# Stormwater Management Report

*For the Proposed:*

## Development

*Located at:*

107 Eastern Boulevard
Glastonbury, Connecticut

*Prepared for Submission to:*

**Town of Glastonbury, Connecticut**

August 24, 2020
*Revised: September 30, 2020*

*Prepared for:*

**WE Acquisitions, LLC**
107 Eastern Boulevard
Glastonbury, Connecticut

*Prepared by:*

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BL Project Number: 2000669

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## Executive Summary

This report has been prepared in support of a Permit Application by WE Acquisitions, LLC to the Town of Glastonbury for the proposed development at 107 Eastern Boulevard. The project parcel is approximately 12.5 acres in size and is currently a developed lot with a warehouse and associated paved parking areas and driveways, landscaped areas, and site utilities. The remaining site area is wooded and lawn area. The property is located at the northeastern corner of the intersection of National Drive and Eastern Boulevard. It is roughly bordered by the Planned Employment Zone (PE) on all sides. There is a small portion of wetland located on site towards the northwest of the site.

In general, the existing topography generally slopes from the north to the south of the site and eventually offsite to Salmon Brook. Elevations on site range from 70' to 110'. There are currently catch basins and drainage piping on site for the existing development but no stormwater management system located within the project parcel.

Proposed site improvements will include minor building modifications, additional paved parking areas and driveways, landscaped areas, pedestrian sidewalks, site lighting, and a stormwater management system.

The proposed stormwater management system is designed to be in compliance with the 2002 State of Connecticut Guidelines for Soil Erosion and Sediment Control, and the 2004 State of Connecticut Stormwater Quality Manual.

A HydroCAD model, using TR-55 methodology, was developed to evaluate the existing and proposed drainage conditions of the property. The results of the analysis demonstrate that there will not be an increase in peak stormwater runoff rates for the 2-, 10-, 25-, and 100-year storm events.

The proposed stormwater management system has been designed to attenuate the increased flows generated by the proposed development. The project site is located in the Town of Glastonbury Groundwater Protection Zone 1 (GW-1). All proposed development will be in conformance with the Town of Glastonbury regulations including nitrogen loading and watertight sanitary sewer construction. Due to high groundwater, infiltration has been omitted from the stormwater management design. Stormwater quality is being addressed by a formalized street sweeping program, deep sumps and hooded outlet catch basins, and a sediment isolator row. These features will provide the minimum required 80% TSS removal as required in the CT Stormwater Quality Manual.

## Existing Site Conditions and Hydrologic Conditions

*General Site Information*

The site soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS) are Ellington silt loam, 0 to 5 percent slopes, Hartford sandy loam, 3 to 8 percent slopes, and udorthents-urban land complex. Per the USDA, the NRCS Hydrologic Soil Group ratings for soils within the project area are B, A, and B respectively. A copy of the USDA NRCS Hydrologic Soil Group Map is included in Appendix A for reference.

Per the FEMA Flood Insurance Rate Map Number 09003C0527F and 09003C0529F for the Town of Glastonbury, Connecticut, maps revised date: September 26, 2008, the site resides in FEMA Flood Hazard Area X (unshaded). Zone X (unshaded) is defined as "areas determined to be outside the 0.2% annual chance floodplain". A copy of the FEMA Flood insurance rate Map is included in Appendix A for reference.

*Existing Hydrologic Conditions*

The existing site drainage area that was analyzed totals 20.32 acres and is approximately 43% impervious. This area includes the portions of the properties to the north and west that sheet flow to the design points within the town roads. There is currently no existing stormwater management system onsite. Stormwater from the subject property enters the onsite drainage system by means of catch basins and flows untreated into the town drainage system or sheet flows untreated town drainage system or offsite. Below is a description of that area.

The following is a brief analysis of the existing design points as shown on the enclosed Existing Drainage Mapping (ED-1) Map, in Appendix E.

**Existing Drainage Area 1 (EDA-1):** This drainage area consists of the southeastern portion of the project parcel and portions of Eastern Boulevard that drain into the closed Town drainage system which flows towards the southeast of the site within eastern boulevard (DP-1). It is 1.67 acres and is approximately 61% impervious. EDA-1 consists of impervious parking, road, and building area, and lawn areas.

**Existing Drainage Area 2 (EDA-2):** This drainage area consists of the majority of the project parcel which drains into the closed Town drainage system which crosses National Drive to the south of the project parcel (DP-2). It is 9.45 acres and is approximately 40% impervious. EDA-2 consists of impervious parking, road, and building area, wooded, and lawn areas.

**Existing Drainage Area 3 (EDA-3):** This drainage area consists of the western portion of the project parcel and a portion of the adjacent parcel which drains into the closed Town drainage system which flows west along National Drive to the west of the project parcel (DP-3). It is 6.15 acres and is approximately 39% impervious. EDA-3 consists of impervious parking, road, and building area, wooded, and lawn areas.

**Existing Drainage Area 4 (EDA-4):** This drainage area consists of the northwestern portion of the project parcel which sheet flows offsite to the north (DP-4). It is 0.48 acres and is approximately 0% impervious. EDA-4 consists of wooded areas.

**Table 1 – Pre-Development (Existing Conditions) Drainage Characteristics.**

| Drainage Area | Area (square feet) | Composite Curve Number | Impervious Cover (%) | Time of Concentration (minutes) |
|---|---|---|---|---|
| EDA-1 (Area to CBs Southeast of site) | 184,485 | 86 | 61 | 9.7 |
| EDA-2 (Area to CBs Southwest of site) | 411,817 | 74 | 40 | 22.6 |
| EDA-3 (Area to CBs West of site) | 267,870 | 76 | 39 | 21.8 |
| EDA-4 (Area sheet flowing north offsite) | 21,119 | 36 | 0 | 15.0 |

**Table 2 – Pre-Development Conditions Peak Flows**

| Analysis Point | Peak Flow (cfs) | | | |
|---|---|---|---|---|
| | 2-yr | 10-yr | 25-yr | 100-yr |
| Design Point 1 (CBs Southeast of site) | 8.72 | 16.26 | 21.00 | 28.25 |
| Design Point 2 (CBs Southwest of site) | 6.42 | 15.71 | 22.06 | 32.25 |
| Design Point 3 (CBs West of site) | 4.83 | 11.21 | 15.50 | 22.32 |
| Design Point 4 (Offsite to the North) | 0.00 | 0.00 | 0.02 | 0.13 |

**Developed Site Conditions and Hydrologic Conditions**

In the proposed condition, a site stormwater management system will be installed to mitigate any increase in peak flow from the site. Two subsurface stormwater detention systems will be installed on-site. The site stormwater system will connect to the existing town drainage system by means of pipe connections to existing catch basins. The stormwater system will also provide stormwater detention and quality improvements through the implementation of a formalized street sweeping program for the impervious surfaces and the installation of deep sump and hooded outlet catch basins, and a subsurface sediment isolator row. These measures will treat the stormwater quality flow through structural means to provide water quality treatment in conformance with the State of Connecticut Water Quality Manual.

The Town of Glastonbury Groundwater Protection Zone regulations state that nitrogen loading to groundwater shall be less than 10 mg/L. Nitrogen Loading Calculations were performed, and included in Appendix D, adapted from the Cape Cod Commission Water Resources Office Nitrogen Loading manual from the Technical Bulletin 91-001 (FINAL) dated April 1992, using Town of Glastonbury constants. The calculations for nitrogen loading from the site include concentrations from impervious surface runoff and lawn area fertilizer applications, which result in a total nitrogen load to groundwater of 1.625 mg/L. The Town of Glastonbury Groundwater Protection Zone regulations also state that the proposed development shall not decrease the site's groundwater infiltration potential by more than 50%. As demonstrated by the Groundwater Recharge Calculations in Appendix D, the proposed site will provide water quality volumes for potential infiltration to groundwater that exceed the minimum required volume to meet the existing condition groundwater infiltration potential. Additionally, the pre development and post development outflow volume comparison Table 8 below shows a decrease to total outflow volume from the site in all storm events to the town drainage system, demonstrating that a greater volume of stormwater is infiltrated into groundwater in the proposed condition.

The proposed site drainage area analyzed totals 20.32 acres and is approximately 63% impervious. The intent of the proposed site drainage is to match existing drainage patterns to the maximum extent practical. For the hydrologic analysis, the developed site retained the same Design Points as the existing model. The following drainage areas were developed to model the proposed site improvements.

**Proposed Drainage Area 11 (PDA-11):** This drainage area consists of the southeastern portion of the project parcel and portions of Eastern Boulevard that drain into the closed Town drainage system which flows towards the southeast of the site within eastern boulevard (DP-1). It is 3.37 acres and is approximately 57% impervious. PDA-11 consists of impervious parking, road, and building area, and lawn areas. This area's runoff is clean or unchanged.

**Proposed Drainage Area 12 (PDA-12):** This drainage area consists of the eastern portion of the project parcel that drains into Subsurface Detention System #1 with an isolator row and eventually into the closed Town drainage system within eastern boulevard (DP-1). It is 1.02 acres and is approximately 80% impervious. The subsurface stormwater detention system has been designed to mitigate the increase in peak flows for all storm events. PDA-12 consists of impervious parking area and lawn area.

**Proposed Drainage Area 21 (PDA-21):** This drainage area consists of the southern portion of the project parcel which sheet flows or flows to catch basins which drain into the closed Town drainage system which crosses National Drive to the south of the project parcel (DP-2). It is 1.55 acres and

is approximately 67% impervious. PDA-21 consists of impervious parking, road, and building area, and lawn areas. This area's runoff is clean or unchanged.

**Proposed Drainage Area 22 (PDA-22):** This drainage area consists of the majority of the project parcel that drains into Subsurface Detention System #2 with an isolator row and eventually into the closed Town drainage system which crosses National Drive to the south of the project parcel (DP-2). It is 8.64 acres and is approximately 76% impervious. The subsurface stormwater detention system has been designed to mitigate the increase in peak flows for all storm events. PDA-22 consists of impervious parking and building area, wooded, and lawn area.

**Proposed Drainage Area 31 (PDA-31):** This drainage area consists of the western portion of the project parcel and a portion of the adjacent parcel which drains into the closed Town drainage system which flows west along National Drive to the west of the project parcel (DP-3). It is 5.26 acres and is approximately 47% impervious. PDA-31 consists of impervious parking, road, and building area, wooded, and lawn areas. This area's runoff is clean or unchanged.

**Proposed Drainage Area 41 (PDA-41):** This drainage area consists of the northwestern portion of the project parcel which sheet flows offsite to the north (DP-4). It is 0.48 acres and is approximately 0% impervious. PDA-41 consists of wooded areas. This area's runoff is clean or unchanged.

**Table 3 – Post-Development Drainage Characteristics.**

| Drainage Area | Area (square feet) | Composite Curve Number | Impervious Cover (%) | Time of Concentration (minutes) |
|---|---|---|---|---|
| PDA-11 (Area to CBs Southeast of site) | 146,902 | 85 | 57 | 9.7 |
| PDA-12 (Area to SSDS #1) | 44,319 | 92 | 80 | 6.8 |
| PDA-21 (Area to CBs Southwest of site) | 67,486 | 88 | 67 | 18.1 |
| PDA-22 (Area to SSDS #1) | 376,167 | 86 | 76 | 21.8 |
| PDA-31 (Area to CBs West of site) | 229,298 | 78 | 47 | 21.8 |
| PDA-41 (Area sheet flowing north offsite) | 21,119 | 36 | 0 | 15.0 |

**Table 4 – Post-Development Conditions Peak Flows**

| Analysis Point | Peak Flow (cfs) | | | |
|---|---|---|---|---|
| | 2-yr | 10-yr | 25-yr | 100-yr |
| Design Point 1 (CBs Southeast of site) | 8.46 | 15.23 | 19.62 | 28.20 |
| Design Point 2 (CBs Southwest of site) | 5.95 | 10.72 | 13.21 | 28.81 |
| Design Point 3 (CBs West of site) | 4.68 | 10.33 | 14.07 | 19.95 |
| Design Point 4 (Offsite to the North) | 0.00 | 0.00 | 0.02 | 0.13 |

**Table 5 – Existing vs Proposed Peak Rates of Runoff**

| | Peak Flow Rate in Cubic Feet per Second (cfs) | | | |
|---|---|---|---|---|
| **Drainage Area** | **2-yr** | **10-yr** | **25-yr** | **100-yr** |
| **Design Point 1** | | | | |
| Existing | 8.72 | 16.26 | 21.00 | 28.25 |
| Proposed | 8.46 | 15.23 | 19.62 | 28.20 |
| Percent Change | -2.98% | -6.33% | -6.57% | -0.18% |
| **Design Point 2** | | | | |
| Existing | 6.42 | 15.71 | 22.06 | 32.25 |
| Proposed | 5.95 | 10.72 | 13.21 | 28.81 |
| Percent Change | -7.32% | -31.76% | -40.12% | -10.67% |
| **Design Point 3** | | | | |
| Existing | 4.83 | 11.21 | 15.50 | 22.32 |
| Proposed | 4.68 | 10.33 | 14.07 | 19.95 |
| Percent Change | -3.11% | -7.85% | -9.23% | -10.62% |
| **Design Point 4** | | | | |
| Existing | 0.00 | 0.00 | 0.02 | 0.13 |
| Proposed | 0.00 | 0.00 | 0.02 | 0.13 |
| Percent Change | 0.00% | 0.00% | 0.00% | 0.00% |

## Stormwater Management

*Hydrologic Modeling of the Entire Site*

The hydrologic analysis to determine peak stormwater discharge rates was performed using the HydroCAD stormwater modeling system computer program, version 10.00 developed by HydroCAD Software Solutions, LLC. Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method. Rainfall depths and distribution per the NOAA Atlas 14 for Glastonbury, CT were used for the calculation of peak flow rates and are listed in Table 6. The

drainage areas, or subcatchments as labeled by the program, are depicted by hexagons on the attached drainage diagrams. Pre-development HydroCAD output can be found in Appendix B and Post-development HydroCAD output can be found in Appendix C.

**Table 6 – Rainfall Depths per NOAA Atlas 14**
**Appendix B - 24 hour Rainfall Data**

| Return Period | 24-hour Rainfall Depth |
|---|---|
| 2-year | 3.09” |
| 10-year | 4.87” |
| 25-year | 5.98” |
| 100-year | 7.69” |

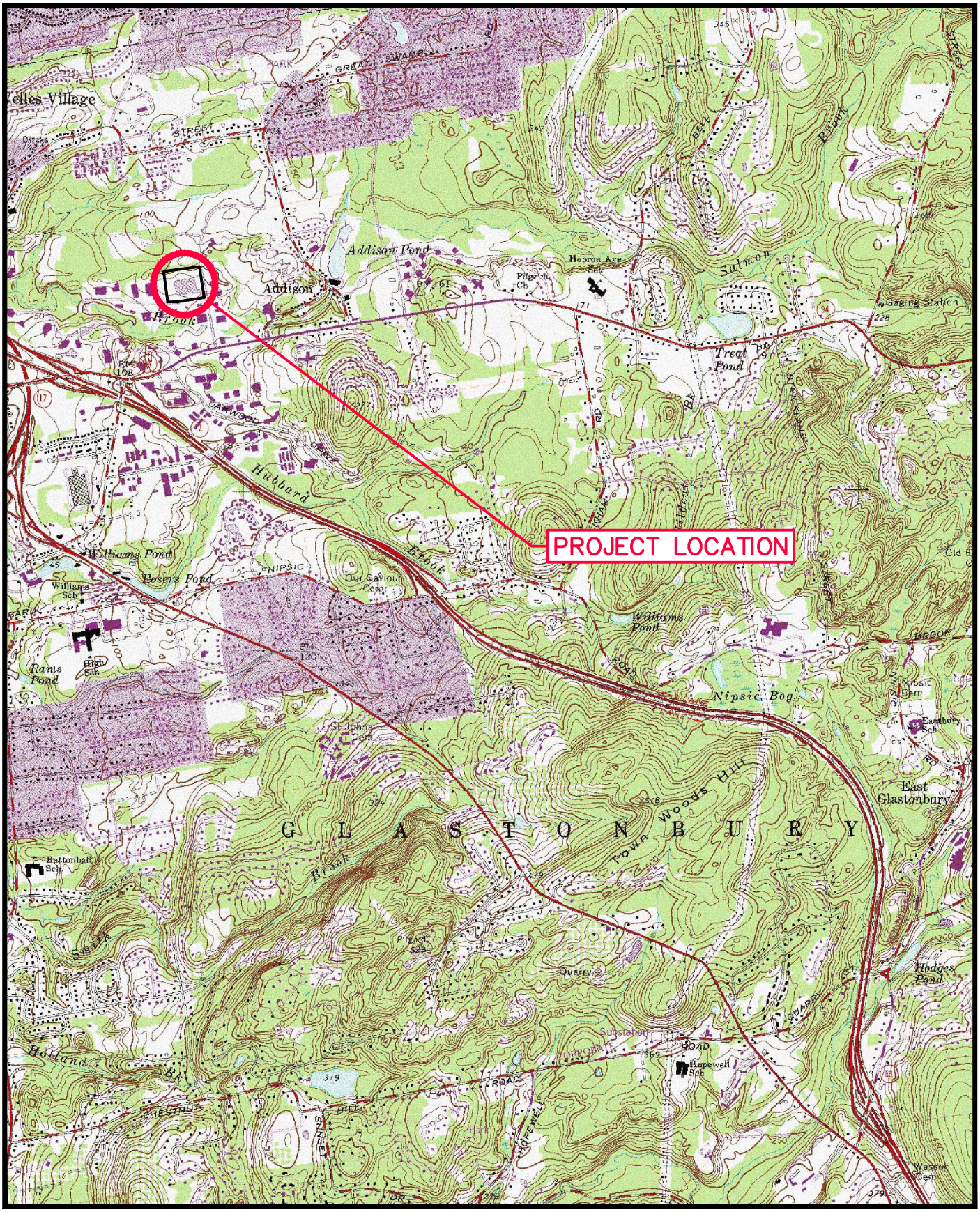
**Summary**

The post-development peak discharge rates for the total developed site have been maintained or decreased for all storm events. All post development stormwater will be discharged offsite to match existing drainage patterns. The proposed underground stormwater detention systems have been designed to attenuate peak flows for the 2-, 10-, 25-, and 100-year storm events. Due to high groundwater on site, infiltration has been omitted from the stormwater management design. Stormwater quality is being addressed by a formalized street sweeping program, deep sump and hooded outlet catch basins, and a sediment isolator row. These features will provide the minimum required 80% TSS removal as required in the CT Stormwater Manual. The proposed stormwater management system will meet the stormwater quality requirements of the State of Connecticut.

# APPENDIX A

## LOCATION MAPS

Figure 1: USGS Location Map
Figure 2: Aerial Location Map
Figure 3: NRCS Soil Survey Map with Hydrologic Soil Group Data
Figure 4: FEMA Federal Insurance Rate Map
Figure 5: NOAA Atlas 14 Storm Data

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ENGINEERING
ENVIRONMENTAL
LAND SURVEYING

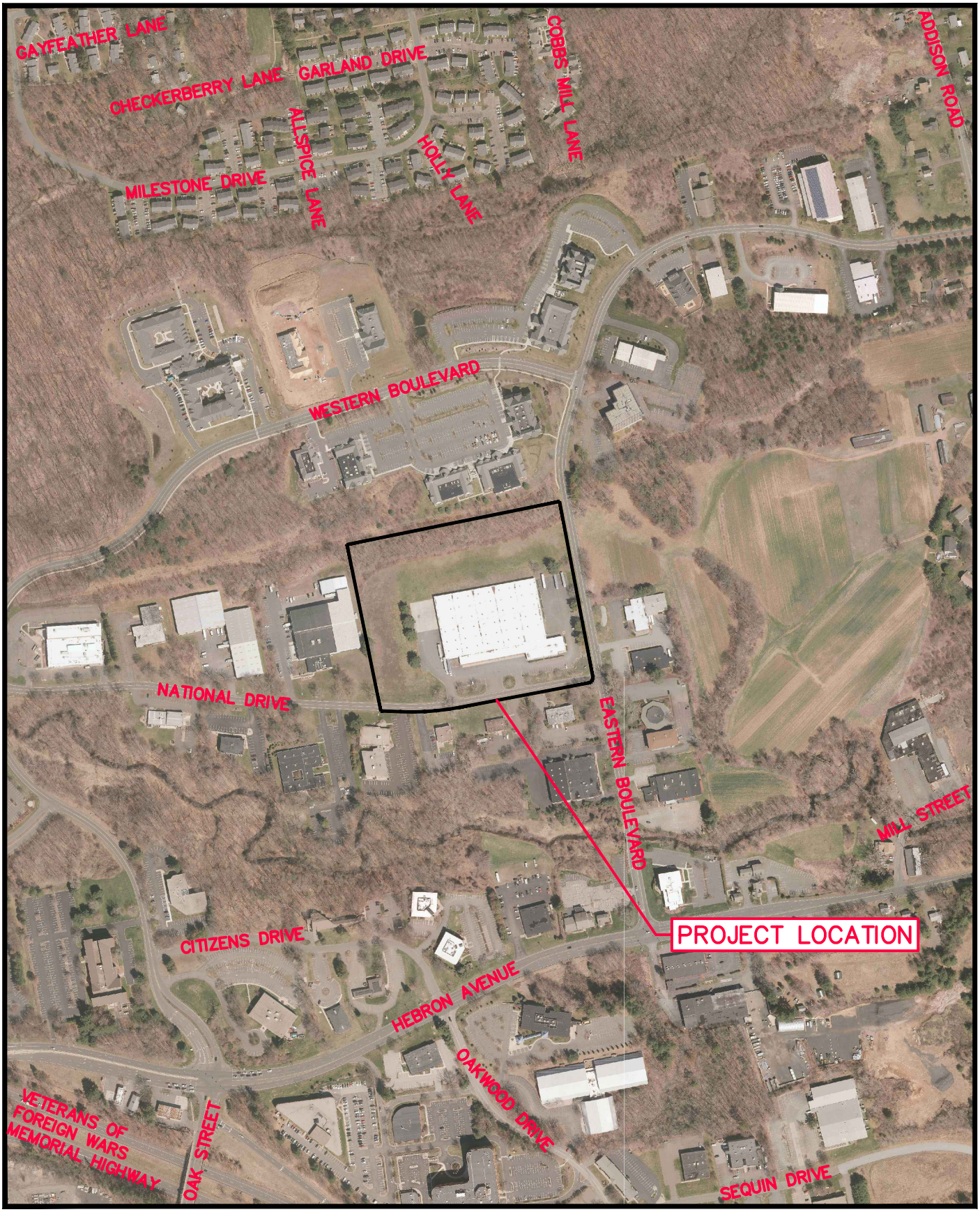
**PROPOSED DEVELOPMENT**

EASTERN BOULEVARD
GLASTONBURY, CONNECTICUT

| | |
|---|---|
| Designed | H.J.T. |
| Drawn | H.J.T. |
| Checked | M.J.B. |
| Approved | M.J.B. |
| Scale | 1"=2,000' |
| Project No. | 2000669 |
| Date | 08/18/2020 |
| CAD File | LOC200066901 |

# FIGURE 1

**USGS LOCATION MAP**

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LAND SURVEYING

**PROPOSED DEVELOPMENT**

EASTERN BOULEVARD
GLASTONBURY, CONNECTICUT

| | |
|---|---|
| Designed | H.J.T. |
| Drawn | H.J.T. |
| Checked | M.J.B. |
| Approved | M.J.B. |
| Scale | 1"=500' |
| Project No. | 2000669 |
| Date | 08/18/2020 |
| CAD File | LOC200066901 |

# FIGURE 2

**AERIAL LOCATION MAP**

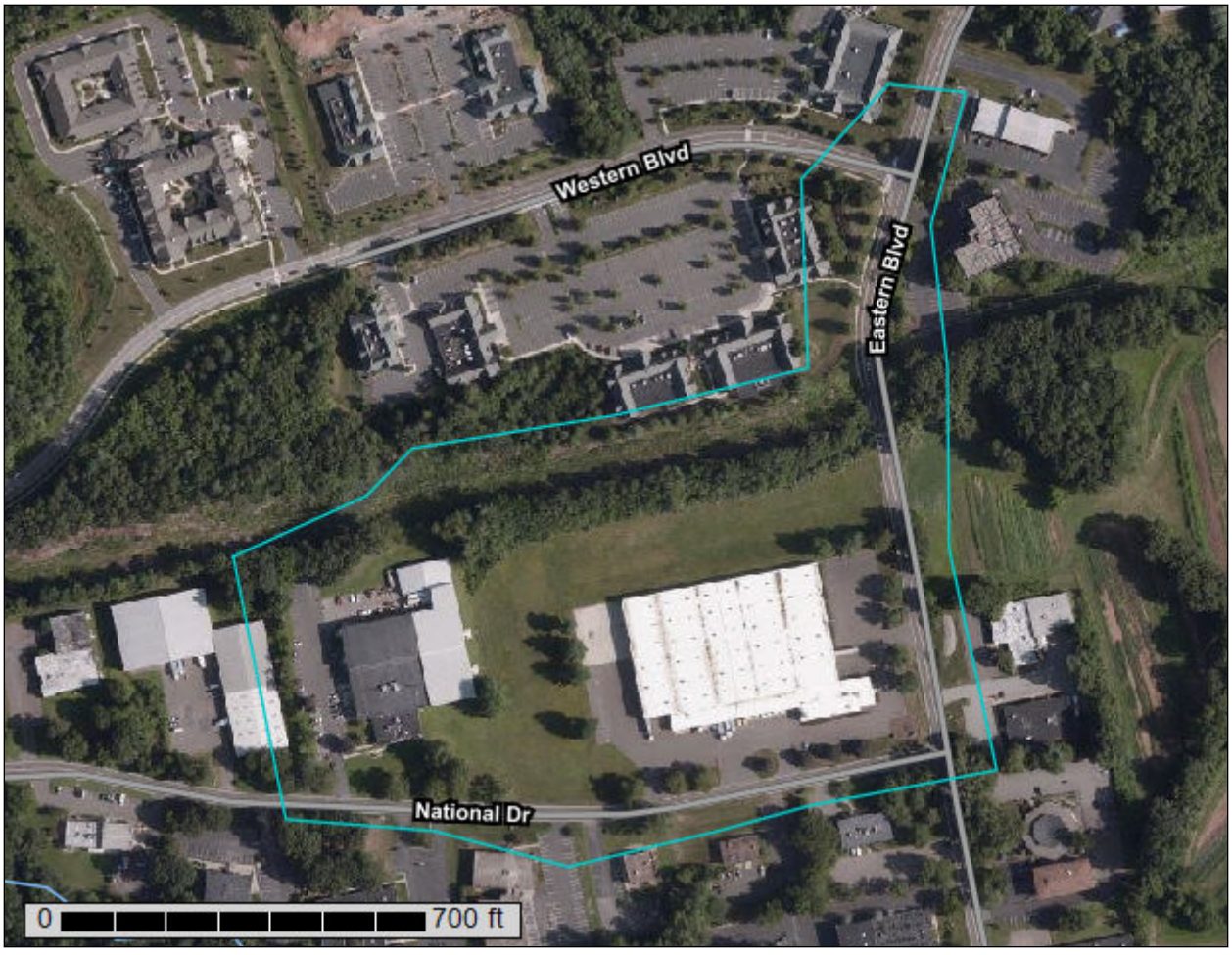
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

# Custom Soil Resource Report for State of Connecticut




August 10, 2020

# Preface

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

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

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

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

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

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

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

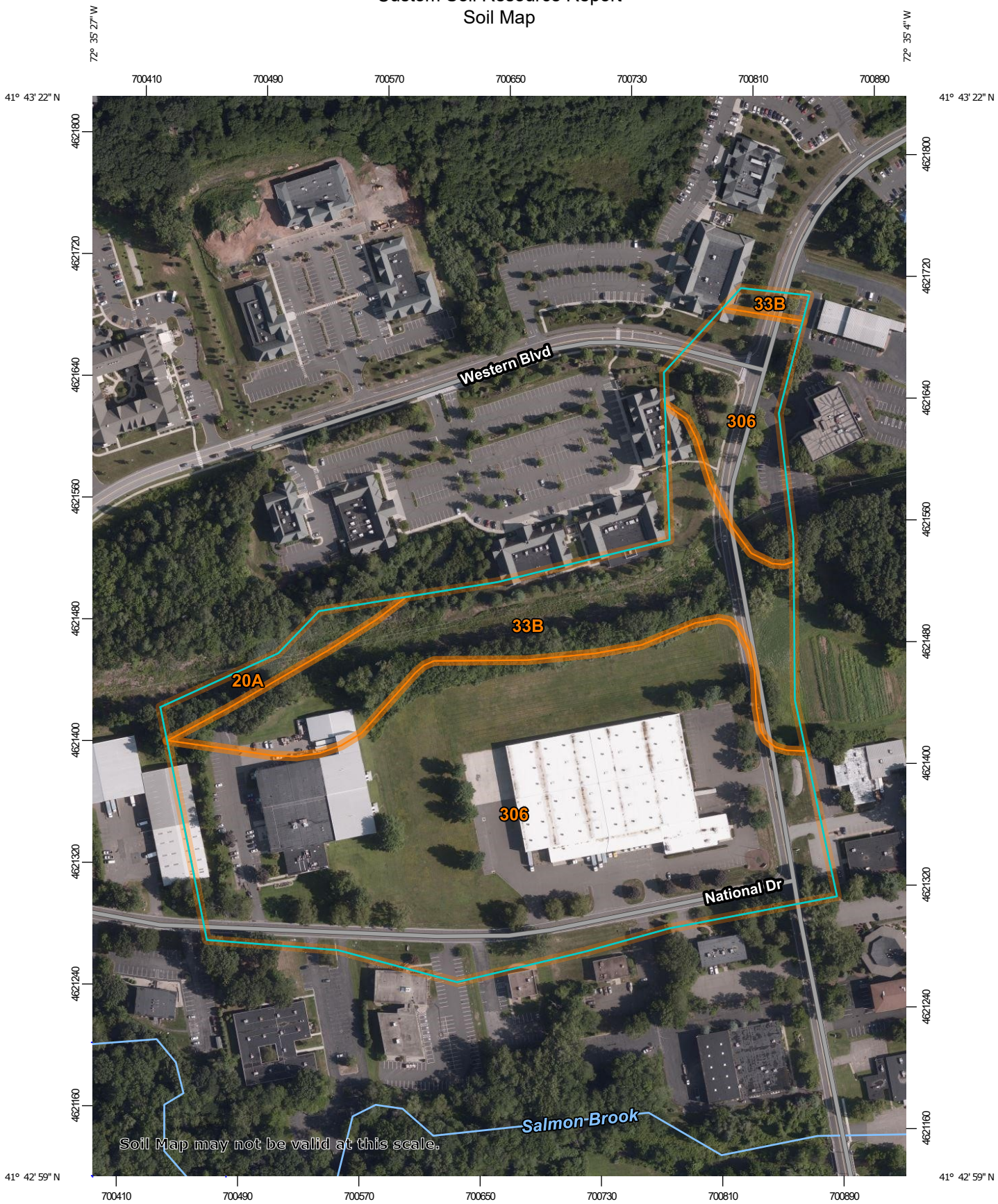
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:3,460 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

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

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

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

**Water Features**
- Streams and Canals

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

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

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

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 20A | Ellington silt loam, 0 to 5 percent slopes | 0.8 | 2.9% |
| 33B | Hartford sandy loam, 3 to 8 percent slopes | 6.5 | 24.3% |
| 306 | Udorthents-Urban land complex | 19.6 | 72.8% |
| **Totals for Area of Interest** | | **27.0** | **100.0%** |

# Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

# State of Connecticut

## 20A—Ellington silt loam, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 9lk5
*Elevation:* 0 to 1,200 feet
*Mean annual precipitation:* 43 to 54 inches
*Mean annual air temperature:* 45 to 55 degrees F
*Frost-free period:* 140 to 185 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Ellington and similar soils:* 80 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ellington

#### Setting

*Landform:* Terraces, outwash plains
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from sandstone and shale and/or basalt

#### Typical profile

*Ap - 0 to 8 inches:* silt loam
*Bw1 - 8 to 18 inches:* silt loam
*Bw2 - 18 to 26 inches:* very fine sandy loam
*2C - 26 to 65 inches:* stratified loamy fine sand to very gravelly coarse sand

#### Properties and qualities

*Slope:* 0 to 5 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* About 18 to 30 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 6.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* B
*Ecological site:* F145XY010CT - Moist Outwash
*Hydric soil rating:* No

### Minor Components

#### Branford

*Percent of map unit:* 5 percent
*Landform:* Outwash plains, terraces

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

**Unnamed, fine sandy loam surface**
*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Raypol**
*Percent of map unit:* 5 percent
*Landform:* Depressions, drainageways
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

**Raynham**
*Percent of map unit:* 5 percent
*Landform:* Depressions, drainageways
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 33B—Hartford sandy loam, 3 to 8 percent slopes

### Map Unit Setting
*National map unit symbol:* 9lmw
*Elevation:* 0 to 1,200 feet
*Mean annual precipitation:* 43 to 54 inches
*Mean annual air temperature:* 45 to 55 degrees F
*Frost-free period:* 140 to 185 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition
*Hartford and similar soils:* 80 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hartford

#### Setting
*Landform:* Outwash plains, terraces
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Sandy glaciofluvial deposits derived from sandstone and/or basalt

#### Typical profile
*Ap - 0 to 8 inches:* sandy loam
*Bw1 - 8 to 20 inches:* sandy loam
*Bw2 - 20 to 26 inches:* loamy sand
*2C - 26 to 65 inches:* stratified very gravelly coarse sand to loamy fine sand

**Properties and qualities**

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat excessively drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 4.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2e
*Hydrologic Soil Group:* A
*Ecological site:* F145XY008MA - Dry Outwash
*Hydric soil rating:* No

**Minor Components**

**Penwood**

*Percent of map unit:* 5 percent
*Landform:* Terraces, outwash plains
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Hydric soil rating:* No

**Ellington**

*Percent of map unit:* 5 percent
*Landform:* Terraces, outwash plains
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Hydric soil rating:* No

**Manchester**

*Percent of map unit:* 5 percent
*Landform:* Kames, outwash plains, terraces, eskers
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Branford**

*Percent of map unit:* 5 percent
*Landform:* Outwash plains, terraces
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Hydric soil rating:* No

## 306—Udorthents-Urban land complex

### Map Unit Setting

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

### Map Unit Composition

*Udorthents and similar soils:* 50 percent
*Urban land:* 35 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Udorthents

#### Setting

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

#### Typical profile

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

#### Properties and qualities

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

#### Interpretive groups

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

### Description of Urban Land

#### Typical profile

*H - 0 to 6 inches:* material

**Interpretive groups**

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

**Minor Components**

**Unnamed, undisturbed soils**

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

**Udorthents, wet substratum**

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

**Rock outcrop**

*Percent of map unit:* 2 percent
*Hydric soil rating:* No

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

### Hydrologic Soil Group

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:

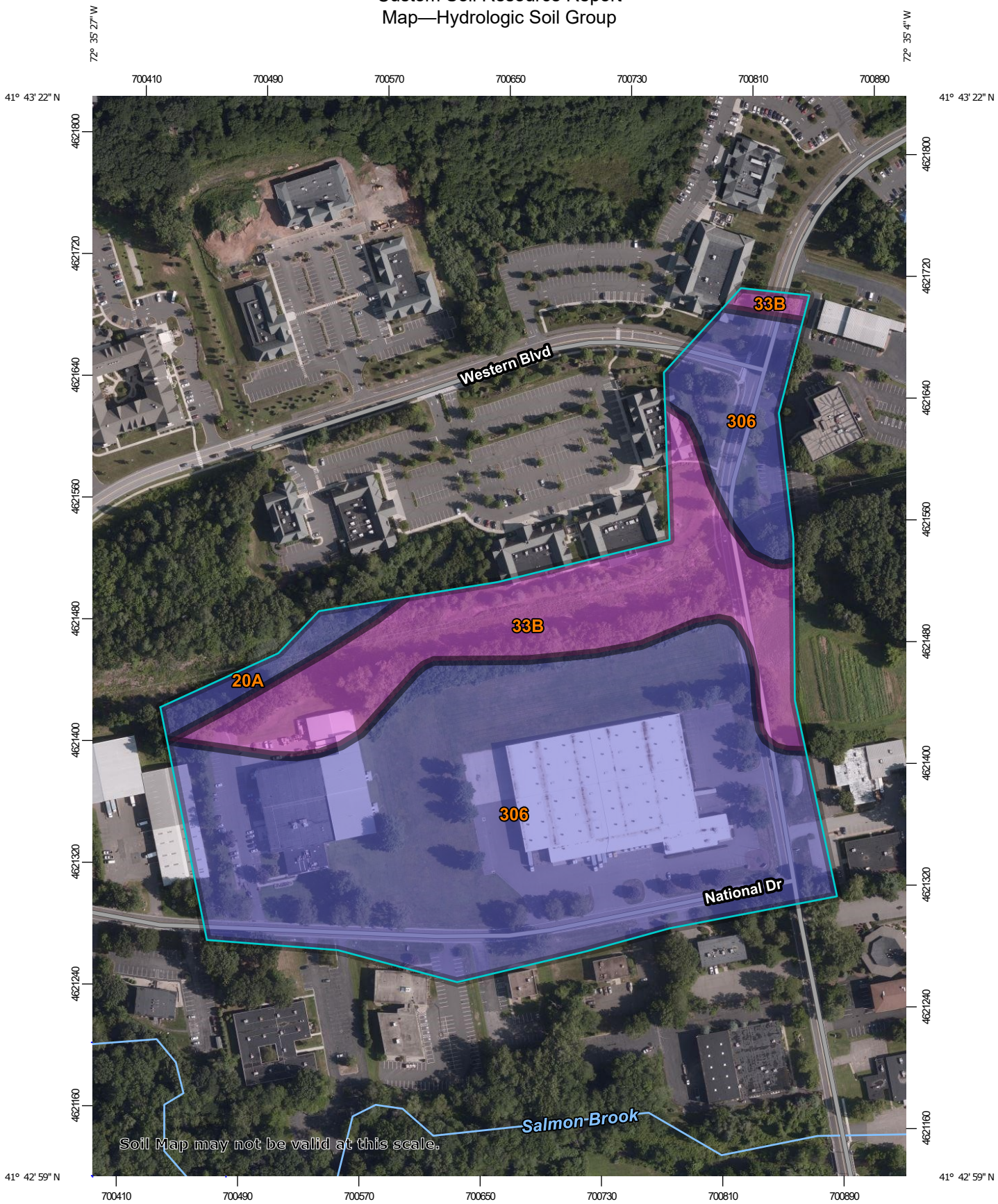
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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.




Map Scale: 1:3,460 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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 1:12,000.

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

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.

