DRAINAGE REPORT

DIVINITY CAMPUS

CITY OF ROCHESTER, MONROE COUNTY
STATE OF NEW YORK

PREPARED FOR:

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PREPARED BY:

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217 Lake Avenue
Rochester NY 14608

PROJECT NO. CE#6702
MAY, 2019
REVISED: JULY 25th, 2019

COSTICH ENGINEERING

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DIVINITY CAMPUS
CITY OF ROCHESTER, MONROE COUNTY
STATE OF NEW YORK

STORMWATER FEASIBILITY REPORT

OVERVIEW

The stormwater feasibility analysis for the Divinity Campus Apartment Buildings, being proposed in the City of Rochester, New York, is outlined in this report. The project is located at the Divinity School Campus, existing at the north east corner of the intersection of Highland Avenue and South Goodman Street. Refer to the location sketch in Appendix I for reference.

The site currently exists as developed land for the existing Divinity School Campus. Two apartment buildings and associated parking are being proposed and the project will include improvements to the existing Saunders House and Andrews House. Impervious area to be disturbed includes parking and driveway paved surfaces. The site is bordered by a residential neighborhood to the north along Highland Parkway, and to the east.

Approximately 0.95 acres of new impervious area will be constructed with approximately 5.2± acres total being disturbed during construction activities.

This report will provide a feasibility analysis of pre and post-development stormwater runoff, water quality and runoff reduction volumes, for the associated site.

DRAINAGE OVERVIEW

The Soil Conservation Service (SCS) method TR-55 was used to generate hydrographs within the proposed site under existing and developed conditions. The redevelopment will result in an increase in impervious area. Existing and developed watersheds & required water quality, runoff reduction volumes will be discussed in this report.

Since the site will disturb greater than one (1) acre of land during construction activity, a SPDES General Permit for Stormwater Discharges from Construction Activity will be required for this project.

DESCRIPTION OF SOILS

According to the Natural Resources Conservation Service Web Soil Survey 2.0, the predominant soils present onsite are classified as Hydrological Soil Group (HSG) Type D. The soils on site are listed as Urban. Please refer to appendix I for site soil mapping.

EXISTING CONDITIONS

The existing drainage areas are shown on the drawing entitled, "Existing Drainage Area Map" (See Appendix 2). The terminology existing hereto refers to site conditions pertinent to the drainage areas that will be disturbed by construction activities on the site. The existing drainage area consists of the existing Saunders and Andrews Houses, the Montgomery House (Presidents House), parking lot areas, a portion of Campus Drive, a portion of the access drive to Hope Lodge with associated parking, grass and wooded areas.

The total drainage area that will be affected under existing conditions is approximately the upper bounds of the property (9.13 acres). The site has been modeled as five (5) separate drainage areas (E-1, E-2, E-3, E-4.A & E-4.B) which discharge to three (3) separate points off site. These discharge points include the combined sewer along South Goodman Street (DP-1: E-1 & E-2), properties to the north east corner of the site (DP-2: E-3), and the existing storm sewer on Highland Avenue (DP-3: E-4.A & E-4.B). Existing drainage areas were found to have curve numbers (CN) of 87, 77, 79, 90 & 90 and time of concentrations (Tc) of 18.9, 11.3, 10.1, 13.3 and 11.5 mins, respectively.

Existing Drainage Area 1 (E-1) primarily flows overland on the property to the west property line on South Goodman Street where it is collected in drain inlets and conveyed to the existing City of Rochester combined sewer.

The Existing Drainage Area 2 (E-2) primarily flows overland to the north/north west property lines and to adjacent properties.

Existing Drainage Area 3 (E-3) primarily flows overland to the north east corner property line and to adjacent properties.

Existing Drainage Area 4 (E-4.A & E-4.B) primarily flows overland and is collected in existing drainage inlets onsite, and conveyed to the south property line on Highland Avenue where it enters the existing City of Rochester storm sewer.

The SCS method TR-55 was used to obtain a peak flow rates for the 1, 2, 10 and 100-year storm events under the aforementioned conditions. Table 1 summarizes the existing flow rates for the drainage area.

TABLE 1 – EXISTING FLOW RATES (9.13 ± Acres)

Area Designation	Q_1 (cfs)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
E-1 (3.31 ac)	2.97	3.92	6.97	14.17
E-2 (1.67 ac)	0.77	1.19	2.71	6.78
E-3 (0.89 ac)	0.53	0.79	1.68	3.99
E-4.A (1.89 ac)	2.47	3.14	5.23	10.0
E-4.B (1.38 ac)	1.91	2.43	4.03	7.69
Total	8.31	11.03	19.88	41.13

All corresponding data and calculations used to derive these results can be found in Appendix 2.

DEVELOPED CONDITIONS

The developed drainage areas are shown on the drawing entitled, "Developed Drainage Area Map" (See Appendix 3). Under post developed conditions, drainage inlets and storm sewers will be used to collect the stormwater from all impervious areas where it will be conveyed to the proposed stormwater management facility, located at the south west property corner (Highland Avenue & South Goodman Street intersection). The stormwater management facility will attenuate stormwater and provide water quality volumes for the newly created impervious area. Refer to the "Stormwater Storage & Attenuation" maps (See Appendix 3) for conceptual stormwater management facility locations.

The total drainage area that will be affected under existing conditions is approximately the upper bounds of the property (9.13 acres). The developed site has been modeled as six (6) separate drainage areas (DA-1, DA-2, DA-3, DA-4.A, DA-4.B, DA-5) which discharge to three (3) separate points off site. These discharge points include the combined sewer along South Goodman Street (DA-1 & DA-2), properties to the north east corner of the site (DA-3) and the existing storm sewer on Highland Avenue (DA-4.A, DA-4.B, DA-5). Developed drainage areas were found to have curve numbers (CN) of 88, 77, 80, 93, 95 & 92 and time of concentrations (Tc) of 17.4, 11.3, 9.3, 5, 5 and 5 mins, respectively.

Developed Drainage Area 1 (DA-1) consists of the Campus Drive, pavement areas to be reconstructed, parking areas and existing grass areas. Stormwater primarily flows overland on the property to the west property line on South Goodman Street where it is collected in drain inlets and conveyed to the existing City of Rochester combined sewer.

Developed Drainage Area 2 (DA-2) consists of wooded areas not to be disturbed. Stormwater primarily flows overland to the north/north west property lines and to adjacent properties.

Developed Drainage Area 3 (DA-3) consists of wooded areas, a portion of the access drive to Hope Lodge. Stormwater primarily flows overland to the north east corner property line and to adjacent properties.

Developed Drainage Area 4 (DA-4.A & DA-4.B) consists of the proposed residential buildings, existing Saunders House and parking areas. Stormwater primarily sheet flows where it is collected in drainage inlets, and conveyed to the proposed stormwater management facility located at the south west corner of the property.

Developed Drainage Area 5 (DA-5) consists of an existing parking lot, parking lot expansion work, and a portion of the access drive to Hope Lodge.

Table 2 summarizes the developed peak flow rates for the drainage area.

TABLE 2 –DEVELOPED FLOW RATES (9.13 ± Acres)

Area Designation	Q_1 (cfs)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
DA-1 (2.51 ac)	2.50	3.26	5.68	11.30
DA-2 (1.52 ac)	0.70	1.08	2.47	6.17
DA-3 (0.84 ac)	0.52	0.77	1.63	3.88
DA-4.A (1.34 ac)	2.76	3.39	5.31	9.59
DA-4.B (1.64 ac)	3.74	4.52	6.85	12.02
DA-5 (1.28 ac)	2.49	3.09	4.92	9.03
Total	11.21	14.22	23.77	46.22

All supporting data and calculations used to derive the developed peak flow rates can be found in Appendix III.

Overall stormwater discharge rates from the redeveloped site will be reduced from the existing stormwater flow rates in accordance NYSDEC Phase II requirements. Due to increased impervious area and installation of storm sewers, the developed site will have an increased curve number and decreased time of concentration, resulting in a greater runoff volume and peak flow rates. The increase in stormwater runoff will be attenuated in the stormwater management facility, which will also provide water quality volume treatment before leaving the site.

In keeping with the goals of the NYSDEC Stormwater Pollution Prevention Control and SPDES General Permit GP-0-15-002, pollutant removal, runoff reduction and source control practices are to be implemented to provide at least minimum required Water Quality and Runoff Reduction volumes. All practices are to be designed pursuant to the current NYSDEC Stormwater Management Design Manual (January 2015).
Preliminary calculations have estimated the additional storage required to meet the Runoff Reduction (RRv) & Water Quality (WQv) volumes and to provide peak flow attenuation.

Table 3 below shows the required and Water Quality & Runoff Reduction volumes for the development.

TABLE 3 - WATER QUALITY & RUNOFF REDUCTION VOLUME

Water Quality	***Runoff Reduction***
WQv Req'd	**Min RRv Req'd**
ac-ft	*ac-ft*
0.1193	0.0150

The Water Quality volume required will be reduced by green infrastructure practices onsite (EX. Bioretention facilities). The resulting water quality volume required in the stormwater management facility will be the difference of the water quality and runoff reduction volumes required (0.104 ac-ft).

Table 4 below shows the existing & developed runoff volumes for a 100-Year storm event, and the storage volume required to attenuate the increased runoff.

TABLE 4 – EXISTING & DEVELOPED 100-YEAR RUNOFF VOLUMES

	Existing	Developed	Increase in Runoff Volume
	Ac-ft		
100-Year Runoff Volume	*2.753*	*2.950*	*0.197*

Stormwater management facilities will be required to provide the above volumes in order to meet the required Water Quality Volume and to attenuate the increase in stormwater runoff from existing to developed conditions. Green infrastructure practices will be implemented on site to provide the required runoff reduction volumes (EX: Bioretention) and a stormwater management facility is being proposed to provide water quality volumes.

Table 5 below shows the storage required and the storage provided in the Stormwater Management Facility.

TABLE 5 – STORMWATER ATENNUATION AND VOLUMES PROVIDED

Required Storage	Stormwater Management Facility Storage Provided	
ac-ft	ac-ft	Pond Area 4-ft depth
0.301	*0.320*	*3,282 SF (0.075 ac)*

All supporting data and calculations used to derive the storage required and provided can be found in Appendix III.

Green infrastructure is to be achieved where applicable by infiltration, groundwater recharge, reuse, recycle, evaporation/evapotranspiration through the use of green infrastructure techniques as a standard practice. These practices will be used to treat and provide runoff reduction volumes (RRv).

The following practices have been identified as feasible practices for the proposed development:

- Disconnection of Roof Top Areas (Area Reduction Practice)
- Sheet flow to Filter Strips (Treatment Practice)
- Bioretention (Treatment Practice)

EROSION AND SEDIMENT CONTROL MEASURES

All erosion and sediment control measures will be designed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control." The site contractor and all assigned sub-contractors shall adhere to all erosion and sediment control measures as outlined on applicable plans.

All temporary measures will be installed as outlined in construction documents to control any potential pollutants leaving the construction site. Prior to a pre-construction meeting, all responsible contractors are to provide documentation of the 4-hour Erosion and Sediment Control training, and provide all necessary Contractor/sub-contractor certification formwork.

Temporary stabilization practices for this site include (but not limited to) sedimentation basins, siltation fence, inlet protection for existing inlets, filter fabric drop inlet protection of new inlets, stone filter check dam(s) and a stabilized construction entrances.

Permanent stabilization practices for this site include (but not limited to) landscaping, permanent seeding of all lawn areas and outlet protection.

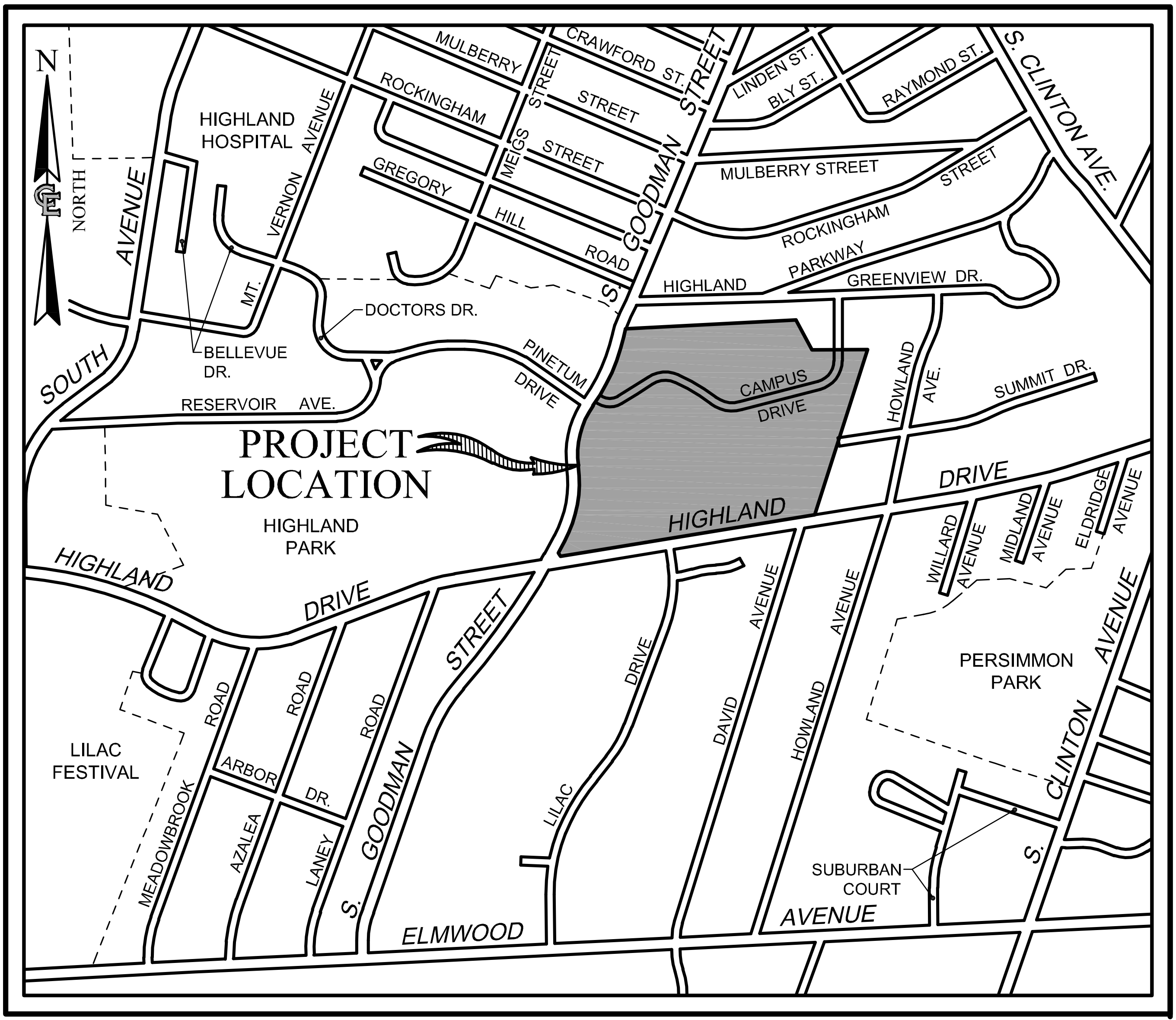
SEQUENCE OF MAJOR ACTIVITIES

The contractor will be responsible for implementing all erosion control and storm water management control measures. The contractor may designate these tasks to certain subcontractors as he sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the contractor. A detailed order of activities will be provided with final construction documents.

- Construct temporary stabilized construction entrance.
- Demolition of existing parking lot areas to be disturbed.
- Provide inlet protection to existing catch basins and new catch basins as utility installation progresses.
- Provide perimeter silt fencing as required.
- Strip topsoil from site. Topsoil for reuse shall be temporarily stockpiled and surrounded by siltation fencing.
- Construct Stormwater Management Facility.
- Grade area for building pads, and access drives
- Stabilize building pads with stone sub-base.
- Install utilities.
- Stabilize access drives and parking areas with stone sub-base.
- Stabilization measures (Temporary and/or permanent seeding, mulching, Geotextiles, Etc.) must be initiated within 14 days where construction activities have temporarily or permanently ceased, and not expected to resume within 21 days.

APPENDIX I

- SITE LOCATION SKETCH
- NRCS HYDROLOGIC SOIL MAPPING
- MONROE COUNTY GIS SOILS MAP
- NYSDEC ENVIRONMENTAL RESOURCE MAPPER
- NYSDEC STORMWATER INTERACTIVE MAPPER
- NATIONAL WETLANDS INVENTORY
- NYS CULTURAL RESOURCE INFORMATION SYSTEM MAPPER (CRIS)

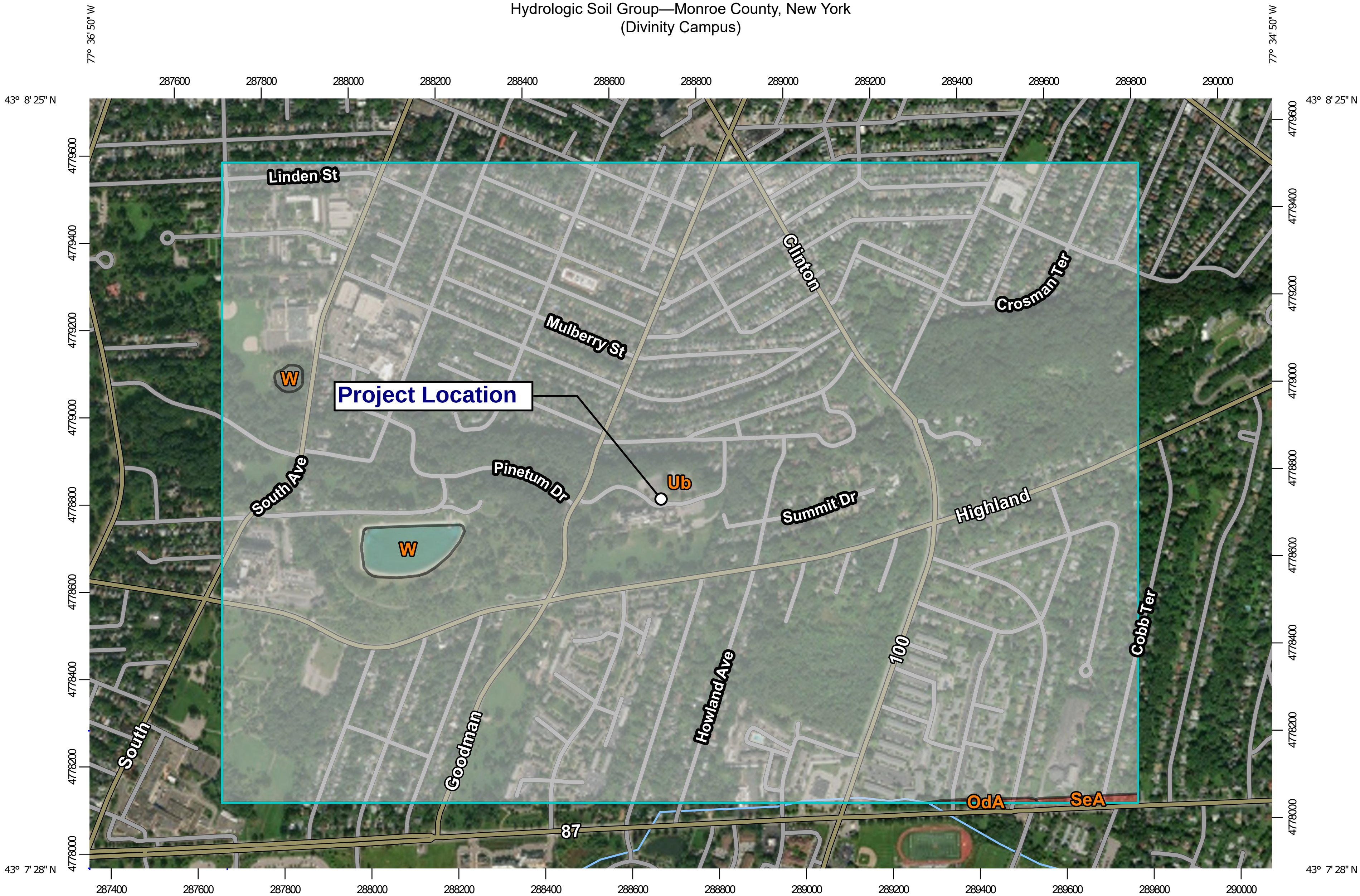


LOCATION SKETCH

NOT TO SCALE

COSTICH
ENGINEERING

Hydrologic Soil Group—Monroe County, New York
(Divinity Campus)



Map Scale: 1:12,400 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

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 Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:15,800.

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: Monroe County, New York
Survey Area Data: Version 17, Sep 3, 2018

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 16, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
OdA	Odessa silt loam, 0 to 3 percent slopes	D	0.5	0.1%
SeA	Schoharie silt loam, 0 to 3 percent slopes	D	0.9	0.1%
Ub	Urban land		759.8	99.0%
W	Water		6.4	0.8%
Totals for Area of Interest			**767.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

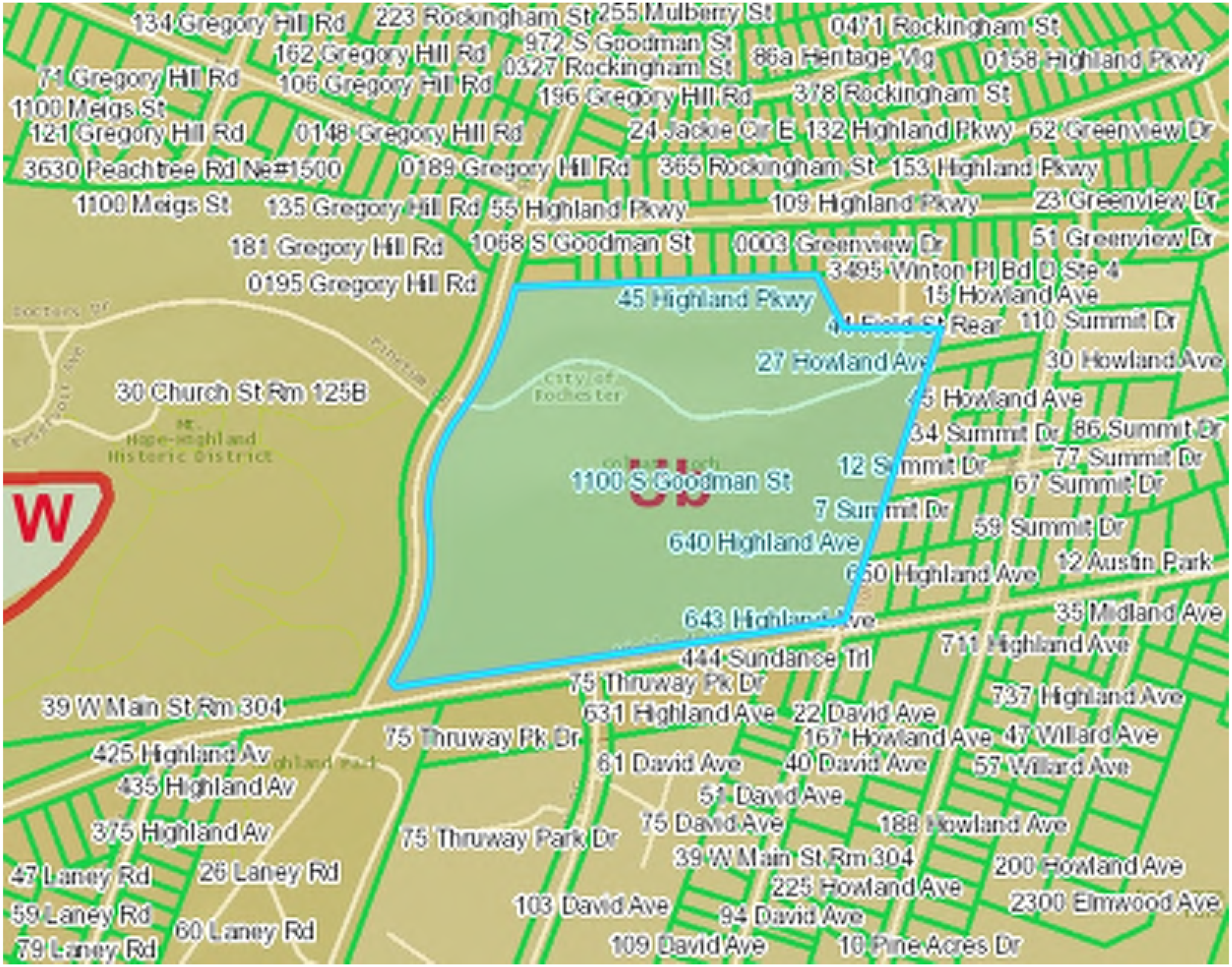
Rating Options

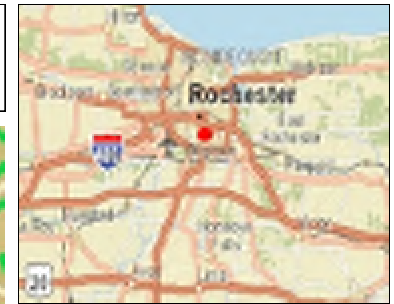
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Monroe County GIS Services Division





Legend

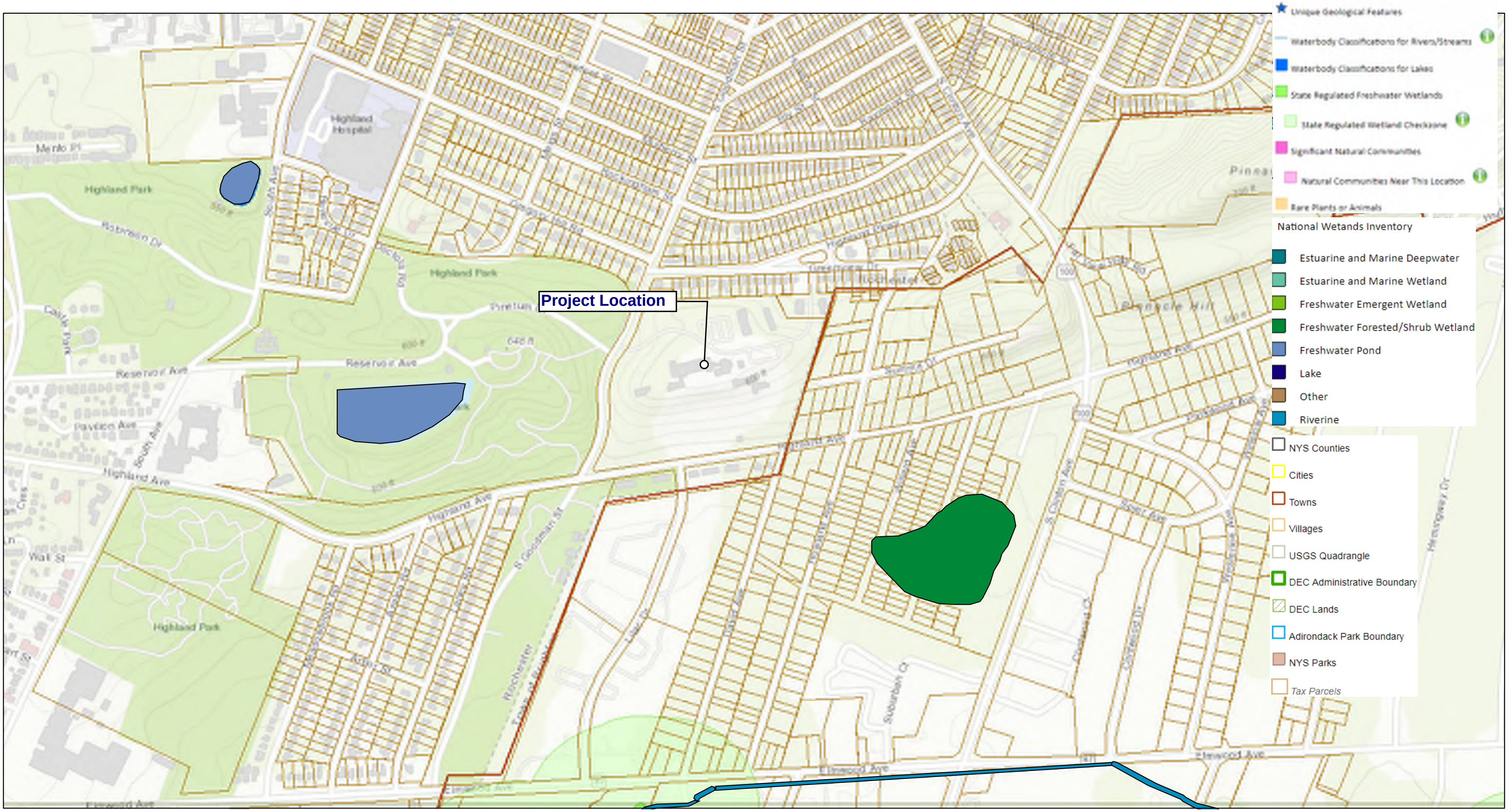
- SSURGO Soils
- Parcels

Notes

992.5 0 496.27 992.5 Feet

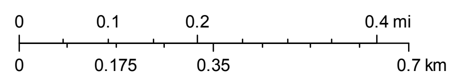
WGS_1984_Web_Mercator_Auxiliary_Sphere

Divinity School



April 29, 2019

1:9,028



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

NYS Department of Environmental Conservation
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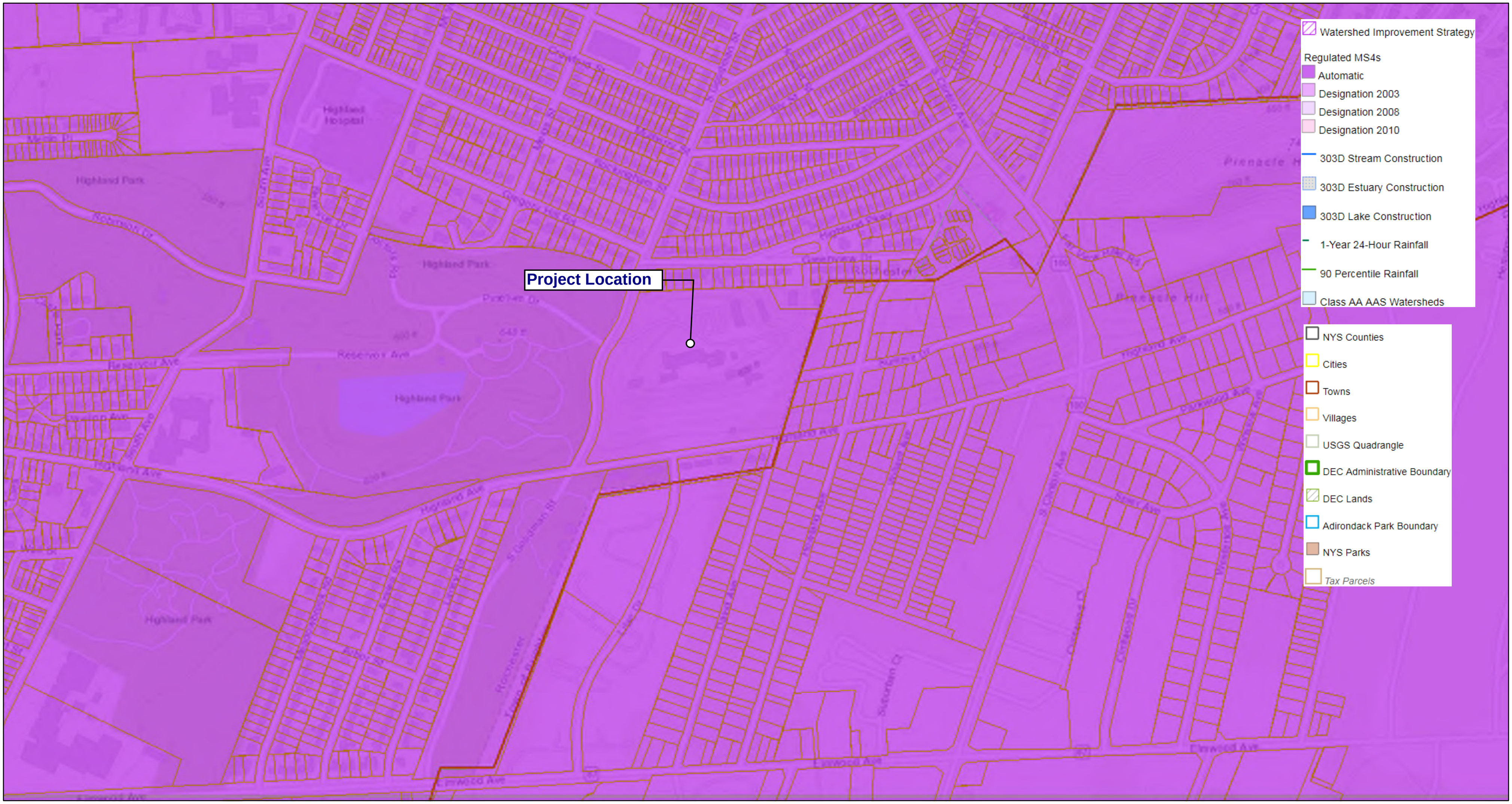
Divinity School



April 29, 2019

1:9,028

0 0.1 0.2 0.4 mi

0 0.175 0.35 0.7 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Author: Costich Engineering, DPC
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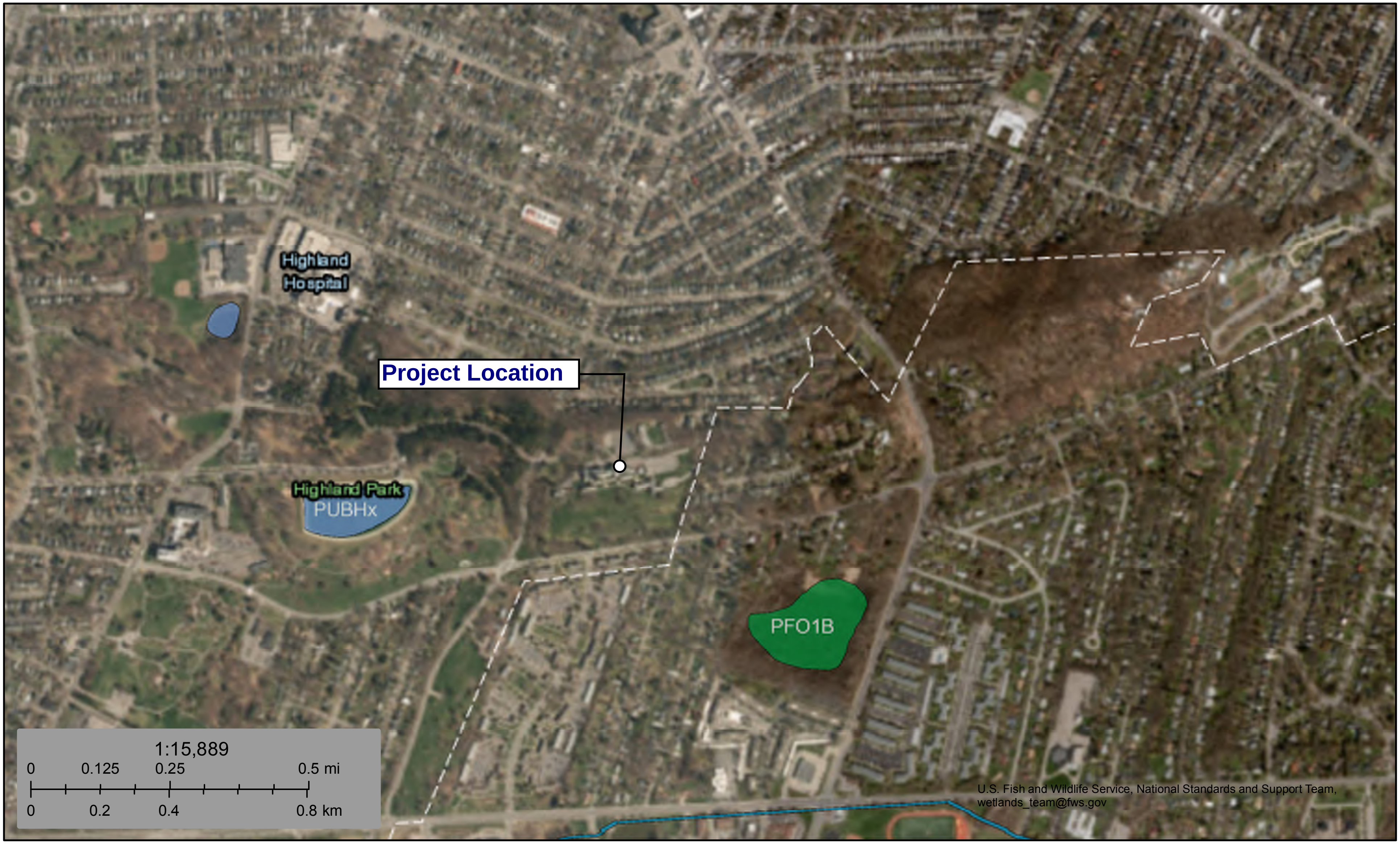
U.S. Fish and Wildlife Service

National Wetlands Inventory

Divinity Campus



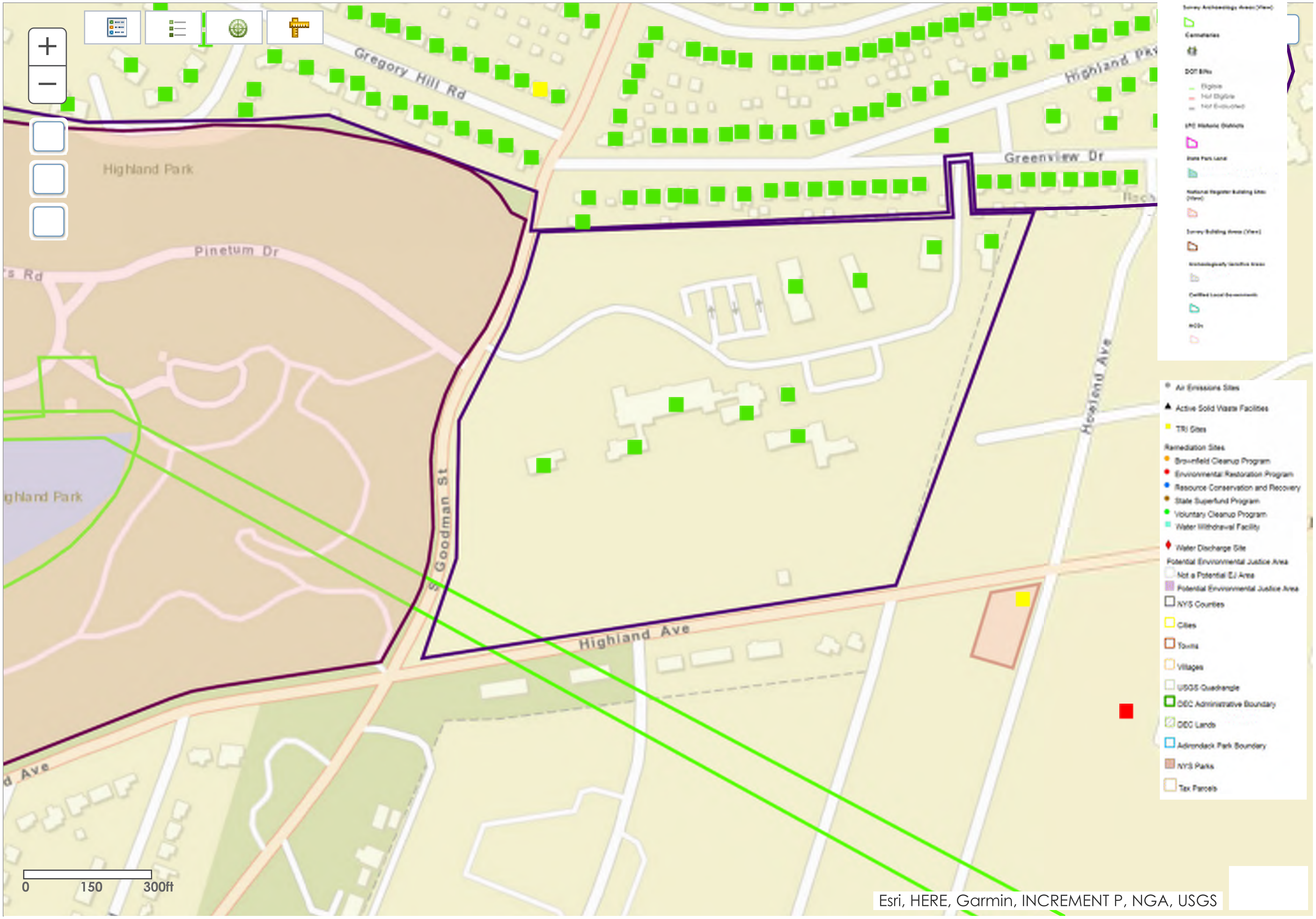
May 20, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

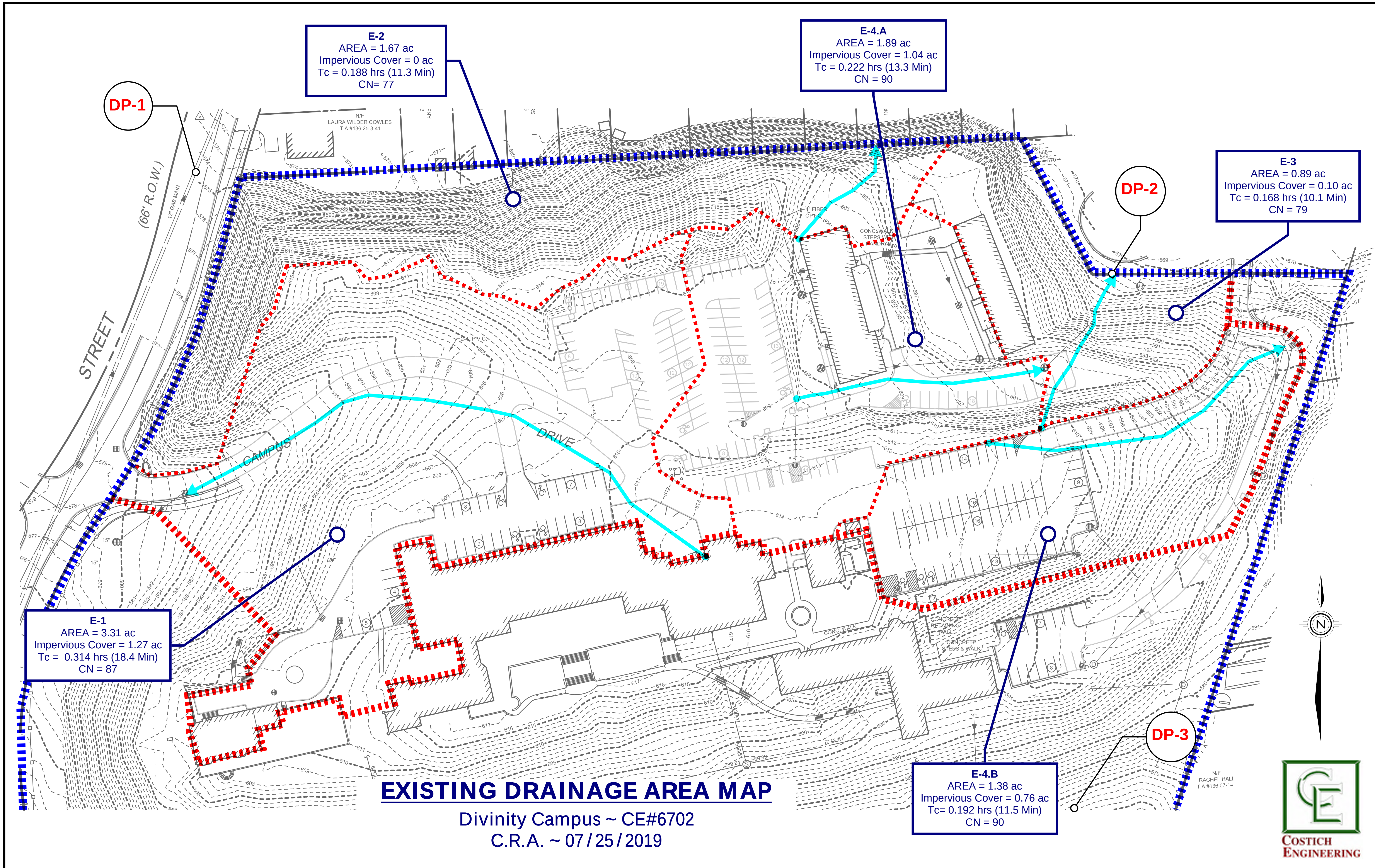
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

CRIS NYS
Cultural Resource Information System



APPENDIX II

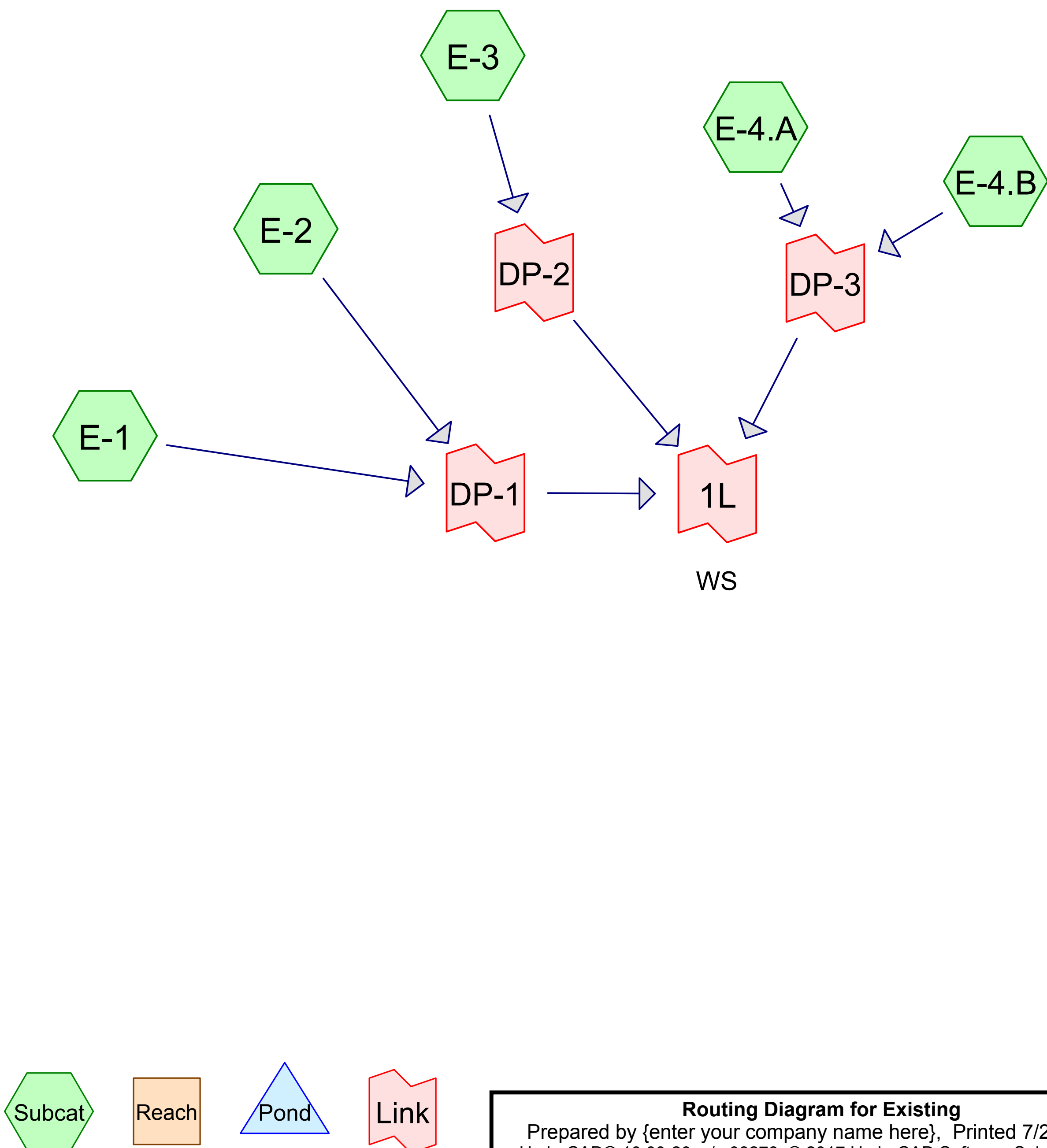
- EXISTING DRAINAGE AREA MAP
- EXISTING HYDROCAD ROUTING REPORT
- EXISTING SCS CALCULATIONS



