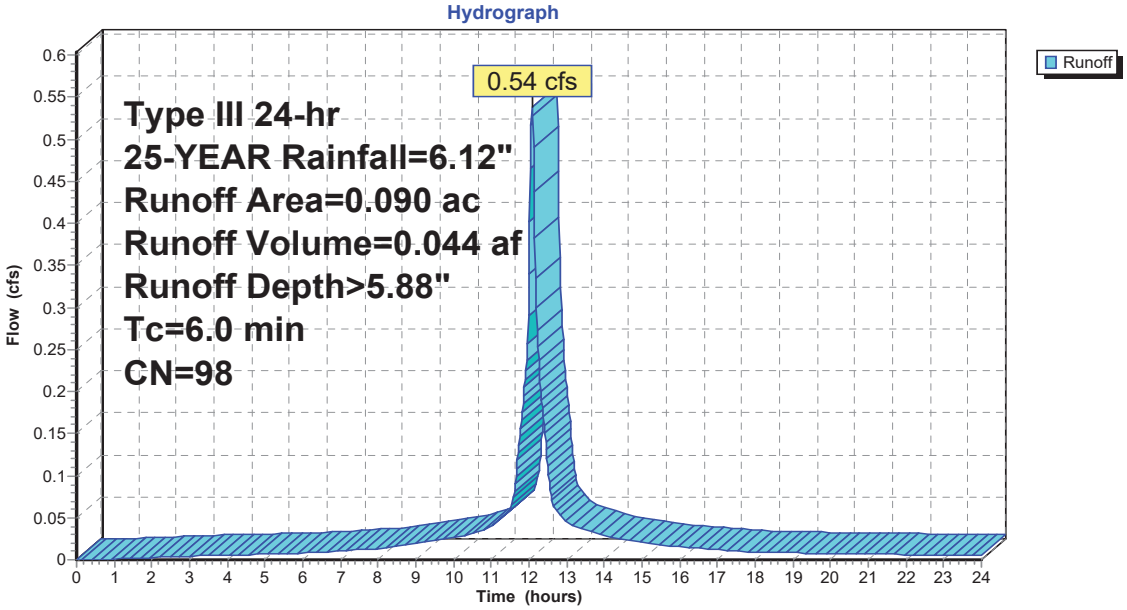
Runoff = 0.54 cfs @ 12.08 hrs, Volume= 0.044 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

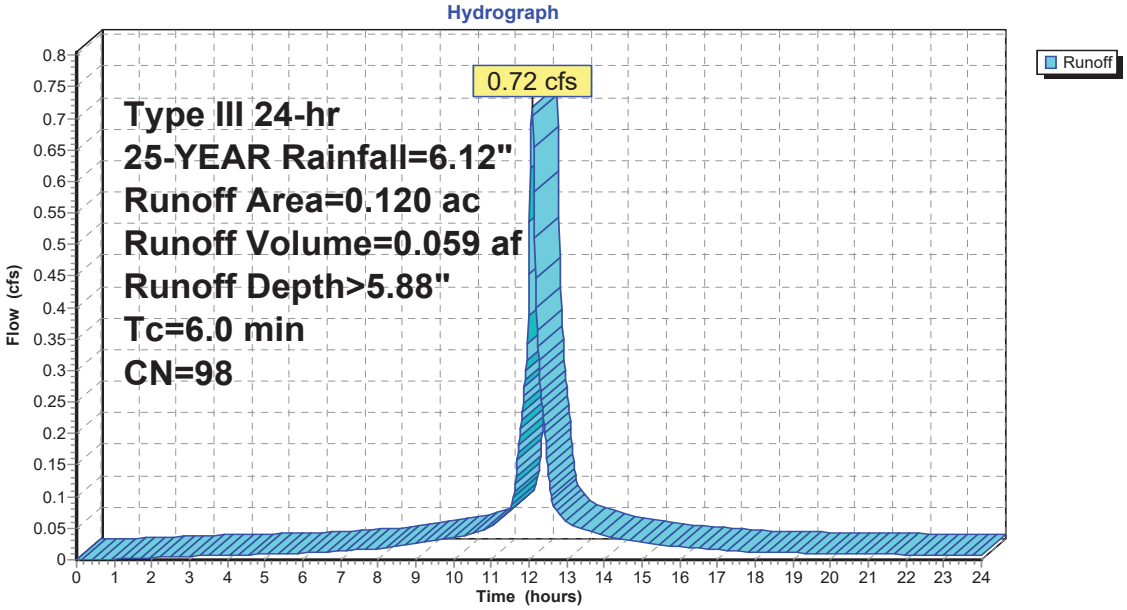
Runoff = 0.72 cfs @ 12.08 hrs, Volume= 0.059 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



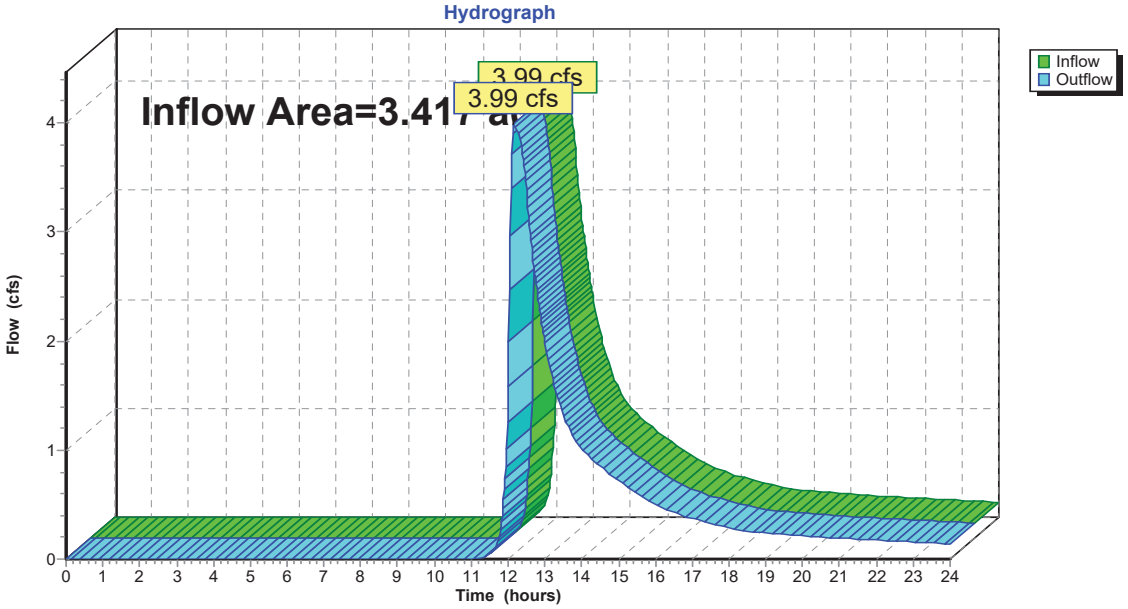
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

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

Inflow Area =	3.417 ac,	47.03% Impervious,	Inflow Depth >	2.34"	for 25-YEAR event
Inflow =	3.99 cfs @	12.15 hrs,	Volume=	0.666 af	
Outflow =	3.99 cfs @	12.15 hrs,	Volume=	0.666 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



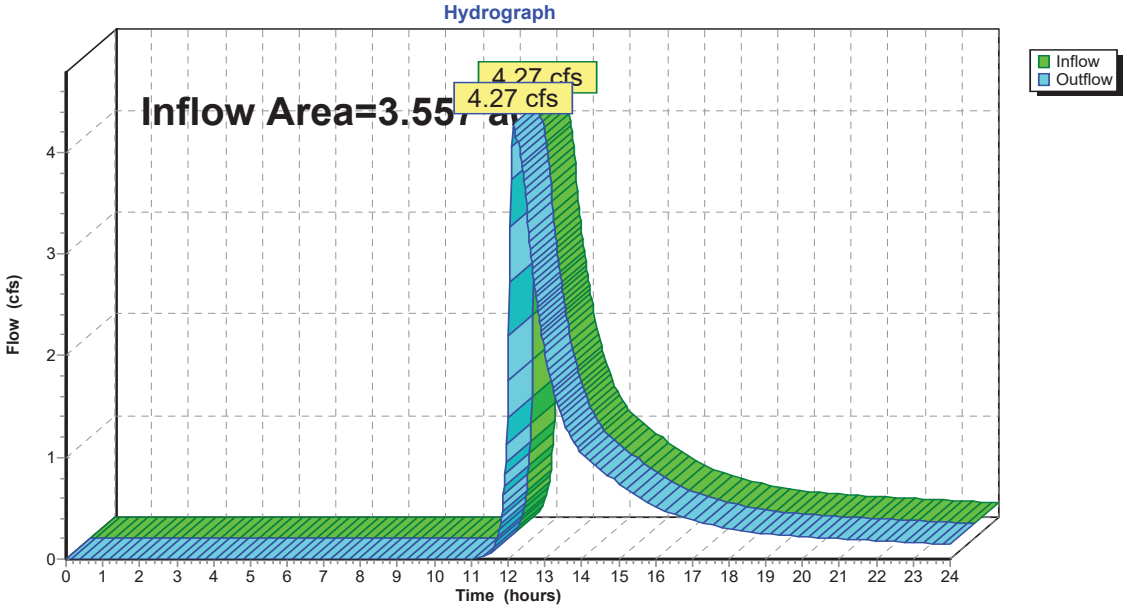
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

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

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 2.33" for 25-YEAR event
Inflow = 4.27 cfs @ 12.14 hrs, Volume= 0.690 af
Outflow = 4.27 cfs @ 12.14 hrs, Volume= 0.690 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

[58] Hint: Peaked 0.33' above defined flood level

Inflow Area =	0.600 ac,	48.33% Impervious,	Inflow Depth >	3.78"	for 25-YEAR event
Inflow =	2.65 cfs @	12.09 hrs,	Volume=	0.189 af	
Outflow =	0.80 cfs @	12.43 hrs,	Volume=	0.147 af,	Atten= 70%, Lag= 20.4 min
Primary =	0.80 cfs @	12.43 hrs,	Volume=	0.147 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.27' @ 12.43 hrs Surf.Area= 2,131 sf Storage= 3,461 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 147.6 min calculated for 0.147 af (78% of inflow)
Center-of-Mass det. time= 66.7 min (881.9 - 815.2)

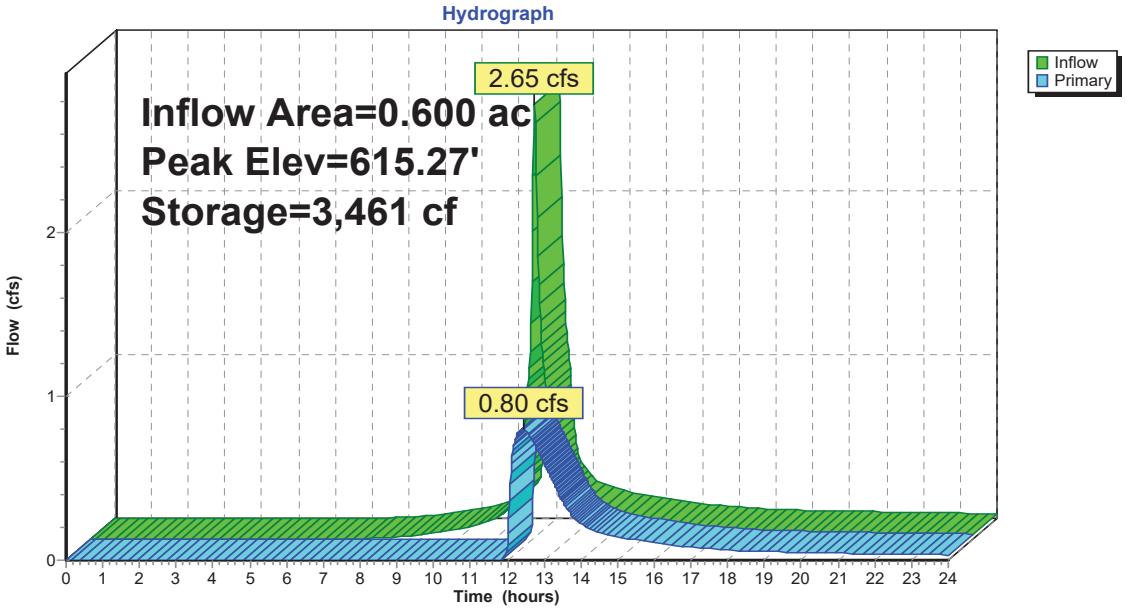
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

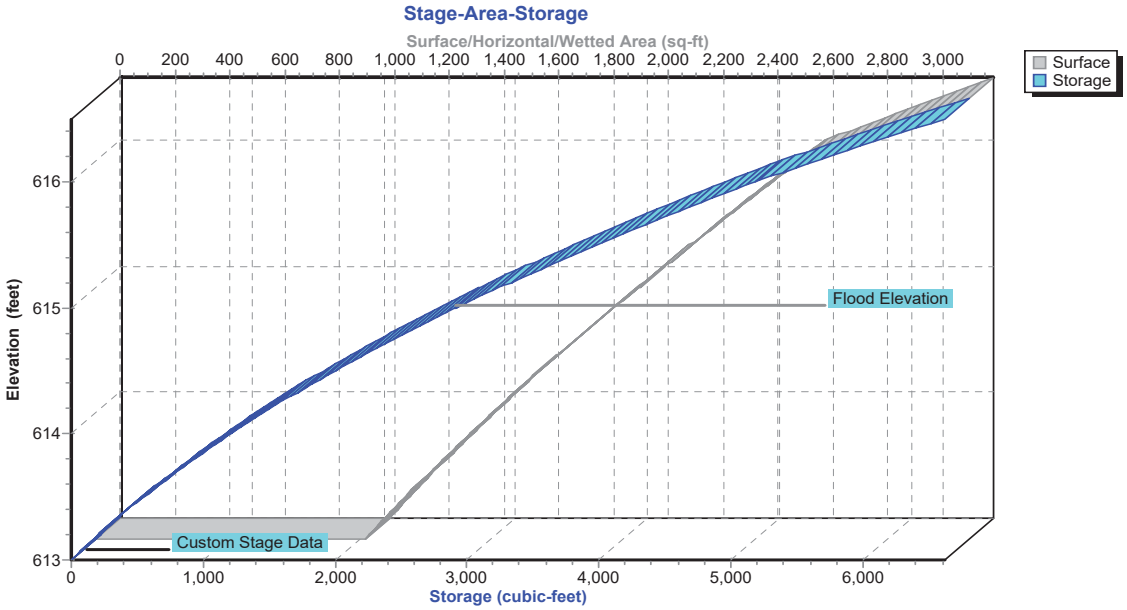
Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.80 cfs @ 12.43 hrs HW=615.27' (Free Discharge)
└─**1=Culvert** (Passes 0.80 cfs of 4.57 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.80 cfs @ 4.07 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 3.76" for 25-YEAR event
Inflow = 6.21 cfs @ 12.08 hrs, Volume= 0.461 af
Outflow = 1.98 cfs @ 12.39 hrs, Volume= 0.345 af, Atten= 68%, Lag= 18.2 min
Primary = 1.98 cfs @ 12.39 hrs, Volume= 0.345 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.02' @ 12.39 hrs Surf.Area= 5,184 sf Storage= 9,648 cf