## Table—Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 20A | Ellington silt loam, 0 to 5 percent slopes | B | 0.8 | 2.9% |
| 33B | Hartford sandy loam, 3 to 8 percent slopes | A | 6.5 | 24.3% |
| 306 | Udorthents-Urban land complex | B | 19.6 | 72.8% |
| **Totals for Area of Interest** | | | **27.0** | **100.0%** |

## Rating Options—Hydrologic Soil Group

*Aggregation Method:* Dominant Condition

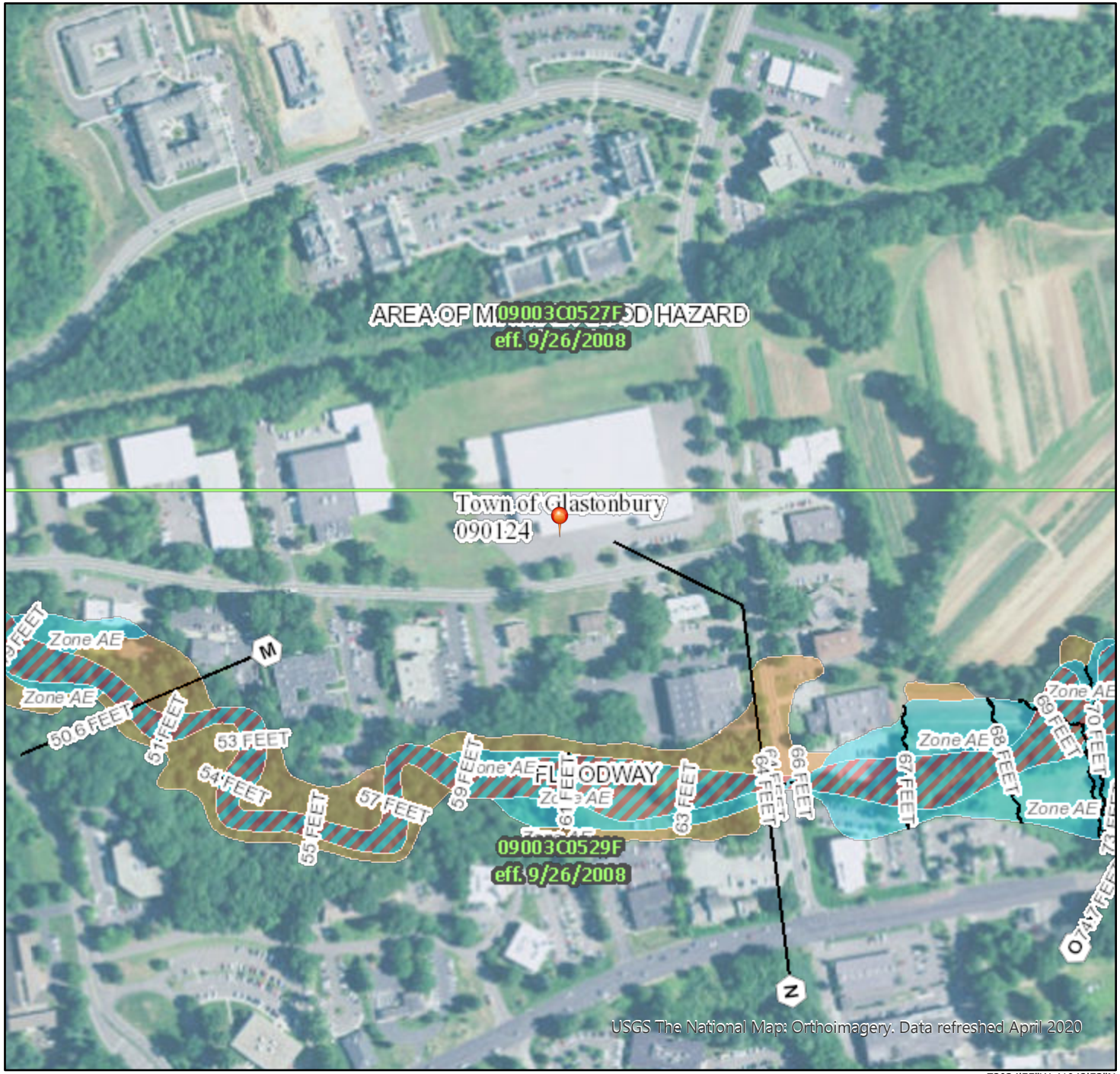
*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# National Flood Hazard Layer FIRMette

FEMA

72°35'33"W 41°43'20"N




72°34'55"W 41°42'53"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/19/2020 at 11:41 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

**NOAA Atlas 14, Volume 10, Version 3**
**Location name: Glastonbury, Connecticut, USA***
**Latitude: 41.718°, Longitude: -72.5896°**
**Elevation: 71.04 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.331 (0.263-0.416) | 0.404 (0.320-0.508) | 0.523 (0.412-0.659) | 0.621 (0.487-0.789) | 0.757 (0.573-1.01) | 0.859 (0.635-1.17) | 0.966 (0.692-1.37) | 1.09 (0.735-1.58) | 1.26 (0.817-1.90) | 1.40 (0.886-2.15) |
| 10-min | 0.469 (0.372-0.589) | 0.572 (0.453-0.719) | 0.740 (0.583-0.933) | 0.880 (0.690-1.12) | 1.07 (0.811-1.43) | 1.22 (0.900-1.66) | 1.37 (0.981-1.94) | 1.54 (1.04-2.23) | 1.78 (1.16-2.68) | 1.98 (1.25-3.05) |
| 15-min | 0.552 (0.438-0.693) | 0.673 (0.533-0.846) | 0.871 (0.687-1.10) | 1.04 (0.811-1.31) | 1.26 (0.954-1.68) | 1.43 (1.06-1.95) | 1.61 (1.15-2.28) | 1.81 (1.23-2.63) | 2.10 (1.36-3.16) | 2.33 (1.48-3.59) |
| 30-min | 0.743 (0.588-0.932) | 0.906 (0.717-1.14) | 1.17 (0.924-1.48) | 1.39 (1.09-1.77) | 1.70 (1.28-2.26) | 1.93 (1.43-2.62) | 2.17 (1.55-3.07) | 2.44 (1.65-3.53) | 2.82 (1.83-4.25) | 3.14 (1.99-4.83) |
| 60-min | 0.933 (0.739-1.17) | 1.14 (0.900-1.43) | 1.47 (1.16-1.86) | 1.75 (1.37-2.22) | 2.13 (1.61-2.84) | 2.42 (1.79-3.29) | 2.72 (1.95-3.85) | 3.06 (2.07-4.44) | 3.55 (2.30-5.34) | 3.94 (2.50-6.06) |
| 2-hr | 1.22 (0.972-1.52) | 1.48 (1.18-1.84) | 1.90 (1.51-2.38) | 2.25 (1.77-2.83) | 2.73 (2.08-3.62) | 3.09 (2.31-4.19) | 3.47 (2.52-4.92) | 3.93 (2.66-5.66) | 4.60 (2.99-6.88) | 5.16 (3.28-7.88) |
| 3-hr | 1.41 (1.13-1.75) | 1.70 (1.36-2.12) | 2.19 (1.74-2.73) | 2.59 (2.05-3.25) | 3.14 (2.40-4.15) | 3.55 (2.66-4.81) | 3.99 (2.90-5.64) | 4.52 (3.07-6.49) | 5.32 (3.47-7.93) | 6.00 (3.82-9.13) |
| 6-hr | 1.76 (1.42-2.18) | 2.14 (1.72-2.64) | 2.75 (2.20-3.41) | 3.25 (2.59-4.06) | 3.95 (3.04-5.19) | 4.46 (3.37-6.02) | 5.02 (3.68-7.08) | 5.70 (3.89-8.14) | 6.75 (4.42-9.99) | 7.65 (4.88-11.6) |
| 12-hr | 2.14 (1.74-2.63) | 2.61 (2.12-3.21) | 3.38 (2.73-4.17) | 4.02 (3.22-4.99) | 4.90 (3.80-6.41) | 5.55 (4.21-7.44) | 6.26 (4.62-8.77) | 7.13 (4.89-10.1) | 8.46 (5.56-12.4) | 9.61 (6.15-14.4) |
| 24-hr | 2.50 (2.04-3.05) | 3.09 (2.52-3.78) | 4.06 (3.30-4.98) | 4.87 (3.93-6.00) | 5.98 (4.66-7.78) | 6.79 (5.19-9.07) | 7.69 (5.72-10.8) | 8.81 (6.06-12.4) | 10.6 (6.97-15.5) | 12.1 (7.79-18.1) |
| 2-day | 2.84 (2.33-3.44) | 3.57 (2.93-4.33) | 4.77 (3.90-5.80) | 5.76 (4.67-7.05) | 7.12 (5.60-9.25) | 8.11 (6.26-10.8) | 9.23 (6.95-13.0) | 10.7 (7.37-15.0) | 13.1 (8.64-19.0) | 15.2 (9.80-22.5) |
| 3-day | 3.09 (2.55-3.73) | 3.90 (3.21-4.71) | 5.21 (4.27-6.32) | 6.30 (5.13-7.68) | 7.80 (6.16-10.1) | 8.89 (6.89-11.8) | 10.1 (7.65-14.2) | 11.8 (8.12-16.4) | 14.4 (9.55-20.9) | 16.9 (10.9-24.8) |
| 4-day | 3.31 (2.74-3.98) | 4.16 (3.44-5.01) | 5.56 (4.57-6.72) | 6.71 (5.48-8.16) | 8.31 (6.58-10.7) | 9.46 (7.35-12.6) | 10.8 (8.16-15.1) | 12.5 (8.65-17.4) | 15.4 (10.2-22.1) | 17.9 (11.6-26.3) |
| 7-day | 3.89 (3.23-4.65) | 4.83 (4.01-5.79) | 6.38 (5.28-7.67) | 7.67 (6.29-9.27) | 9.43 (7.50-12.1) | 10.7 (8.35-14.1) | 12.2 (9.23-16.8) | 14.0 (9.76-19.4) | 17.1 (11.4-24.5) | 19.9 (12.9-29.0) |
| 10-day | 4.48 (3.74-5.35) | 5.48 (4.56-6.54) | 7.11 (5.89-8.52) | 8.46 (6.97-10.2) | 10.3 (8.21-13.1) | 11.7 (9.10-15.3) | 13.2 (9.98-18.1) | 15.1 (10.5-20.8) | 18.2 (12.1-26.0) | 20.9 (13.6-30.4) |
| 20-day | 6.44 (5.41-7.63) | 7.49 (6.28-8.89) | 9.22 (7.70-11.0) | 10.6 (8.83-12.8) | 12.6 (10.1-15.8) | 14.1 (11.0-18.1) | 15.7 (11.8-21.0) | 17.5 (12.3-23.9) | 20.3 (13.6-28.7) | 22.7 (14.7-32.7) |
| 30-day | 8.12 (6.85-9.59) | 9.21 (7.75-10.9) | 11.0 (9.21-13.0) | 12.5 (10.4-14.9) | 14.5 (11.6-18.0) | 16.0 (12.5-20.4) | 17.6 (13.2-23.2) | 19.4 (13.6-26.3) | 21.9 (14.7-30.8) | 23.9 (15.6-34.3) |
| 45-day | 10.2 (8.67-12.1) | 11.4 (9.61-13.4) | 13.2 (11.1-15.6) | 14.7 (12.3-17.5) | 16.8 (13.5-20.8) | 18.5 (14.4-23.2) | 20.1 (15.0-26.1) | 21.7 (15.4-29.3) | 23.9 (16.1-33.4) | 25.5 (16.7-36.6) |
| 60-day | 12.0 (10.2-14.1) | 13.2 (11.2-15.5) | 15.1 (12.7-17.8) | 16.7 (14.0-19.8) | 18.9 (15.1-23.1) | 20.6 (16.0-25.7) | 22.2 (16.5-28.6) | 23.8 (16.9-31.9) | 25.7 (17.4-35.9) | 27.1 (17.7-38.7) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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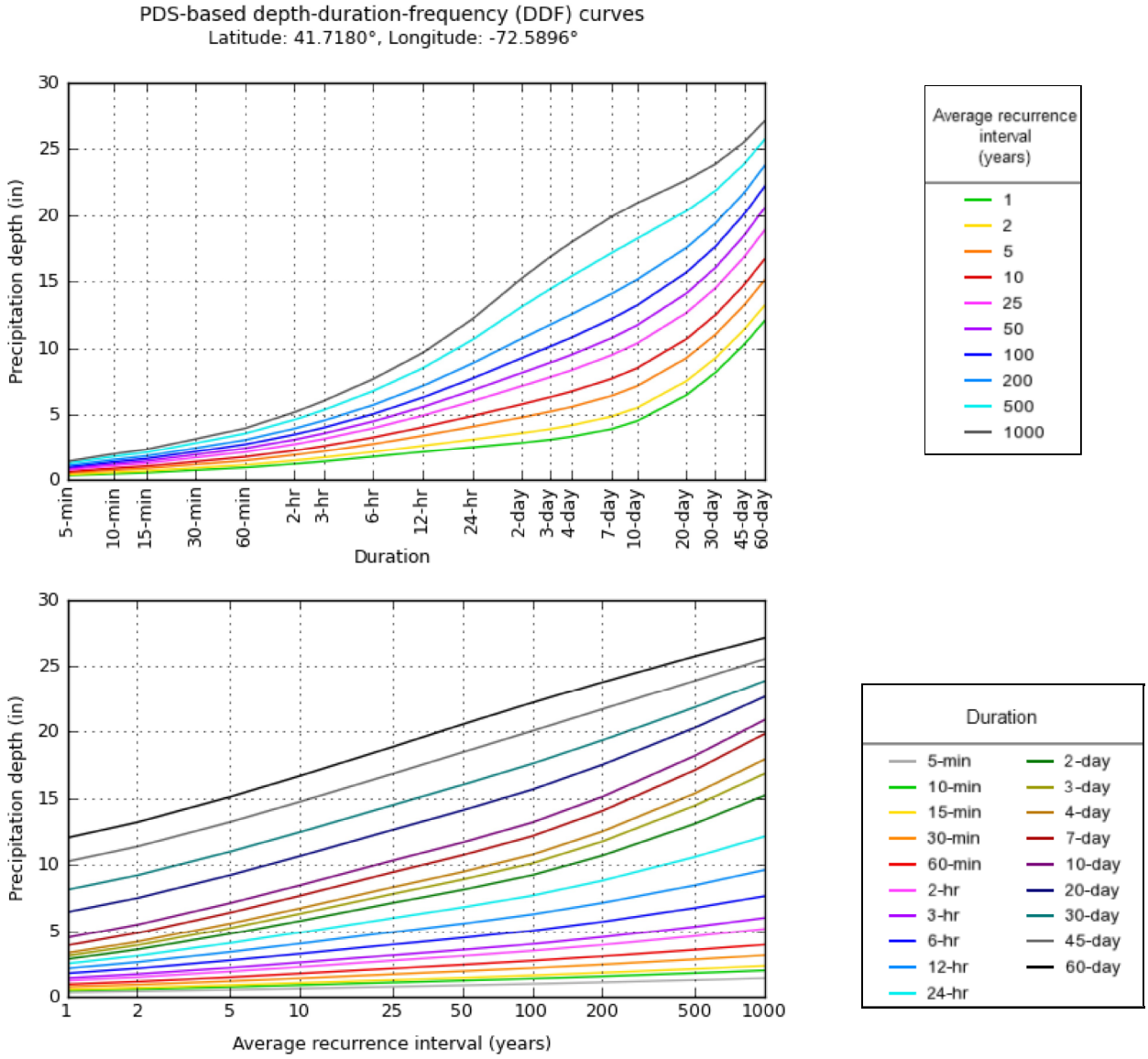
## PF graphical




NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Mon Aug 10 18:11:59 2020

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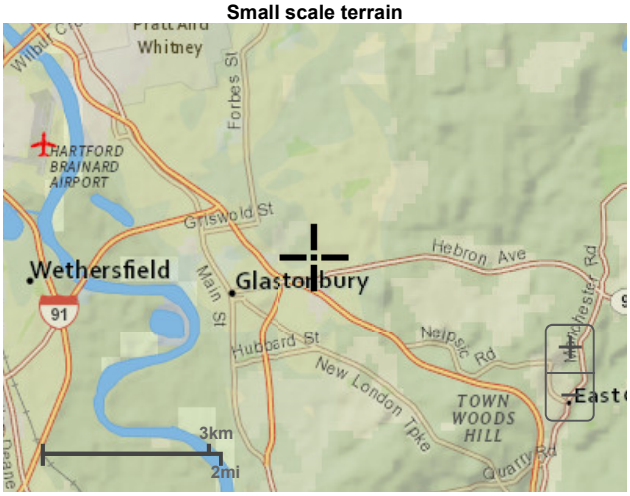
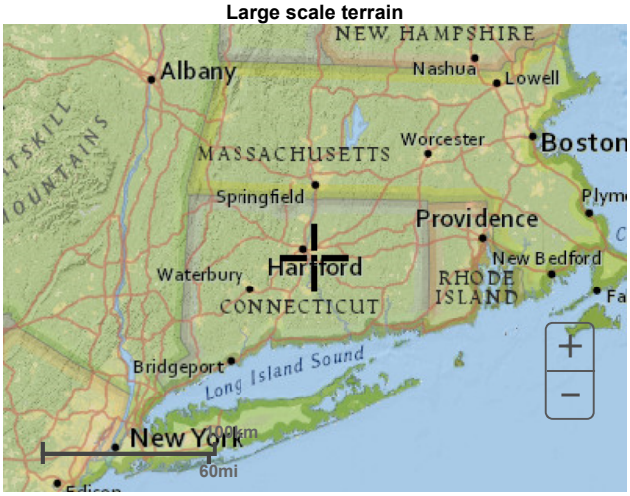
# Maps & aerials

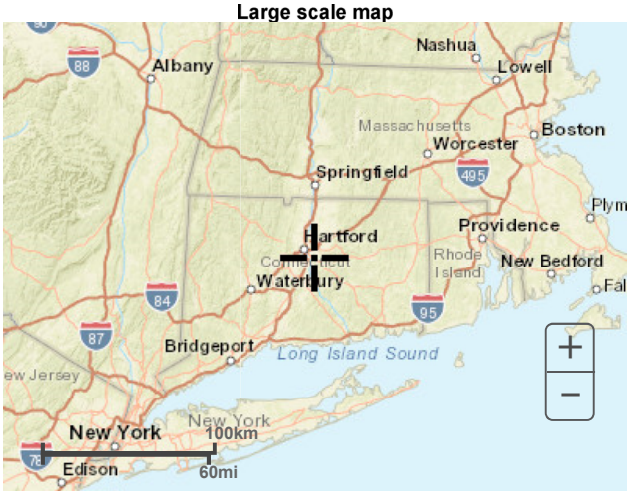
**Small scale terrain**



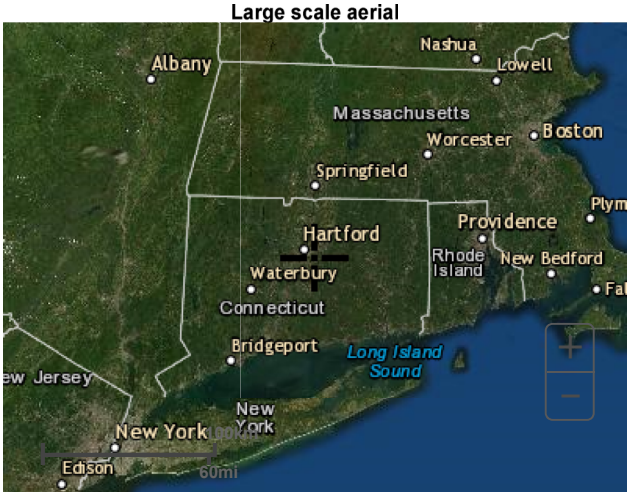

**Large scale terrain**




**Large scale map**



**Large scale aerial**

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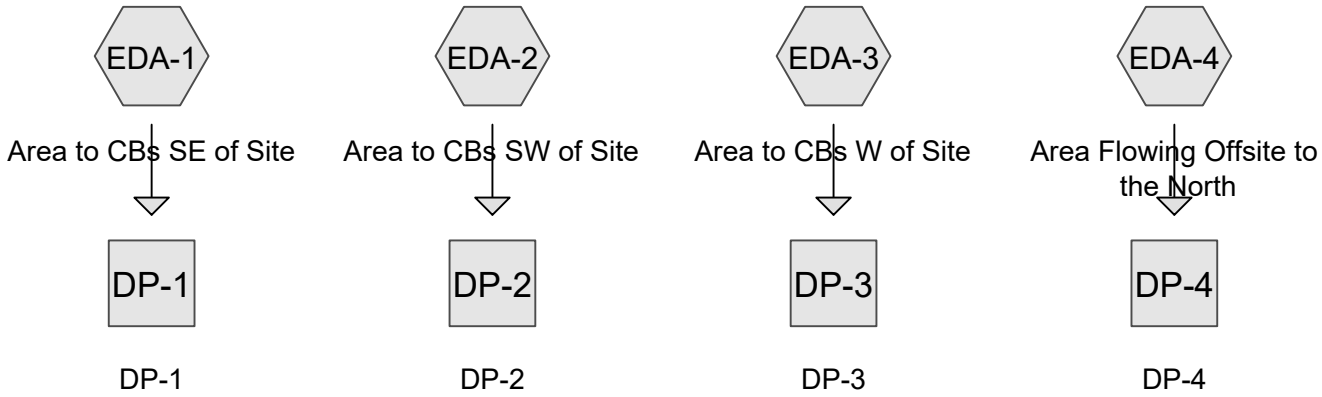
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

# APPENDIX B

# PRE-DEVELOPMENT HYDROLOGY




Subcat Reach Pond Link

**Routing Diagram for C-DAT-2000669-EXISTING HYDROLOGY**
Prepared by BL Companies, Inc., Printed 8/19/2020

Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment EDA-1: Area to CBs SE of** Runoff Area=184,485 sf 60.55% Impervious Runoff Depth=1.74"
Flow Length=248' Tc=9.7 min CN=86 Runoff=8.72 cfs 0.614 af

**Subcatchment EDA-2: Area to CBs SW of** Runoff Area=411,817 sf 39.56% Impervious Runoff Depth=0.97"
Flow Length=1,332' Tc=22.6 min CN=74 Runoff=6.42 cfs 0.761 af

**Subcatchment EDA-3: Area to CBs W of** Runoff Area=267,870 sf 39.03% Impervious Runoff Depth=1.08"
Flow Length=852' Tc=21.8 min CN=76 Runoff=4.83 cfs 0.551 af

**Subcatchment EDA-4: Area Flowing Offsite** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.00 cfs 0.000 af

**Reach DP-1: DP-1** Inflow=8.72 cfs 0.614 af
Outflow=8.72 cfs 0.614 af

**Reach DP-2: DP-2** Inflow=6.42 cfs 0.761 af
Outflow=6.42 cfs 0.761 af

**Reach DP-3: DP-3** Inflow=4.83 cfs 0.551 af
Outflow=4.83 cfs 0.551 af

**Reach DP-4: DP-4** Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 20.323 ac Runoff Volume = 1.926 af Average Runoff Depth = 1.14"**
**57.17% Pervious = 11.618 ac 42.83% Impervious = 8.705 ac**

## Summary for Subcatchment EDA-1: Area to CBs SE of Site

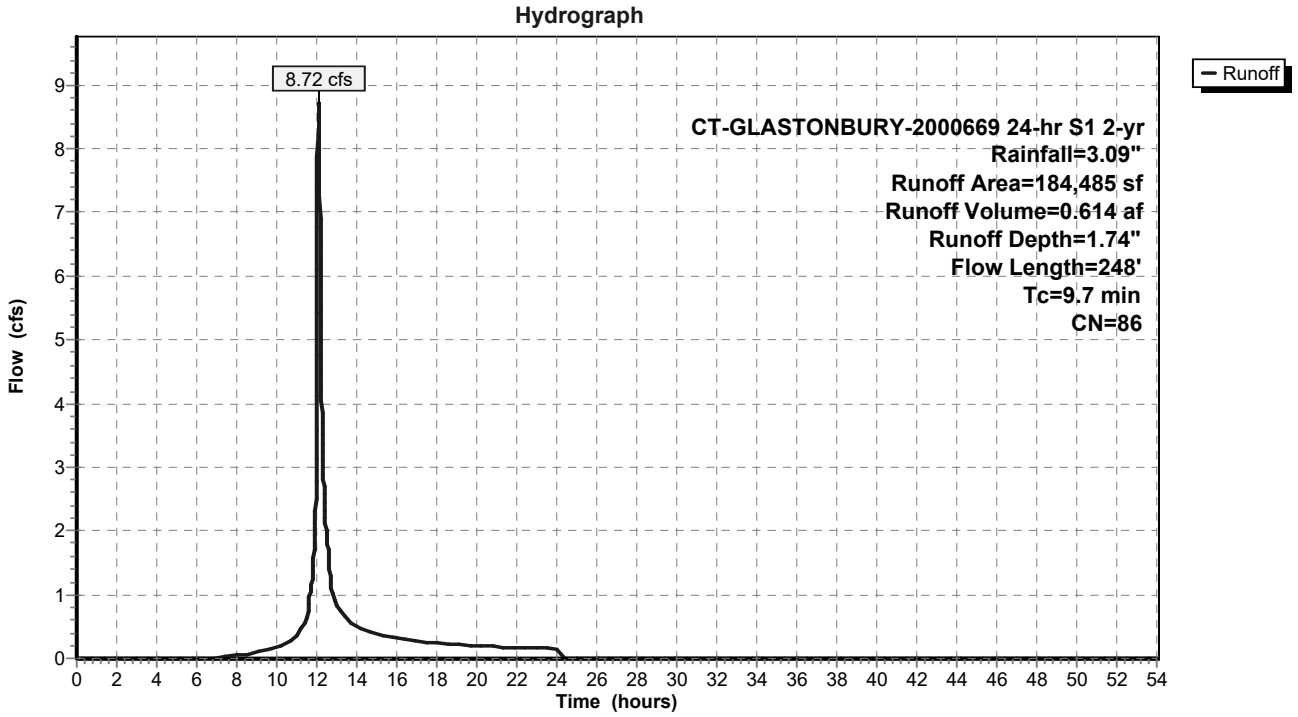
Runoff = 8.72 cfs @ 12.08 hrs, Volume= 0.614 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 10,997 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 100,716 | 98 | Paved parking, HSG B |
| 65,299 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 184,485 | 86 | Weighted Average |
| 72,772 | | 39.45% Pervious Area |
| 111,713 | | 60.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment EDA-1: Area to CBs SE of Site



## Summary for Subcatchment EDA-2: Area to CBs SW of Site

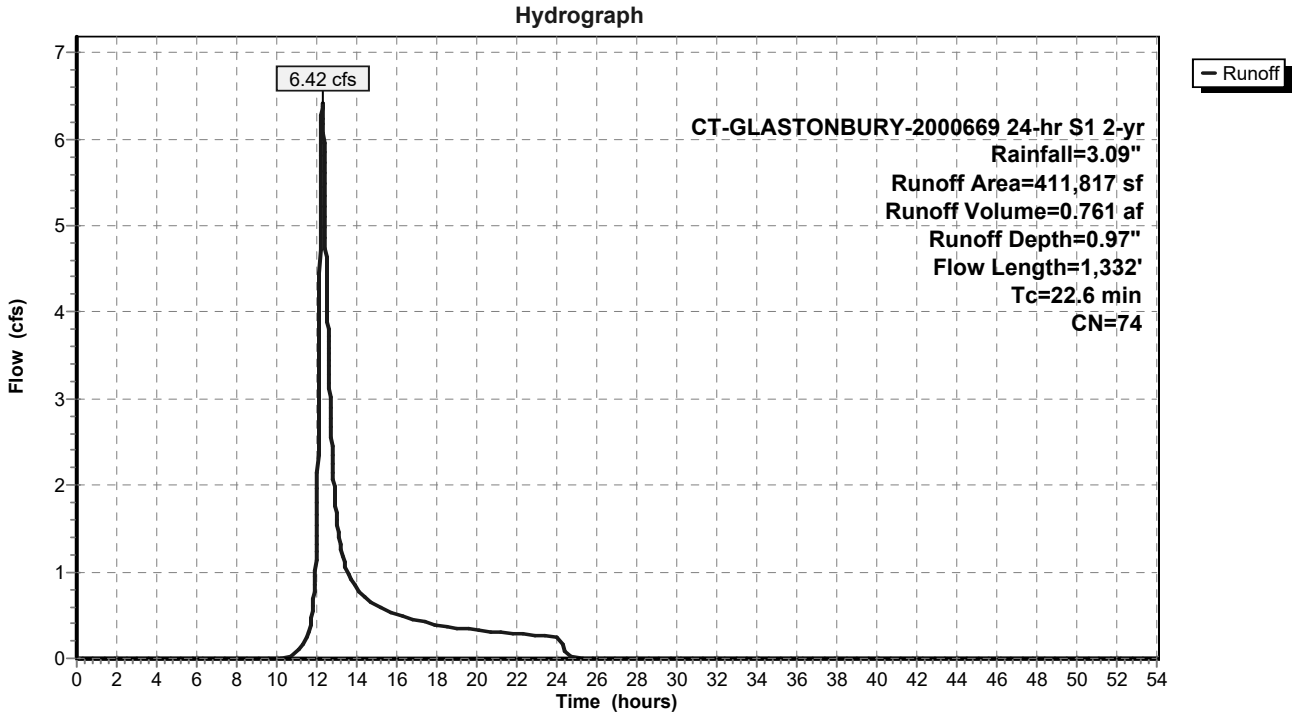
Runoff = 6.42 cfs @ 12.28 hrs, Volume= 0.761 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 666 | 98 | Paved parking, HSG A |
| 7,080 | 49 | 50-75% Grass cover, Fair, HSG A |
| 72,925 | 36 | Woods, Fair, HSG A |
| 162,265 | 98 | Paved parking, HSG B |
| 153,049 | 69 | 50-75% Grass cover, Fair, HSG B |
| 15,832 | 60 | Woods, Fair, HSG B |
| 411,817 | 74 | Weighted Average |
| 248,886 | | 60.44% Pervious Area |
| 162,931 | | 39.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 76 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 28 | 0.0428 | 1.03 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.0 | 181 | 0.0440 | 3.15 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 947 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 22.6 | 1,332 | Total | | | |

## Subcatchment EDA-2: Area to CBs SW of Site



## Summary for Subcatchment EDA-3: Area to CBs W of Site

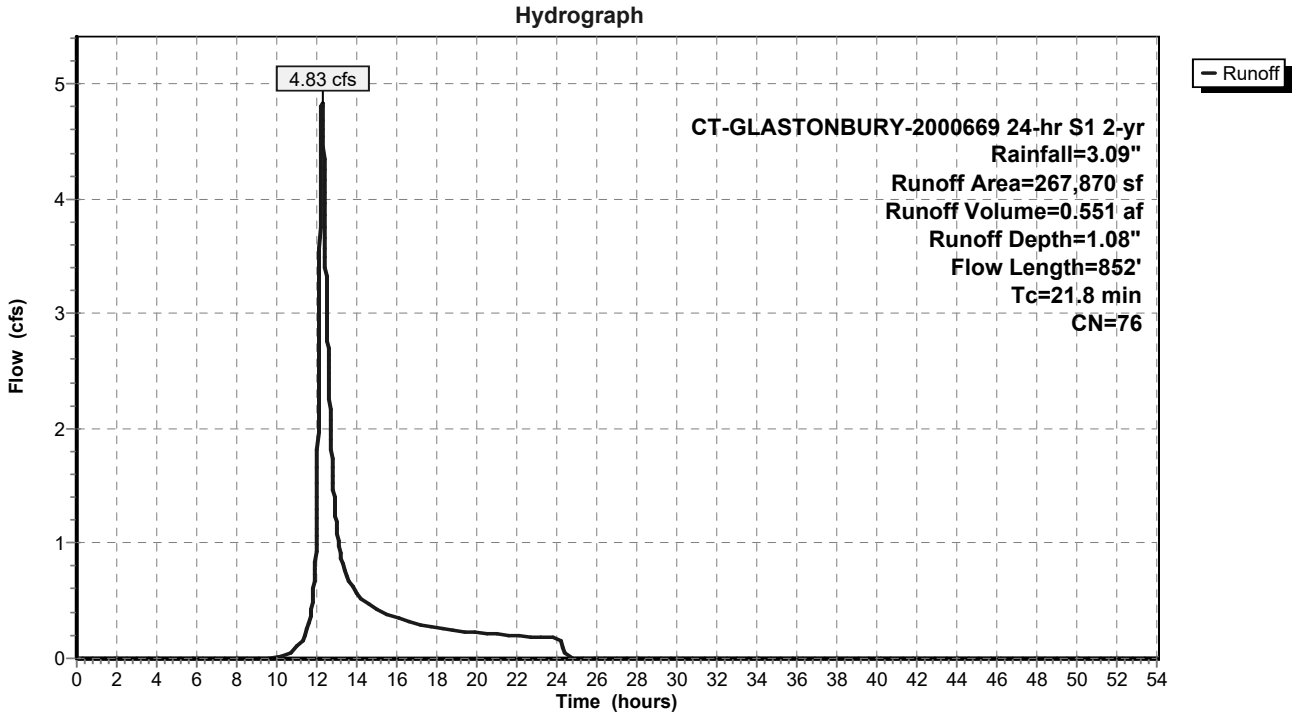
Runoff = 4.83 cfs @ 12.26 hrs, Volume= 0.551 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 25,398 | 36 | Woods, Fair, HSG A |
| 88,595 | 98 | Paved parking, HSG B |
| 113,691 | 69 | 50-75% Grass cover, Fair, HSG B |
| 8,083 | 60 | Woods, Fair, HSG B |
| 267,870 | 76 | Weighted Average |
| 163,319 | | 60.97% Pervious Area |
| 104,551 | | 39.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment EDA-3: Area to CBs W of Site



## Summary for Subcatchment EDA-4: Area Flowing Offsite to the North

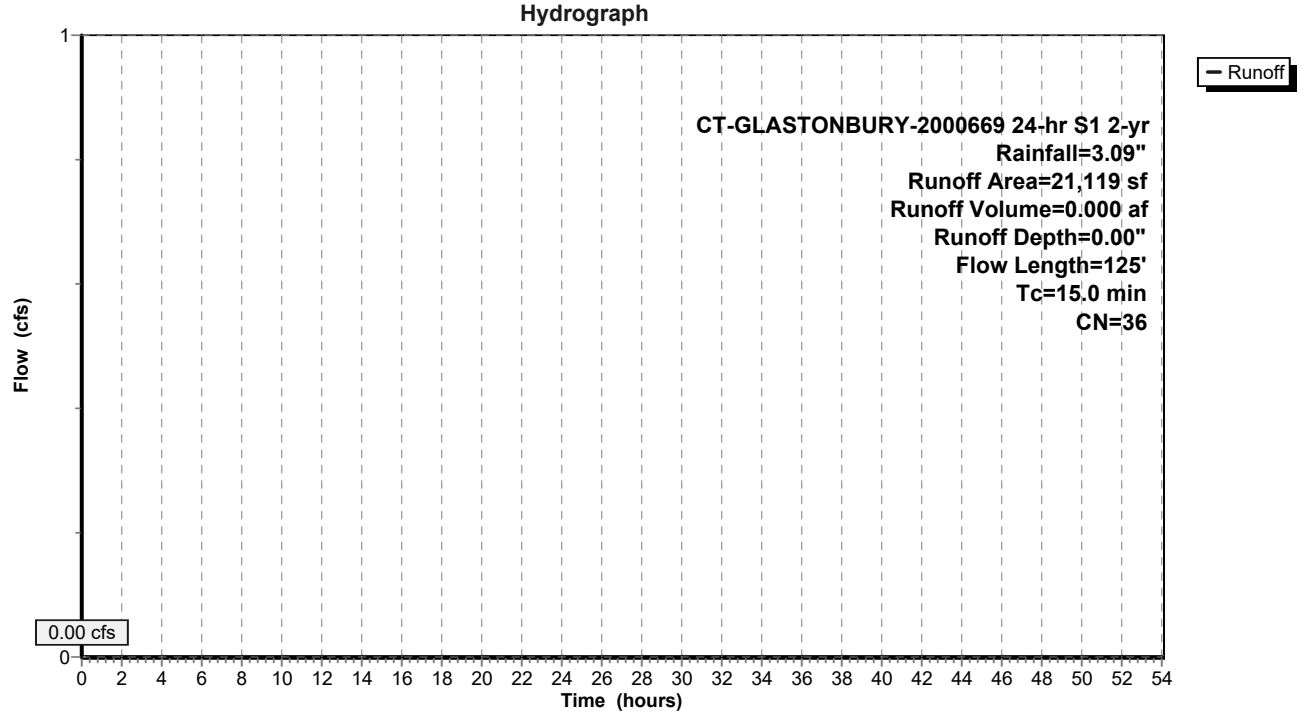
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment EDA-4: Area Flowing Offsite to the North

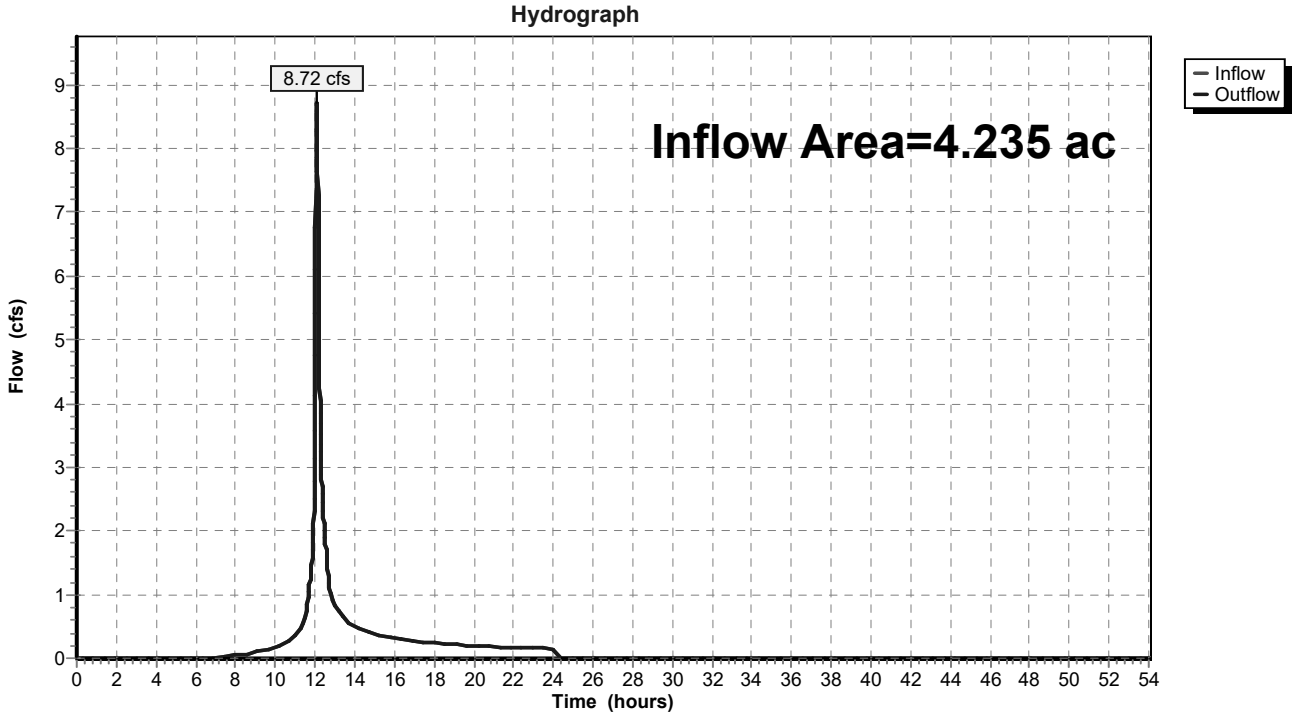


## Summary for Reach DP-1: DP-1

Inflow Area = 4.235 ac, 60.55% Impervious, Inflow Depth = 1.74" for 2-yr event
Inflow = 8.72 cfs @ 12.08 hrs, Volume= 0.614 af
Outflow = 8.72 cfs @ 12.08 hrs, Volume= 0.614 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

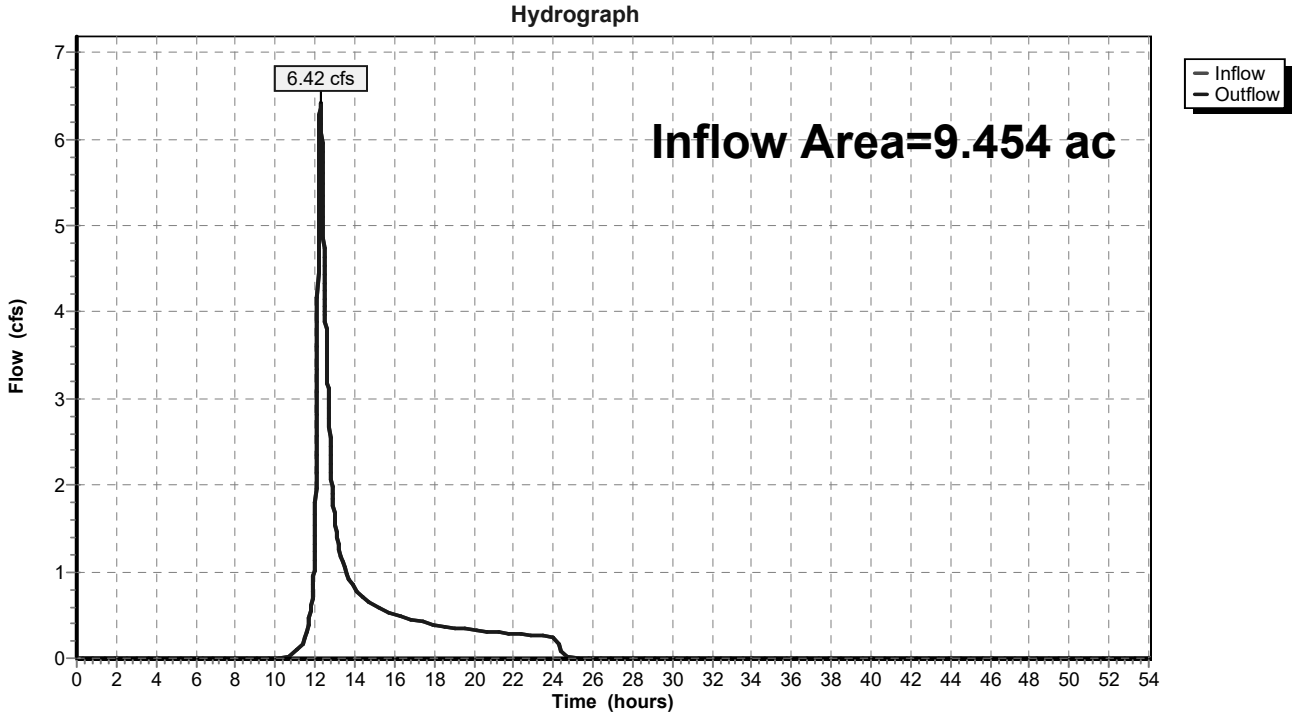


## Summary for Reach DP-2: DP-2

Inflow Area = 9.454 ac, 39.56% Impervious, Inflow Depth = 0.97" for 2-yr event
Inflow = 6.42 cfs @ 12.28 hrs, Volume= 0.761 af
Outflow = 6.42 cfs @ 12.28 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