EXISTING DRAINAGE AREA MAP

Divinity Campus ~ CE#6702

C.R.A. ~ 07/25/2019



Routing Diagram for Existing
Prepared by {enter your company name here}, Printed 7/24/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.310	87	(E-1)
1.670	77	(E-2)
0.890	79	(E-3)
3.270	90	(E-4.A, E-4.B)
9.140	**85**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=3.310 ac 0.00% Impervious Runoff Depth>0.78"
Tc=18.4 min CN=87 Runoff=2.97 cfs 0.215 af

SubcatchmentE-2: Runoff Area=1.670 ac 0.00% Impervious Runoff Depth>0.36"
Tc=11.3 min CN=77 Runoff=0.77 cfs 0.051 af

SubcatchmentE-3: Runoff Area=0.890 ac 0.00% Impervious Runoff Depth>0.43"
Tc=10.1 min CN=79 Runoff=0.53 cfs 0.032 af

SubcatchmentE-4.A: Runoff Area=1.890 ac 0.00% Impervious Runoff Depth>0.96"
Tc=13.3 min CN=90 Runoff=2.47 cfs 0.151 af

SubcatchmentE-4.B: Runoff Area=1.380 ac 0.00% Impervious Runoff Depth>0.96"
Tc=11.5 min CN=90 Runoff=1.91 cfs 0.110 af

Link 1L: WS Inflow=8.31 cfs 0.558 af
Primary=8.31 cfs 0.558 af

Link DP-1: Inflow=3.62 cfs 0.265 af
Primary=3.62 cfs 0.265 af

Link DP-2: Inflow=0.53 cfs 0.032 af
Primary=0.53 cfs 0.032 af

Link DP-3: Inflow=4.36 cfs 0.261 af
Primary=4.36 cfs 0.261 af

Total Runoff Area = 9.140 ac Runoff Volume = 0.558 af Average Runoff Depth = 0.73"
100.00% Pervious = 9.140 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E-1:

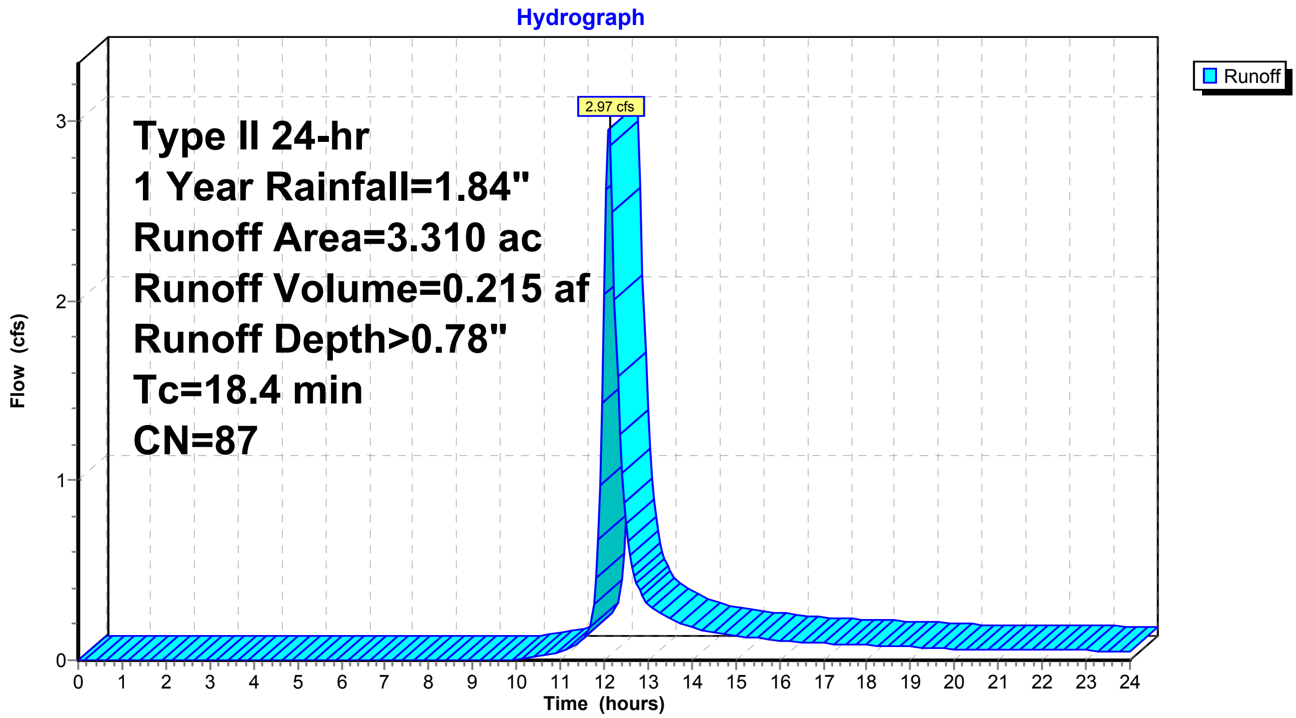
Runoff = 2.97 cfs @ 12.12 hrs, Volume= 0.215 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	3.310	87	
	3.310		100.00% Pervious Area

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

Subcatchment E-1:



Summary for Subcatchment E-2:

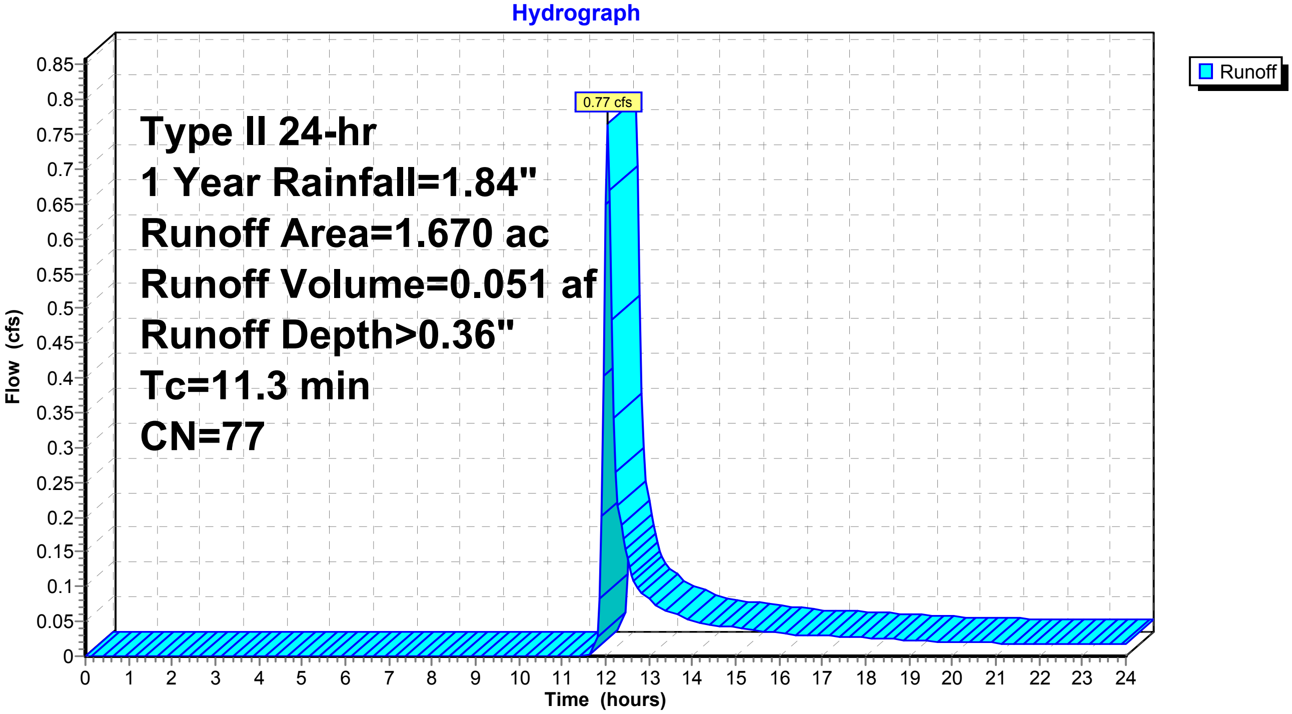
Runoff = 0.77 cfs @ 12.05 hrs, Volume= 0.051 af, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.670	77	
	1.670		100.00% Pervious Area

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

Subcatchment E-2:



Summary for Subcatchment E-3:

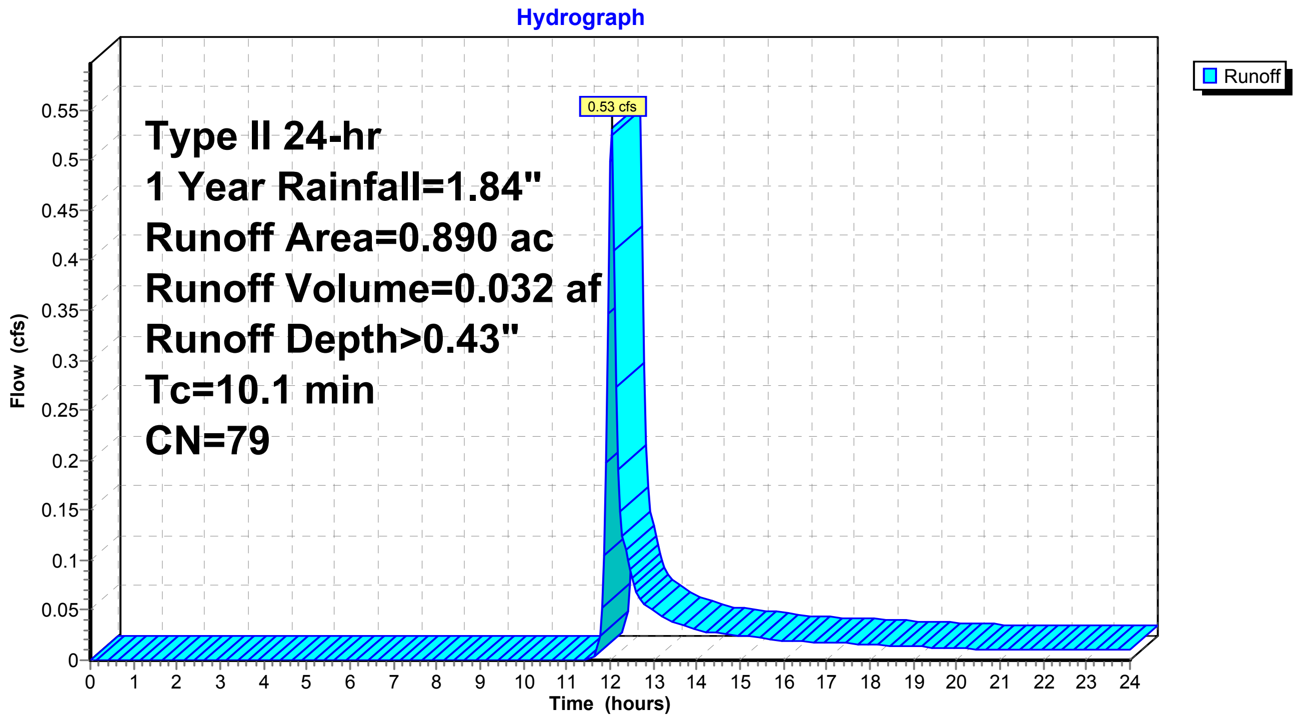
Runoff = 0.53 cfs @ 12.03 hrs, Volume= 0.032 af, Depth> 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	0.890	79	
	0.890		100.00% Pervious Area

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

Subcatchment E-3:



Summary for Subcatchment E-4.A:

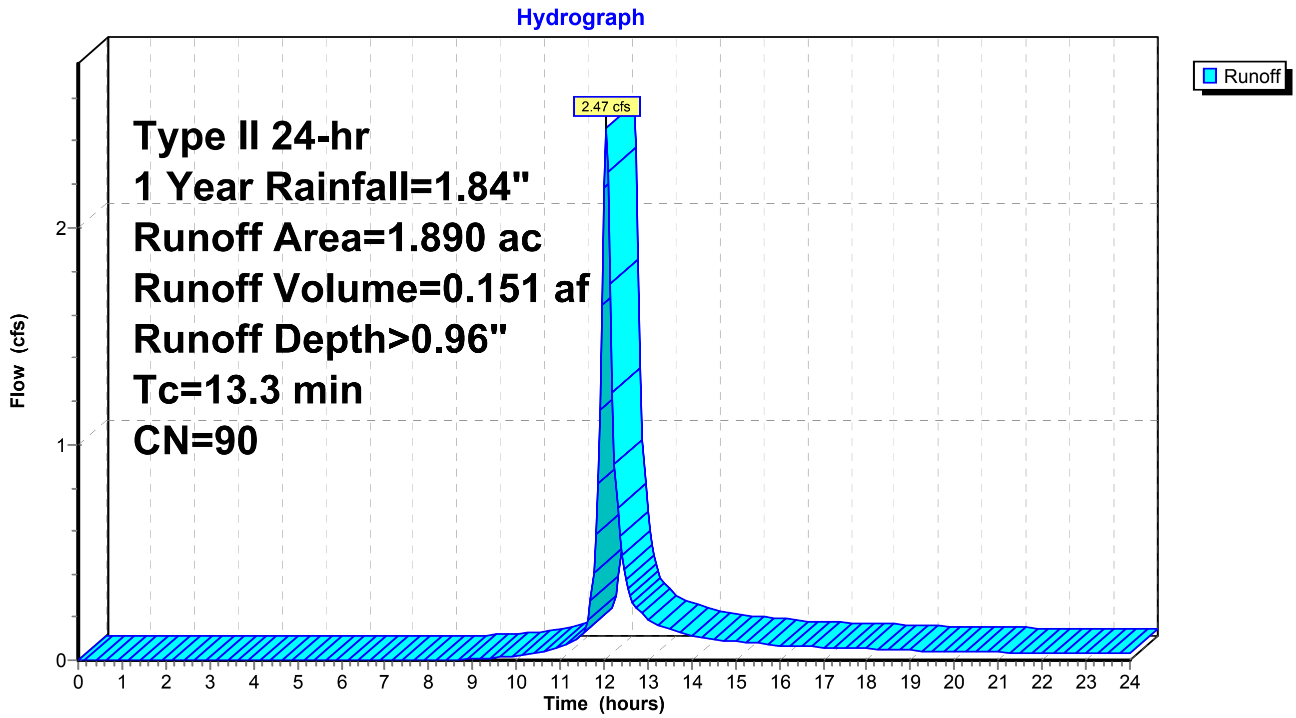
Runoff = 2.47 cfs @ 12.05 hrs, Volume= 0.151 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.890	90	
	1.890		100.00% Pervious Area

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

Subcatchment E-4.A:



Summary for Subcatchment E-4.B:

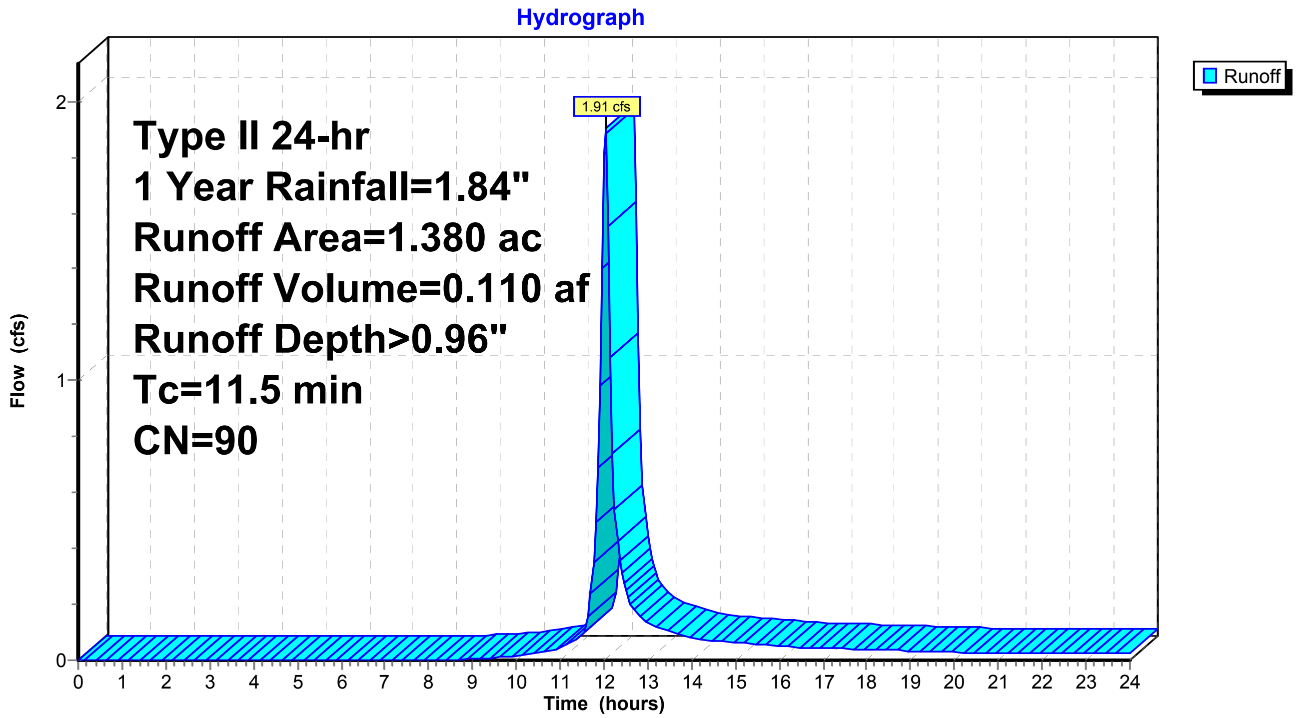
Runoff = 1.91 cfs @ 12.03 hrs, Volume= 0.110 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.380	90	
	1.380		100.00% Pervious Area

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

Subcatchment E-4.B:

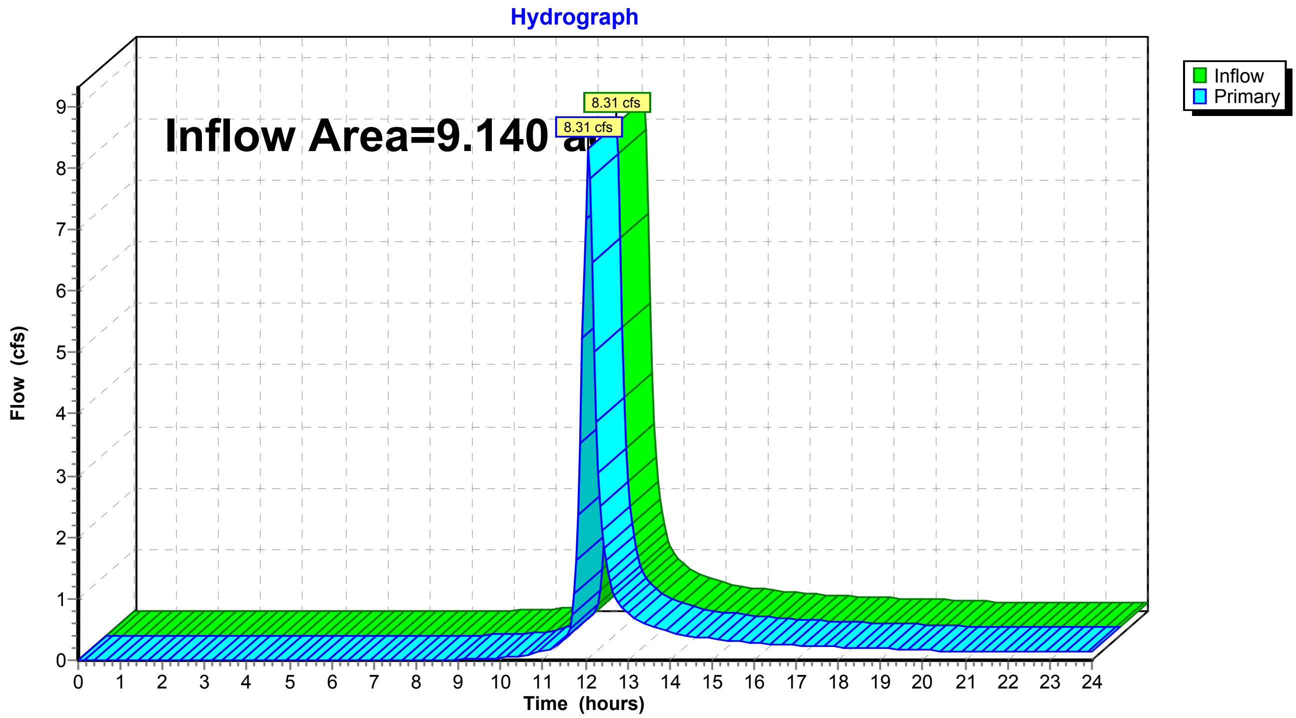


Summary for Link 1L: WS

Inflow Area = 9.140 ac, 0.00% Impervious, Inflow Depth > 0.73" for 1 Year event
Inflow = 8.31 cfs @ 12.06 hrs, Volume= 0.558 af
Primary = 8.31 cfs @ 12.06 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: WS

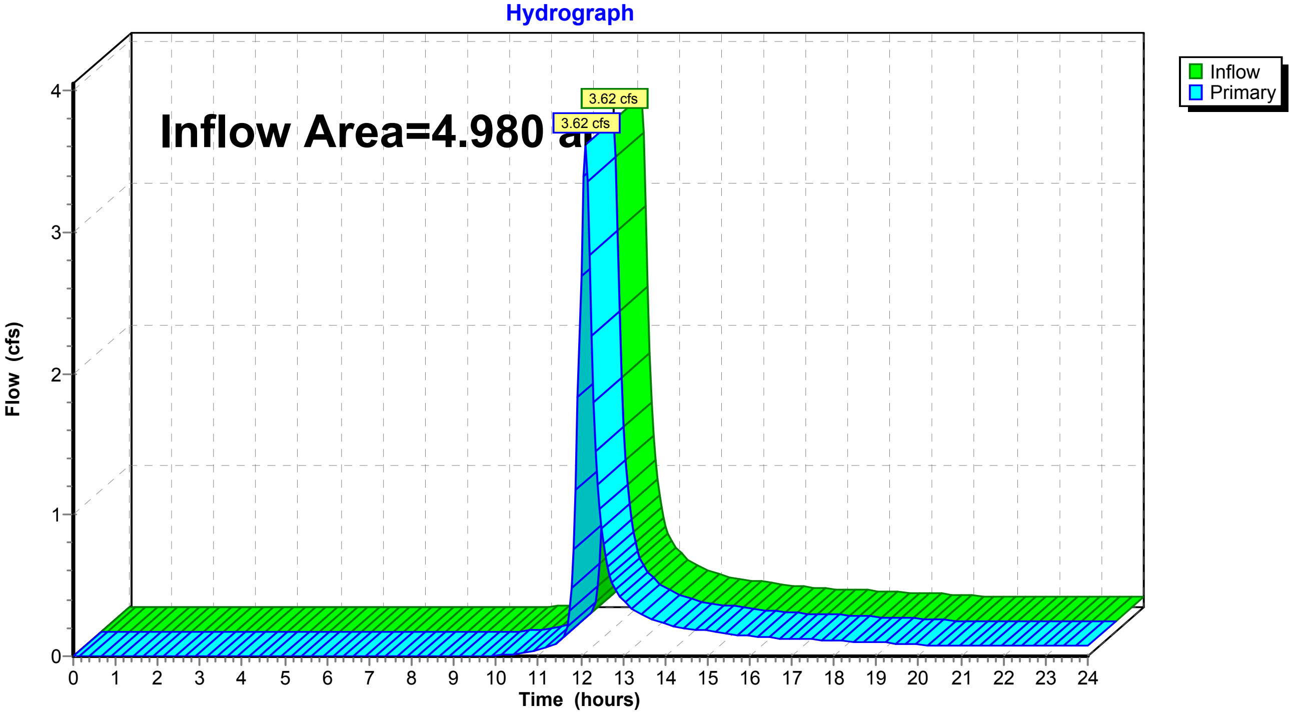


Summary for Link DP-1:

Inflow Area = 4.980 ac, 0.00% Impervious, Inflow Depth > 0.64" for 1 Year event
Inflow = 3.62 cfs @ 12.10 hrs, Volume= 0.265 af
Primary = 3.62 cfs @ 12.10 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

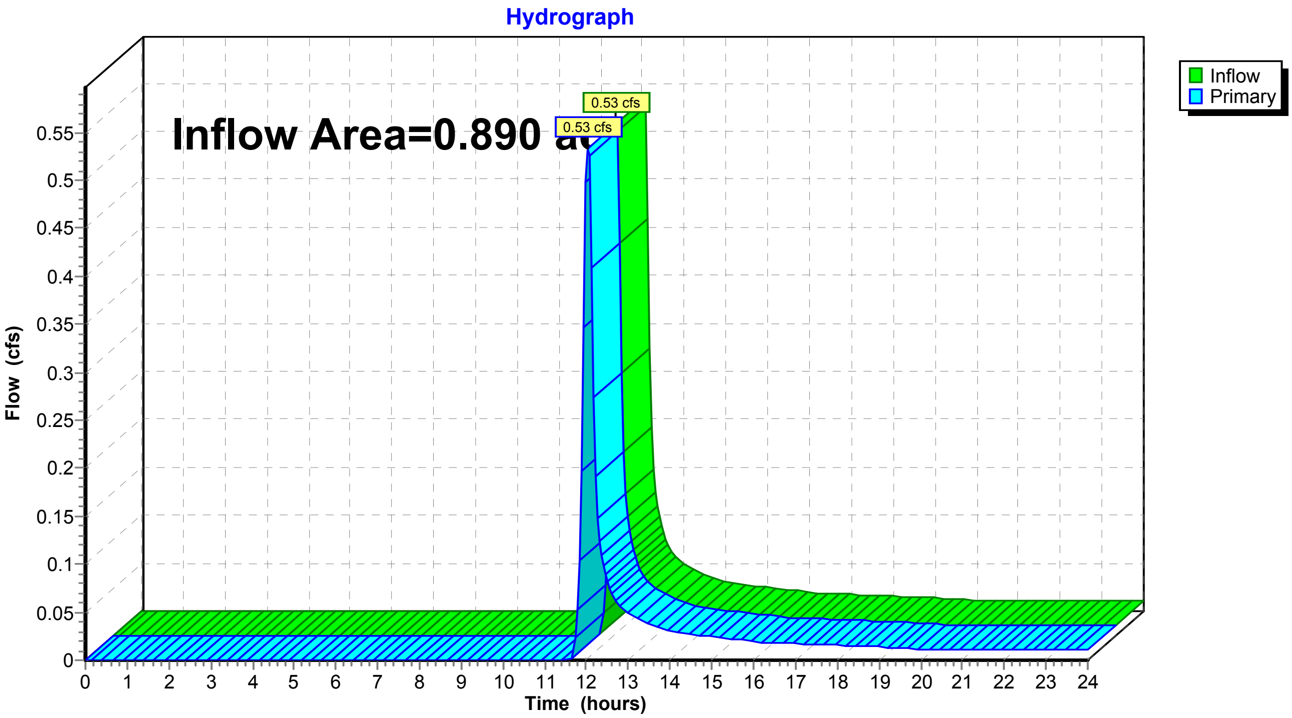


Summary for Link DP-2:

Inflow Area = 0.890 ac, 0.00% Impervious, Inflow Depth > 0.43" for 1 Year event
Inflow = 0.53 cfs @ 12.03 hrs, Volume= 0.032 af
Primary = 0.53 cfs @ 12.03 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

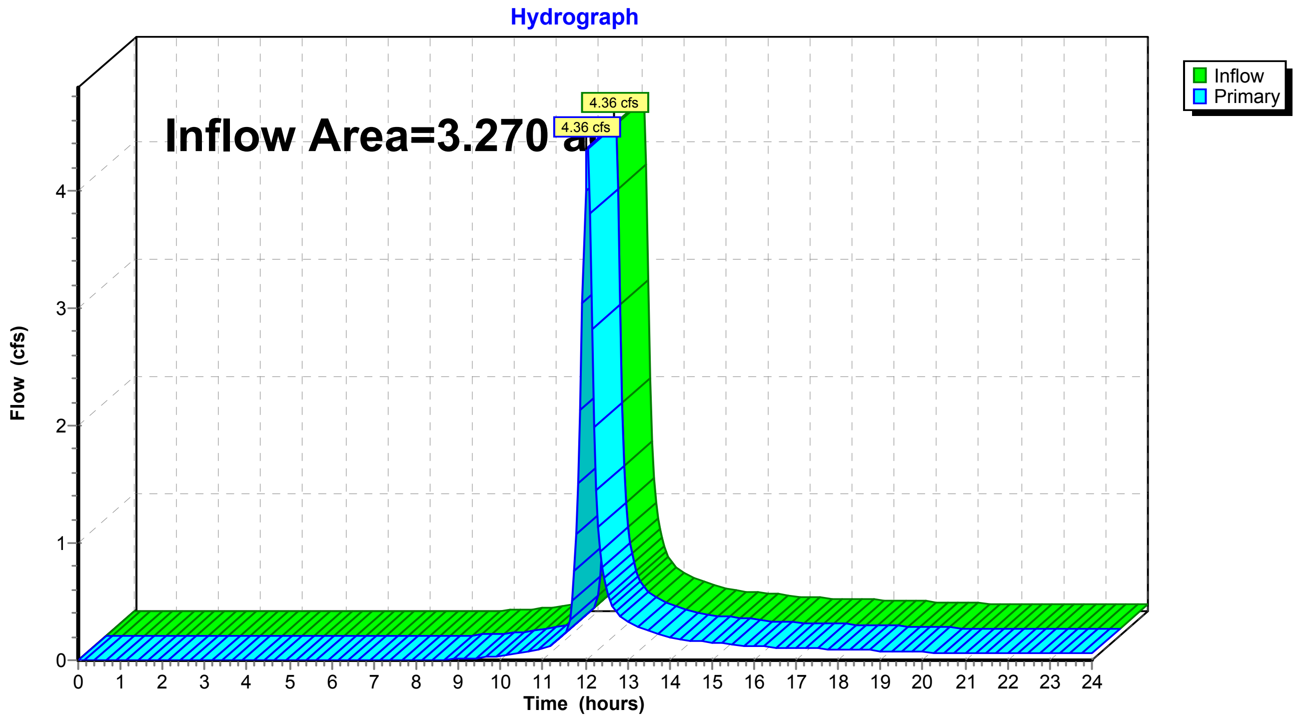


Summary for Link DP-3:

Inflow Area = 3.270 ac, 0.00% Impervious, Inflow Depth > 0.96" for 1 Year event
Inflow = 4.36 cfs @ 12.04 hrs, Volume= 0.261 af
Primary = 4.36 cfs @ 12.04 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=3.310 ac 0.00% Impervious Runoff Depth>1.02"
Tc=18.4 min CN=87 Runoff=3.92 cfs 0.281 af

SubcatchmentE-2: Runoff Area=1.670 ac 0.00% Impervious Runoff Depth>0.53"
Tc=11.3 min CN=77 Runoff=1.19 cfs 0.074 af

SubcatchmentE-3: Runoff Area=0.890 ac 0.00% Impervious Runoff Depth>0.61"
Tc=10.1 min CN=79 Runoff=0.79 cfs 0.045 af

SubcatchmentE-4.A: Runoff Area=1.890 ac 0.00% Impervious Runoff Depth>1.22"
Tc=13.3 min CN=90 Runoff=3.14 cfs 0.192 af

SubcatchmentE-4.B: Runoff Area=1.380 ac 0.00% Impervious Runoff Depth>1.22"
Tc=11.5 min CN=90 Runoff=2.43 cfs 0.140 af

Link 1L: WS Inflow=11.03 cfs 0.732 af
Primary=11.03 cfs 0.732 af

Link DP-1: Inflow=4.93 cfs 0.355 af
Primary=4.93 cfs 0.355 af

Link DP-2: Inflow=0.79 cfs 0.045 af
Primary=0.79 cfs 0.045 af

Link DP-3: Inflow=5.54 cfs 0.332 af
Primary=5.54 cfs 0.332 af

Total Runoff Area = 9.140 ac Runoff Volume = 0.732 af Average Runoff Depth = 0.96"
100.00% Pervious = 9.140 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E-1:

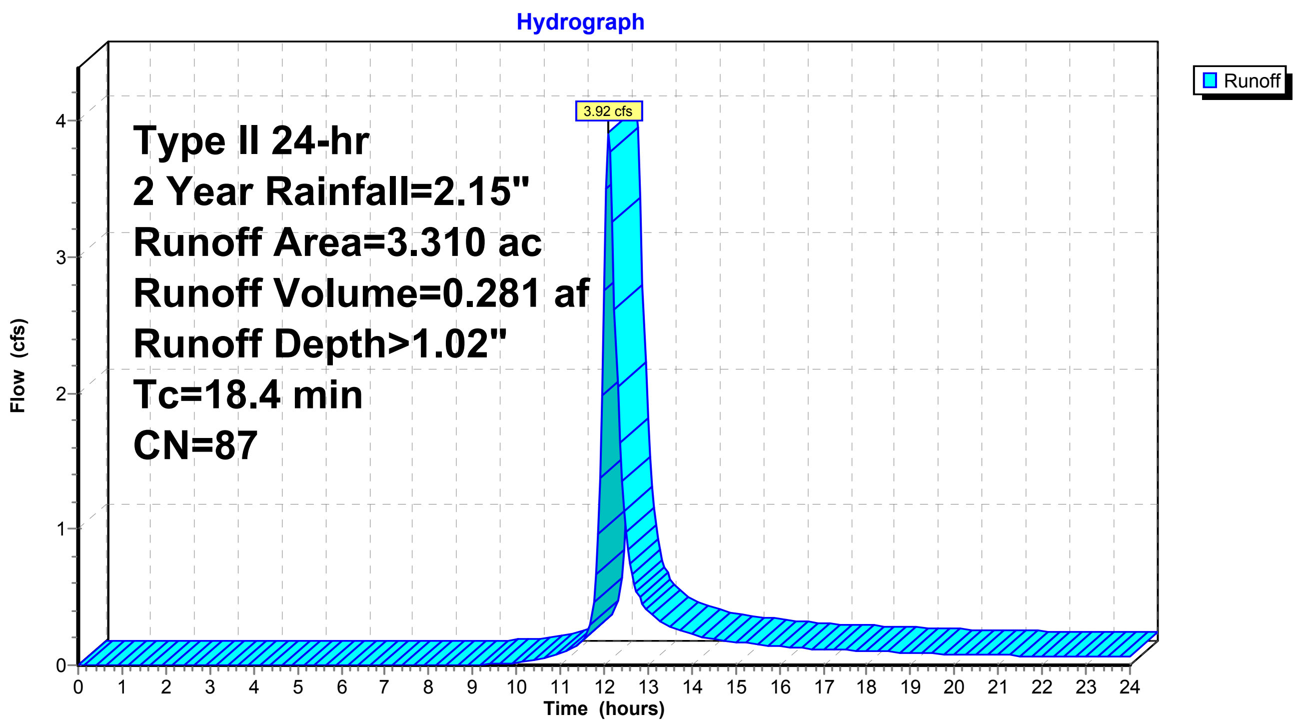
Runoff = 3.92 cfs @ 12.11 hrs, Volume= 0.281 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	3.310	87	
	3.310		100.00% Pervious Area

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

Subcatchment E-1:



Summary for Subcatchment E-2:

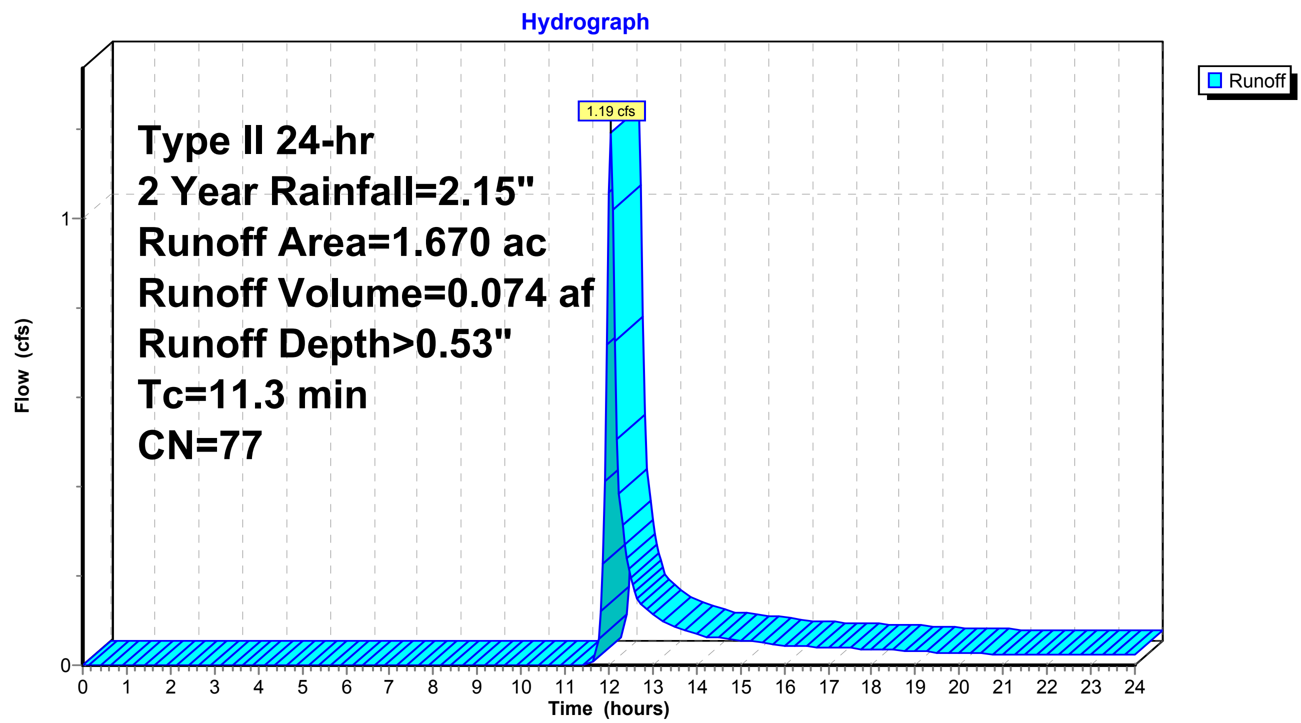
Runoff = 1.19 cfs @ 12.05 hrs, Volume= 0.074 af, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.670	77	
	1.670		100.00% Pervious Area

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

Subcatchment E-2:



Summary for Subcatchment E-3:

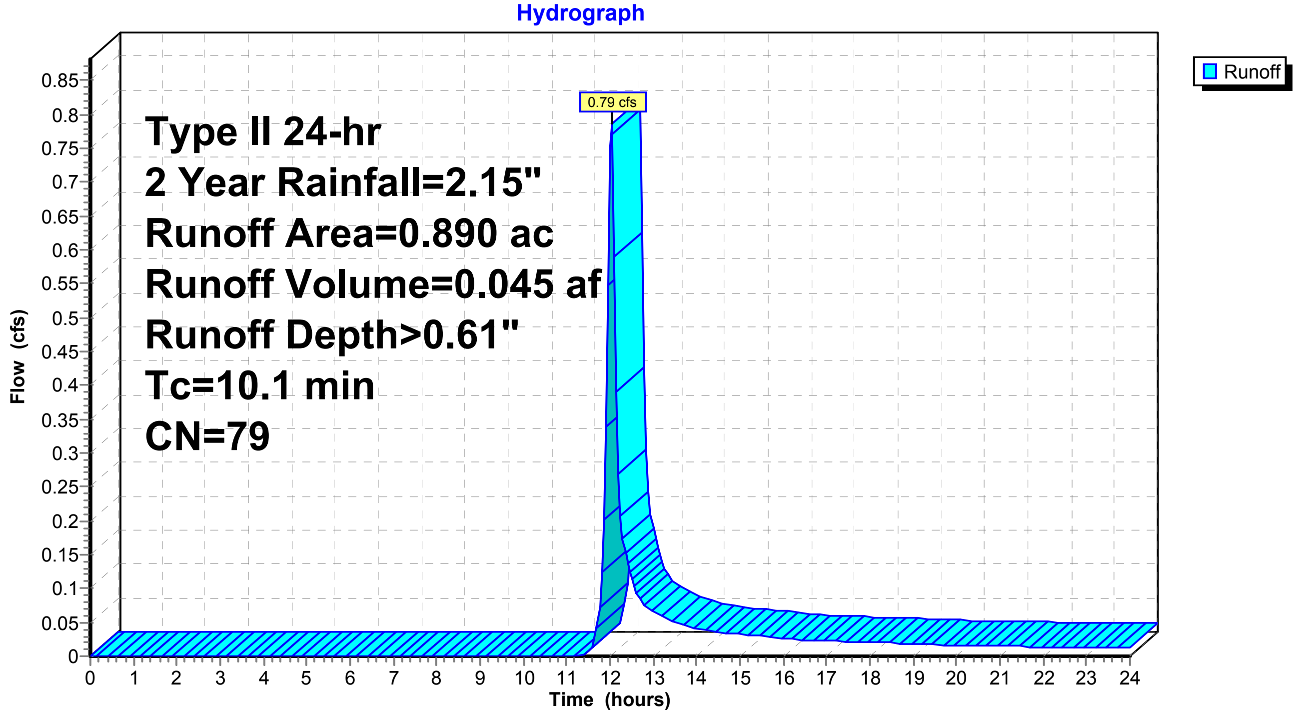
Runoff = 0.79 cfs @ 12.03 hrs, Volume= 0.045 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	0.890	79	
	0.890		100.00% Pervious Area

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

Subcatchment E-3:



Summary for Subcatchment E-4.A:

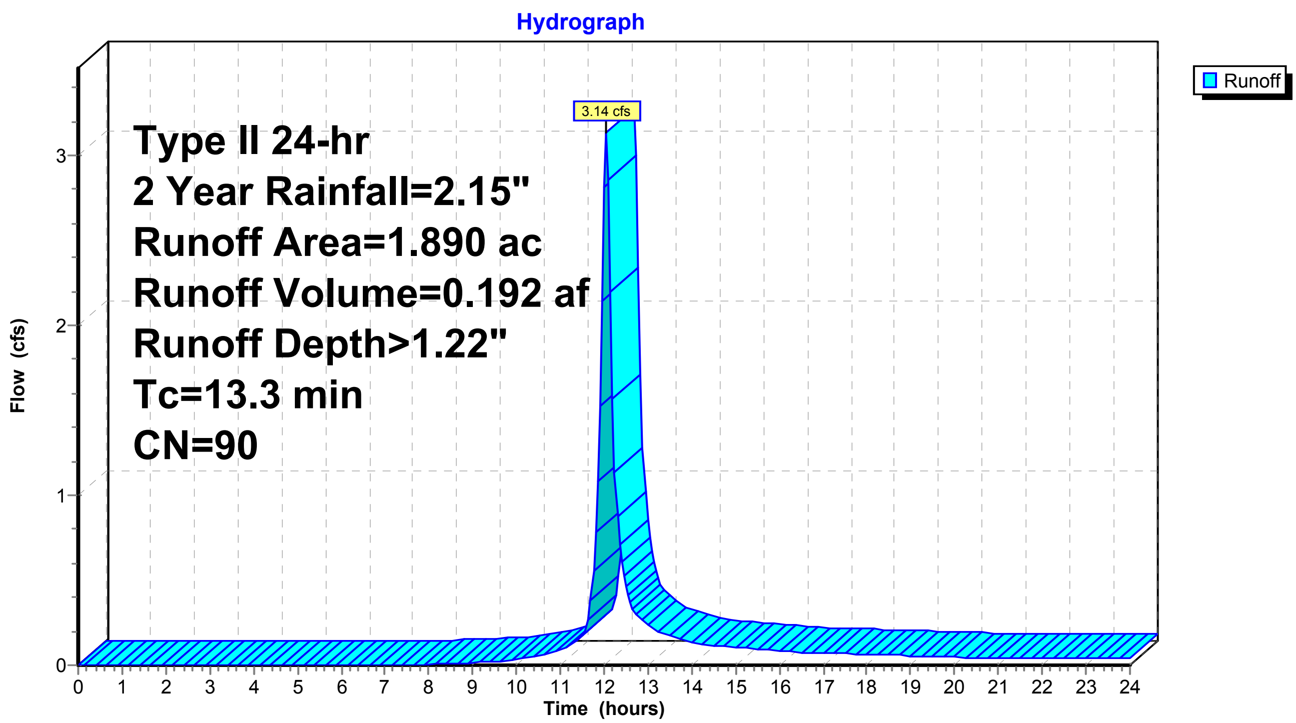
Runoff = 3.14 cfs @ 12.05 hrs, Volume= 0.192 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.890	90	
	1.890		100.00% Pervious Area

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

Subcatchment E-4.A:



Summary for Subcatchment E-4.B:

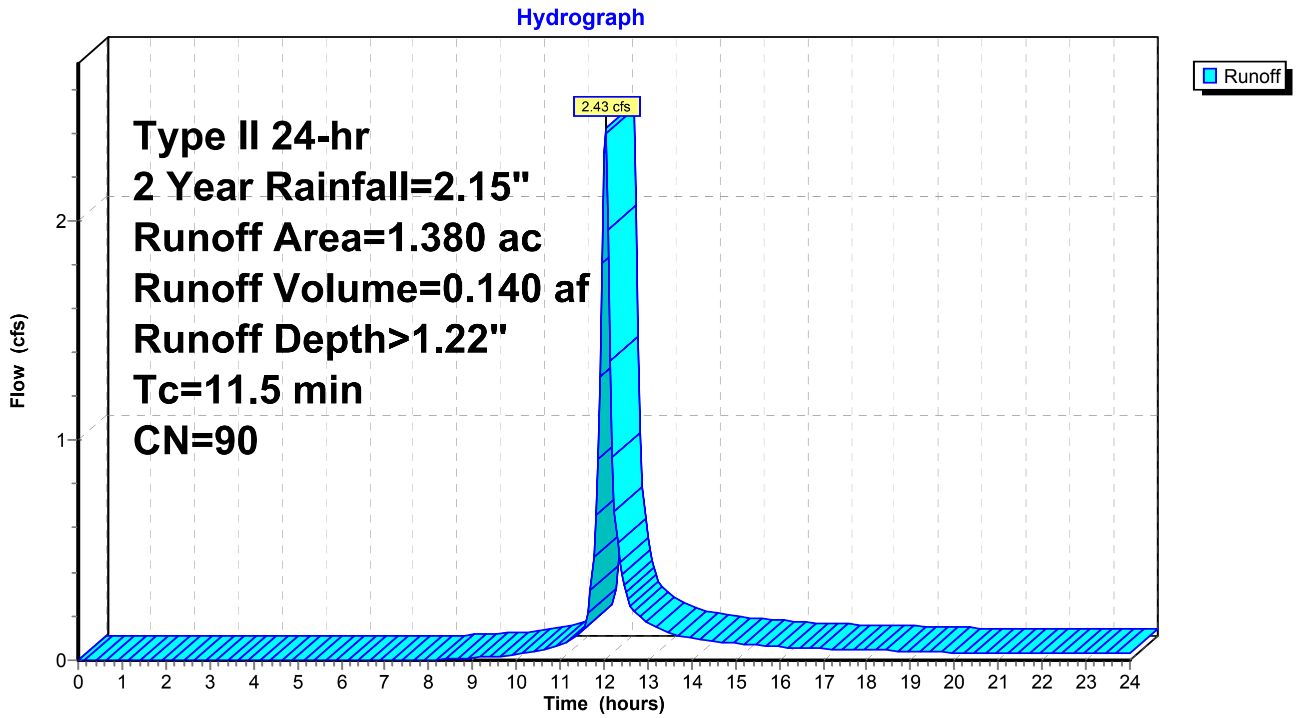
Runoff = 2.43 cfs @ 12.03 hrs, Volume= 0.140 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.380	90	
	1.380		100.00% Pervious Area

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

Subcatchment E-4.B:

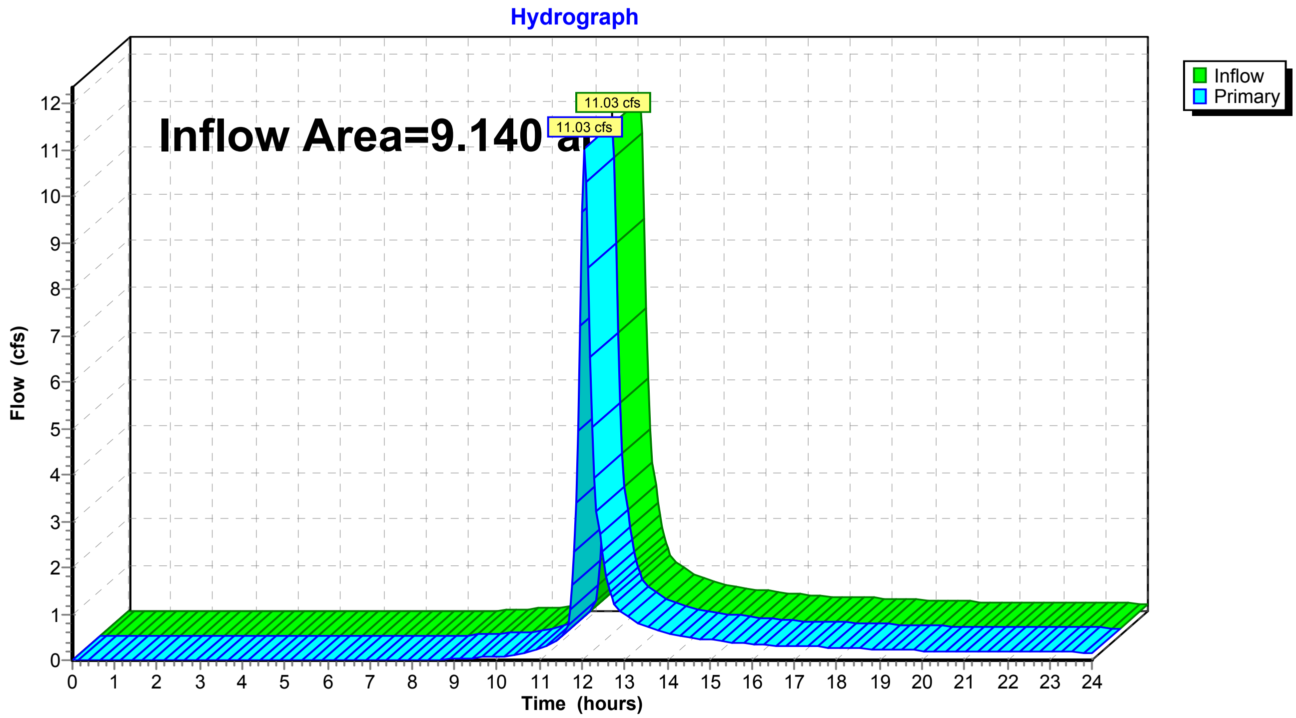


Summary for Link 1L: WS

Inflow Area = 9.140 ac, 0.00% Impervious, Inflow Depth > 0.96" for 2 Year event
Inflow = 11.03 cfs @ 12.06 hrs, Volume= 0.732 af
Primary = 11.03 cfs @ 12.06 hrs, Volume= 0.732 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: WS

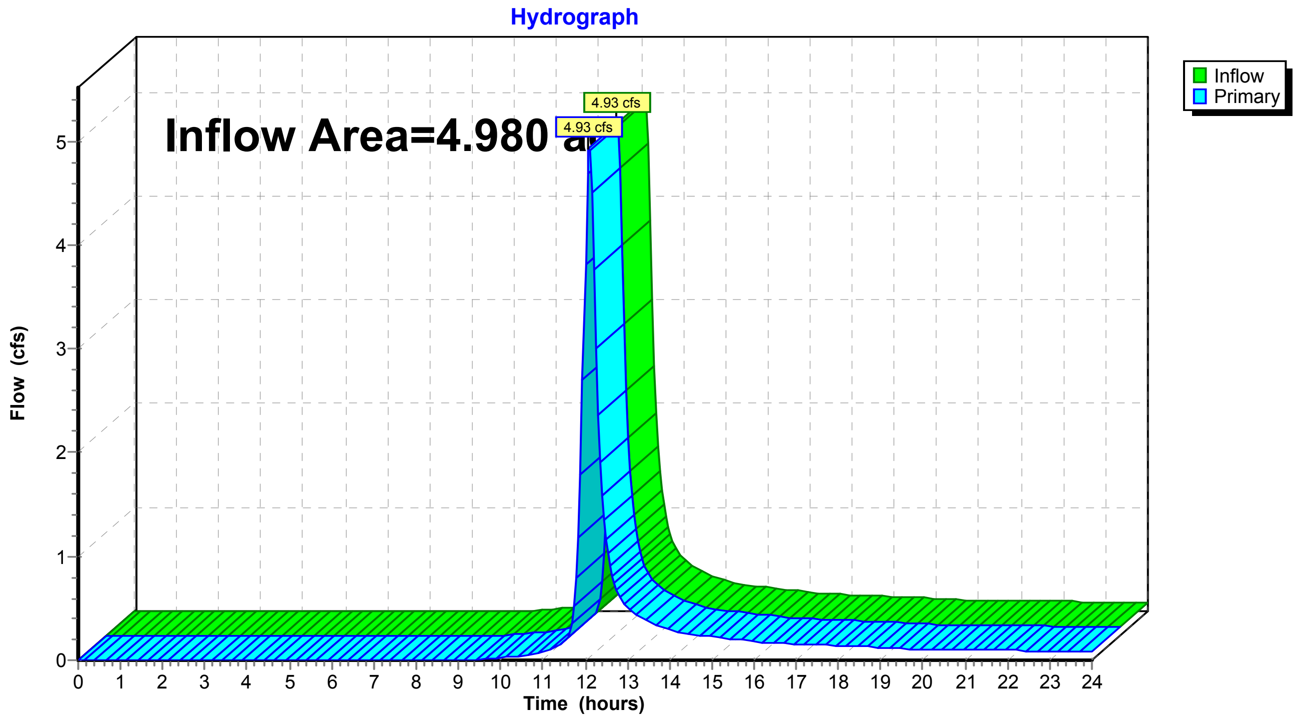


Summary for Link DP-1:

Inflow Area = 4.980 ac, 0.00% Impervious, Inflow Depth > 0.85" for 2 Year event
Inflow = 4.93 cfs @ 12.09 hrs, Volume= 0.355 af
Primary = 4.93 cfs @ 12.09 hrs, Volume= 0.355 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

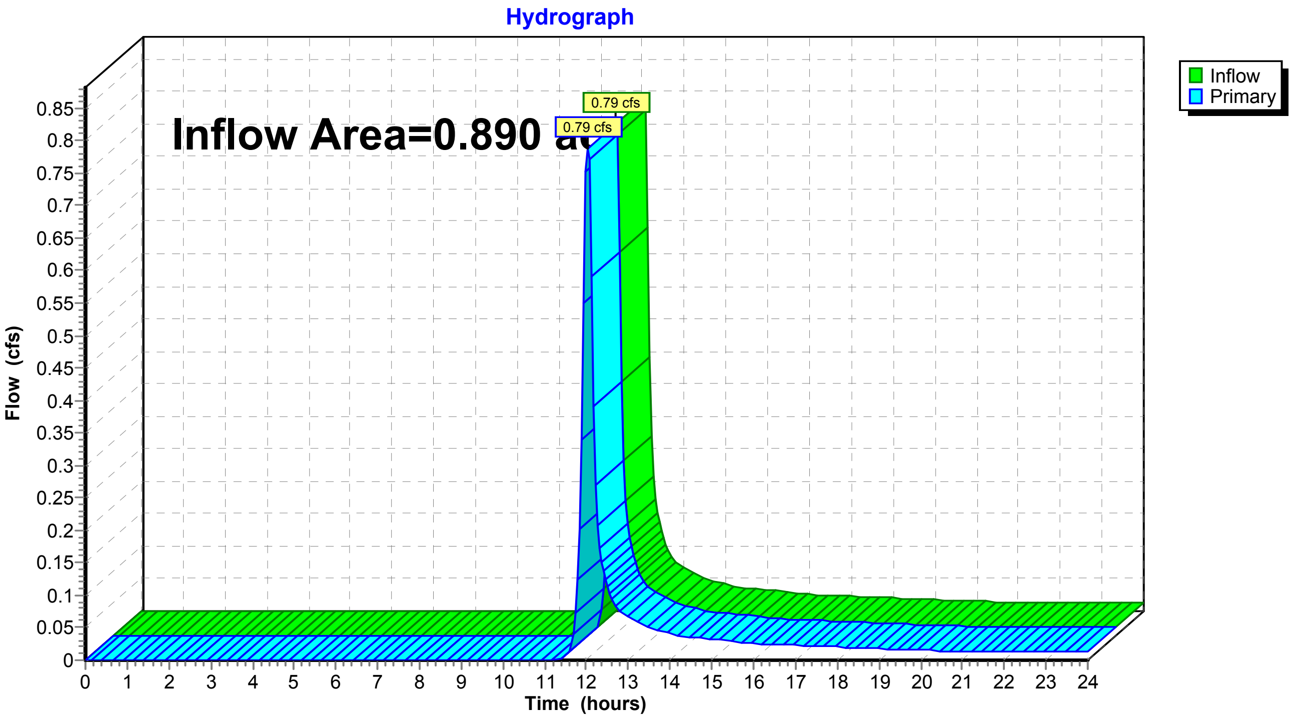


Summary for Link DP-2:

Inflow Area =	0.890 ac,	0.00% Impervious,	Inflow Depth > 0.61"	for 2 Year event
Inflow =	0.79 cfs @	12.03 hrs, Volume=	0.045 af	
Primary =	0.79 cfs @	12.03 hrs, Volume=	0.045 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

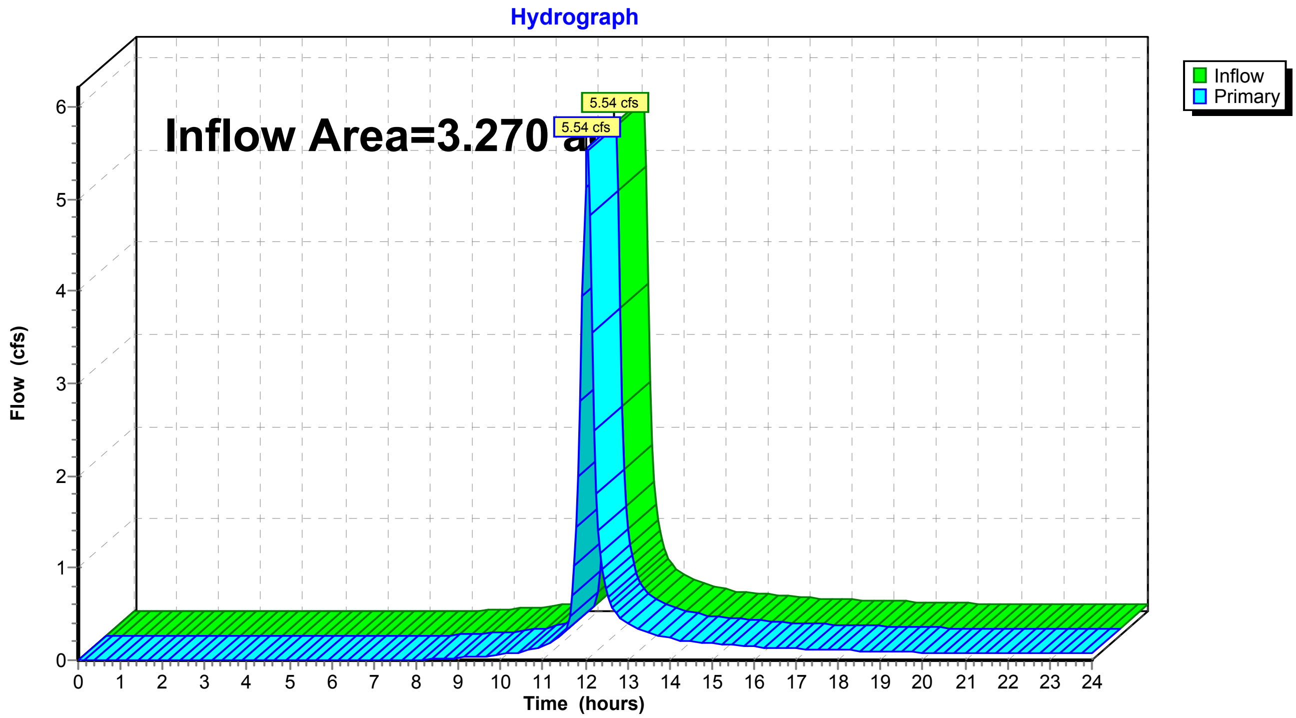


Summary for Link DP-3:

Inflow Area = 3.270 ac, 0.00% Impervious, Inflow Depth > 1.22" for 2 Year event
Inflow = 5.54 cfs @ 12.04 hrs, Volume= 0.332 af
Primary = 5.54 cfs @ 12.04 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=3.310 ac 0.00% Impervious Runoff Depth>1.81"
Tc=18.4 min CN=87 Runoff=6.97 cfs 0.499 af

SubcatchmentE-2: Runoff Area=1.670 ac 0.00% Impervious Runoff Depth>1.13"
Tc=11.3 min CN=77 Runoff=2.71 cfs 0.157 af

SubcatchmentE-3: Runoff Area=0.890 ac 0.00% Impervious Runoff Depth>1.25"
Tc=10.1 min CN=79 Runoff=1.68 cfs 0.093 af

SubcatchmentE-4.A: Runoff Area=1.890 ac 0.00% Impervious Runoff Depth>2.06"
Tc=13.3 min CN=90 Runoff=5.23 cfs 0.325 af

SubcatchmentE-4.B: Runoff Area=1.380 ac 0.00% Impervious Runoff Depth>2.06"
Tc=11.5 min CN=90 Runoff=4.03 cfs 0.237 af

Link 1L: WS Inflow=19.88 cfs 1.311 af
Primary=19.88 cfs 1.311 af

Link DP-1: Inflow=9.27 cfs 0.657 af
Primary=9.27 cfs 0.657 af

Link DP-2: Inflow=1.68 cfs 0.093 af
Primary=1.68 cfs 0.093 af

Link DP-3: Inflow=9.23 cfs 0.562 af
Primary=9.23 cfs 0.562 af

Total Runoff Area = 9.140 ac Runoff Volume = 1.311 af Average Runoff Depth = 1.72"
100.00% Pervious = 9.140 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E-1:

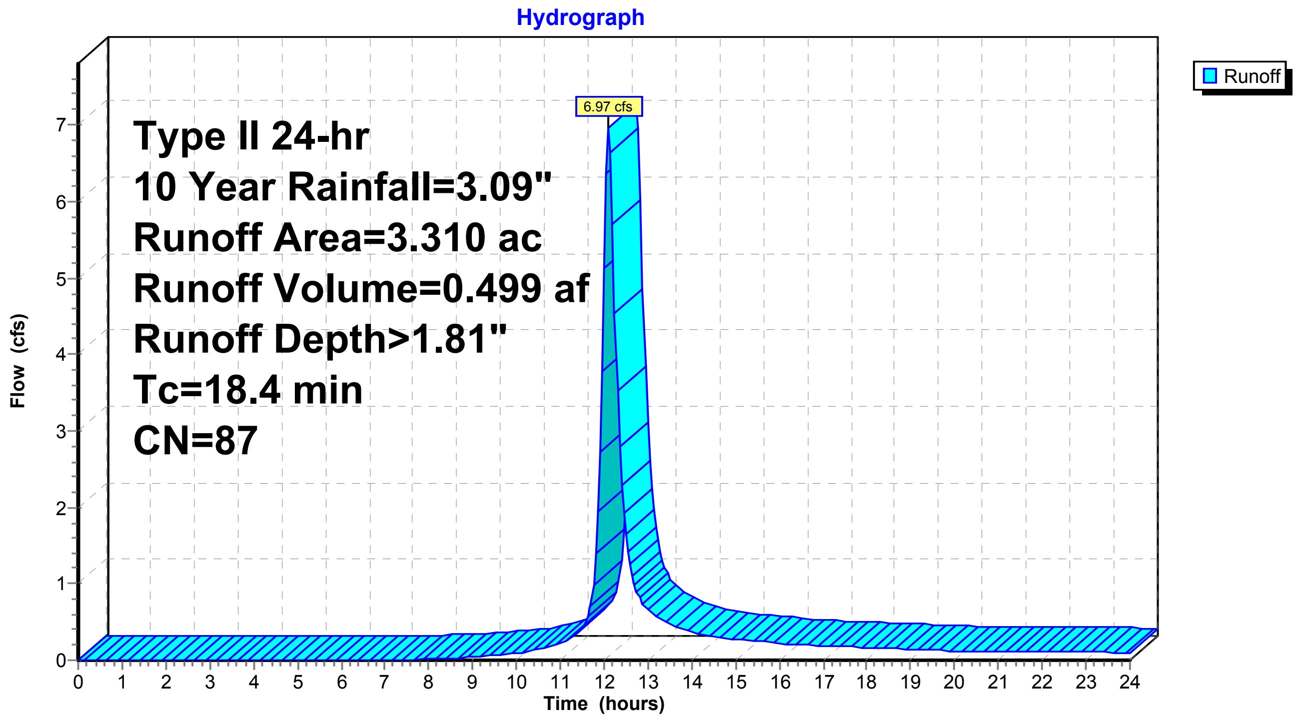
Runoff = 6.97 cfs @ 12.11 hrs, Volume= 0.499 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	3.310	87	
	3.310		100.00% Pervious Area

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

Subcatchment E-1:



Summary for Subcatchment E-2:

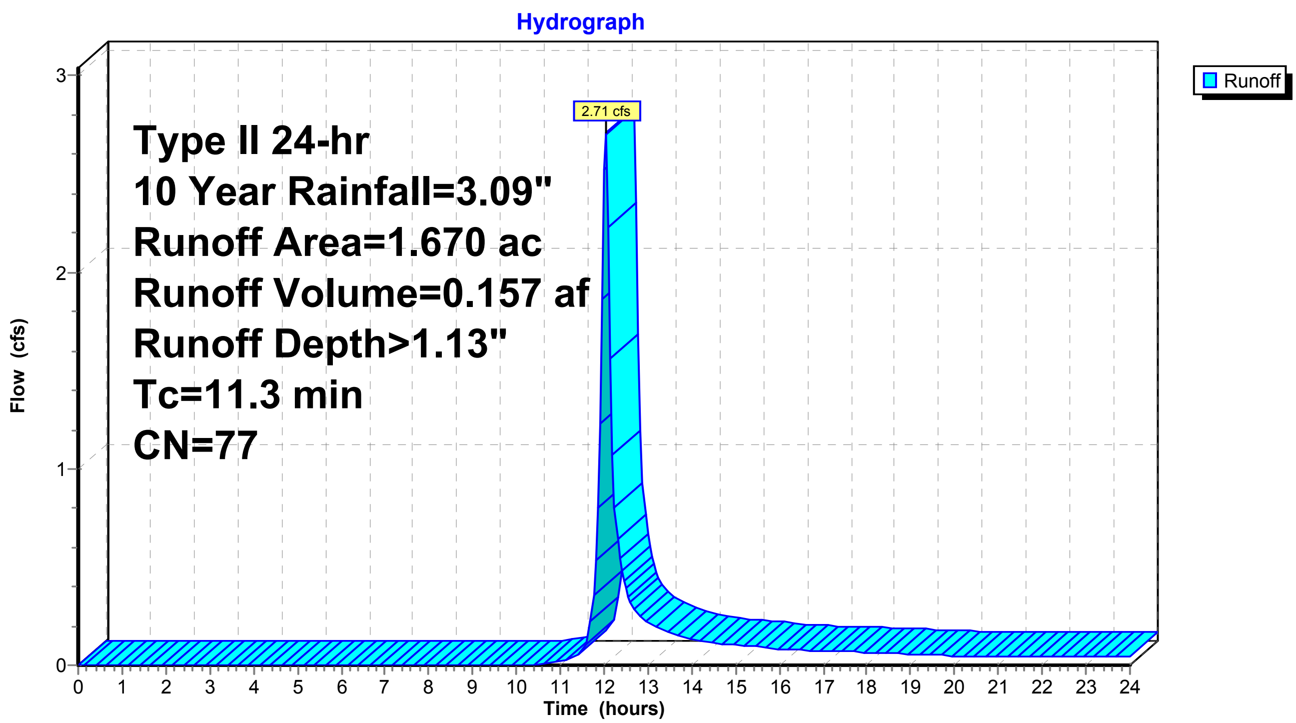
Runoff = 2.71 cfs @ 12.04 hrs, Volume= 0.157 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.670	77	
	1.670		100.00% Pervious Area

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

Subcatchment E-2:



Summary for Subcatchment E-3:

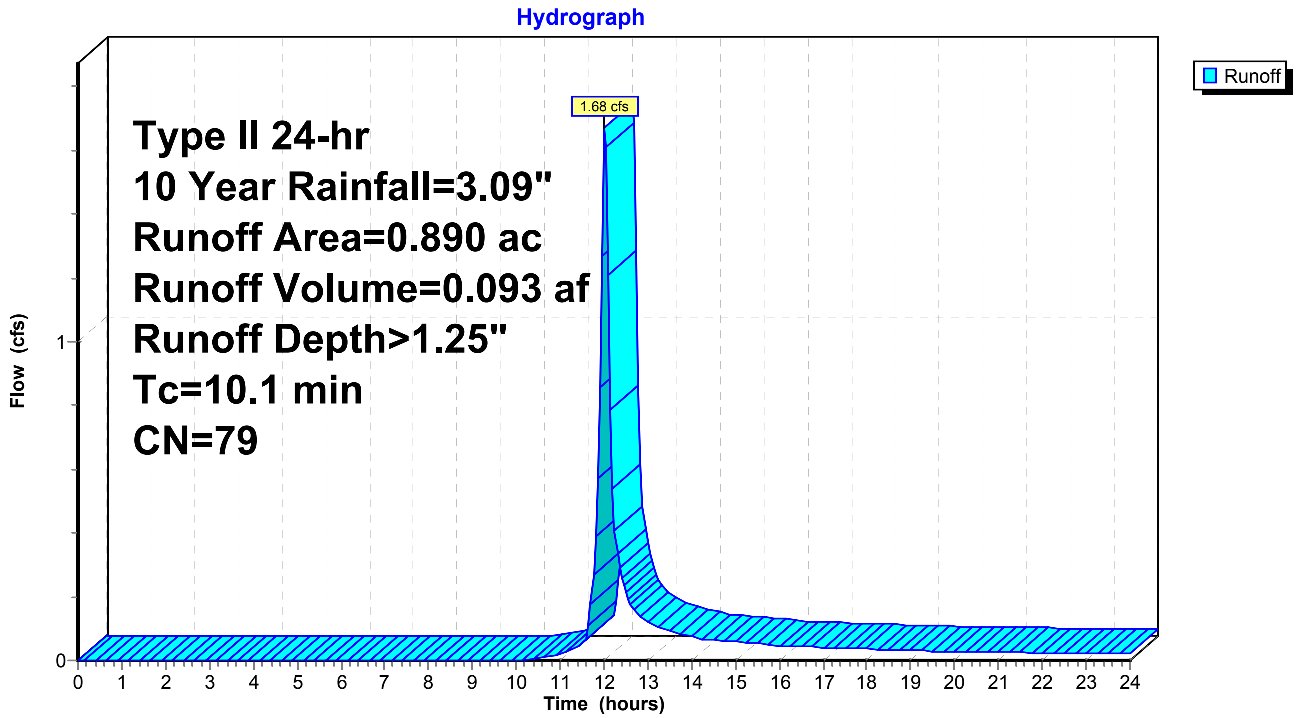
Runoff = 1.68 cfs @ 12.02 hrs, Volume= 0.093 af, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	0.890	79	
	0.890		100.00% Pervious Area

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

Subcatchment E-3:



Summary for Subcatchment E-4.A:

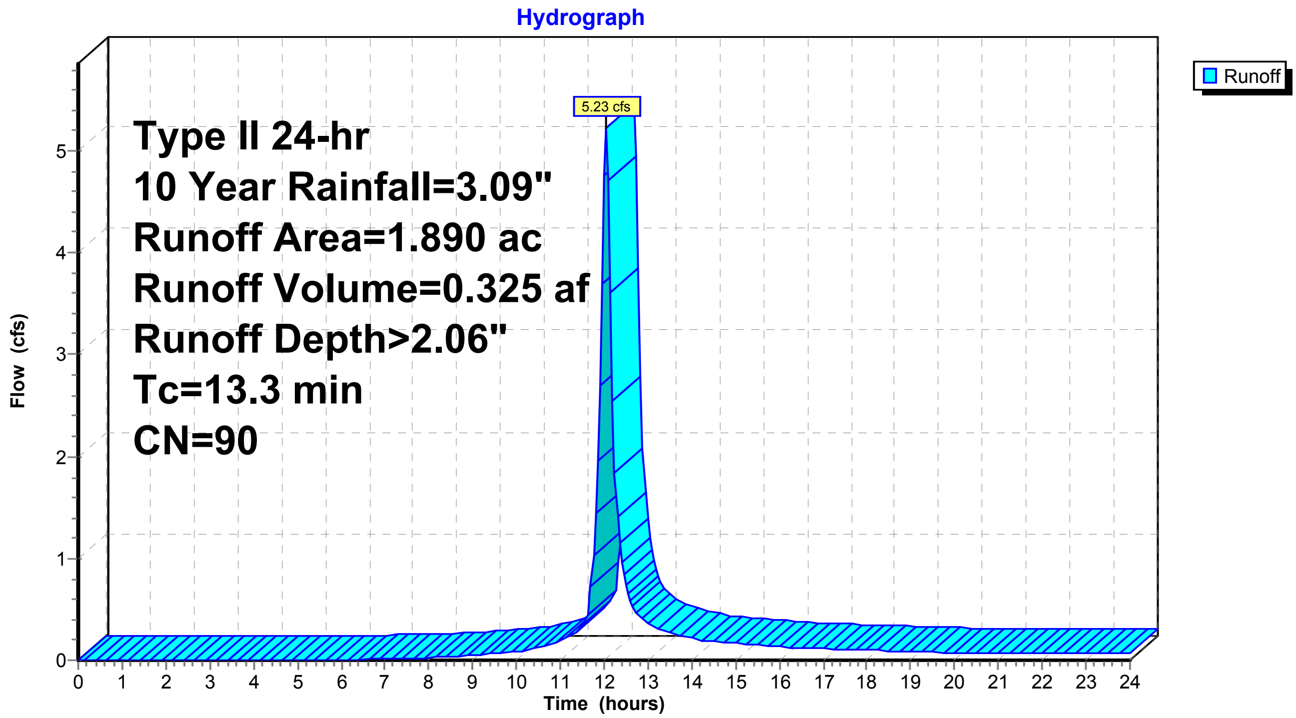
Runoff = 5.23 cfs @ 12.05 hrs, Volume= 0.325 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.890	90	
	1.890		100.00% Pervious Area

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

Subcatchment E-4.A:



Summary for Subcatchment E-4.B:

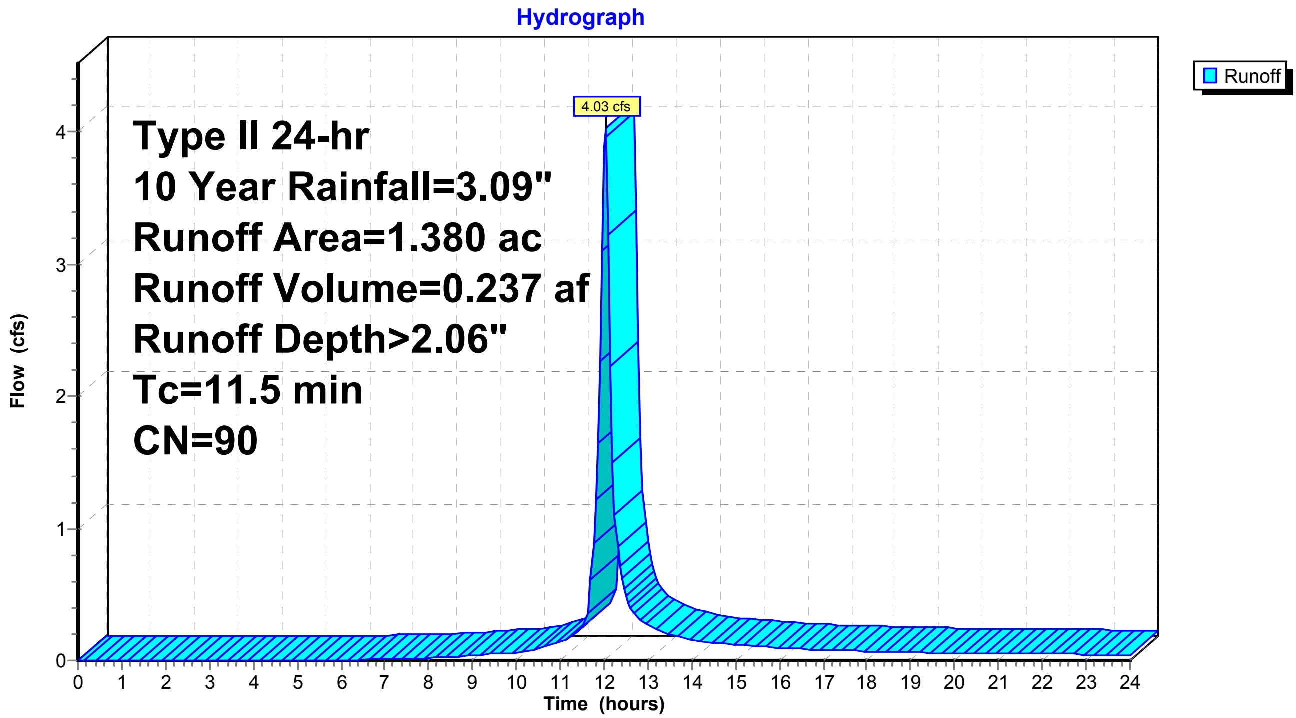
Runoff = 4.03 cfs @ 12.03 hrs, Volume= 0.237 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.380	90	
	1.380		100.00% Pervious Area

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

Subcatchment E-4.B:

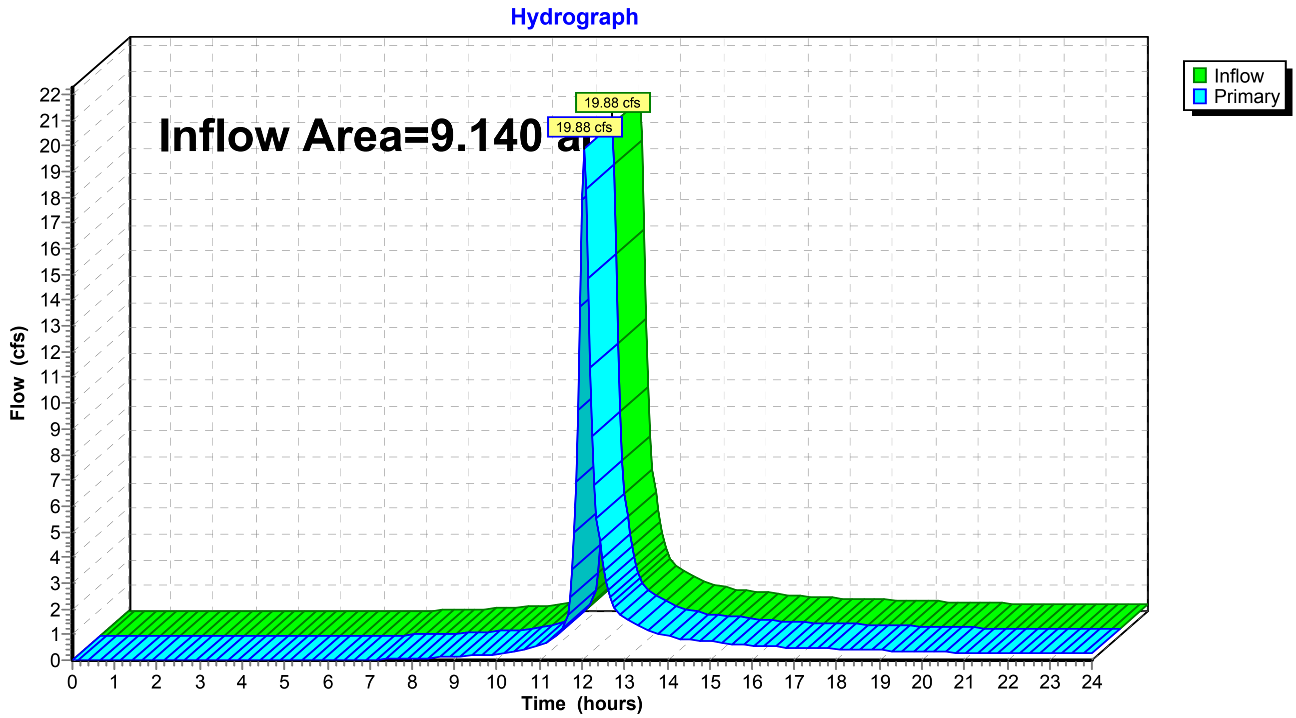


Summary for Link 1L: WS

Inflow Area = 9.140 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 Year event
Inflow = 19.88 cfs @ 12.05 hrs, Volume= 1.311 af
Primary = 19.88 cfs @ 12.05 hrs, Volume= 1.311 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: WS

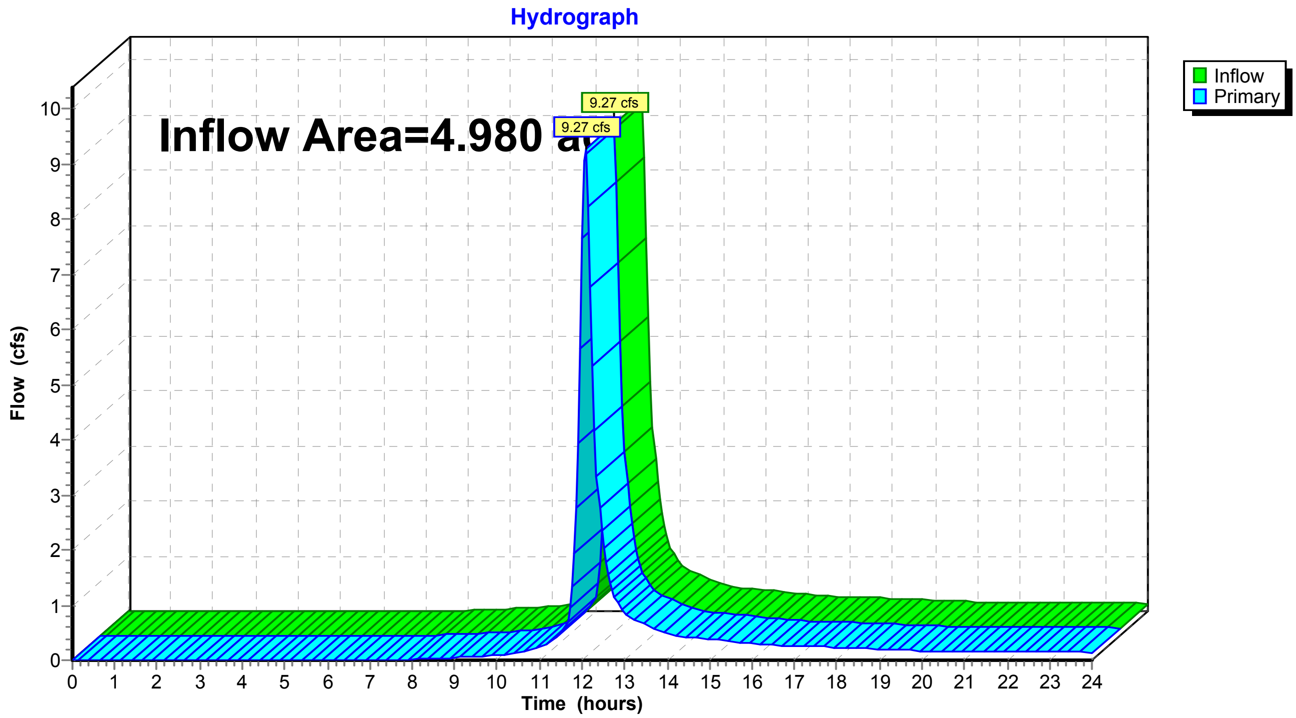


Summary for Link DP-1:

Inflow Area = 4.980 ac, 0.00% Impervious, Inflow Depth > 1.58" for 10 Year event
Inflow = 9.27 cfs @ 12.08 hrs, Volume= 0.657 af
Primary = 9.27 cfs @ 12.08 hrs, Volume= 0.657 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

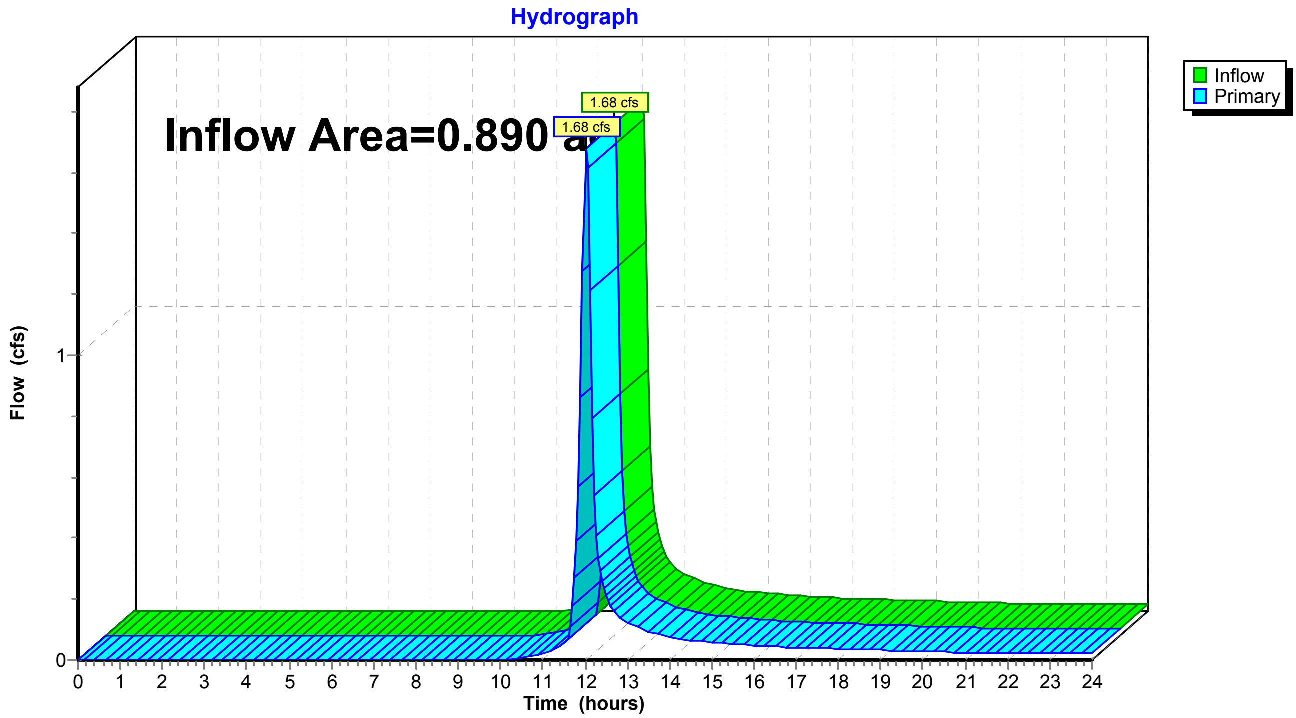


Summary for Link DP-2:

Inflow Area =	0.890 ac,	0.00% Impervious,	Inflow Depth > 1.25"	for 10 Year event	
Inflow =	1.68 cfs @	12.02 hrs,	Volume=	0.093 af	
Primary =	1.68 cfs @	12.02 hrs,	Volume=	0.093 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

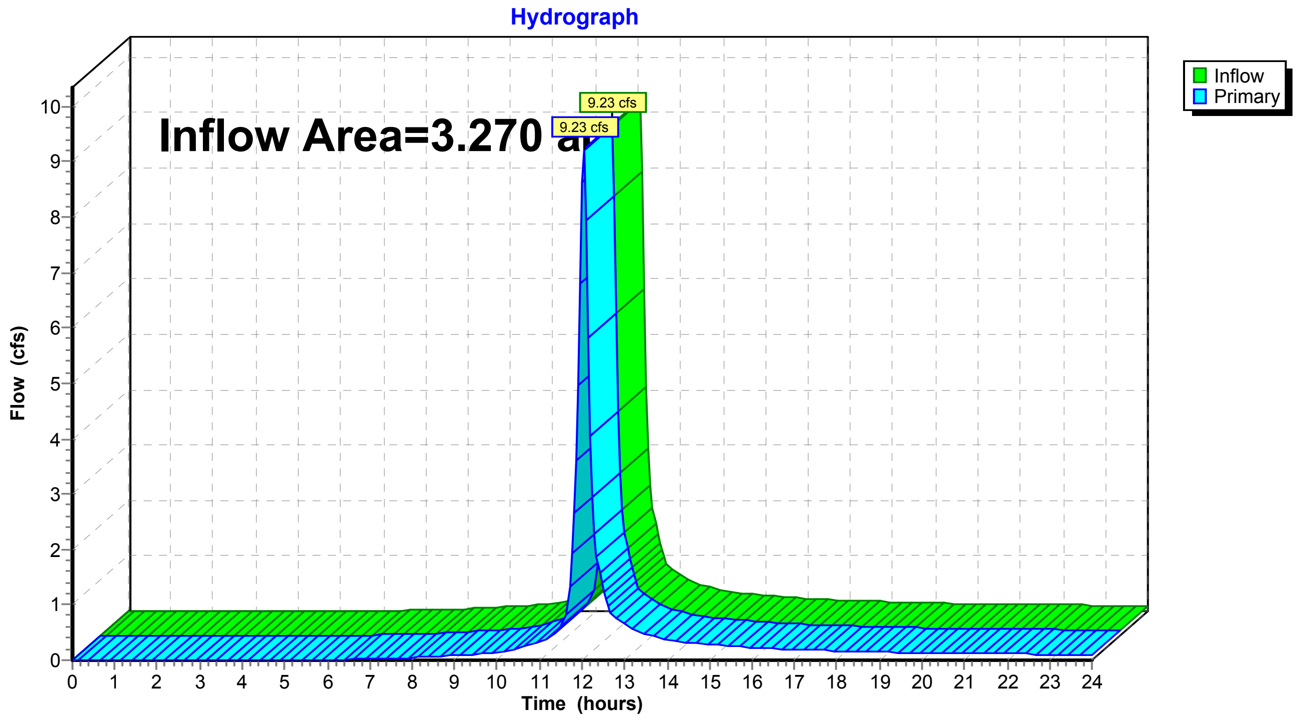


Summary for Link DP-3:

Inflow Area = 3.270 ac, 0.00% Impervious, Inflow Depth > 2.06" for 10 Year event
Inflow = 9.23 cfs @ 12.04 hrs, Volume= 0.562 af
Primary = 9.23 cfs @ 12.04 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE-1: Runoff Area=3.310 ac 0.00% Impervious Runoff Depth>3.75"
Tc=18.4 min CN=87 Runoff=14.17 cfs 1.035 af

SubcatchmentE-2: Runoff Area=1.670 ac 0.00% Impervious Runoff Depth>2.79"
Tc=11.3 min CN=77 Runoff=6.78 cfs 0.389 af

SubcatchmentE-3: Runoff Area=0.890 ac 0.00% Impervious Runoff Depth>2.98"
Tc=10.1 min CN=79 Runoff=3.99 cfs 0.221 af

SubcatchmentE-4.A: Runoff Area=1.890 ac 0.00% Impervious Runoff Depth>4.07"
Tc=13.3 min CN=90 Runoff=10.00 cfs 0.641 af

SubcatchmentE-4.B: Runoff Area=1.380 ac 0.00% Impervious Runoff Depth>4.07"
Tc=11.5 min CN=90 Runoff=7.69 cfs 0.468 af

Link 1L: WS Inflow=41.13 cfs 2.753 af
Primary=41.13 cfs 2.753 af

Link DP-1: Inflow=20.06 cfs 1.423 af
Primary=20.06 cfs 1.423 af

Link DP-2: Inflow=3.99 cfs 0.221 af
Primary=3.99 cfs 0.221 af

Link DP-3: Inflow=17.63 cfs 1.109 af
Primary=17.63 cfs 1.109 af

Total Runoff Area = 9.140 ac Runoff Volume = 2.753 af Average Runoff Depth = 3.61"
100.00% Pervious = 9.140 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E-1:

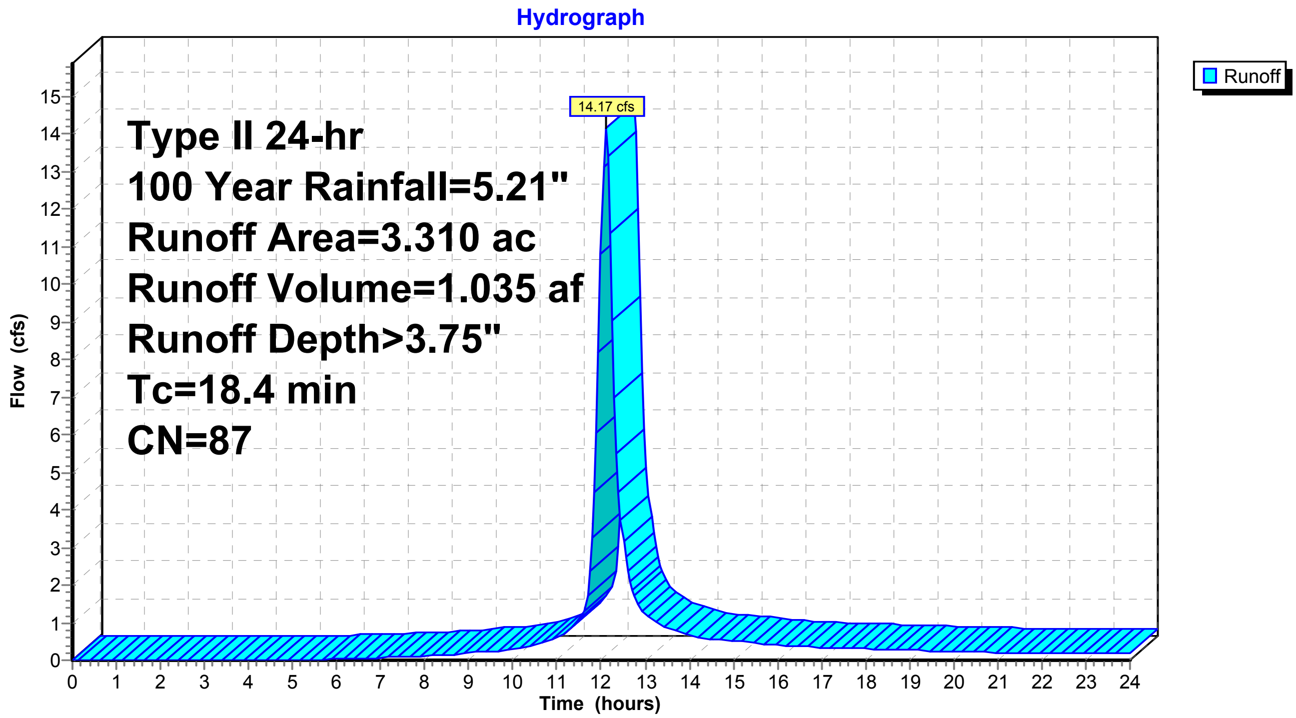
Runoff = 14.17 cfs @ 12.10 hrs, Volume= 1.035 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	3.310	87	
	3.310		100.00% Pervious Area

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

Subcatchment E-1:



Summary for Subcatchment E-2:

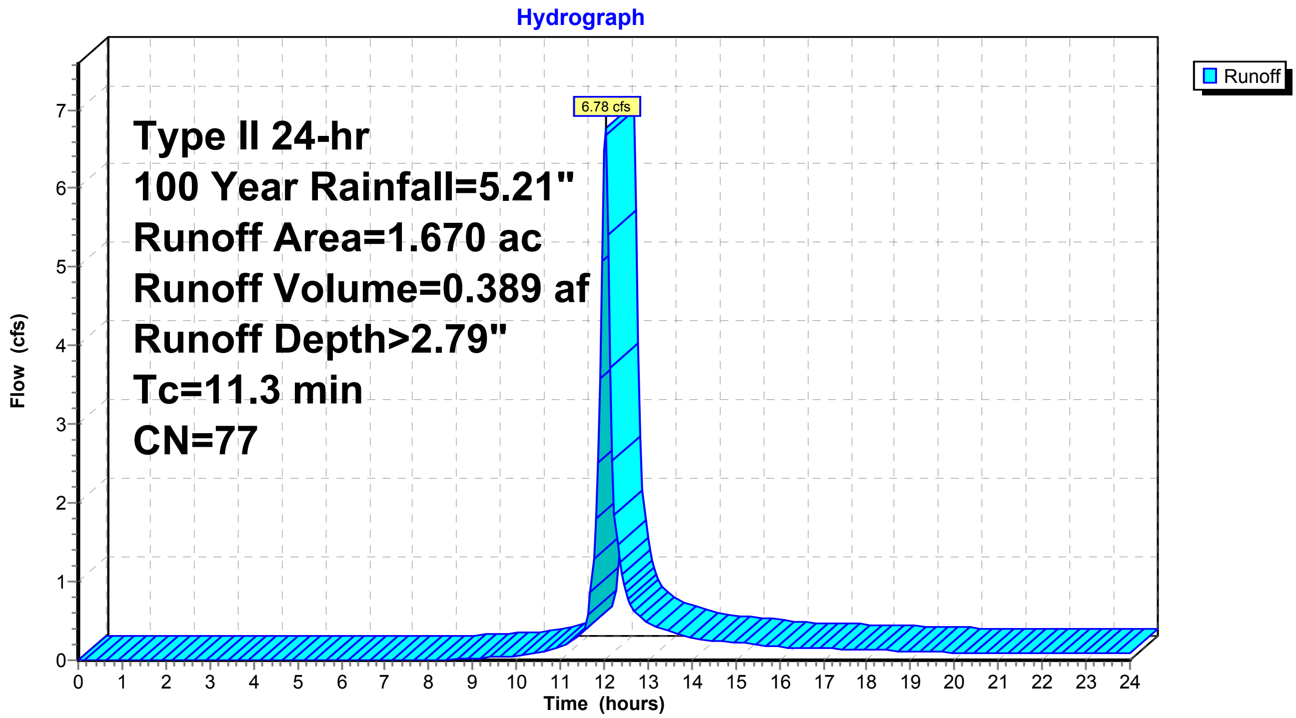
Runoff = 6.78 cfs @ 12.03 hrs, Volume= 0.389 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.670	77	
	1.670		100.00% Pervious Area

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

Subcatchment E-2:



Summary for Subcatchment E-3:

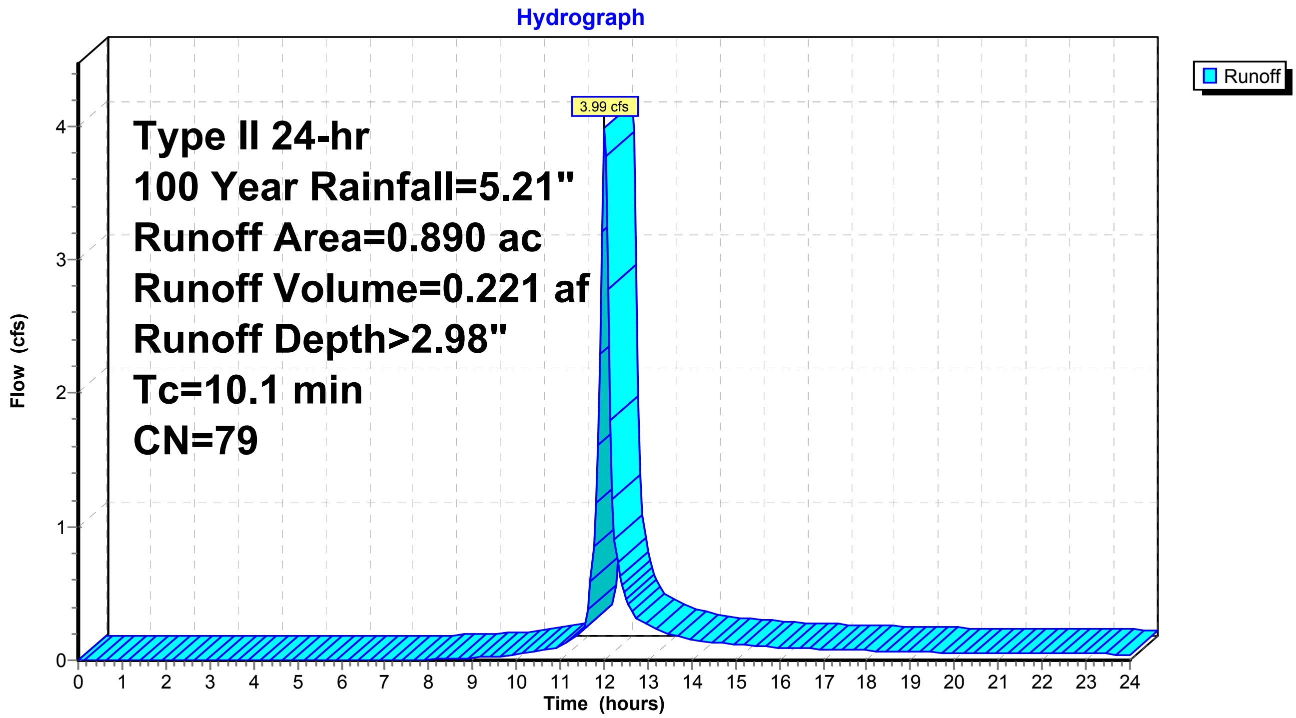
Runoff = 3.99 cfs @ 12.02 hrs, Volume= 0.221 af, Depth> 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	0.890	79	
	0.890		100.00% Pervious Area

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

Subcatchment E-3:



Summary for Subcatchment E-4.A:

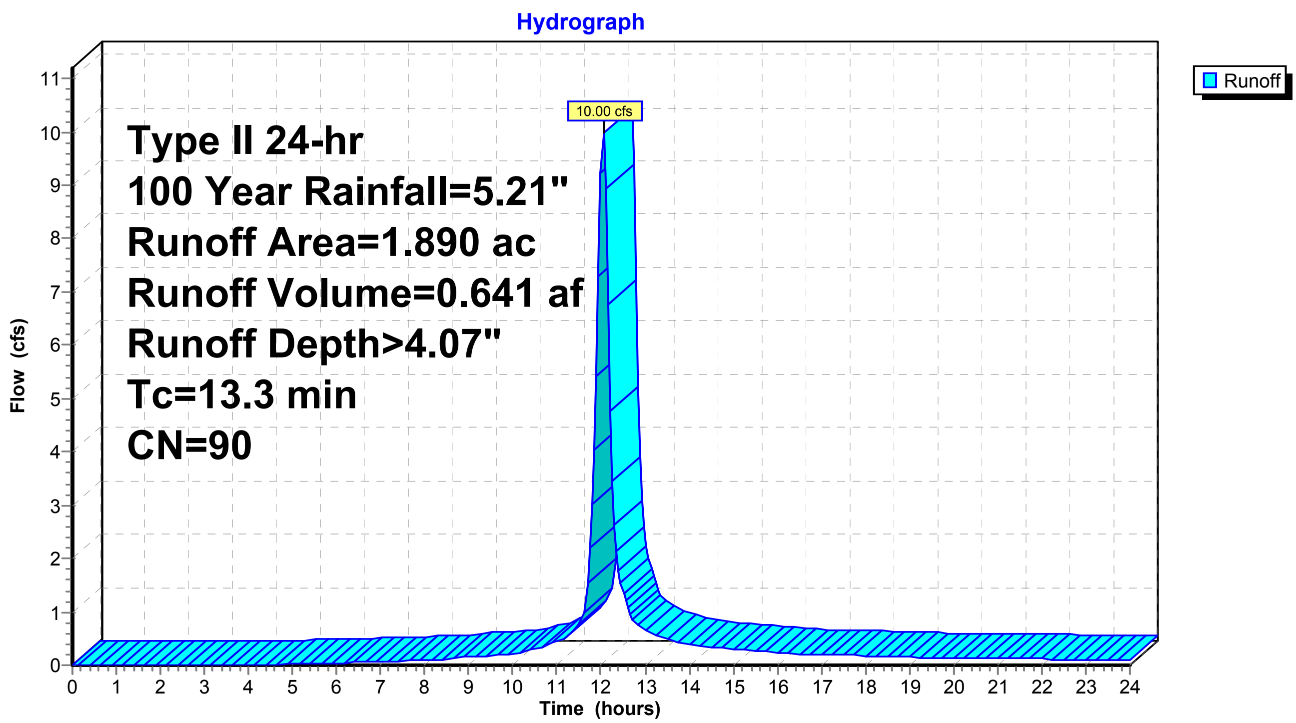
Runoff = 10.00 cfs @ 12.05 hrs, Volume= 0.641 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.890	90	
	1.890		100.00% Pervious Area

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

Subcatchment E-4.A:



Summary for Subcatchment E-4.B:

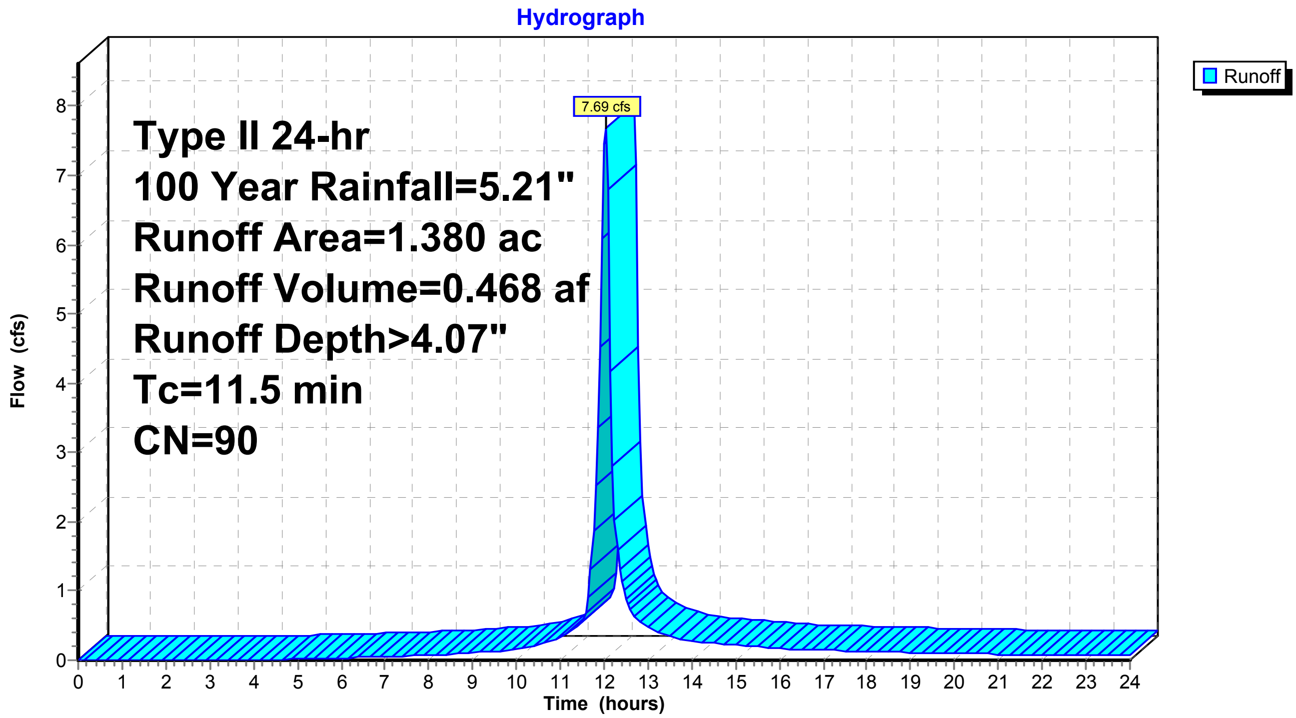
Runoff = 7.69 cfs @ 12.03 hrs, Volume= 0.468 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.380	90	
	1.380		100.00% Pervious Area

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

Subcatchment E-4.B:

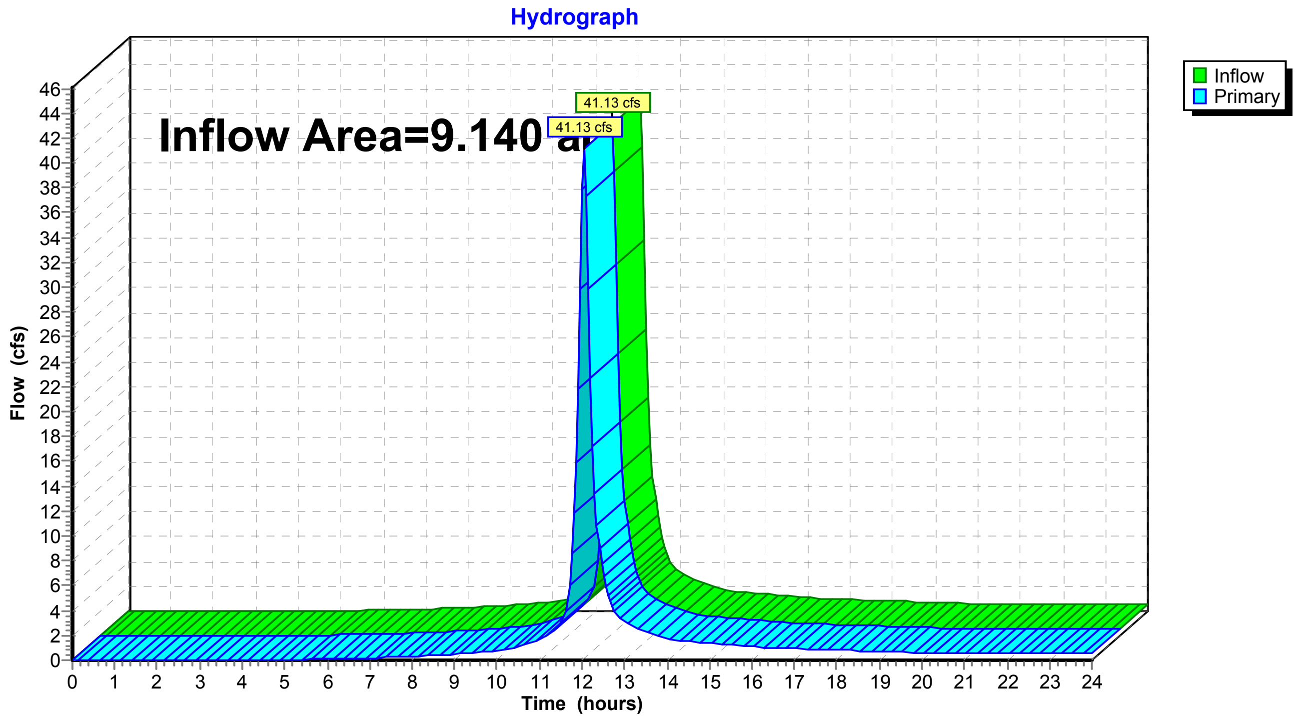


Summary for Link 1L: WS

Inflow Area = 9.140 ac, 0.00% Impervious, Inflow Depth > 3.61" for 100 Year event
Inflow = 41.13 cfs @ 12.05 hrs, Volume= 2.753 af
Primary = 41.13 cfs @ 12.05 hrs, Volume= 2.753 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: WS

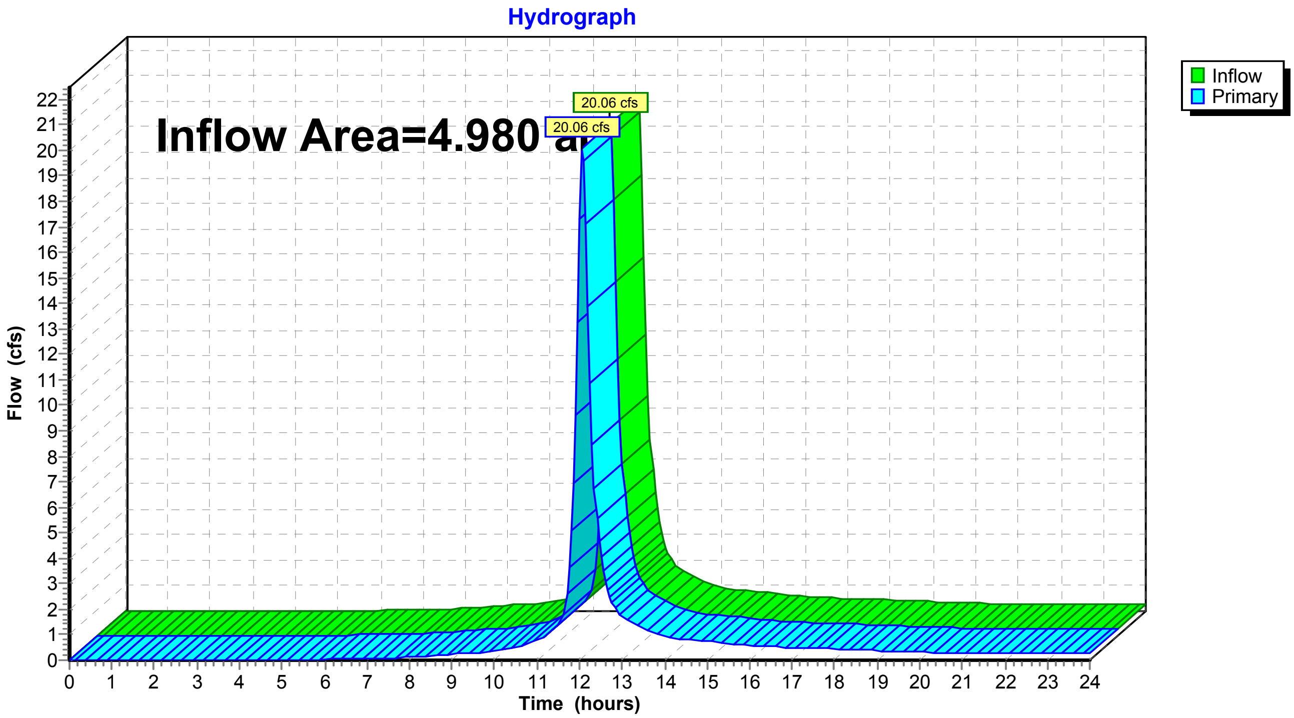


Summary for Link DP-1:

Inflow Area = 4.980 ac, 0.00% Impervious, Inflow Depth > 3.43" for 100 Year event
Inflow = 20.06 cfs @ 12.07 hrs, Volume= 1.423 af
Primary = 20.06 cfs @ 12.07 hrs, Volume= 1.423 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

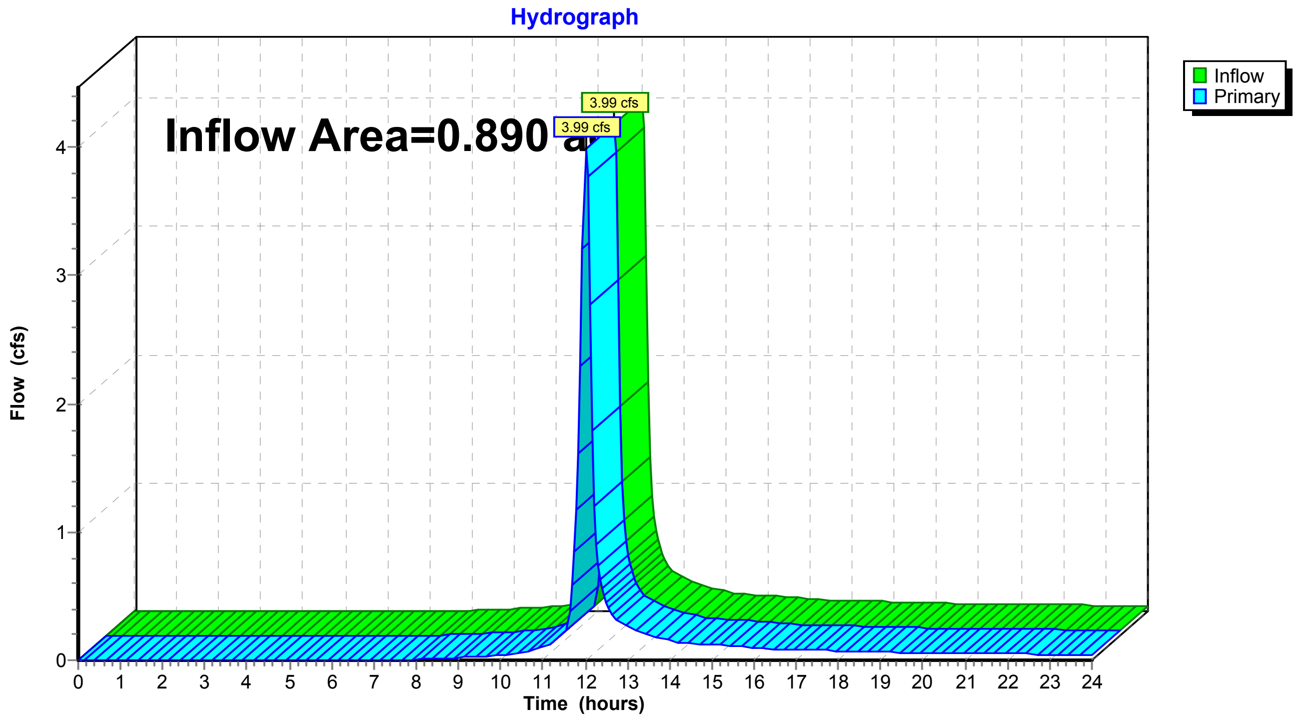


Summary for Link DP-2:

Inflow Area =	0.890 ac,	0.00% Impervious,	Inflow Depth > 2.98"	for 100 Year event	
Inflow =	3.99 cfs @	12.02 hrs,	Volume=	0.221 af	
Primary =	3.99 cfs @	12.02 hrs,	Volume=	0.221 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

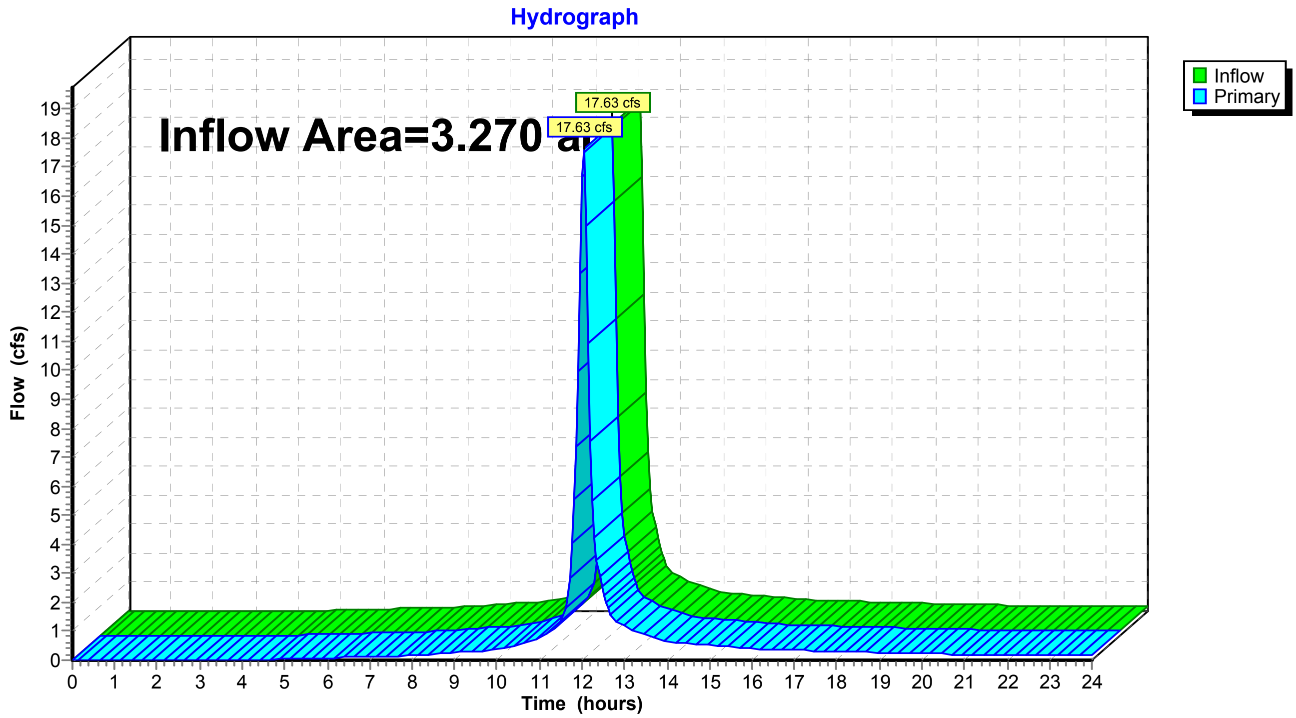


Summary for Link DP-3:

Inflow Area =	3.270 ac,	0.00% Impervious,	Inflow Depth > 4.07"	for 100 Year event
Inflow =	17.63 cfs @	12.04 hrs, Volume=	1.109 af	
Primary =	17.63 cfs @	12.04 hrs, Volume=	1.109 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-1

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		61	80	4880
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot / Avg. % Imp.												
1/8 acre 65		77			85			90			92	
1/4 acre 38		61			75			83			87	
1/3 acre 30		57			72			81			86	
1/2 acre 25		54			70			80			85	
1 acre 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		39	98	3822
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**8702**

$$\textit{WEIGHTED CURVE NUMBER} = \frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100} = \boxed{87}$$

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-2

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70		100	77	7700
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74			80	
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot / Avg. % Imp.												
1/8 acre 65		77			85			90			92	
1/4 acre 38		61			75			83			87	
1/3 acre 30		57			72			81			86	
1/2 acre 25		54			70			80			85	
1 acre 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98			98	
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**7700**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = *77*

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-3

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70		89	77	6853
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74			80	
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot — Avg. % Imp.												
1/8 acre — 65		77			85			90			92	
1/4 acre — 38		61			75			83			87	
1/3 acre — 30		57			72			81			86	
1/2 acre — 25		54			70			80			85	
1 acre — 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		11	98	1078
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**7931**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***79***

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-4.A

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		45	80	3600
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot — Avg. % Imp.												
1/8 acre — 65		77			85			90			92	
1/4 acre — 38		61			75			83			87	
1/3 acre — 30		57			72			81			86	
1/2 acre — 25		54			70			80			85	
1 acre — 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		55	98	5390
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**8990**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***90***

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-4.B

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		45	80	3600
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot — Avg. % Imp.												
1/8 acre — 65		77			85			90			92	
1/4 acre — 38		61			75			83			87	
1/3 acre — 30		57			72			81			86	
1/2 acre — 25		54			70			80			85	
1 acre — 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		55	98	5390
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**8990**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***90***

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-1

SHEET FLOW (Applicable to Tc only)				
Segment ID	A-B			
1. Surface Description (table 3-1) …………………………………………………..	Grass			
2. Mannings Roughness Coefficient, n (table 3-1) ………………………………….	0.24			
3. Flow Length, L (total L<300') ………………………………………….…ft	95			
4. Two-year 24-hour rainfall, P_2 ……………………………………………….in	2.15			
5. Land Slope, s ……………………………………………………………ft/ft	0.03			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$ Compute T_t………………hr	0.237			0.237

SHALLOW CONCENTRATED FLOW				
Segment ID	B-C	C-D		
7. Surface Description (paved or unpaved) …………………………………………	Paved	Unpaved		
8. Flow Length, L ………………………………………..……………………ft	143	400		
9. Watercourse Slope, s …………………………………………………….ft/ft	0.03	0.067		
10. Average Velocity, V (figure 3-1) ……………………...……..………ft/s	2.5	1.8		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t ……...………hr	0.016	0.062		0.078

CHANNEL FLOW				
Segment ID				
12. Cross Sectional Flow Area, a ……………………………..…………..ft^2				
13. Wetted Perimeter, p_w ………………………………………………………ft				
14. Hydraulic Radius, $r = a/p_w$ ………………………………………………ft				
15. Channel Slope, s ………………………….……………………ft/ft				
16. Manning's Roughness Coefficient, n ……………………………………………				
17. $V=(1.49\ r^{2/3}\ s^{1/2})/n$ ……………………………..………………..ft/s				
18. Flow Length, L ………………………………….……………………ft				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t ……...………hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ………………………………………………………..hr **0.314**

min 18.86

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-2

SHEET FLOW (Applicable to Tc only)

Segment ID	A-B	B-C		
1. Surface Description (table 3-1)	Grass	Woods		
2. Mannings Roughness Coefficient, n (table 3-1)	0.24	0.4		
3. Flow Length, L (total L<300') ft	40	60		
4. Two-year 24-hour rainfall, P_2 in	2.15	2.15		
5. Land Slope, s ft/ft	0.05	0.42		
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$ Compute T_t hr	0.097	0.086		0.182

SHALLOW CONCENTRATED FLOW

Segment ID	C-D			
7. Surface Description (paved or unpaved)	UnPaved			
8. Flow Length, L ft	50			
9. Watercourse Slope, s ft/ft	0.34			
10. Average Velocity, V (figure 3-1) ft/s	2.7			
11. $T_t = \frac{L}{3600\,V}$ Compute T_t hr	0.005			0.005

CHANNEL FLOW

Segment ID				
12. Cross Sectional Flow Area, a ft^2				
13. Wetted Perimeter, p_w ft				
14. Hydraulic Radius, $r = a/p_w$ ft				
15. Channel Slope, s ft/ft				
16. Manning's Roughness Coefficient, n				
17. $V=(1.49\, r^{2/3}\, s^{1/2})/n$ ft/s				
18. Flow Length, L ft				
19. $T_t = \frac{L}{3600\,V}$ Compute T_t hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ……..hr **0.188**

min 11.26

NOTES:

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EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-3

SHEET FLOW (Applicable to Tc only)				
Segment ID	A-B	B-C		
1. Surface Description (table 3-1) ……..	Grass	Woods		
2. Mannings Roughness Coefficient, n (table 3-1) …….	0.24	0.4		
3. Flow Length, L (total L<300') ……ft	60	40		
4. Two-year 24-hour rainfall, P_2 ……in	2.15	2.15		
5. Land Slope, s ……ft/ft	0.15	0.25		
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$ Compute T_t……hr	0.086	0.076		0.163

SHALLOW CONCENTRATED FLOW				
Segment ID	C-D			
7. Surface Description (paved or unpaved) ……	UnPaved			
8. Flow Length, L ……ft	54			
9. Watercourse Slope, s ……ft/ft	0.3			
10. Average Velocity, V (figure 3-1) ……ft/s	2.6			
11. $T_t = \frac{L}{3600\,V}$ Compute T_t ……hr	0.006			0.006

CHANNEL FLOW				
Segment ID				
12. Cross Sectional Flow Area, a ……ft^2				
13. Wetted Perimeter, p_w ……ft				
14. Hydraulic Radius, $r = a/p_w$ ……ft				
15. Channel Slope, s ……ft/ft				
16. Manning's Roughness Coefficient, n ……				
17. $V=(1.49\,r^{2/3}\,s^{1/2})/n$ ……ft/s				
18. Flow Length, L ……ft				
19. $T_t = \frac{L}{3600\,V}$ Compute T_t ……hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ……hr **0.168**

min 10.10

NOTES:

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Rochester, NY 14608

EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-4.A

SHEET FLOW (Applicable to Tc only)

Segment ID	A-B			
1. Surface Description (table 3-1) …………………………………………………..	Grass			
2. Mannings Roughness Coefficient, n (table 3-1) ………………………………….	0.24			
3. Flow Length, L (total L<300') ………………………………………………..…ft	88			
4. Two-year 24-hour rainfall, P_2 ……………………………………………….in	2.15			
5. Land Slope, s ……………………………………………………………….ft/ft	0.05			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$ Compute T_t………………hr	0.182			0.182

SHALLOW CONCENTRATED FLOW

Segment ID	B-C	C-D		
7. Surface Description (paved or unpaved) …………………………………………	Paved	Unpaved		
8. Flow Length, L ……………………………………………..……………………ft	33	78		
9. Watercourse Slope, s ……………………………………………….…….……ft/ft	0.025	0.09		
10. Average Velocity, V (figure 3-1) ……………………………...……….……….ft/s	3.4	2.1		
11. $T_t = \frac{L}{3600\,V}$ Compute T_t ……...………hr	0.020	0.020		0.040

CHANNEL FLOW

Segment ID				
12. Cross Sectional Flow Area, a …………………………………..…………..ft^2				
13. Wetted Perimeter, p_w ……………………………………………………………ft				
14. Hydraulic Radius, $r = a/p_w$ ……………………………………………………ft				
15. Channel Slope, s ……………………………….……………………….ft/ft				
16. Manning's Roughness Coefficient, n ……………………………………………				
17. $V=(1.49\, r^{2/3}\, s^{1/2})/n$ ……………………………………..…………………..ft/s				
18. Flow Length, L ……………………………………..……………………ft				
19. $T_t = \frac{L}{3600\,V}$ Compute T_t ……...………hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ……………………………………………………………..hr **0.222**

min 13.29

NOTES:

Costich Engineering, P.C.
217 Lake Ave.
Rochester, NY 14608

Time of Concentration Worksheet

EXISTING CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

E-4.B

SHEET FLOW (Applicable to Tc only)

Segment ID	A-B			
1. Surface Description (table 3-1)	Unpaved			
2. Mannings Roughness Coefficient, n (table 3-1)	0.24			
3. Flow Length, L (total L<300') ……ft	100			
4. Two-year 24-hour rainfall, P_2 ……in	2.15			
5. Land Slope, s ……ft/ft	0.07			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$ Compute T_t……hr	0.176			0.176

SHALLOW CONCENTRATED FLOW

Segment ID	C-D			
7. Surface Description (paved or unpaved)	UnPaved			
8. Flow Length, L ……ft	143			
9. Watercourse Slope, s ……ft/ft	0.13			
10. Average Velocity, V (figure 3-1) ……ft/s	2.5			
11. $T_t = \frac{L}{3600\,V}$ Compute T_t……hr	0.016			0.016

CHANNEL FLOW

Segment ID				
12. Cross Sectional Flow Area, a ……ft^2				
13. Wetted Perimeter, p_w ……ft				
14. Hydraulic Radius, $r = a/p_w$ ……ft				
15. Channel Slope, s ……ft/ft				
16. Manning's Roughness Coefficient, n				
17. $V=(1.49\,r^{2/3}\,s^{1/2})/n$ ……ft/s				
18. Flow Length, L ……ft				
19. $T_t = \frac{L}{3600\,V}$ Compute T_t……hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ……hr **0.192**

min 11.50

NOTES:

2-Year 24 Hour Rainfall Event = 2.15 (Updated 2019)

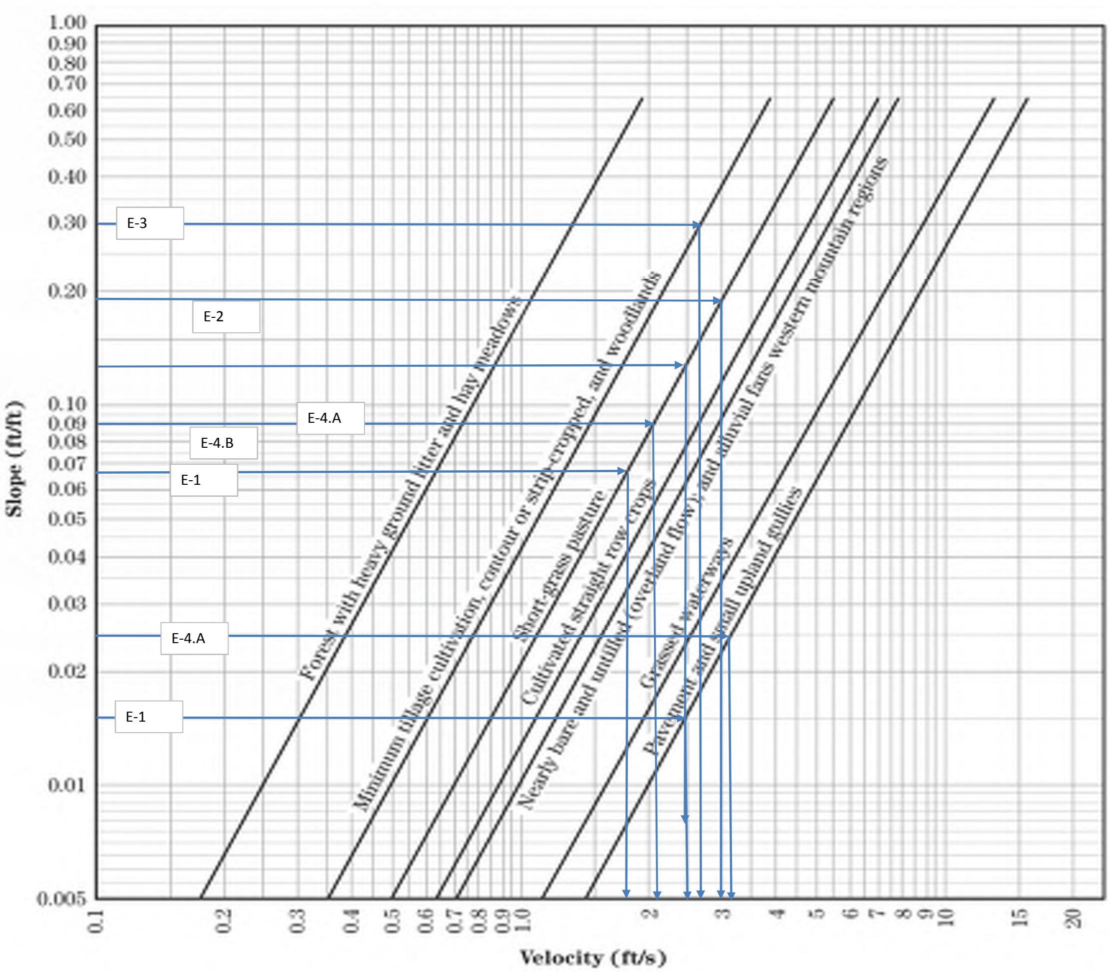
Table 3-1 Roughness coefficients (Manning's n) for sheet flow

Surface description	n [1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods:[3]	
Light underbrush	0.40
Dense underbrush	0.80

[1] The n values are a composite of information compiled by Engman (1986).
[2] Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.
[3] When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

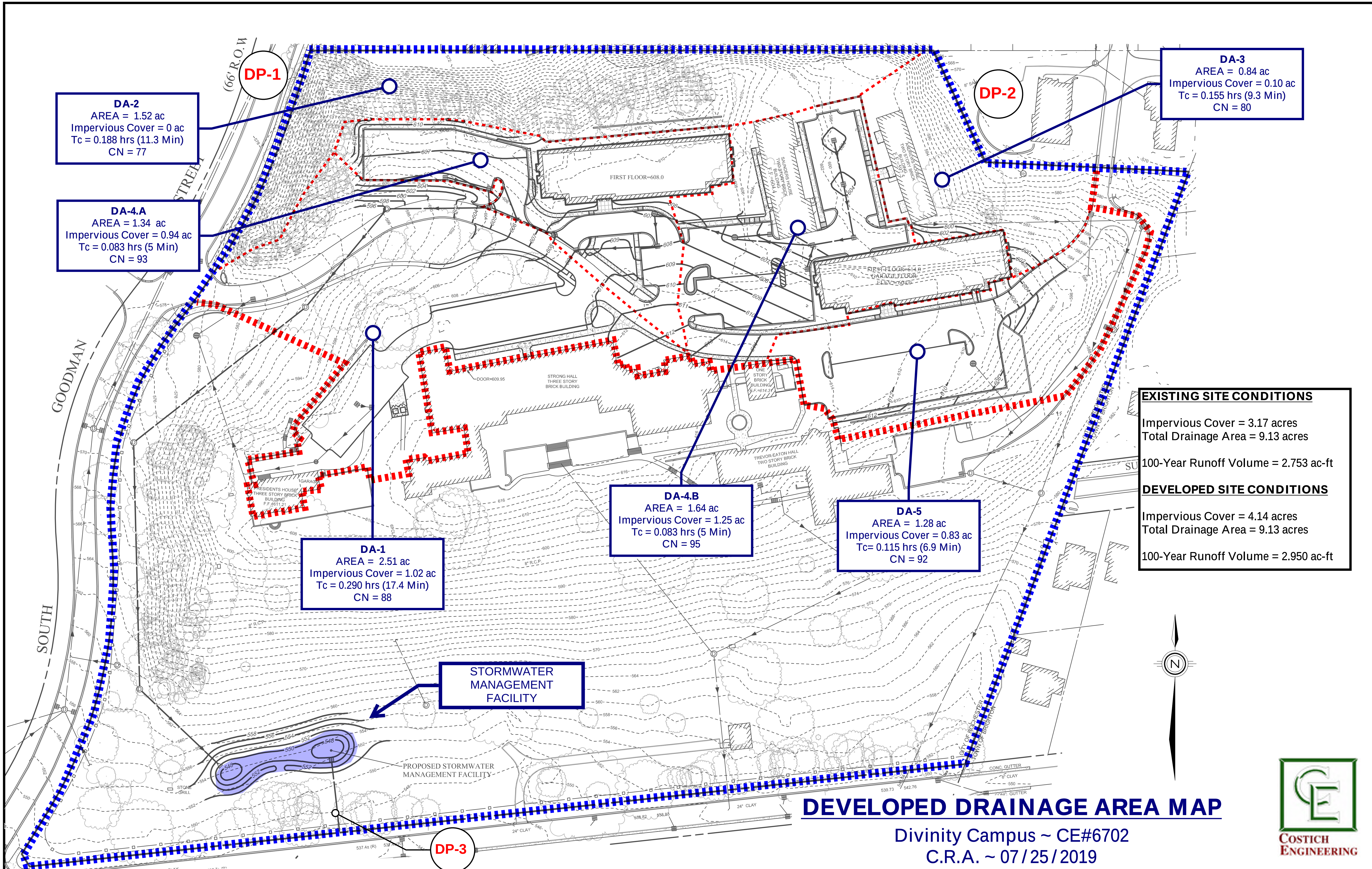
E-1

Figure 15–4 Velocity versus slope for shallow concentrated flow



APPENDIX III

- DEVELOPED DRAINAGE AREA MAP
- STORMWATER ATTENUATION SCENARIO EXHIBITS
- CONCEPTUAL STORMWATER DESIGN SUMMARY CALCULATONS
- DEVELOPED HYDROCAD ROUTING REPORT
- DEVELOPOPED SCS CALCULATIONS
- WQv, RRv & CPv CALCULATIONS



DEVELOPED DRAINAGE AREA MAP

Divinity Campus ~ CE#6702

C.R.A. ~ 07 / 25 / 2019

COSTICH ENGINEERING

DIVINITY CAMPUS
CITY OF ROCHESTER, NEW YORK

CONCEPTUAL STORMWATER ANALYSIS

SITE DATA:

Total Drainage Area Evaluated for Stormwater Attenuation in Pond = 9.13 acres

Site Soils = Urban (UB) – HSG D

Area Evaluated For Required Water Quality & Runoff Reduction Volumes:

	Impervious Cover	Pervious Cover
Existing:	2.23 acres	3.08 acres
Developed:	3.18 acres	2.13 acres