Plug-Flow detention time= 180.6 min calculated for 0.345 af (75% of inflow)
Center-of-Mass det. time= 96.9 min (883.9 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.25'	6,164 cf	**32.00'W x 162.00'L x 4.50'H Field A** 23,328 cf Overall - 7,917 cf Embedded = 15,411 cf x 40.0% Voids
#2A	613.75'	7,917 cf	**CMP Round 36** x 56 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L 7 Rows of 8 Chambers
#3	613.75'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		14,112 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.75' / 613.75' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.72'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.98 cfs @ 12.39 hrs HW=616.02' (Free Discharge)
└─**1=Culvert** (Passes 1.98 cfs of 7.43 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.97 cfs @ 4.94 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.01 cfs @ 2.89 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L

36.0" Wide + 18.0" Spacing = 54.0" C-C Row Spacing

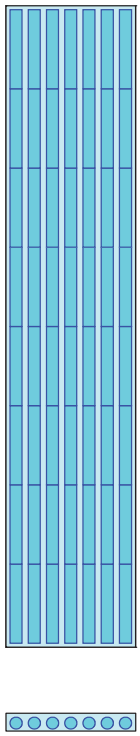
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
7 Rows x 36.0" Wide + 18.0" Spacing x 6 + 12.0" Side Stone x 2 = 32.00' Base Width
6.0" Base + 36.0" Chamber Height + 12.0" Cover = 4.50' Field Height

56 Chambers x 141.4 cf = 7,916.8 cf Chamber Storage

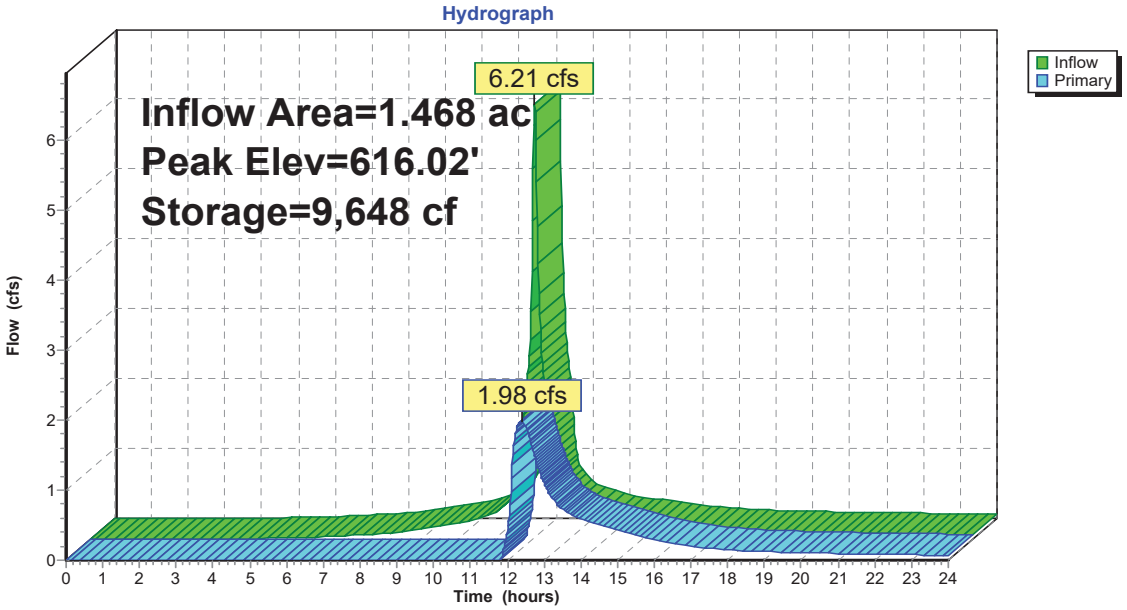
23,328.0 cf Field - 7,916.8 cf Chambers = 15,411.2 cf Stone x 40.0% Voids = 6,164.5 cf Stone Storage

Chamber Storage + Stone Storage = 14,081.3 cf = 0.323 af
Overall Storage Efficiency = 60.4%
Overall System Size = 162.00' x 32.00' x 4.50'

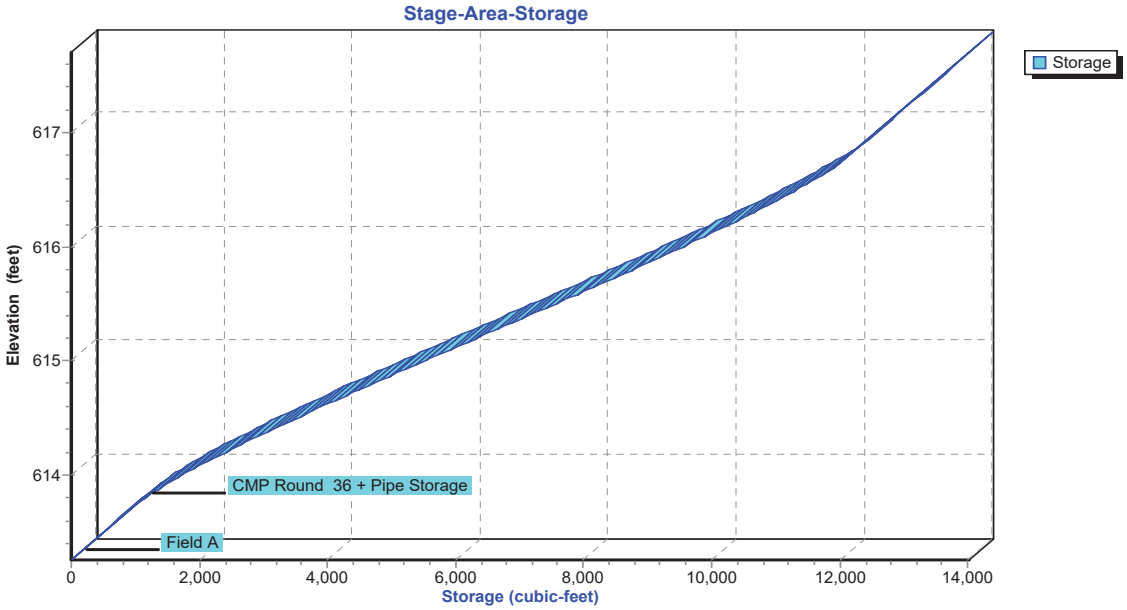
56 Chambers
864.0 cy Field
570.8 cy Stone



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 5.88" for 25-YEAR event
Inflow = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.73' @ 24.00 hrs Surf.Area= 607 sf Storage= 2,112 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

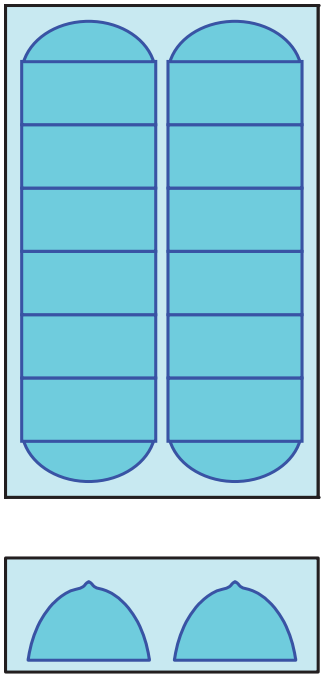
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

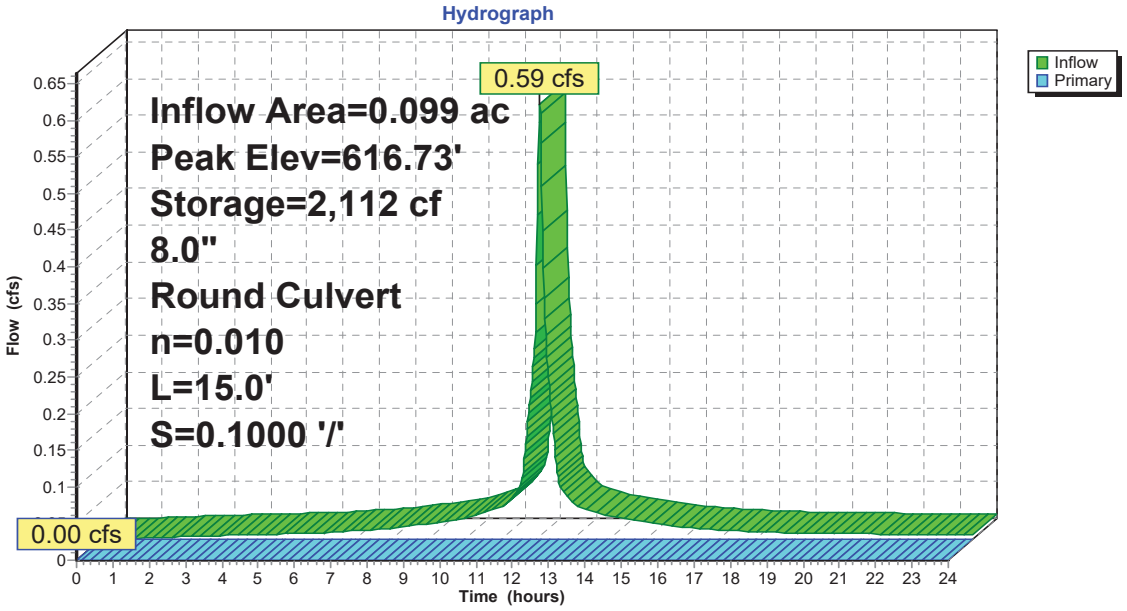
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

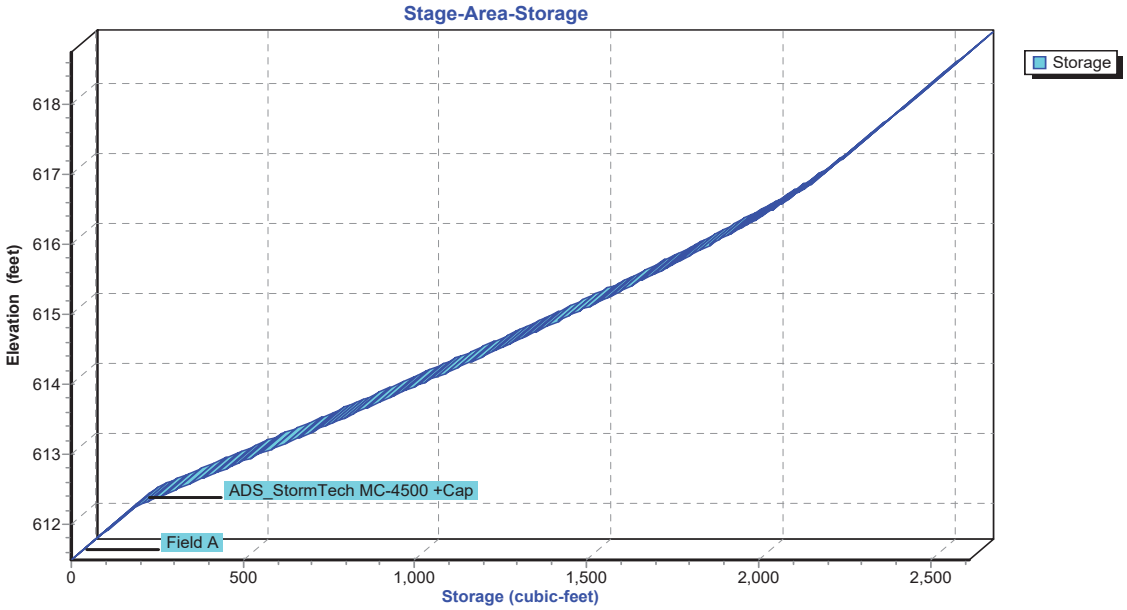
12 Chambers
163.0 cy Field
110.4 cy Stone



Pond 3P: ROOF INFILTRATION



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 5.88" for 25-YEAR event
Inflow = 1.96 cfs @ 12.08 hrs, Volume= 0.161 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.73' @ 24.00 hrs Surf.Area= 0.049 ac Storage= 0.161 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	612.17'	0.082 af	**28.50'W x 75.54'L x 6.75'H Field A** 0.334 af Overall - 0.130 af Embedded = 0.204 af x 40.0% Voids
#2A	612.92'	0.130 af	**ADS_StormTech MC-4500 +Cap** x 51 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 17 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.211 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=612.17' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

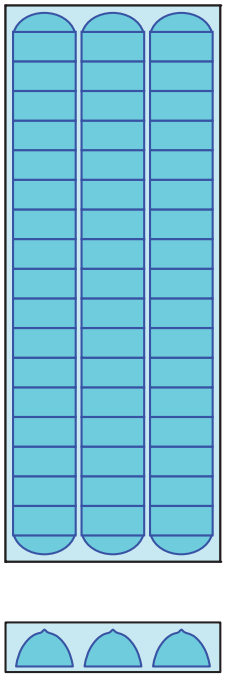
17 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 73.54' Row Length +12.0" End Stone x 2 = 75.54' Base Length
3 Rows x 100.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 28.50' Base Width
9.0" Base + 60.0" Chamber Height + 12.0" Cover = 6.75' Field Height

51 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 3 Rows = 5,645.2 cf Chamber Storage

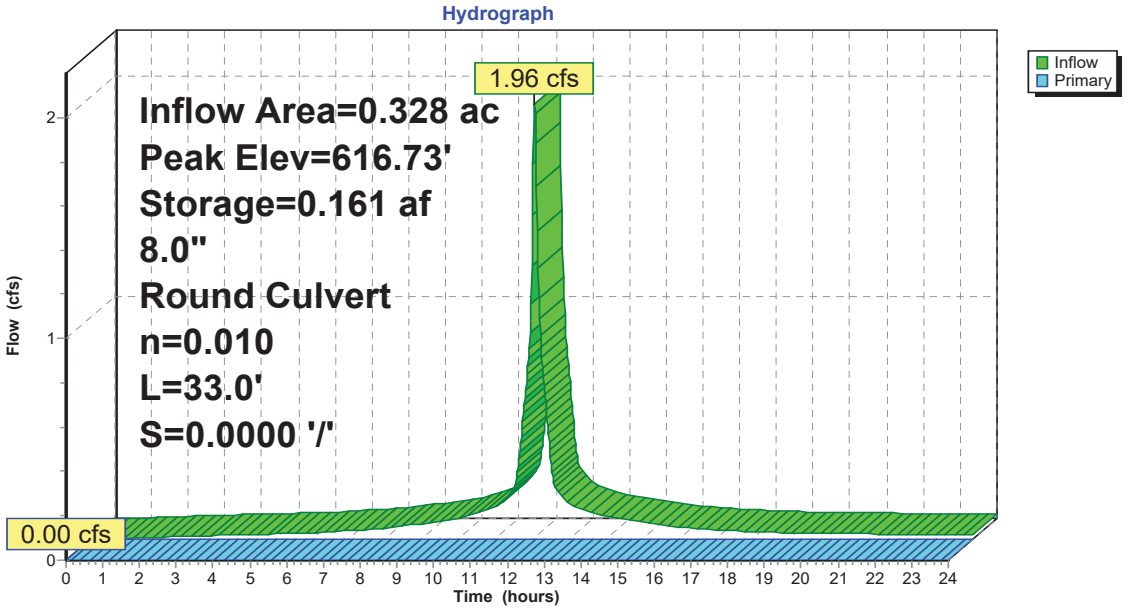
14,532.3 cf Field - 5,645.2 cf Chambers = 8,887.1 cf Stone x 40.0% Voids = 3,554.8 cf Stone Storage