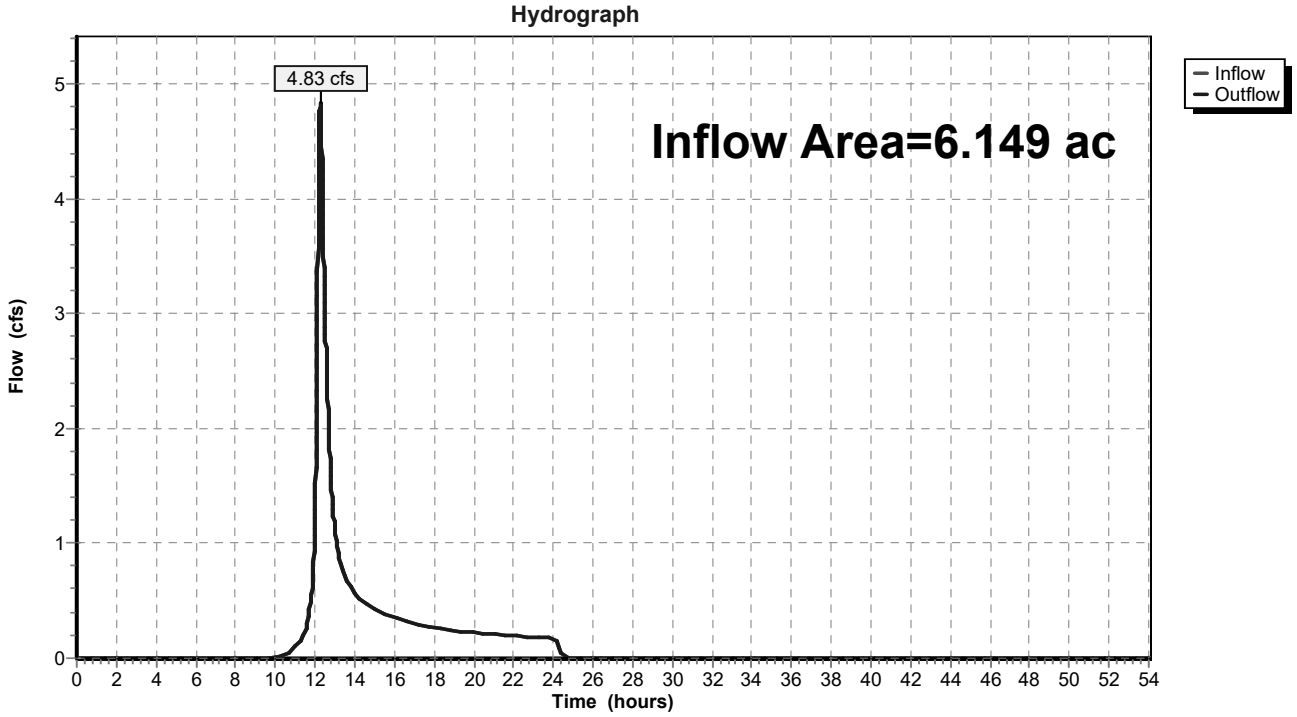


## Summary for Reach DP-3: DP-3

Inflow Area = 6.149 ac, 39.03% Impervious, Inflow Depth = 1.08" for 2-yr event
Inflow = 4.83 cfs @ 12.26 hrs, Volume= 0.551 af
Outflow = 4.83 cfs @ 12.26 hrs, Volume= 0.551 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

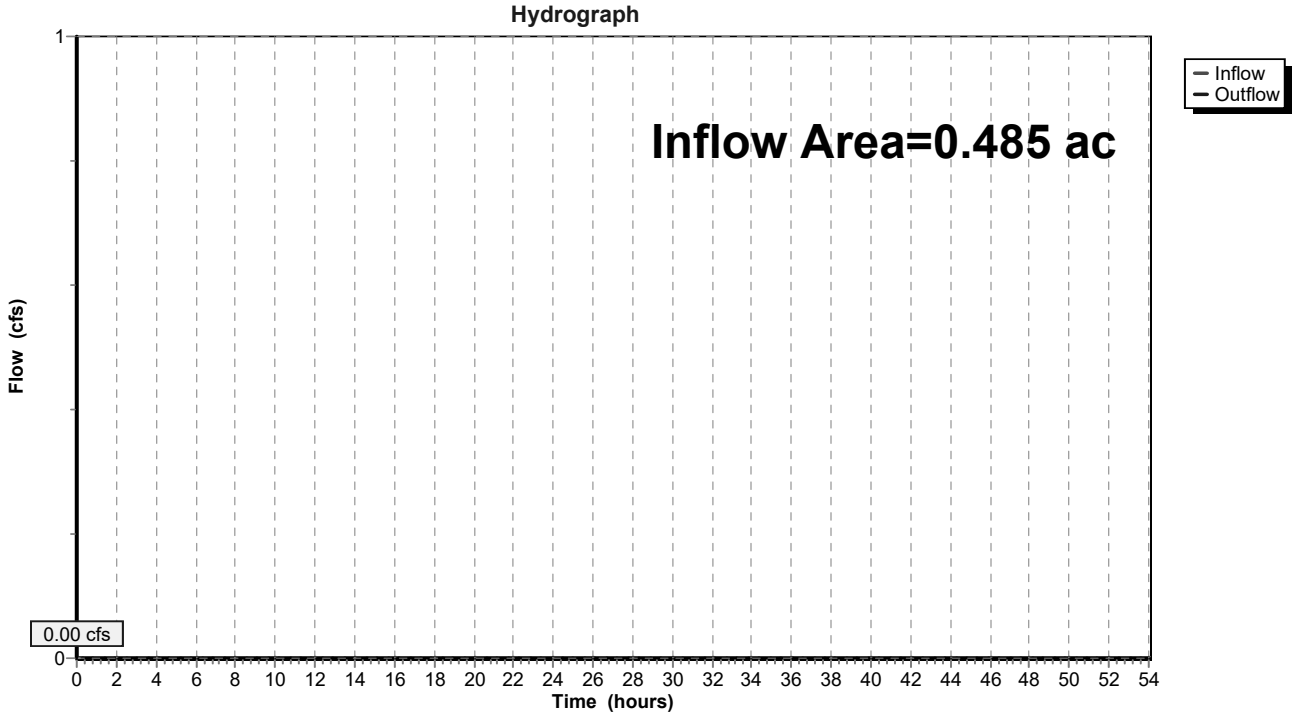


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment EDA-1: Area to CBs SE of** Runoff Area=184,485 sf 60.55% Impervious Runoff Depth=3.35"
Flow Length=248' Tc=9.7 min CN=86 Runoff=16.26 cfs 1.181 af

**Subcatchment EDA-2: Area to CBs SW of** Runoff Area=411,817 sf 39.56% Impervious Runoff Depth=2.26"
Flow Length=1,332' Tc=22.6 min CN=74 Runoff=15.71 cfs 1.781 af

**Subcatchment EDA-3: Area to CBs W of** Runoff Area=267,870 sf 39.03% Impervious Runoff Depth=2.43"
Flow Length=852' Tc=21.8 min CN=76 Runoff=11.21 cfs 1.245 af

**Subcatchment EDA-4: Area Flowing Offsite** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.00 cfs 0.004 af

**Reach DP-1: DP-1** Inflow=16.26 cfs 1.181 af
Outflow=16.26 cfs 1.181 af

**Reach DP-2: DP-2** Inflow=15.71 cfs 1.781 af
Outflow=15.71 cfs 1.781 af

**Reach DP-3: DP-3** Inflow=11.21 cfs 1.245 af
Outflow=11.21 cfs 1.245 af

**Reach DP-4: DP-4** Inflow=0.00 cfs 0.004 af
Outflow=0.00 cfs 0.004 af

**Total Runoff Area = 20.323 ac Runoff Volume = 4.210 af Average Runoff Depth = 2.49"**
**57.17% Pervious = 11.618 ac 42.83% Impervious = 8.705 ac**

## Summary for Subcatchment EDA-1: Area to CBs SE of Site

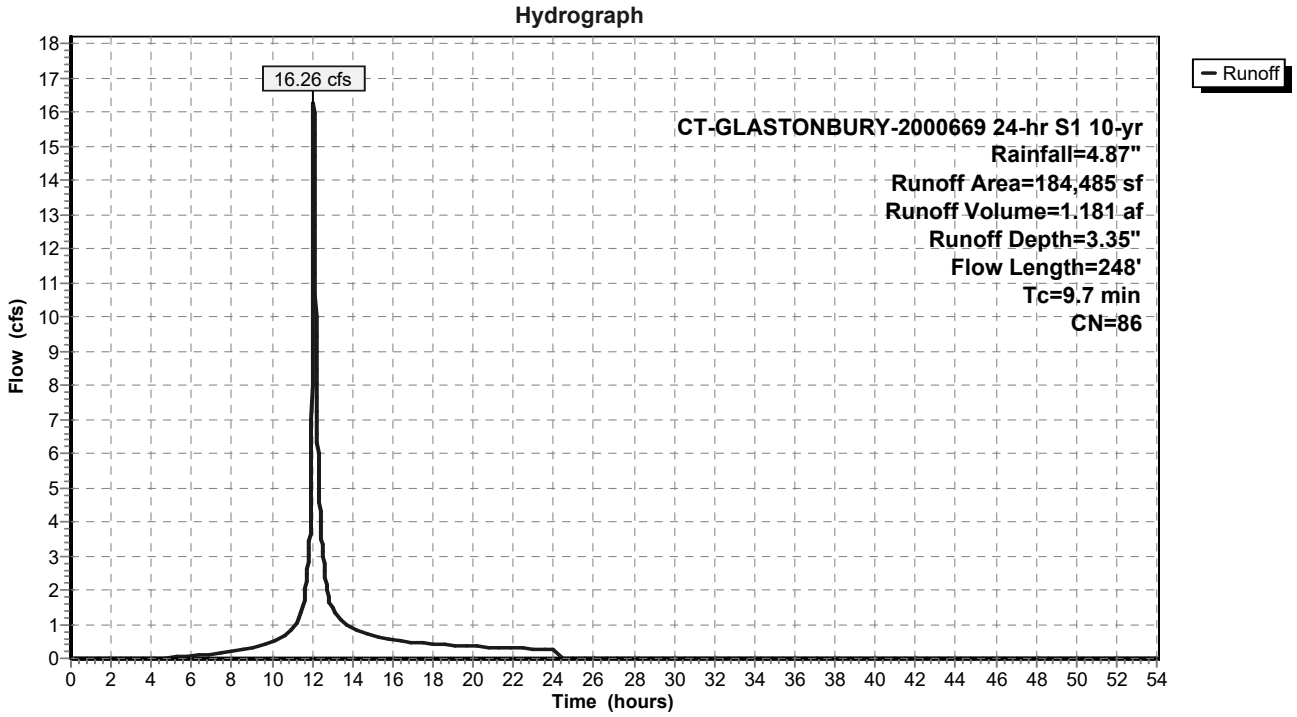
Runoff = 16.26 cfs @ 12.08 hrs, Volume= 1.181 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 10,997 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 100,716 | 98 | Paved parking, HSG B |
| 65,299 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 184,485 | 86 | Weighted Average |
| 72,772 | | 39.45% Pervious Area |
| 111,713 | | 60.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment EDA-1: Area to CBs SE of Site



## Summary for Subcatchment EDA-2: Area to CBs SW of Site

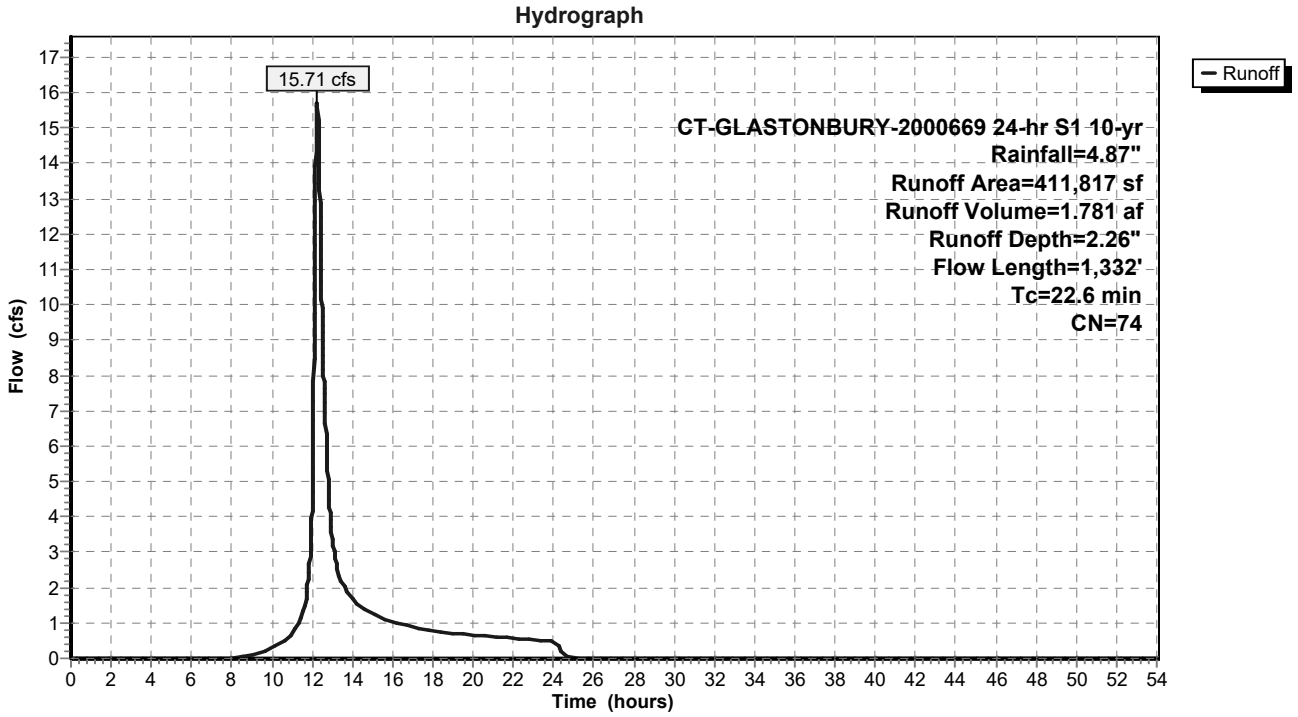
Runoff = 15.71 cfs @ 12.27 hrs, Volume= 1.781 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 666 | 98 | Paved parking, HSG A |
| 7,080 | 49 | 50-75% Grass cover, Fair, HSG A |
| 72,925 | 36 | Woods, Fair, HSG A |
| 162,265 | 98 | Paved parking, HSG B |
| 153,049 | 69 | 50-75% Grass cover, Fair, HSG B |
| 15,832 | 60 | Woods, Fair, HSG B |
| 411,817 | 74 | Weighted Average |
| 248,886 | | 60.44% Pervious Area |
| 162,931 | | 39.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 76 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 28 | 0.0428 | 1.03 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.0 | 181 | 0.0440 | 3.15 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 947 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 22.6 | 1,332 | Total | | | |

## Subcatchment EDA-2: Area to CBs SW of Site



## Summary for Subcatchment EDA-3: Area to CBs W of Site

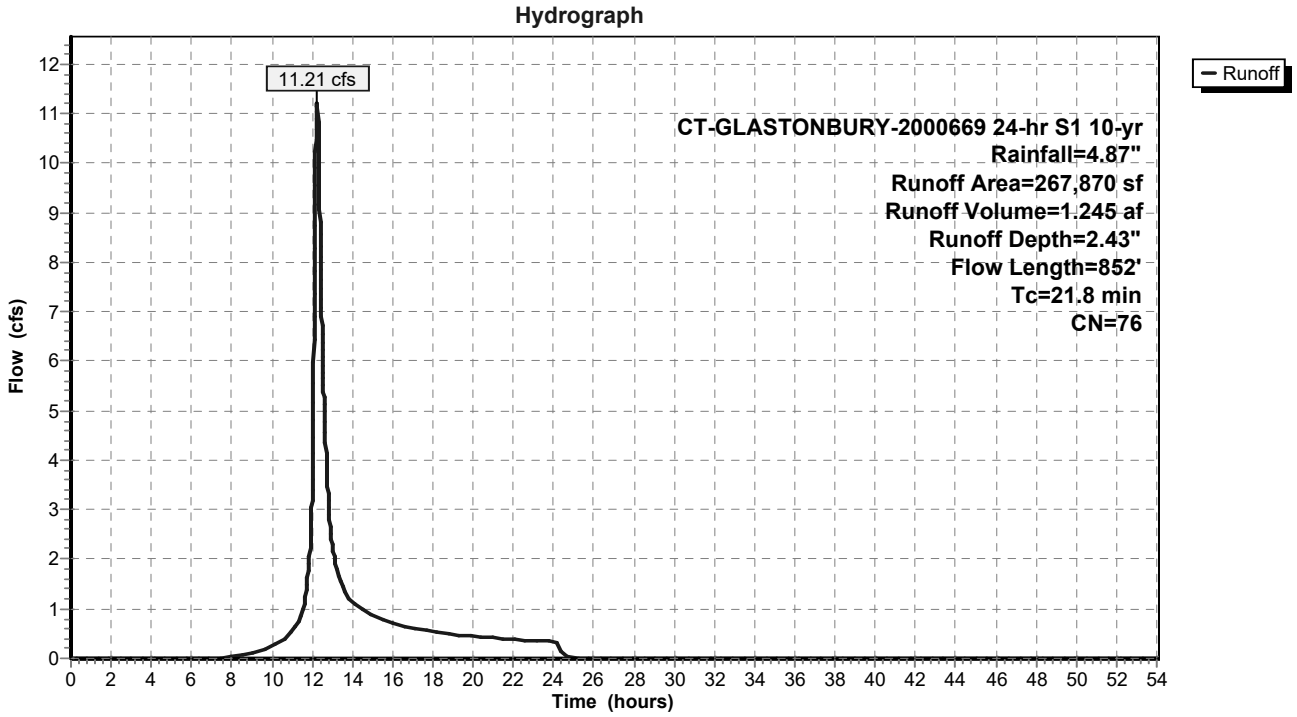
Runoff = 11.21 cfs @ 12.25 hrs, Volume= 1.245 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 25,398 | 36 | Woods, Fair, HSG A |
| 88,595 | 98 | Paved parking, HSG B |
| 113,691 | 69 | 50-75% Grass cover, Fair, HSG B |
| 8,083 | 60 | Woods, Fair, HSG B |
| 267,870 | 76 | Weighted Average |
| 163,319 | | 60.97% Pervious Area |
| 104,551 | | 39.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment EDA-3: Area to CBs W of Site



## Summary for Subcatchment EDA-4: Area Flowing Offsite to the North

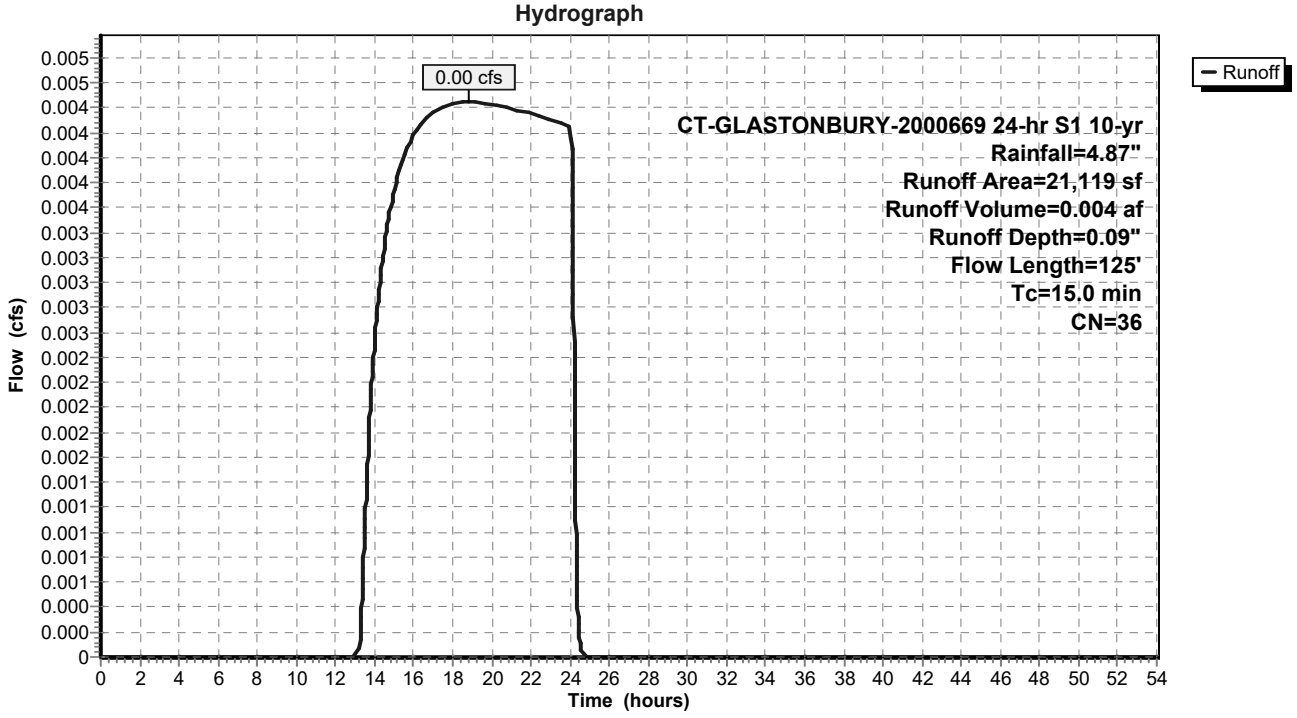
Runoff = 0.00 cfs @ 18.85 hrs, Volume= 0.004 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment EDA-4: Area Flowing Offsite to the North

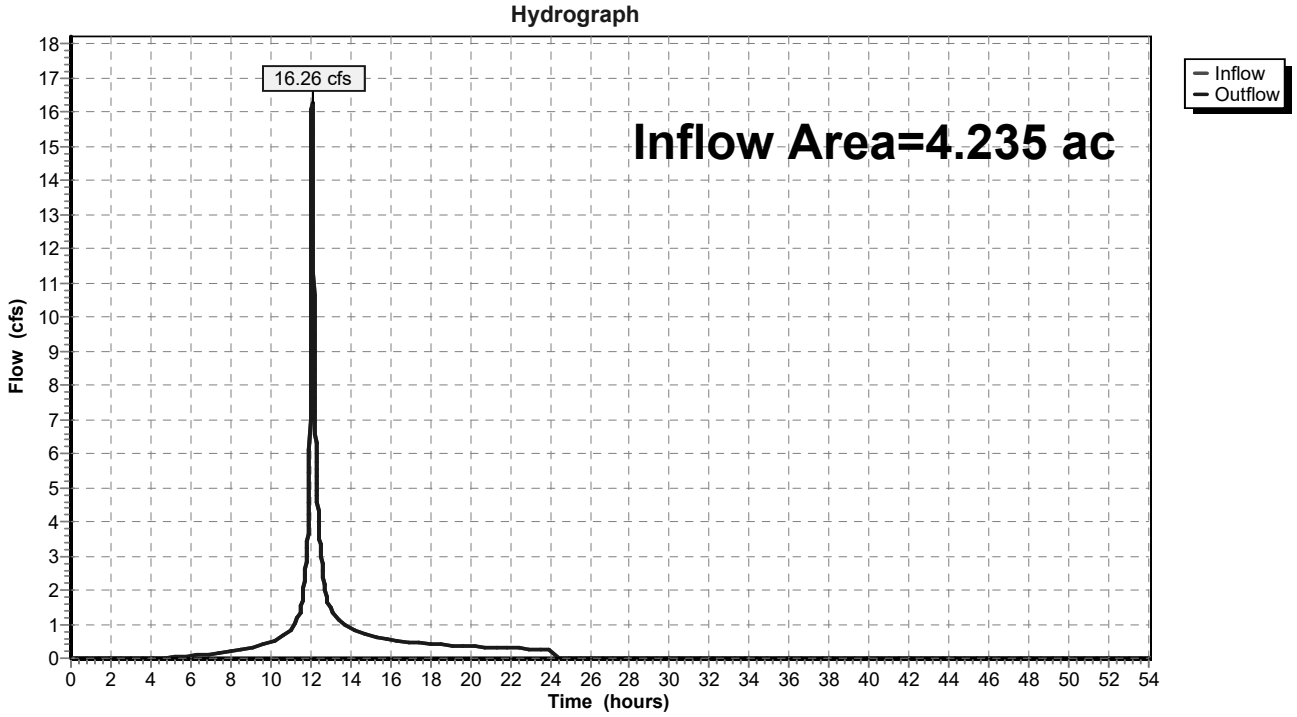


## Summary for Reach DP-1: DP-1

Inflow Area = 4.235 ac, 60.55% Impervious, Inflow Depth = 3.35" for 10-yr event
Inflow = 16.26 cfs @ 12.08 hrs, Volume= 1.181 af
Outflow = 16.26 cfs @ 12.08 hrs, Volume= 1.181 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

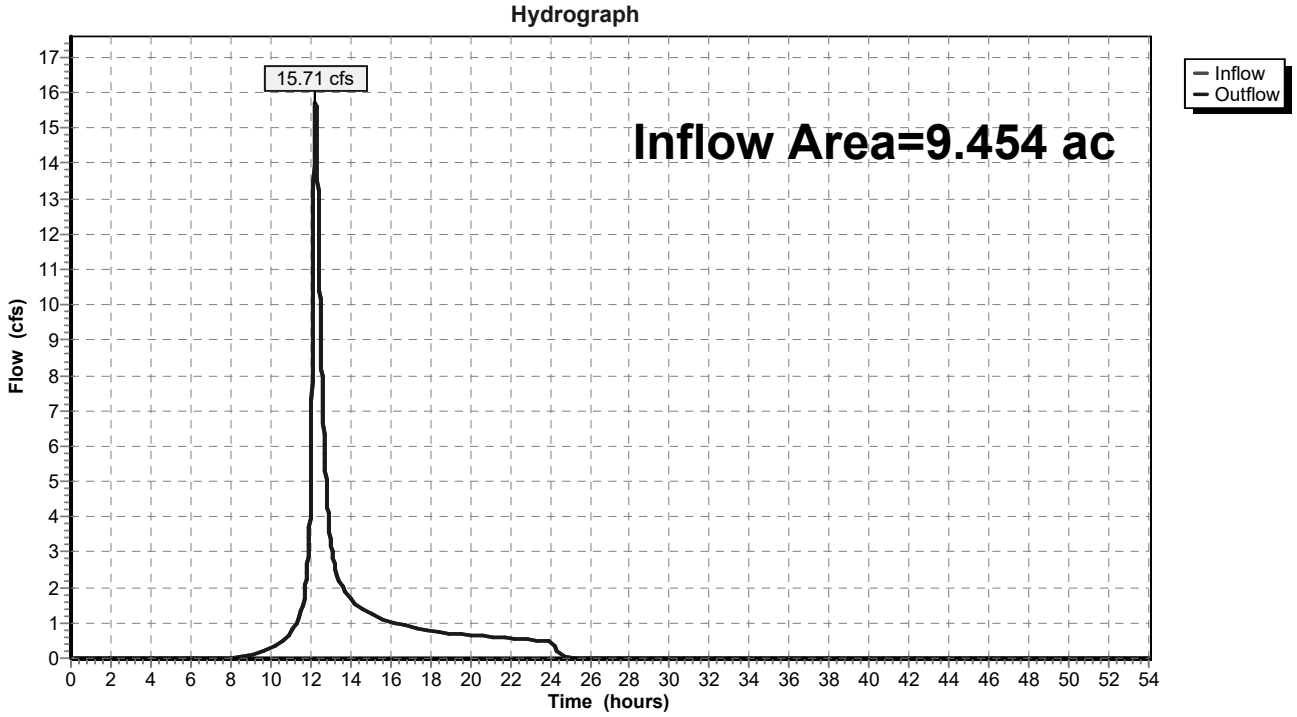


## Summary for Reach DP-2: DP-2

Inflow Area = 9.454 ac, 39.56% Impervious, Inflow Depth = 2.26" for 10-yr event
Inflow = 15.71 cfs @ 12.27 hrs, Volume= 1.781 af
Outflow = 15.71 cfs @ 12.27 hrs, Volume= 1.781 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

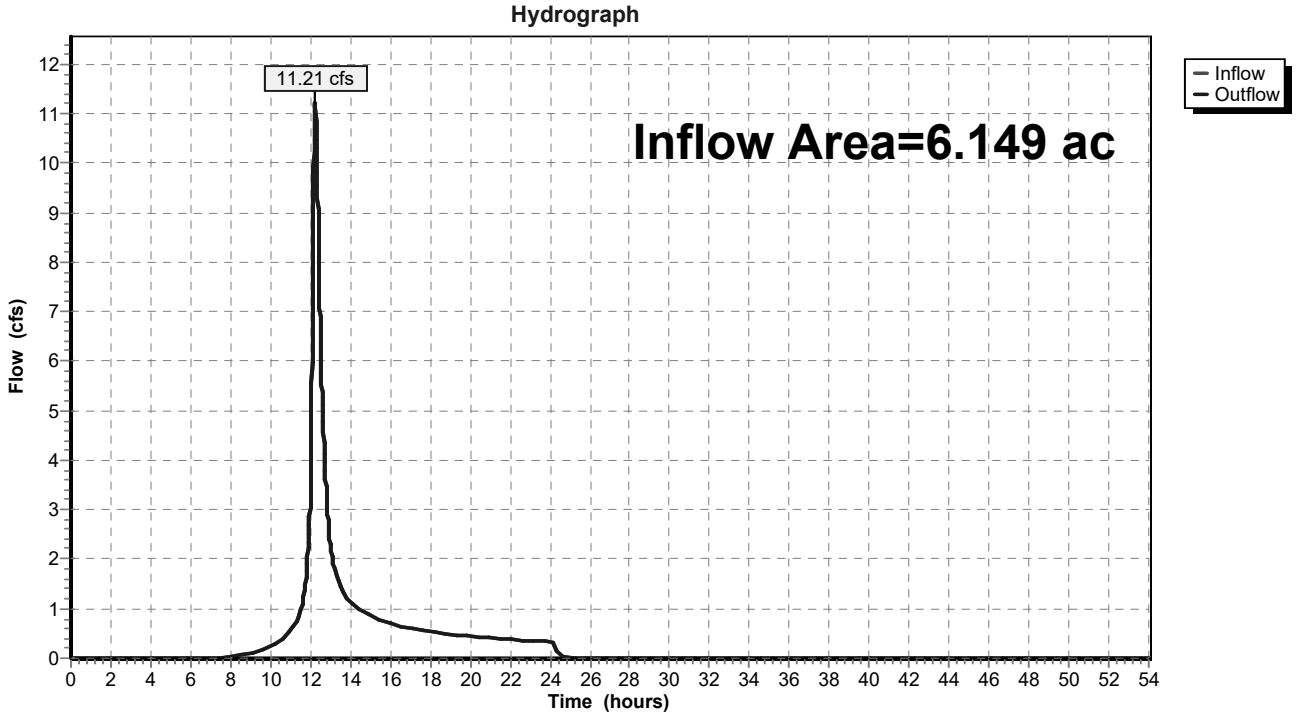


## Summary for Reach DP-3: DP-3

Inflow Area = 6.149 ac, 39.03% Impervious, Inflow Depth = 2.43" for 10-yr event
Inflow = 11.21 cfs @ 12.25 hrs, Volume= 1.245 af
Outflow = 11.21 cfs @ 12.25 hrs, Volume= 1.245 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

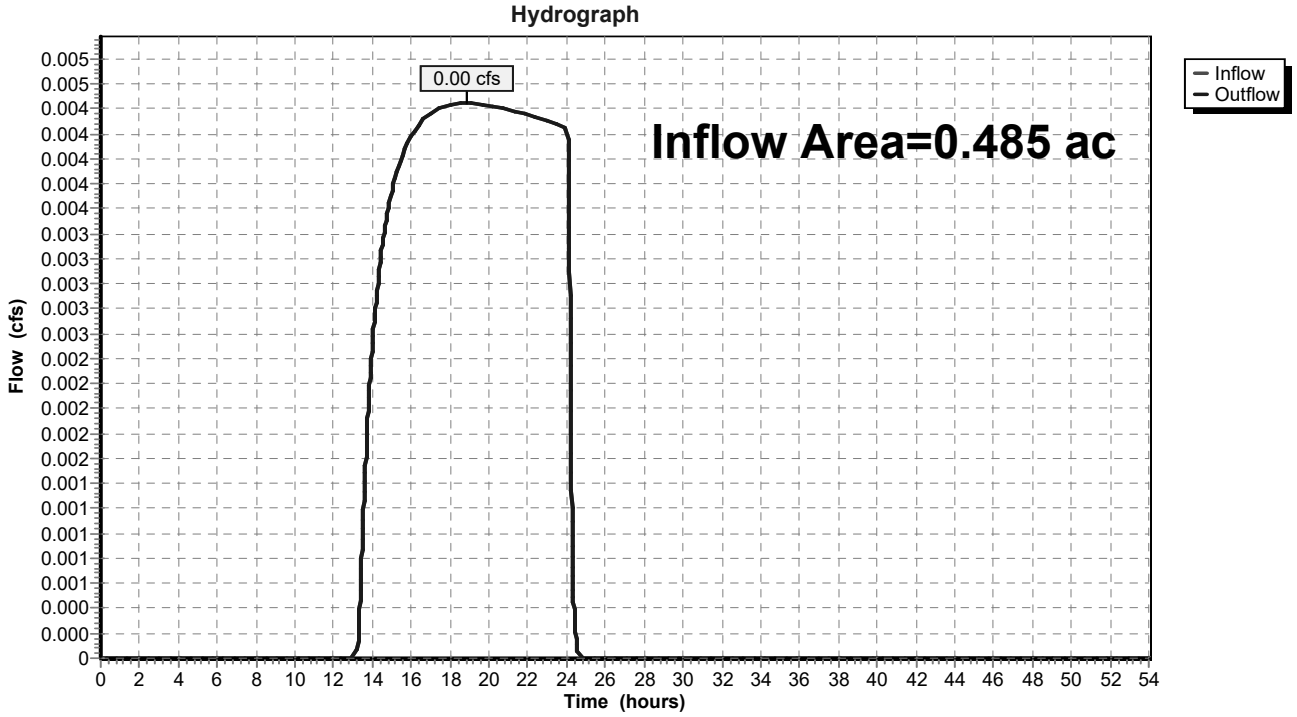


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.09" for 10-yr event
Inflow = 0.00 cfs @ 18.85 hrs, Volume= 0.004 af
Outflow = 0.00 cfs @ 18.85 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment EDA-1: Area to CBs SE of** Runoff Area=184,485 sf 60.55% Impervious Runoff Depth=4.39"
Flow Length=248' Tc=9.7 min CN=86 Runoff=21.00 cfs 1.550 af

**Subcatchment EDA-2: Area to CBs SW of** Runoff Area=411,817 sf 39.56% Impervious Runoff Depth=3.17"
Flow Length=1,332' Tc=22.6 min CN=74 Runoff=22.06 cfs 2.496 af

**Subcatchment EDA-3: Area to CBs W of** Runoff Area=267,870 sf 39.03% Impervious Runoff Depth=3.36"
Flow Length=852' Tc=21.8 min CN=76 Runoff=15.50 cfs 1.723 af

**Subcatchment EDA-4: Area Flowing Offsite** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.29"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.02 cfs 0.012 af

**Reach DP-1: DP-1** Inflow=21.00 cfs 1.550 af
Outflow=21.00 cfs 1.550 af

**Reach DP-2: DP-2** Inflow=22.06 cfs 2.496 af
Outflow=22.06 cfs 2.496 af

**Reach DP-3: DP-3** Inflow=15.50 cfs 1.723 af
Outflow=15.50 cfs 1.723 af

**Reach DP-4: DP-4** Inflow=0.02 cfs 0.012 af
Outflow=0.02 cfs 0.012 af

**Total Runoff Area = 20.323 ac Runoff Volume = 5.781 af Average Runoff Depth = 3.41"**
**57.17% Pervious = 11.618 ac 42.83% Impervious = 8.705 ac**

## Summary for Subcatchment EDA-1: Area to CBs SE of Site

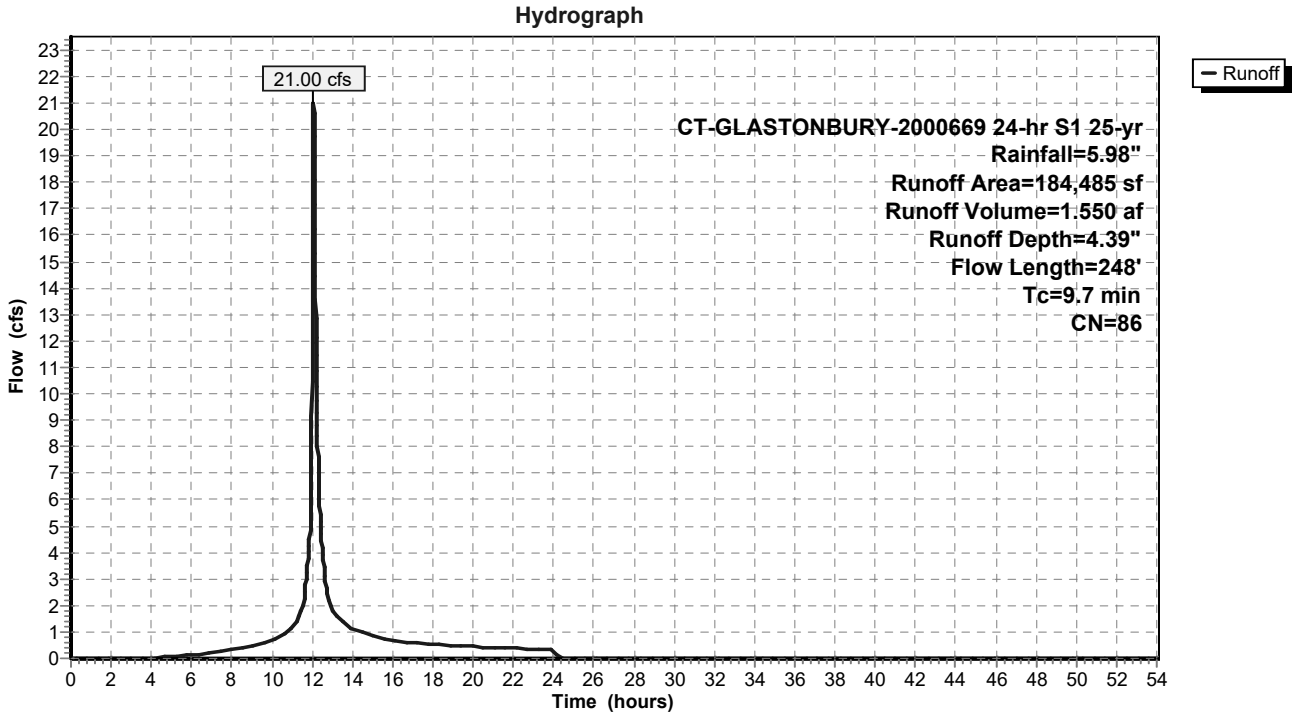
Runoff = 21.00 cfs @ 12.08 hrs, Volume= 1.550 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 10,997 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 100,716 | 98 | Paved parking, HSG B |
| 65,299 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 184,485 | 86 | Weighted Average |
| 72,772 | | 39.45% Pervious Area |
| 111,713 | | 60.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment EDA-1: Area to CBs SE of Site



## Summary for Subcatchment EDA-2: Area to CBs SW of Site

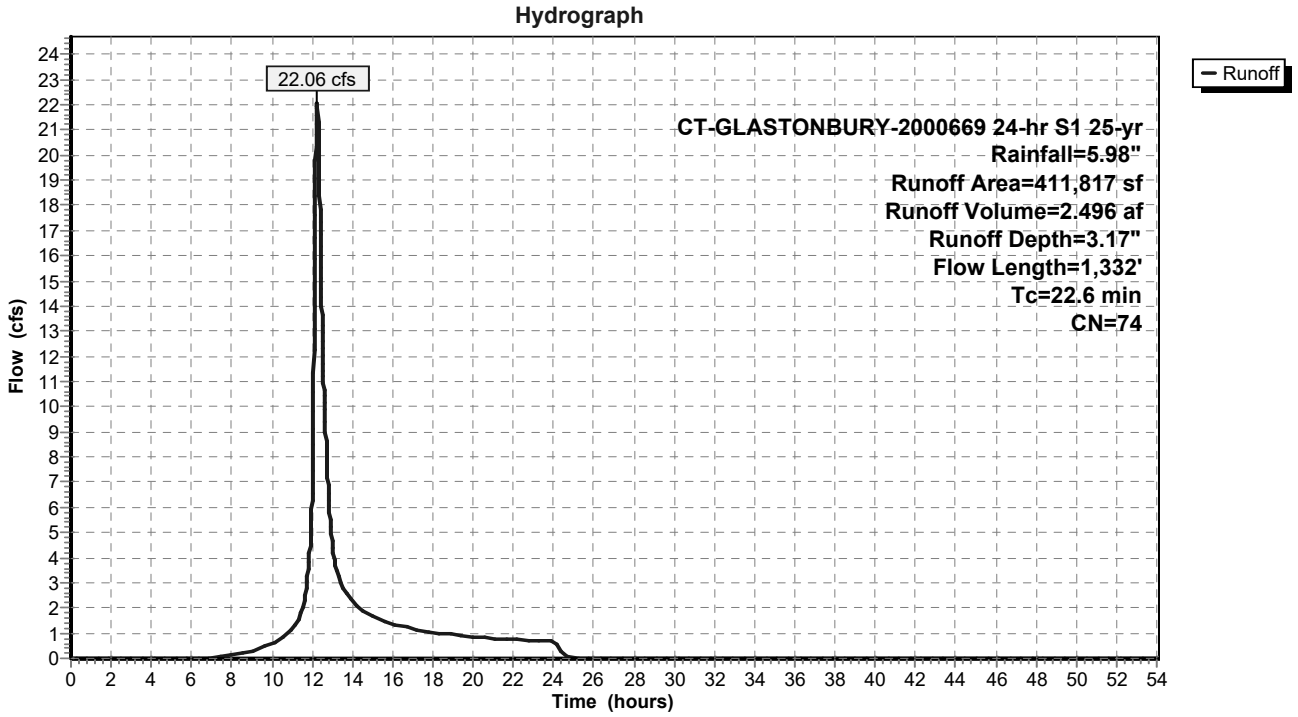
Runoff = 22.06 cfs @ 12.26 hrs, Volume= 2.496 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 666 | 98 | Paved parking, HSG A |
| 7,080 | 49 | 50-75% Grass cover, Fair, HSG A |
| 72,925 | 36 | Woods, Fair, HSG A |
| 162,265 | 98 | Paved parking, HSG B |
| 153,049 | 69 | 50-75% Grass cover, Fair, HSG B |
| 15,832 | 60 | Woods, Fair, HSG B |
| 411,817 | 74 | Weighted Average |
| 248,886 | | 60.44% Pervious Area |
| 162,931 | | 39.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 76 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 28 | 0.0428 | 1.03 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.0 | 181 | 0.0440 | 3.15 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 947 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 22.6 | 1,332 | Total | | | |