New Impervious Cover = 0.95 acres

RUNOFF REDUCTION & WATER QUALITY VOLUME:

Water Quality Volume:

- Calculated For Redevelopment
- To Treat 100% of New Impervious Cover (0.95 acres) & 25% of Existing Impervious Cover To Be Disturbed (2.23 acres)

Required Water Quality Volume = 0.1193 ac-ft = 5,199 CF

Runoff Reduction Volume:

- 100% HSG D → S = 0.20

Minimum Runoff Reduction Volume = 0.0150 ac-ft = 655 CF

Filter Bed Sizing:

- To Treat wQv Req. = 8,665 SF
- To Treat RRv Min = 1,092 SF

PEAK FLOW ATTENUATION STORAGE:

*See Drainage Area Exhibits For Reference

Existing Conditions:

- Area = 9.13 acres
- 100- Year Storm Total Rainfall Volume
    - Volume of Runoff = 2.753 ac-ft = 119,920 CF

Developed Conditions:

- Area = 9.13 acres
- 100- Year Storm Total Rainfall Volume
    - Volume of Runoff = 2.950 ac-ft = 128,502 CF

Storage Required To Attenuate Stormwater:

- Difference in Runoff From Existing To Developed Conditions
- Storage Required (100-Year Storm) = 128,502 CF – 119,920 CF
  = 8,582 CF

Stormwater Storage & Attenuation:

1. Stormwater Management Facility (Pond)
    - To Attenuate Stormwater & Provide Water Quality Volumes

Summary of Volumes Required:

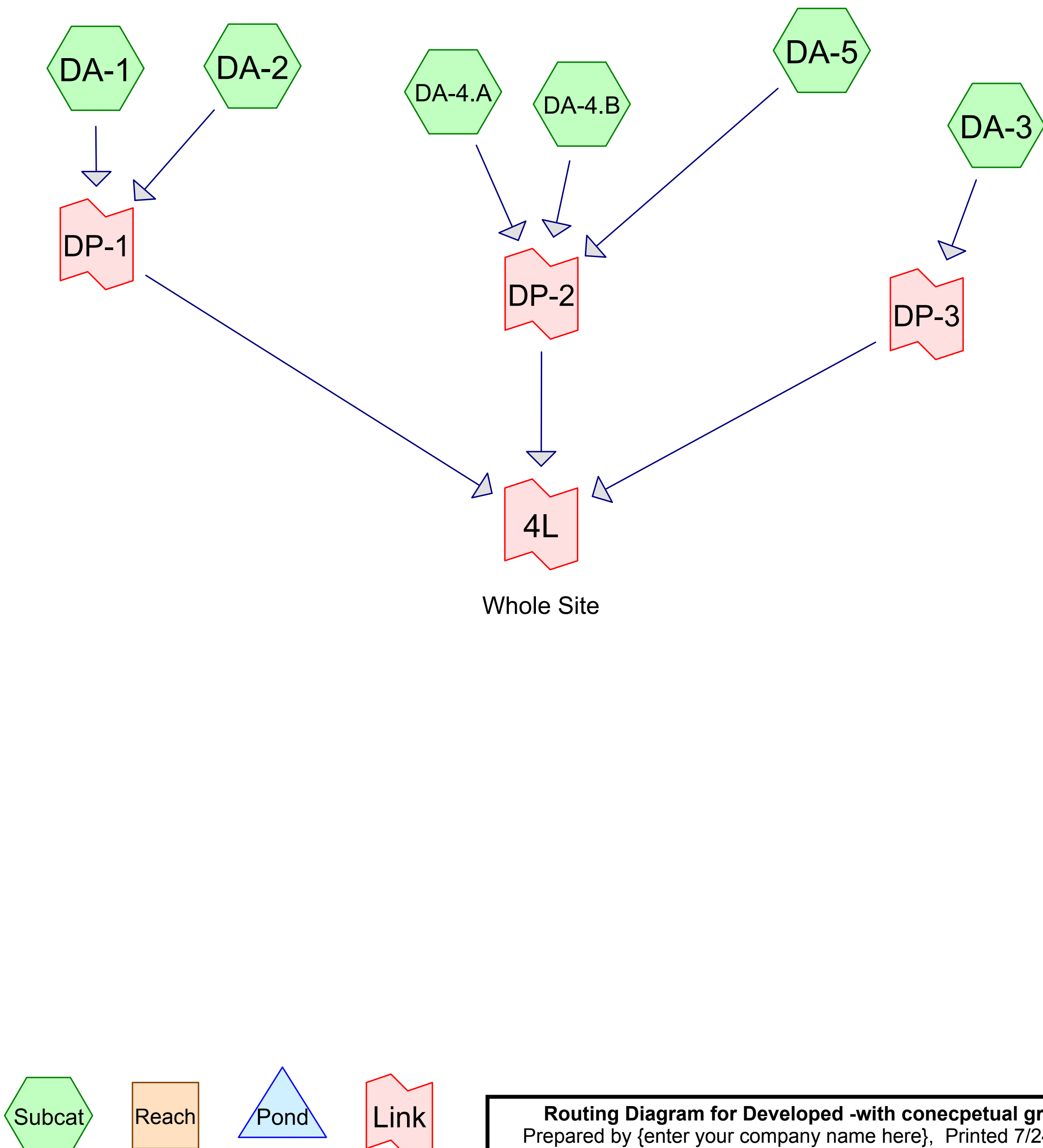
Stormwater Attenuation:
- Storage Required: 8,582 CF = 0.197 ac-ft

Water Quality Volume:
- Required after RRv Reductions = 4,544 CF = 0.104 ac-ft

Total Storage Required:
- Required Storage = 13,126 CF = 0.301 ac-ft

Scenario No. 01: Stormwater Management Facility (Pond)

Stormwater Management Facility (Pond):
- Required Storage = 13,126 CF = 0.301 ac-ft
- Depth of Pond = 4'
- Surface Area of Pond = 3,282 SF = 0.075 acres



Routing Diagram for Developed -with conecpetual grading
Prepared by {enter your company name here}, Printed 7/24/2019
HydroCAD® 10.00-20 s/n 08278 © 2017 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.510	88	(DA-1)
1.520	77	(DA-2)
0.840	79	(DA-3)
1.340	93	(DA-4.A)
1.640	95	(DA-4.B)
1.280	92	(DA-5)
9.130	**88**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: Runoff Area=2.510 ac 0.00% Impervious Runoff Depth>0.83"
Tc=17.4 min CN=88 Runoff=2.50 cfs 0.174 af

SubcatchmentDA-2: Runoff Area=1.520 ac 0.00% Impervious Runoff Depth>0.36"
Tc=11.3 min CN=77 Runoff=0.70 cfs 0.046 af

SubcatchmentDA-3: Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>0.43"
Tc=9.3 min CN=79 Runoff=0.52 cfs 0.030 af

SubcatchmentDA-4.A: Runoff Area=1.340 ac 0.00% Impervious Runoff Depth>1.17"
Tc=5.0 min CN=93 Runoff=2.76 cfs 0.130 af

SubcatchmentDA-4.B: Runoff Area=1.640 ac 0.00% Impervious Runoff Depth>1.33"
Tc=5.0 min CN=95 Runoff=3.74 cfs 0.182 af

SubcatchmentDA-5: Runoff Area=1.280 ac 0.00% Impervious Runoff Depth>1.09"
Tc=5.0 min CN=92 Runoff=2.49 cfs 0.117 af

Link 4L: Whole Site Inflow=11.21 cfs 0.679 af
Primary=11.21 cfs 0.679 af

Link DP-1: Inflow=3.12 cfs 0.221 af
Primary=3.12 cfs 0.221 af

Link DP-2: Inflow=8.99 cfs 0.429 af
Primary=8.99 cfs 0.429 af

Link DP-3: Inflow=0.52 cfs 0.030 af
Primary=0.52 cfs 0.030 af

Total Runoff Area = 9.130 ac Runoff Volume = 0.679 af Average Runoff Depth = 0.89"
100.00% Pervious = 9.130 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA-1:

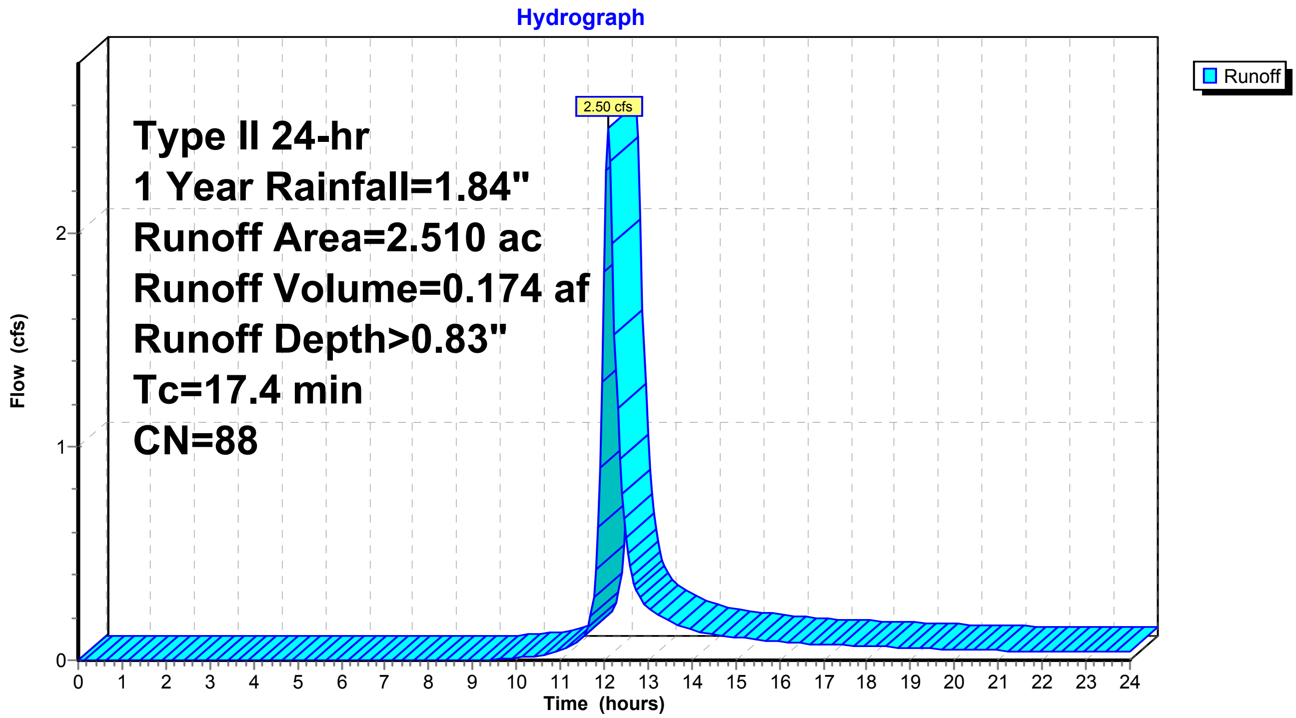
Runoff = 2.50 cfs @ 12.10 hrs, Volume= 0.174 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	2.510	88	
	2.510		100.00% Pervious Area

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

Subcatchment DA-1:



Summary for Subcatchment DA-2:

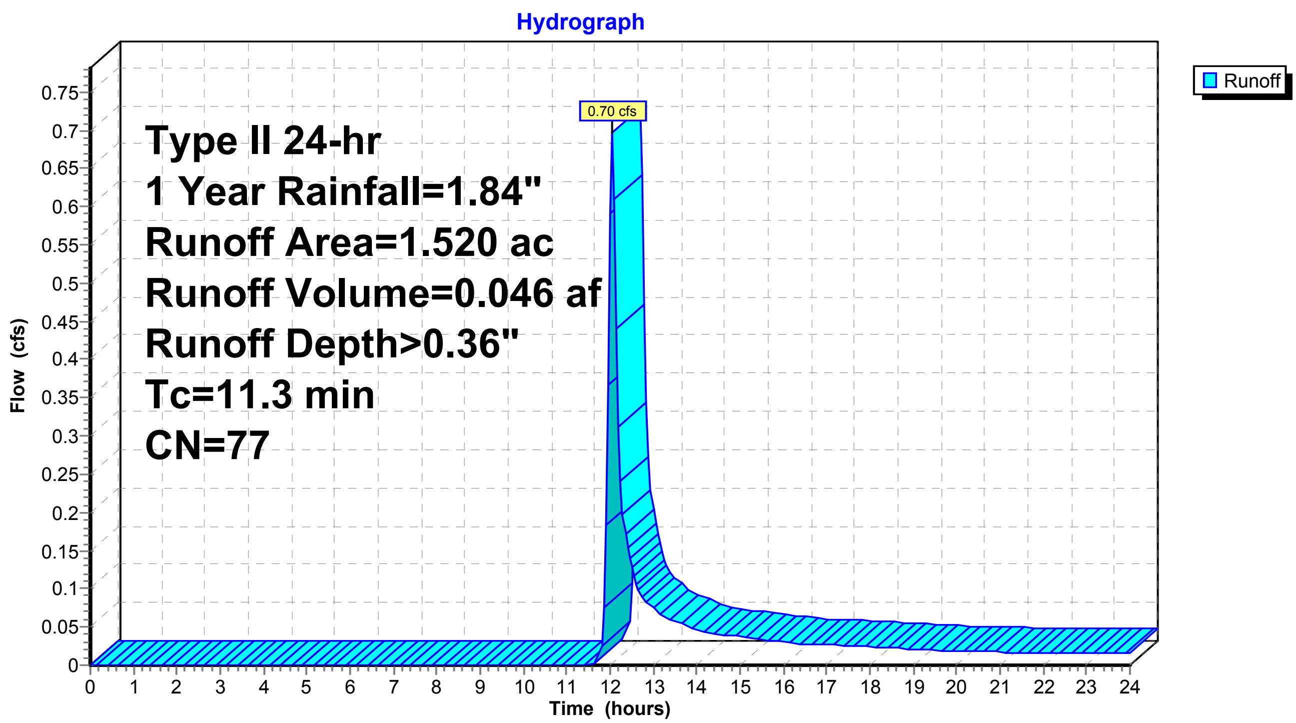
Runoff = 0.70 cfs @ 12.05 hrs, Volume= 0.046 af, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.520	77	
	1.520		100.00% Pervious Area

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

Subcatchment DA-2:



Summary for Subcatchment DA-3:

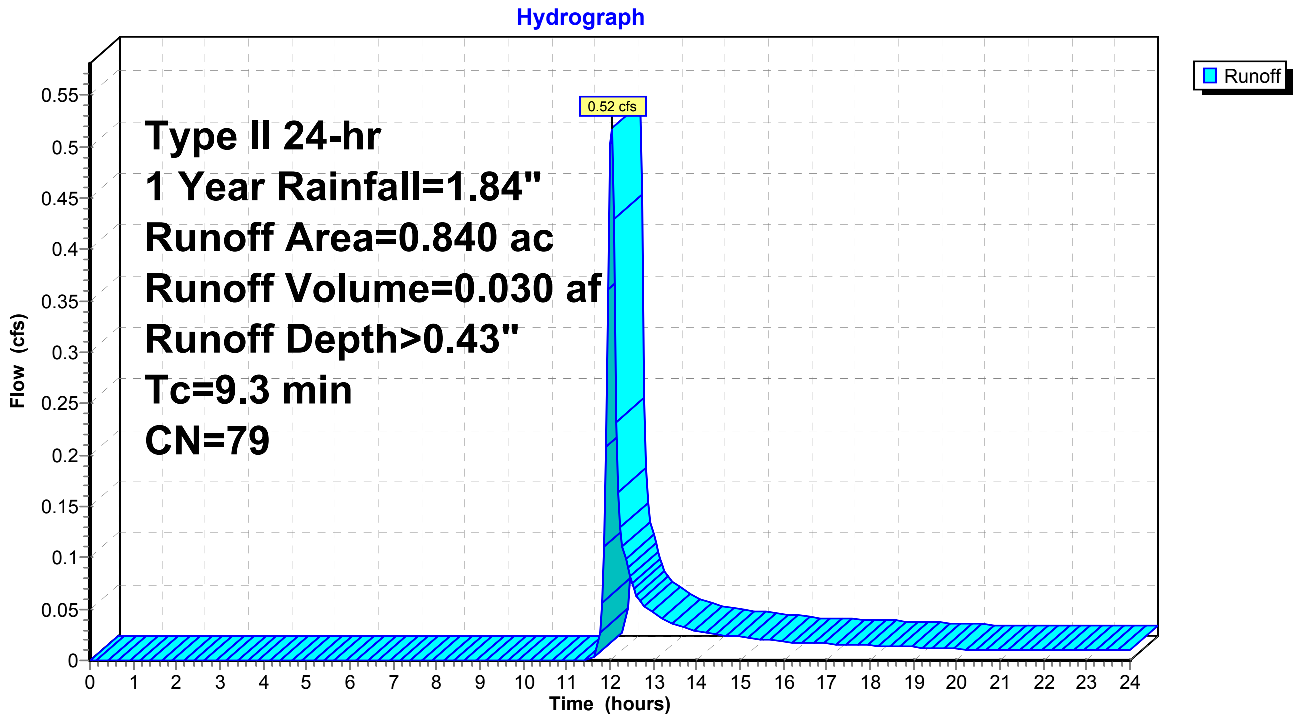
Runoff = 0.52 cfs @ 12.02 hrs, Volume= 0.030 af, Depth> 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	0.840	79	
	0.840		100.00% Pervious Area

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

Subcatchment DA-3:



Summary for Subcatchment DA-4.A:

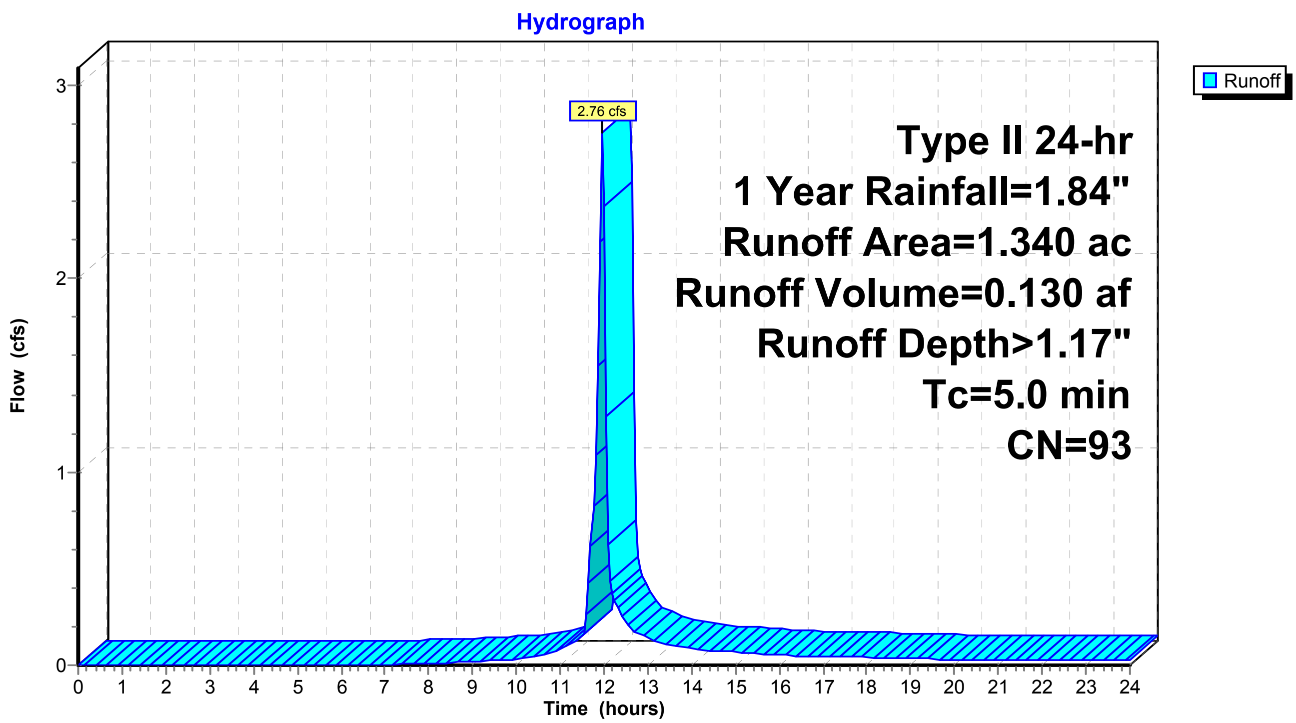
Runoff = 2.76 cfs @ 11.95 hrs, Volume= 0.130 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.340	93	
	1.340		100.00% Pervious Area

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

Subcatchment DA-4.A:



Summary for Subcatchment DA-4.B:

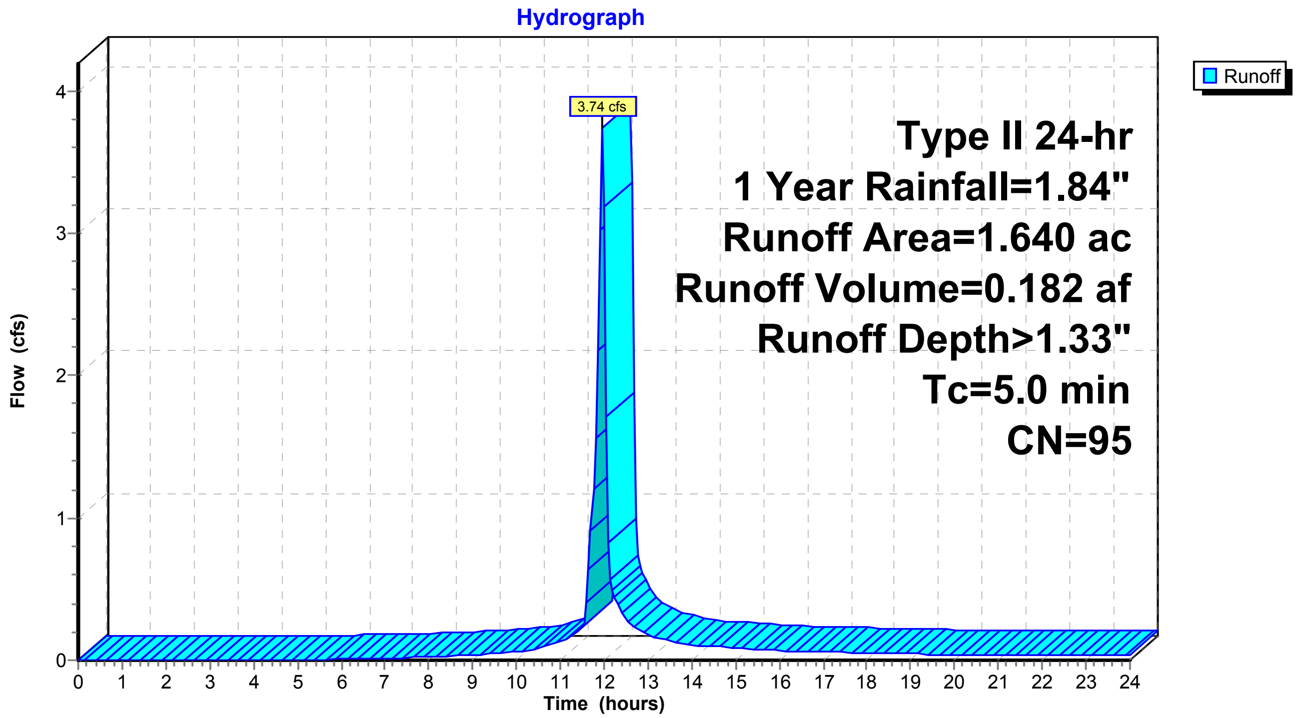
Runoff = 3.74 cfs @ 11.95 hrs, Volume= 0.182 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.640	95	
	1.640		100.00% Pervious Area

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

Subcatchment DA-4.B:



Summary for Subcatchment DA-5:

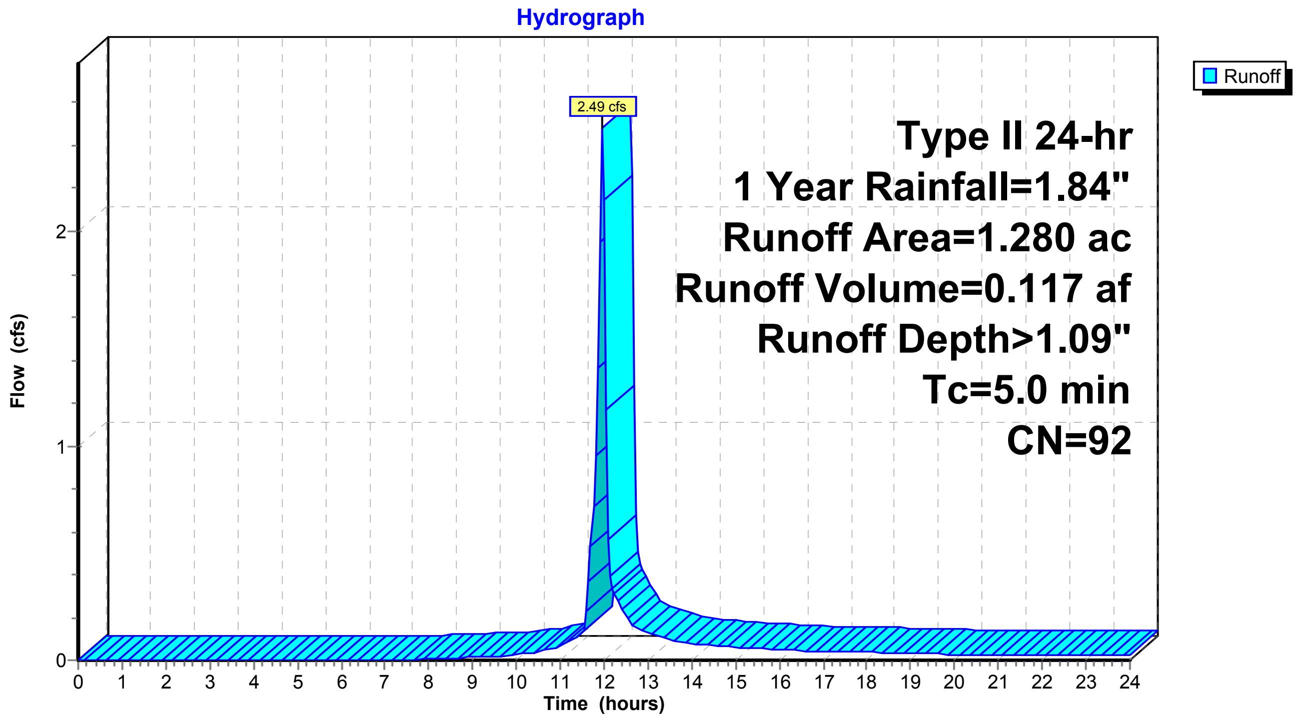
Runoff = 2.49 cfs @ 11.96 hrs, Volume= 0.117 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 Year Rainfall=1.84"

	Area (ac)	CN	Description
*	1.280	92	
	1.280		100.00% Pervious Area

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

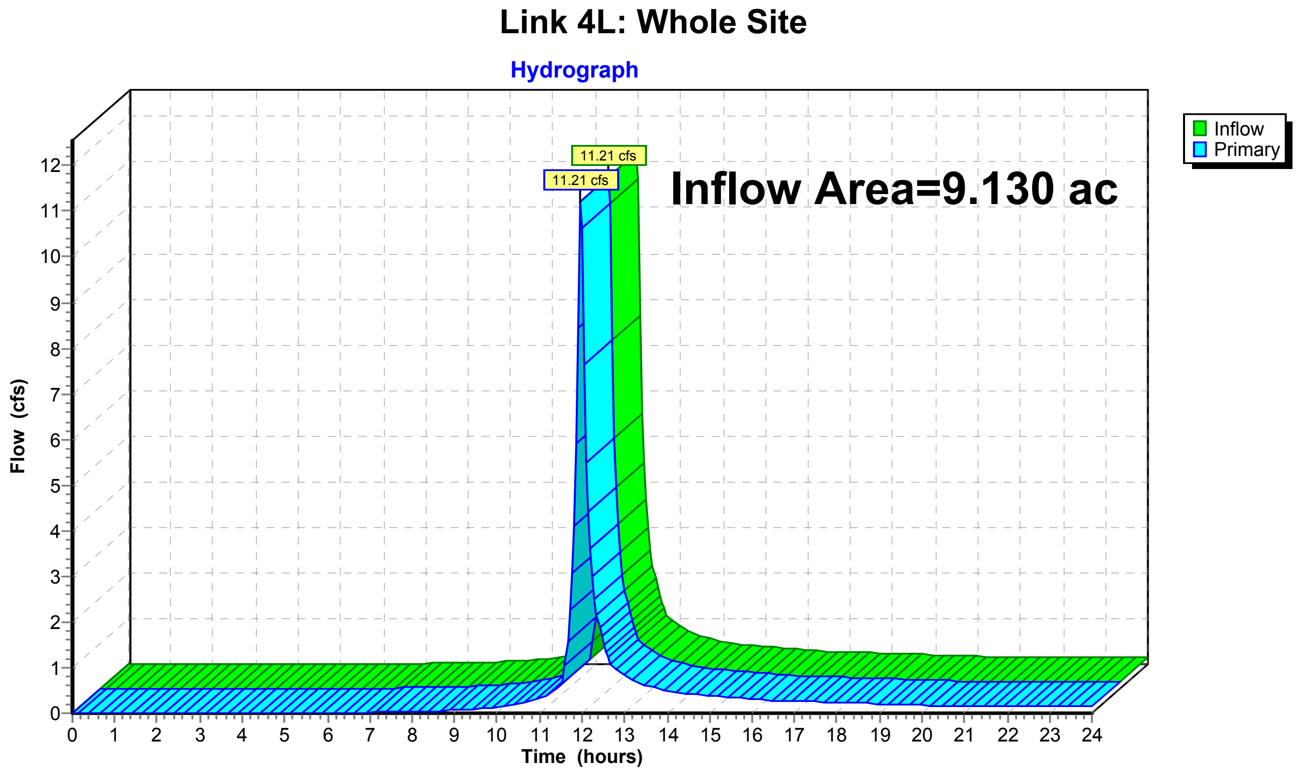
Subcatchment DA-5:



Summary for Link 4L: Whole Site

Inflow Area = 9.130 ac, 0.00% Impervious, Inflow Depth > 0.89" for 1 Year event
Inflow = 11.21 cfs @ 11.97 hrs, Volume= 0.679 af
Primary = 11.21 cfs @ 11.97 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

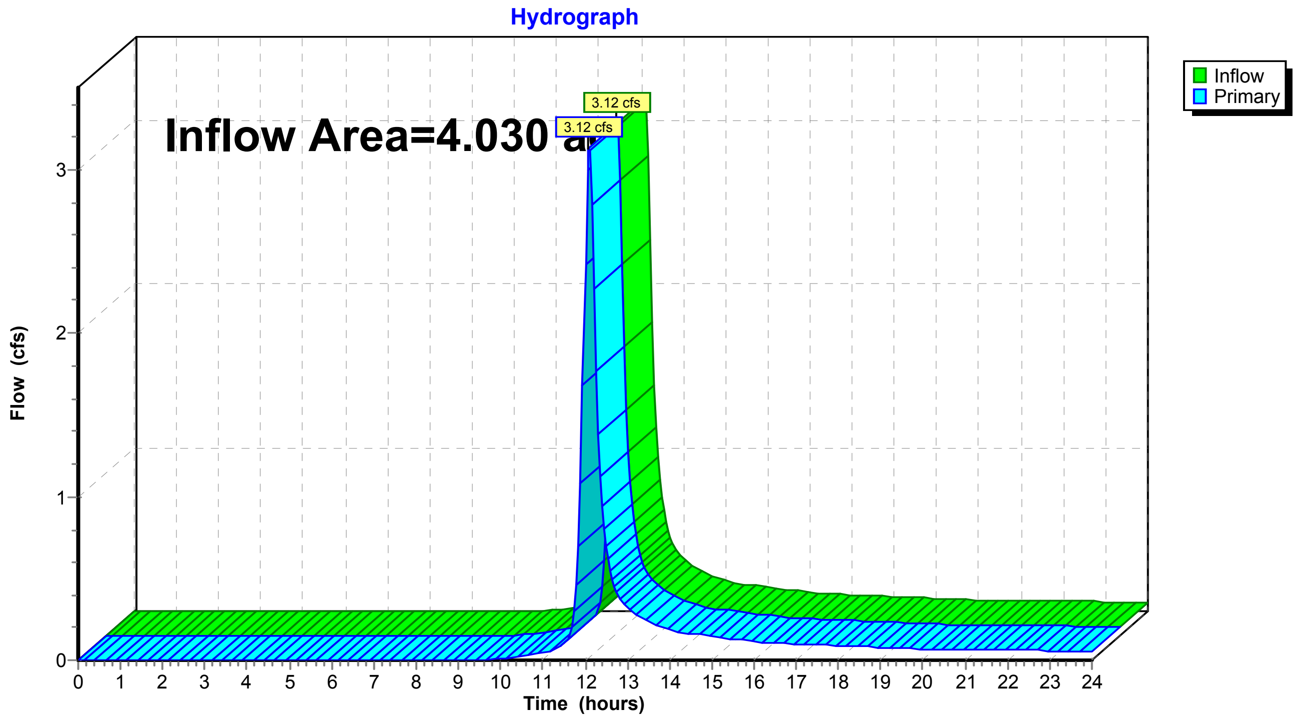


Summary for Link DP-1:

Inflow Area = 4.030 ac, 0.00% Impervious, Inflow Depth > 0.66" for 1 Year event
Inflow = 3.12 cfs @ 12.09 hrs, Volume= 0.221 af
Primary = 3.12 cfs @ 12.09 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

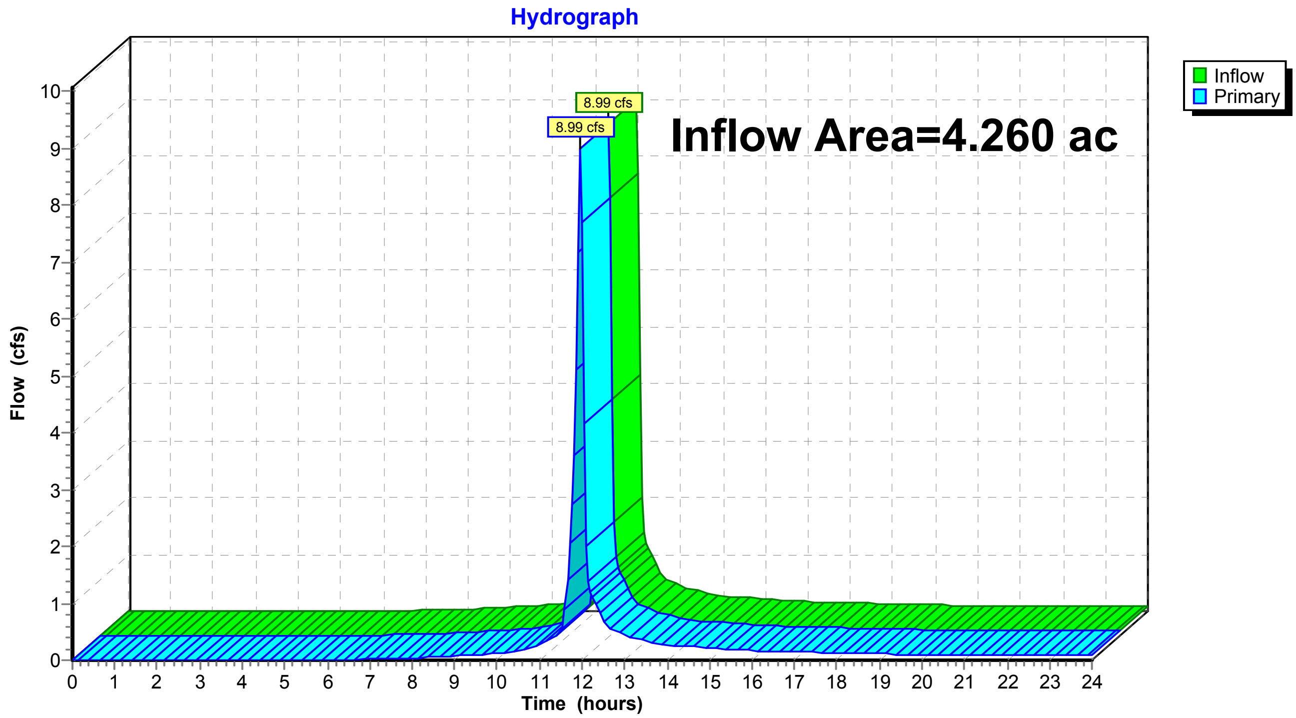


Summary for Link DP-2:

Inflow Area =	4.260 ac,	0.00% Impervious,	Inflow Depth > 1.21"	for 1 Year event
Inflow =	8.99 cfs @	11.95 hrs, Volume=	0.429 af	
Primary =	8.99 cfs @	11.95 hrs, Volume=	0.429 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

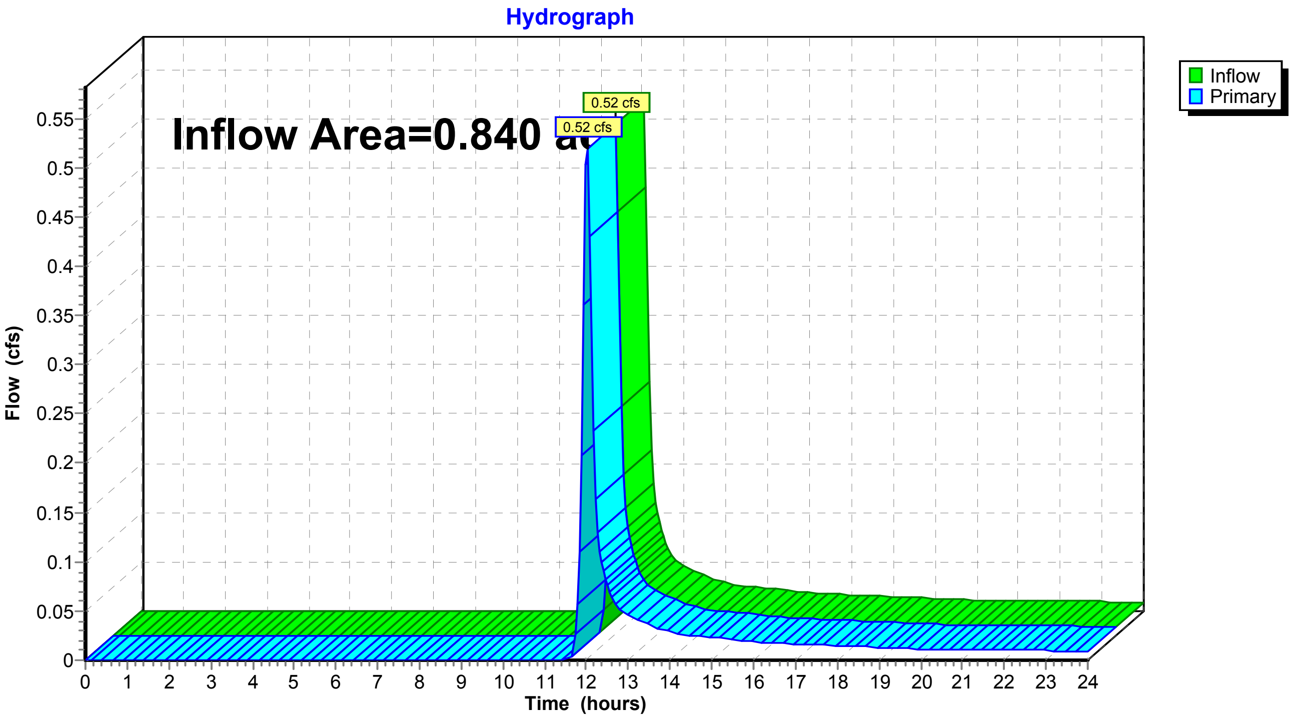


Summary for Link DP-3:

Inflow Area = 0.840 ac, 0.00% Impervious, Inflow Depth > 0.43" for 1 Year event
Inflow = 0.52 cfs @ 12.02 hrs, Volume= 0.030 af
Primary = 0.52 cfs @ 12.02 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: Runoff Area=2.510 ac 0.00% Impervious Runoff Depth>1.08"
Tc=17.4 min CN=88 Runoff=3.26 cfs 0.226 af

SubcatchmentDA-2: Runoff Area=1.520 ac 0.00% Impervious Runoff Depth>0.53"
Tc=11.3 min CN=77 Runoff=1.08 cfs 0.067 af

SubcatchmentDA-3: Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>0.61"
Tc=9.3 min CN=79 Runoff=0.77 cfs 0.043 af

SubcatchmentDA-4.A: Runoff Area=1.340 ac 0.00% Impervious Runoff Depth>1.45"
Tc=5.0 min CN=93 Runoff=3.39 cfs 0.162 af

SubcatchmentDA-4.B: Runoff Area=1.640 ac 0.00% Impervious Runoff Depth>1.62"
Tc=5.0 min CN=95 Runoff=4.52 cfs 0.222 af

SubcatchmentDA-5: Runoff Area=1.280 ac 0.00% Impervious Runoff Depth>1.37"
Tc=5.0 min CN=92 Runoff=3.09 cfs 0.146 af

Link 4L: Whole Site Inflow=14.22 cfs 0.867 af
Primary=14.22 cfs 0.867 af

Link DP-1: Inflow=4.22 cfs 0.293 af
Primary=4.22 cfs 0.293 af

Link DP-2: Inflow=10.99 cfs 0.530 af
Primary=10.99 cfs 0.530 af

Link DP-3: Inflow=0.77 cfs 0.043 af
Primary=0.77 cfs 0.043 af

Total Runoff Area = 9.130 ac Runoff Volume = 0.867 af Average Runoff Depth = 1.14"
100.00% Pervious = 9.130 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA-1:

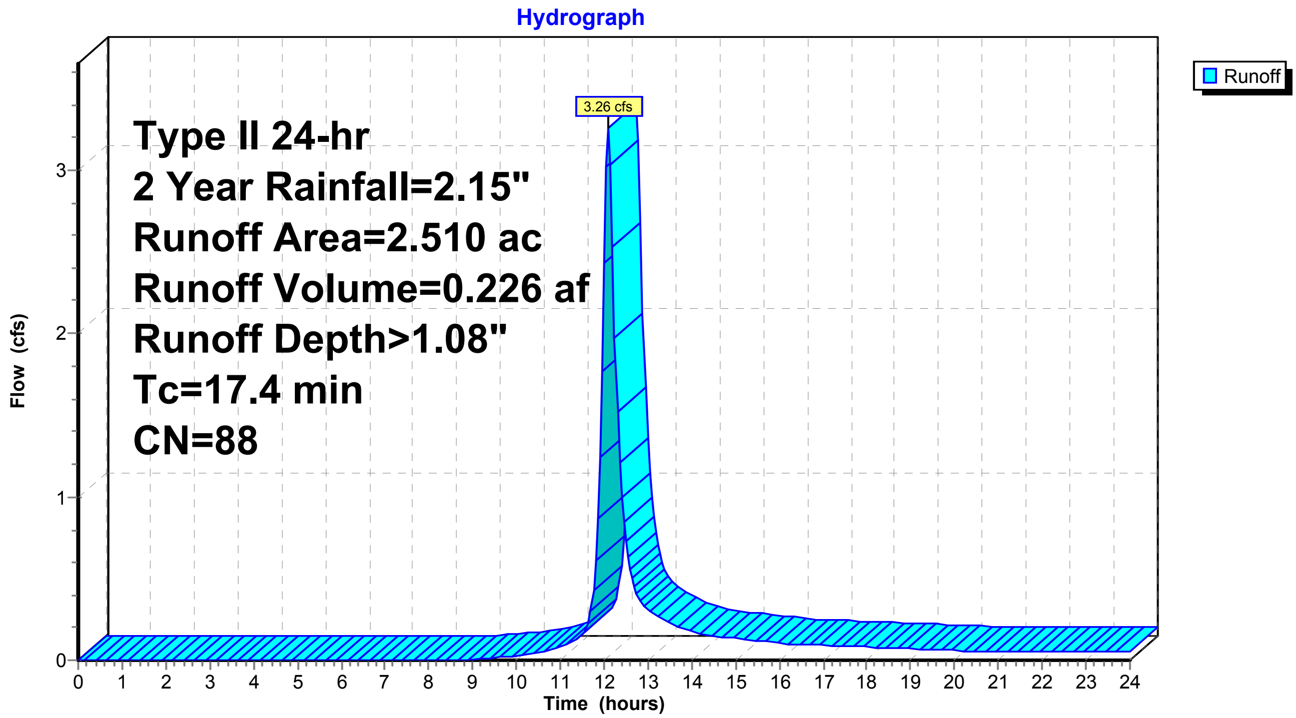
Runoff = 3.26 cfs @ 12.10 hrs, Volume= 0.226 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	2.510	88	
	2.510		100.00% Pervious Area

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

Subcatchment DA-1:



Summary for Subcatchment DA-2:

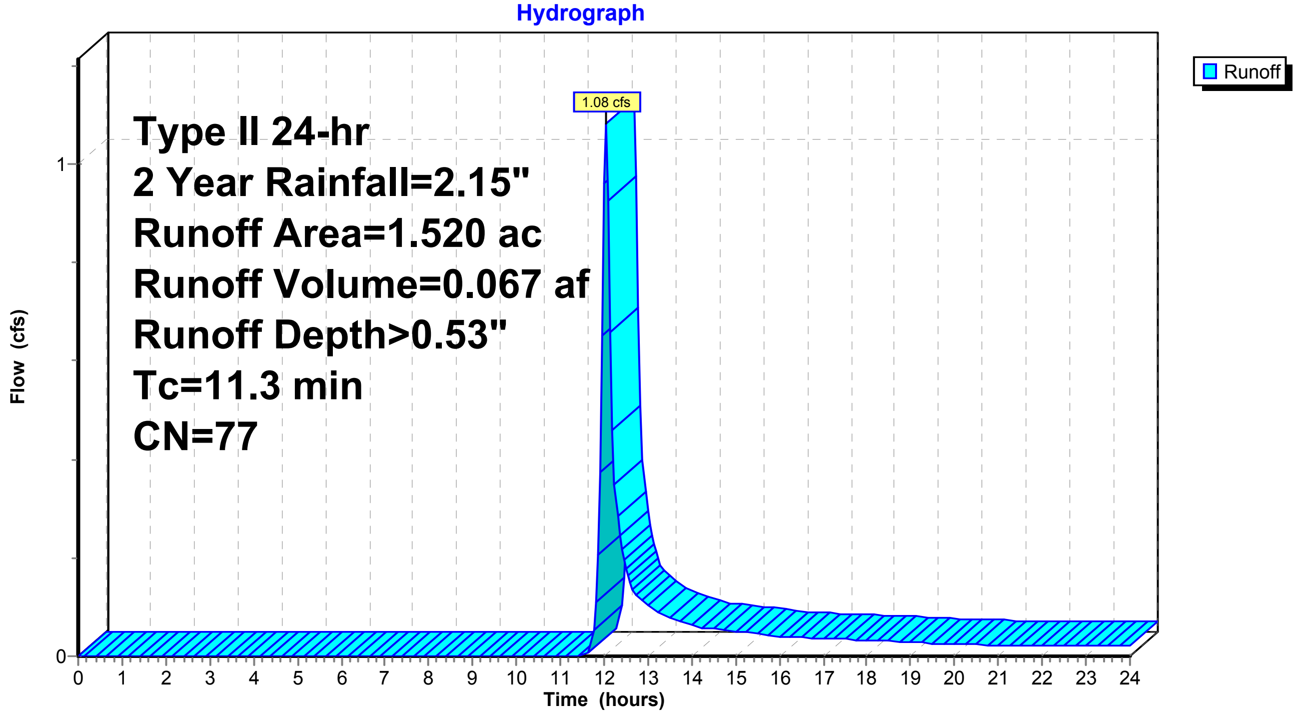
Runoff = 1.08 cfs @ 12.05 hrs, Volume= 0.067 af, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.520	77	
	1.520		100.00% Pervious Area