Chamber Storage + Stone Storage = 9,200.1 cf = 0.211 af
Overall Storage Efficiency = 63.3%
Overall System Size = 75.54' x 28.50' x 6.75'

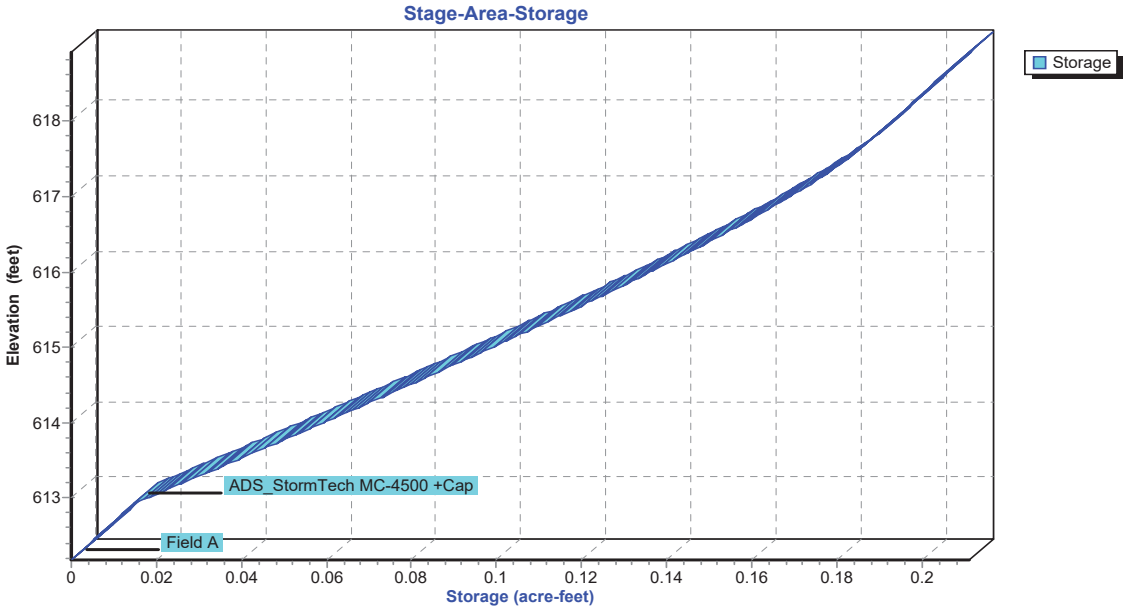
51 Chambers
538.2 cy Field
329.2 cy Stone



Pond 4P: ROOF INFILTRATION



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>3.27"
Tc=6.0 min CN=61 Runoff=0.53 cfs 0.038 af

Subcatchment P2-1: DISCHARGE TO Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>5.30"
Tc=6.0 min CN=79 Runoff=3.68 cfs 0.265 af

Subcatchment P2-2: DISCHARGE TO Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>6.47"
Tc=6.0 min CN=89 Runoff=8.15 cfs 0.614 af

Subcatchment P2-3: DISCHARGE TO THE Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>2.74"
Tc=6.0 min CN=56 Runoff=3.86 cfs 0.285 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.76 cfs 0.062 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.90 cfs 0.074 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.69 cfs 0.057 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.92 cfs 0.075 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=6.97 cfs 1.044 af
Outflow=6.97 cfs 1.044 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=7.49 cfs 1.082 af
Outflow=7.49 cfs 1.082 af

Pond 1P: DETENTION BASIN Peak Elev=615.83' Storage=4,750 cf Inflow=3.68 cfs 0.265 af
Outflow=1.07 cfs 0.222 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=616.68' Storage=11,876 cf Inflow=8.15 cfs 0.647 af
Outflow=2.94 cfs 0.527 af

Pond 3P: ROOF INFILTRATION Peak Elev=617.59' Storage=2,331 cf Inflow=0.76 cfs 0.062 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.02 cfs 0.009 af

Pond 4P: ROOF INFILTRATION Peak Elev=617.23' Storage=0.176 af Inflow=2.50 cfs 0.206 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.07 cfs 0.033 af

Total Runoff Area = 3.557 ac Runoff Volume = 1.471 af Average Runoff Depth = 4.96"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

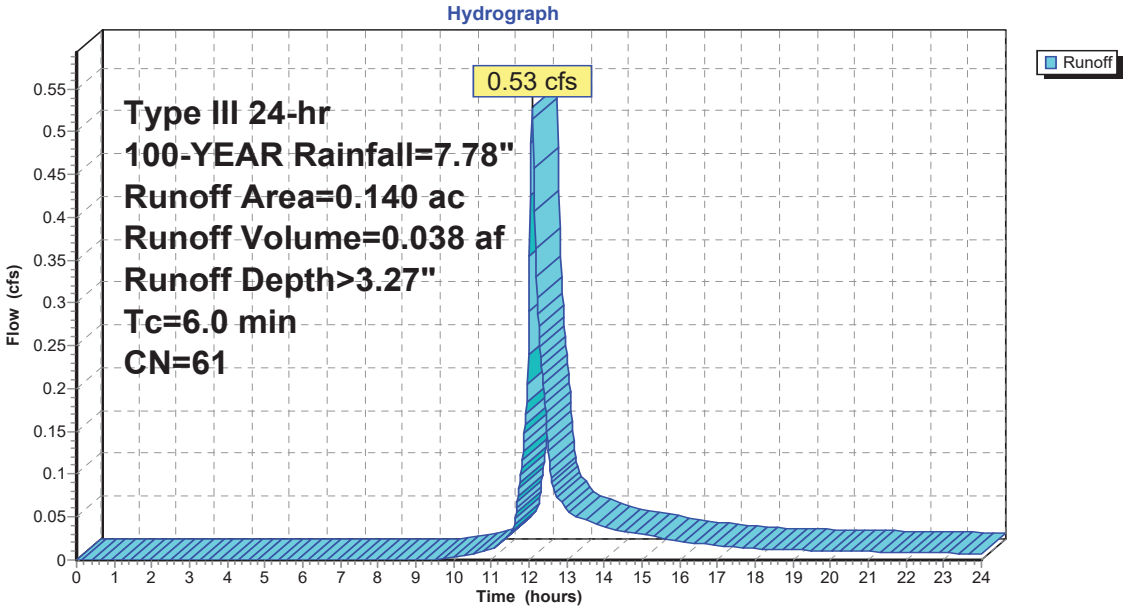
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

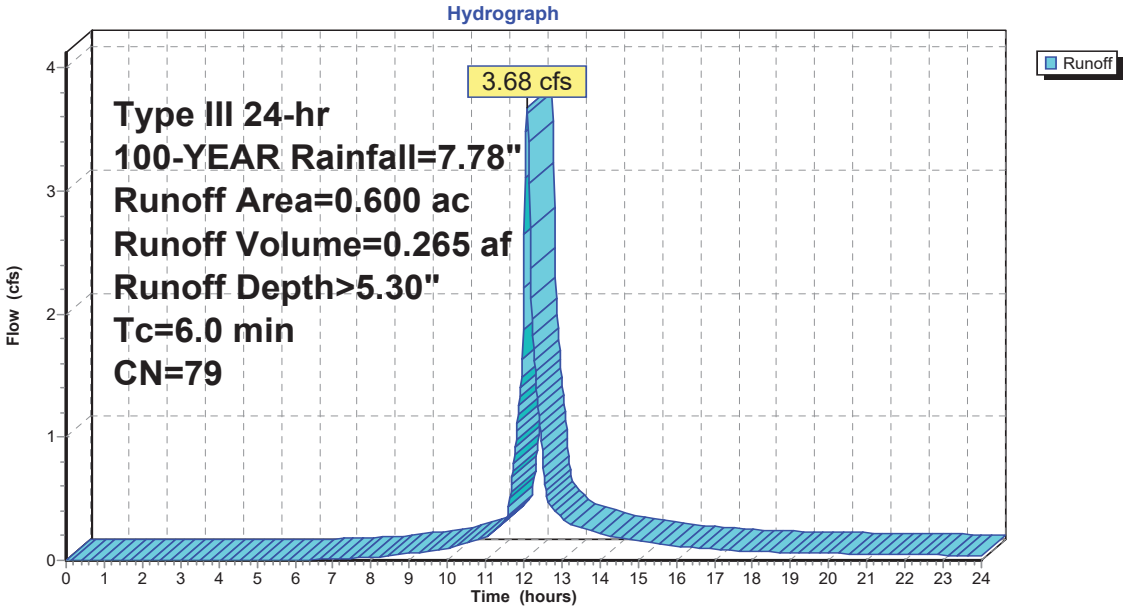
Runoff = 3.68 cfs @ 12.09 hrs, Volume= 0.265 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

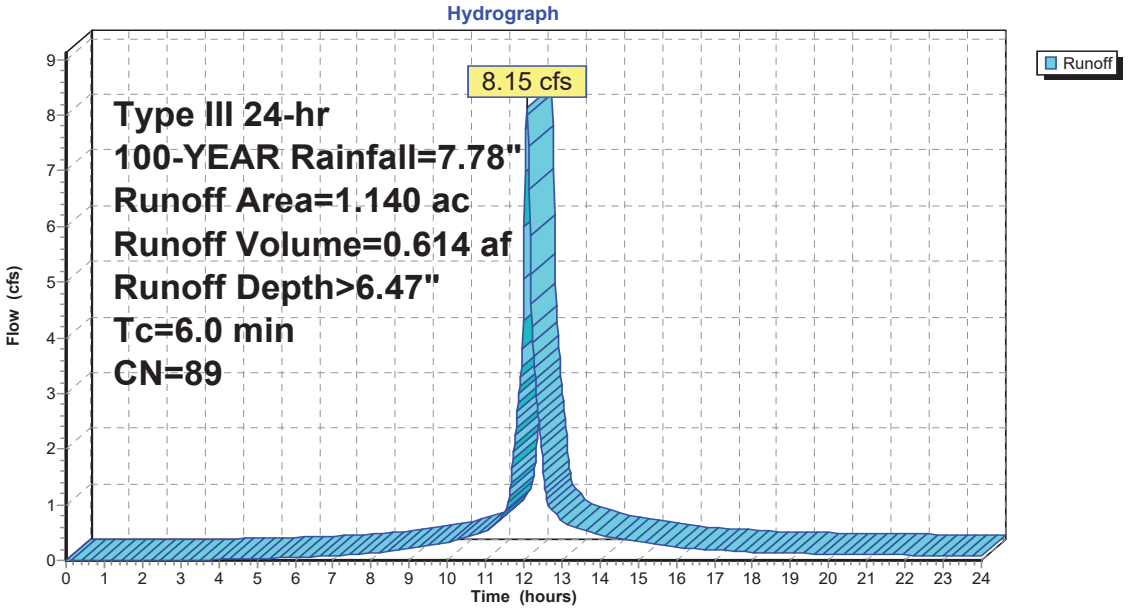
Runoff = 8.15 cfs @ 12.08 hrs, Volume= 0.614 af, Depth> 6.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

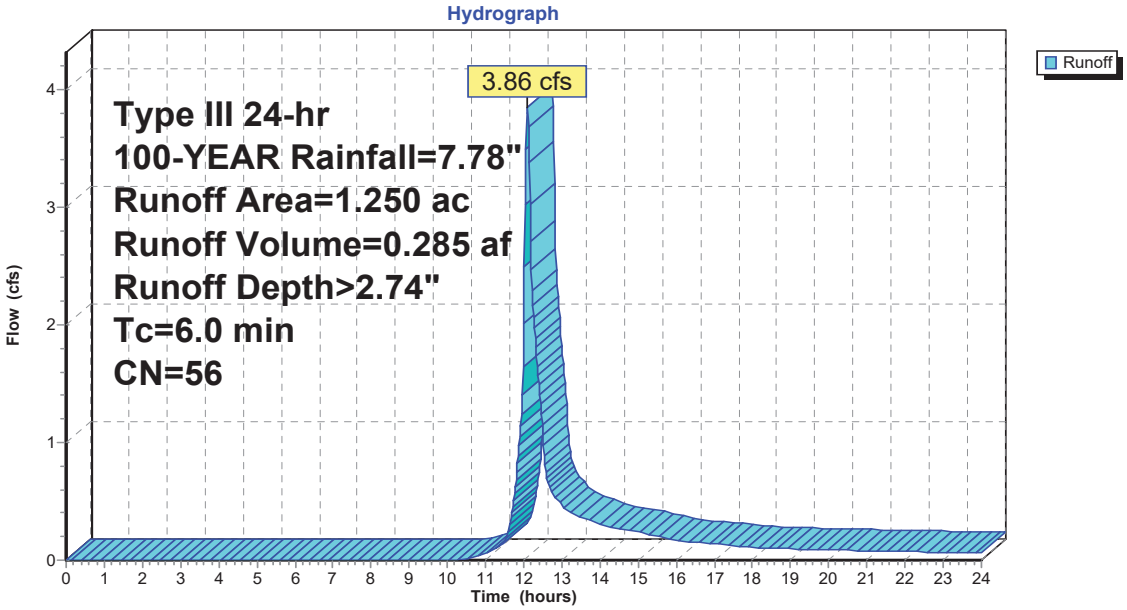
Runoff = 3.86 cfs @ 12.09 hrs, Volume= 0.285 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

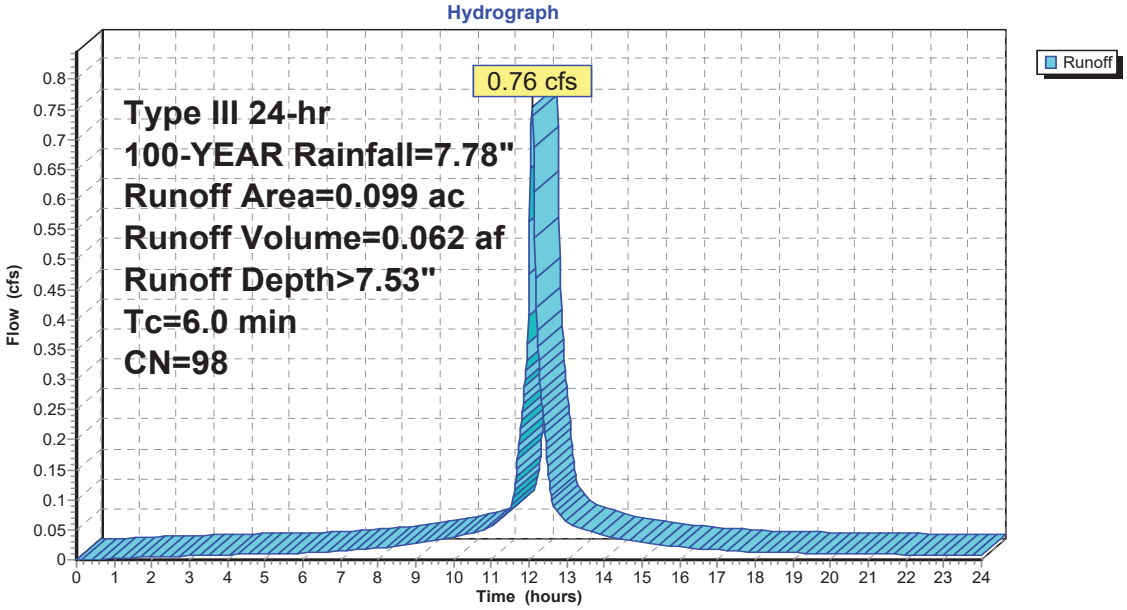
Runoff = 0.76 cfs @ 12.08 hrs, Volume= 0.062 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