## Subcatchment EDA-2: Area to CBs SW of Site



## Summary for Subcatchment EDA-3: Area to CBs W of Site

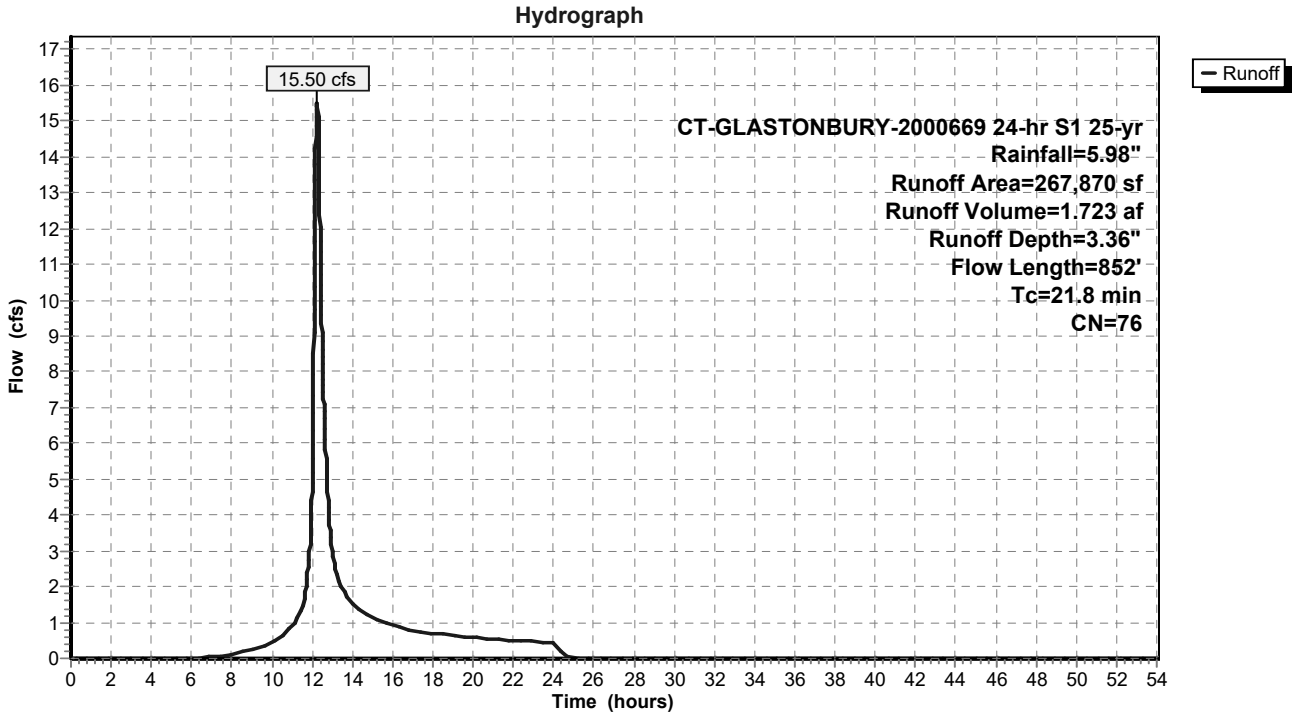
Runoff = 15.50 cfs @ 12.24 hrs, Volume= 1.723 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 25,398 | 36 | Woods, Fair, HSG A |
| 88,595 | 98 | Paved parking, HSG B |
| 113,691 | 69 | 50-75% Grass cover, Fair, HSG B |
| 8,083 | 60 | Woods, Fair, HSG B |
| 267,870 | 76 | Weighted Average |
| 163,319 | | 60.97% Pervious Area |
| 104,551 | | 39.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment EDA-3: Area to CBs W of Site



## Summary for Subcatchment EDA-4: Area Flowing Offsite to the North

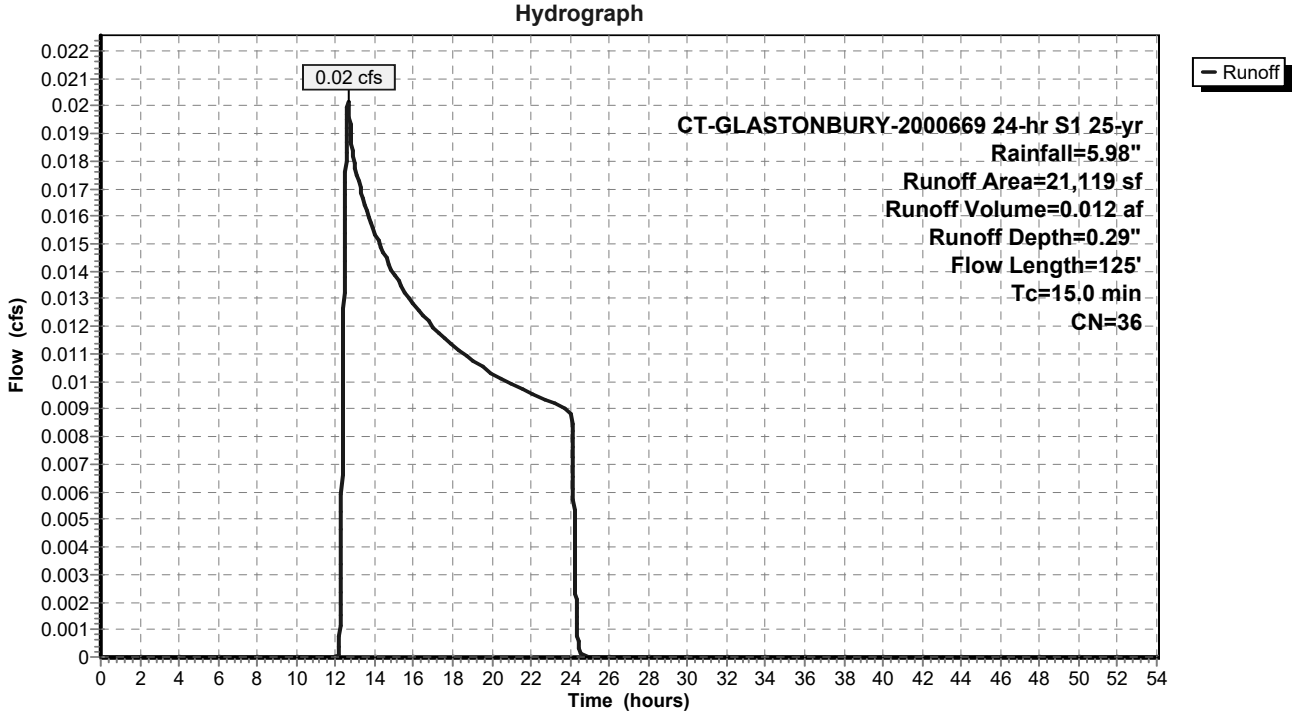
Runoff = 0.02 cfs @ 12.64 hrs, Volume= 0.012 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment EDA-4: Area Flowing Offsite to the North

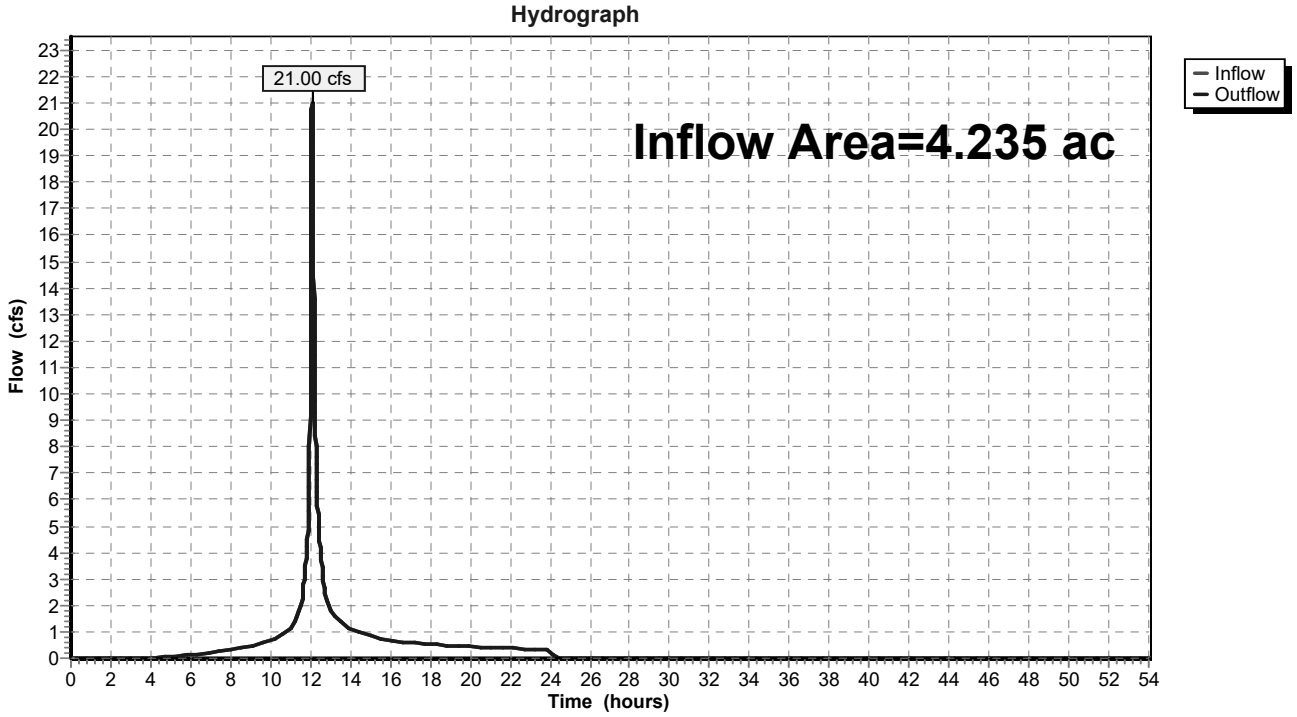


## Summary for Reach DP-1: DP-1

Inflow Area = 4.235 ac, 60.55% Impervious, Inflow Depth = 4.39" for 25-yr event
Inflow = 21.00 cfs @ 12.08 hrs, Volume= 1.550 af
Outflow = 21.00 cfs @ 12.08 hrs, Volume= 1.550 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

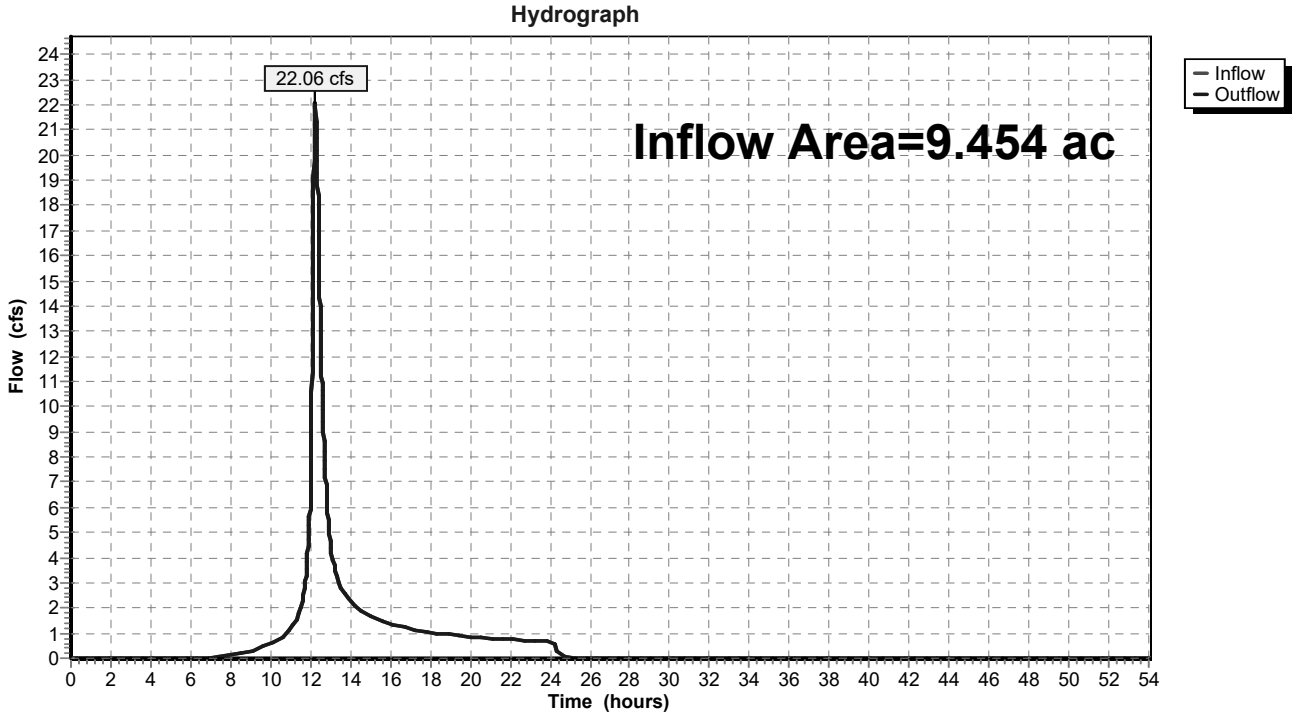


## Summary for Reach DP-2: DP-2

Inflow Area = 9.454 ac, 39.56% Impervious, Inflow Depth = 3.17" for 25-yr event
Inflow = 22.06 cfs @ 12.26 hrs, Volume= 2.496 af
Outflow = 22.06 cfs @ 12.26 hrs, Volume= 2.496 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

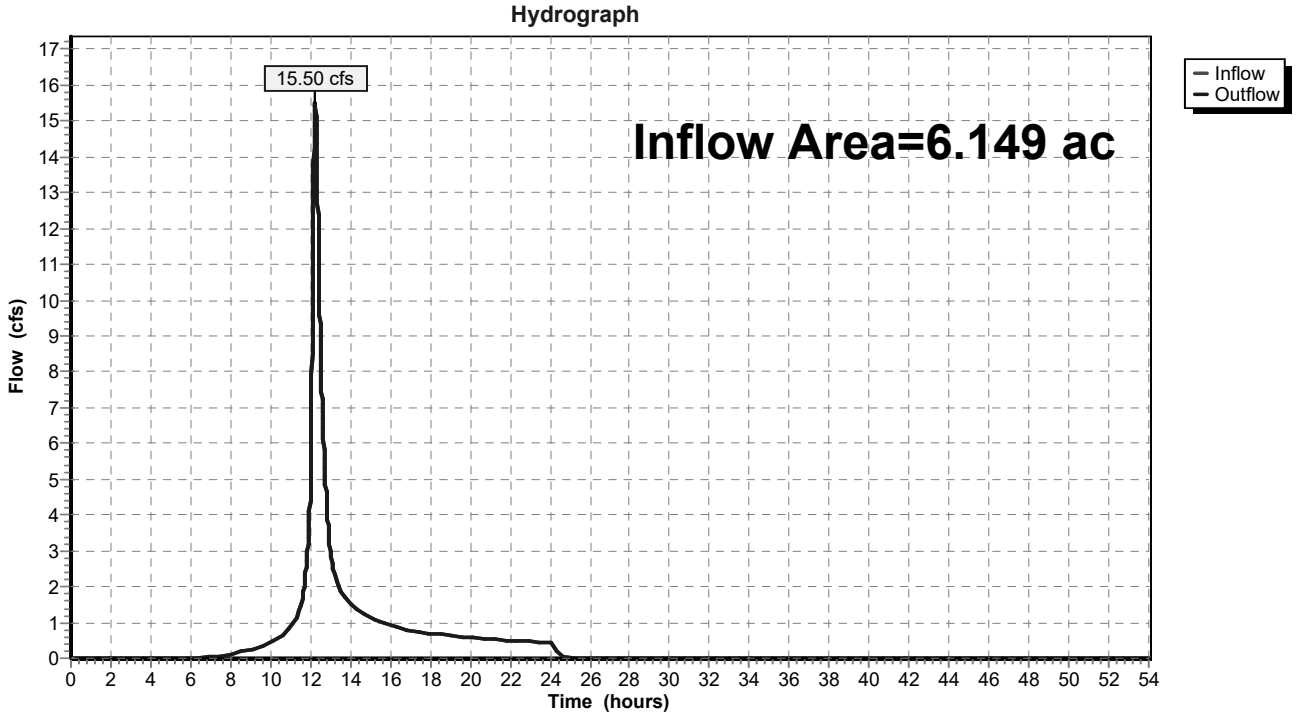


## Summary for Reach DP-3: DP-3

Inflow Area = 6.149 ac, 39.03% Impervious, Inflow Depth = 3.36" for 25-yr event
Inflow = 15.50 cfs @ 12.24 hrs, Volume= 1.723 af
Outflow = 15.50 cfs @ 12.24 hrs, Volume= 1.723 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

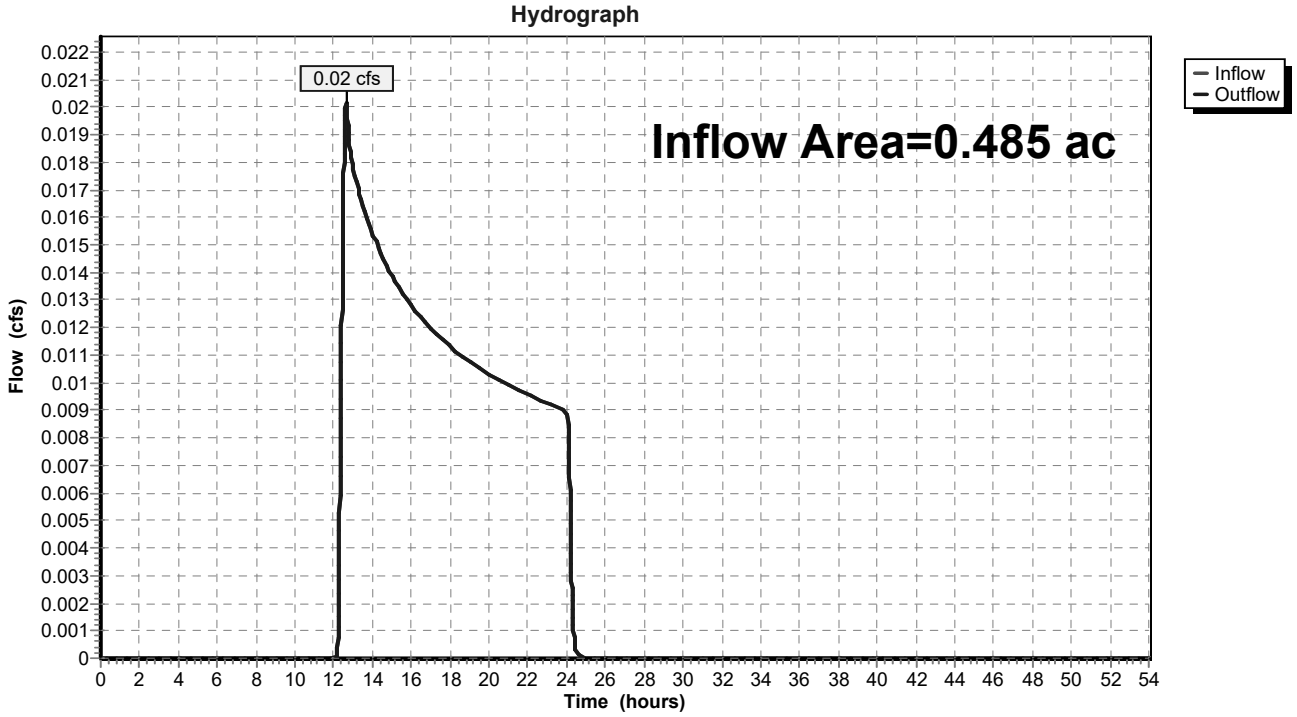


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.29" for 25-yr event
Inflow = 0.02 cfs @ 12.64 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 12.64 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment EDA-1: Area to CBs SE of** Runoff Area=184,485 sf 60.55% Impervious Runoff Depth=6.03"
Flow Length=248' Tc=9.7 min CN=86 Runoff=28.25 cfs 2.129 af

**Subcatchment EDA-2: Area to CBs SW of** Runoff Area=411,817 sf 39.56% Impervious Runoff Depth=4.65"
Flow Length=1,332' Tc=22.6 min CN=74 Runoff=32.25 cfs 3.663 af

**Subcatchment EDA-3: Area to CBs W of** Runoff Area=267,870 sf 39.03% Impervious Runoff Depth=4.88"
Flow Length=852' Tc=21.8 min CN=76 Runoff=22.32 cfs 2.499 af

**Subcatchment EDA-4: Area Flowing Offsite** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.78"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.13 cfs 0.032 af

**Reach DP-1: DP-1** Inflow=28.25 cfs 2.129 af
Outflow=28.25 cfs 2.129 af

**Reach DP-2: DP-2** Inflow=32.25 cfs 3.663 af
Outflow=32.25 cfs 3.663 af

**Reach DP-3: DP-3** Inflow=22.32 cfs 2.499 af
Outflow=22.32 cfs 2.499 af

**Reach DP-4: DP-4** Inflow=0.13 cfs 0.032 af
Outflow=0.13 cfs 0.032 af

**Total Runoff Area = 20.323 ac Runoff Volume = 8.322 af Average Runoff Depth = 4.91"**
**57.17% Pervious = 11.618 ac 42.83% Impervious = 8.705 ac**

## Summary for Subcatchment EDA-1: Area to CBs SE of Site

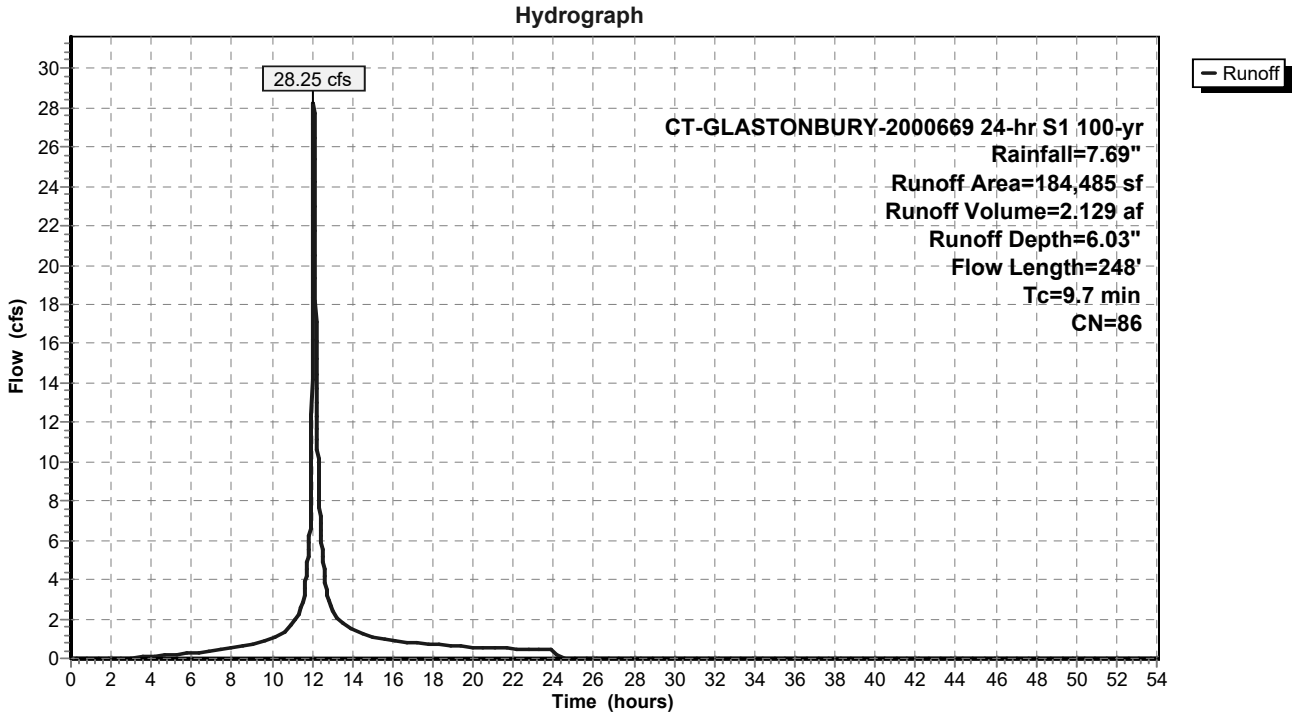
Runoff = 28.25 cfs @ 12.08 hrs, Volume= 2.129 af, Depth= 6.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 10,997 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 100,716 | 98 | Paved parking, HSG B |
| 65,299 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 184,485 | 86 | Weighted Average |
| 72,772 | | 39.45% Pervious Area |
| 111,713 | | 60.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment EDA-1: Area to CBs SE of Site



## Summary for Subcatchment EDA-2: Area to CBs SW of Site

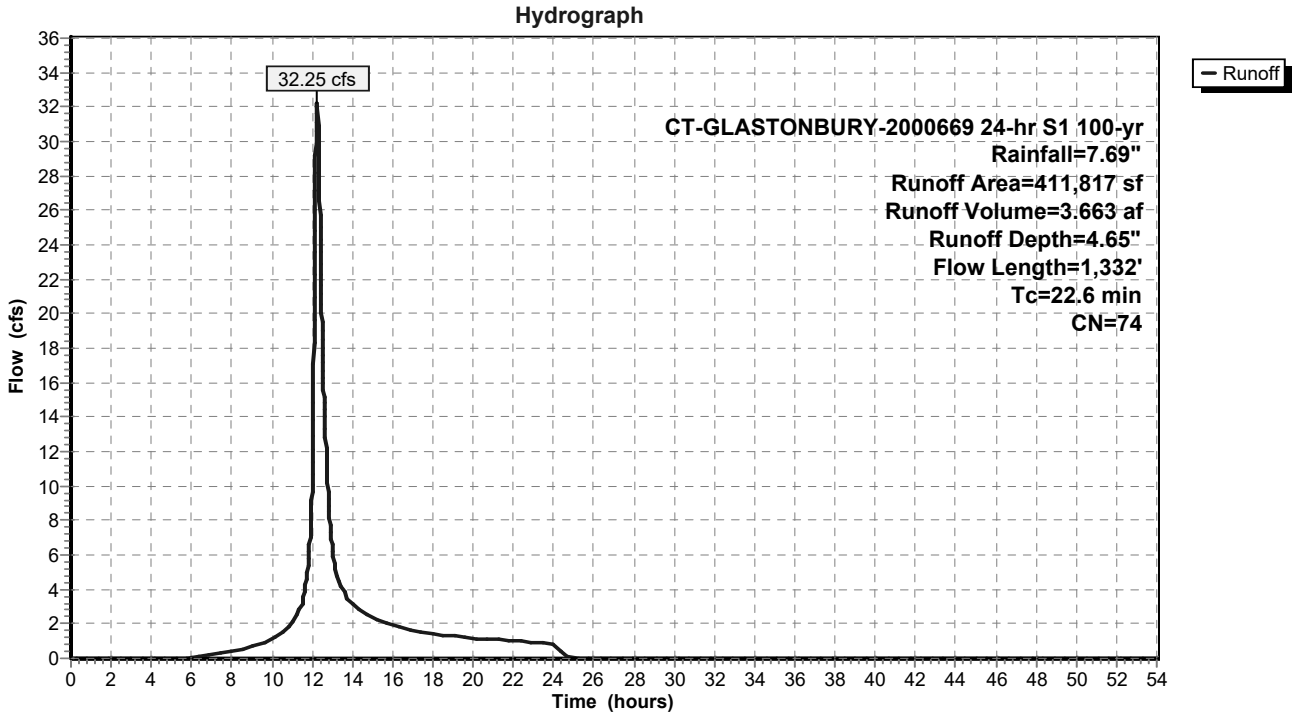
Runoff = 32.25 cfs @ 12.26 hrs, Volume= 3.663 af, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 666 | 98 | Paved parking, HSG A |
| 7,080 | 49 | 50-75% Grass cover, Fair, HSG A |
| 72,925 | 36 | Woods, Fair, HSG A |
| 162,265 | 98 | Paved parking, HSG B |
| 153,049 | 69 | 50-75% Grass cover, Fair, HSG B |
| 15,832 | 60 | Woods, Fair, HSG B |
| 411,817 | 74 | Weighted Average |
| 248,886 | | 60.44% Pervious Area |
| 162,931 | | 39.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 76 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 28 | 0.0428 | 1.03 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.0 | 181 | 0.0440 | 3.15 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 947 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 22.6 | 1,332 | Total | | | |

## Subcatchment EDA-2: Area to CBs SW of Site



## Summary for Subcatchment EDA-3: Area to CBs W of Site

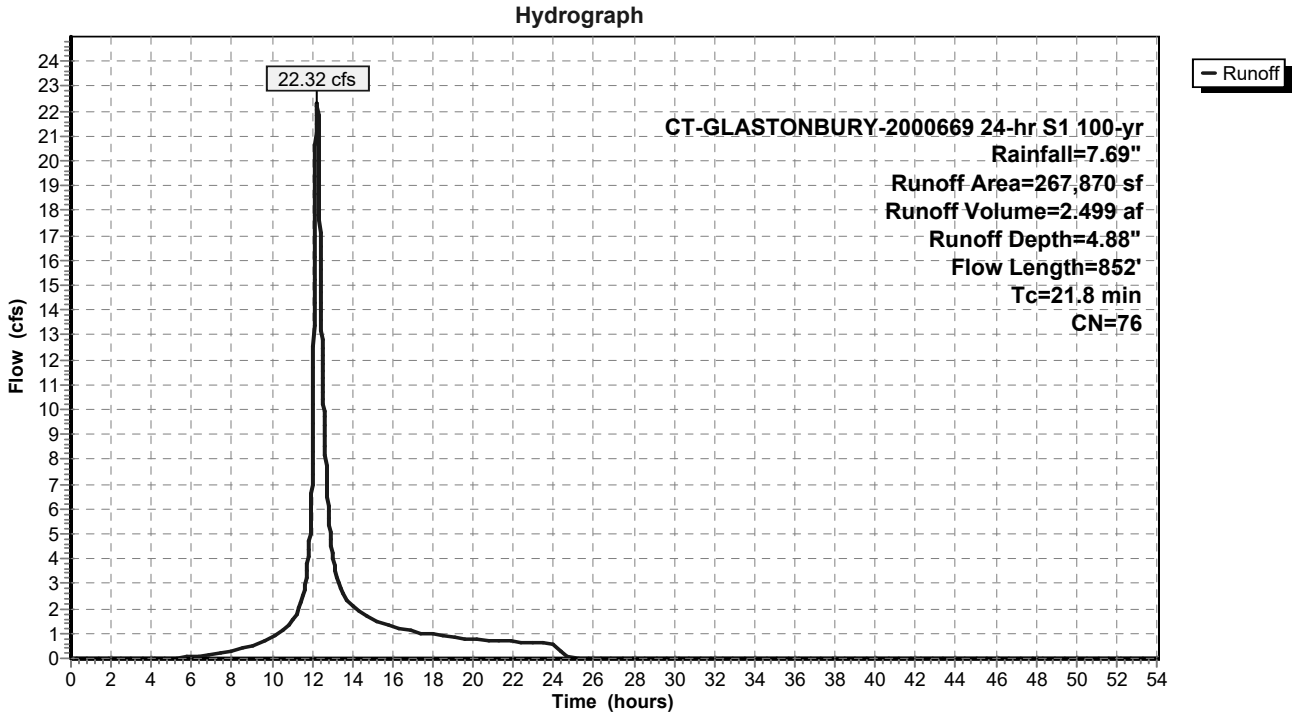
Runoff = 22.32 cfs @ 12.24 hrs, Volume= 2.499 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 25,398 | 36 | Woods, Fair, HSG A |
| 88,595 | 98 | Paved parking, HSG B |
| 113,691 | 69 | 50-75% Grass cover, Fair, HSG B |
| 8,083 | 60 | Woods, Fair, HSG B |
| 267,870 | 76 | Weighted Average |
| 163,319 | | 60.97% Pervious Area |
| 104,551 | | 39.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment EDA-3: Area to CBs W of Site



## Summary for Subcatchment EDA-4: Area Flowing Offsite to the North

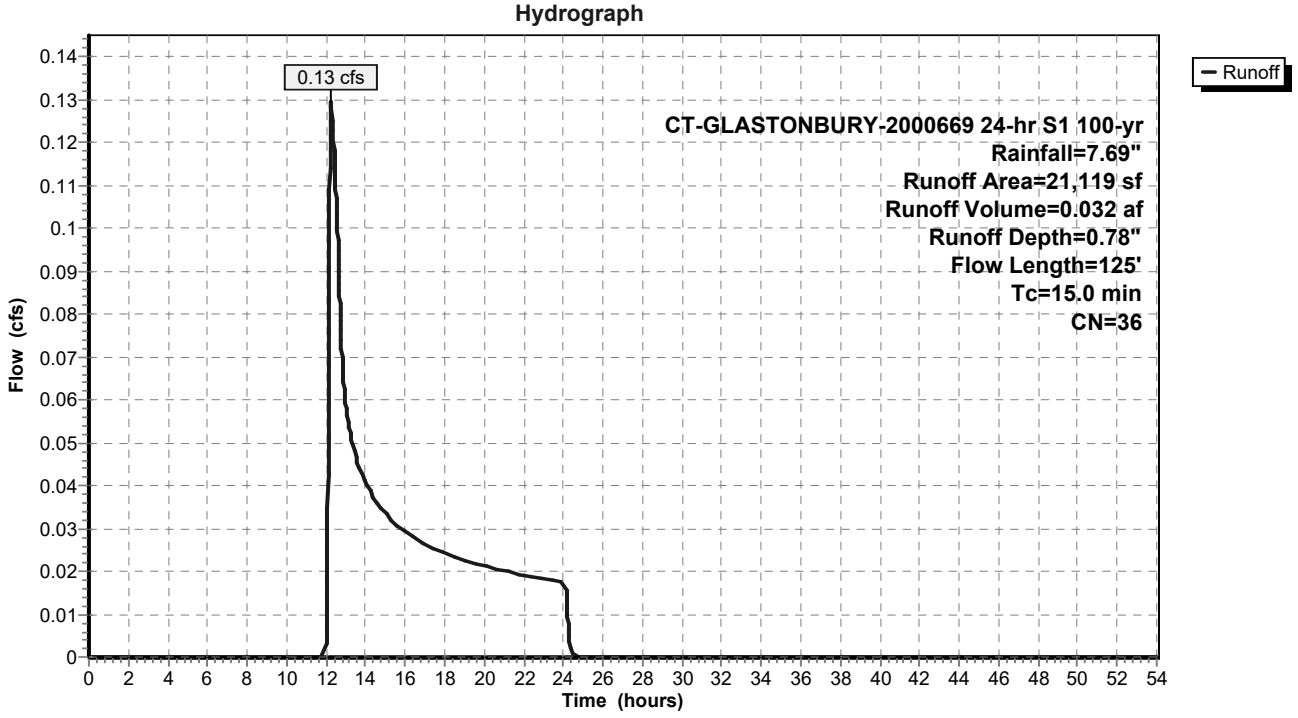
Runoff = 0.13 cfs @ 12.25 hrs, Volume= 0.032 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment EDA-4: Area Flowing Offsite to the North

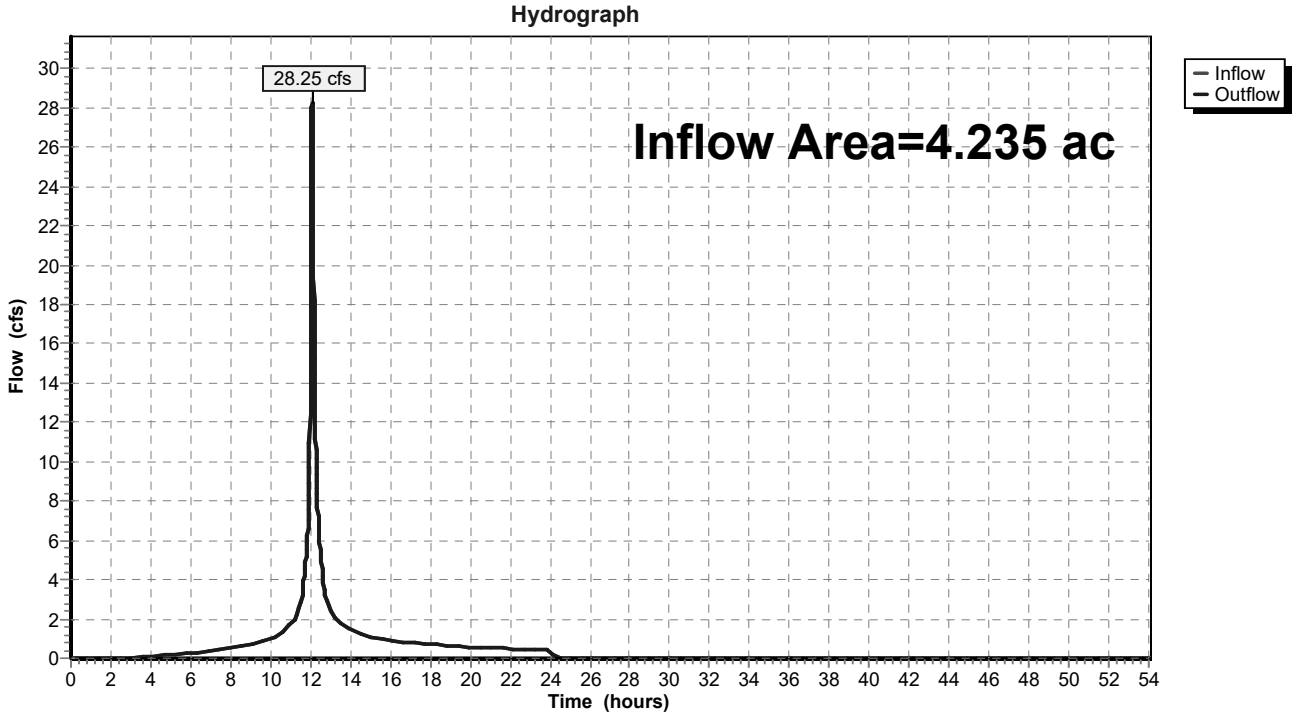


## Summary for Reach DP-1: DP-1

Inflow Area = 4.235 ac, 60.55% Impervious, Inflow Depth = 6.03" for 100-yr event
Inflow = 28.25 cfs @ 12.08 hrs, Volume= 2.129 af
Outflow = 28.25 cfs @ 12.08 hrs, Volume= 2.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

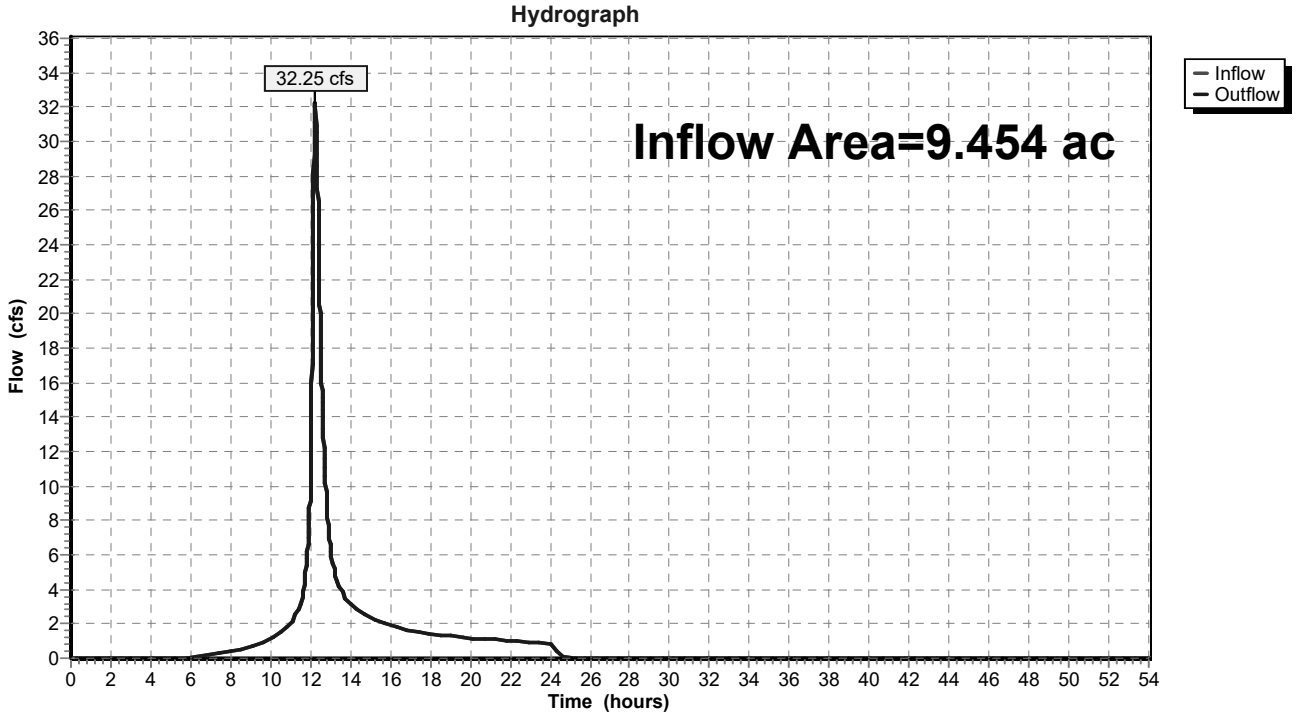


## Summary for Reach DP-2: DP-2

Inflow Area = 9.454 ac, 39.56% Impervious, Inflow Depth = 4.65" for 100-yr event
Inflow = 32.25 cfs @ 12.26 hrs, Volume= 3.663 af
Outflow = 32.25 cfs @ 12.26 hrs, Volume= 3.663 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