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

Subcatchment DA-2:



Summary for Subcatchment DA-3:

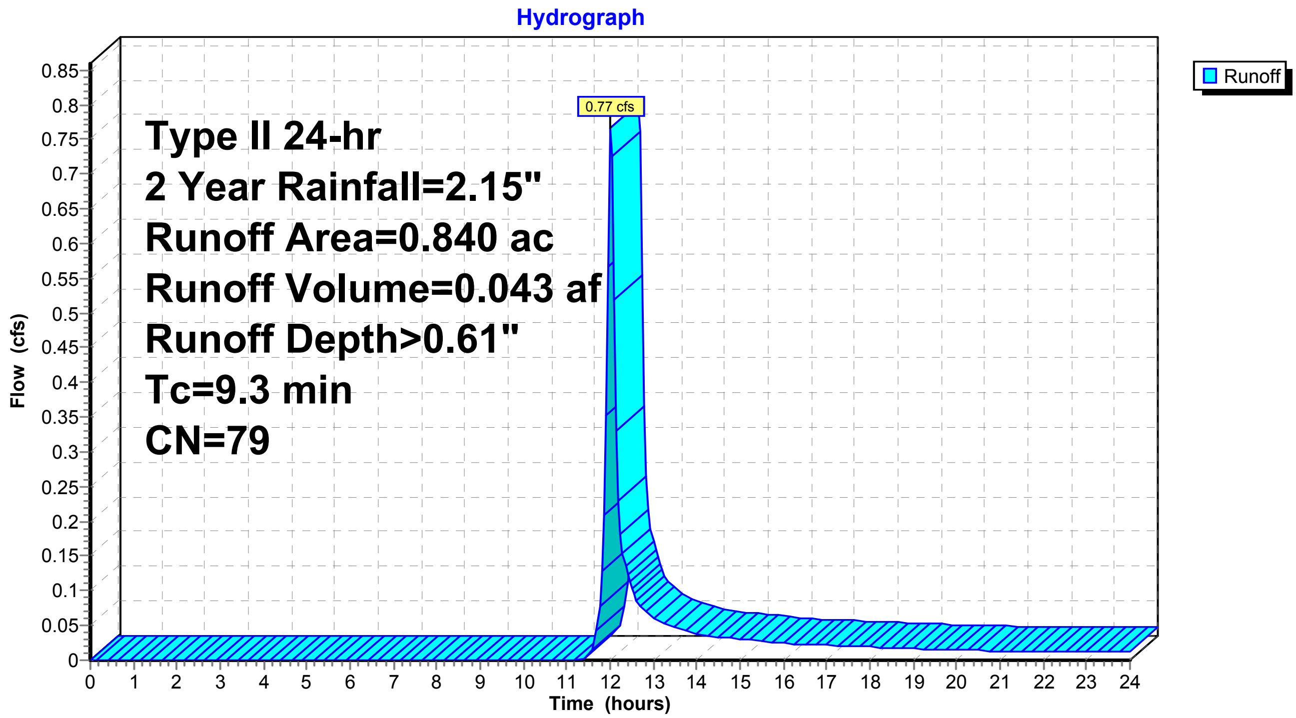
Runoff = 0.77 cfs @ 12.02 hrs, Volume= 0.043 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	0.840	79	
	0.840		100.00% Pervious Area

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

Subcatchment DA-3:



Summary for Subcatchment DA-4.A:

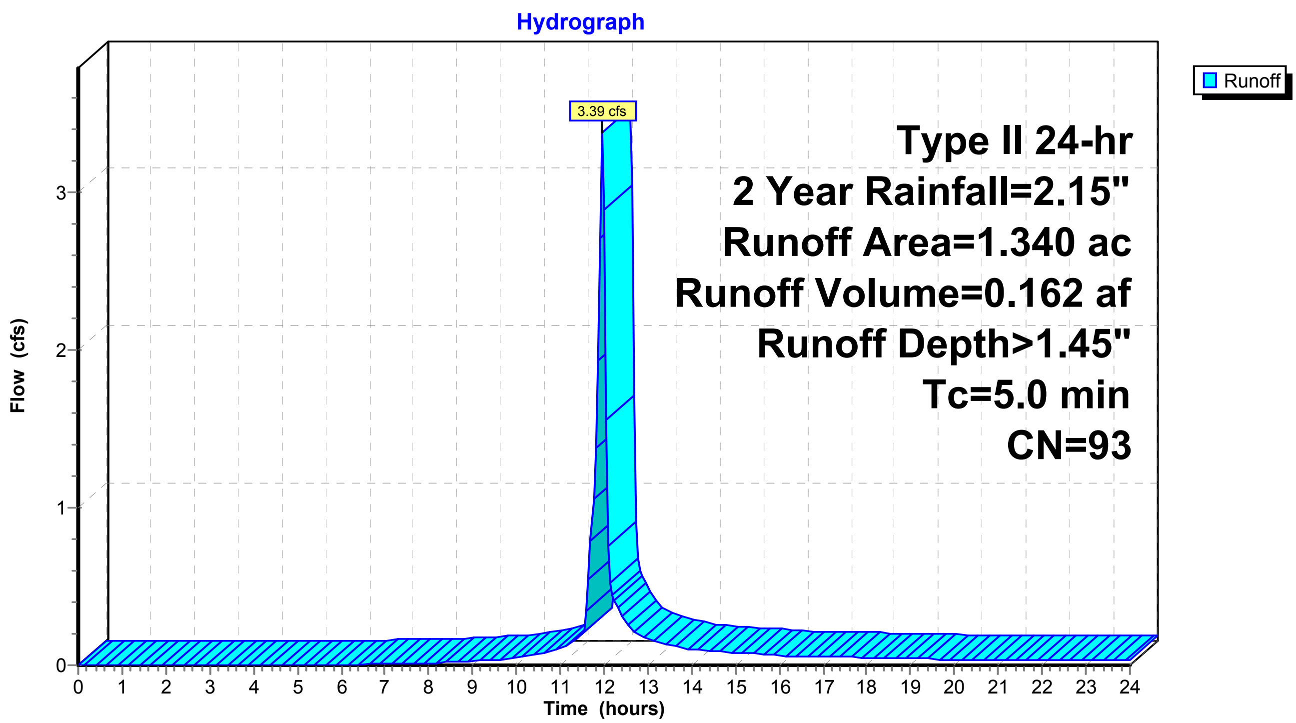
Runoff = 3.39 cfs @ 11.95 hrs, Volume= 0.162 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.340	93	
	1.340		100.00% Pervious Area

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

Subcatchment DA-4.A:



Summary for Subcatchment DA-4.B:

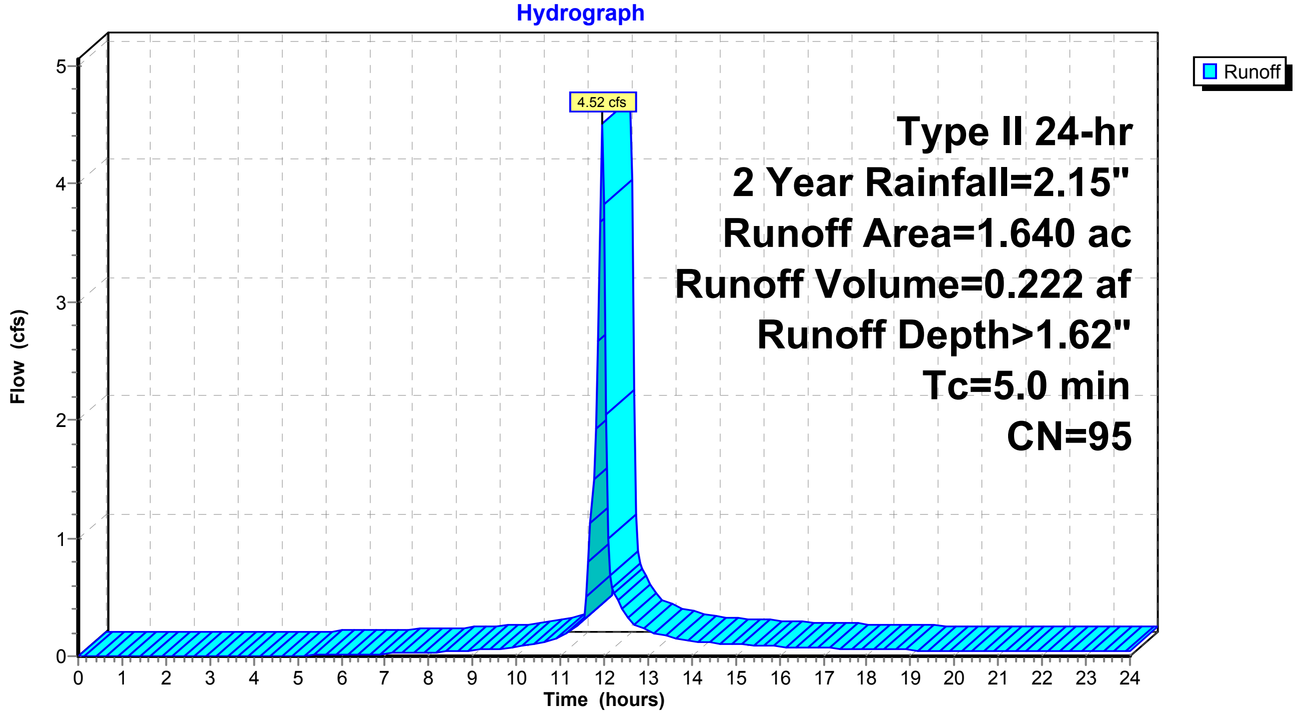
Runoff = 4.52 cfs @ 11.95 hrs, Volume= 0.222 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.640	95	
	1.640		100.00% Pervious Area

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

Subcatchment DA-4.B:



Summary for Subcatchment DA-5:

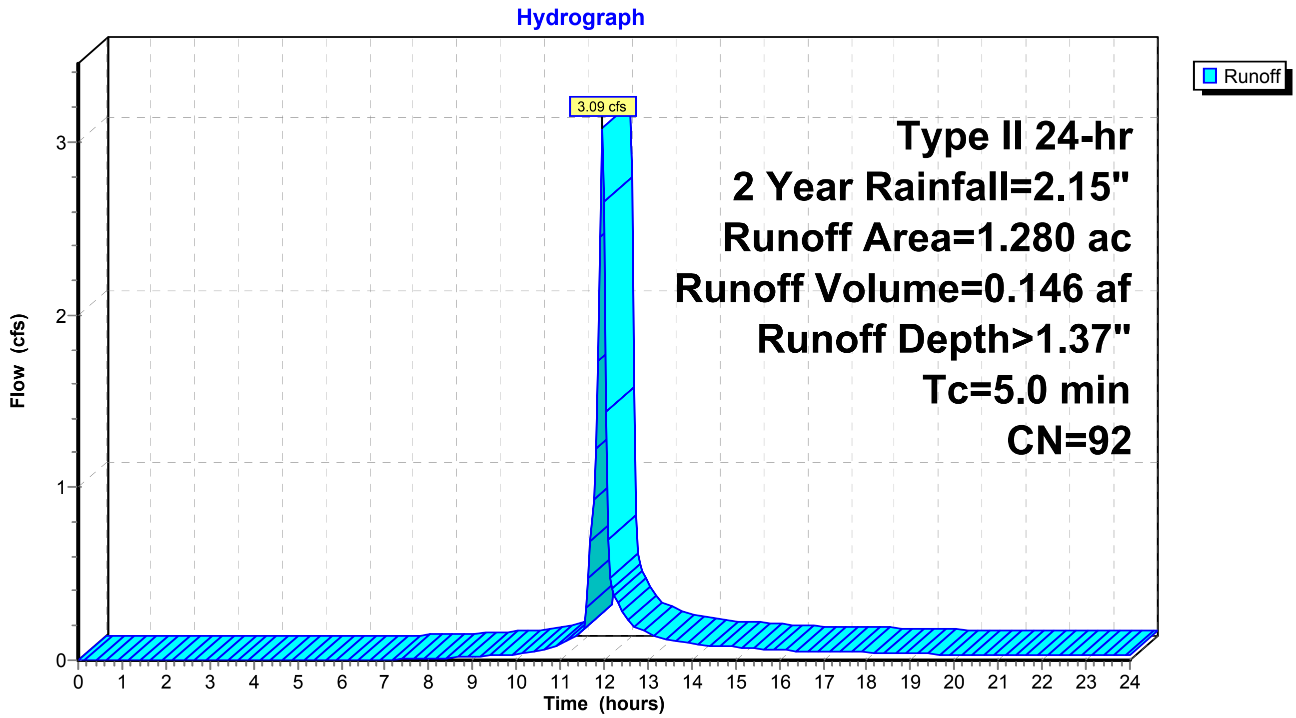
Runoff = 3.09 cfs @ 11.95 hrs, Volume= 0.146 af, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Year Rainfall=2.15"

	Area (ac)	CN	Description
*	1.280	92	
	1.280		100.00% Pervious Area

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

Subcatchment DA-5:

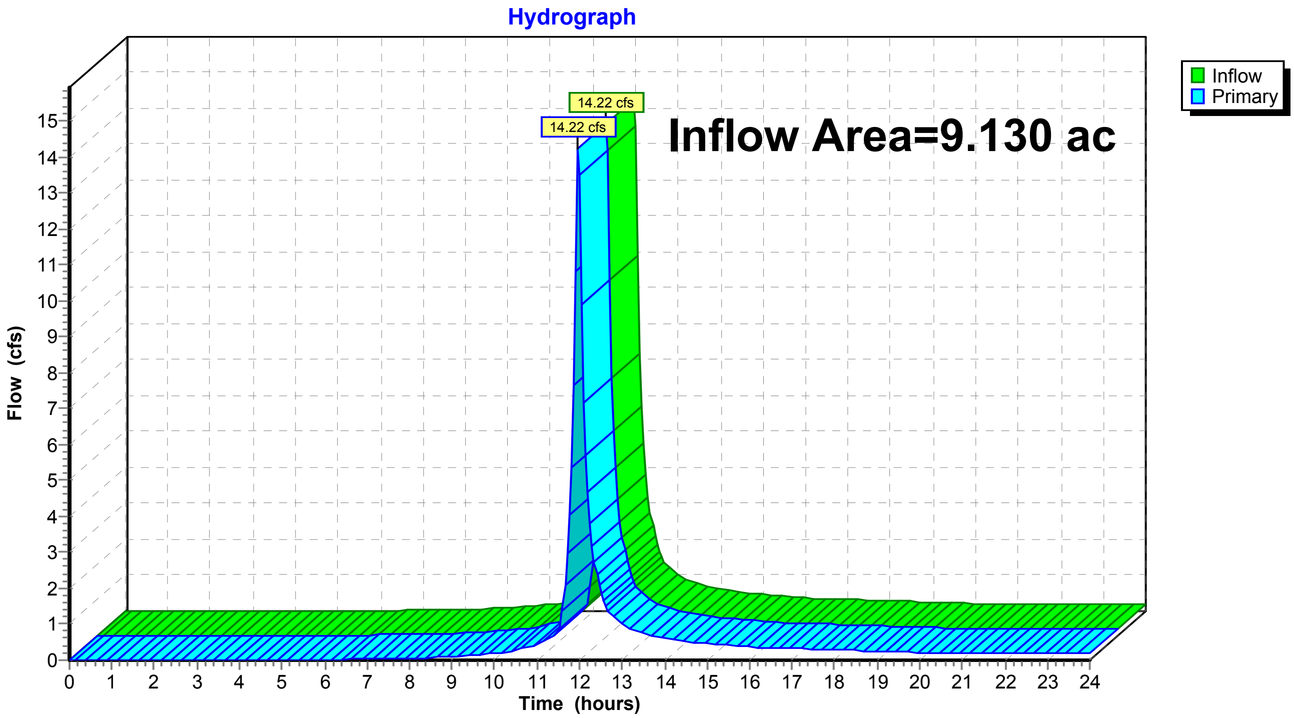


Summary for Link 4L: Whole Site

Inflow Area = 9.130 ac, 0.00% Impervious, Inflow Depth > 1.14" for 2 Year event
Inflow = 14.22 cfs @ 11.97 hrs, Volume= 0.867 af
Primary = 14.22 cfs @ 11.97 hrs, Volume= 0.867 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 4L: Whole Site

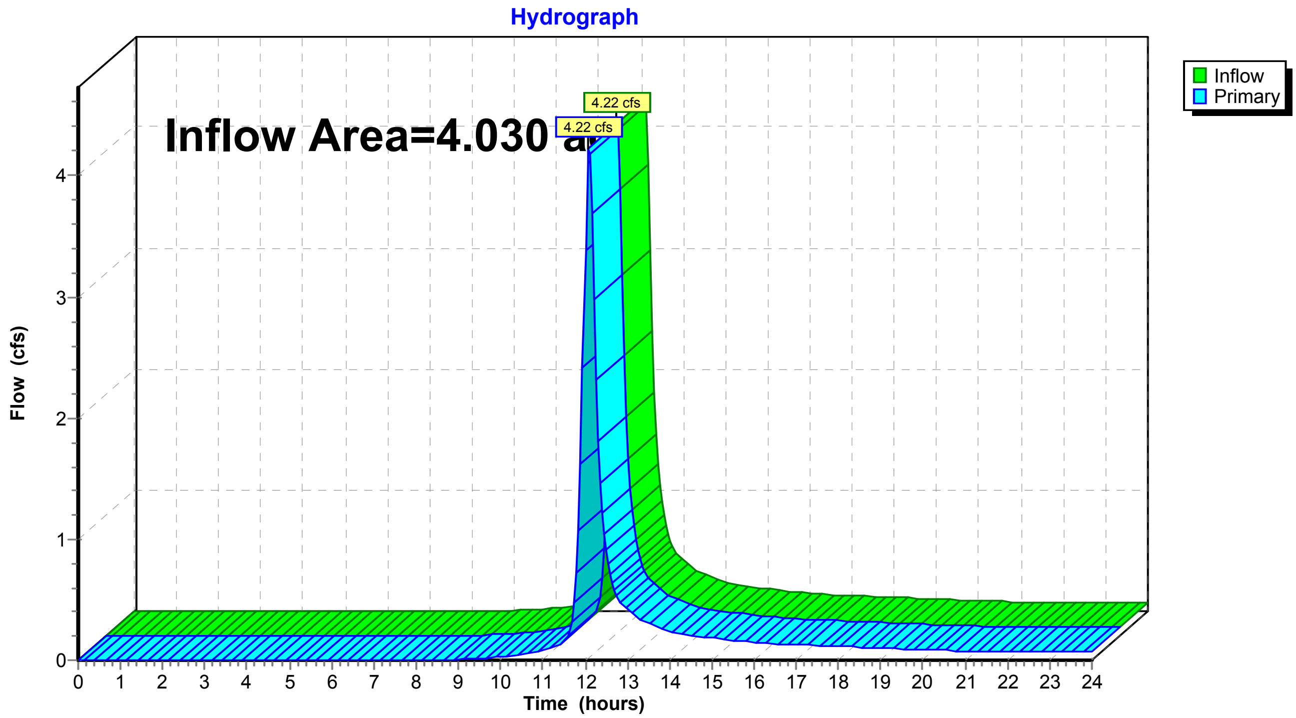


Summary for Link DP-1:

Inflow Area = 4.030 ac, 0.00% Impervious, Inflow Depth > 0.87" for 2 Year event
Inflow = 4.22 cfs @ 12.08 hrs, Volume= 0.293 af
Primary = 4.22 cfs @ 12.08 hrs, Volume= 0.293 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

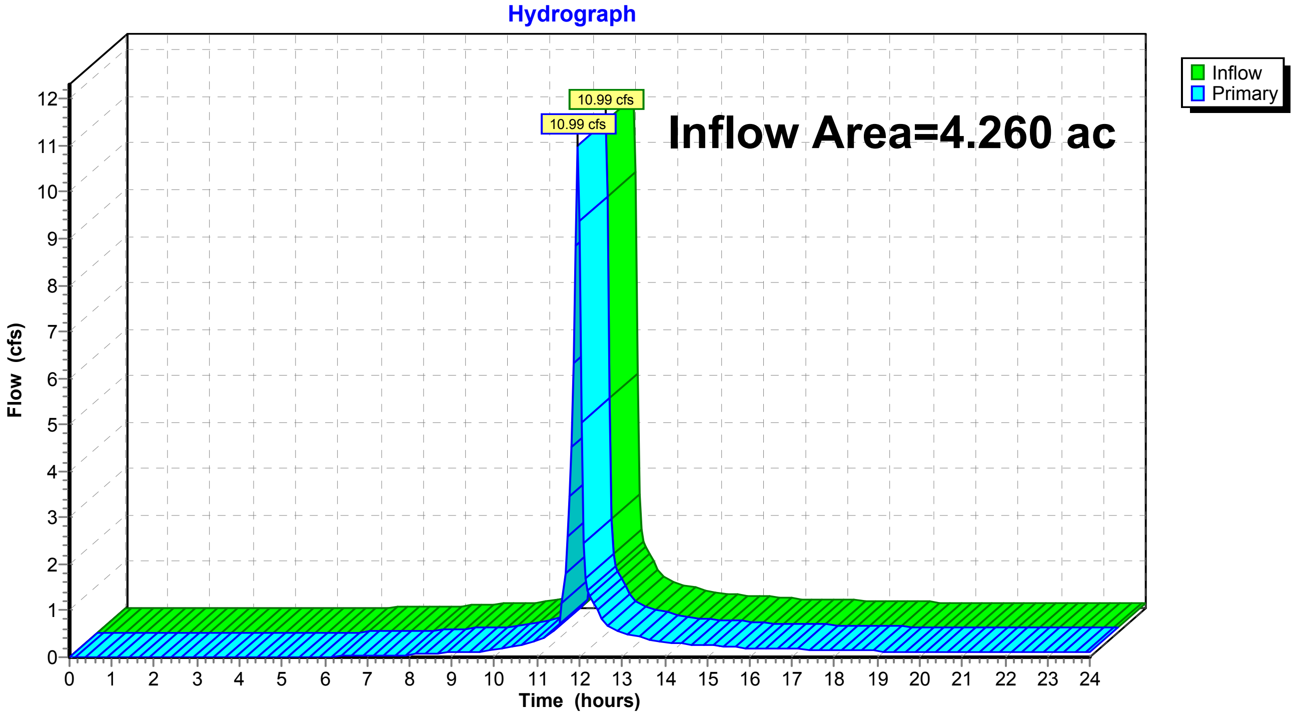


Summary for Link DP-2:

Inflow Area =	4.260 ac,	0.00% Impervious,	Inflow Depth > 1.49"	for 2 Year event
Inflow =	10.99 cfs @	11.95 hrs, Volume=	0.530 af	
Primary =	10.99 cfs @	11.95 hrs, Volume=	0.530 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

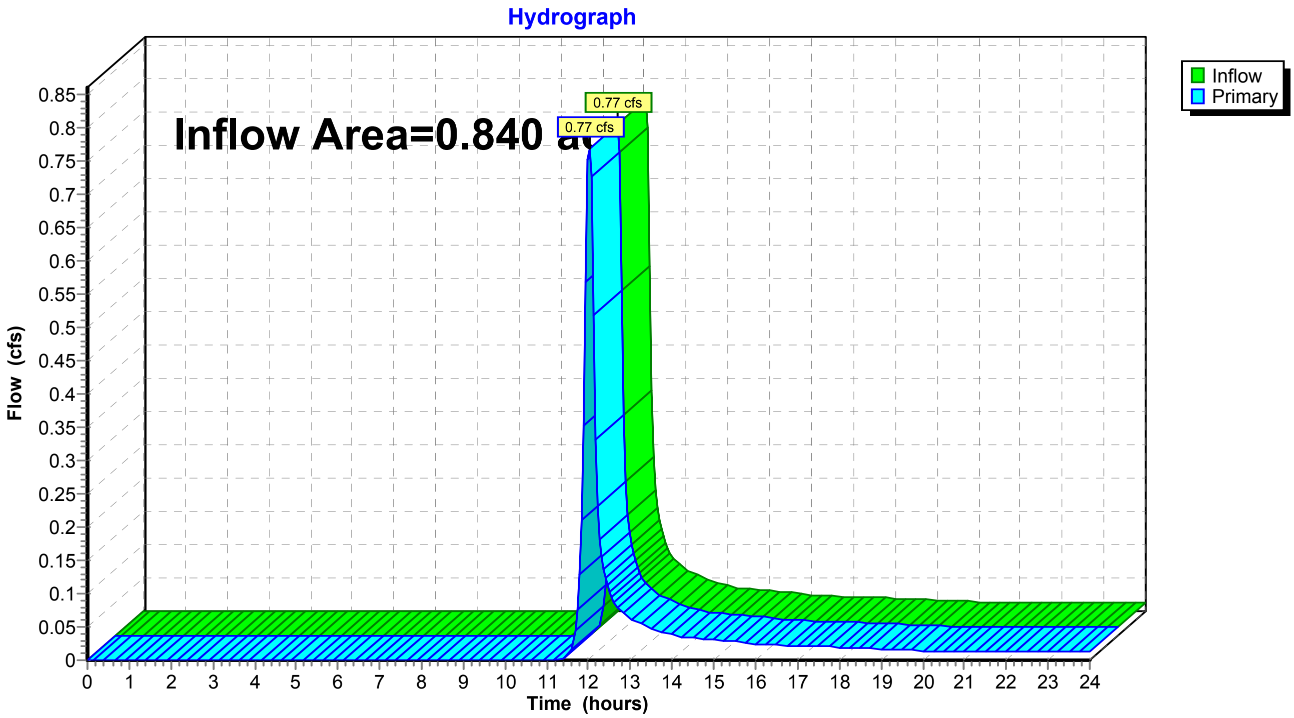


Summary for Link DP-3:

Inflow Area = 0.840 ac, 0.00% Impervious, Inflow Depth > 0.61" for 2 Year event
Inflow = 0.77 cfs @ 12.02 hrs, Volume= 0.043 af
Primary = 0.77 cfs @ 12.02 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: Runoff Area=2.510 ac 0.00% Impervious Runoff Depth>1.89"
Tc=17.4 min CN=88 Runoff=5.68 cfs 0.396 af

SubcatchmentDA-2: Runoff Area=1.520 ac 0.00% Impervious Runoff Depth>1.13"
Tc=11.3 min CN=77 Runoff=2.47 cfs 0.143 af

SubcatchmentDA-3: Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>1.25"
Tc=9.3 min CN=79 Runoff=1.63 cfs 0.088 af

SubcatchmentDA-4.A: Runoff Area=1.340 ac 0.00% Impervious Runoff Depth>2.34"
Tc=5.0 min CN=93 Runoff=5.31 cfs 0.261 af

SubcatchmentDA-4.B: Runoff Area=1.640 ac 0.00% Impervious Runoff Depth>2.54"
Tc=5.0 min CN=95 Runoff=6.85 cfs 0.347 af

SubcatchmentDA-5: Runoff Area=1.280 ac 0.00% Impervious Runoff Depth>2.24"
Tc=5.0 min CN=92 Runoff=4.92 cfs 0.239 af

Link 4L: Whole Site Inflow=23.77 cfs 1.473 af
Primary=23.77 cfs 1.473 af

Link DP-1: Inflow=7.90 cfs 0.539 af
Primary=7.90 cfs 0.539 af

Link DP-2: Inflow=17.08 cfs 0.847 af
Primary=17.08 cfs 0.847 af

Link DP-3: Inflow=1.63 cfs 0.088 af
Primary=1.63 cfs 0.088 af

Total Runoff Area = 9.130 ac Runoff Volume = 1.473 af Average Runoff Depth = 1.94"
100.00% Pervious = 9.130 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA-1:

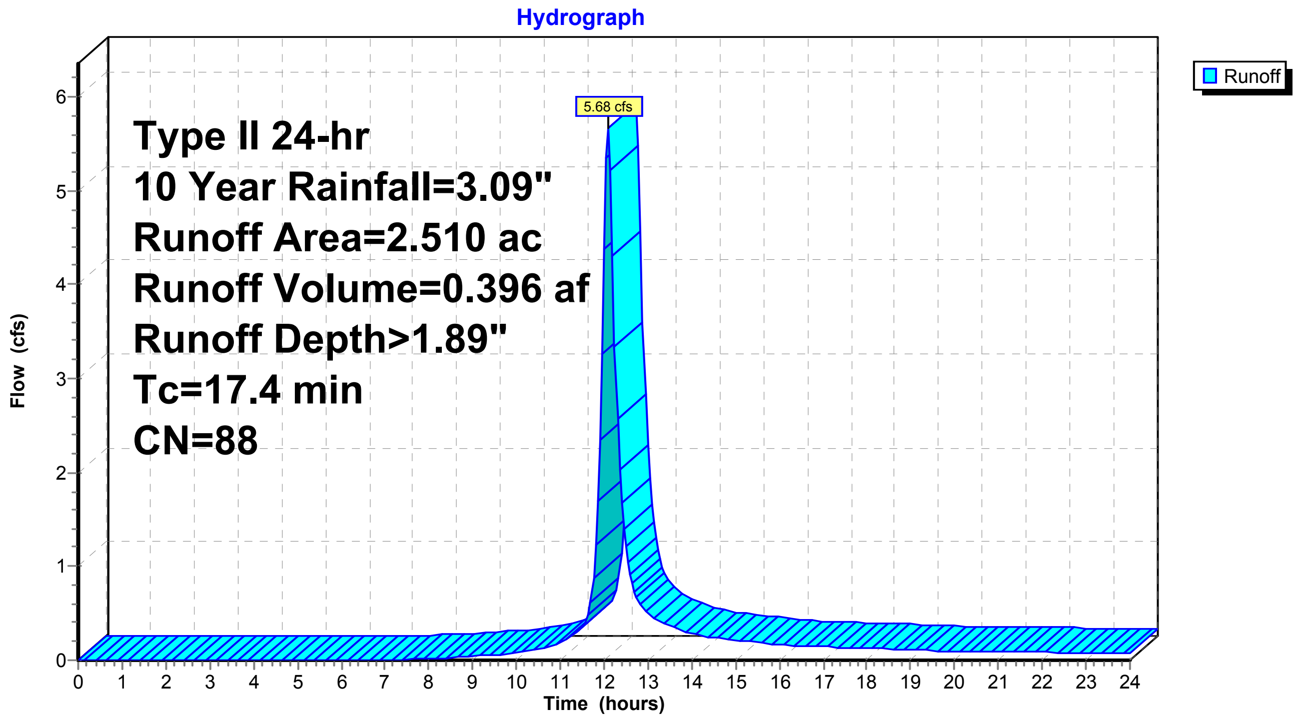
Runoff = 5.68 cfs @ 12.10 hrs, Volume= 0.396 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	2.510	88	
	2.510		100.00% Pervious Area

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

Subcatchment DA-1:



Summary for Subcatchment DA-2:

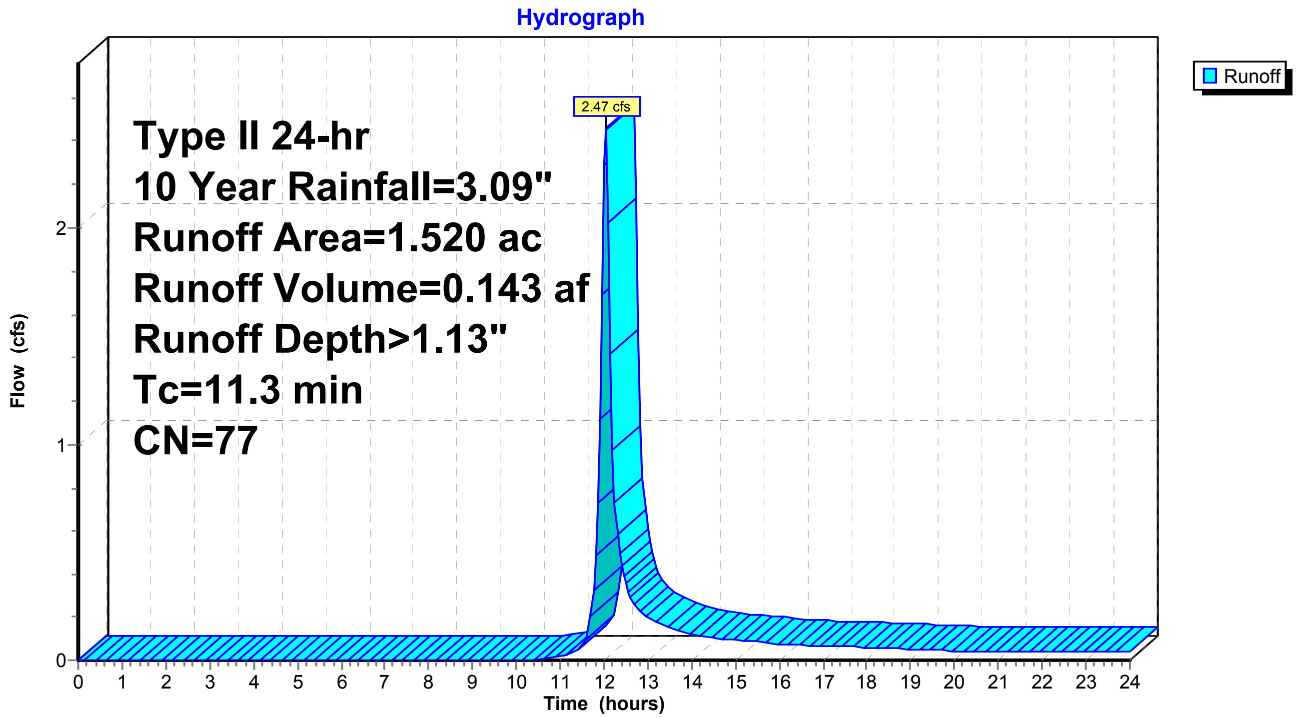
Runoff = 2.47 cfs @ 12.04 hrs, Volume= 0.143 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.520	77	
	1.520		100.00% Pervious Area

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

Subcatchment DA-2:



Summary for Subcatchment DA-3:

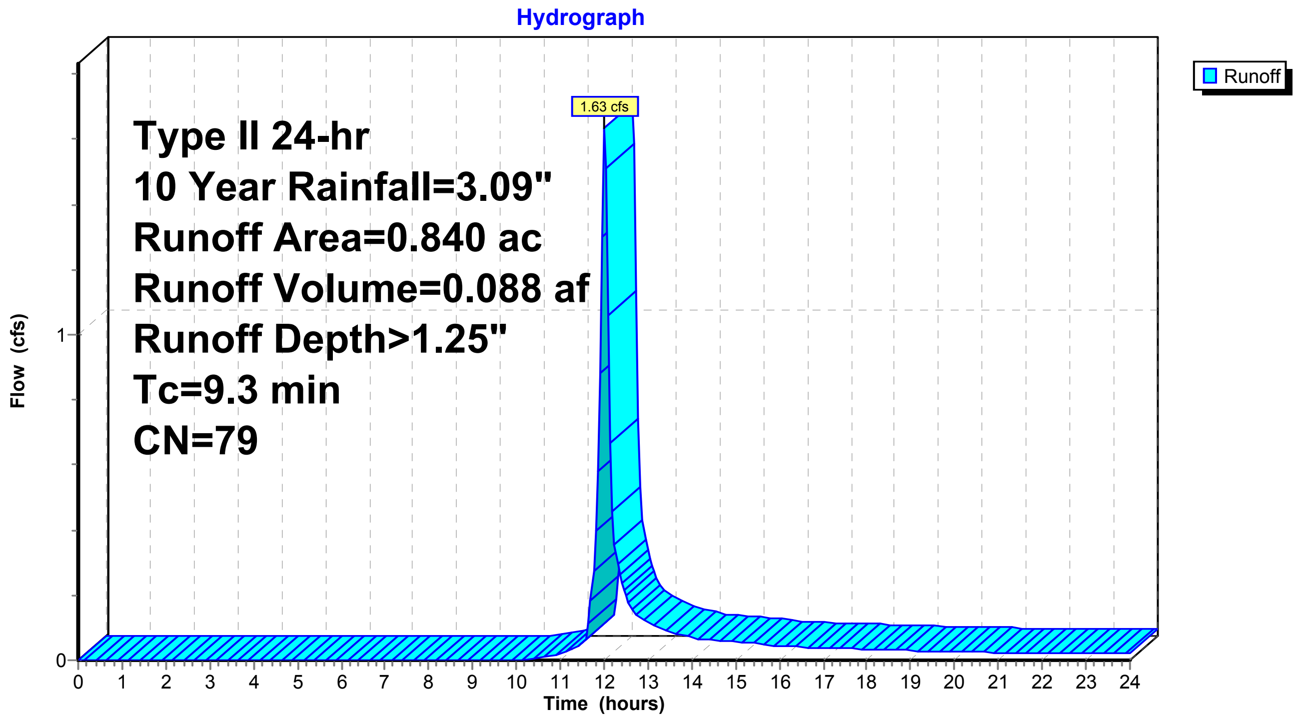
Runoff = 1.63 cfs @ 12.01 hrs, Volume= 0.088 af, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	0.840	79	
	0.840		100.00% Pervious Area

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

Subcatchment DA-3:



Summary for Subcatchment DA-4.A:

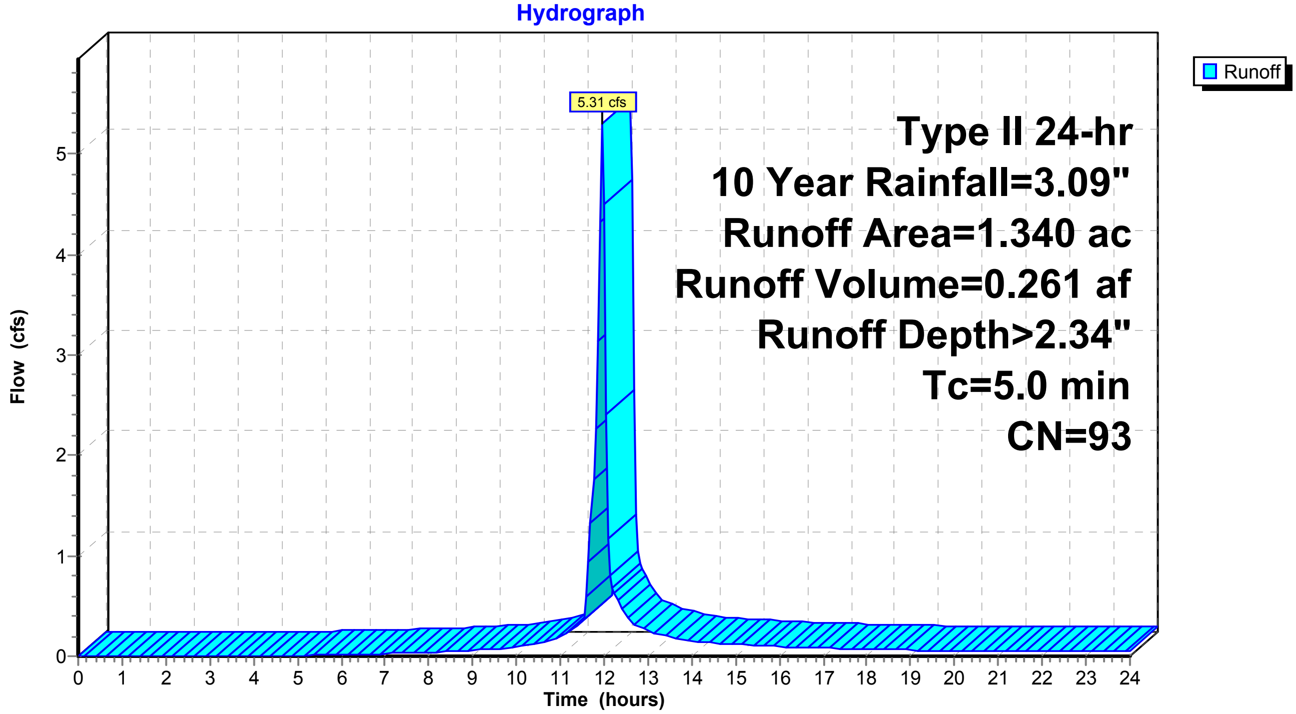
Runoff = 5.31 cfs @ 11.95 hrs, Volume= 0.261 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.340	93	
	1.340		100.00% Pervious Area

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

Subcatchment DA-4.A:



Summary for Subcatchment DA-4.B:

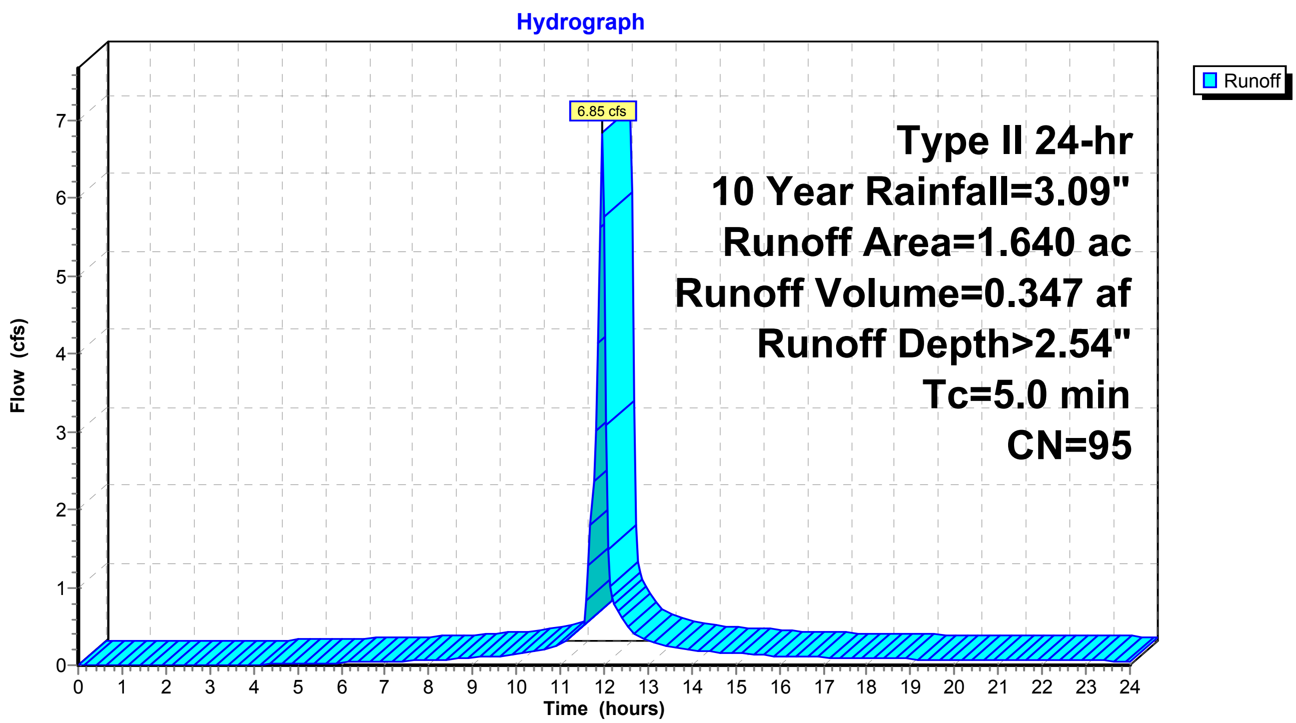
Runoff = 6.85 cfs @ 11.95 hrs, Volume= 0.347 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.640	95	
	1.640		100.00% Pervious Area

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

Subcatchment DA-4.B:



Summary for Subcatchment DA-5:

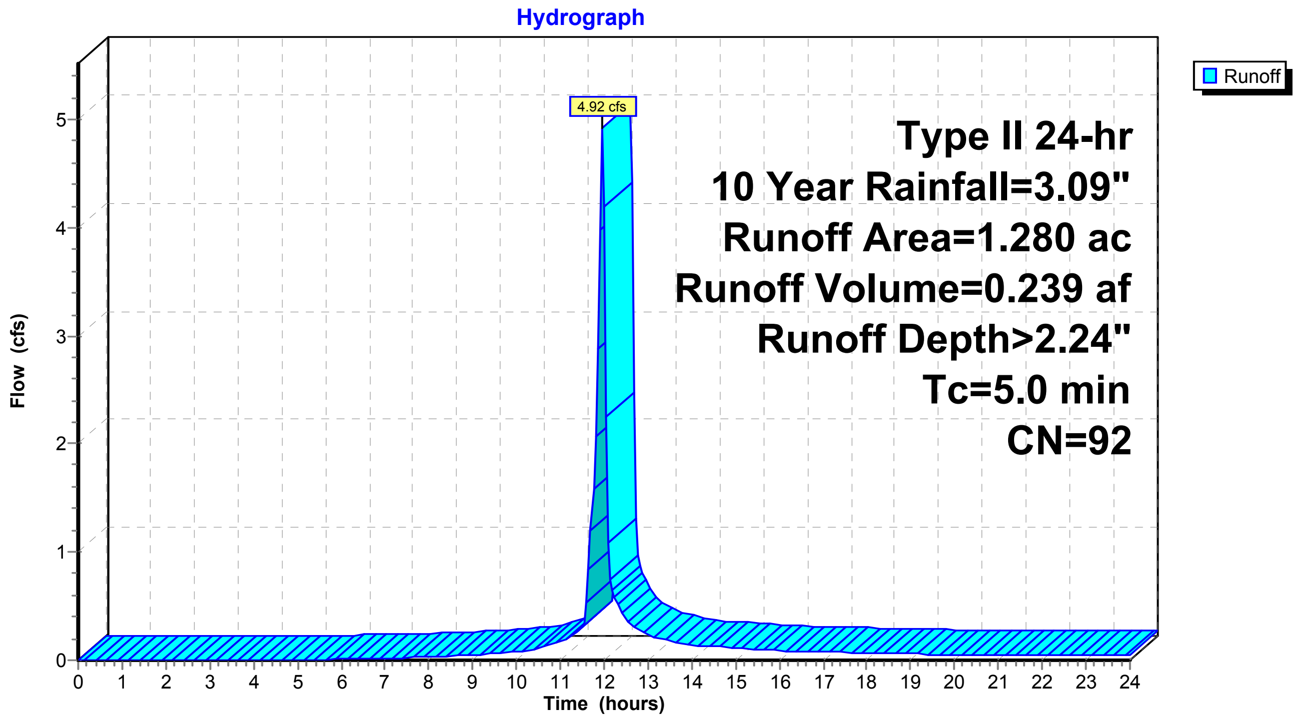
Runoff = 4.92 cfs @ 11.95 hrs, Volume= 0.239 af, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.09"