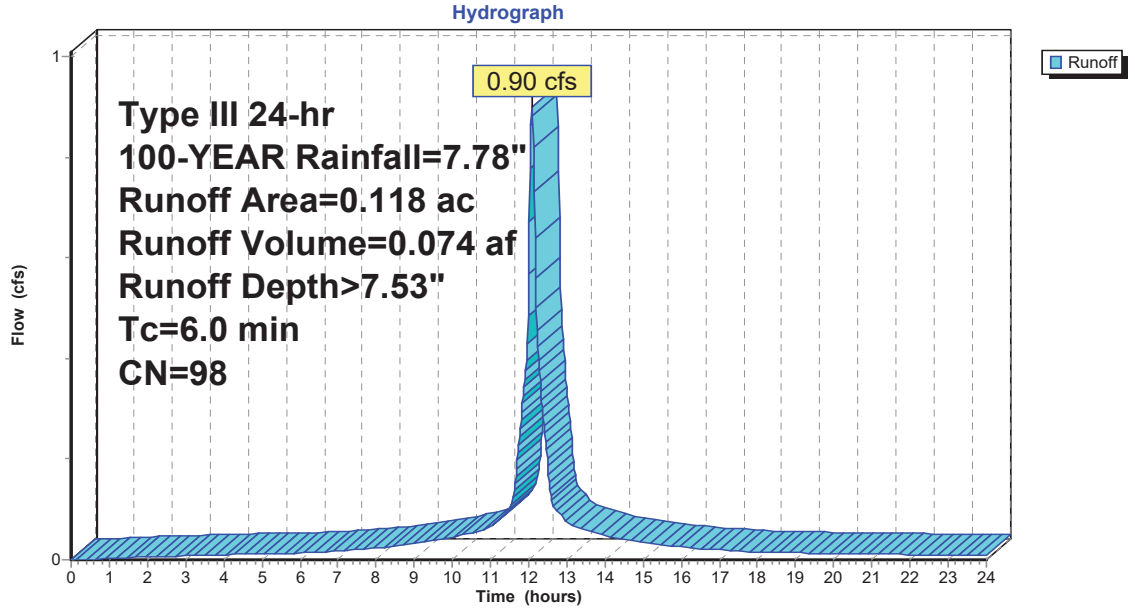
Runoff = 0.90 cfs @ 12.08 hrs, Volume= 0.074 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

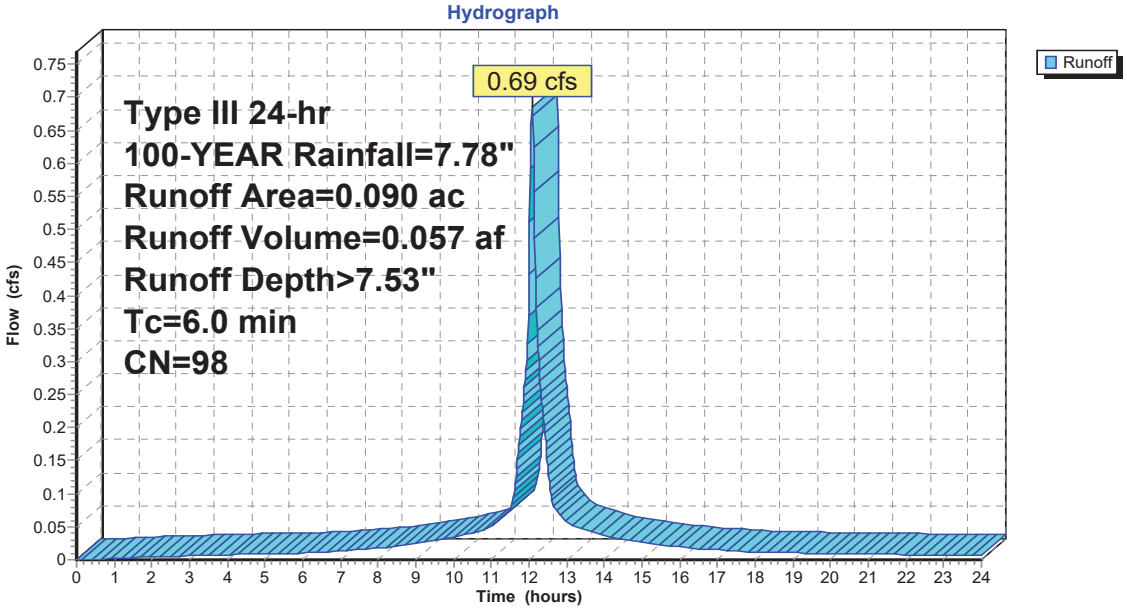
Runoff = 0.69 cfs @ 12.08 hrs, Volume= 0.057 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

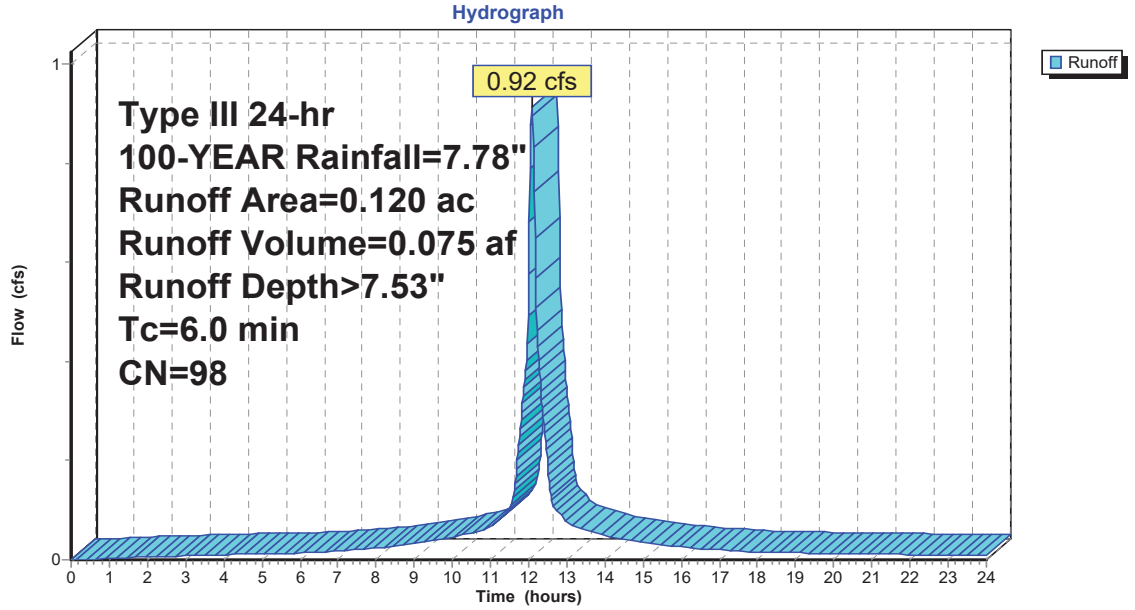
Runoff = 0.92 cfs @ 12.08 hrs, Volume= 0.075 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



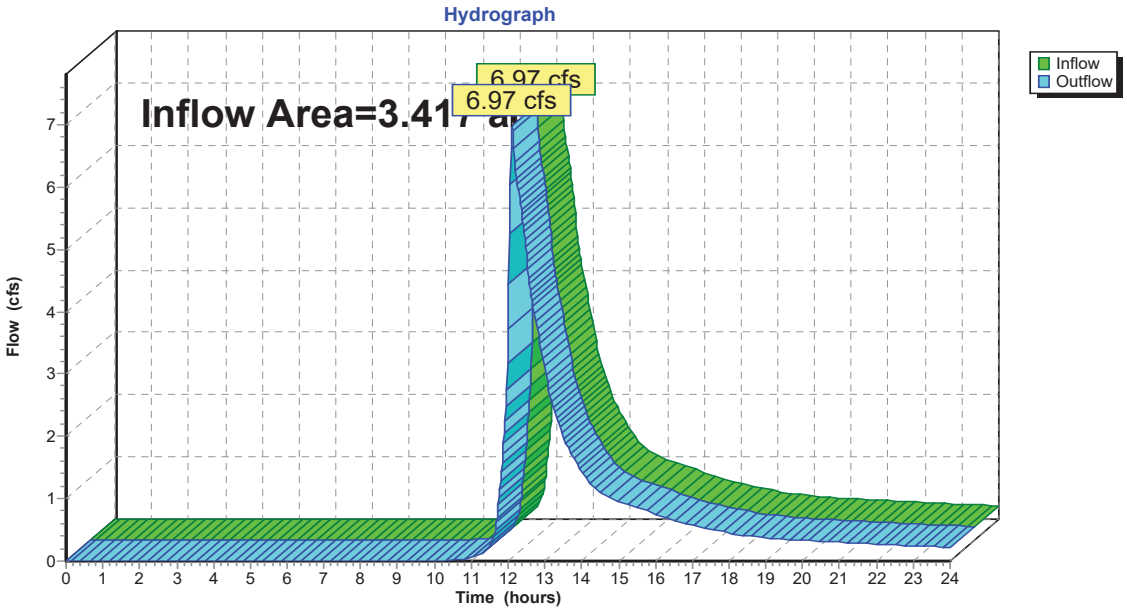
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

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

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 3.67" for 100-YEAR event
Inflow = 6.97 cfs @ 12.12 hrs, Volume= 1.044 af
Outflow = 6.97 cfs @ 12.12 hrs, Volume= 1.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



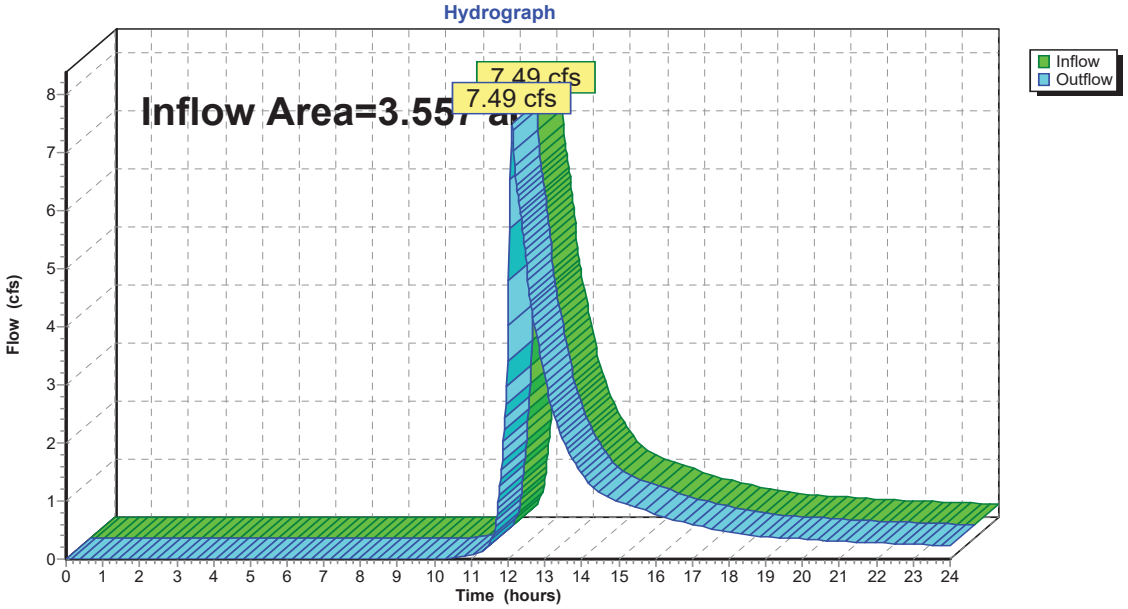
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

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

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 3.65" for 100-YEAR event
Inflow = 7.49 cfs @ 12.11 hrs, Volume= 1.082 af
Outflow = 7.49 cfs @ 12.11 hrs, Volume= 1.082 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

[58] Hint: Peaked 0.89' above defined flood level

Inflow Area =	0.600 ac,	48.33% Impervious,	Inflow Depth >	5.30"	for 100-YEAR event
Inflow =	3.68 cfs @	12.09 hrs,	Volume=	0.265 af	
Outflow =	1.07 cfs @	12.43 hrs,	Volume=	0.222 af,	Atten= 71%, Lag= 20.7 min
Primary =	1.07 cfs @	12.43 hrs,	Volume=	0.222 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.83' @ 12.43 hrs Surf.Area= 2,463 sf Storage= 4,750 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 128.9 min calculated for 0.222 af (84% of inflow)
Center-of-Mass det. time= 62.8 min (868.5 - 805.7)

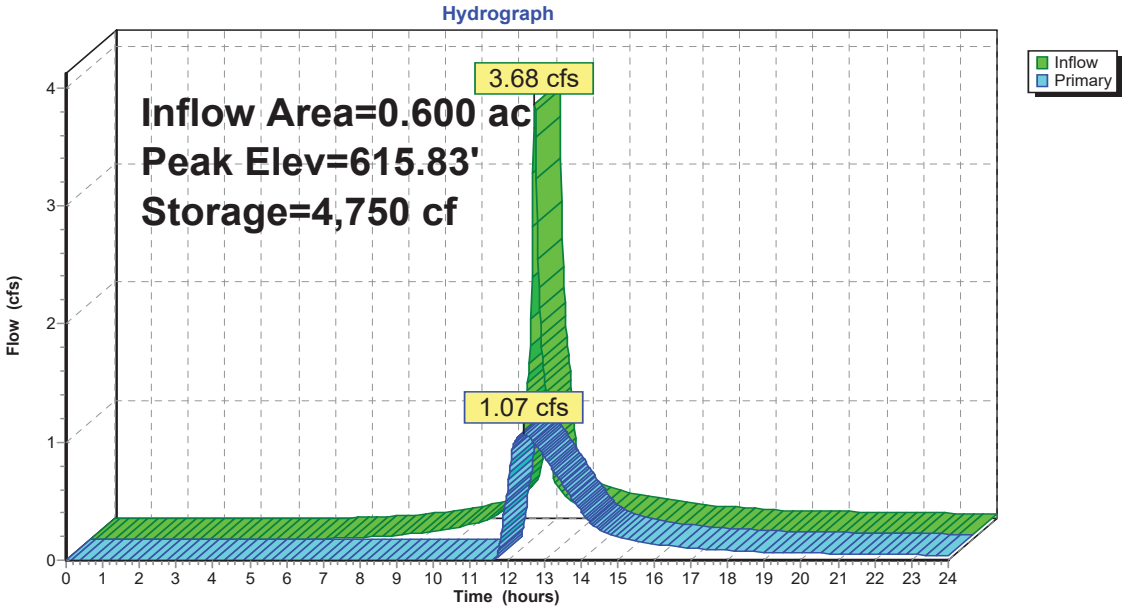
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