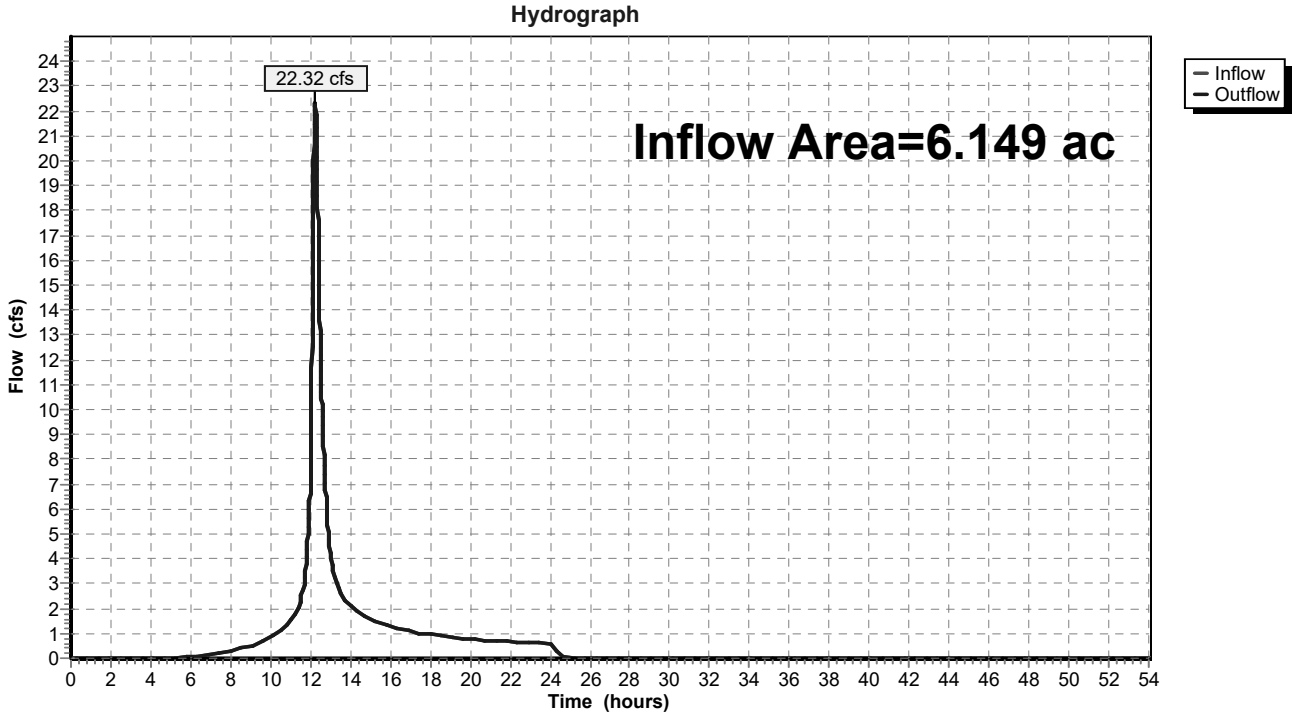


## Summary for Reach DP-3: DP-3

Inflow Area = 6.149 ac, 39.03% Impervious, Inflow Depth = 4.88" for 100-yr event
Inflow = 22.32 cfs @ 12.24 hrs, Volume= 2.499 af
Outflow = 22.32 cfs @ 12.24 hrs, Volume= 2.499 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

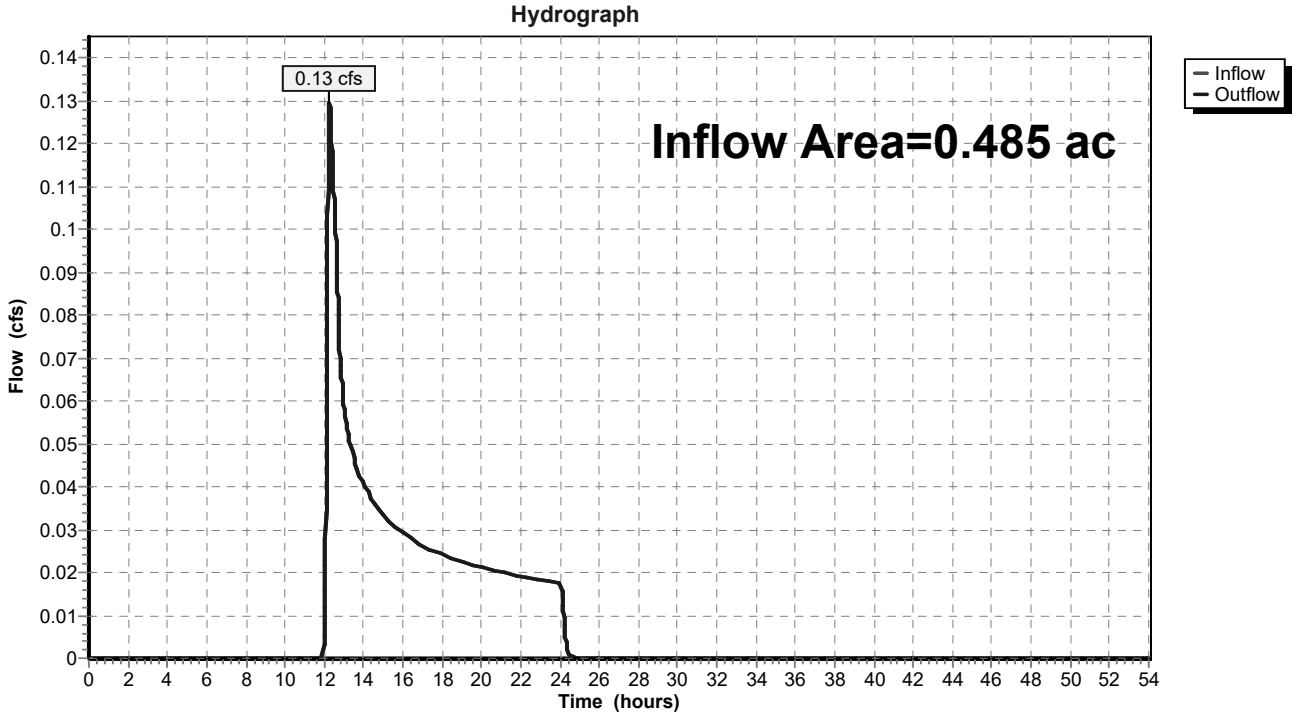


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.78" for 100-yr event
Inflow = 0.13 cfs @ 12.25 hrs, Volume= 0.032 af
Outflow = 0.13 cfs @ 12.25 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

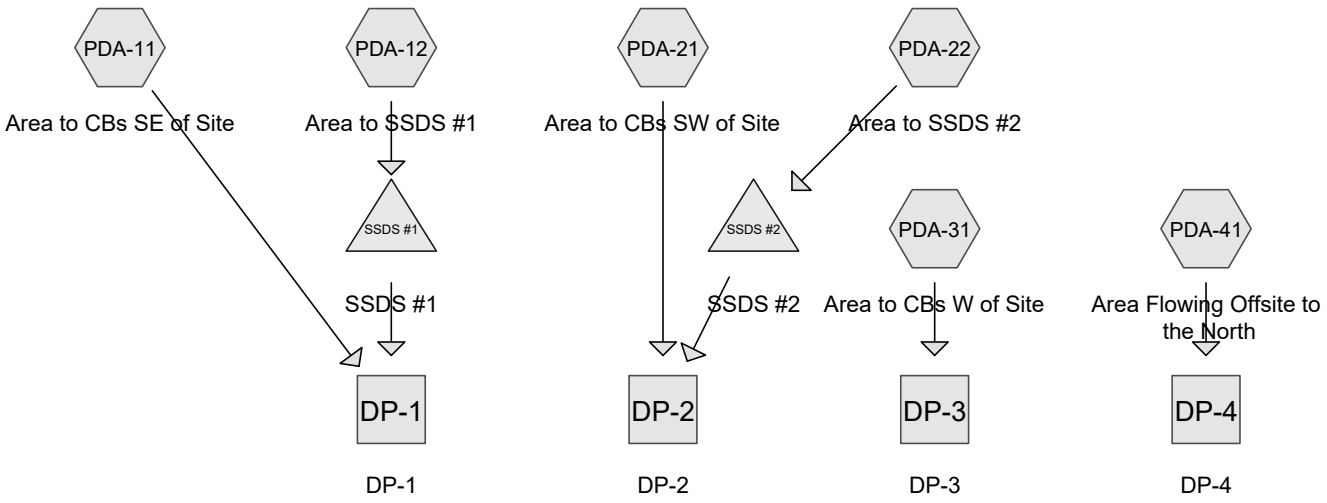
Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



# APPENDIX C

# POST-DEVELOPMENT HYDROLOGY




Subcat Reach Pond Link

**Routing Diagram for C-DAT-2000669-PROPOSED HYDROLOGY**
Prepared by BL Companies, Inc., Printed 9/29/2020

Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PDA-11: Area to CBs SE of** Runoff Area=146,902 sf 57.08% Impervious Runoff Depth=1.66"
Flow Length=248' Tc=9.7 min CN=85 Runoff=6.63 cfs 0.468 af

**Subcatchment PDA-12: Area to SSDS #1** Runoff Area=44,319 sf 79.76% Impervious Runoff Depth=2.25"
Flow Length=186' Tc=6.8 min CN=92 Runoff=3.10 cfs 0.190 af

**Subcatchment PDA-21: Area to CBs SW of** Runoff Area=67,486 sf 66.87% Impervious Runoff Depth=1.90"
Flow Length=176' Tc=18.1 min CN=88 Runoff=2.52 cfs 0.245 af

**Subcatchment PDA-22: Area to SSDS #2** Runoff Area=376,167 sf 76.33% Impervious Runoff Depth=1.74"
Flow Length=1,036' Tc=21.8 min CN=86 Runoff=11.64 cfs 1.252 af

**Subcatchment PDA-31: Area to CBs W of** Runoff Area=229,298 sf 46.81% Impervious Runoff Depth=1.19"
Flow Length=852' Tc=21.8 min CN=78 Runoff=4.68 cfs 0.523 af

**Subcatchment PDA-41: Area Flowing** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.00 cfs 0.000 af

**Reach DP-1: DP-1** Inflow=8.46 cfs 0.651 af
Outflow=8.46 cfs 0.651 af

**Reach DP-2: DP-2** Inflow=5.95 cfs 1.400 af
Outflow=5.95 cfs 1.400 af

**Reach DP-3: DP-3** Inflow=4.68 cfs 0.523 af
Outflow=4.68 cfs 0.523 af

**Reach DP-4: DP-4** Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Pond SSDS #1: SSDS #1** Peak Elev=70.69' Storage=1,385 cf Inflow=3.10 cfs 0.190 af
Outflow=1.91 cfs 0.183 af

**Pond SSDS #2: SSDS #2** Peak Elev=66.21' Storage=18,691 cf Inflow=11.64 cfs 1.252 af
Outflow=4.96 cfs 1.155 af

**Total Runoff Area = 20.323 ac Runoff Volume = 2.679 af Average Runoff Depth = 1.58"**
**36.88% Pervious = 7.495 ac 63.12% Impervious = 12.828 ac**

## Summary for Subcatchment PDA-11: Area to CBs SE of Site

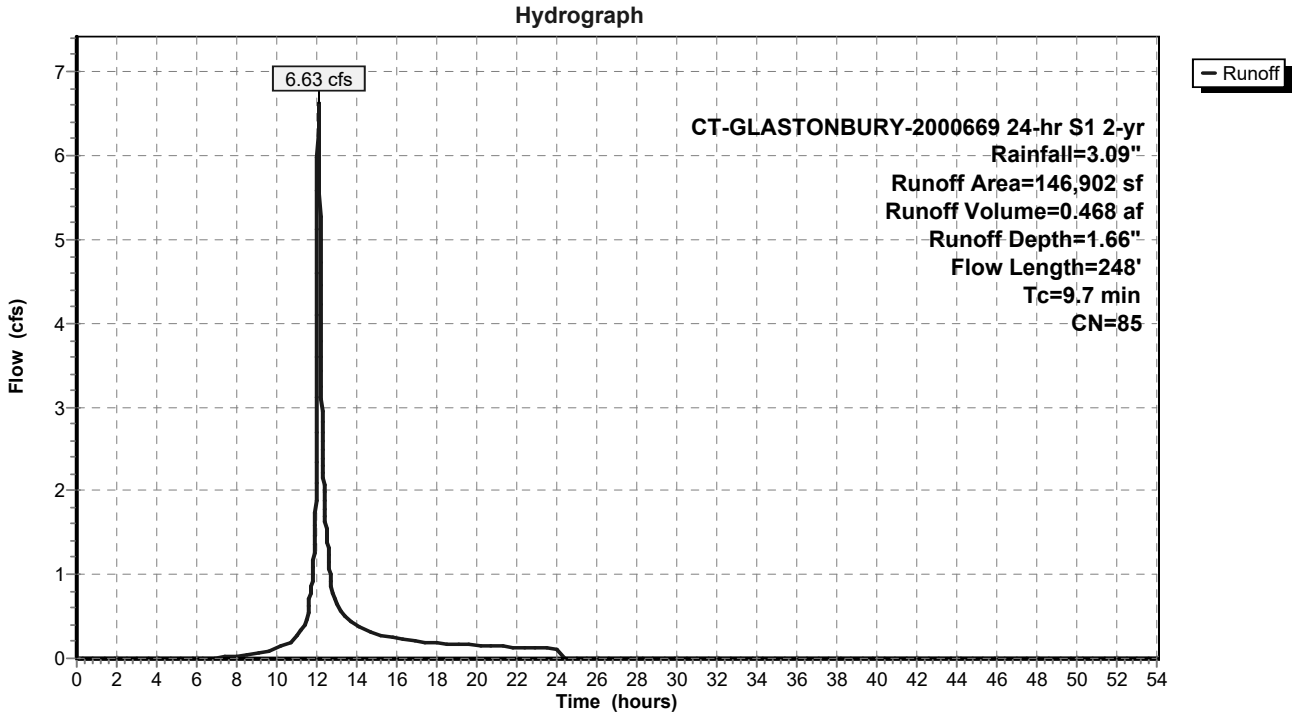
Runoff = 6.63 cfs @ 12.08 hrs, Volume= 0.468 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 10,998 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 72,861 | 98 | Paved parking, HSG B |
| 55,570 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 146,902 | 85 | Weighted Average |
| 63,043 | | 42.92% Pervious Area |
| 83,859 | | 57.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment PDA-11: Area to CBs SE of Site



## Summary for Subcatchment PDA-12: Area to SSDS #1

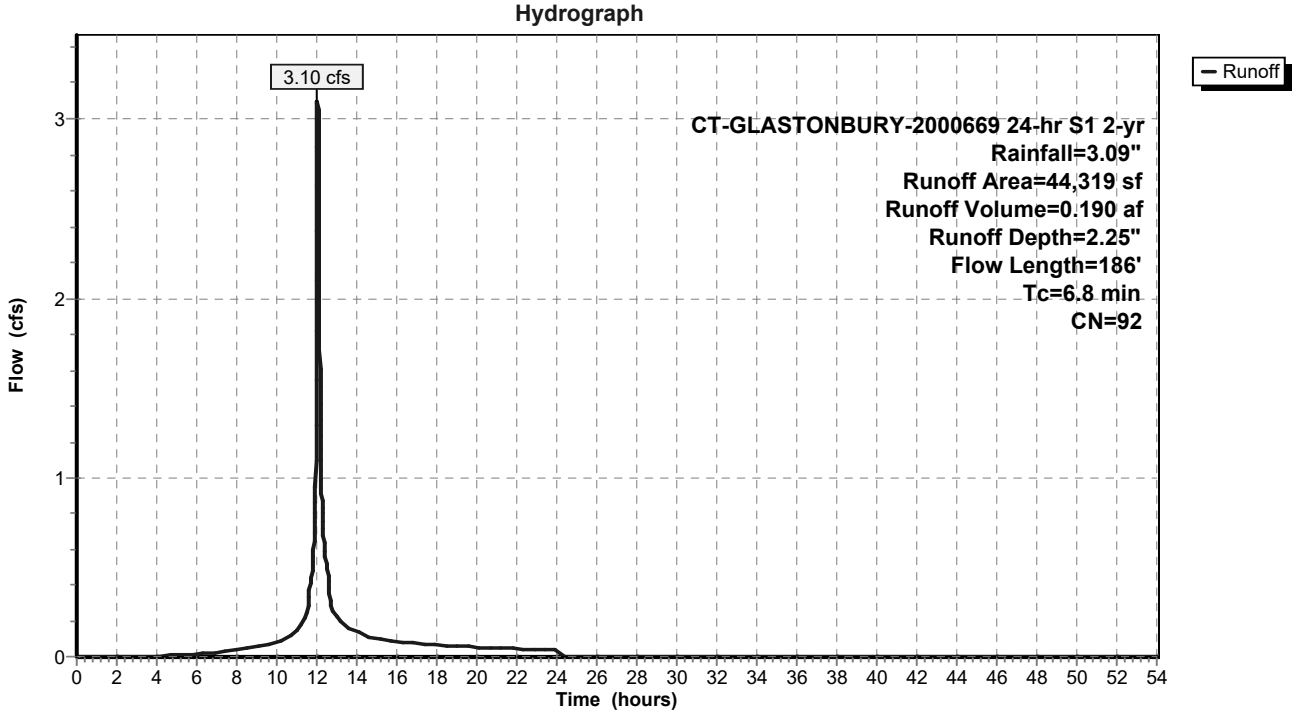
Runoff = 3.10 cfs @ 12.05 hrs, Volume= 0.190 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 35,349 | 98 | Paved parking, HSG B |
| 8,970 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 44,319 | 92 | Weighted Average |
| 8,970 | | 20.24% Pervious Area |
| 35,349 | | 79.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.4 | 77 | 0.0357 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 109 | 0.0415 | 4.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.8 | 186 | Total | | | |

## Subcatchment PDA-12: Area to SSDS #1



## Summary for Subcatchment PDA-21: Area to CBs SW of Site

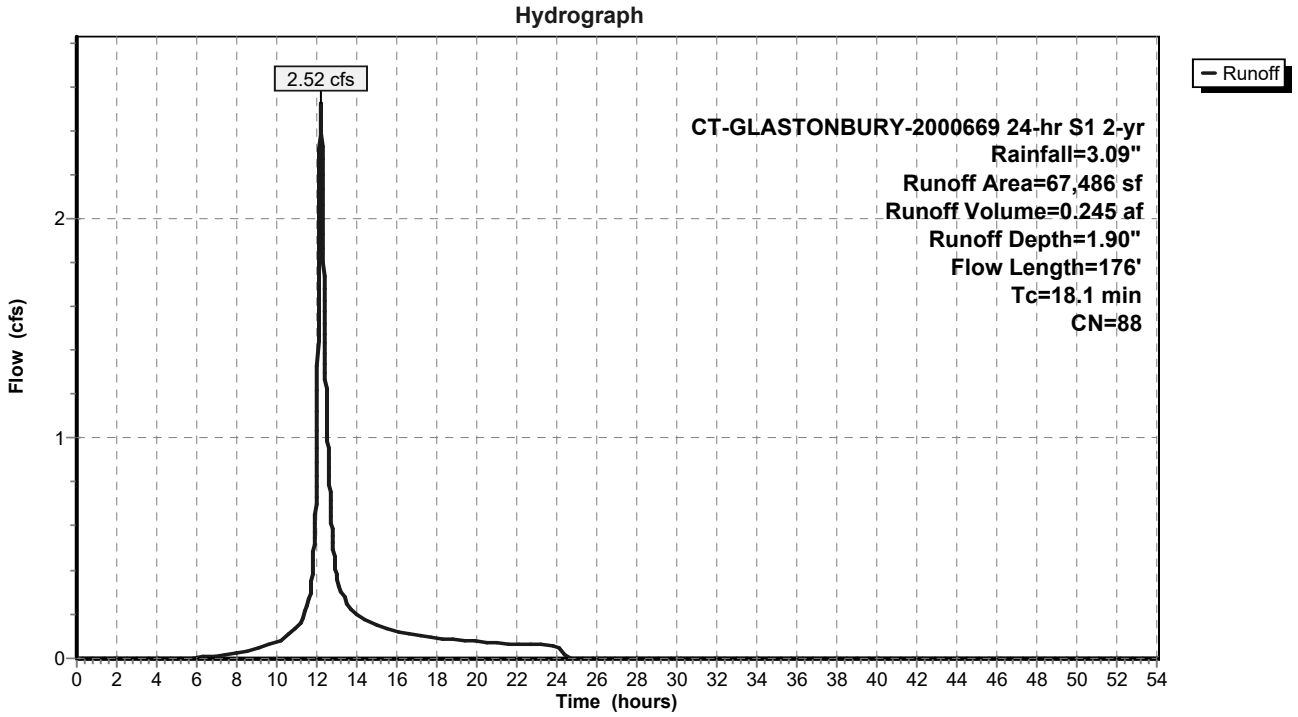
Runoff = 2.52 cfs @ 12.20 hrs, Volume= 0.245 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 45,126 | 98 | Paved parking, HSG B |
| 22,360 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 67,486 | 88 | Weighted Average |
| 22,360 | | 33.13% Pervious Area |
| 45,126 | | 66.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.4 | 100 | 0.0050 | 0.10 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 26 | 0.0050 | 1.06 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.3 | 50 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 18.1 | 176 | Total | | | |

## Subcatchment PDA-21: Area to CBs SW of Site



## Summary for Subcatchment PDA-22: Area to SSDS #2

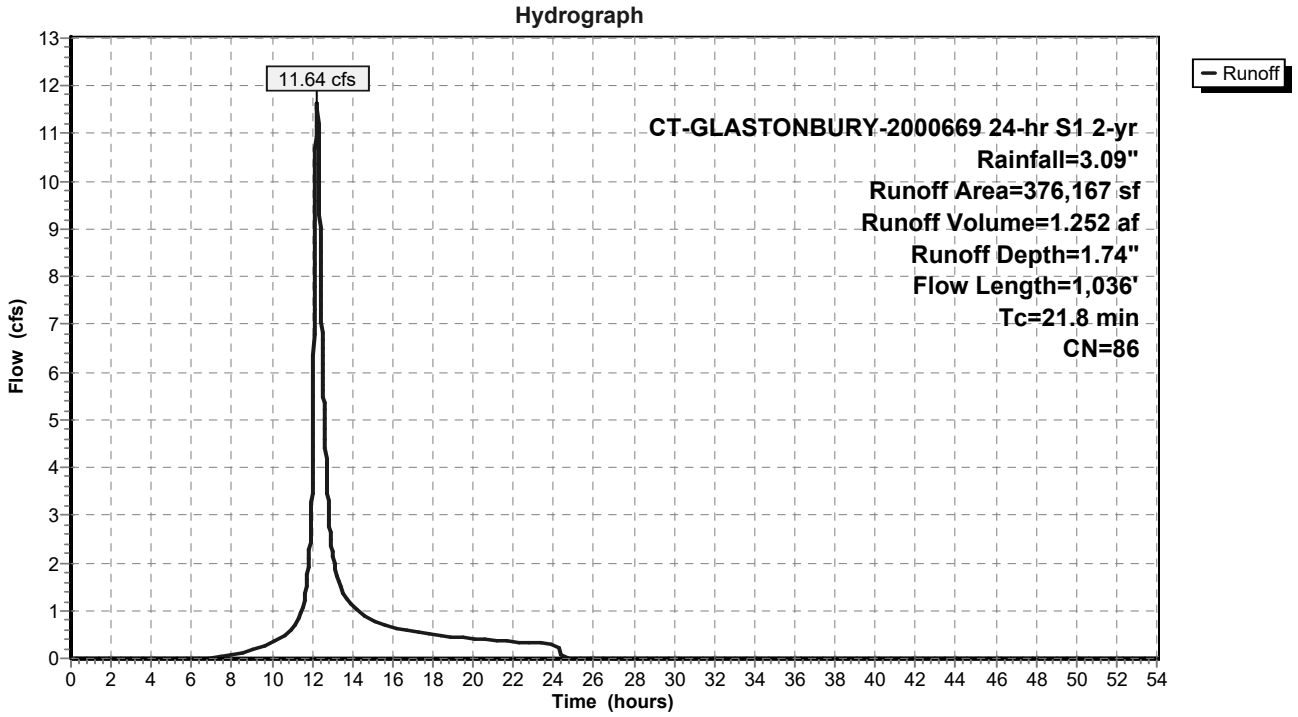
Runoff = 11.64 cfs @ 12.24 hrs, Volume= 1.252 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 18,678 | 98 | Paved parking, HSG A |
| 7,214 | 49 | 50-75% Grass cover, Fair, HSG A |
| 58,835 | 36 | Woods, Fair, HSG A |
| 268,445 | 98 | Paved parking, HSG B |
| 22,808 | 69 | 50-75% Grass cover, Fair, HSG B |
| 187 | 60 | Woods, Fair, HSG B |
| 376,167 | 86 | Weighted Average |
| 89,044 | | 23.67% Pervious Area |
| 287,123 | | 76.33% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 74 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.3 | 219 | 0.0183 | 2.75 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.4 | 643 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 21.8 | 1,036 | Total | | | |

## Subcatchment PDA-22: Area to SSDS #2



## Summary for Subcatchment PDA-31: Area to CBs W of Site

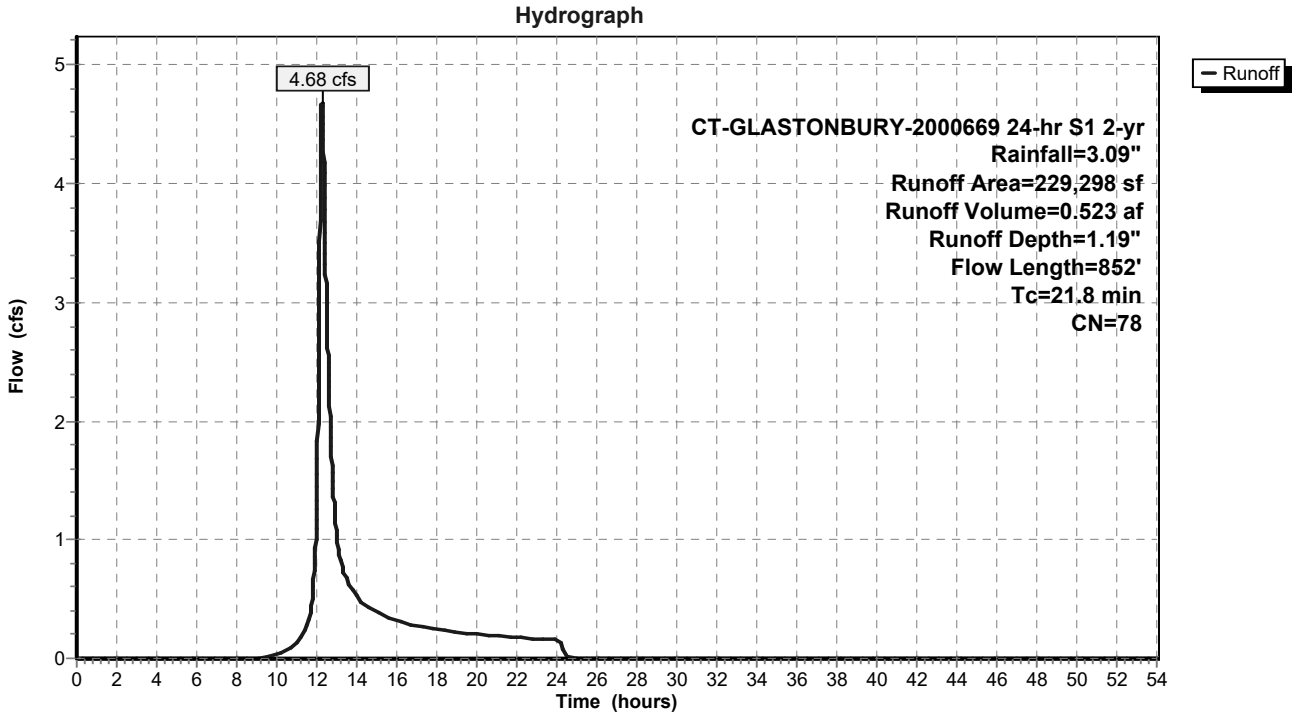
Runoff = 4.68 cfs @ 12.26 hrs, Volume= 0.523 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,342 | 36 | Woods, Fair, HSG A |
| 91,375 | 98 | Paved parking, HSG B |
| 81,933 | 69 | 50-75% Grass cover, Fair, HSG B |
| 2,545 | 60 | Woods, Fair, HSG B |
| 229,298 | 78 | Weighted Average |
| 121,967 | | 53.19% Pervious Area |
| 107,331 | | 46.81% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment PDA-31: Area to CBs W of Site



## Summary for Subcatchment PDA-41: Area Flowing Offsite to the North

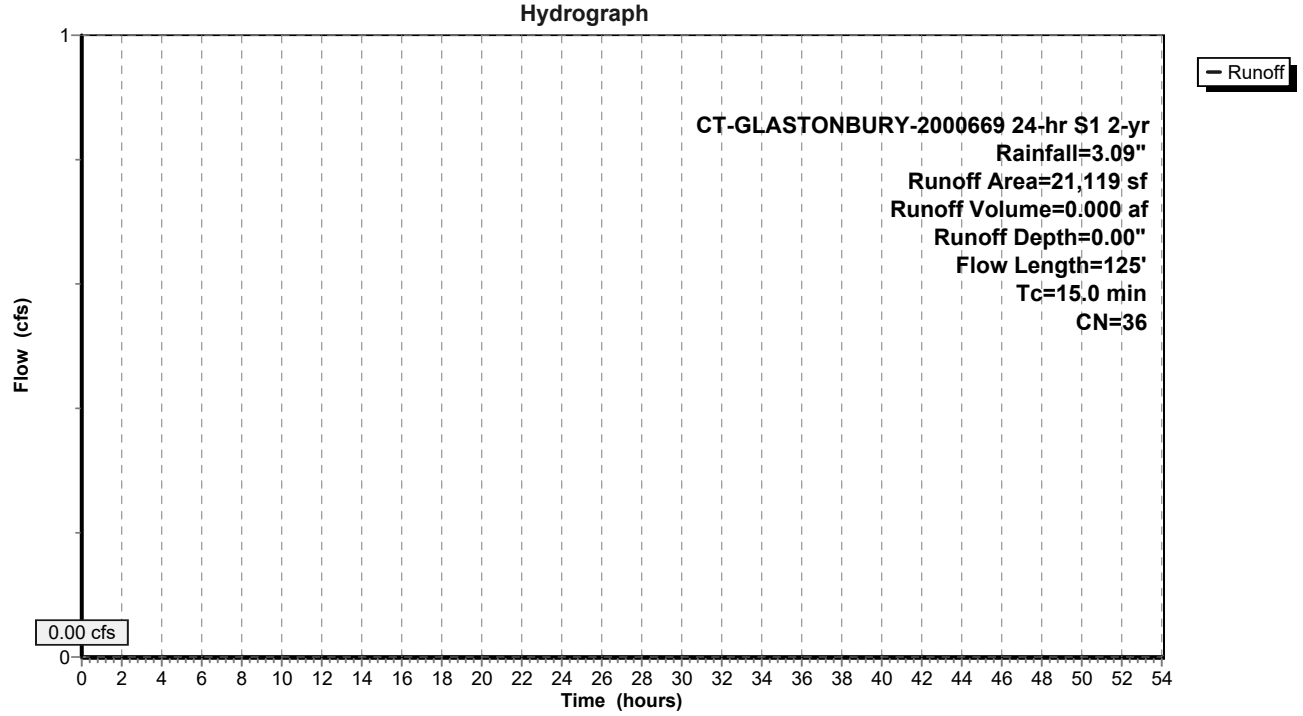
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 2-yr Rainfall=3.09"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment PDA-41: Area Flowing Offsite to the North

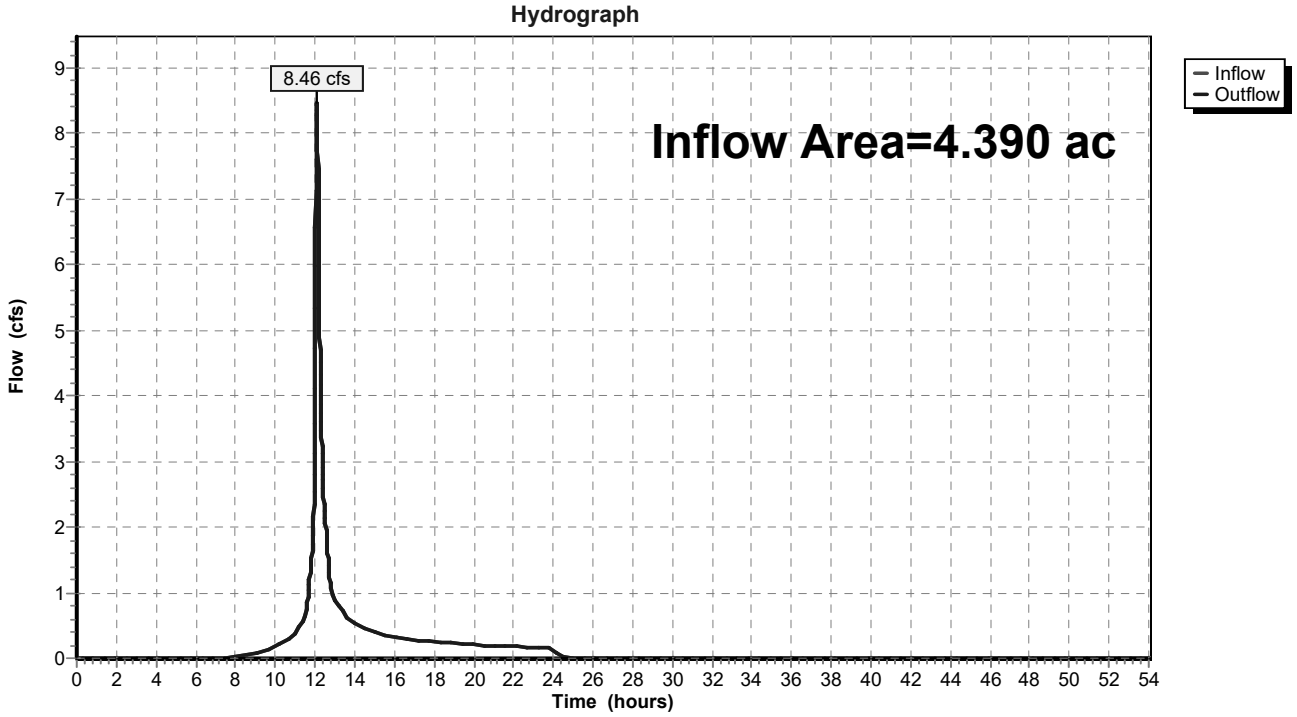


## Summary for Reach DP-1: DP-1

Inflow Area = 4.390 ac, 62.34% Impervious, Inflow Depth = 1.78" for 2-yr event
Inflow = 8.46 cfs @ 12.09 hrs, Volume= 0.651 af
Outflow = 8.46 cfs @ 12.09 hrs, Volume= 0.651 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

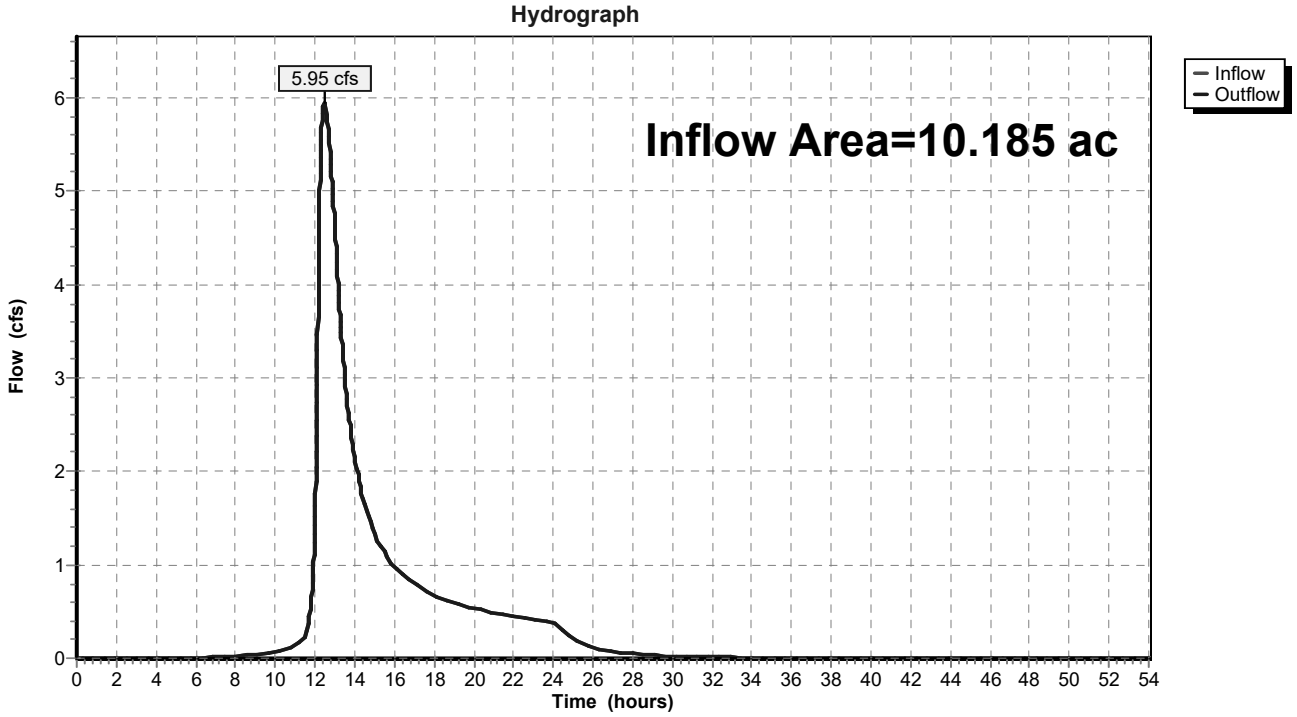


## Summary for Reach DP-2: DP-2

Inflow Area = 10.185 ac, 74.89% Impervious, Inflow Depth = 1.65" for 2-yr event
Inflow = 5.95 cfs @ 12.45 hrs, Volume= 1.400 af
Outflow = 5.95 cfs @ 12.45 hrs, Volume= 1.400 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

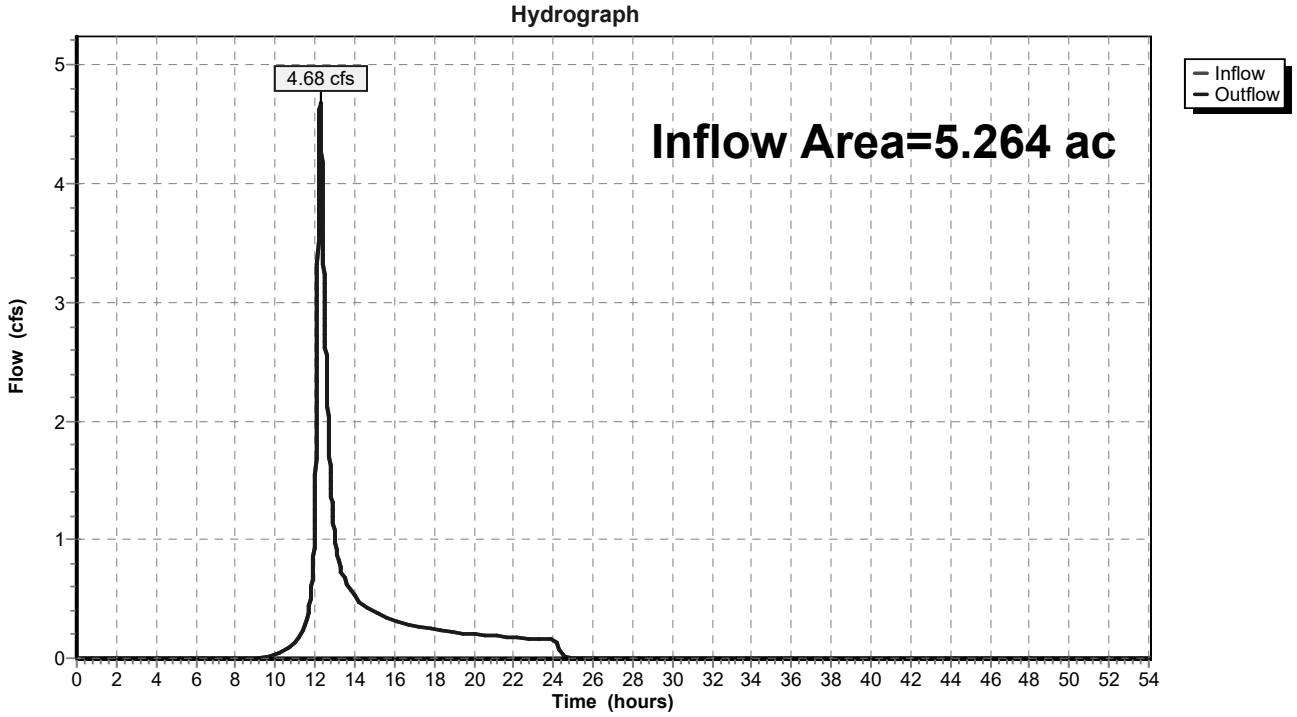


## Summary for Reach DP-3: DP-3

Inflow Area = 5.264 ac, 46.81% Impervious, Inflow Depth = 1.19" for 2-yr event
Inflow = 4.68 cfs @ 12.26 hrs, Volume= 0.523 af
Outflow = 4.68 cfs @ 12.26 hrs, Volume= 0.523 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