	Area (ac)	CN	Description
*	1.280	92	
	1.280		100.00% Pervious Area

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

Subcatchment DA-5:

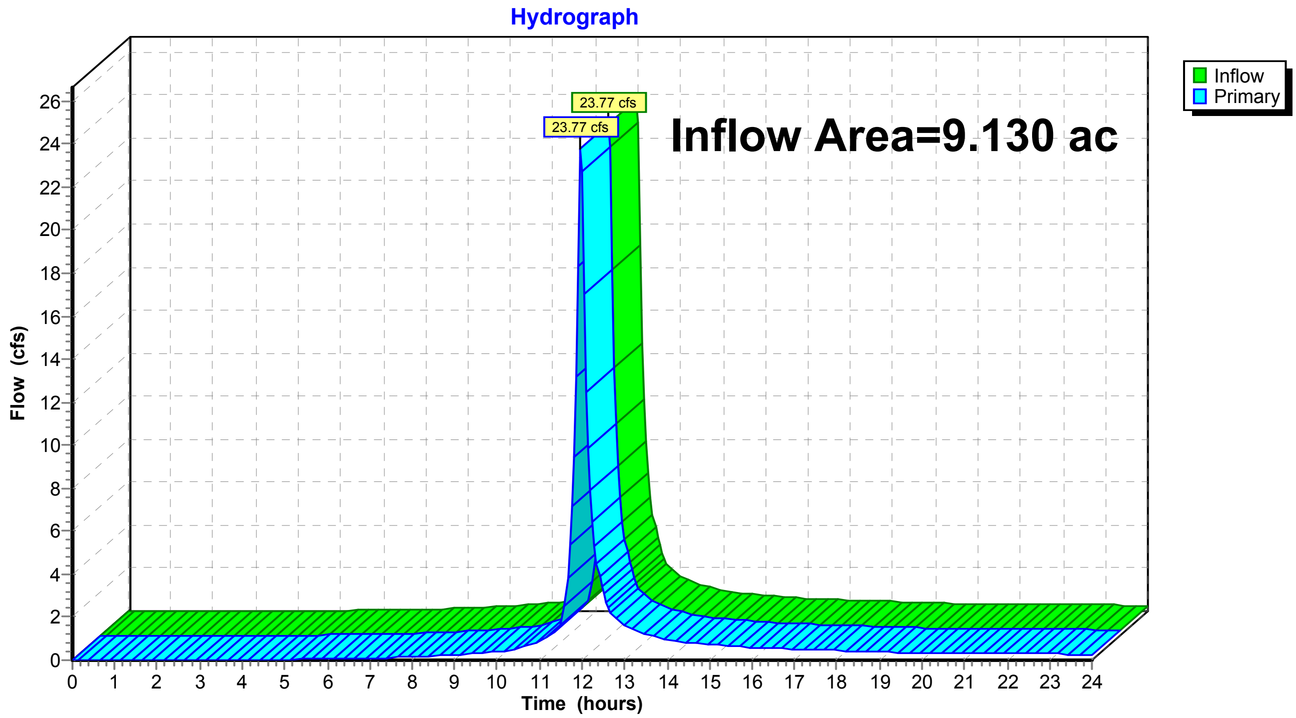


Summary for Link 4L: Whole Site

Inflow Area =	9.130 ac,	0.00% Impervious, Inflow Depth > 1.94"	for 10 Year event	
Inflow =	23.77 cfs @	11.97 hrs, Volume=	1.473 af	
Primary =	23.77 cfs @	11.97 hrs, Volume=	1.473 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 4L: Whole Site

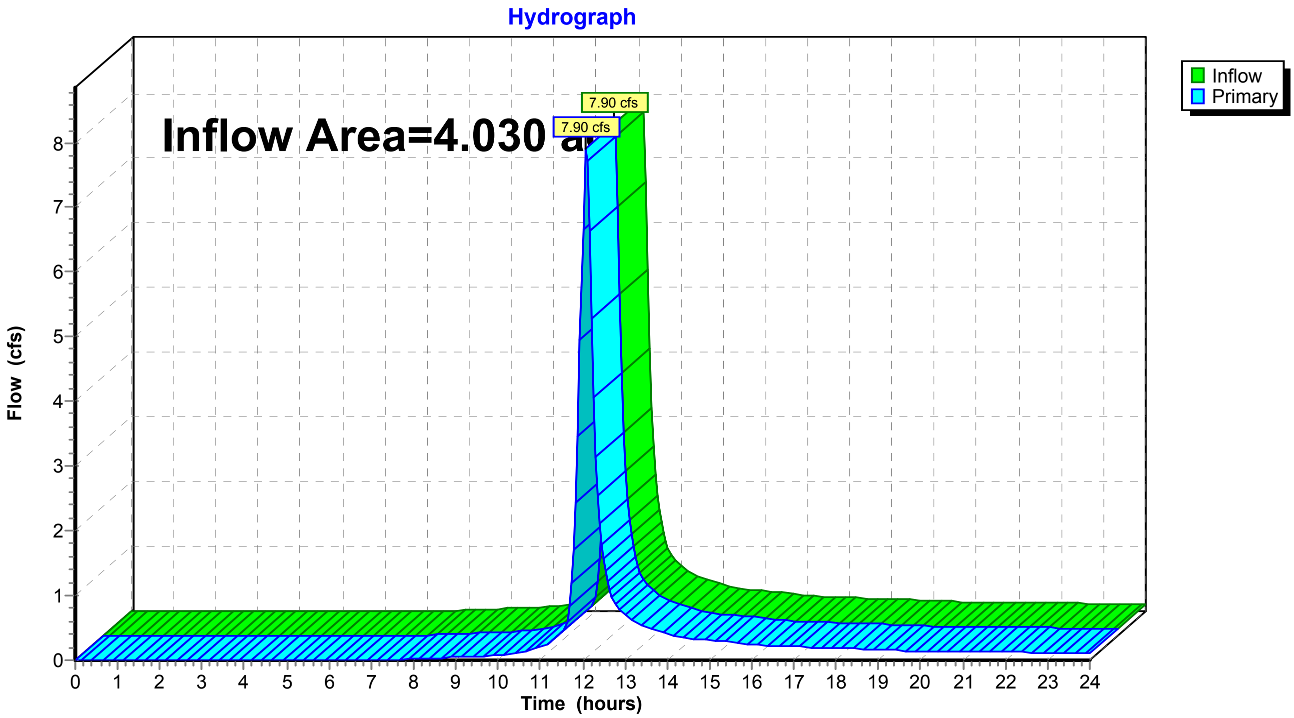


Summary for Link DP-1:

Inflow Area =	4.030 ac,	0.00% Impervious,	Inflow Depth > 1.60"	for 10 Year event	
Inflow =	7.90 cfs @	12.07 hrs,	Volume=	0.539 af	
Primary =	7.90 cfs @	12.07 hrs,	Volume=	0.539 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

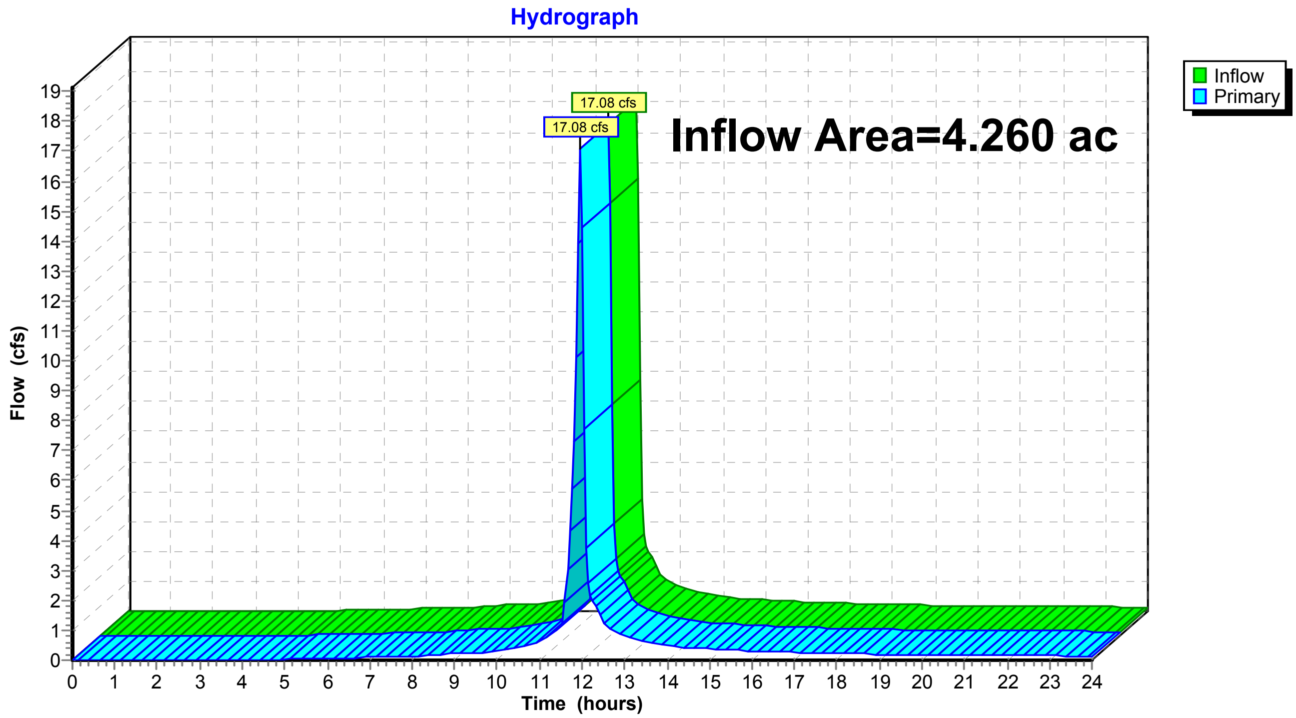


Summary for Link DP-2:

Inflow Area = 4.260 ac, 0.00% Impervious, Inflow Depth > 2.39" for 10 Year event
Inflow = 17.08 cfs @ 11.95 hrs, Volume= 0.847 af
Primary = 17.08 cfs @ 11.95 hrs, Volume= 0.847 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

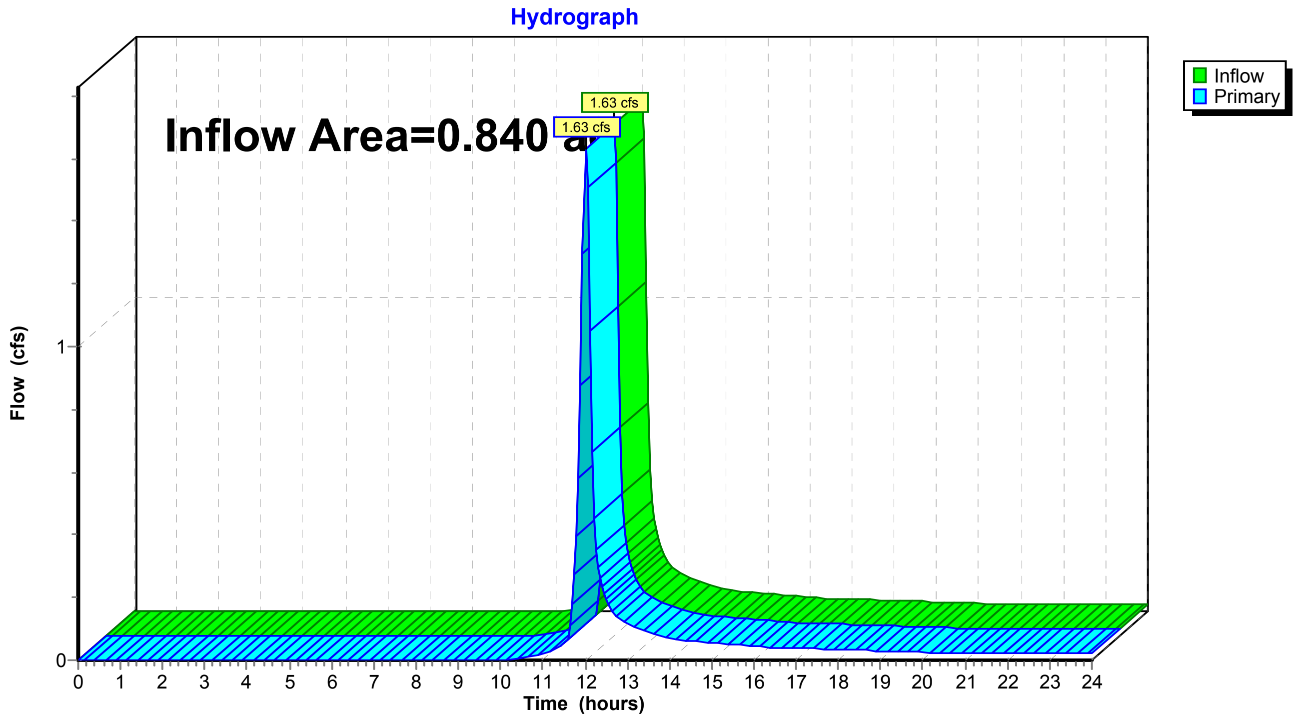


Summary for Link DP-3:

Inflow Area =	0.840 ac,	0.00% Impervious,	Inflow Depth > 1.25"	for 10 Year event	
Inflow =	1.63 cfs @	12.01 hrs,	Volume=	0.088 af	
Primary =	1.63 cfs @	12.01 hrs,	Volume=	0.088 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: Runoff Area=2.510 ac 0.00% Impervious Runoff Depth>3.86"
Tc=17.4 min CN=88 Runoff=11.30 cfs 0.806 af

SubcatchmentDA-2: Runoff Area=1.520 ac 0.00% Impervious Runoff Depth>2.79"
Tc=11.3 min CN=77 Runoff=6.17 cfs 0.354 af

SubcatchmentDA-3: Runoff Area=0.840 ac 0.00% Impervious Runoff Depth>2.98"
Tc=9.3 min CN=79 Runoff=3.88 cfs 0.208 af

SubcatchmentDA-4.A: Runoff Area=1.340 ac 0.00% Impervious Runoff Depth>4.40"
Tc=5.0 min CN=93 Runoff=9.59 cfs 0.491 af

SubcatchmentDA-4.B: Runoff Area=1.640 ac 0.00% Impervious Runoff Depth>4.62"
Tc=5.0 min CN=95 Runoff=12.02 cfs 0.632 af

SubcatchmentDA-5: Runoff Area=1.280 ac 0.00% Impervious Runoff Depth>4.29"
Tc=5.0 min CN=92 Runoff=9.03 cfs 0.458 af

Link 4L: Whole Site Inflow=46.22 cfs 2.950 af
Primary=46.22 cfs 2.950 af

Link DP-1: Inflow=16.93 cfs 1.160 af
Primary=16.93 cfs 1.160 af

Link DP-2: Inflow=30.64 cfs 1.581 af
Primary=30.64 cfs 1.581 af

Link DP-3: Inflow=3.88 cfs 0.208 af
Primary=3.88 cfs 0.208 af

Total Runoff Area = 9.130 ac Runoff Volume = 2.950 af Average Runoff Depth = 3.88"
100.00% Pervious = 9.130 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA-1:

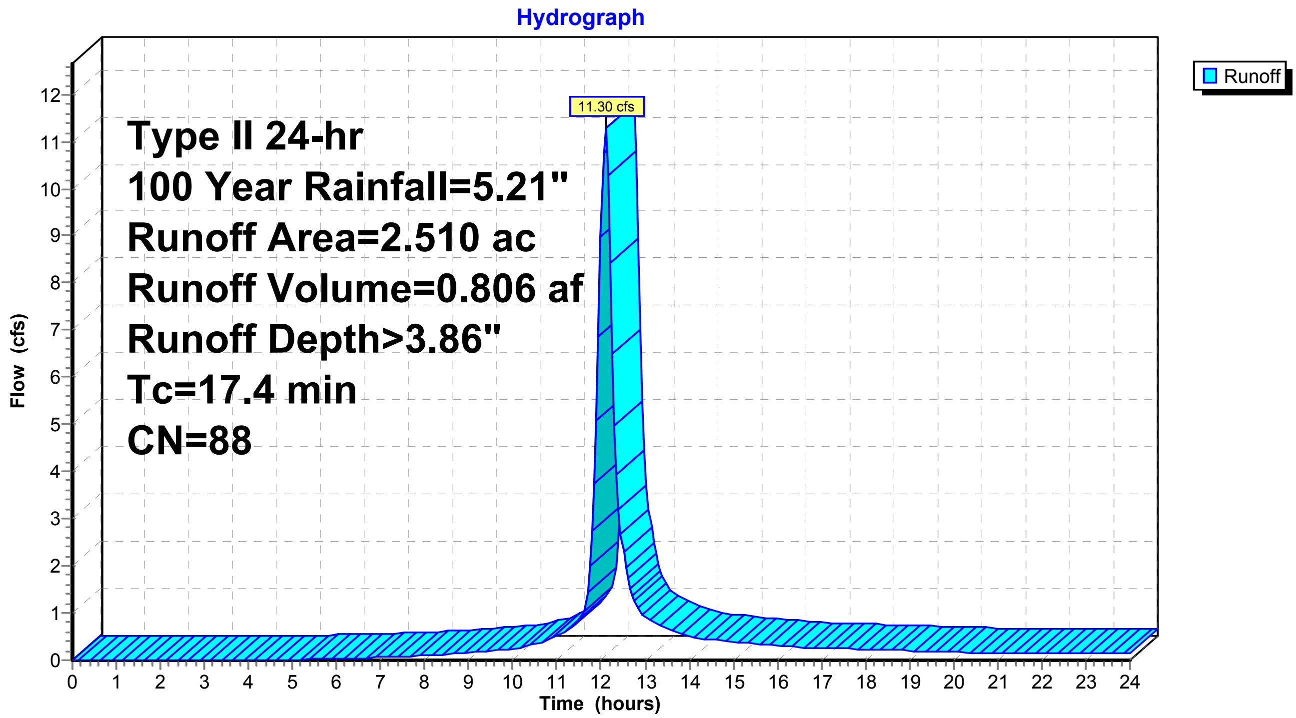
Runoff = 11.30 cfs @ 12.09 hrs, Volume= 0.806 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	2.510	88	
	2.510		100.00% Pervious Area

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

Subcatchment DA-1:



Summary for Subcatchment DA-2:

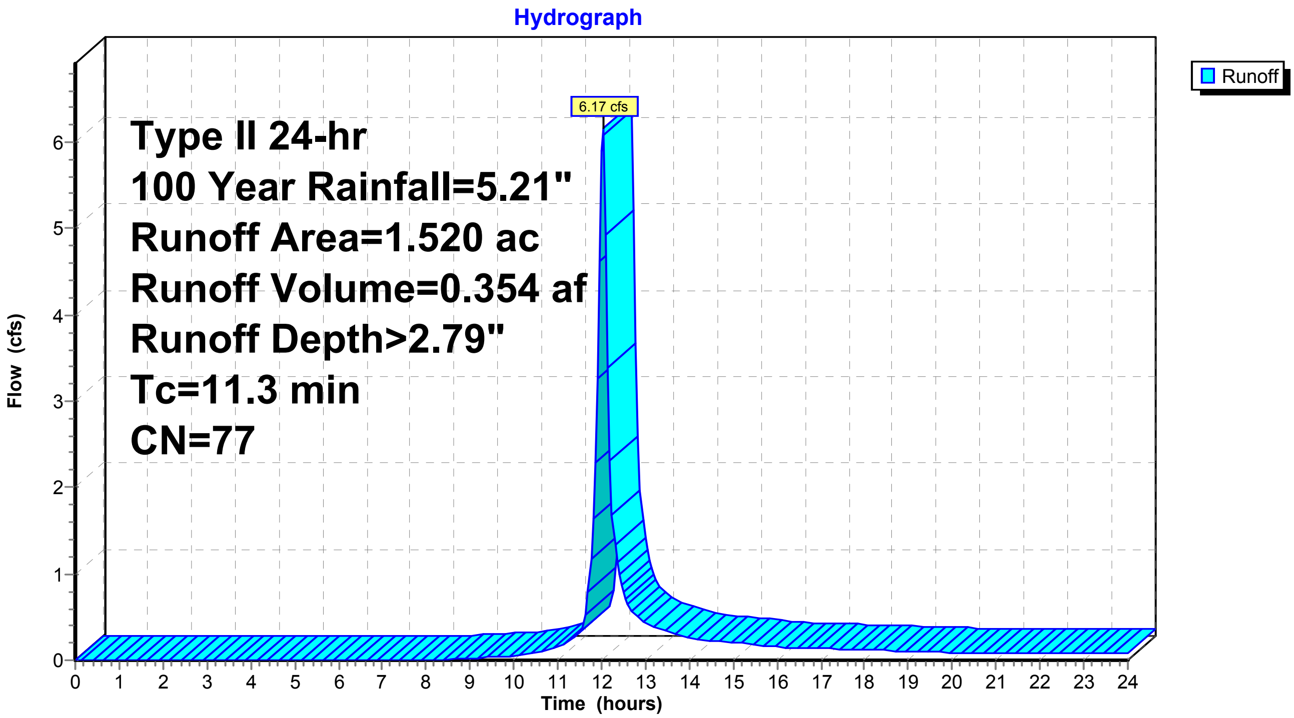
Runoff = 6.17 cfs @ 12.03 hrs, Volume= 0.354 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.520	77	
	1.520		100.00% Pervious Area

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

Subcatchment DA-2:



Summary for Subcatchment DA-3:

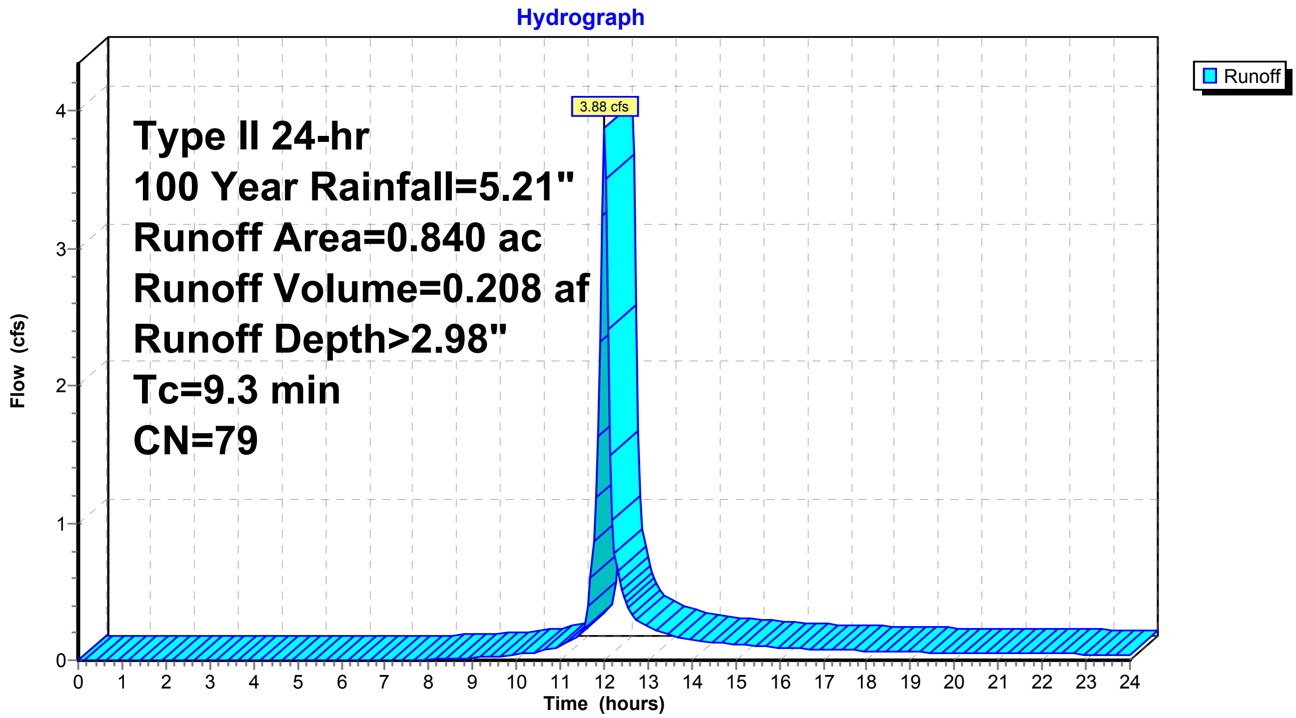
Runoff = 3.88 cfs @ 12.01 hrs, Volume= 0.208 af, Depth> 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	0.840	79	
	0.840		100.00% Pervious Area

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

Subcatchment DA-3:



Summary for Subcatchment DA-4.A:

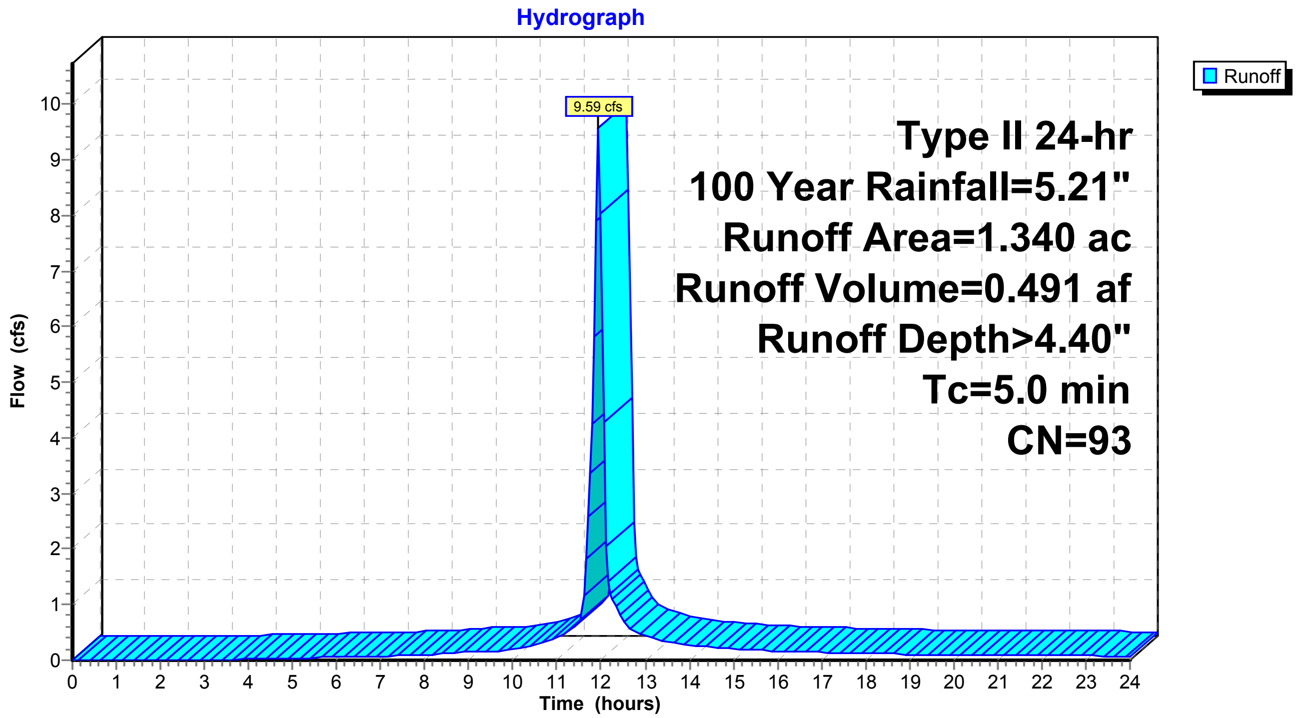
Runoff = 9.59 cfs @ 11.95 hrs, Volume= 0.491 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.340	93	
	1.340		100.00% Pervious Area

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

Subcatchment DA-4.A:



Summary for Subcatchment DA-4.B:

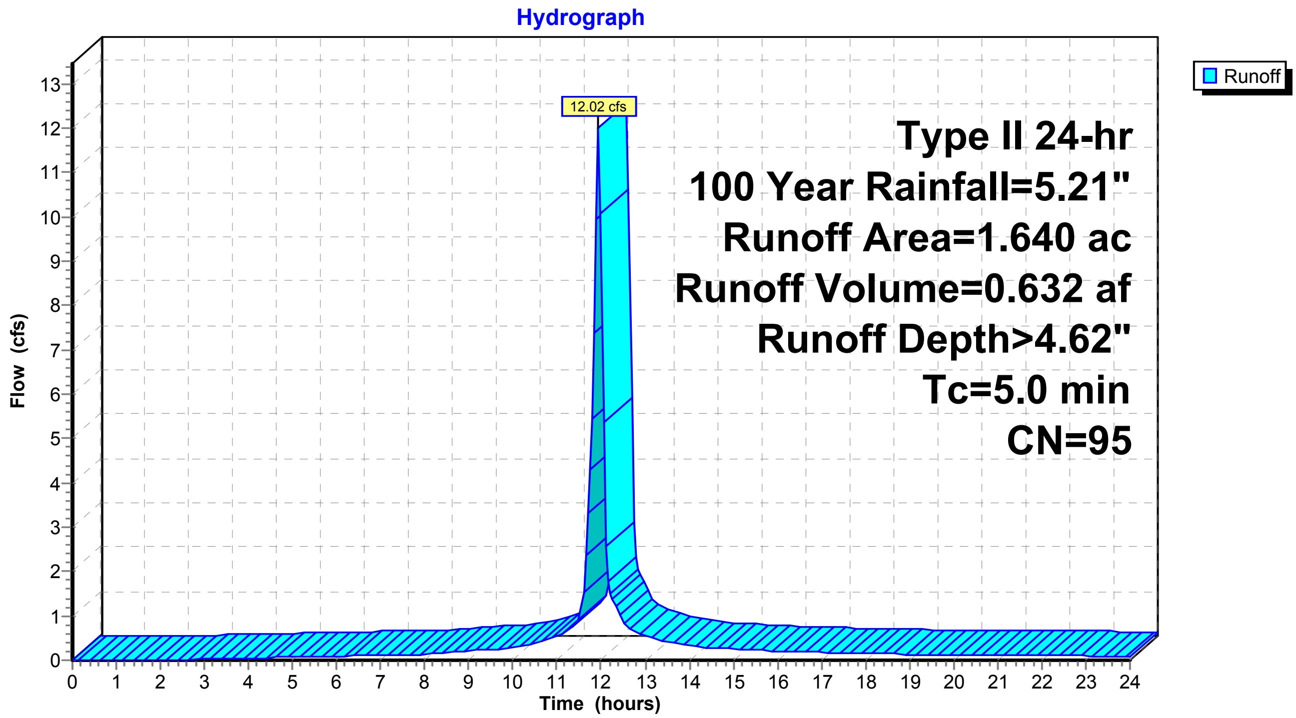
Runoff = 12.02 cfs @ 11.95 hrs, Volume= 0.632 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.640	95	
	1.640		100.00% Pervious Area

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

Subcatchment DA-4.B:



Summary for Subcatchment DA-5:

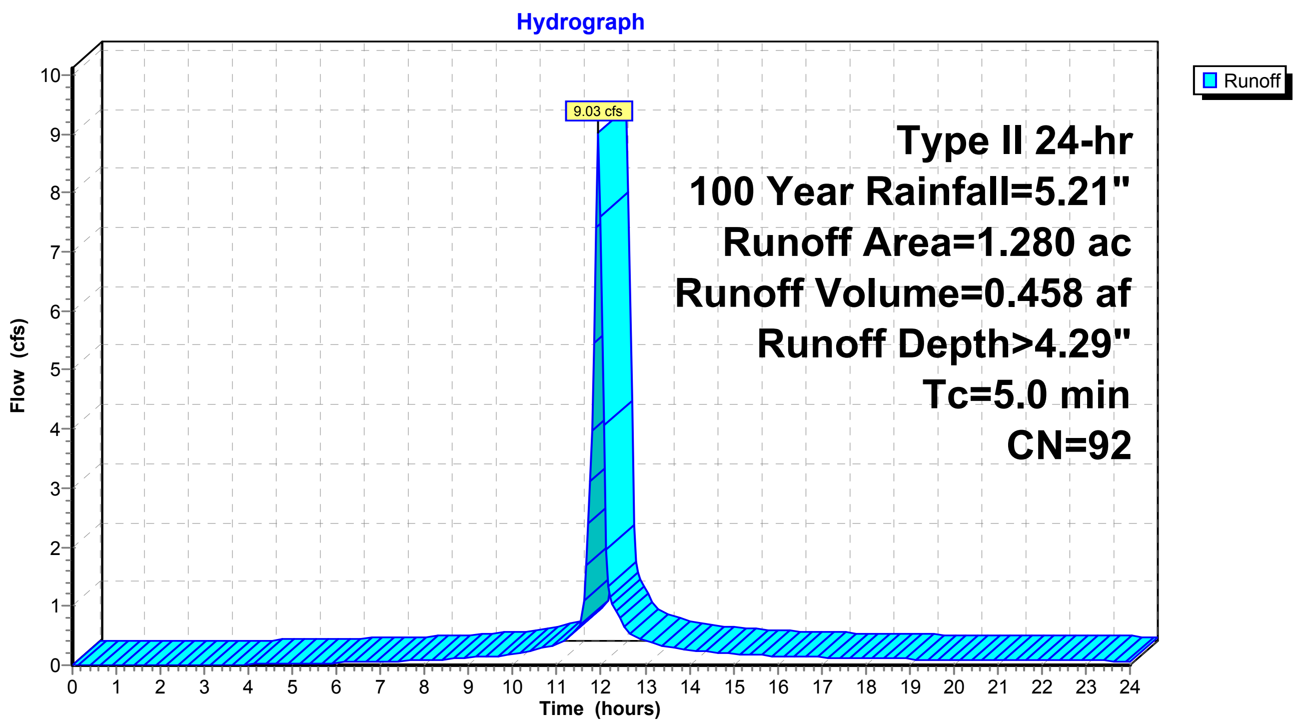
Runoff = 9.03 cfs @ 11.95 hrs, Volume= 0.458 af, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Year Rainfall=5.21"

	Area (ac)	CN	Description
*	1.280	92	
	1.280		100.00% Pervious Area

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

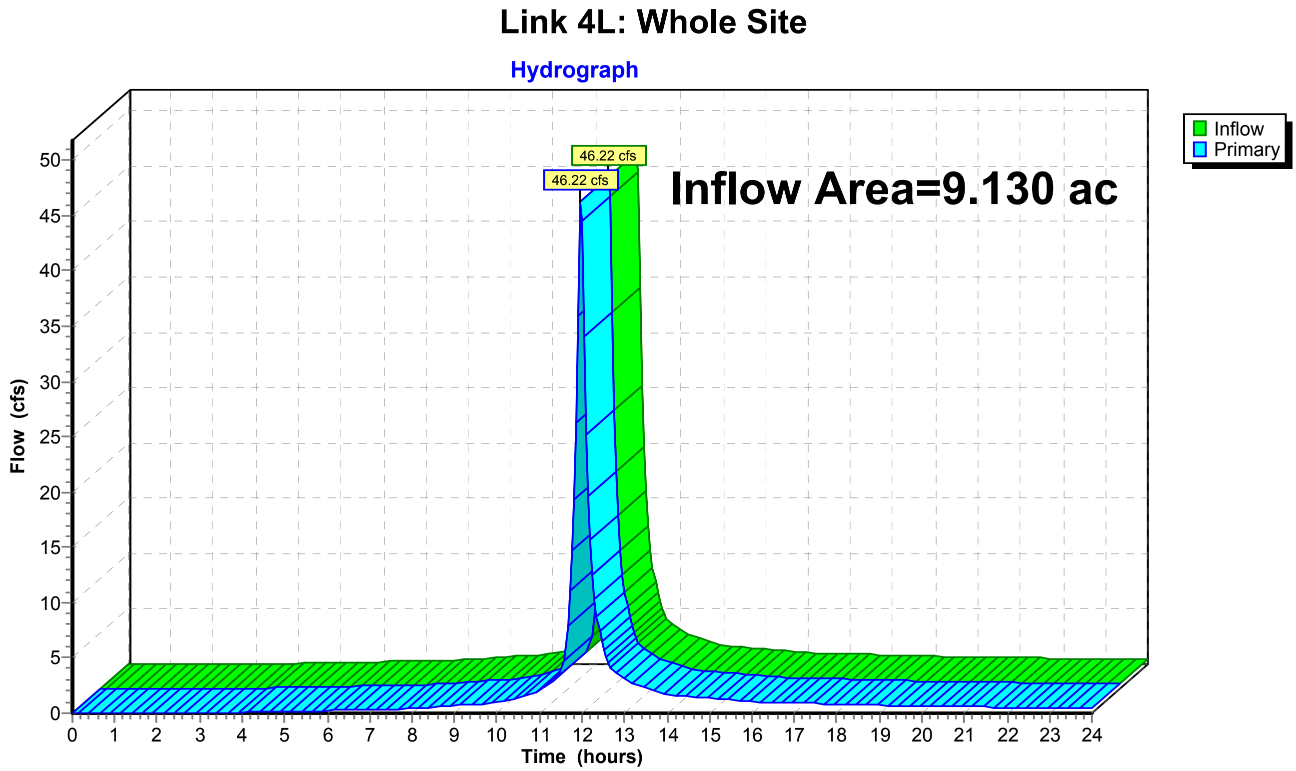
Subcatchment DA-5:



Summary for Link 4L: Whole Site

Inflow Area = 9.130 ac, 0.00% Impervious, Inflow Depth > 3.88" for 100 Year event
Inflow = 46.22 cfs @ 11.97 hrs, Volume= 2.950 af
Primary = 46.22 cfs @ 11.97 hrs, Volume= 2.950 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

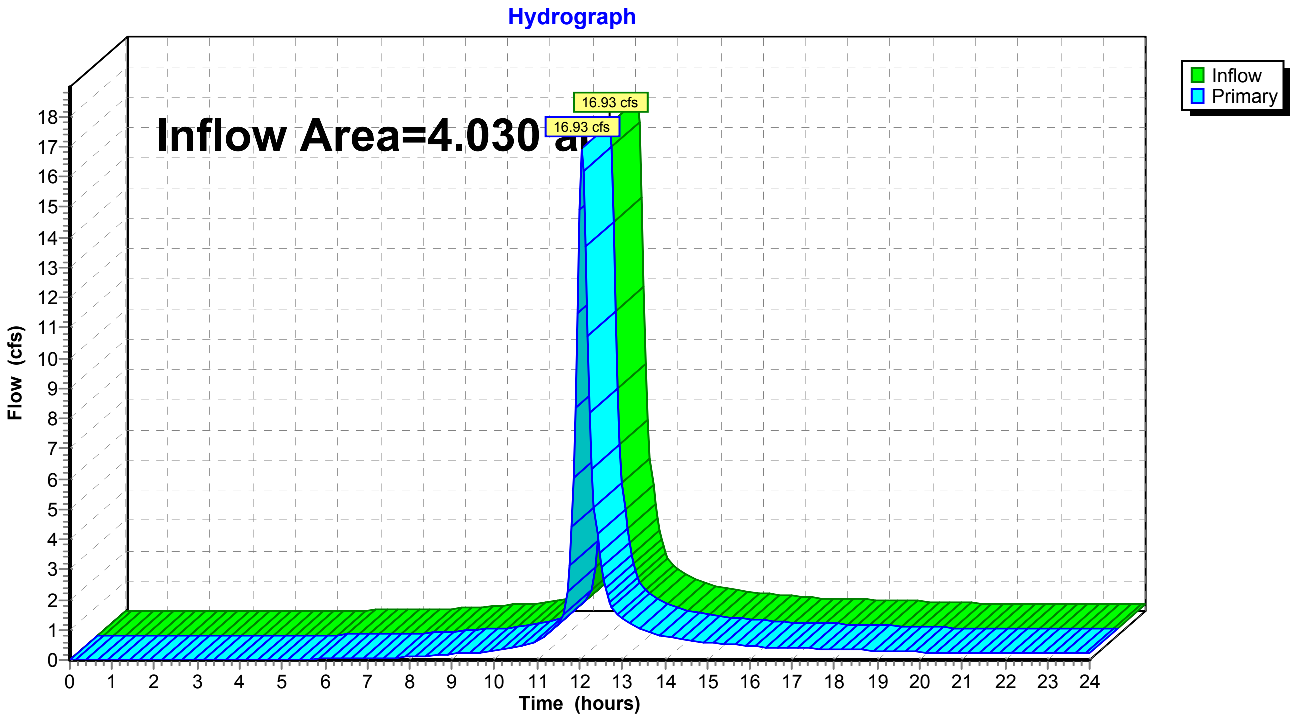


Summary for Link DP-1:

Inflow Area =	4.030 ac,	0.00% Impervious,	Inflow Depth > 3.45"	for 100 Year event
Inflow =	16.93 cfs @	12.06 hrs, Volume=	1.160 af	
Primary =	16.93 cfs @	12.06 hrs, Volume=	1.160 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1:

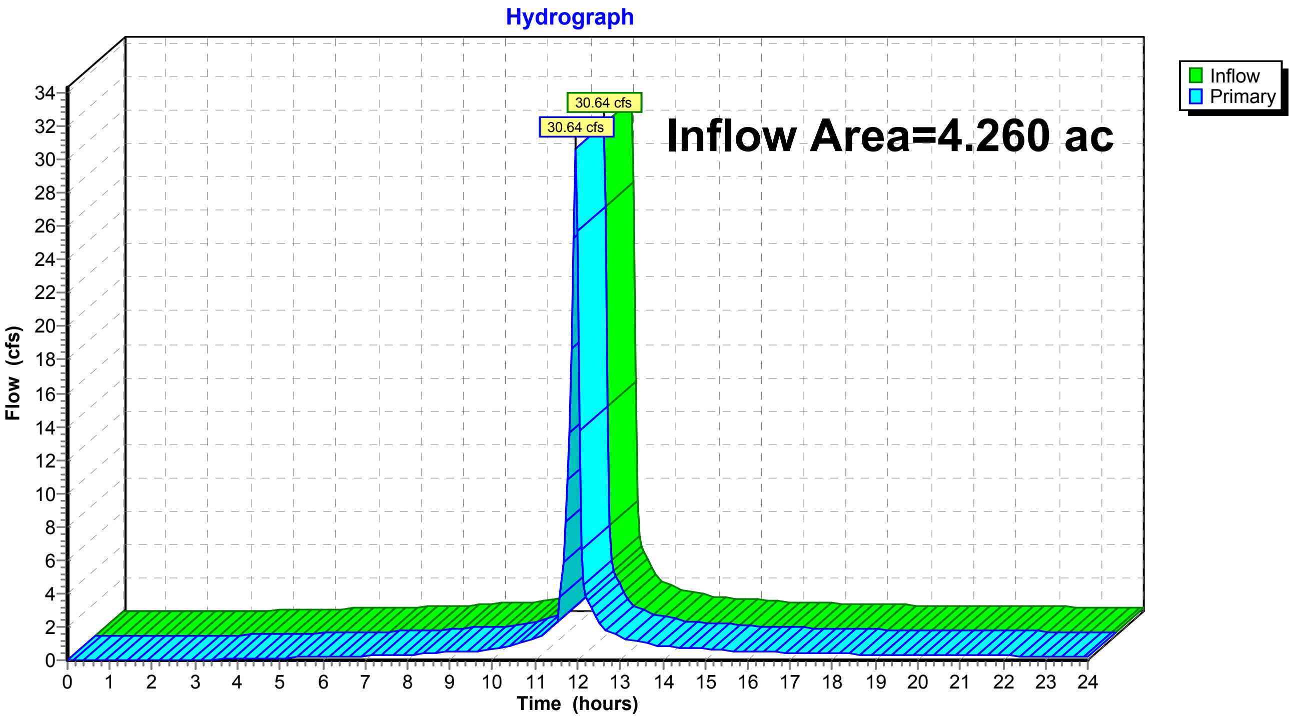


Summary for Link DP-2:

Inflow Area =	4.260 ac,	0.00% Impervious,	Inflow Depth > 4.45"	for 100 Year event
Inflow =	30.64 cfs @	11.95 hrs, Volume=	1.581 af	
Primary =	30.64 cfs @	11.95 hrs, Volume=	1.581 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2:

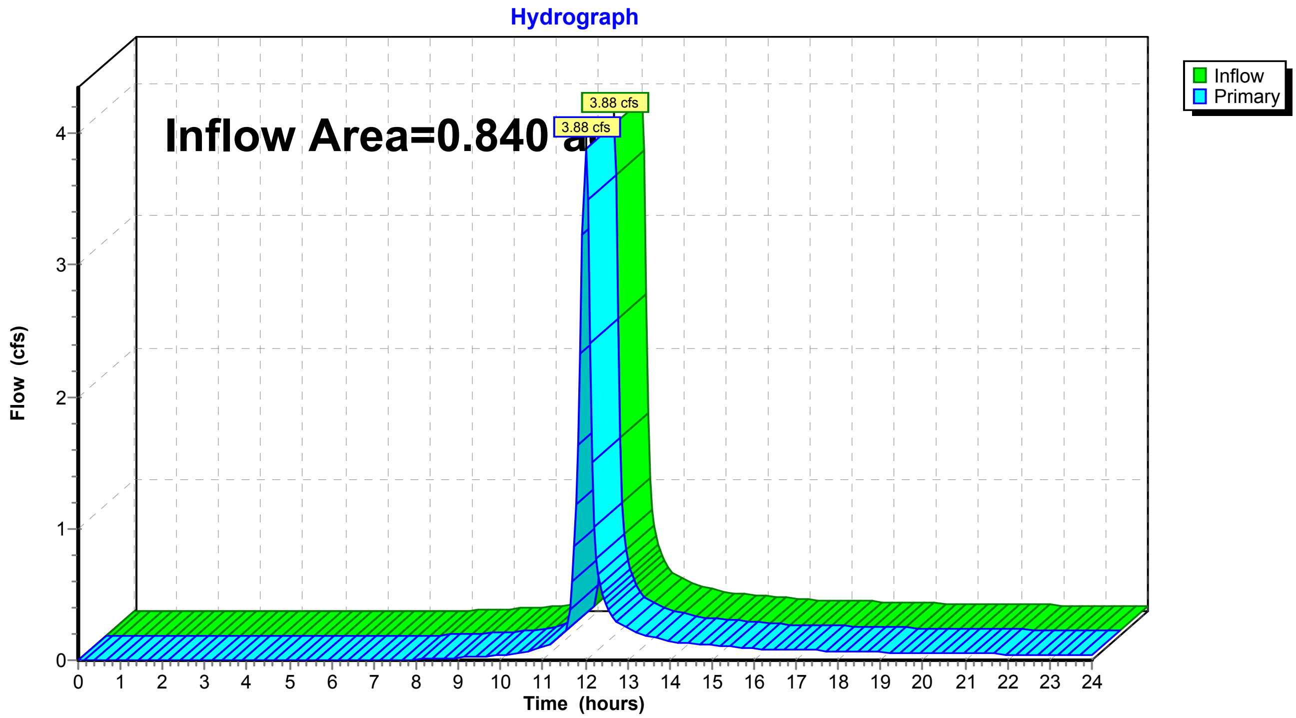


Summary for Link DP-3:

Inflow Area =	0.840 ac,	0.00% Impervious, Inflow Depth > 2.98"	for 100 Year event	
Inflow =	3.88 cfs @	12.01 hrs, Volume=	0.208 af	
Primary =	3.88 cfs @	12.01 hrs, Volume=	0.208 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-3:



DEVELOPED CONDITIONS
DIVINITY CAMPUS (ROCHESTER, NY)

7/25/2019
CRA

DA-1

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		58	80	4640
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot / Avg. % Imp.												
1/8 acre 65		77			85			90			92	
1/4 acre 38		61			75			83			87	
1/3 acre 30		57			72			81			86	
1/2 acre 25		54			70			80			85	
1 acre 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		42	98	4116
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**8756**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***88***

NOTES:

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Rochester, NY 14608

DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-2

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70		100	77	7700
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74			80	
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot / Avg. % Imp.												
1/8 acre 65		77			85			90			92	
1/4 acre 38		61			75			83			87	
1/3 acre 30		57			72			81			86	
1/2 acre 25		54			70			80			85	
1 acre 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98			98	
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**7700**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = *77*

NOTES:

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DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-3

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70		71	77	5467
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		20	80	1600
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot — Avg. % Imp.												
1/8 acre — 65		77			85			90			92	
1/4 acre — 38		61			75			83			87	
1/3 acre — 30		57			72			81			86	
1/2 acre — 25		54			70			80			85	
1 acre — 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		9	98	882
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**7949**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***79***

NOTES:

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DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-4.A

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		28	80	2240
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot — Avg. % Imp.												
1/8 acre — 65		77			85			90			92	
1/4 acre — 38		61			75			83			87	
1/3 acre — 30		57			72			81			86	
1/2 acre — 25		54			70			80			85	
1 acre — 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		72	98	7056
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**9296**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***93***

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DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-4.B

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		19	80	1520
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot — Avg. % Imp.												
1/8 acre — 65		77			85			90			92	
1/4 acre — 38		61			75			83			87	
1/3 acre — 30		57			72			81			86	
1/2 acre — 25		54			70			80			85	
1 acre — 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		81	98	7938
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**9458**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***95***

NOTES:

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DEVELOPED CONDITIONS
DIVINITY CAMPUS (ROCHESTER, NY)

7/25/2019
CRA

DA-5

LAND USE DESCRIPTION	%	A	Total	%	B	Total	%	C	Total	%	D	Total
Cultivated Land:												
Without conservation treatment		72			81			88			91	
With conservation treatment		62			71			78			81	
Pasture or Range Land:												
Poor Condition		68			79			86			89	
Fair Condition		54			70			80			85	
Good Condition		39			61			74			80	
Meadow:												
Good Condition		30			58			71			78	
Woods or Forest Land:												
Thin Stand, Poor Cover, No Mulch		45			66			77			83	
Fair Condition		25			55			70			77	
Open Spaces (lawns, parks, etc.)												
Good Condition with grass cover on 75% or more of the area		39			61			74		35	80	2800
Fair Condition with grass cover on 50%-75% of the area		49			69			79			84	
Commercial or Business Areas:												
(85% Impervious)		89			92			94			95	
Industrial Areas:												
(72% Impervious)		81			88			91			93	
Residential Areas:												
Avg. Lot / Avg. % Imp.												
1/8 acre 65		77			85			90			92	
1/4 acre 38		61			75			83			87	
1/3 acre 30		57			72			81			86	
1/2 acre 25		54			70			80			85	
1 acre 20		51			68			79			84	
Paved Parking, Roofs, Driveways, Etc.		98			98			98		65	98	6370
Streets and Roads:												
Paved with curbs & storm sewers		98			98			98			98	
Gravel		76			85			89			91	
Dirt		72			82			87			69	
TOTAL	**0**		**0**	**0**		**0**	**0**		**0**	**100**		**9170**

WEIGHTED CURVE NUMBER = $\frac{\text{TOTAL A + TOTAL B + TOTAL C + TOTAL D}}{100}$ = ***92***

NOTES:

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DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-1

SHEET FLOW (Applicable to Tc only)

Segment ID	A-B			
1. Surface Description (table 3-1)	Grass			
2. Mannings Roughness Coefficient, n (table 3-1)	0.24			
3. Flow Length, L (total L<300') ... ft	95			
4. Two-year 24-hour rainfall, P_2 ... in	2.15			
5. Land Slope, s ... ft/ft	0.03			
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t ... hr	0.237			0.237

SHALLOW CONCENTRATED FLOW

Segment ID	B-C	C-D		
7. Surface Description (paved or unpaved)	Paved	Unpaved		
8. Flow Length, L ... ft	110	302		
9. Watercourse Slope, s ... ft/ft	0.015	0.079		
10. Average Velocity, V (figure 3-1) ... ft/s	3.5	1.9		
11. $T_t = \frac{L}{3600 V}$ Compute T_t ... hr	0.009	0.044		0.053

CHANNEL FLOW

Segment ID				
12. Cross Sectional Flow Area, a ... ft^2				
13. Wetted Perimeter, p_w ... ft				
14. Hydraulic Radius, $r = a/p_w$ ... ft				
15. Channel Slope, s ... ft/ft				
16. Manning's Roughness Coefficient, n				
17. $V=(1.49\, r^{2/3}\, s^{1/2})/n$ ... ft/s				
18. Flow Length, L ... ft				
19. $T_t = \frac{L}{3600 V}$ Compute T_t ... hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ... hr **0.290**

min 17.38

NOTES:

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DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-2

SHEET FLOW (Applicable to Tc only)

Segment ID	A-B	B-C		
1. Surface Description (table 3-1) …………………………………………………..	Grass	Woods		
2. Mannings Roughness Coefficient, n (table 3-1) ………………………………….	0.24	0.4		
3. Flow Length, L (total L<300') ……………………………………………..…ft	40	60		
4. Two-year 24-hour rainfall, P_2 ……………………………………………….in	2.15	2.15		
5. Land Slope, s ……………………………………………………………….ft/ft	0.05	0.42		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t………………hr	0.097	0.086		0.182

SHALLOW CONCENTRATED FLOW

Segment ID	C-D			
7. Surface Description (paved or unpaved) …………………………………………	UnPaved			
8. Flow Length, L ……………………………………….……………………ft	50			
9. Watercourse Slope, s ……………………………………………….………ft/ft	0.34			
10. Average Velocity, V (figure 3-1) …………………………...……..………ft/s	2.7			
11. $T_t = \frac{L}{3600\ V}$ Compute T_t ……...………hr	0.005			0.005

CHANNEL FLOW

Segment ID				
12. Cross Sectional Flow Area, a ……………………………………..…………..ft^2				
13. Wetted Perimeter, p_w ……………………………………………………….ft				
14. Hydraulic Radius, $r = a/p_w$ ……………………………………………………ft				
15. Channel Slope, s …………………………….……………………….ft/ft				
16. Manning's Roughness Coefficient, n …………………………………………				
17. $V=(1.49\ r^{2/3}\ s^{1/2})/n$ ……………………………….…………………..ft/s				
18. Flow Length, L ……………………………….…………………….ft				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t ……...………hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ……………………………………………………………..hr **0.188**

min 11.26

NOTES:

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Time of Concentration Worksheet

DEVELOPED CONDITIONS *7/25/2019*
DIVINITY CAMPUS (ROCHESTER, NY) CRA

DA-3

SHEET FLOW (Applicable to Tc only)

	Segment ID				
	Segment ID	A-B	B-C		
1. Surface Description (table 3-1)		Grass	Woods		
2. Mannings Roughness Coefficient, n (table 3-1)		0.24	0.4		
3. Flow Length, L (total L<300')	ft	60	40		
4. Two-year 24-hour rainfall, P_2	in	2.15	2.15		
5. Land Slope, s	ft/ft	0.14	0.36		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$	Compute T_t hr	0.089	0.066		0.155

SHALLOW CONCENTRATED FLOW

	Segment ID				
7. Surface Description (paved or unpaved)					
8. Flow Length, L	ft				
9. Watercourse Slope, s	ft/ft				
10. Average Velocity, V (figure 3-1)	ft/s				
11. $T_t = \frac{L}{3600\ V}$	Compute T_t hr				0.000

CHANNEL FLOW

	Segment ID				
12. Cross Sectional Flow Area, a	ft^2				
13. Wetted Perimeter, p_w	ft				
14. Hydraulic Radius, $r = a/p_w$	ft				
15. Channel Slope, s	ft/ft				
16. Manning's Roughness Coefficient, n					
17. $V=(1.49\ r^{2/3}\ s^{1/2})/n$	ft/s				
18. Flow Length, L	ft				
19. $T_t = \frac{L}{3600\ V}$	Compute T_t hr				0.000

20. Watershed or subarea T_c or T_t (add in steps 6, 11, and 19) ……hr **0.155**
min 9.27

NOTES:

2-Year 24 Hour Rainfall Event = 2.15 (Updated 2019)

Table 3-1 Roughness coefficients (Manning's n) for sheet flow

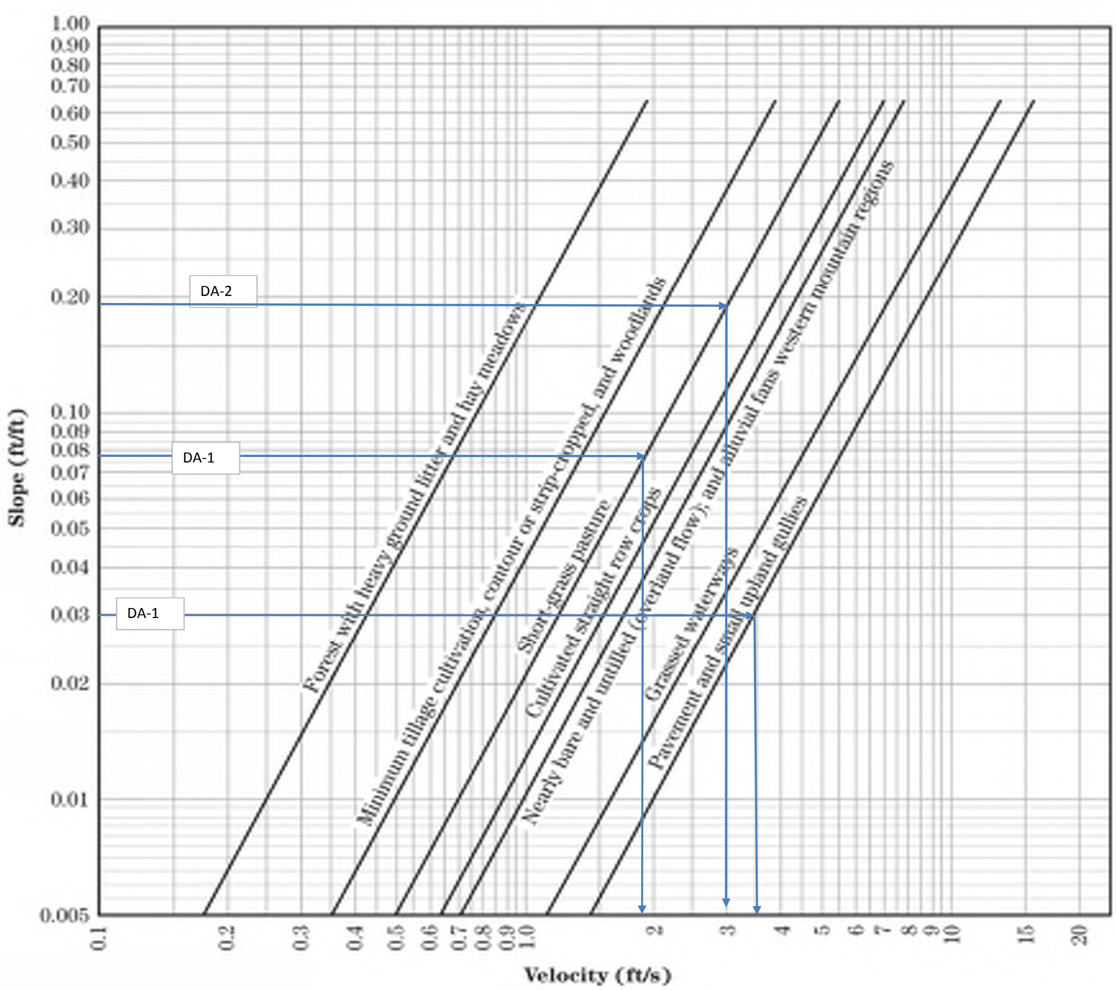
Surface description	n [1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods: [3]	
Light underbrush	0.40
Dense underbrush	0.80

1 The n values are a composite of information compiled by Engman (1986).

2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

3 When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

Figure 15–4 Velocity versus slope for shallow concentrated flow



PROJECT NAME: *Divinity School Campus (Rochester New York)* **PROJECT NUMBER:** *6702*

CALCULATED BY: *C.R.A* **DATE:** *7/25/2019*

SITE DATA: New Development [ ] Redevelopment [X]

	Impervious Cover	Porous Cover	Total Area		
Existing Conditions	2.23	3.08	5.31	ac	5.31
Developed Conditions	3.18	2.13	5.31	ac	5.31
		Total Site Area:	5.31	ac	
		New Impervious Cover	0.95	ac	

Site Soils:			
	% HSG A	0	0.55
	% HSG B	0	0.4
	% HSG C	0	0.3
	% HSG D	100	0.2
S = Hydraulic Soil Group Specific Reduction Factor			0.20

Water Quality Volume (wQv) - Required

For New Development:

$$wQv = \frac{P\ x\ Rv\ x\ Atotal}{12}$$

For Redevelopment:

$$wQv = \frac{P\ x\ Rv\ x\ A\ (Ext\ IC)}{12}(0.25) + \frac{P\ x\ Rv\ x\ A\ (New\ IC)}{12}$$

Where:				
P =	90% Rainfall Event Number =	1	in	
Rv =	0.05 + 0.009(I) =	0.95		**I** = % Impervious Cover = 60 %
A =	Total Site Area =	5.31	ac	
A (Ext. IC) =	Existing Impervious Cover =	2.23	ac	
A (New IC) =	New Impervious Cover =	0.95	ac	

For New Development:	**wQv Reqd =**	**N/A**	**ac-ft**	**=**	**N/A**	**cf**
For Redevelopment:	**wQv Reqd =**	**0.0441**	**+**		**0.0752**	
	wQv Reqd =	**0.1193**	**ac-ft**	**=**	**5,199**	**cf**

Note:

Per NYS Stormwater Design Manual (Chapter 9), 25% Reduction of Existing Impervious Cover & 100% Of New Imperivous Cover Must Be Met For Redevelopment. For New Development, 100% Of New Impervious Cover Must Be Met.

PROJECT NAME: *Divinity School Campus (Rochester New York)* **PROJECT NUMBER:** *6702*

CALCULATED BY: *C.R.A* **DATE:** *7/25/2019*

Runoff Reduction Volume (RRv) - Minimum

$$RRv = \frac{P \; x \; S \; x \; Rv \; x \; AIC}{12}$$

Where:	**P =**	90% Rainfall Event Number =	1
	S =	Soil Group Specific Reduction Factor =	0.20
	Rv =	0.05 + 0.009(I = 100 % impervious cover) =	0.95
	A IC =	New Impervious Cover =	0.95 ac

RRv =	**0.0150**	**ac-ft**	**655**	**cf**

COSTICH ENGINEERING

Filter Bed Sizing:

$$Af = \frac{WQv\ (df}{[k\ x\ (hf+df)(tf)]}$$

Where:

Af =	the required surface area (sf)	=	**8,665**	**SF**	**[All wQv]**
		=	**1,092**	**SF**	**[RRv Only]**
wQv Reqd =	water quality volume [cf]	=	5,199	CF	
RRv Min =	runoff reduction volume [cf]	=	655	CF	
df =	depth of soil medium [ft]	=	2.5	ft	
k =	hydraulic conductivity [ft/day]	=	0.5	ft/Day	

Sand =	3.5	From NYS Stormwater Design Manual (Jan, 2015)
Peat =	2	
Leaf Compost =	8.7	
Bio Soil =	0.5	

hf =	average height of ponding water [ft]	=	0.5	ft
tf =	design time to filter the treatement [hrs]	=	1	days

STORMWATER MANAGEMENT
FACILITY STORAGE PER GRADING

Stage-Area-Storage for Pond 1P: (new Pond)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
547.50	250	0
547.55	325	14
547.60	401	33
547.65	476	54
547.70	552	80
547.75	628	110
547.80	703	143
547.85	779	180
547.90	854	221
547.95	930	265
548.00	1,005	314
548.05	1,066	366
548.10	1,127	420
548.15	1,188	478
548.20	1,248	539
548.25	1,309	603
548.30	1,370	670
548.35	1,431	740
548.40	1,492	813
548.45	1,553	889
548.50	1,614	968
548.55	1,674	1,051
548.60	1,735	1,136
548.65	1,796	1,224
548.70	1,857	1,315
548.75	1,918	1,410
548.80	1,979	1,507
548.85	2,039	1,608
548.90	2,100	1,711
548.95	2,161	1,818
549.00	2,222	1,927
549.05	2,283	2,040
549.10	2,344	2,156
549.15	2,405	2,274
549.20	2,465	2,396
549.25	2,526	2,521
549.30	2,587	2,649
549.35	2,648	2,779
549.40	2,709	2,913
549.45	2,770	3,050
549.50	2,831	3,190
549.55	2,891	3,333
549.60	2,952	3,480
549.65	3,013	3,629
549.70	3,074	3,781
549.75	3,135	3,936
549.80	3,196	4,094
549.85	3,256	4,256
549.90	3,317	4,420
549.95	3,378	4,587
550.00	3,439	4,758
550.05	3,497	4,931
550.10	3,554	5,107
550.15	3,612	5,287
550.20	3,669	5,469
550.25	3,727	5,653
550.30	3,784	5,841
550.35	3,842	6,032
550.40	3,899	6,225
550.45	3,957	6,422
550.50	4,014	6,621
550.55	4,072	6,823
550.60	4,129	7,028
550.65	4,187	7,236
550.70	4,244	7,447
550.75	4,302	7,661
550.80	4,359	7,877
550.85	4,417	8,097
550.90	4,474	8,319
550.95	4,532	8,544
551.00	4,590	8,772
551.05	4,647	9,003
551.10	4,705	9,237
551.15	4,762	9,473
551.20	4,820	9,713
551.25	4,877	9,955
551.30	4,935	10,201
551.35	4,992	10,449
551.40	5,050	10,700
551.45	5,107	10,954
551.50	5,165	11,211
551.55	5,222	11,470
551.60	5,280	11,733
551.65	5,337	11,998
551.70	5,395	12,267
551.75	5,452	12,538
551.80	5,510	12,812
551.85	5,567	13,089
551.90	5,625	13,369
551.95	5,682	13,651
552.00	**5,740**	**13,937**

= 0.320 ac-ft of Storage

APPENDIX IV

- **NYSSESC GUIDANCE FOR EROSION & SEDIMENT CONTROL PRACTICE INSTALLATION**

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015

Expiration Date: January 28, 2020

Modification Date:

July 14, 2015 – Correction of typographical error in definition of "New Development", Appendix A

November 23, 2016 – Updated to require the use of the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. The use of this standard will be required as of February 1, 2017.

John J. Ferguson
Chief Permit Administrator

Authorized Signature

11-14-16
Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK

Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12" – 32" except that 8" diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	5	10	20	25	33	50
8	225*	200	100	50	20	—	—
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50

* Length in feet

5. The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**

6. The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2" x 2" wooden stakes driven 12" into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.

4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.

5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

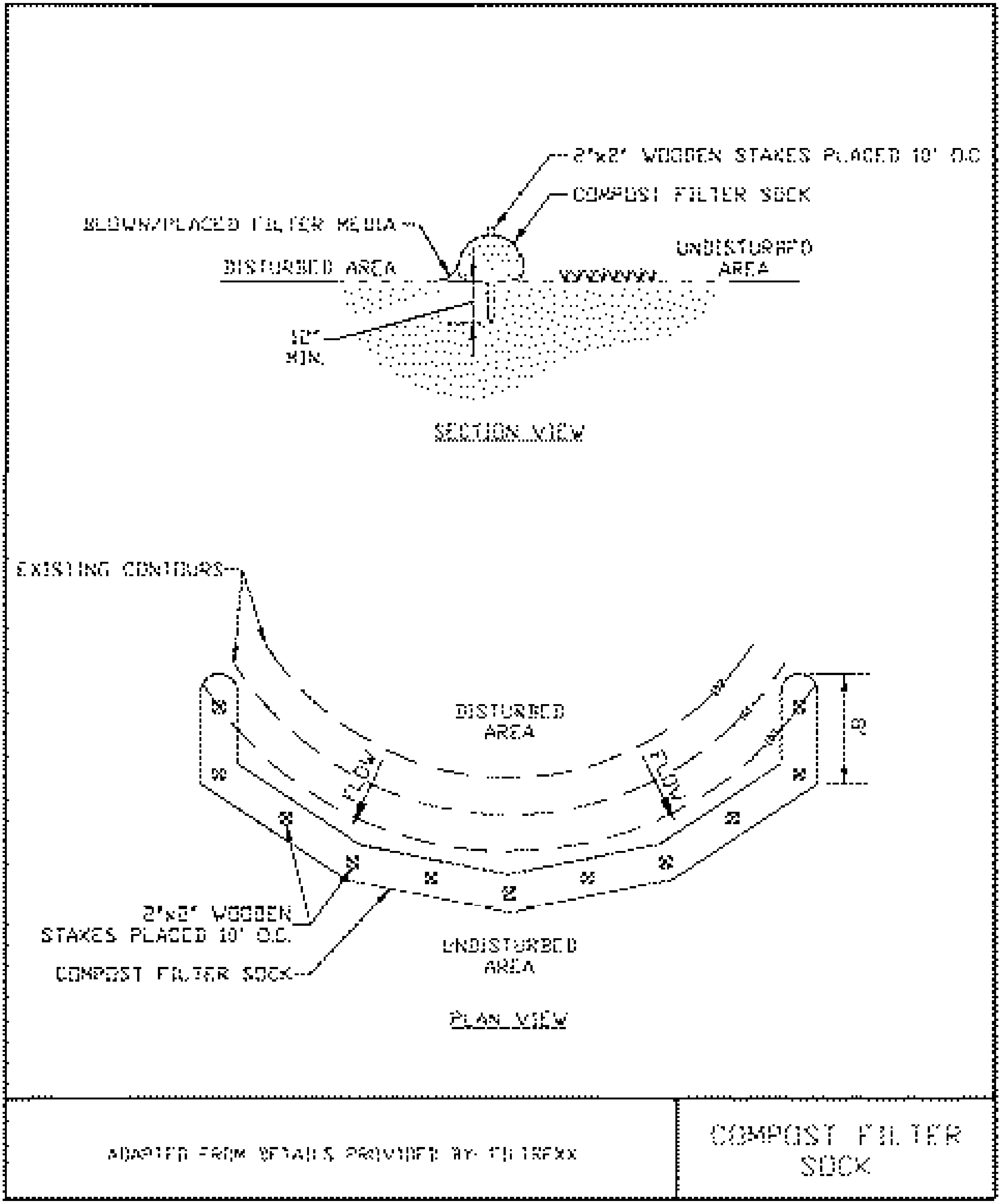
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Table 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1" screen and 10 - 50% passing a 3/8" screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

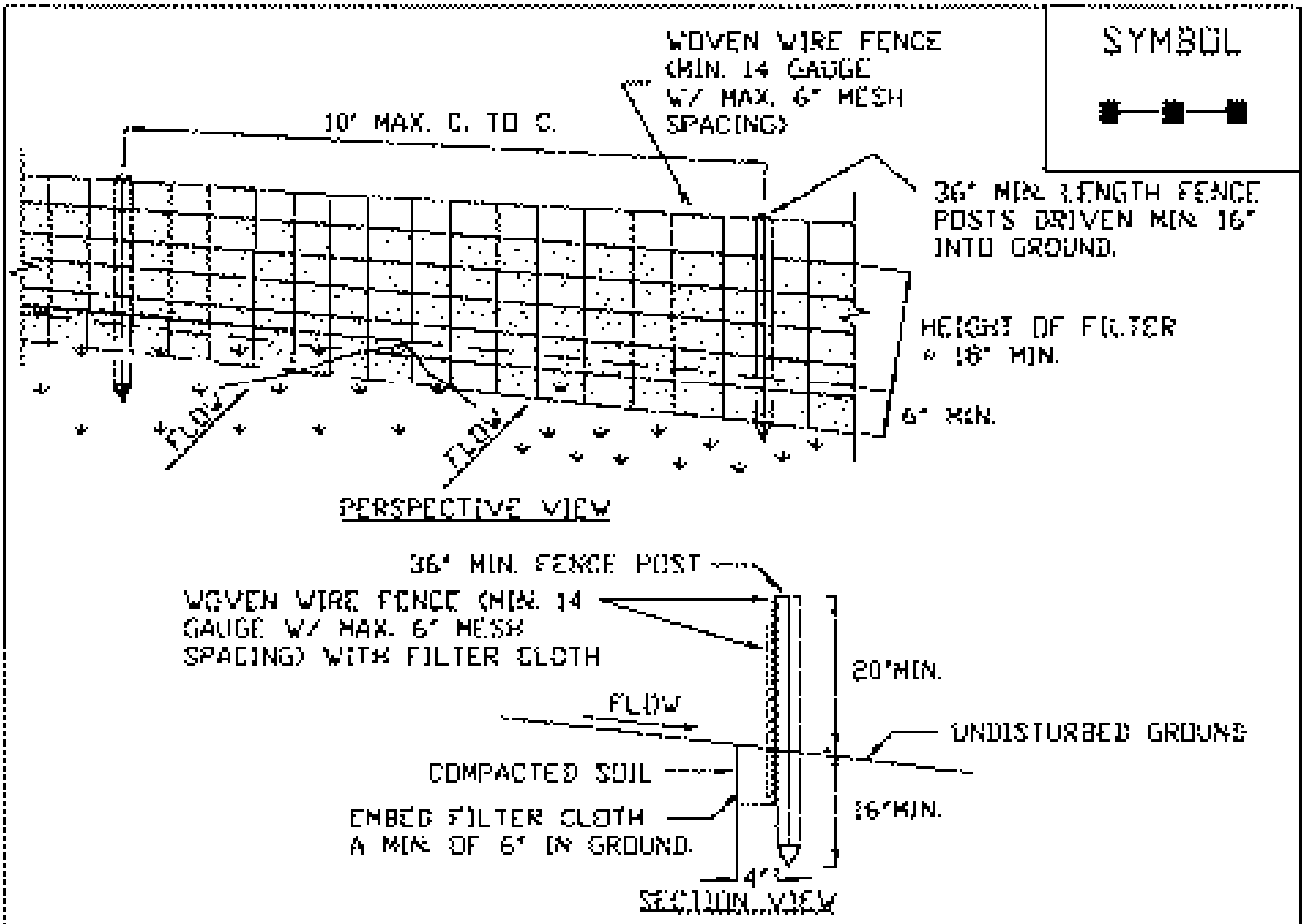
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

Reinforced Silt Fence

Super Silt Fence

Figure 5.30
Reinforced Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	REINFORCED SILT FENCE

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.

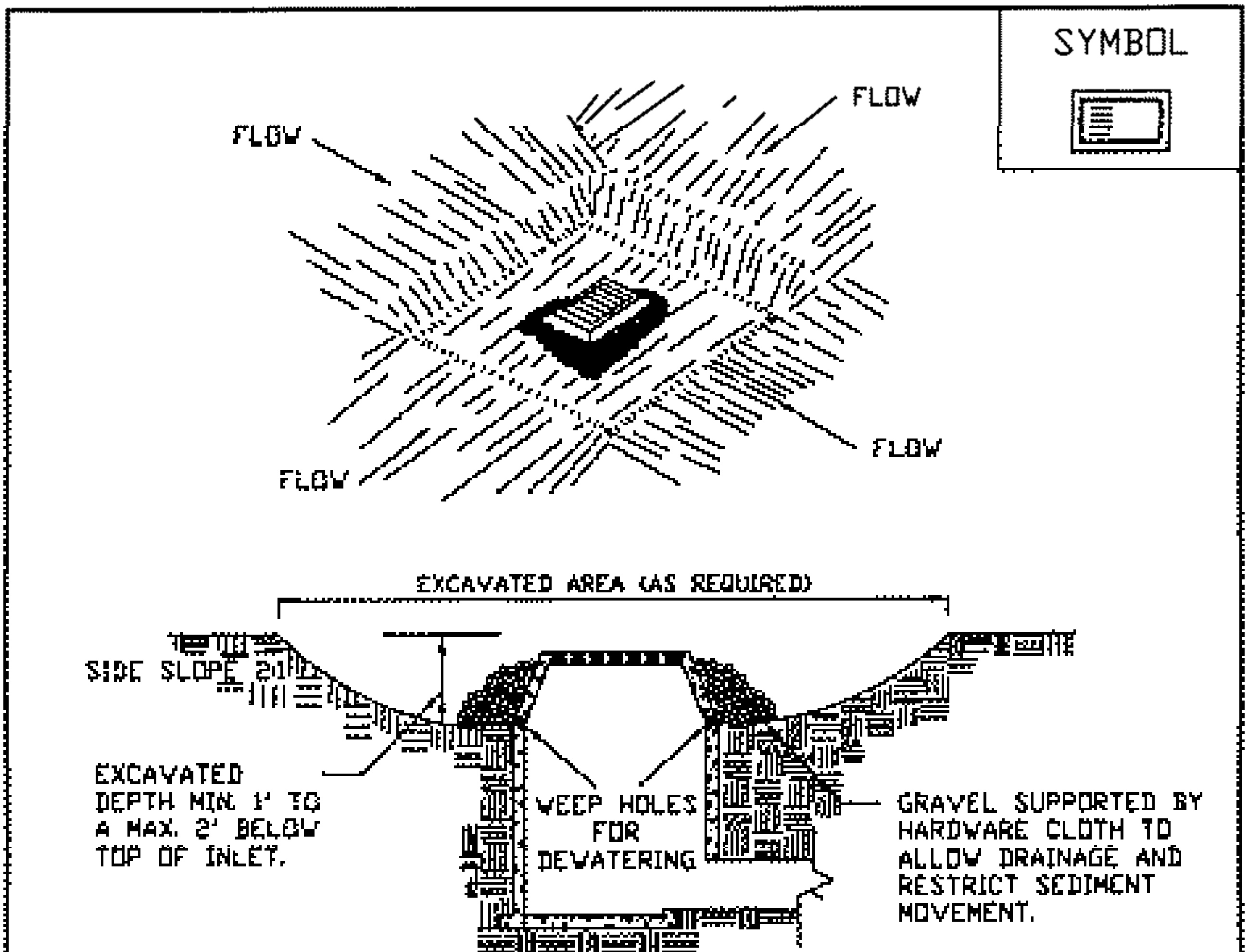
The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection



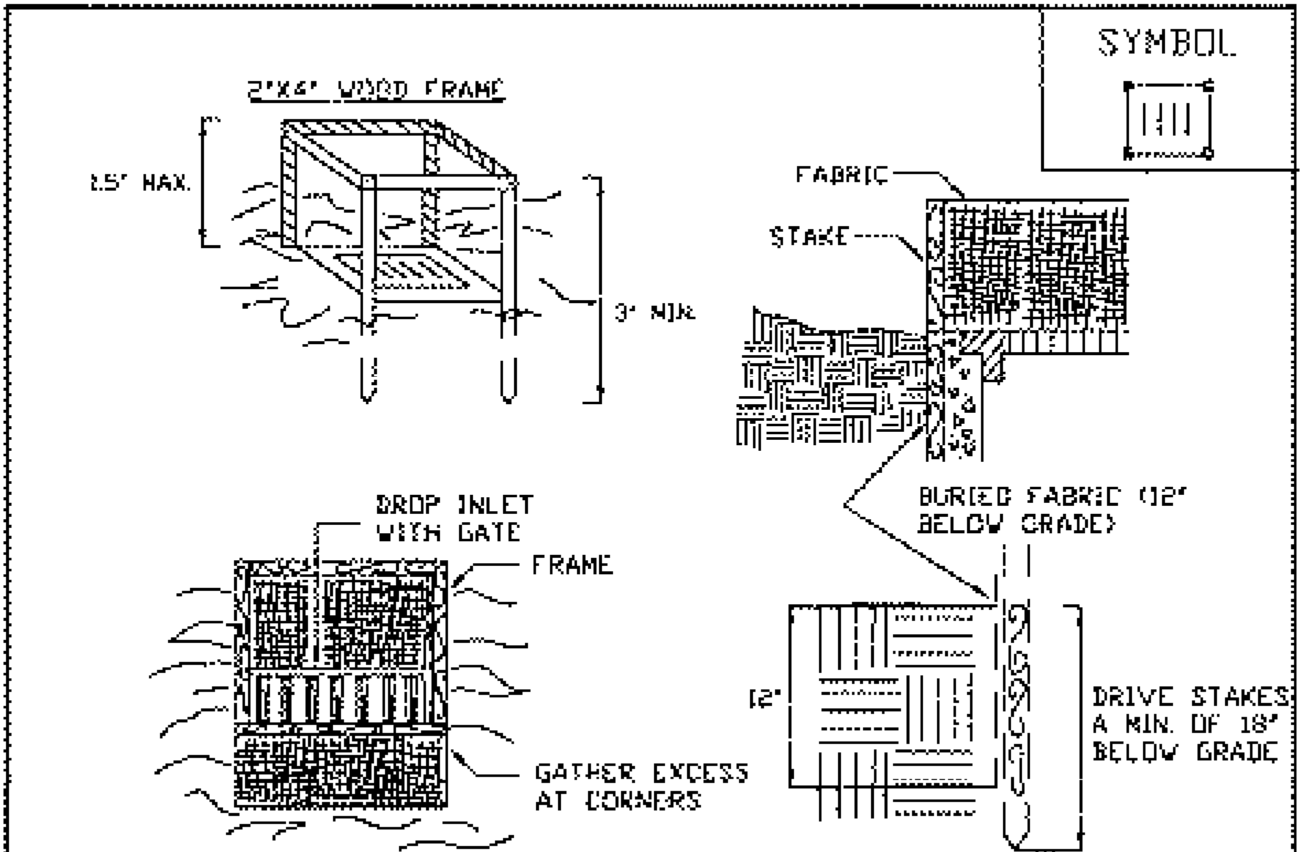
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5.32
Fabric Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

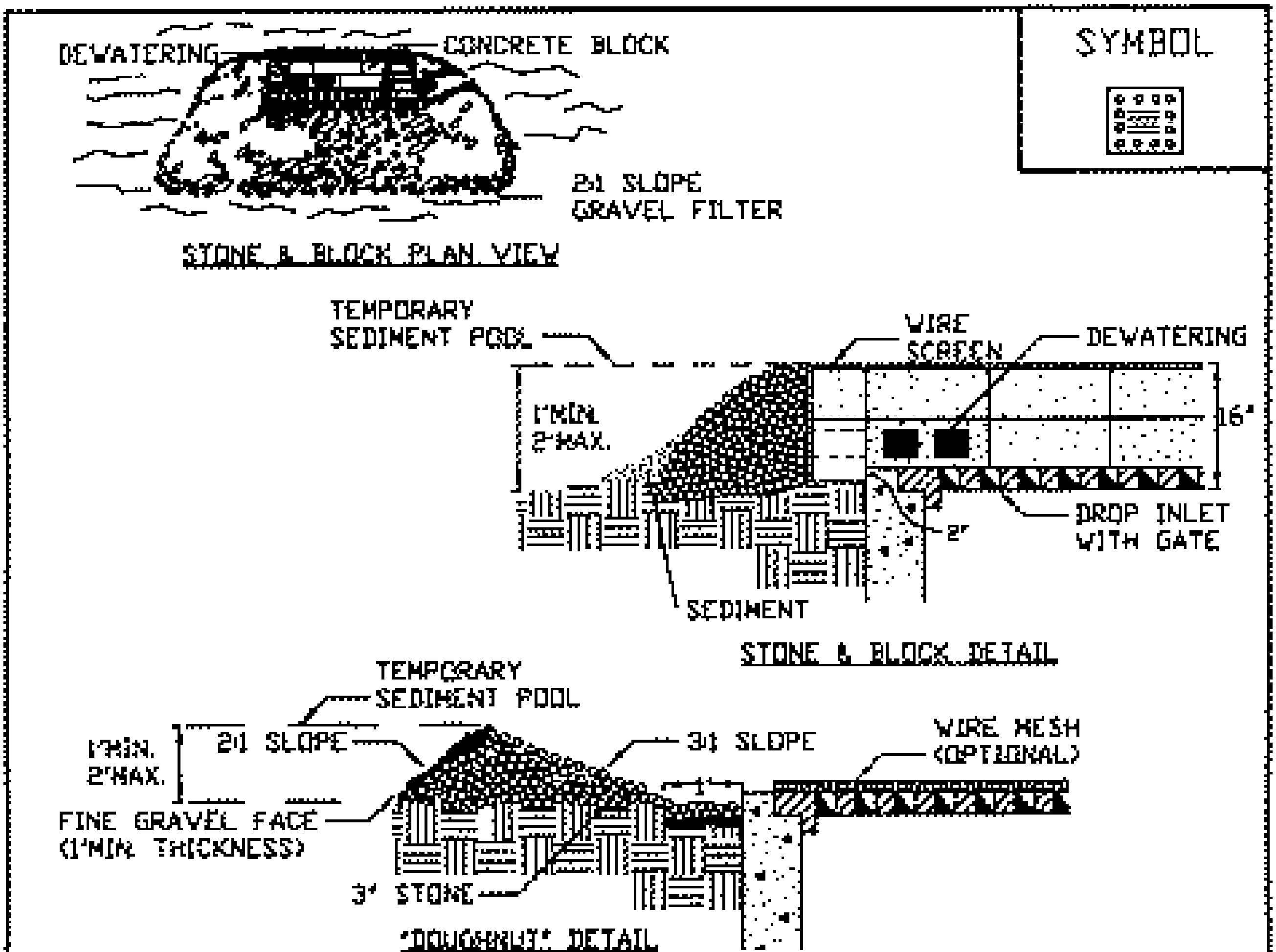
1. FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

FABRIC
DROP INLET
PROTECTION

Figure 5.33
Stone & Block Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS FOR CHECK DAM

Definition & Scope

Small barriers or dams constructed of stone, bagged sand or gravel, or other durable materials across a drainageway to reduce erosion in a drainage channel by reducing the velocity of flow in the channel.

Conditions Where Practice Applies

This practice is used as a **temporary** and, in some cases, a **permanent** measure to limit erosion by reducing velocities in open channels that are degrading or subject to erosion or where permanent stabilization is impractical due to short period of usefulness and time constraints of construction.

Design Criteria

Drainage Area: Maximum drainage area above the check dam shall not exceed two (2) acres.

Height: Not greater than 2 feet. Center shall be maintained 9 inches lower than abutments at natural ground elevation.

Side Slopes: Shall be 2:1 or flatter.

Spacing: The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

Therefore:

$$S = \frac{h}{s}$$

Where:
S = spacing interval (ft.)
h = height of check dam (ft.)
s = channel slope (ft./ft.)

Example:

For a channel with a 4% slope and 2 ft. high stone check dams, they are spaced as follows:

$$S = \frac{2\text{ ft}}{0.04\frac{\text{ft}}{\text{ft}}} = 50\text{ ft}$$

For stone check dams: Use a well graded stone matrix 2 to 9 inches in size (NYS – DOT Light Stone Fill meets these requirements).

The overflow of the check dams will be stabilized to resist erosion that might be caused by the check dam. See Figure 3.1 on page 3.3 for details.

Check dams should be anchored in the channel by a cutoff trench 1.5 ft. wide and 0.5 ft. deep and lined with filter fabric to prevent soil migration.

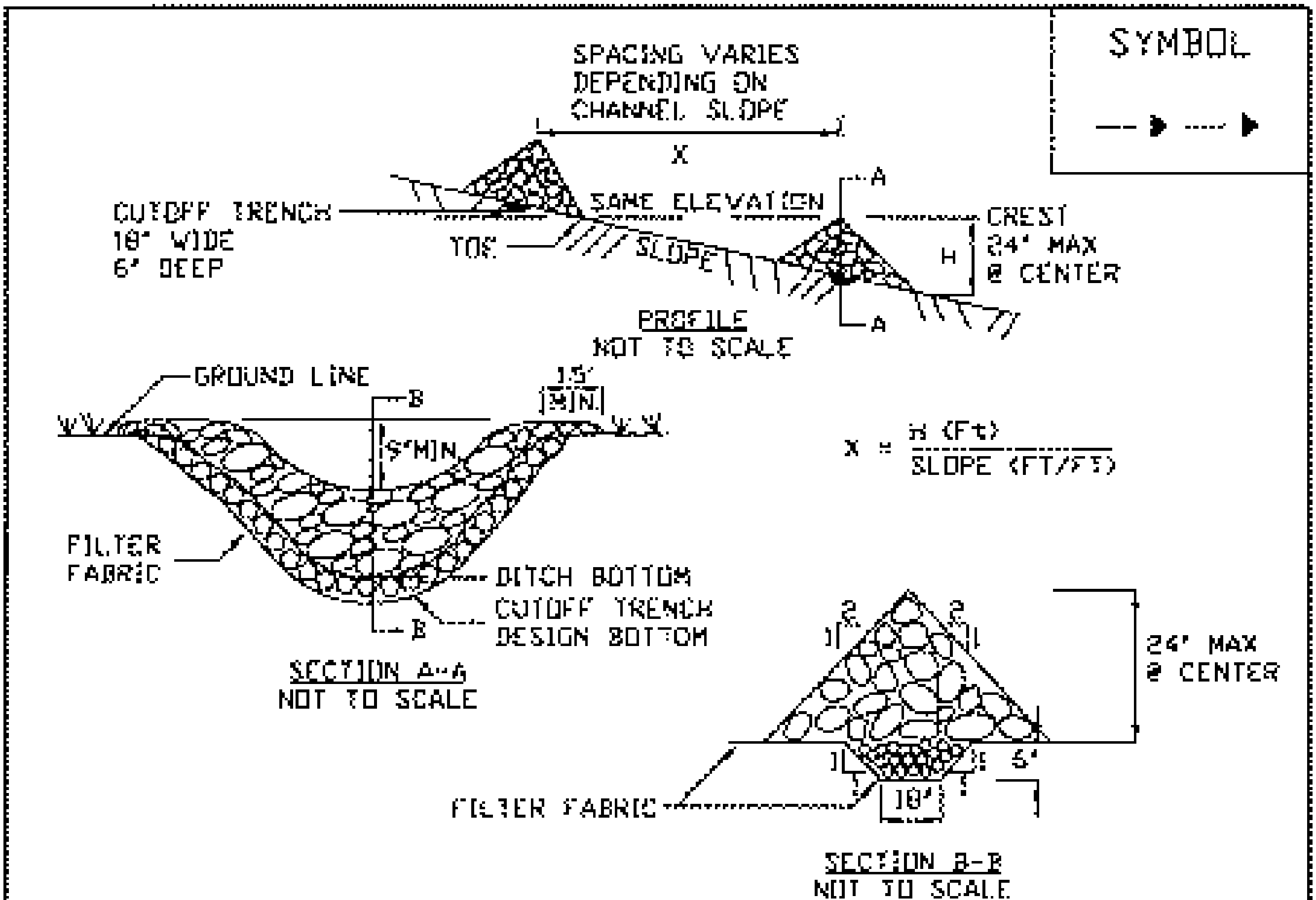
For filter sock or fiber roll check dams: The check dams will be anchored by staking the dam to the earth contact surface. The dam will extend to the top of the bank. The check dam will have a splash apron of NYS DOT #2 crushed stone extending a minimum 3 feet downstream from the dam and 1 foot up the sides of the channel. The compost and materials for a filter sock check dam shall meet the requirements shown in the standard for Compost Filter Sock on page 5.7.

Maintenance

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel or additional check dams added.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam.

Figure 3.1
Stone Check Dam Detail



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

MAXIMUM DRAINAGE AREA 2 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE CHECK DAM

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.35 on page 5A.76 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile

The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth	6	10	--

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

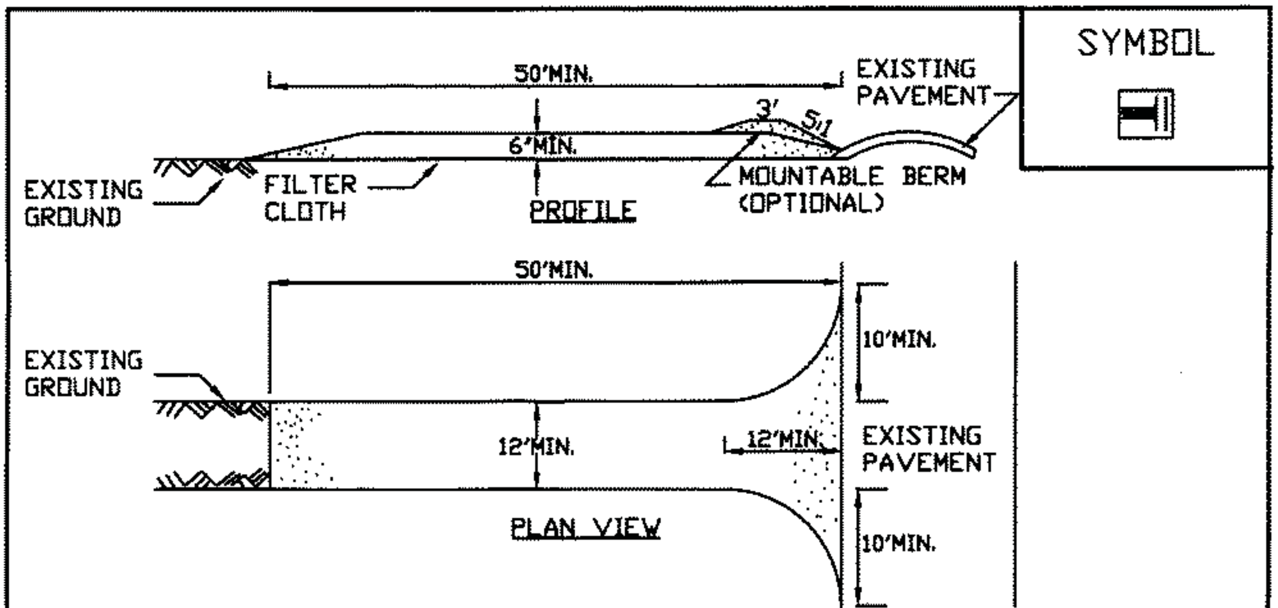
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.35
Stabilized Construction Entrance



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ENTRANCE