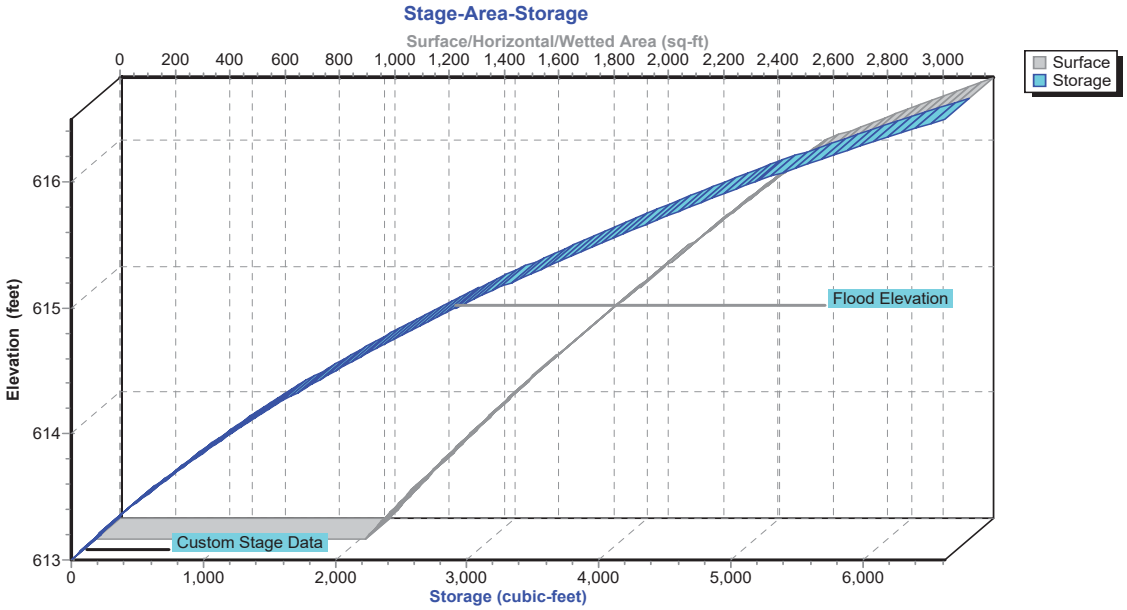
Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.07 cfs @ 12.43 hrs HW=615.83' (Free Discharge)
└─**1=Culvert** (Passes 1.07 cfs of 6.34 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.07 cfs @ 5.44 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 5.29" for 100-YEAR event
Inflow = 8.15 cfs @ 12.08 hrs, Volume= 0.647 af
Outflow = 2.94 cfs @ 12.34 hrs, Volume= 0.527 af, Atten= 64%, Lag= 15.4 min
Primary = 2.94 cfs @ 12.34 hrs, Volume= 0.527 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.68' @ 12.34 hrs Surf.Area= 5,184 sf Storage= 11,876 cf

Plug-Flow detention time= 164.4 min calculated for 0.527 af (81% of inflow)
Center-of-Mass det. time= 86.3 min (882.9 - 796.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.25'	6,164 cf	**32.00'W x 162.00'L x 4.50'H Field A** 23,328 cf Overall - 7,917 cf Embedded = 15,411 cf x 40.0% Voids
#2A	613.75'	7,917 cf	**CMP Round 36** x 56 Inside #1 Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf Overall Size= 36.0"W x 36.0"H x 20.00'L 7 Rows of 8 Chambers
#3	613.75'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		14,112 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.75' / 613.75' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.72'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.94 cfs @ 12.34 hrs HW=616.68' (Free Discharge)
└─**1=Culvert** (Passes 2.94 cfs of 8.98 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.24 cfs @ 6.30 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.70 cfs @ 4.87 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 36 (Round Corrugated Metal Pipe)
Effective Size= 36.0"W x 36.0"H => 7.07 sf x 20.00'L = 141.4 cf
Overall Size= 36.0"W x 36.0"H x 20.00'L

36.0" Wide + 18.0" Spacing = 54.0" C-C Row Spacing

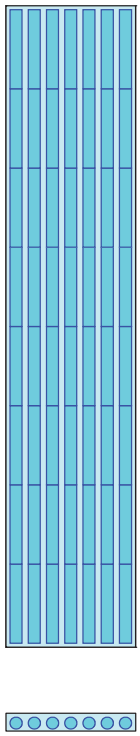
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
7 Rows x 36.0" Wide + 18.0" Spacing x 6 + 12.0" Side Stone x 2 = 32.00' Base Width
6.0" Base + 36.0" Chamber Height + 12.0" Cover = 4.50' Field Height

56 Chambers x 141.4 cf = 7,916.8 cf Chamber Storage

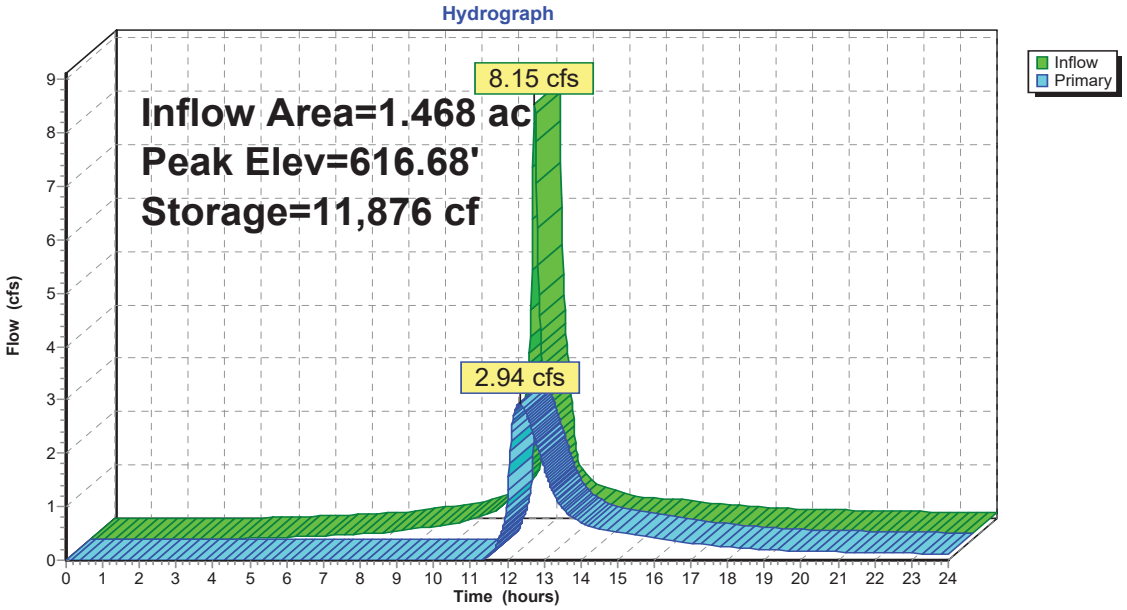
23,328.0 cf Field - 7,916.8 cf Chambers = 15,411.2 cf Stone x 40.0% Voids = 6,164.5 cf Stone Storage

Chamber Storage + Stone Storage = 14,081.3 cf = 0.323 af
Overall Storage Efficiency = 60.4%
Overall System Size = 162.00' x 32.00' x 4.50'

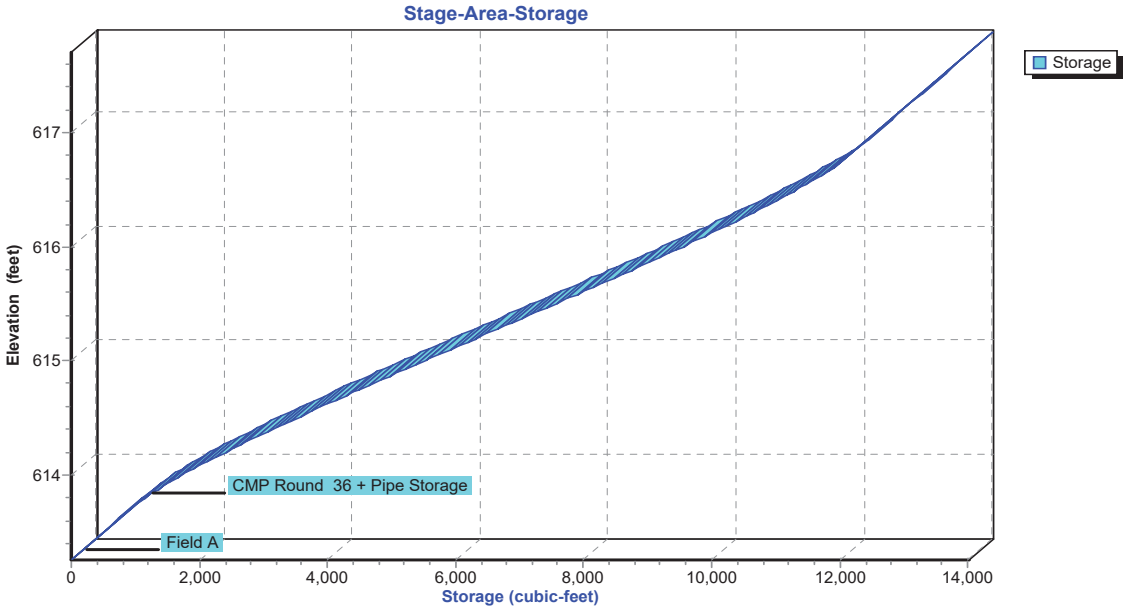
56 Chambers
864.0 cy Field
570.8 cy Stone



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 7.53" for 100-YEAR event
Inflow = 0.76 cfs @ 12.08 hrs, Volume= 0.062 af
Outflow = 0.02 cfs @ 15.80 hrs, Volume= 0.009 af, Atten= 97%, Lag= 222.9 min
Primary = 0.02 cfs @ 15.80 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.59' @ 15.80 hrs Surf.Area= 607 sf Storage= 2,331 cf

Plug-Flow detention time= 721.0 min calculated for 0.009 af (14% of inflow)
Center-of-Mass det. time= 385.3 min (1,126.3 - 741.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.02 cfs @ 15.80 hrs HW=617.59' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.02 cfs @ 0.81 fps)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

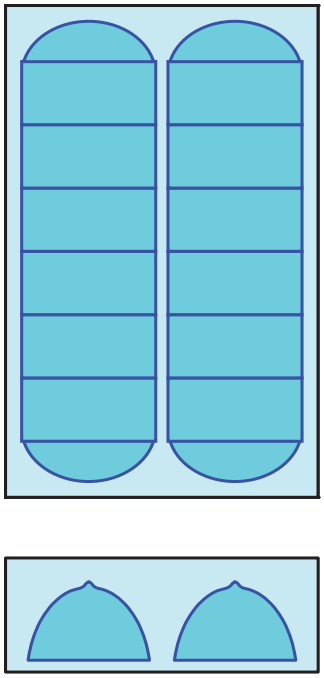
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

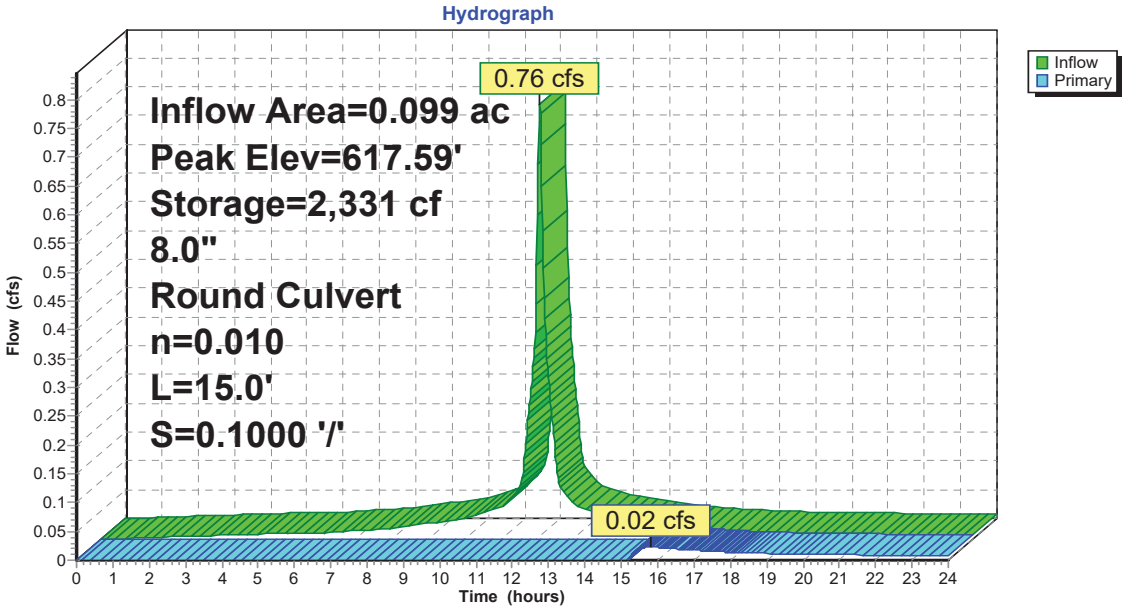
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

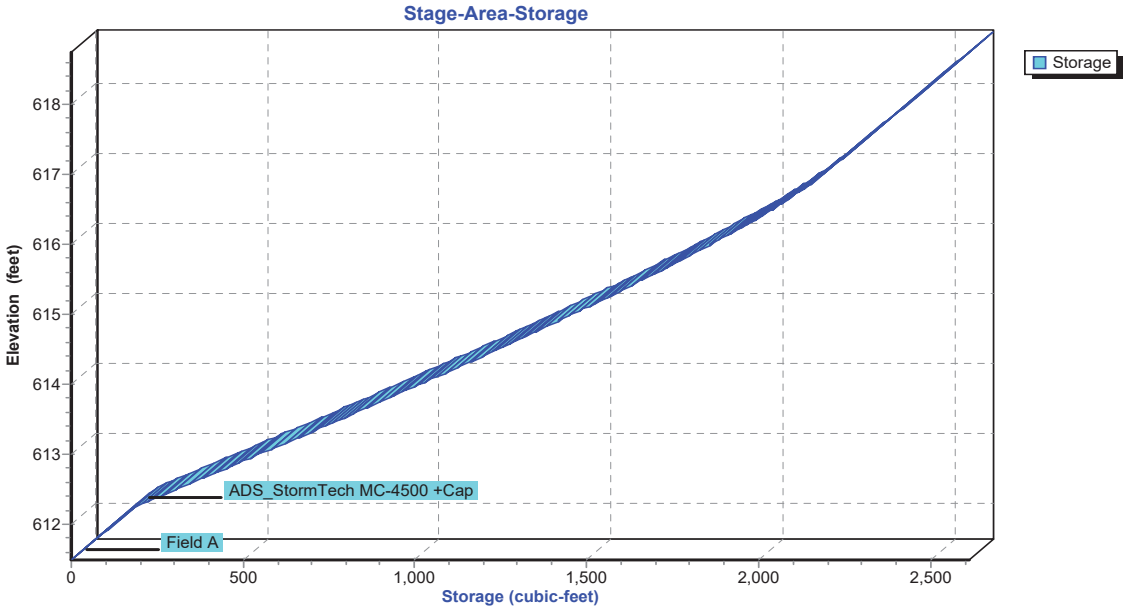
12 Chambers
163.0 cy Field
110.4 cy Stone



Pond 3P: ROOF INFILTRATION



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 7.53" for 100-YEAR event
Inflow = 2.50 cfs @ 12.08 hrs, Volume= 0.206 af
Outflow = 0.07 cfs @ 15.93 hrs, Volume= 0.033 af, Atten= 97%, Lag= 230.6 min
Primary = 0.07 cfs @ 15.93 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.23' @ 15.93 hrs Surf.Area= 0.049 ac Storage= 0.176 af