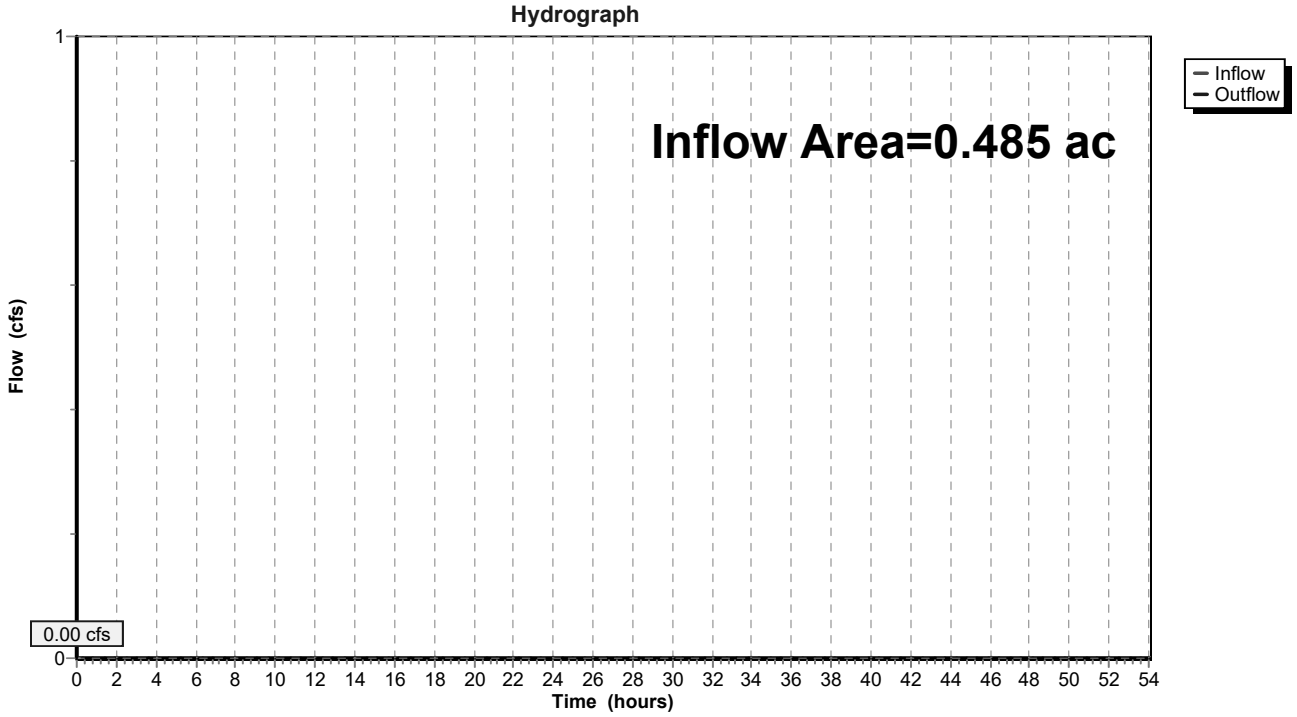


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



## Summary for Pond SSDS #1: SSDS #1

Inflow Area = 1.017 ac, 79.76% Impervious, Inflow Depth = 2.25" for 2-yr event
Inflow = 3.10 cfs @ 12.05 hrs, Volume= 0.190 af
Outflow = 1.91 cfs @ 12.12 hrs, Volume= 0.183 af, Atten= 38%, Lag= 4.7 min
Primary = 1.91 cfs @ 12.12 hrs, Volume= 0.183 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 70.69' @ 12.12 hrs Surf.Area= 1,530 sf Storage= 1,385 cf

Plug-Flow detention time= 59.9 min calculated for 0.183 af (96% of inflow)
Center-of-Mass det. time= 37.9 min ( 848.5 - 810.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 69.30' | 1,406 cf | **25.25'W x 60.58'L x 3.50'H Field A**<br>5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids |
| #2A | 69.80' | 1,838 cf | **ADS_StormTech SC-740 +Cap** x 40 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>40 Chambers in 5 Rows |
| | | 3,244 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 69.80' | **15.0" Round Culvert**<br>L= 49.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 69.80' / 69.30' S= 0.0102 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf |
| #2 | Device 1 | 69.80' | **12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 72.30' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #4 | Device 1 | 71.50' | **8.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.91 cfs @ 12.12 hrs HW=70.69' (Free Discharge)
└**1=Culvert** (Passes 1.91 cfs of 2.91 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.91 cfs @ 3.82 fps)
  ├**3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └**4=Orifice/Grate** ( Controls 0.00 cfs)

## Pond SSDS #1: SSDS #1 - Chamber Wizard Field A

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

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

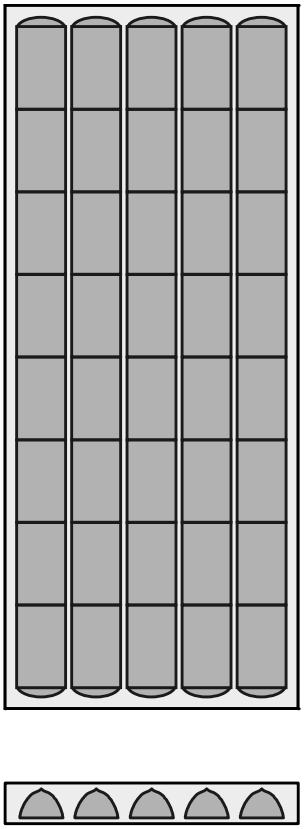
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

40 Chambers x 45.9 cf = 1,837.6 cf Chamber Storage

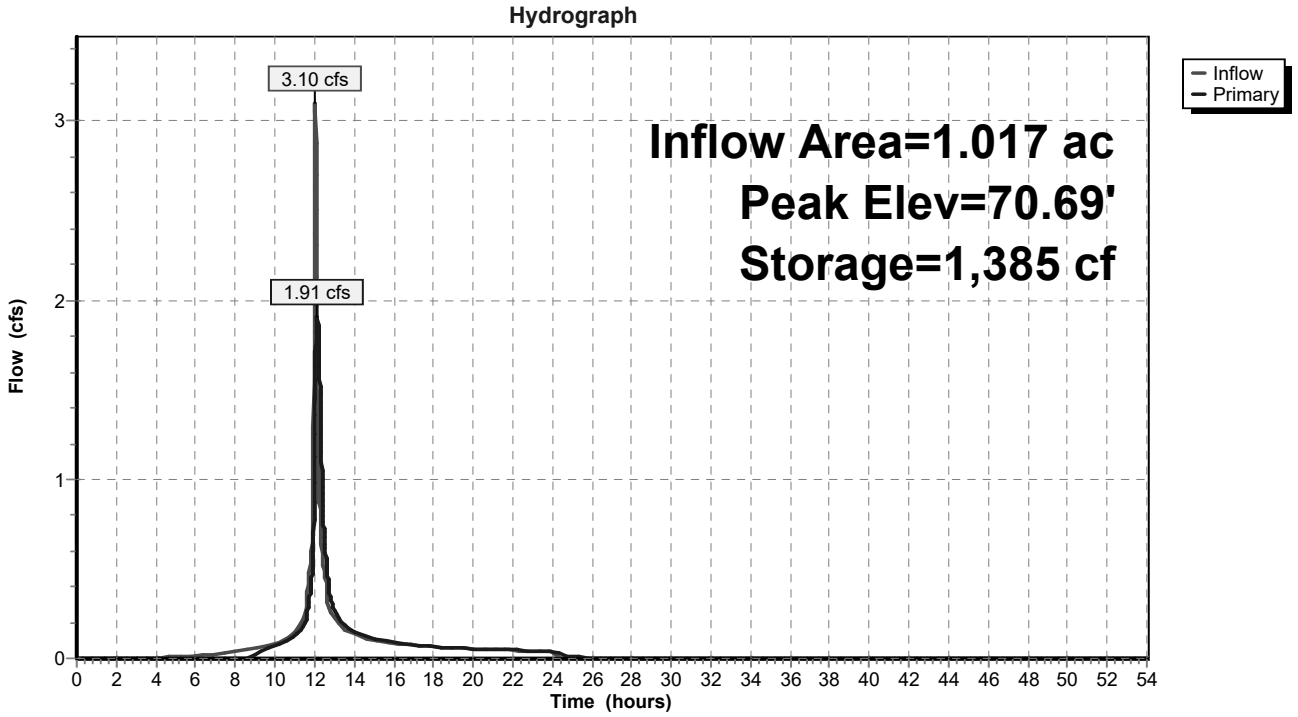
5,353.5 cf Field - 1,837.6 cf Chambers = 3,515.9 cf Stone x 40.0% Voids = 1,406.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,243.9 cf = 0.074 af
Overall Storage Efficiency = 60.6%
Overall System Size = 60.58' x 25.25' x 3.50'

40 Chambers
198.3 cy Field
130.2 cy Stone



## Pond SSDS #1: SSDS #1



## Summary for Pond SSDS #2: SSDS #2

Inflow Area = 8.636 ac, 76.33% Impervious, Inflow Depth = 1.74" for 2-yr event
Inflow = 11.64 cfs @ 12.24 hrs, Volume= 1.252 af
Outflow = 4.96 cfs @ 12.62 hrs, Volume= 1.155 af, Atten= 57%, Lag= 22.7 min
Primary = 4.96 cfs @ 12.62 hrs, Volume= 1.155 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 66.21' @ 12.62 hrs Surf.Area= 14,046 sf Storage= 18,691 cf

Plug-Flow detention time= 139.3 min calculated for 1.155 af (92% of inflow)
Center-of-Mass det. time= 97.7 min ( 952.9 - 855.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 64.25' | 19,315 cf | **65.75'W x 213.63'L x 5.50'H Field A**<br>77,254 cf Overall - 28,966 cf Embedded = 48,288 cf x 40.0% Voids |
| #2A | 65.00' | 28,966 cf | **ADS_StormTech MC-3500 d +Cap**x 261 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>261 Chambers in 9 Rows<br>Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf |
| | | 48,281 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 64.50' | **24.0" Round Culvert**<br>L= 80.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 64.50' / 64.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf |
| #2 | Device 1 | 65.00' | **15.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 68.65' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |

**Primary OutFlow** Max=4.96 cfs @ 12.62 hrs HW=66.21' (Free Discharge)
└**1=Culvert** (Passes 4.96 cfs of 10.46 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 4.96 cfs @ 3.97 fps)
  └**3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SSDS #2: SSDS #2 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)**
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

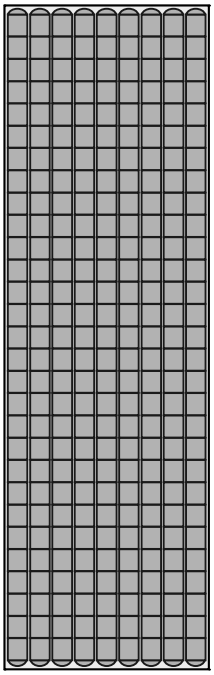
29 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 211.63' Row Length +12.0" End Stone x 2 = 213.63' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

261 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 28,965.7 cf Chamber Storage

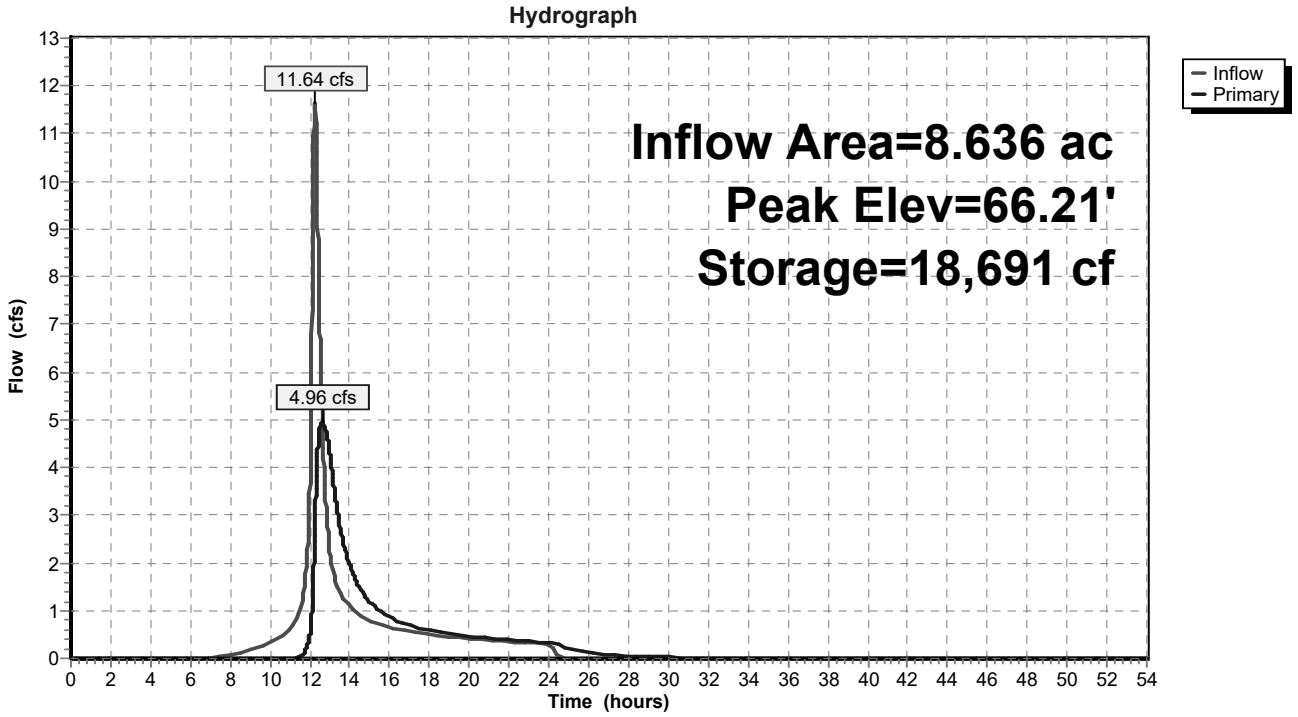
77,253.9 cf Field - 28,965.7 cf Chambers = 48,288.3 cf Stone x 40.0% Voids = 19,315.3 cf Stone Storage

Chamber Storage + Stone Storage = 48,281.0 cf = 1.108 af
Overall Storage Efficiency = 62.5%
Overall System Size = 213.63' x 65.75' x 5.50'

261 Chambers
2,861.3 cy Field
1,788.5 cy Stone



## Pond SSDS #2: SSDS #2



Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PDA-11: Area to CBs SE of** Runoff Area=146,902 sf 57.08% Impervious Runoff Depth=3.25"
Flow Length=248' Tc=9.7 min CN=85 Runoff=12.60 cfs 0.913 af

**Subcatchment PDA-12: Area to SSDS #1** Runoff Area=44,319 sf 79.76% Impervious Runoff Depth=3.96"
Flow Length=186' Tc=6.8 min CN=92 Runoff=5.20 cfs 0.336 af

**Subcatchment PDA-21: Area to CBs SW of** Runoff Area=67,486 sf 66.87% Impervious Runoff Depth=3.55"
Flow Length=176' Tc=18.1 min CN=88 Runoff=4.54 cfs 0.458 af

**Subcatchment PDA-22: Area to SSDS #2** Runoff Area=376,167 sf 76.33% Impervious Runoff Depth=3.35"
Flow Length=1,036' Tc=21.8 min CN=86 Runoff=21.71 cfs 2.408 af

**Subcatchment PDA-31: Area to CBs W of** Runoff Area=229,298 sf 46.81% Impervious Runoff Depth=2.60"
Flow Length=852' Tc=21.8 min CN=78 Runoff=10.33 cfs 1.141 af

**Subcatchment PDA-41: Area Flowing** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.00 cfs 0.004 af

**Reach DP-1: DP-1** Inflow=15.23 cfs 1.242 af
Outflow=15.23 cfs 1.242 af

**Reach DP-2: DP-2** Inflow=10.72 cfs 2.769 af
Outflow=10.72 cfs 2.769 af

**Reach DP-3: DP-3** Inflow=10.33 cfs 1.141 af
Outflow=10.33 cfs 1.141 af

**Reach DP-4: DP-4** Inflow=0.00 cfs 0.004 af
Outflow=0.00 cfs 0.004 af

**Pond SSDS #1: SSDS #1** Peak Elev=71.40' Storage=2,175 cf Inflow=5.20 cfs 0.336 af
Outflow=2.79 cfs 0.329 af

**Pond SSDS #2: SSDS #2** Peak Elev=67.54' Storage=33,052 cf Inflow=21.71 cfs 2.408 af
Outflow=8.57 cfs 2.311 af

**Total Runoff Area = 20.323 ac Runoff Volume = 5.259 af Average Runoff Depth = 3.11"**
**36.88% Pervious = 7.495 ac 63.12% Impervious = 12.828 ac**

## Summary for Subcatchment PDA-11: Area to CBs SE of Site

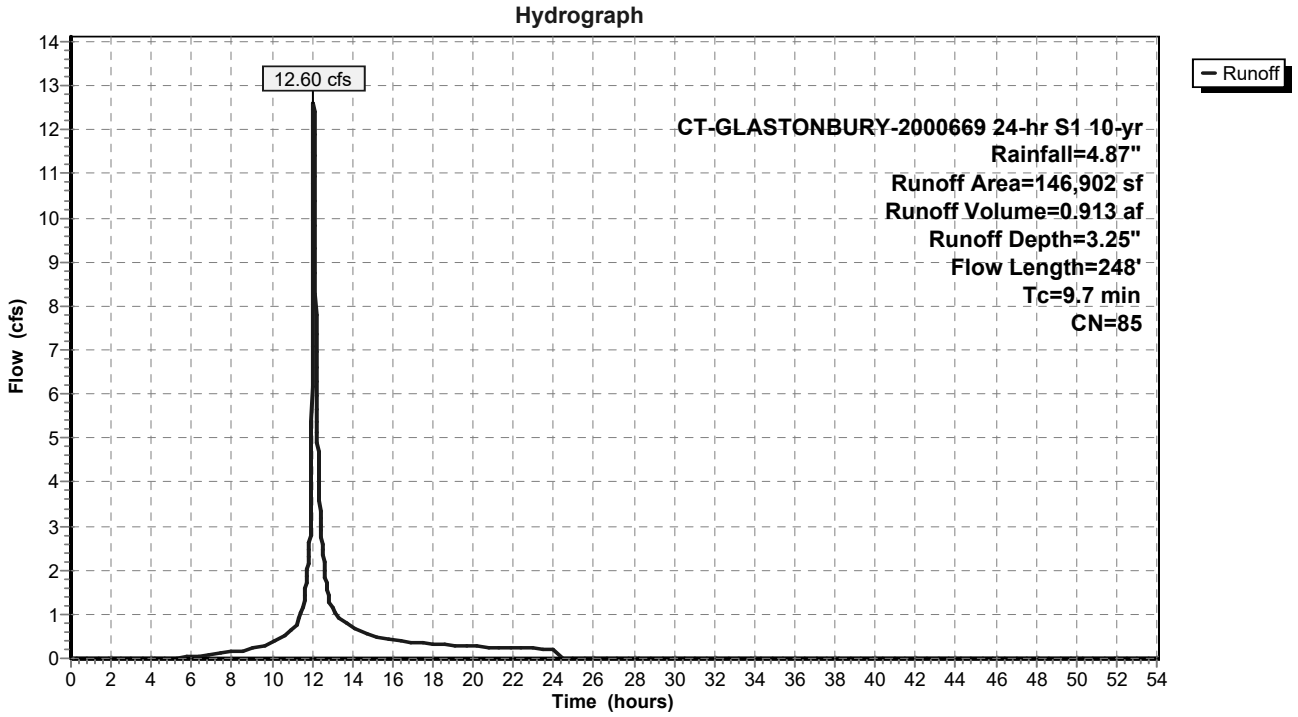
Runoff = 12.60 cfs @ 12.08 hrs, Volume= 0.913 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 10,998 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 72,861 | 98 | Paved parking, HSG B |
| 55,570 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 146,902 | 85 | Weighted Average |
| 63,043 | | 42.92% Pervious Area |
| 83,859 | | 57.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment PDA-11: Area to CBs SE of Site



## Summary for Subcatchment PDA-12: Area to SSDS #1

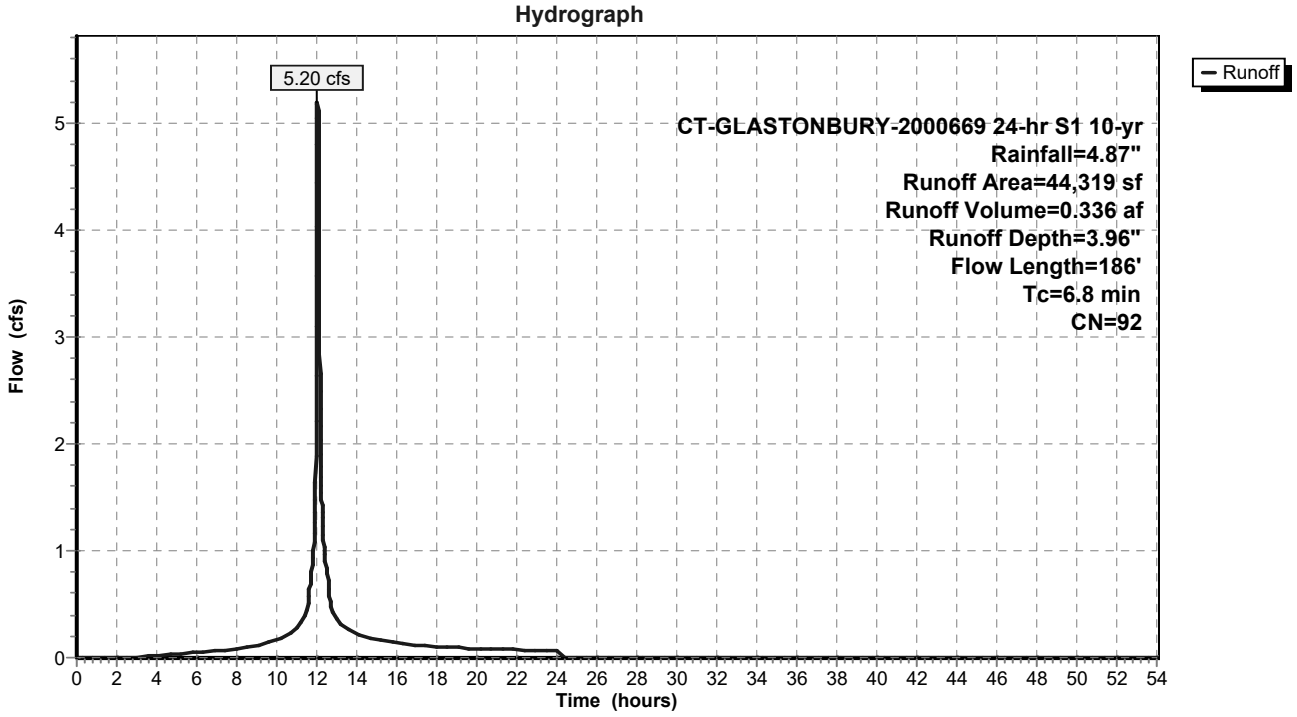
Runoff = 5.20 cfs @ 12.04 hrs, Volume= 0.336 af, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 35,349 | 98 | Paved parking, HSG B |
| 8,970 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 44,319 | 92 | Weighted Average |
| 8,970 | | 20.24% Pervious Area |
| 35,349 | | 79.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.4 | 77 | 0.0357 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 109 | 0.0415 | 4.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.8 | 186 | Total | | | |

## Subcatchment PDA-12: Area to SSDS #1



## Summary for Subcatchment PDA-21: Area to CBs SW of Site

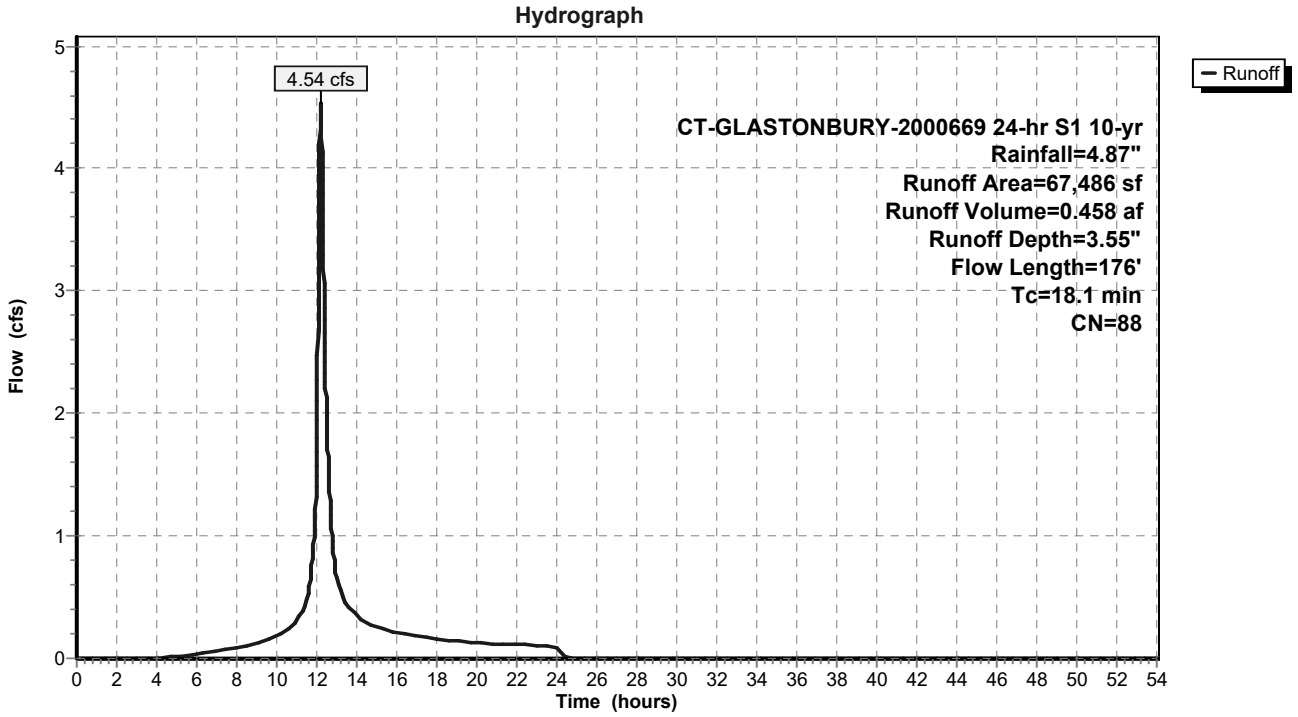
Runoff = 4.54 cfs @ 12.20 hrs, Volume= 0.458 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 45,126 | 98 | Paved parking, HSG B |
| 22,360 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 67,486 | 88 | Weighted Average |
| 22,360 | | 33.13% Pervious Area |
| 45,126 | | 66.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.4 | 100 | 0.0050 | 0.10 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 26 | 0.0050 | 1.06 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.3 | 50 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 18.1 | 176 | Total | | | |

## Subcatchment PDA-21: Area to CBs SW of Site



## Summary for Subcatchment PDA-22: Area to SSDS #2

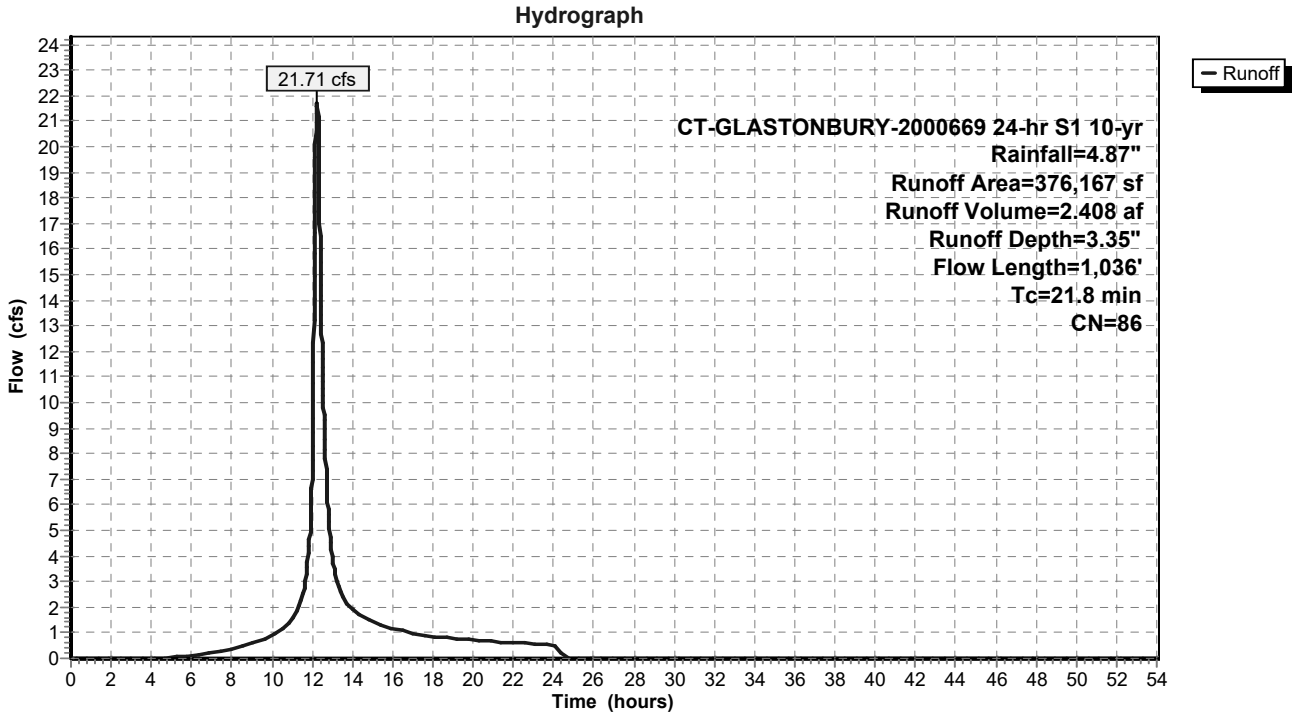
Runoff = 21.71 cfs @ 12.24 hrs, Volume= 2.408 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 18,678 | 98 | Paved parking, HSG A |
| 7,214 | 49 | 50-75% Grass cover, Fair, HSG A |
| 58,835 | 36 | Woods, Fair, HSG A |
| 268,445 | 98 | Paved parking, HSG B |
| 22,808 | 69 | 50-75% Grass cover, Fair, HSG B |
| 187 | 60 | Woods, Fair, HSG B |
| 376,167 | 86 | Weighted Average |
| 89,044 | | 23.67% Pervious Area |
| 287,123 | | 76.33% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 74 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.3 | 219 | 0.0183 | 2.75 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.4 | 643 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 21.8 | 1,036 | Total | | | |

## Subcatchment PDA-22: Area to SSDS #2



## Summary for Subcatchment PDA-31: Area to CBs W of Site

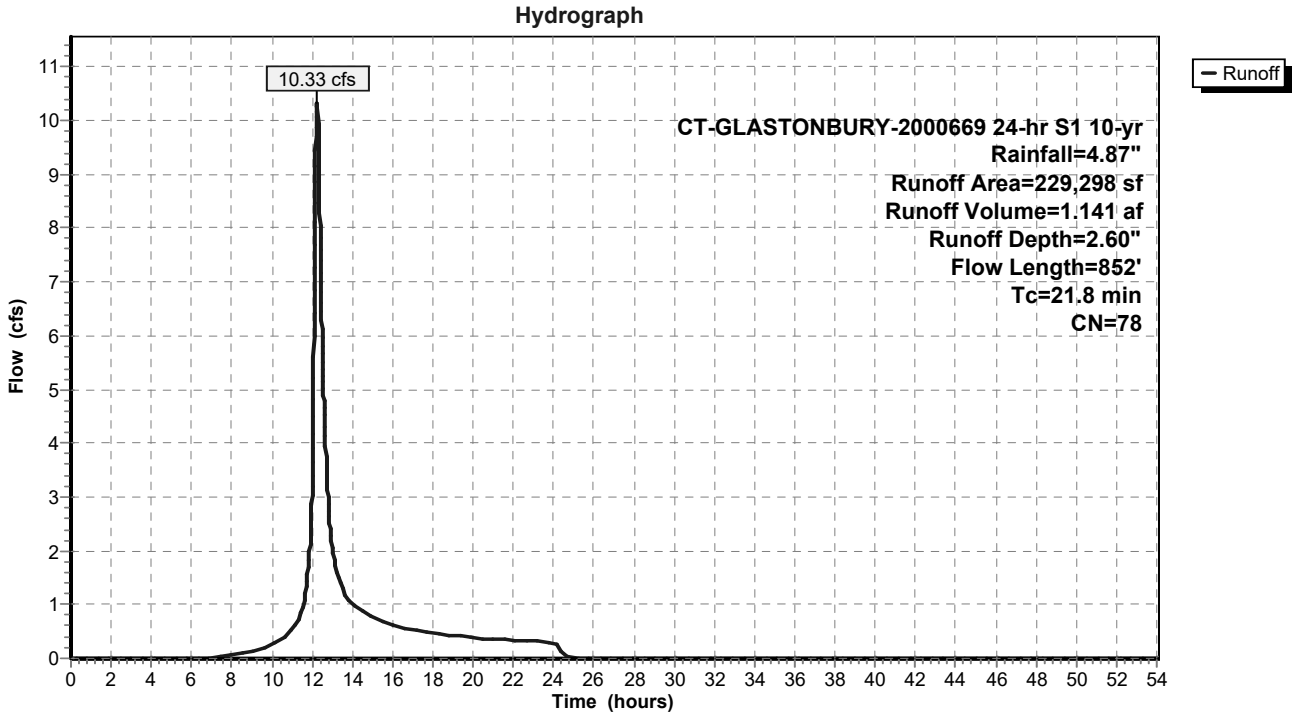
Runoff = 10.33 cfs @ 12.25 hrs, Volume= 1.141 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,342 | 36 | Woods, Fair, HSG A |
| 91,375 | 98 | Paved parking, HSG B |
| 81,933 | 69 | 50-75% Grass cover, Fair, HSG B |
| 2,545 | 60 | Woods, Fair, HSG B |
| 229,298 | 78 | Weighted Average |
| 121,967 | | 53.19% Pervious Area |
| 107,331 | | 46.81% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment PDA-31: Area to CBs W of Site



## Summary for Subcatchment PDA-41: Area Flowing Offsite to the North

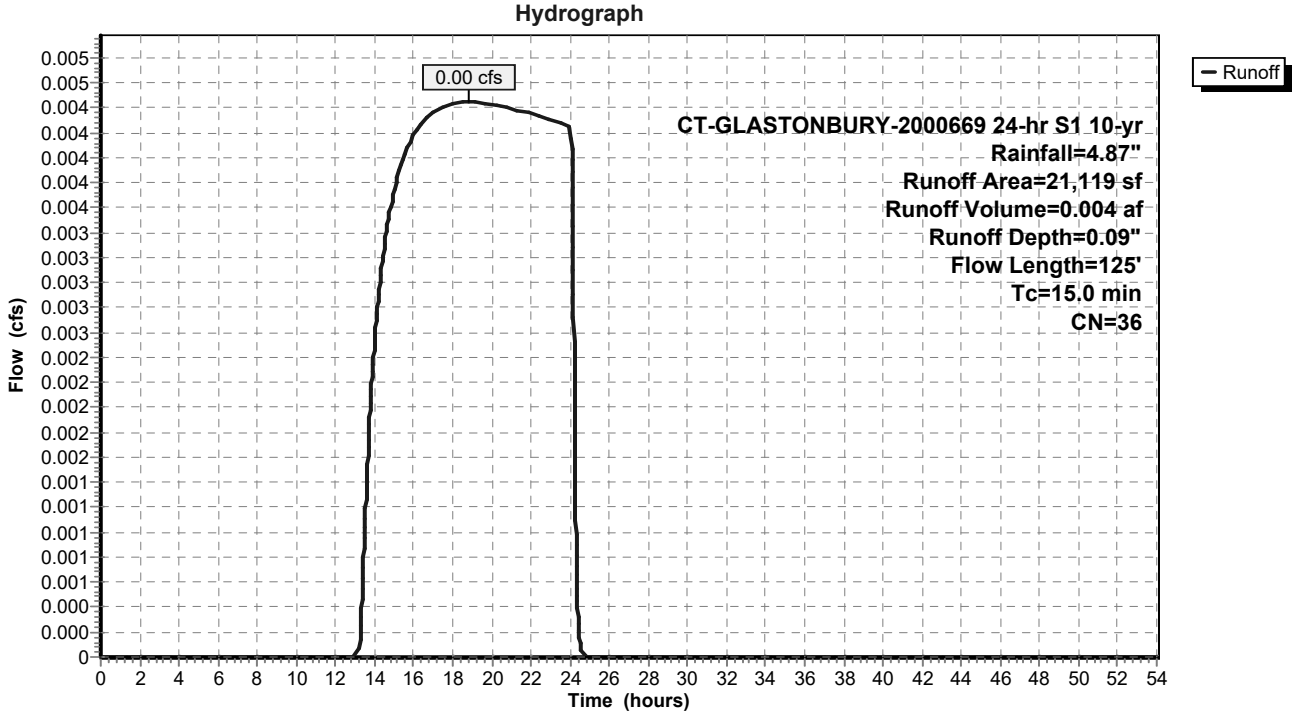
Runoff = 0.00 cfs @ 18.85 hrs, Volume= 0.004 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 10-yr Rainfall=4.87"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment PDA-41: Area Flowing Offsite to the North

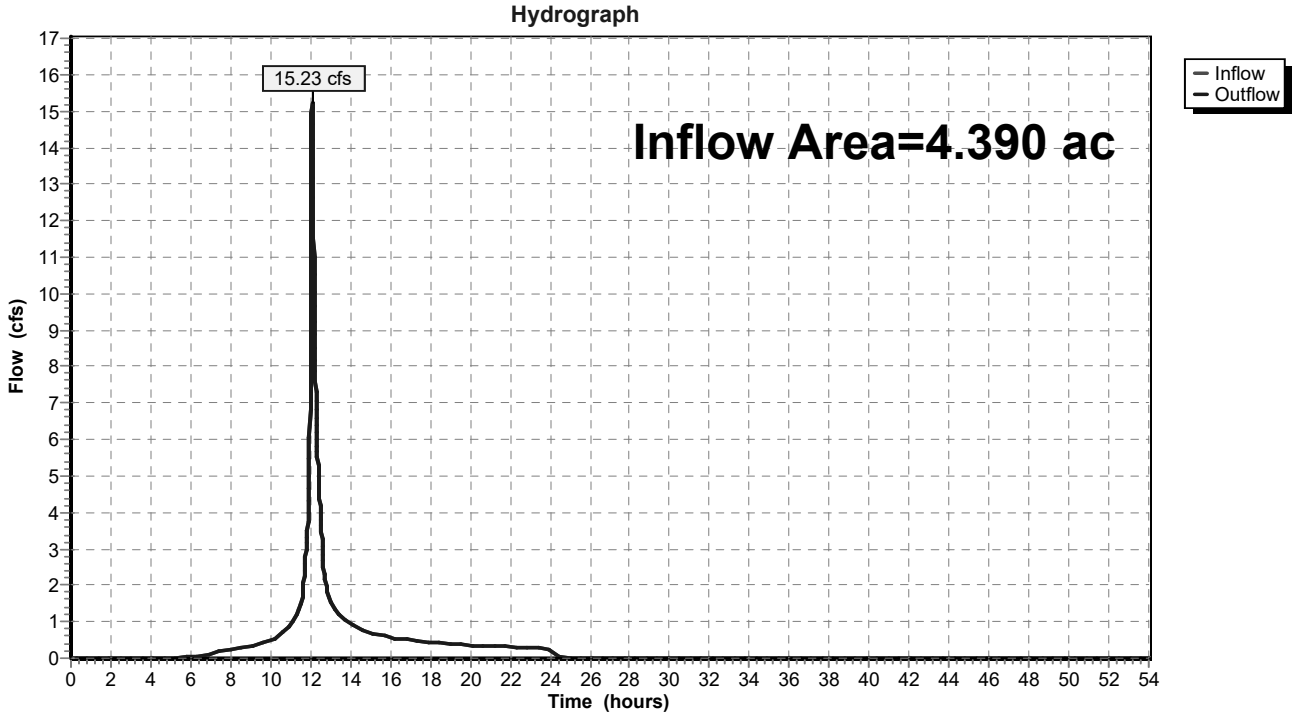


## Summary for Reach DP-1: DP-1

Inflow Area = 4.390 ac, 62.34% Impervious, Inflow Depth = 3.39" for 10-yr event
Inflow = 15.23 cfs @ 12.08 hrs, Volume= 1.242 af
Outflow = 15.23 cfs @ 12.08 hrs, Volume= 1.242 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

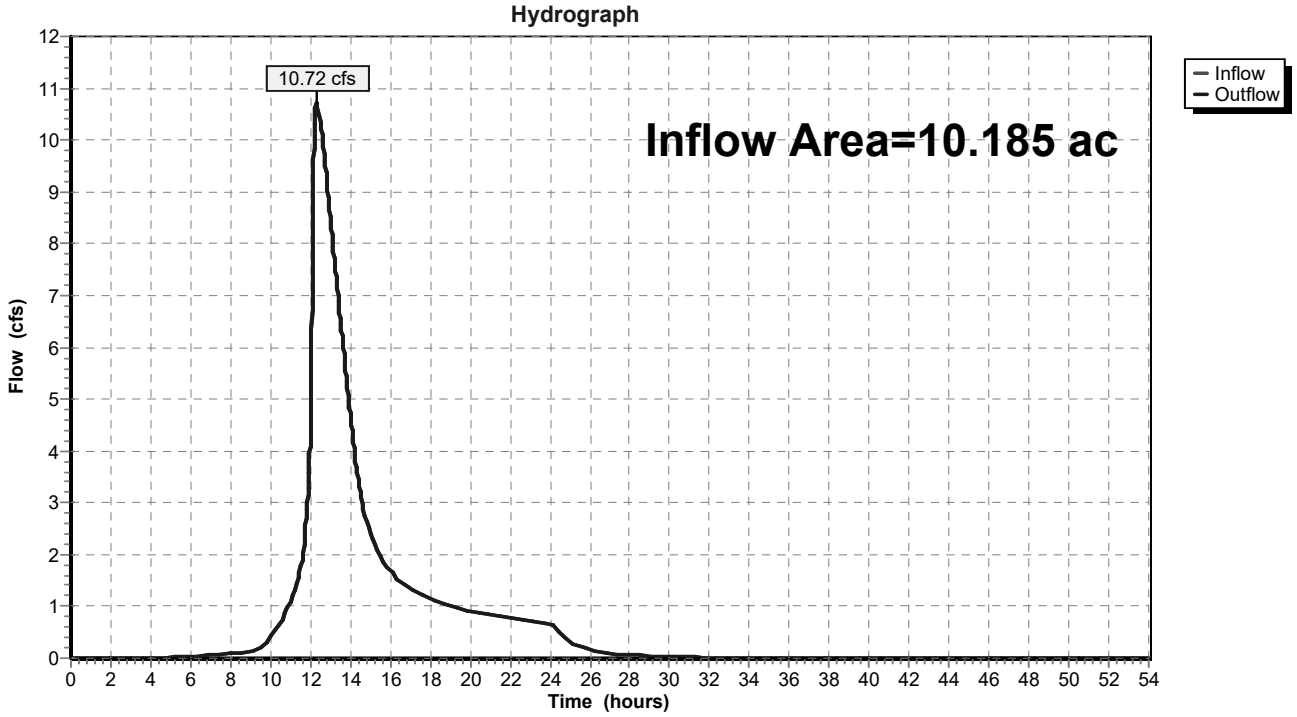


## Summary for Reach DP-2: DP-2

Inflow Area = 10.185 ac, 74.89% Impervious, Inflow Depth = 3.26" for 10-yr event
Inflow = 10.72 cfs @ 12.29 hrs, Volume= 2.769 af
Outflow = 10.72 cfs @ 12.29 hrs, Volume= 2.769 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