Plug-Flow detention time= 694.9 min calculated for 0.033 af (16% of inflow)
Center-of-Mass det. time= 376.9 min (1,117.9 - 741.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.17'	0.082 af	**28.50'W x 75.54'L x 6.75'H Field A** 0.334 af Overall - 0.130 af Embedded = 0.204 af x 40.0% Voids
#2A	612.92'	0.130 af	**ADS_StormTech MC-4500 +Cap** x 51 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 3 Rows of 17 Chambers Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.211 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.07 cfs @ 15.93 hrs HW=617.23' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.07 cfs @ 0.98 fps)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

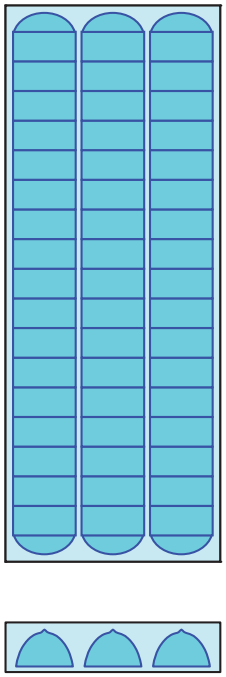
17 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 73.54' Row Length +12.0" End Stone x 2 = 75.54' Base Length
3 Rows x 100.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 28.50' Base Width
9.0" Base + 60.0" Chamber Height + 12.0" Cover = 6.75' Field Height

51 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 3 Rows = 5,645.2 cf Chamber Storage

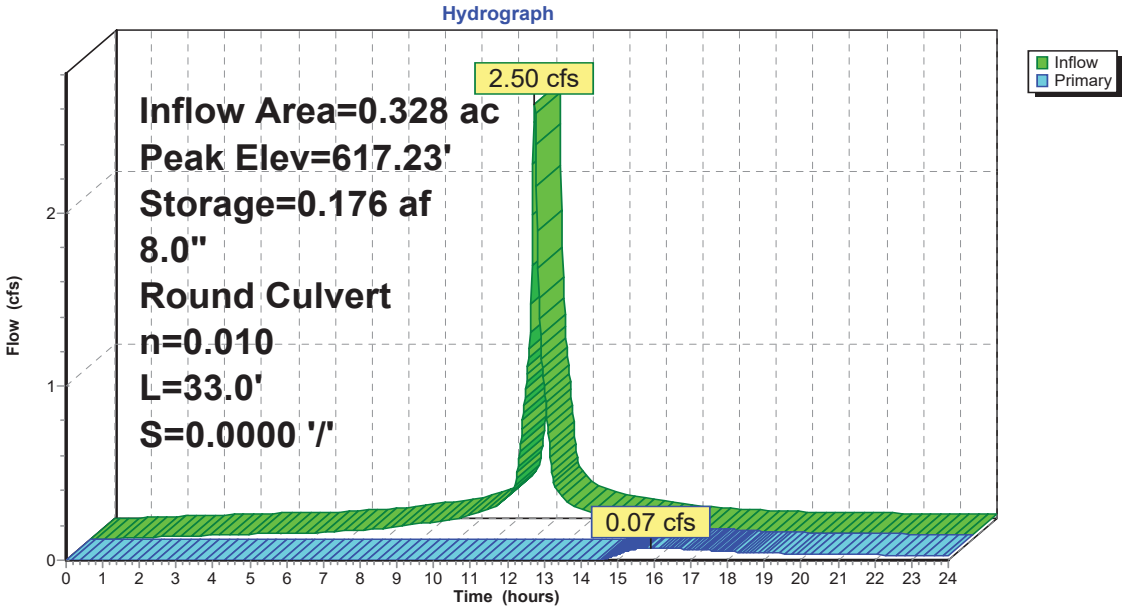
14,532.3 cf Field - 5,645.2 cf Chambers = 8,887.1 cf Stone x 40.0% Voids = 3,554.8 cf Stone Storage

Chamber Storage + Stone Storage = 9,200.1 cf = 0.211 af
Overall Storage Efficiency = 63.3%
Overall System Size = 75.54' x 28.50' x 6.75'

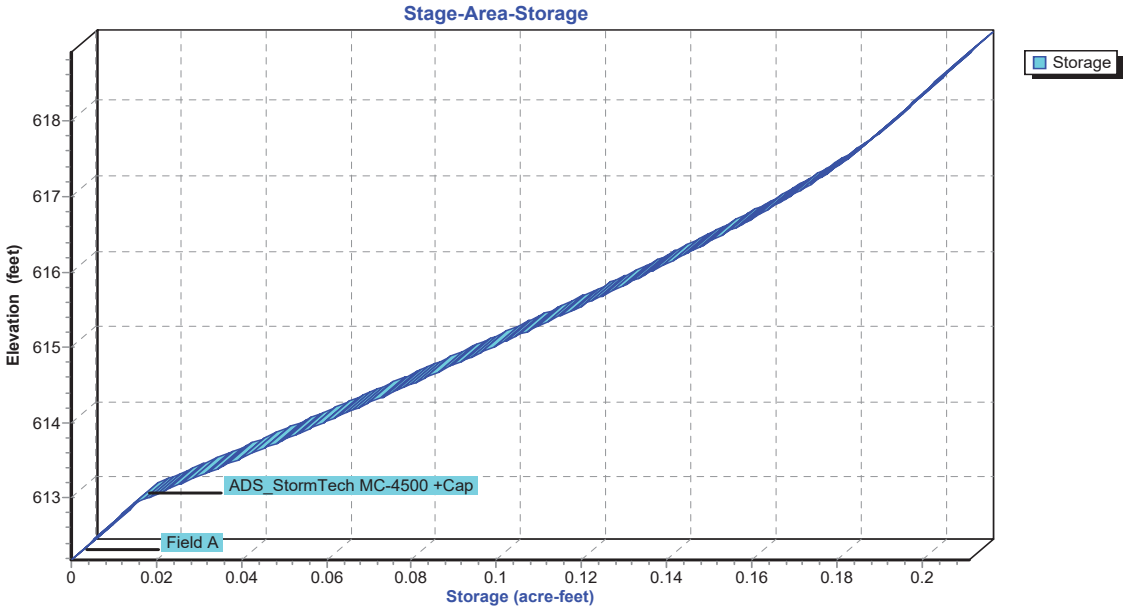
51 Chambers
538.2 cy Field
329.2 cy Stone



Pond 4P: ROOF INFILTRATION



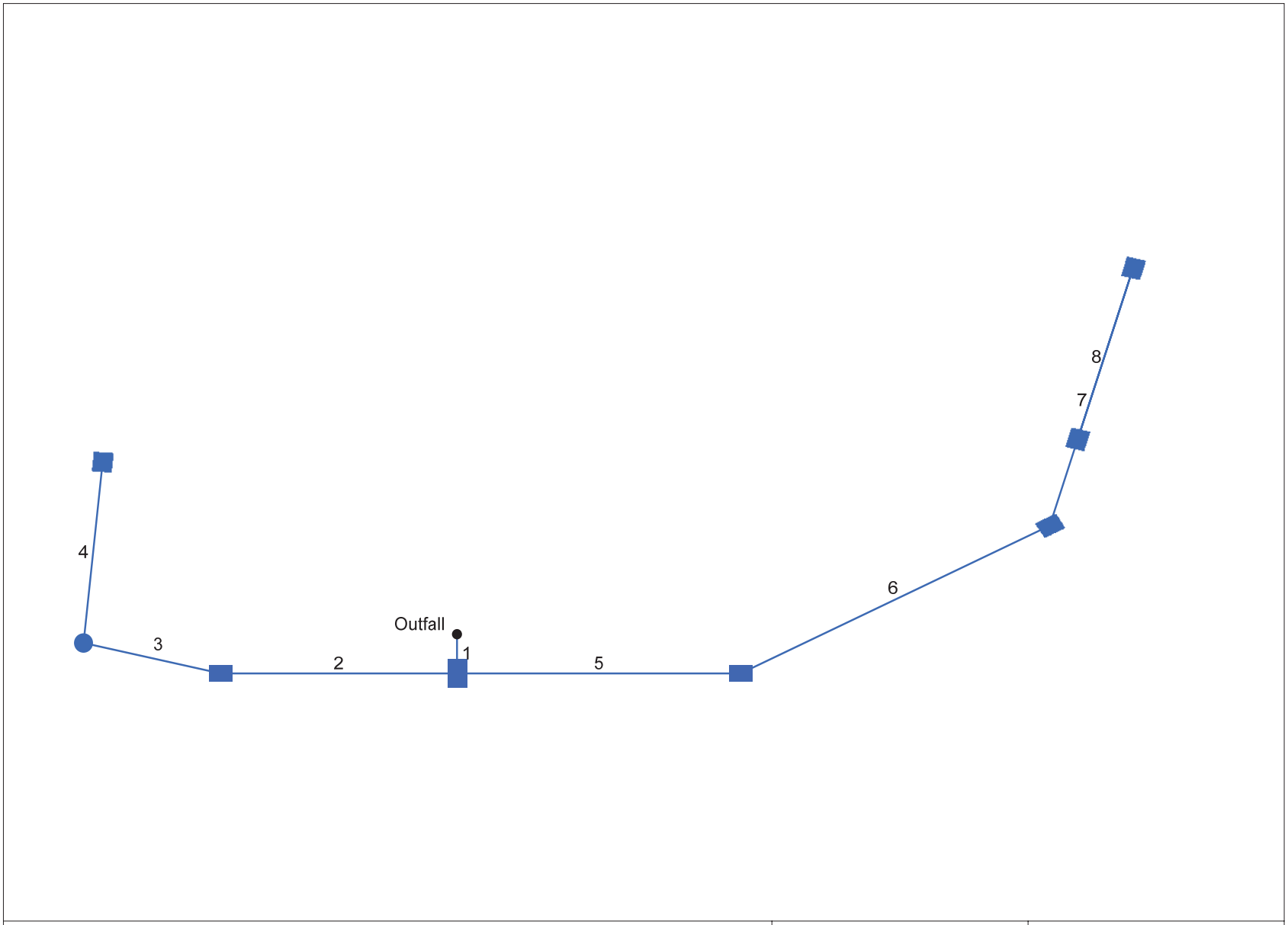
Pond 4P: ROOF INFILTRATION



APPENDIX C

Proposed Hydraulic Sizing Computations

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: HydraFlow.stm	Number of lines: 8	Date: 2/12/2020

Storm Sewers v10.514

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	CB-3	4.26	15	Cir	11.000	615.54	615.65	1.000	616.28	616.48	0.84	616.48	End	Combination
2	CB-2	2.45	12	Cir	55.000	615.75	616.16	0.745	616.48	616.83	n/a	616.98 j	1	Combination
3	DMH	1.96	12	Cir	33.000	616.16	616.41	0.758	616.82	616.94	n/a	616.94	2	Manhole
4	CB-1	2.02	12	Cir	51.000	616.41	616.85	0.863	616.94	617.39	n/a	617.39	3	Combination
5	CB-4	1.34	12	Cir	66.000	615.75	616.41	1.000	615.36	615.54	n/a	615.54	1	Combination
6	CB-5	0.93	12	Cir	83.000	615.41	616.24	1.000	614.48	614.90	n/a	614.90	5	Combination
7	CB-6	0.54	12	Cir	75.000	616.34	617.50	1.547	614.90	615.64	n/a	615.64	6	Combination
8	CB-7	0.27	12	Cir	50.000	617.60	617.90	0.600	615.64	617.80	n/a	617.80	7	Grate

Project File: HydraFlow.stm | Number of lines: 8 | Run Date: 2/12/2020

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewers v10.514

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	11.000	0.30	1.12	0.76	0.23	0.85	5.0	10.4	5.0	4.26	6.46	5.25	15	1.00	615.54	615.65	616.28	616.48	0.00	617.75	CB-3
2	1	55.000	0.11	0.49	0.70	0.08	0.36	5.0	5.6	6.8	2.45	3.07	4.16	12	0.75	615.75	616.16	616.48	616.83	617.75	618.60	CB-2
3	2	33.000	0.00	0.38	0.00	0.00	0.29	0.0	5.3	6.9	1.96	0.00	3.25	12	0.76	616.16	616.41	616.82	616.94	618.60	618.97	DMH
4	3	51.000	0.38	0.38	0.75	0.29	0.29	5.0	5.0	7.1	2.02	0.00	3.76	12	0.86	616.41	616.85	616.94	617.39	618.97	618.85	CB-1
5	1	66.000	0.11	0.33	0.80	0.09	0.26	5.0	9.9	5.1	1.34	0.00	3.74	12	1.00	615.75	616.41	615.36	615.54	617.75	618.54	CB-4
6	5	83.000	0.10	0.22	0.82	0.08	0.17	5.0	9.0	5.4	0.93	0.00	2.84	12	1.00	615.41	616.24	614.48	614.90	618.54	618.50	CB-5
7	6	75.000	0.07	0.12	0.74	0.05	0.09	5.0	7.4	5.9	0.54	0.00	2.79	12	1.55	616.34	617.50	614.90	615.64	618.50	619.50	CB-6
8	7	50.000	0.05	0.05	0.77	0.04	0.04	5.0	5.0	7.1	0.27	0.00	2.66	12	0.60	617.60	617.90	615.64	617.80	619.50	620.24	CB-7

Project File: HydraFlow.stm | Number of lines: 8 | Run Date: 2/12/2020

NOTES:Intensity = 32.36 / (Inlet time + 3.60) ^ 0.71; Return period =Yrs. 10 ; c = cir e = ellip b = box

Storm Sewers v10.514

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB-3	1.61	0.00	1.61	0.00	Comb	5.0	2.73	6.24	4.62	1.35	Sag	12.00	0.023	0.023	0.000	0.10	8.00	0.35	8.00	3.0	Off
2	CB-2	0.54	0.00	0.54	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.010	12.00	0.013	0.013	0.013	0.09	6.95	0.25	0.01	3.0	1
3	DMH	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	CB-1	2.02	0.00	2.02	0.00	Comb	5.0	2.73	3.12	2.31	1.35	Sag	12.00	0.017	0.017	0.000	-0.02	6.11	0.23	6.11	3.0	Off
5	CB-4	0.62	0.00	0.62	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.010	12.00	0.016	0.016	0.013	0.10	6.42	0.25	0.01	3.0	1
6	CB-5	0.58	0.00	0.58	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.009	12.00	0.024	0.024	0.013	0.12	4.95	0.25	0.00	3.0	5
7	CB-6	0.37	0.13	0.49	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.027	12.00	0.010	0.010	0.013	0.07	6.56	0.25	0.01	3.0	6
8	CB-7	0.27	0.00	0.14	0.13	Grate	0.0	0.00	0.00	2.31	1.35	0.010	12.00	0.011	0.011	0.013	0.07	5.95	0.30	4.48	3.0	7

Project File: HydraFlow.stm | Number of lines: 8 | Run Date: 2/12/2020

NOTES: Inlet N-Values = 0.016; Intensity = 32.36 / (Inlet time + 3.60) ^ 0.71; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Storm Sewers v10.514

APPENDIX D
Water Quality Computations

PROJECT NAME: EAGLEVILLE GREEN
DATE: 11/25/2019
CALCS BY: MS
CHECKED BY: RN

P2-1

WATER QUALITY VOLUME	
IMPERVIOUS AREA (ac) =	0.29
IMPERVIOUS AREA (%) =	48.35%
TOTAL AREA (ac) =	0.60
R =	0.49
WQV (ac-ft) =	0.024
WQV (cf) =	1,049

GROUNDWATER RECHARGE VOLUME	
IMPERVIOUS AREA =	0.48
SOIL GROUP =	B
RECHARGE DEPTH (D) =	0.25
TOTAL AREA =	0.60
GRV (ac-ft) =	0.01
GRV (cf) =	261

EFFECTIVE WQV =	788 cf 0.018 ac-ft

WATER QUALITY VOLUME PROVIDED IN POND = 1,664 cf

WATER QUALITY FLOW	
RUNOFF DEPTH (in) =	0.364
DESIGN PRECIPITATION (in) =	1.0
RUNOFF CURVE NUMBER =	91
I_a (in) =	0.198
I_a/P =	0.2
T_c (min) =	
T_c (hr) =	0.0
q_u (cfs/mi^2/in) =	
A (mi^2) =	0.00093
WQF (cfs) =	0.00

P2-2

WATER QUALITY VOLUME	
IMPERVIOUS AREA (ac) =	0.86
IMPERVIOUS AREA (%) =	75.71%
TOTAL AREA (ac) =	1.14
R =	0.73
WQV (ac-ft) =	0.070
WQV (cf) =	3,030

GROUNDWATER RECHARGE VOLUME	
IMPERVIOUS AREA =	0.76
SOIL GROUP =	B
RECHARGE DEPTH (D) =	0.25
TOTAL AREA =	1.14
GRV (ac-ft) =	0.02
GRV (cf) =	784

EFFECTIVE WQV =	2,246 cf 0.052 ac-ft

WATER QUALITY VOLUME PROVIDED IN DETENTION = 2,541 cf

WATER QUALITY FLOW	
RUNOFF DEPTH (in) =	0.542
DESIGN PRECIPITATION (in) =	1.0
RUNOFF CURVE NUMBER =	95
I_a (in) =	0.105
I_a/P =	0.1
T_c (min) =	6.0
T_c (hr) =	0.1
q_u (cfs/mi^2/in) =	650
A (mi^2) =	0.00178
WQF (cfs) =	0.63

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
MANSFIELD, CONNECTICUT

NOVEMBER 25, 2019

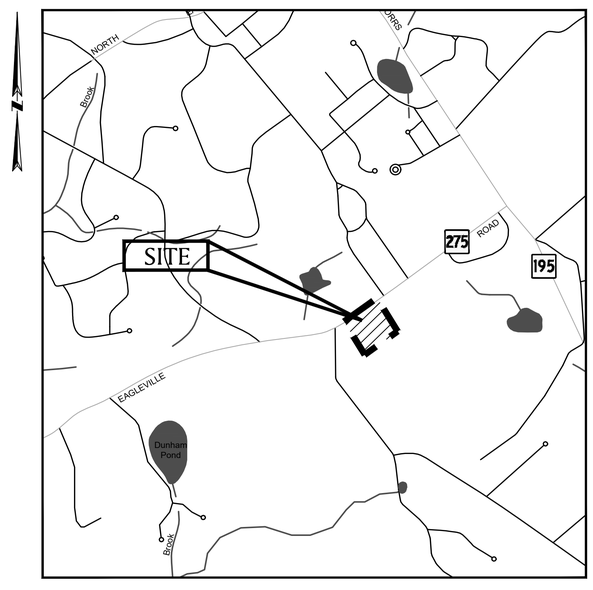
REVISED: FEBRUARY 12, 2020

WETLAND DISTURBANCE = 0
UPLAND DISTANCE = 47,518 SF

ZONING TABLE

ZONE: SER–HO	REQUIRED	EXISTING	PROVIDED
MINIMUM LOT AREA/ACRES	5	5.2	5.2
MINIMUM LOT FRONTAGE (FT)	300	704	704
MINIMUM FRONT SETBACK[1] (FT)	25	44	30
MINIMUM SIDE SETBACK (FT)	5	272	16
MINIMUM STAIR SETBACK (FT)	2	48	2
MINIMUM REAR SETBACK (FT)	5	214	6
MAXIMUM HEIGHT (FT)	45	N/A	33 (WITHOUT CUPOLA) 38'–6" (WITH CUPOLA)
MAXIMUM BUILDING GROUND COVERAGE (%)	20	0.7	14.40
OFF–STREET PARKING	1/UNIT * 42 = 42	N/A	87
ACCESSIBLE PARKING SPACES	4	N/A	8
BUILDABLE AREA (AC)	N/A	N/A	3.2
DWELLING UNITS	–	N/A	42
RESIDENTIAL DENSITY	15	N/A	42/3.2 = 13.125
GROSS FLOOR AREA (SF)	–	N/A	40,198
OPEN SPACE (SF)	–	N/A	103,689

1. MEASURED FROM 30–FOOT HIGHWAY CLEARANCE SETBACK



SITE MAP

500 0 1000 2000 3000 feet
SCALE: 1"=1000'

ISSUED FOR PERMITTING

INDEX OF DRAWINGS

T-1.0	TITLE SHEET
1, 1-2	SITE SURVEYS
EC-1.0	EXISTING CONDITIONS PLAN
OV-1.0	OVERALL SITE IMPROVEMENTS
G-1.0	GENERAL NOTES
C-1.0	EROSION & SEDIMENTATION CONTROL PLAN
C-2.0	SITE PREPARATION PLAN
C-3.0	LAYOUT & MATERIALS PLAN
C-3.1	UCONN FIRE TRUCK TURNING MOVEMENT PLAN
C-4.0	GRADING & DRAINAGE PLAN
C-5.0	UTILITY PLAN
C-5.1	SANITARY SEWER PLAN & PROFILE
C-6.0-6.5	DETAILS
C-7.0	INTERSECTION SIGHT DISTANCE PLAN
L-1.0	PLANTING PLAN
L-1.1	PLANTING RATIO
L-1.2	SHADE STUDY
L-2.0	PHOTOMETRICS PLAN
A1.1	SITE PLAN
A1.1a	SITE INFORMATION

PREPARED FOR:

MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

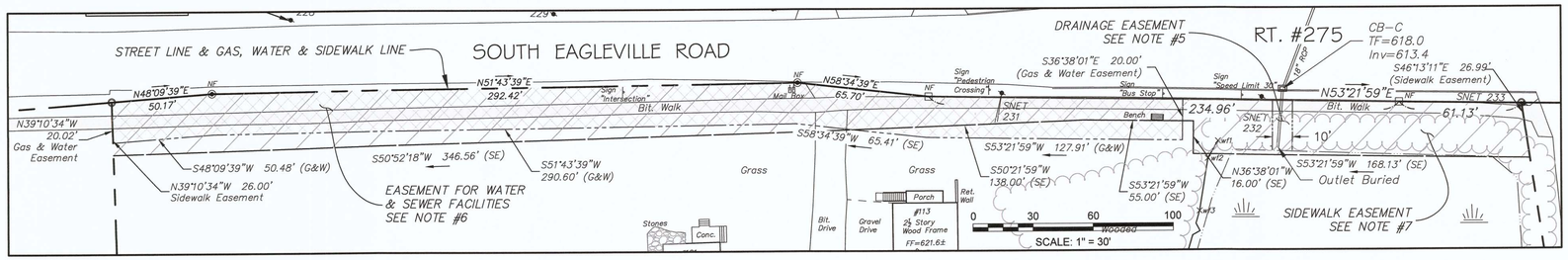
PREPARED BY:

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

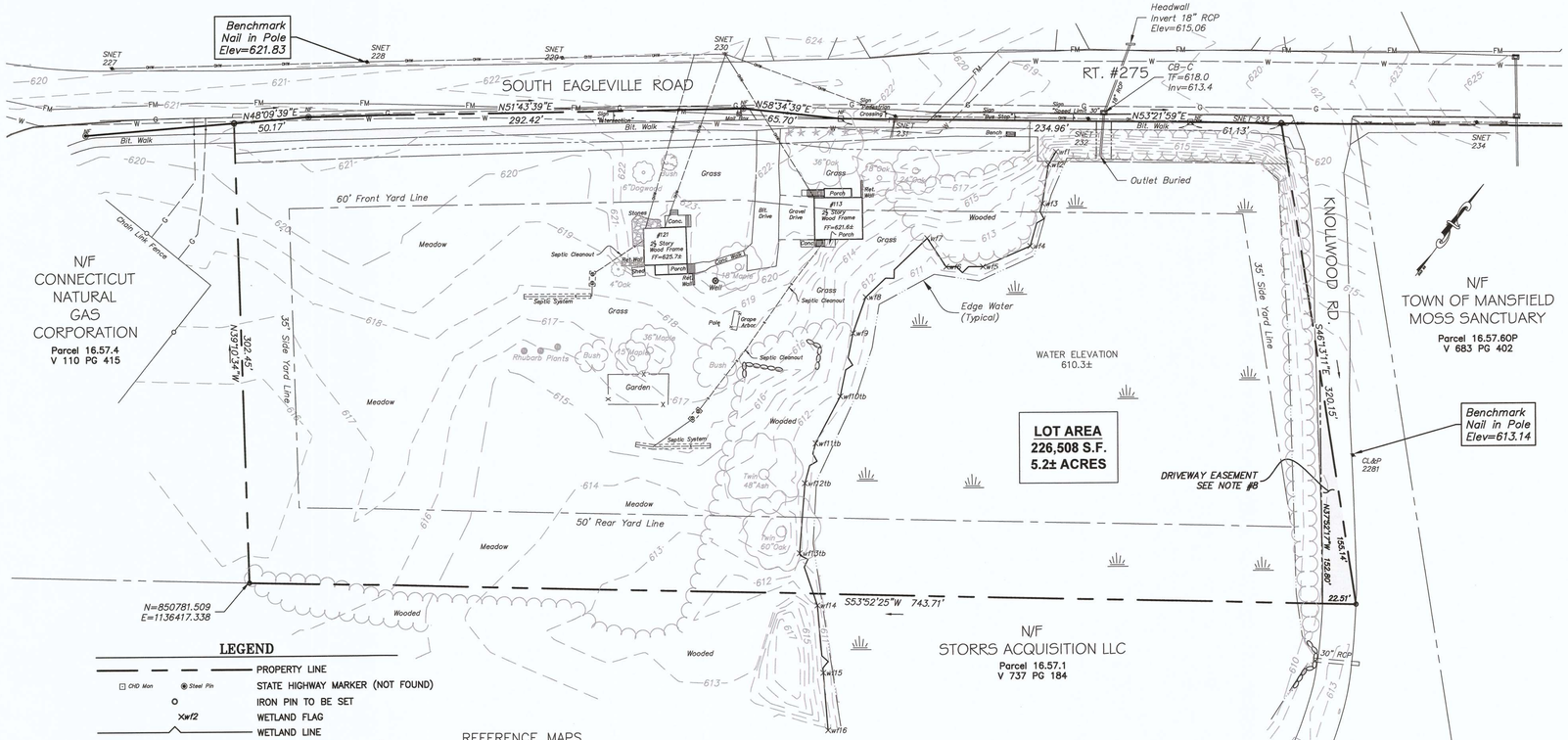
APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION *DATE*

JOB NO: 83749.00 DWG NO: SHEET T–1.0



DETAIL DEPICTING EASEMENTS
Scale 1"=30'



LEGEND

	PROPERTY LINE
CHD Mon / Steel Pin	STATE HIGHWAY MARKER (NOT FOUND)
	IRON PIN TO BE SET
Xwf2	WETLAND FLAG
	WETLAND LINE
616	EXISTING GROUND CONTOUR
	TREELINE
	GAS & WATER EASEMENT LINE
	SIDEWALK EASEMENT LINE
	ROADWAY EASEMENT LINE
	DRAINAGE EASEMENT
	SETBACK LINE
G	GAS MAIN
W	WATER MAIN
FM	SEWER FORCE MAIN
	SANITARY SEWER LINE
OHW	OVERHEAD ELECTRIC WIRE
	WELL

REFERENCE MAPS

1. Connecticut State Highway Department Town of Mansfield Route 275 Plan showing highway line on the south side of the South Eagleville Road, between Maple Road and Knollwood Road. July 1969 Scale 1"=40' Furnished by CDOT District 2 Office NOTE: Monumentation set at the time of this survey has apparently been destroyed by subsequent construction projects.

2. Algonquin Gas Transmission Company Boston, Massachusetts Map Showing Land to be Acquired By Connecticut Natural Gas Corp. July 16, 1969 Scale 1"=40' Nathan Rossman, RLS 4797 Book 9 P 14 Mansfield Land Records

3. Town of Mansfield Map Showing Land & Easement Acquired From J. Alfred Warren South Eagleville Road Scale 1"=40' Date: May 1955 Map #318 Mansfield Land Records

4. Map Showing Easement to be Acquired From Elsie Warren, Mildred Chak and Patricia Chak by the Town of Mansfield Scale: 1"=40' October 1979 Grant Meitzler, RLS Map Book 12 Page 92 Mansfield Land Records

5. Map Showing Easement to be Acquired From Mildred Chak and Patricia Chak by the Town of Mansfield Scale 1"=40' Date Feb. 1988 Rev. May 1988 Lenard Engineering, Inc. Map Book 18 Page 23 Mansfield Land Records

6. ALTA/ACSM Land Title Survey Plan Prepared For Knollwood Apartments LLC Of Knollwood Apartment Complex Mansfield, Ct. Scale 1"=100' Date 9-6-1996 Meehan & Goodin Engineers – Surveyors Map Book 26 Page 34 Mansfield Land Records

7. Resurvey Prepared For The University Of Connecticut South Eagleville Road & Storrs Road Mansfield, Connecticut. Scale 1"=100' Date Oct. 2005 Rev. 6/04/07 Design Professionals, Civil Engineers, Planners, Surveyors, Landscape Architects

8. Water And Sewer Services Mansfield Retirement Community, Mansfield Connecticut South Eagleville Road Sta. 11+00 to Sta. 25+70 sheets #2 & #3, Scale As Noted Date: Aug. 1979 Rev. As Built 10-22-80 Loureiro Engineering Associates.

SURVEY MAPS

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.

2. THIS SURVEY IS A FIRST SURVEY. NO PREVIOUS PROPERTY SURVEY OF THE PARCEL WAS FOUND. MULTIPLE EASEMENT SURVEYS WERE FOUND. THIS PLAN REPRESENTS A COMPILATION OF EASEMENT PLANS AND PROPERTY SURVEYS OF ADJACENT PROPERTIES AS LISTED.

3. BEARINGS ON THIS PLAN ARE BASED ON NAD 1983 COORDINATES. ELEVATIONS ARE BASED ON NAVD 1988 DATUM. EXISTING GROUND CONTOURS ARE 1' INTERVAL.

4. CURRENT OWNER OF THIS PROPERTY IS THE MANSFIELD NONPROFIT HOUSING DEVELOPMENT CORPORATION 309 MAPLE ROAD, STORRS, CT. 06268. PARCEL 16.57.5 DEED VOL 764 PG 555 MANSFIELD LAND RECORDS AREA=226,508 S.F. 5.2± ACRES

5. THIS PARCEL IS SUBJECT TO A DRAINAGE EASEMENT IN FAVOR OF THE STATE OF CONNECTICUT VOL 83 PG 71 REF. MAP #3 AREA=180± S.F.

6. THIS PARCEL IS SUBJECT TO A WATER & SEWER LINE EASEMENT IN FAVOR OF THE TOWN OF MANSFIELD VOL 176 PG 200 REF. MAP #4. AREA=10,696± S.F.

7. THIS PARCEL IS SUBJECT TO A SIDEWALK EASEMENT IN FAVOR OF THE TOWN OF MANSFIELD VOL 271 PG 255 REF. MAP #5. AREA=16,250± S.F.