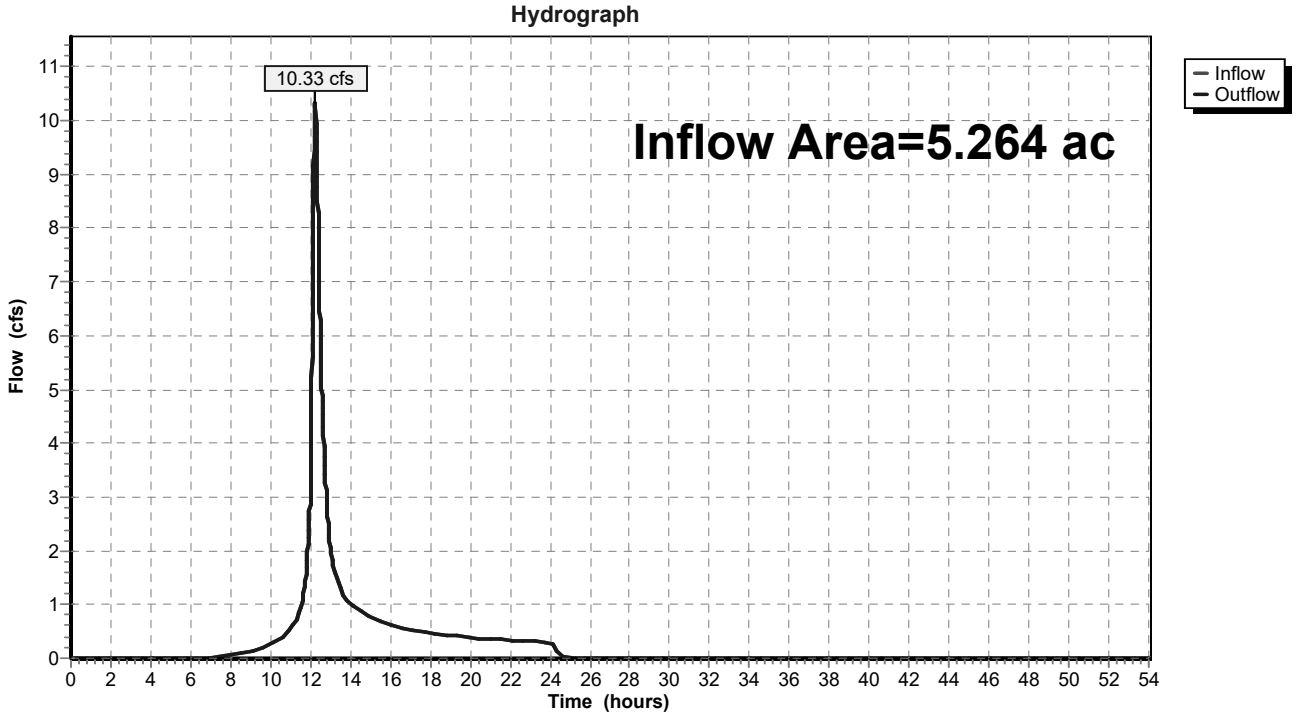


## Summary for Reach DP-3: DP-3

Inflow Area = 5.264 ac, 46.81% Impervious, Inflow Depth = 2.60" for 10-yr event
Inflow = 10.33 cfs @ 12.25 hrs, Volume= 1.141 af
Outflow = 10.33 cfs @ 12.25 hrs, Volume= 1.141 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

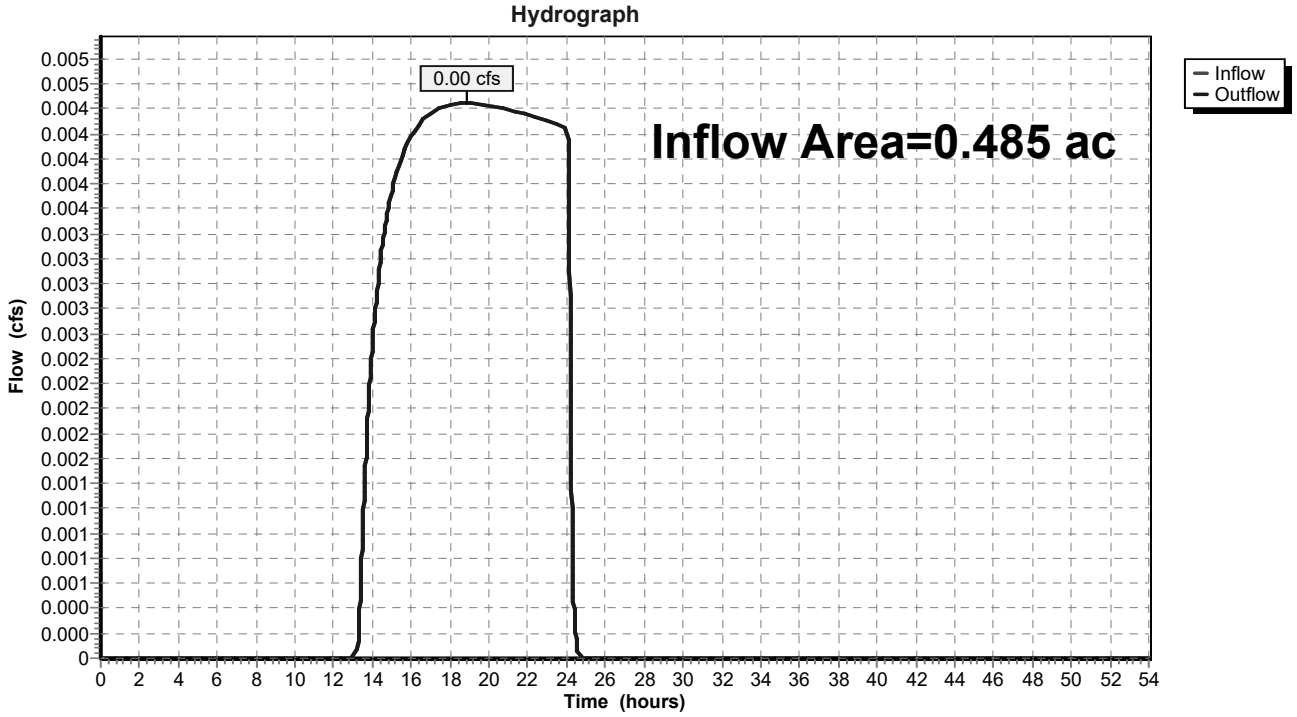


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.09" for 10-yr event
Inflow = 0.00 cfs @ 18.85 hrs, Volume= 0.004 af
Outflow = 0.00 cfs @ 18.85 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



## Summary for Pond SSDS #1: SSDS #1

Inflow Area = 1.017 ac, 79.76% Impervious, Inflow Depth = 3.96" for 10-yr event
Inflow = 5.20 cfs @ 12.04 hrs, Volume= 0.336 af
Outflow = 2.79 cfs @ 12.14 hrs, Volume= 0.329 af, Atten= 46%, Lag= 5.8 min
Primary = 2.79 cfs @ 12.14 hrs, Volume= 0.329 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 71.40' @ 12.14 hrs Surf.Area= 1,530 sf Storage= 2,175 cf

Plug-Flow detention time= 43.0 min calculated for 0.329 af (98% of inflow)
Center-of-Mass det. time= 29.8 min ( 822.2 - 792.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 69.30' | 1,406 cf | **25.25'W x 60.58'L x 3.50'H Field A**<br>5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids |
| #2A | 69.80' | 1,838 cf | **ADS_StormTech SC-740 +Cap** x 40 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>40 Chambers in 5 Rows |
| | | 3,244 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 69.80' | **15.0" Round Culvert**<br>L= 49.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 69.80' / 69.30' S= 0.0102 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf |
| #2 | Device 1 | 69.80' | **12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 72.30' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #4 | Device 1 | 71.50' | **8.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.79 cfs @ 12.14 hrs HW=71.40' (Free Discharge)
└**1=Culvert** (Passes 2.79 cfs of 5.84 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.79 cfs @ 5.59 fps)
  ├**3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └**4=Orifice/Grate** ( Controls 0.00 cfs)

## Pond SSDS #1: SSDS #1 - Chamber Wizard Field A

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

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

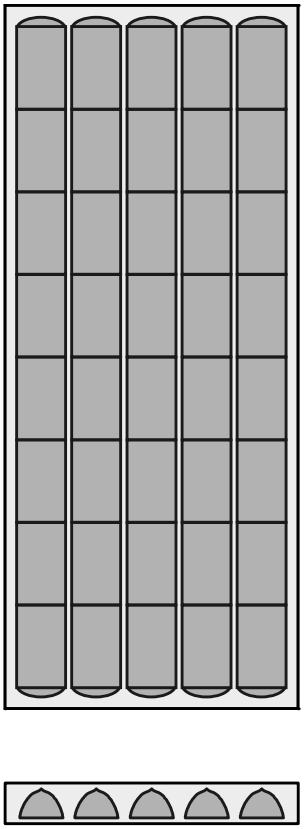
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

40 Chambers x 45.9 cf = 1,837.6 cf Chamber Storage

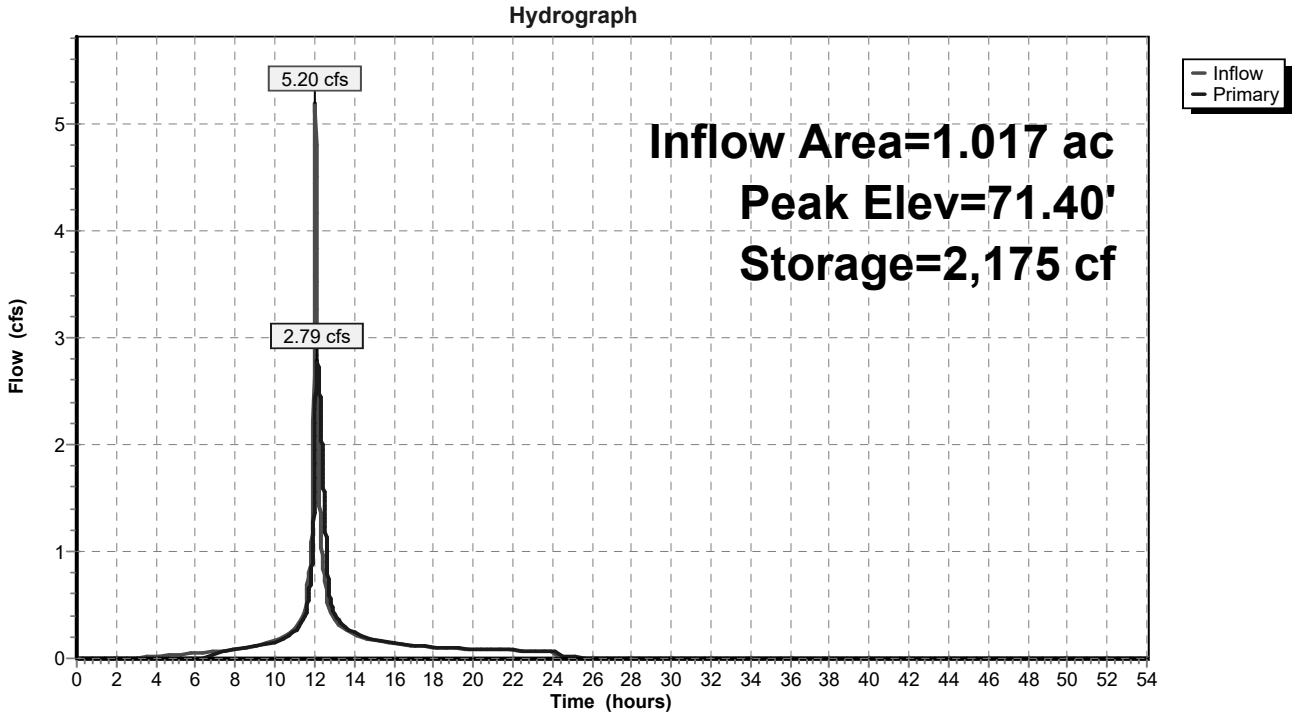
5,353.5 cf Field - 1,837.6 cf Chambers = 3,515.9 cf Stone x 40.0% Voids = 1,406.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,243.9 cf = 0.074 af
Overall Storage Efficiency = 60.6%
Overall System Size = 60.58' x 25.25' x 3.50'

40 Chambers
198.3 cy Field
130.2 cy Stone



## Pond SSDS #1: SSDS #1



## Summary for Pond SSDS #2: SSDS #2

Inflow Area = 8.636 ac, 76.33% Impervious, Inflow Depth = 3.35" for 10-yr event
Inflow = 21.71 cfs @ 12.24 hrs, Volume= 2.408 af
Outflow = 8.57 cfs @ 12.63 hrs, Volume= 2.311 af, Atten= 61%, Lag= 23.7 min
Primary = 8.57 cfs @ 12.63 hrs, Volume= 2.311 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 67.54' @ 12.63 hrs Surf.Area= 14,046 sf Storage= 33,052 cf

Plug-Flow detention time= 106.1 min calculated for 2.311 af (96% of inflow)
Center-of-Mass det. time= 82.5 min ( 916.1 - 833.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 64.25' | 19,315 cf | **65.75'W x 213.63'L x 5.50'H Field A**<br>77,254 cf Overall - 28,966 cf Embedded = 48,288 cf x 40.0% Voids |
| #2A | 65.00' | 28,966 cf | **ADS_StormTech MC-3500 d +Cap**x 261 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>261 Chambers in 9 Rows<br>Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf |
| | | 48,281 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 64.50' | **24.0" Round Culvert**<br>L= 80.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 64.50' / 64.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf |
| #2 | Device 1 | 65.00' | **15.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 68.65' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |

**Primary OutFlow** Max=8.57 cfs @ 12.63 hrs HW=67.54' (Free Discharge)
└**1=Culvert** (Passes 8.57 cfs of 19.73 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 8.57 cfs @ 6.86 fps)
  └**3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SSDS #2: SSDS #2 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)**
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

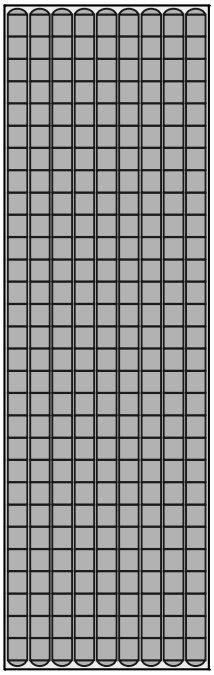
29 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 211.63' Row Length +12.0" End Stone x 2 = 213.63' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

261 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 28,965.7 cf Chamber Storage

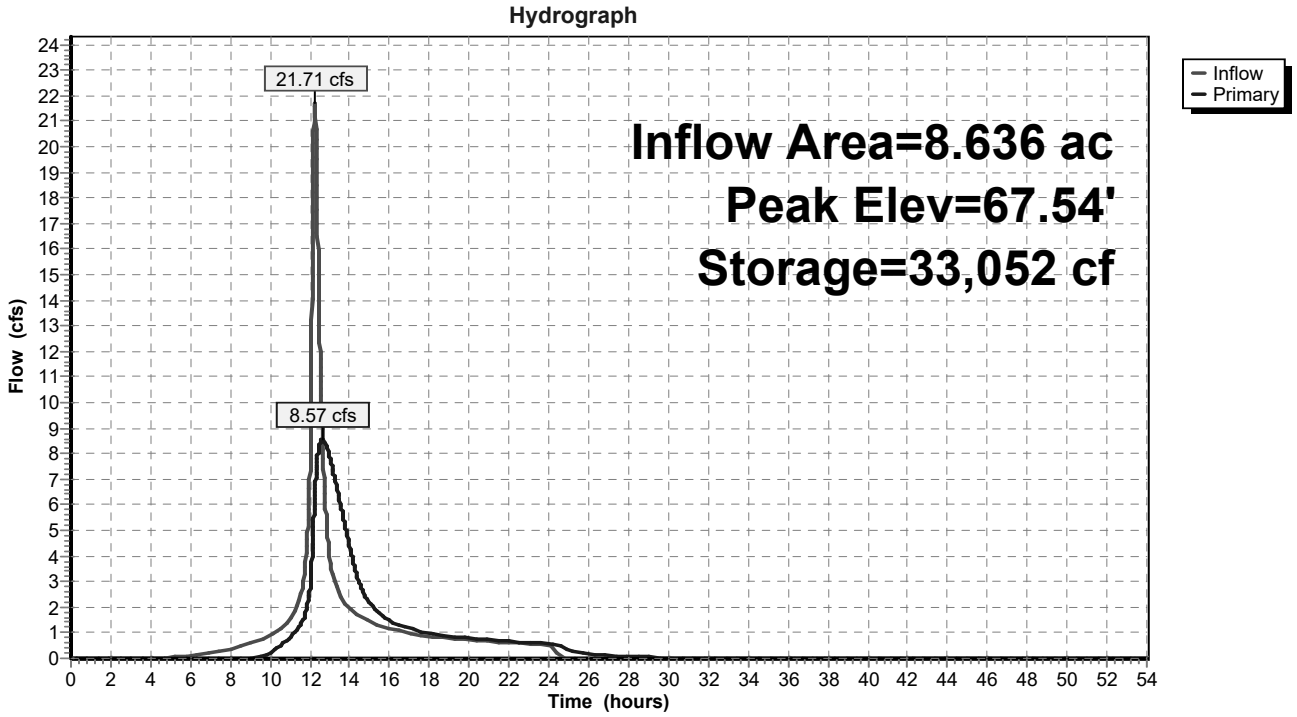
77,253.9 cf Field - 28,965.7 cf Chambers = 48,288.3 cf Stone x 40.0% Voids = 19,315.3 cf Stone Storage

Chamber Storage + Stone Storage = 48,281.0 cf = 1.108 af
Overall Storage Efficiency = 62.5%
Overall System Size = 213.63' x 65.75' x 5.50'

261 Chambers
2,861.3 cy Field
1,788.5 cy Stone



## Pond SSDS #2: SSDS #2



Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PDA-11: Area to CBs SE of** Runoff Area=146,902 sf 57.08% Impervious Runoff Depth=4.28"
Flow Length=248' Tc=9.7 min CN=85 Runoff=16.37 cfs 1.204 af

**Subcatchment PDA-12: Area to SSDS #1** Runoff Area=44,319 sf 79.76% Impervious Runoff Depth=5.05"
Flow Length=186' Tc=6.8 min CN=92 Runoff=6.49 cfs 0.428 af

**Subcatchment PDA-21: Area to CBs SW of** Runoff Area=67,486 sf 66.87% Impervious Runoff Depth=4.61"
Flow Length=176' Tc=18.1 min CN=88 Runoff=5.79 cfs 0.595 af

**Subcatchment PDA-22: Area to SSDS #2** Runoff Area=376,167 sf 76.33% Impervious Runoff Depth=4.39"
Flow Length=1,036' Tc=21.8 min CN=86 Runoff=28.04 cfs 3.159 af

**Subcatchment PDA-31: Area to CBs W of** Runoff Area=229,298 sf 46.81% Impervious Runoff Depth=3.56"
Flow Length=852' Tc=21.8 min CN=78 Runoff=14.07 cfs 1.562 af

**Subcatchment PDA-41: Area Flowing** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.29"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.02 cfs 0.012 af

**Reach DP-1: DP-1** Inflow=19.62 cfs 1.625 af
Outflow=19.62 cfs 1.625 af

**Reach DP-2: DP-2** Inflow=13.21 cfs 3.657 af
Outflow=13.21 cfs 3.657 af

**Reach DP-3: DP-3** Inflow=14.07 cfs 1.562 af
Outflow=14.07 cfs 1.562 af

**Reach DP-4: DP-4** Inflow=0.02 cfs 0.012 af
Outflow=0.02 cfs 0.012 af

**Pond SSDS #1: SSDS #1** Peak Elev=71.87' Storage=2,626 cf Inflow=6.49 cfs 0.428 af
Outflow=3.73 cfs 0.421 af

**Pond SSDS #2: SSDS #2** Peak Elev=68.65' Storage=42,058 cf Inflow=28.04 cfs 3.159 af
Outflow=10.66 cfs 3.063 af

**Total Runoff Area = 20.323 ac Runoff Volume = 6.960 af Average Runoff Depth = 4.11"**
**36.88% Pervious = 7.495 ac 63.12% Impervious = 12.828 ac**

## Summary for Subcatchment PDA-11: Area to CBs SE of Site

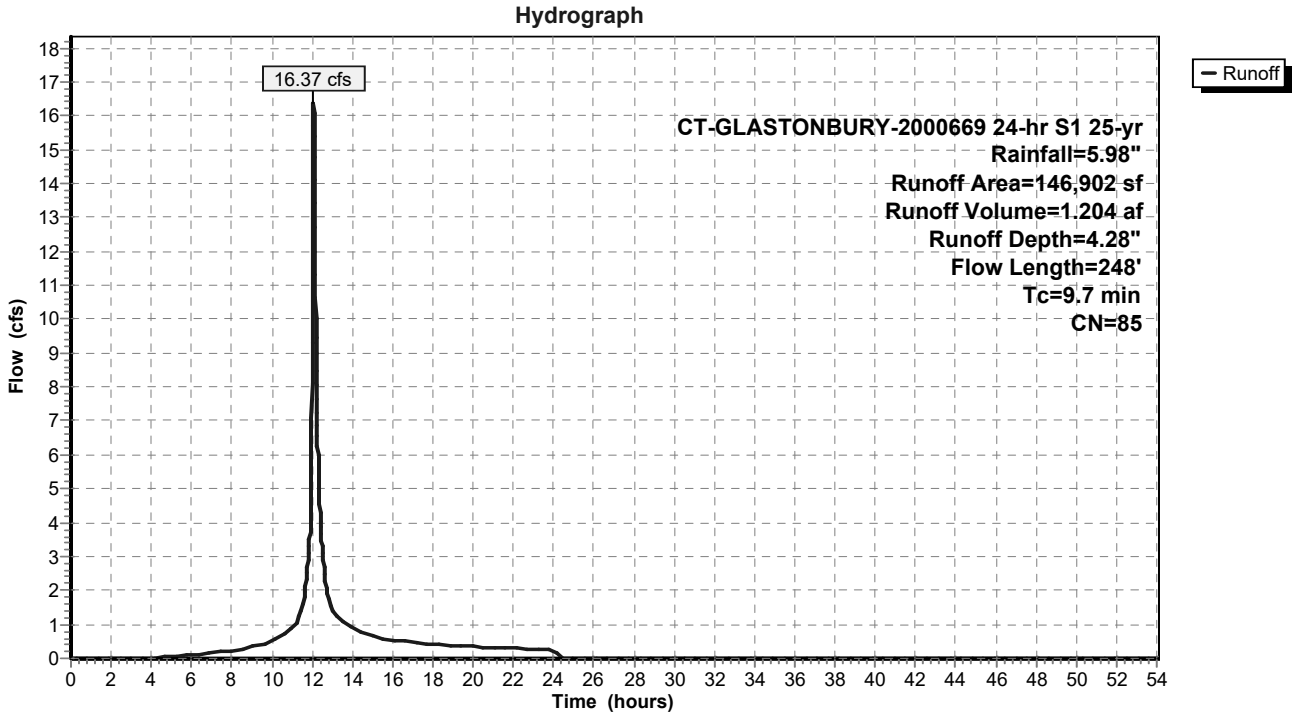
Runoff = 16.37 cfs @ 12.08 hrs, Volume= 1.204 af, Depth= 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 10,998 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 72,861 | 98 | Paved parking, HSG B |
| 55,570 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 146,902 | 85 | Weighted Average |
| 63,043 | | 42.92% Pervious Area |
| 83,859 | | 57.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment PDA-11: Area to CBs SE of Site



## Summary for Subcatchment PDA-12: Area to SSDS #1

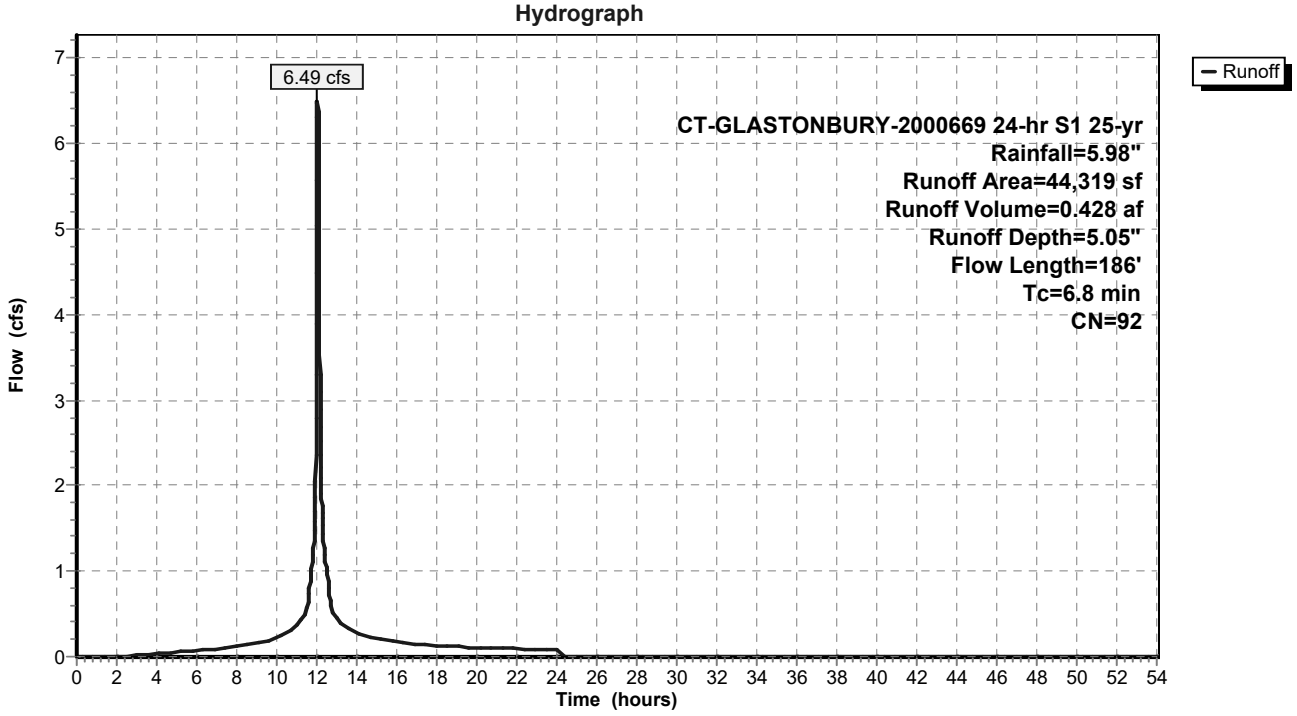
Runoff = 6.49 cfs @ 12.04 hrs, Volume= 0.428 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 35,349 | 98 | Paved parking, HSG B |
| 8,970 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 44,319 | 92 | Weighted Average |
| 8,970 | | 20.24% Pervious Area |
| 35,349 | | 79.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.4 | 77 | 0.0357 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 109 | 0.0415 | 4.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.8 | 186 | Total | | | |

## Subcatchment PDA-12: Area to SSDS #1



## Summary for Subcatchment PDA-21: Area to CBs SW of Site

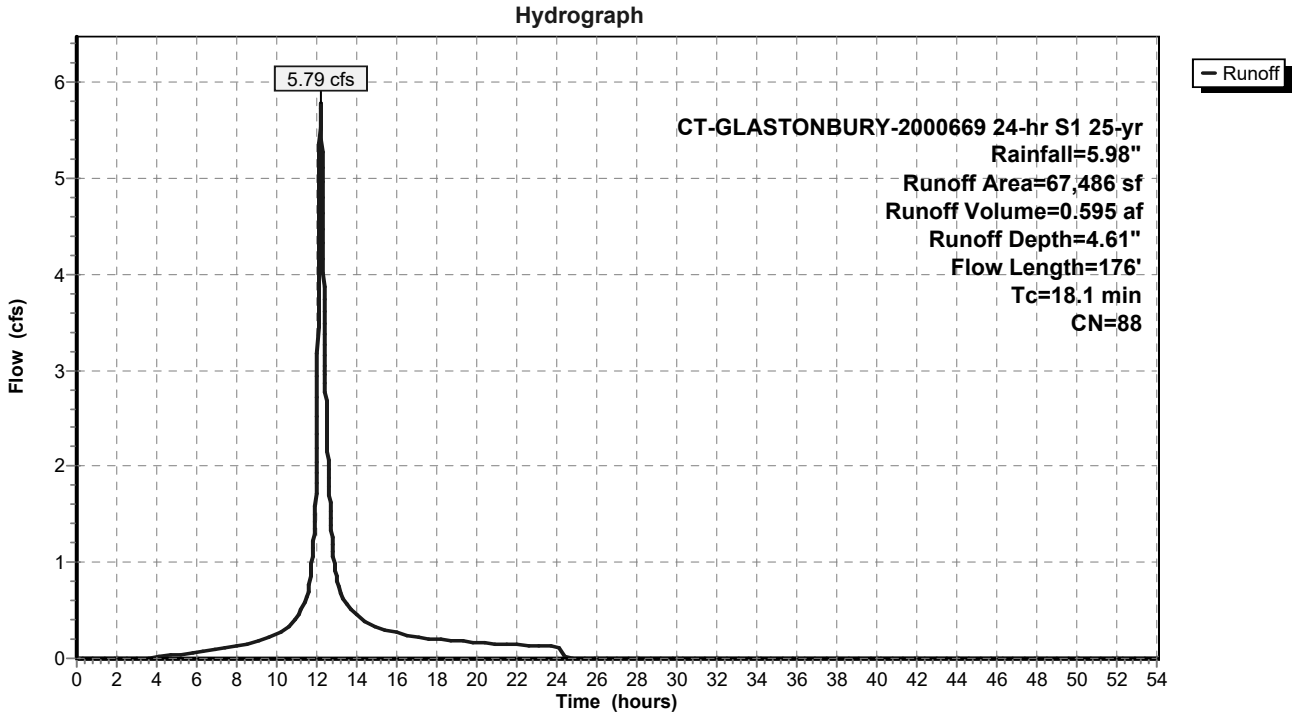
Runoff = 5.79 cfs @ 12.19 hrs, Volume= 0.595 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 45,126 | 98 | Paved parking, HSG B |
| 22,360 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 67,486 | 88 | Weighted Average |
| 22,360 | | 33.13% Pervious Area |
| 45,126 | | 66.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.4 | 100 | 0.0050 | 0.10 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 26 | 0.0050 | 1.06 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.3 | 50 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 18.1 | 176 | Total | | | |

## Subcatchment PDA-21: Area to CBs SW of Site



## Summary for Subcatchment PDA-22: Area to SSDS #2

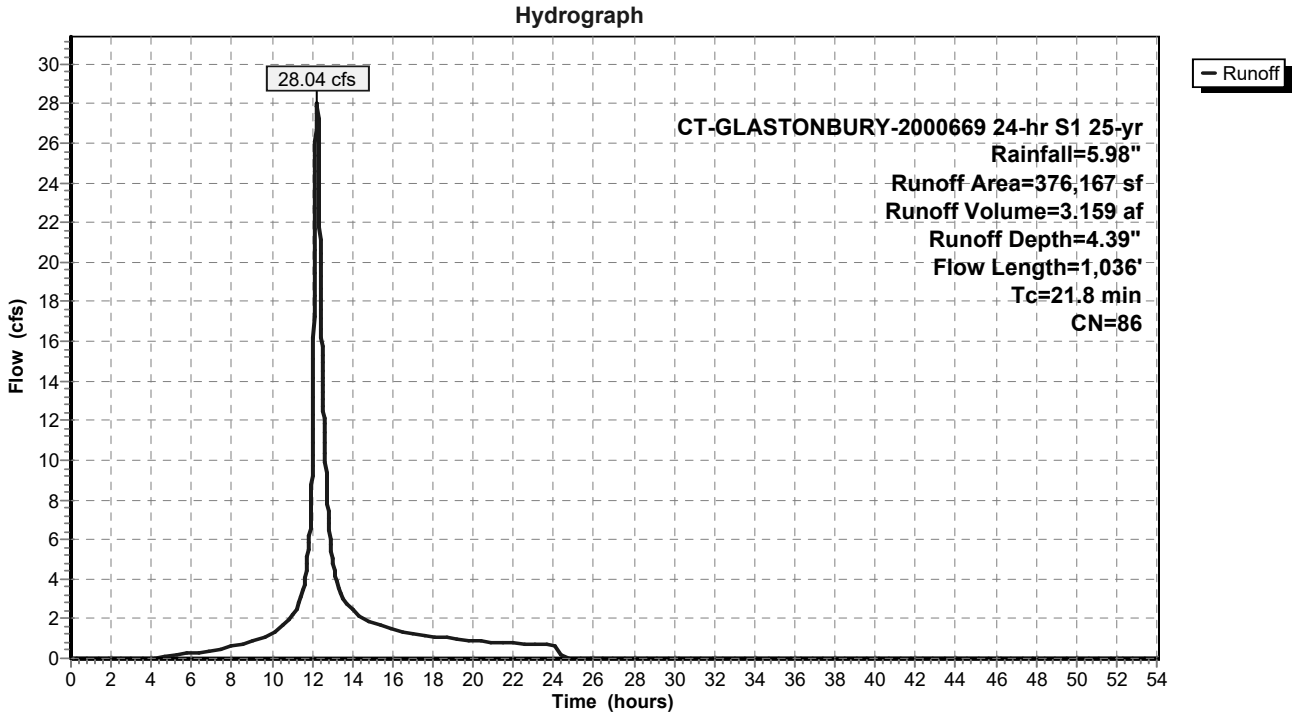
Runoff = 28.04 cfs @ 12.24 hrs, Volume= 3.159 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 18,678 | 98 | Paved parking, HSG A |
| 7,214 | 49 | 50-75% Grass cover, Fair, HSG A |
| 58,835 | 36 | Woods, Fair, HSG A |
| 268,445 | 98 | Paved parking, HSG B |
| 22,808 | 69 | 50-75% Grass cover, Fair, HSG B |
| 187 | 60 | Woods, Fair, HSG B |
| 376,167 | 86 | Weighted Average |
| 89,044 | | 23.67% Pervious Area |
| 287,123 | | 76.33% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 74 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.3 | 219 | 0.0183 | 2.75 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.4 | 643 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 21.8 | 1,036 | Total | | | |

## Subcatchment PDA-22: Area to SSDS #2



## Summary for Subcatchment PDA-31: Area to CBs W of Site

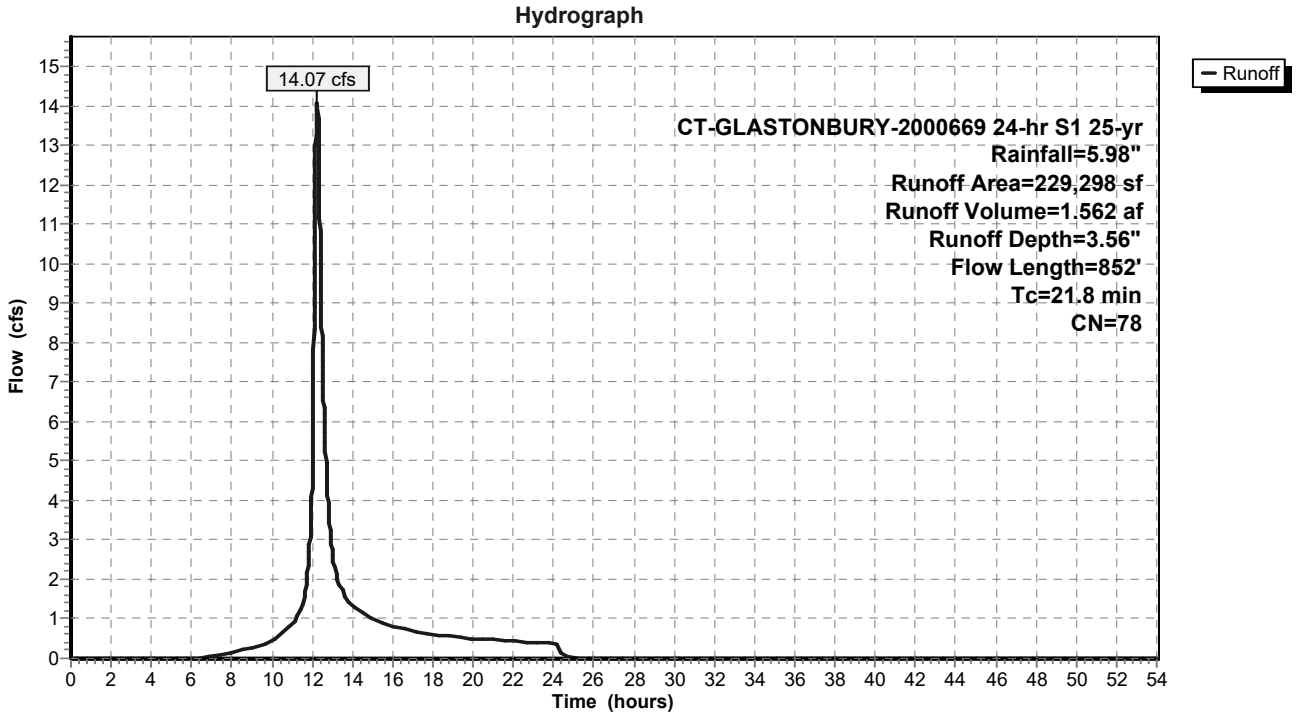
Runoff = 14.07 cfs @ 12.24 hrs, Volume= 1.562 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,342 | 36 | Woods, Fair, HSG A |
| 91,375 | 98 | Paved parking, HSG B |
| 81,933 | 69 | 50-75% Grass cover, Fair, HSG B |
| 2,545 | 60 | Woods, Fair, HSG B |
| 229,298 | 78 | Weighted Average |
| 121,967 | | 53.19% Pervious Area |
| 107,331 | | 46.81% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment PDA-31: Area to CBs W of Site



## Summary for Subcatchment PDA-41: Area Flowing Offsite to the North

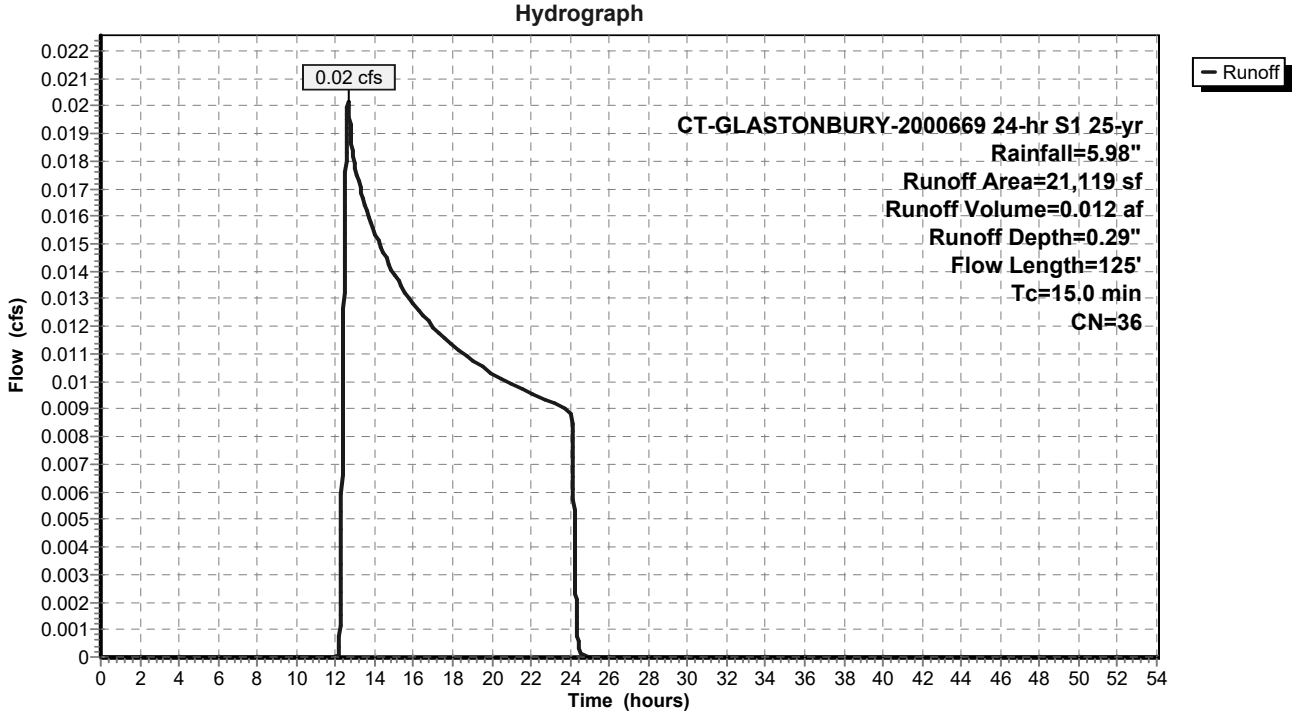
Runoff = 0.02 cfs @ 12.64 hrs, Volume= 0.012 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 25-yr Rainfall=5.98"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment PDA-41: Area Flowing Offsite to the North