8. THIS PARCEL IS SUBJECT TO A ROADWAY EASEMENT IN FAVOR OF KNOLLWOOD APARTMENTS VOL 378 PG 285 REF. MAP #6. AREA=1,655± S.F.

9. PROPERTY IS LOCATED IN RURAL AGRICULTURAL RESIDENCE 90 ZONE (RAR-90) BUILDING #113 S EAGLEVILLE ROAD IS NON-CONFORMING TO FRONT YARD REQUIREMENT, BUILT PRIOR TO PRESENT ZONING REGULATIONS.

10. PROPERTY IS NOT LOCATED IN FLOOD ZONE – FIRM MAP TOWN OF MANSFIELD CONNECTICUT TOLLAND COUNTY COMMUNITY-PANEL NUMBER 090128 0005 C EFFECTIVE JAN. 2, 1981

11. WETLANDS WERE DELINEATED ON JUNE 8, 2016 BY IAN T. COLE, REGISTERED SOIL SCIENTIST/PROFESSIONAL WETLAND SCIENTIST #2006. WETLAND FLAGS LOCATED AS SHOWN BY LENARD ENGINEERING, INC. JUNE 13, 2016.

12. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON WERE HAVE BEEN COMPILED IN PART FROM RECORD MAPPING AND/OR OTHER SOURCES AND MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO LENARD ENGINEERING, INC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY APPROPRIATE AUTHORITIES PRIOR TO ANY EXCAVATION OR CONSTRUCTION CALL-BEFORE-YOU-DIG 1-800-922-4455.

13. THIS MAP & SURVEY CONFORMS TO CLASS A-2 HORIZONTAL ACCURACY AND CLASS T-2 TOPOGRAPHIC SURVEY ACCURACY.

To the best of my knowledge and belief this map is substantially correct as noted hereon.

KEVIN L. DaROS #13291 DATE 6/27/16

No certification is expressed or implied unless this map bears the embossed seal of the Land Surveyor whose signature appears hereon.

Designed By: KLD
Drawn By: KLD
Checked By: PM
CAD File: Basemap

Drawing Scale: 1"=40'
Drawing date: June 27, 2016

Rev.	Date	Revision	By

PROPERTY/BOUNDARY SURVEY

PREPARED FOR

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

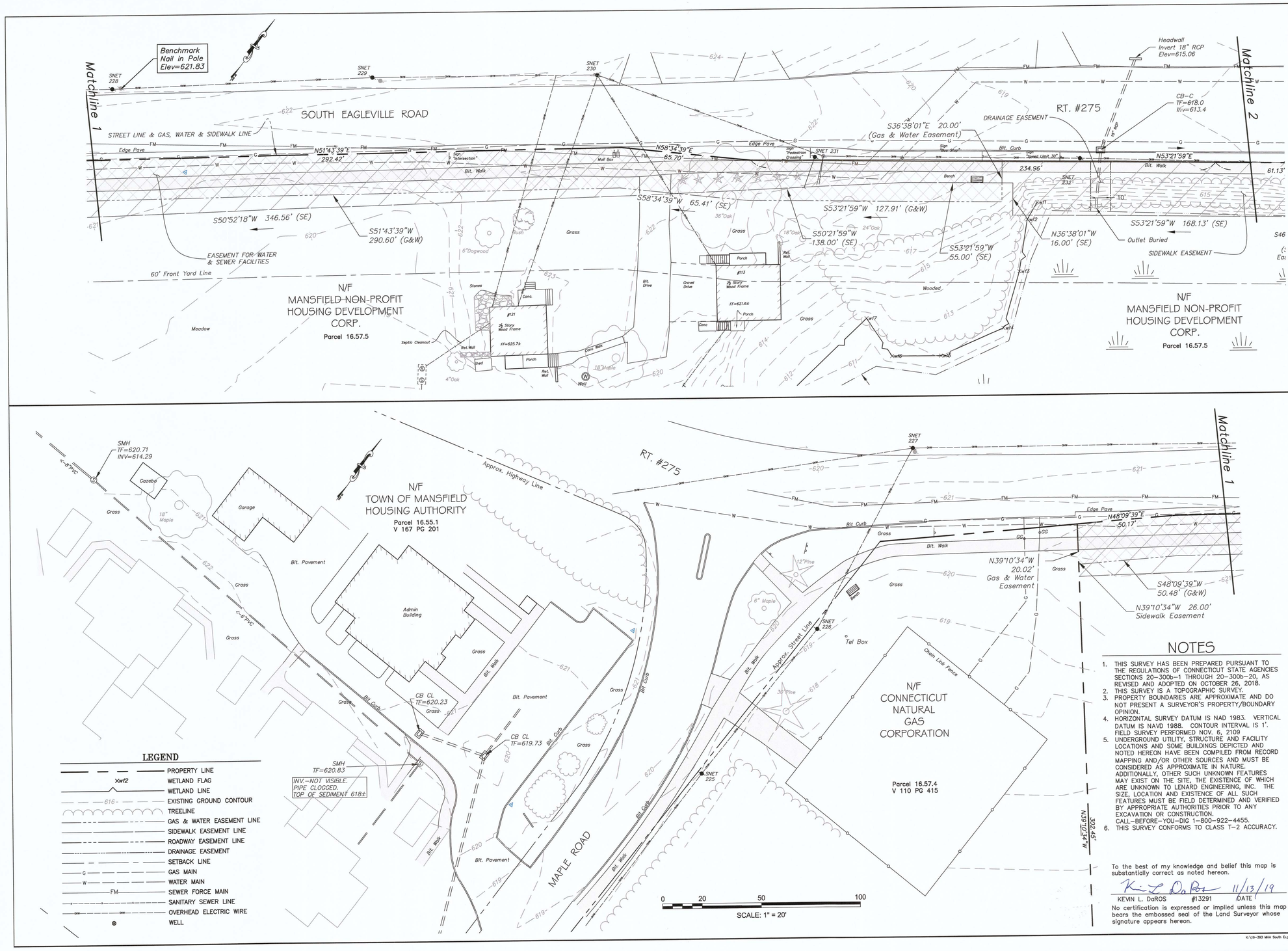
113-121 SOUTH EAGLEVILLE ROAD
STORRS, CONNECTICUT

Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
2210 Main Street GLASTONBURY, CT (860) 659-3100
140 Willow Street WINSTED, CT (860) 379-0669
19 Midstate Drive AUBURN, MA (508) 721-1900

Drawing #: 1

Job #: 16-358

K:\16-383 MHA South Eagleville\Production Drawings\A-2 Survey.dwg 9/26/2019 1:10 PM



LEGEND

- PROPERTY LINE
- Xw/f2 — WETLAND FLAG
- WETLAND LINE
- 616 — EXISTING GROUND CONTOUR
- TREELINE
- GAS & WATER EASEMENT LINE
- SIDEWALK EASEMENT LINE
- ROADWAY EASEMENT LINE
- DRAINAGE EASEMENT
- SETBACK LINE
- G — GAS MAIN
- W — WATER MAIN
- FM — SEWER FORCE MAIN
- SANITARY SEWER LINE
- OHE — OVERHEAD ELECTRIC WIRE
- WELL

NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20, AS REVISED AND ADOPTED ON OCTOBER 26, 2018.
2. THIS SURVEY IS A TOPOGRAPHIC SURVEY.
3. PROPERTY BOUNDARIES ARE APPROXIMATE AND DO NOT PRESENT A SURVEYOR'S PROPERTY/BOUNDARY OPINION.
4. HORIZONTAL SURVEY DATUM IS NAD 1983. VERTICAL DATUM IS NAVD 1988. CONTOUR INTERVAL IS 1'. FIELD SURVEY PERFORMED NOV. 6, 2109
5. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS AND SOME BUILDINGS DEPICTED AND NOTED HEREON HAVE BEEN COMPILED FROM RECORD MAPPING AND/OR OTHER SOURCES AND MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH UNKNOWN FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO LENARD ENGINEERING, INC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY APPROPRIATE AUTHORITIES PRIOR TO ANY EXCAVATION OR CONSTRUCTION. CALL-BEFORE-YOU-DIG 1-800-922-4455.
6. THIS SURVEY CONFORMS TO CLASS T-2 ACCURACY.

To the best of my knowledge and belief this map is substantially correct as noted hereon.

K. L. DaRos 11/13/19

KEVIN L. DaROS #13291 DATE

No certification is expressed or implied unless this map bears the embossed seal of the Land Surveyor whose signature appears hereon.

Designed By: KLD
Drawn By: KLD
Checked By: PM
CAD File: Survey2

Drawing Scale: 1"=20'
Drawing date: Nov. 13, 2019

Rev.	Date	Revision	By.

TOPOGRAPHIC SURVEY

PREPARED FOR

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

113-121 SOUTH EAGLEVILLE ROAD

STORRS, CONNECTICUT

Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
19 Midstate Drive AUBURN, MA (508) 721-7600
140 Willow Street WINSTED, CT (860) 379-8669
2210 Main Street GLASTONBURY, CT (860) 659-3100

Drawing #: 1 of 2

Job #: 19-404

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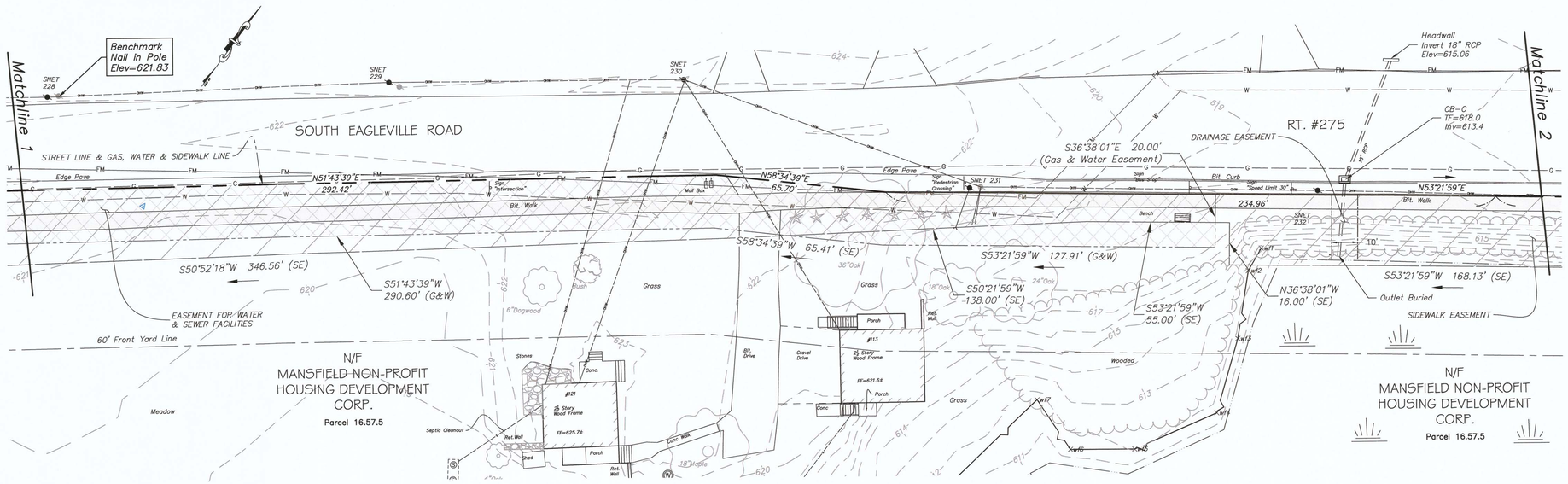

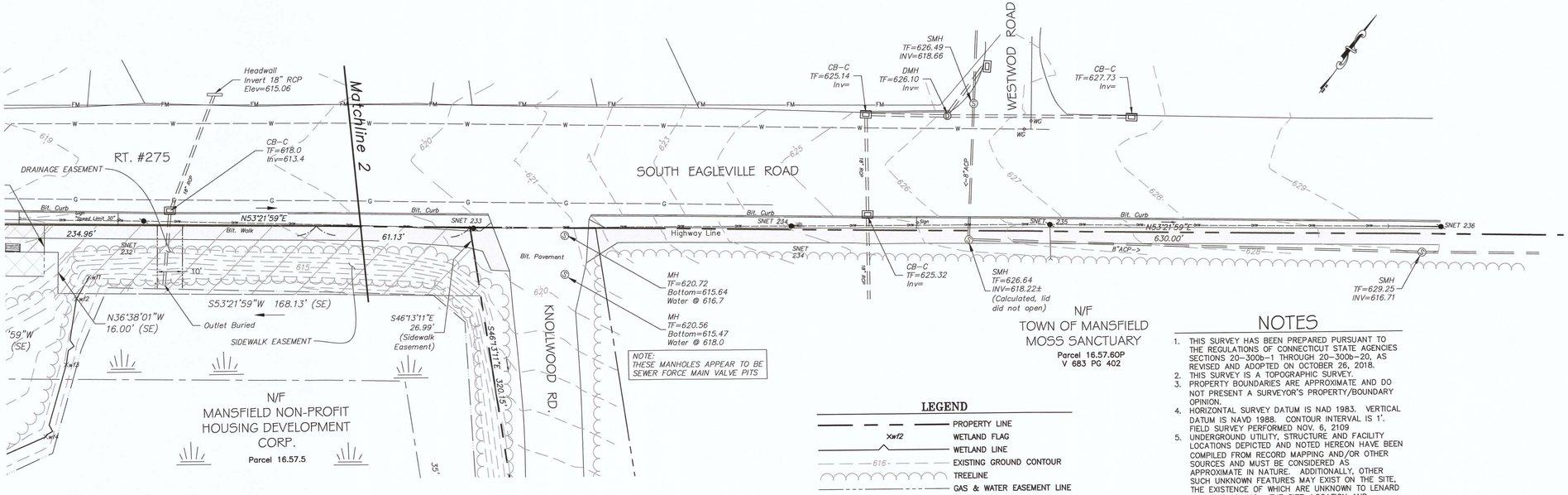

LEGEND

- PROPERTY LINE
- Xwf2 — WETLAND FLAG
- WETLAND LINE
- 616 — EXISTING GROUND CONTOUR
- TREELINE
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- SIDEWALK EASEMENT LINE
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To the best of my knowledge and belief this map is substantially correct as noted hereon.

Kevin L. DaRos 11/13/19
KEVIN L. DaROS #13291 (DATE)

No certification is expressed or implied unless this map bears the embossed seal of the Land Surveyor whose signature appears hereon.

Reference Map:
Property Boundary Survey Prepared for Mansfield Non–Profit Housing Development Corp. 113–121 South Eagleville Road, Storrs, Connecticut. Date June 24, 2016 Scale: 1"=40' Class A–2 and Class T–2 Accuracy Lenard Engineering, Inc. 2210 Main St. Glastonbury, Connecticut

0 20 50 100
SCALE: 1" = 20'

Designed By: KLD
Drawn By: KLD
Checked By: PM
CAD File: Survey2

Drawing Scale: 1"=20'

Rev.	Date	Revision	By

Drawing date: Nov. 13, 2019

TOPOGRAPHIC SURVEY

PREPARED FOR

MANSFIELD NON–PROFIT HOUSING DEVELOPMENT CORP.

113–121 SOUTH EAGLEVILLE ROAD

STORRS, CONNECTICUT

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Drawing #: 2 OF 2

Job #: 19–404

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