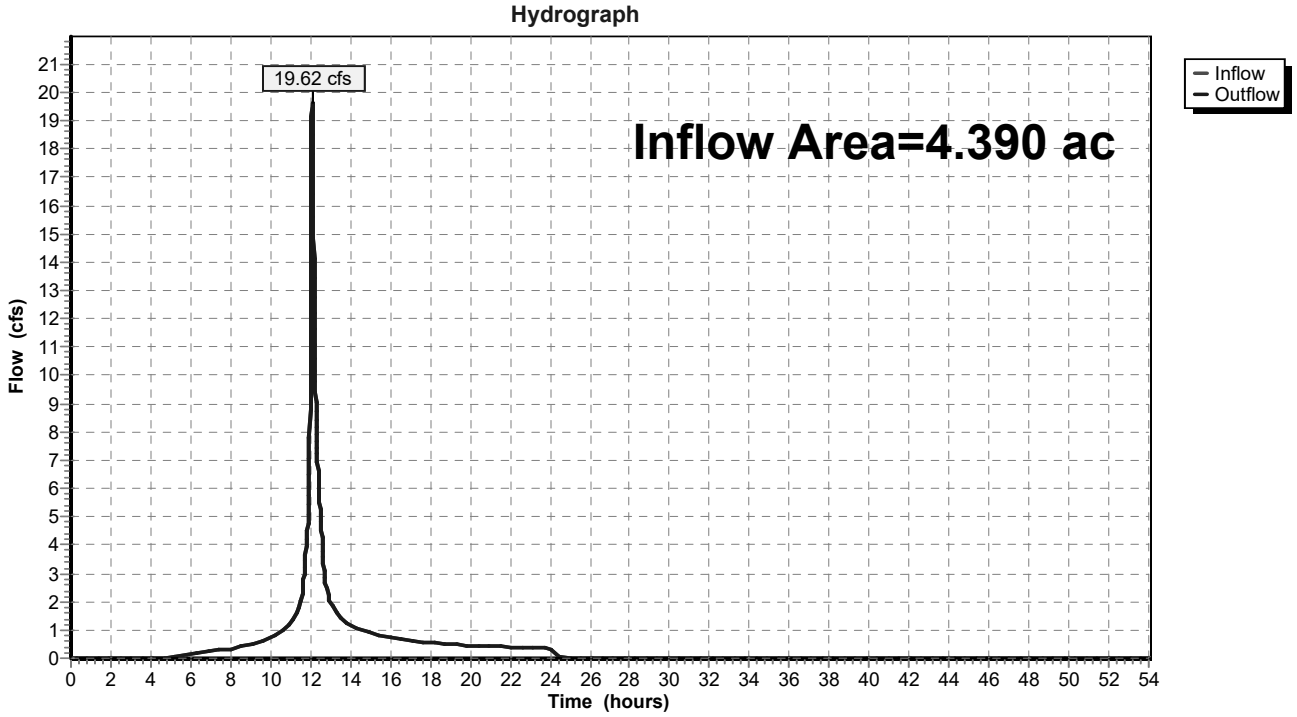


## Summary for Reach DP-1: DP-1

Inflow Area = 4.390 ac, 62.34% Impervious, Inflow Depth = 4.44" for 25-yr event
Inflow = 19.62 cfs @ 12.09 hrs, Volume= 1.625 af
Outflow = 19.62 cfs @ 12.09 hrs, Volume= 1.625 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

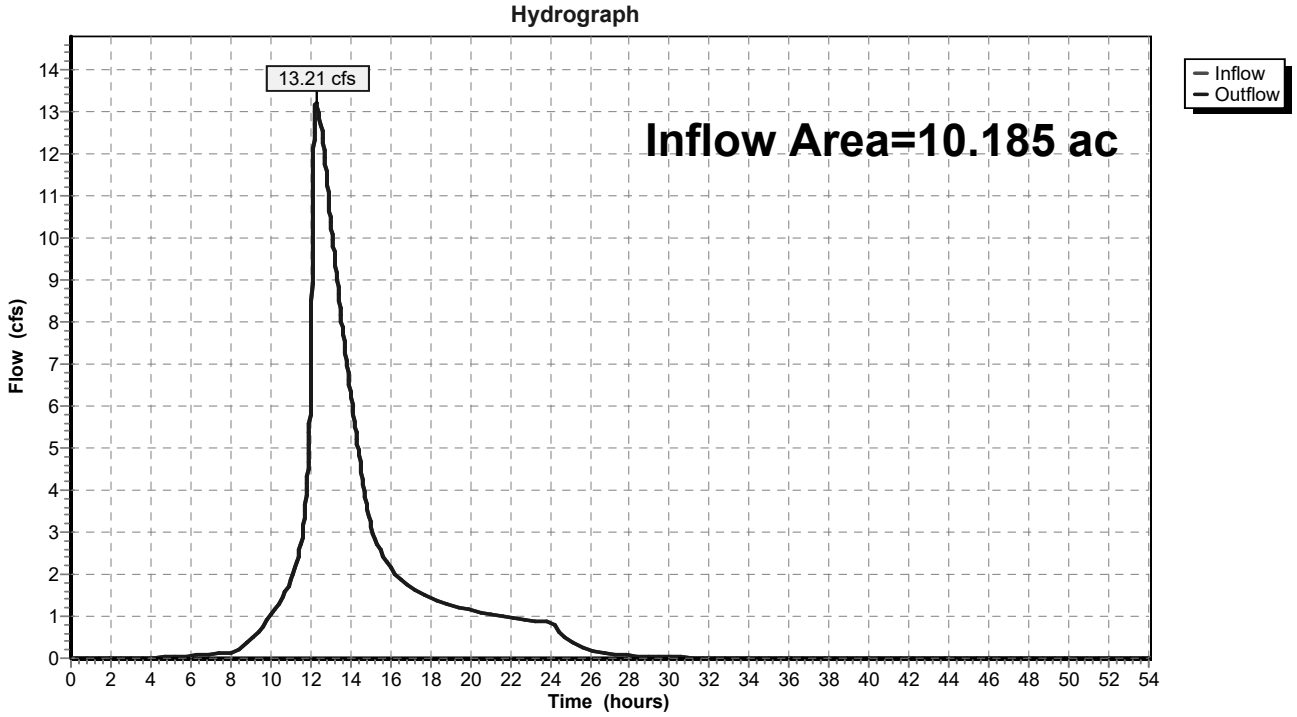


## Summary for Reach DP-2: DP-2

Inflow Area = 10.185 ac, 74.89% Impervious, Inflow Depth = 4.31" for 25-yr event
Inflow = 13.21 cfs @ 12.27 hrs, Volume= 3.657 af
Outflow = 13.21 cfs @ 12.27 hrs, Volume= 3.657 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

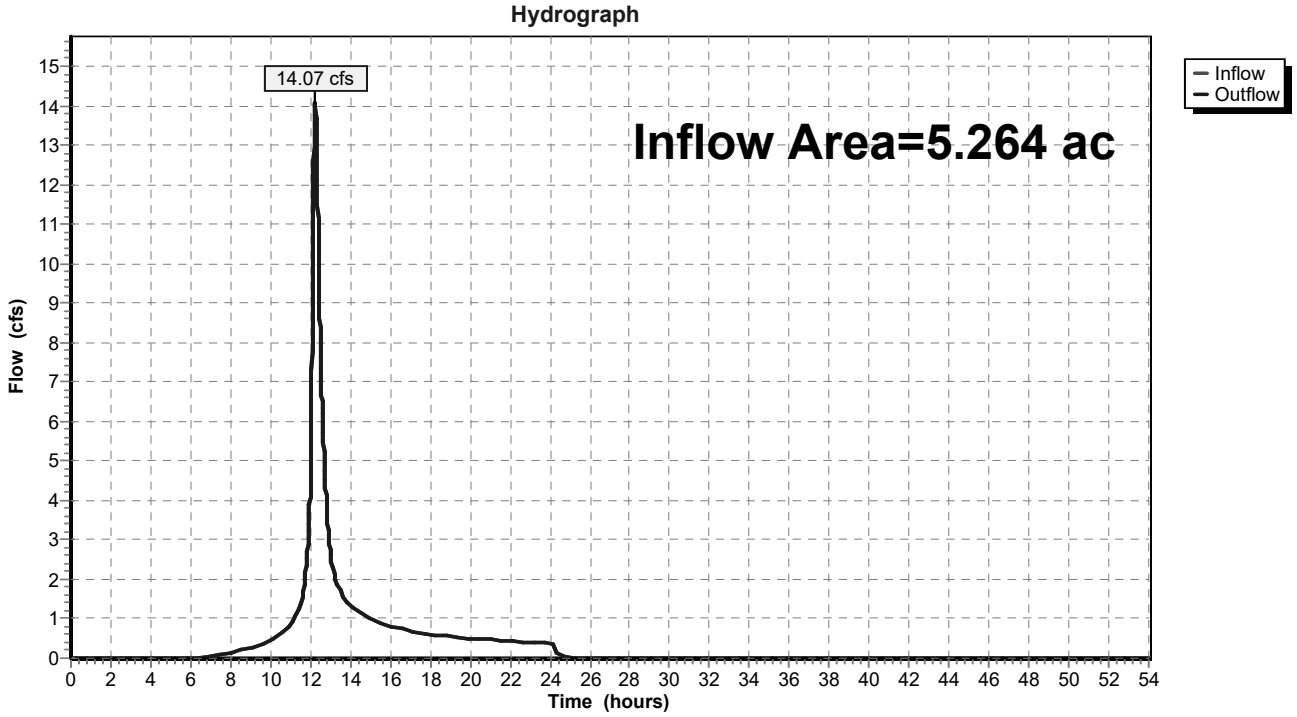


## Summary for Reach DP-3: DP-3

Inflow Area = 5.264 ac, 46.81% Impervious, Inflow Depth = 3.56" for 25-yr event
Inflow = 14.07 cfs @ 12.24 hrs, Volume= 1.562 af
Outflow = 14.07 cfs @ 12.24 hrs, Volume= 1.562 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

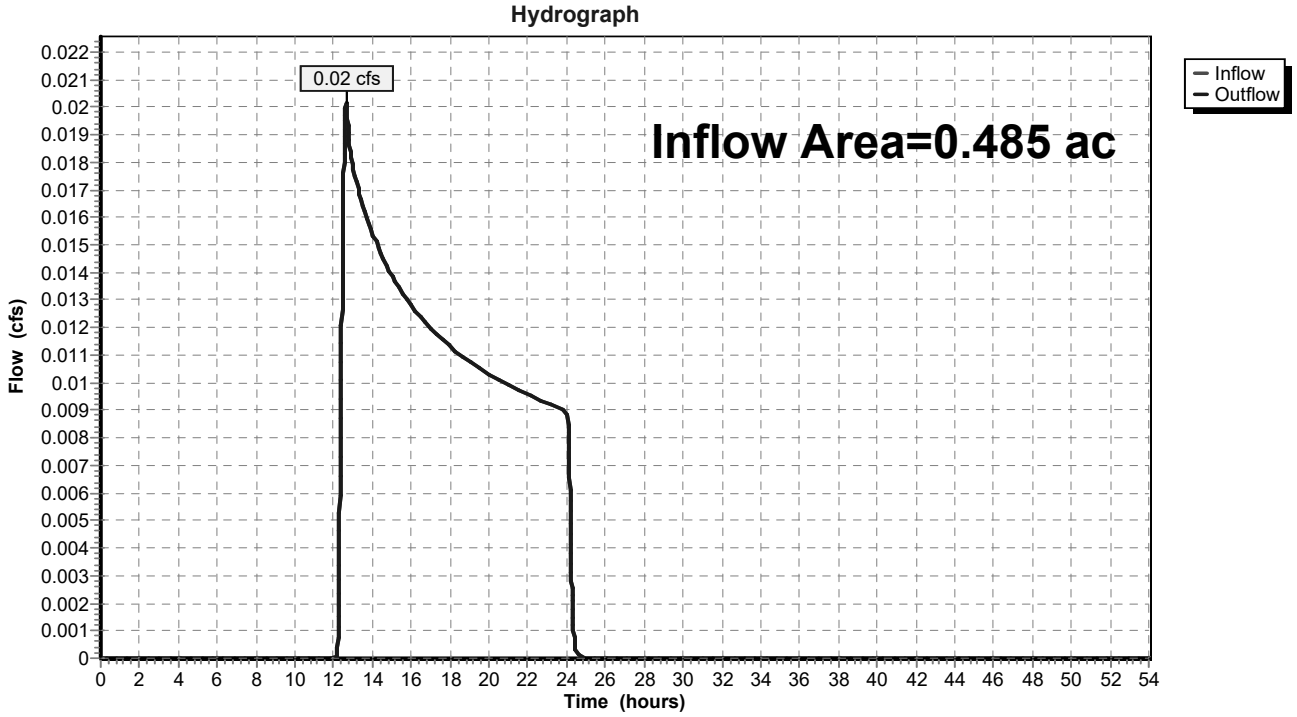


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.29" for 25-yr event
Inflow = 0.02 cfs @ 12.64 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 12.64 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



## Summary for Pond SSDS #1: SSDS #1

Inflow Area = 1.017 ac, 79.76% Impervious, Inflow Depth = 5.05" for 25-yr event
Inflow = 6.49 cfs @ 12.04 hrs, Volume= 0.428 af
Outflow = 3.73 cfs @ 12.13 hrs, Volume= 0.421 af, Atten= 43%, Lag= 5.2 min
Primary = 3.73 cfs @ 12.13 hrs, Volume= 0.421 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 71.87' @ 12.13 hrs Surf.Area= 1,530 sf Storage= 2,626 cf

Plug-Flow detention time= 37.1 min calculated for 0.421 af (98% of inflow)
Center-of-Mass det. time= 26.7 min ( 811.5 - 784.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 69.30' | 1,406 cf | **25.25'W x 60.58'L x 3.50'H Field A**<br>5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids |
| #2A | 69.80' | 1,838 cf | **ADS_StormTech SC-740 +Cap** x 40 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>40 Chambers in 5 Rows |
| | | 3,244 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 69.80' | **15.0" Round Culvert**<br>L= 49.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 69.80' / 69.30' S= 0.0102 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf |
| #2 | Device 1 | 69.80' | **12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 72.30' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #4 | Device 1 | 71.50' | **8.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=3.73 cfs @ 12.13 hrs HW=71.87' (Free Discharge)
└**1=Culvert** (Passes 3.73 cfs of 7.10 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 3.25 cfs @ 6.49 fps)
├**3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
└**4=Orifice/Grate** (Orifice Controls 0.48 cfs @ 1.95 fps)

## Pond SSDS #1: SSDS #1 - Chamber Wizard Field A

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

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

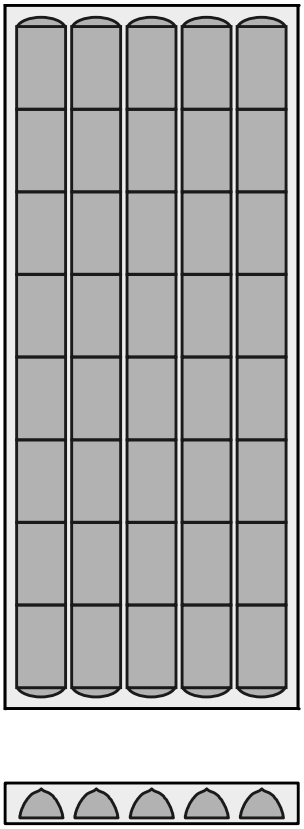
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

40 Chambers x 45.9 cf = 1,837.6 cf Chamber Storage

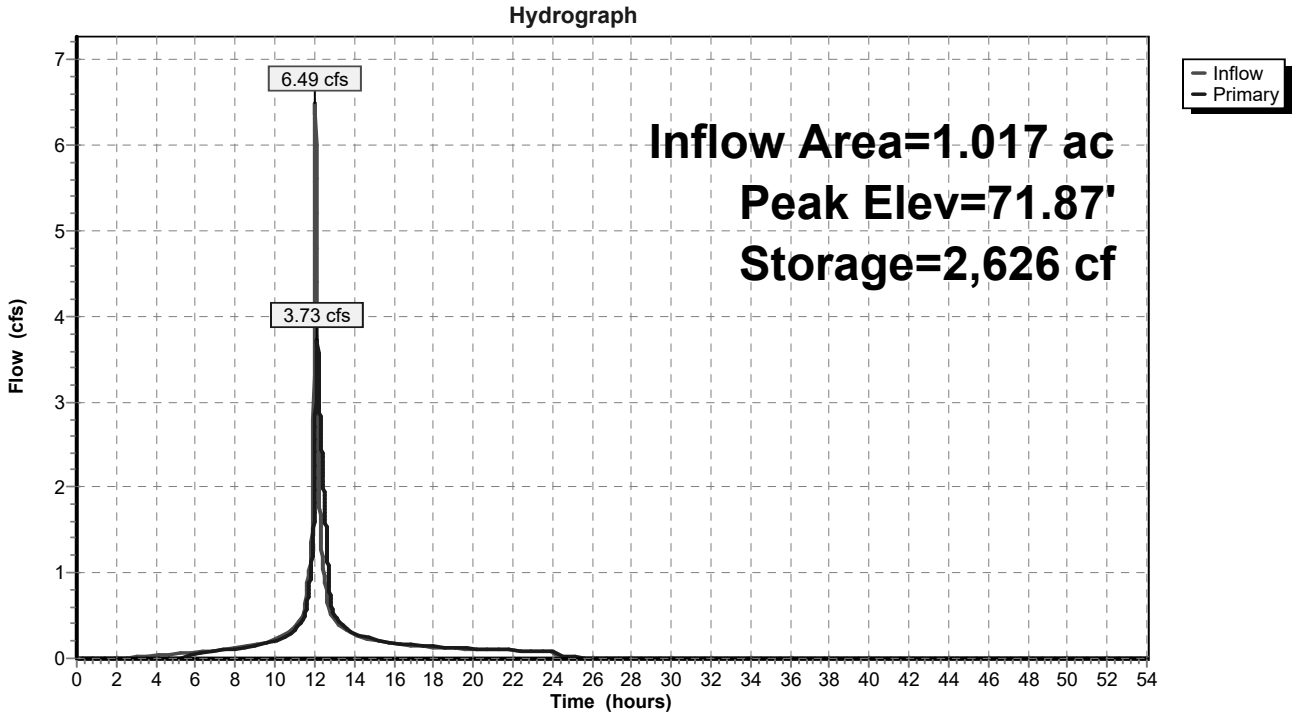
5,353.5 cf Field - 1,837.6 cf Chambers = 3,515.9 cf Stone x 40.0% Voids = 1,406.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,243.9 cf = 0.074 af
Overall Storage Efficiency = 60.6%
Overall System Size = 60.58' x 25.25' x 3.50'

40 Chambers
198.3 cy Field
130.2 cy Stone



## Pond SSDS #1: SSDS #1



## Summary for Pond SSDS #2: SSDS #2

Inflow Area = 8.636 ac, 76.33% Impervious, Inflow Depth = 4.39" for 25-yr event
Inflow = 28.04 cfs @ 12.24 hrs, Volume= 3.159 af
Outflow = 10.66 cfs @ 12.64 hrs, Volume= 3.063 af, Atten= 62%, Lag= 24.4 min
Primary = 10.66 cfs @ 12.64 hrs, Volume= 3.063 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 68.65' @ 12.64 hrs Surf.Area= 14,046 sf Storage= 42,058 cf

Plug-Flow detention time= 97.0 min calculated for 3.063 af (97% of inflow)
Center-of-Mass det. time= 78.5 min ( 903.0 - 824.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 64.25' | 19,315 cf | **65.75'W x 213.63'L x 5.50'H Field A**<br>77,254 cf Overall - 28,966 cf Embedded = 48,288 cf x 40.0% Voids |
| #2A | 65.00' | 28,966 cf | **ADS_StormTech MC-3500 d +Cap**x 261 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>261 Chambers in 9 Rows<br>Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf |
| | | 48,281 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 64.50' | **24.0" Round Culvert**<br>L= 80.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 64.50' / 64.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf |
| #2 | Device 1 | 65.00' | **15.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 68.65' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |

**Primary OutFlow** Max=10.66 cfs @ 12.64 hrs HW=68.64' (Free Discharge)
└**1=Culvert** (Passes 10.66 cfs of 26.24 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 10.66 cfs @ 8.53 fps)
  └**3=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SSDS #2: SSDS #2 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)**
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

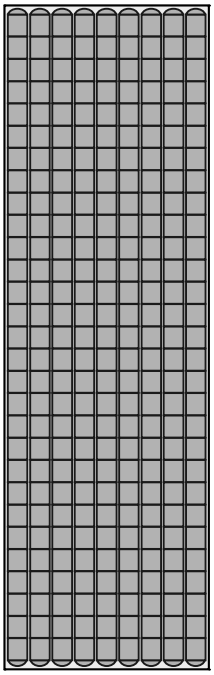
29 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 211.63' Row Length +12.0" End Stone x 2 = 213.63' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

261 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 28,965.7 cf Chamber Storage

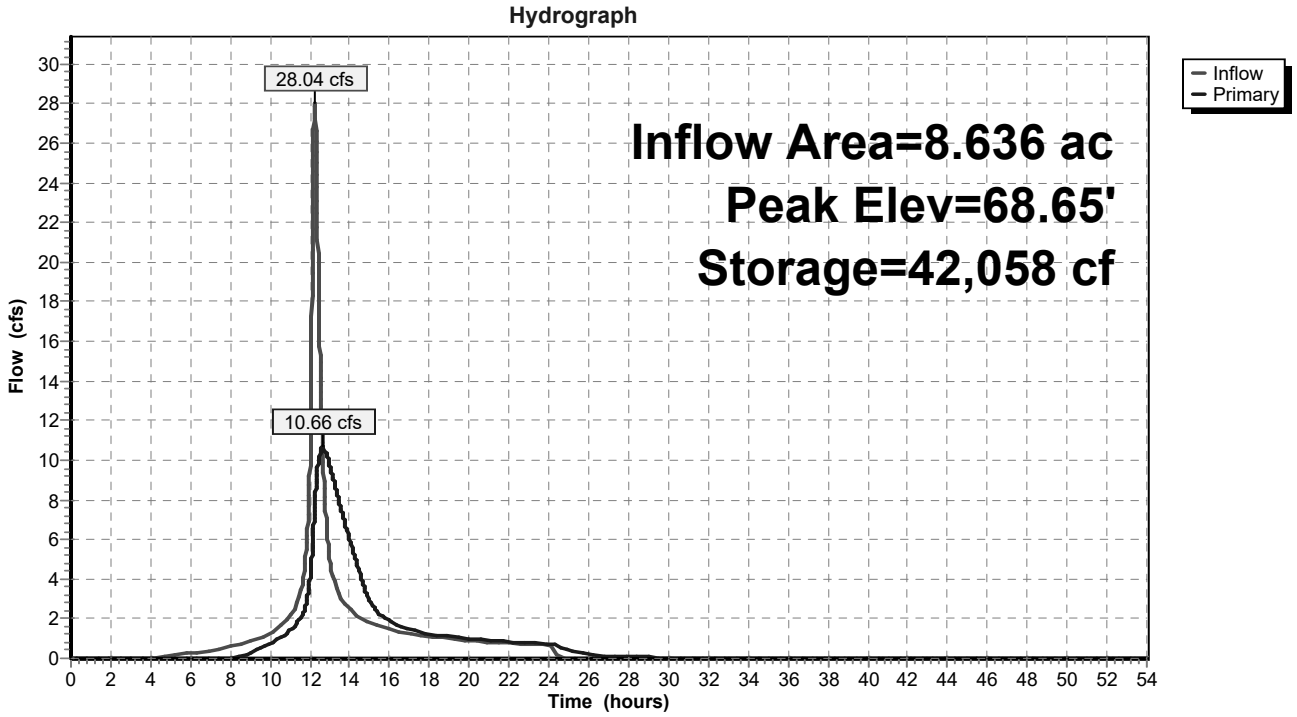
77,253.9 cf Field - 28,965.7 cf Chambers = 48,288.3 cf Stone x 40.0% Voids = 19,315.3 cf Stone Storage

Chamber Storage + Stone Storage = 48,281.0 cf = 1.108 af
Overall Storage Efficiency = 62.5%
Overall System Size = 213.63' x 65.75' x 5.50'

261 Chambers
2,861.3 cy Field
1,788.5 cy Stone



## Pond SSDS #2: SSDS #2



Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PDA-11: Area to CBs SE of** Runoff Area=146,902 sf 57.08% Impervious Runoff Depth=5.91"
Flow Length=248' Tc=9.7 min CN=85 Runoff=22.16 cfs 1.662 af

**Subcatchment PDA-12: Area to SSDS #1** Runoff Area=44,319 sf 79.76% Impervious Runoff Depth=6.74"
Flow Length=186' Tc=6.8 min CN=92 Runoff=8.46 cfs 0.571 af

**Subcatchment PDA-21: Area to CBs SW of** Runoff Area=67,486 sf 66.87% Impervious Runoff Depth=6.27"
Flow Length=176' Tc=18.1 min CN=88 Runoff=7.70 cfs 0.809 af

**Subcatchment PDA-22: Area to SSDS #2** Runoff Area=376,167 sf 76.33% Impervious Runoff Depth=6.03"
Flow Length=1,036' Tc=21.8 min CN=86 Runoff=37.74 cfs 4.340 af

**Subcatchment PDA-31: Area to CBs W of** Runoff Area=229,298 sf 46.81% Impervious Runoff Depth=5.11"
Flow Length=852' Tc=21.8 min CN=78 Runoff=19.95 cfs 2.239 af

**Subcatchment PDA-41: Area Flowing** Runoff Area=21,119 sf 0.00% Impervious Runoff Depth=0.78"
Flow Length=125' Tc=15.0 min CN=36 Runoff=0.13 cfs 0.032 af

**Reach DP-1: DP-1** Inflow=28.20 cfs 2.226 af
Outflow=28.20 cfs 2.226 af

**Reach DP-2: DP-2** Inflow=28.81 cfs 5.052 af
Outflow=28.81 cfs 5.052 af

**Reach DP-3: DP-3** Inflow=19.95 cfs 2.239 af
Outflow=19.95 cfs 2.239 af

**Reach DP-4: DP-4** Inflow=0.13 cfs 0.032 af
Outflow=0.13 cfs 0.032 af

**Pond SSDS #1: SSDS #1** Peak Elev=72.50' Storage=3,063 cf Inflow=8.46 cfs 0.571 af
Outflow=6.36 cfs 0.564 af

**Pond SSDS #2: SSDS #2** Peak Elev=69.66' Storage=47,768 cf Inflow=37.74 cfs 4.340 af
Outflow=24.85 cfs 4.243 af

**Total Runoff Area = 20.323 ac Runoff Volume = 9.653 af Average Runoff Depth = 5.70"**
**36.88% Pervious = 7.495 ac 63.12% Impervious = 12.828 ac**

## Summary for Subcatchment PDA-11: Area to CBs SE of Site

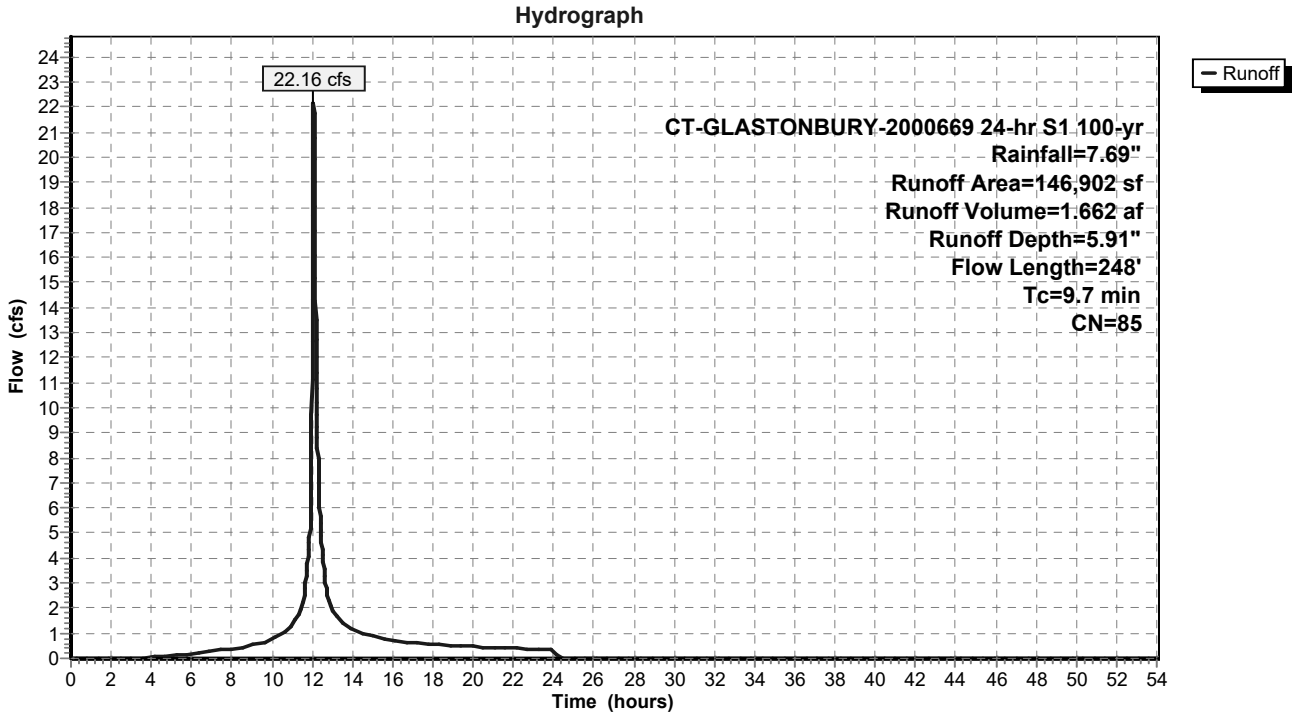
Runoff = 22.16 cfs @ 12.08 hrs, Volume= 1.662 af, Depth= 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 10,998 | 98 | Paved parking, HSG A |
| 7,473 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 72,861 | 98 | Paved parking, HSG B |
| 55,570 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 146,902 | 85 | Weighted Average |
| 63,043 | | 42.92% Pervious Area |
| 83,859 | | 57.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 100 | 0.0260 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 71 | 0.0408 | 3.03 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.1 | 13 | 0.0385 | 3.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 64 | 0.0125 | 6.38 | 7.82 | **Pipe Channel, RCP_Round 15"** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 9.7 | 248 | Total | | | |

## Subcatchment PDA-11: Area to CBs SE of Site



## Summary for Subcatchment PDA-12: Area to SSDS #1

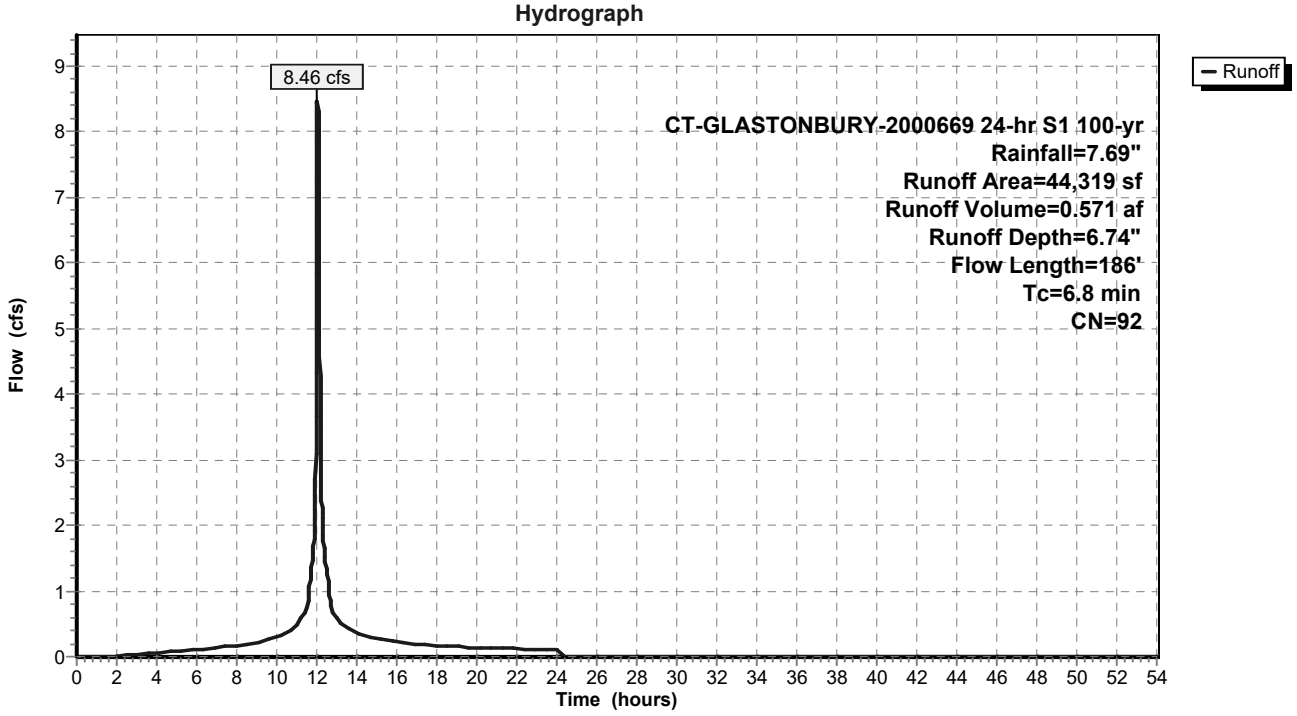
Runoff = 8.46 cfs @ 12.04 hrs, Volume= 0.571 af, Depth= 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 35,349 | 98 | Paved parking, HSG B |
| 8,970 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 44,319 | 92 | Weighted Average |
| 8,970 | | 20.24% Pervious Area |
| 35,349 | | 79.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.4 | 77 | 0.0357 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 109 | 0.0415 | 4.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.8 | 186 | Total | | | |

## Subcatchment PDA-12: Area to SSDS #1



## Summary for Subcatchment PDA-21: Area to CBs SW of Site

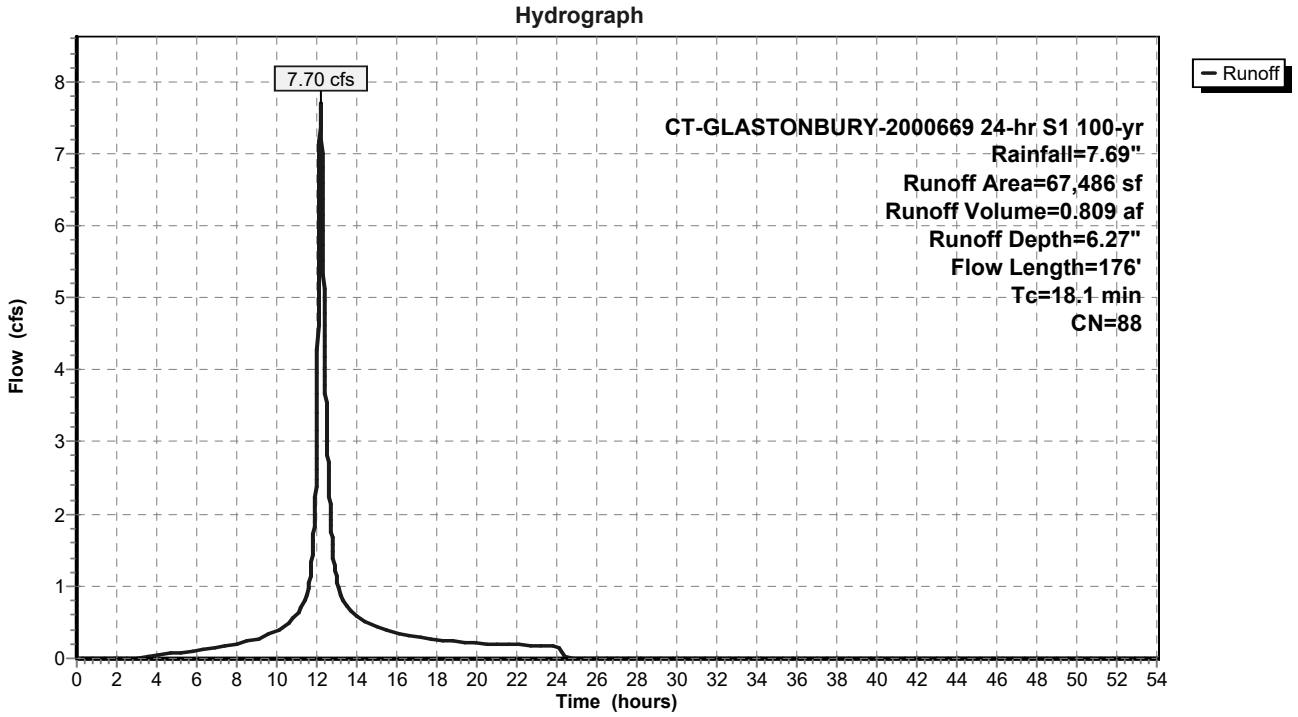
Runoff = 7.70 cfs @ 12.19 hrs, Volume= 0.809 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 0 | 36 | Woods, Fair, HSG A |
| 45,126 | 98 | Paved parking, HSG B |
| 22,360 | 69 | 50-75% Grass cover, Fair, HSG B |
| 0 | 60 | Woods, Fair, HSG B |
| 67,486 | 88 | Weighted Average |
| 22,360 | | 33.13% Pervious Area |
| 45,126 | | 66.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.4 | 100 | 0.0050 | 0.10 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.09" |
| 0.4 | 26 | 0.0050 | 1.06 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 0.3 | 50 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 18.1 | 176 | Total | | | |

## Subcatchment PDA-21: Area to CBs SW of Site



## Summary for Subcatchment PDA-22: Area to SSDS #2

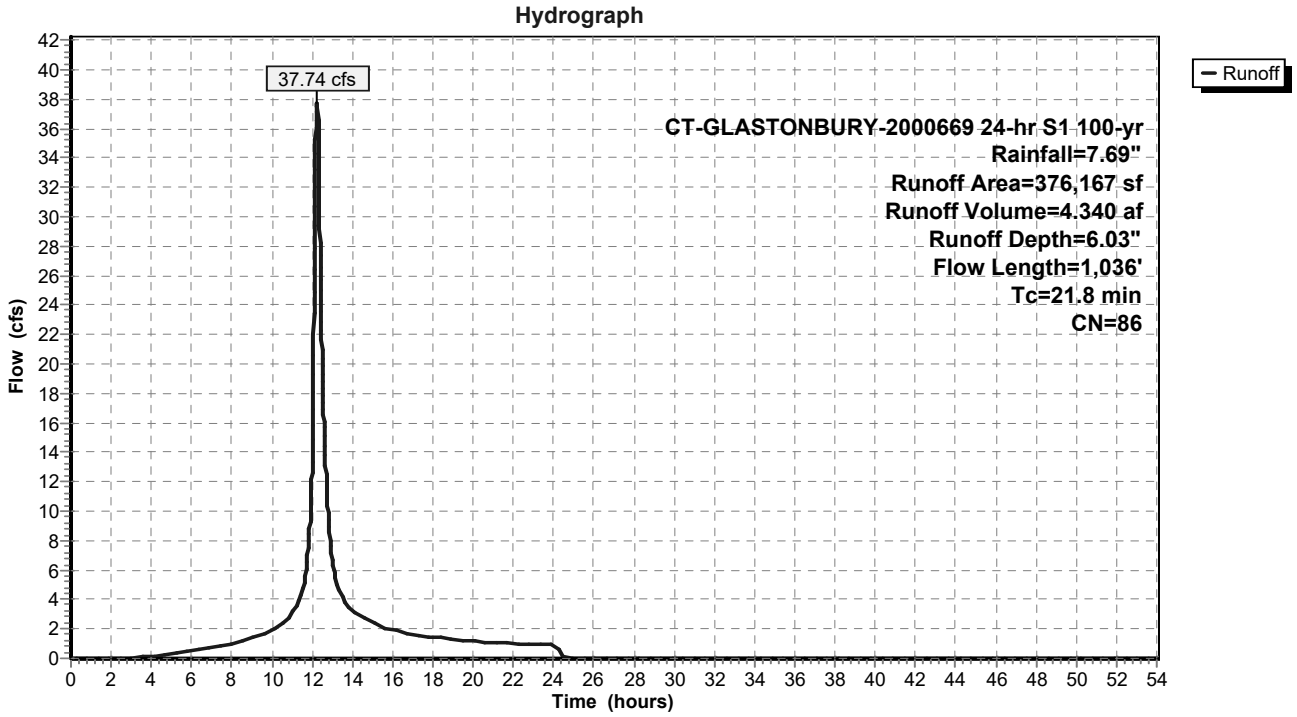
Runoff = 37.74 cfs @ 12.24 hrs, Volume= 4.340 af, Depth= 6.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 18,678 | 98 | Paved parking, HSG A |
| 7,214 | 49 | 50-75% Grass cover, Fair, HSG A |
| 58,835 | 36 | Woods, Fair, HSG A |
| 268,445 | 98 | Paved parking, HSG B |
| 22,808 | 69 | 50-75% Grass cover, Fair, HSG B |
| 187 | 60 | Woods, Fair, HSG B |
| 376,167 | 86 | Weighted Average |
| 89,044 | | 23.67% Pervious Area |
| 287,123 | | 76.33% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.6 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 74 | 0.2894 | 2.69 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.3 | 219 | 0.0183 | 2.75 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.4 | 643 | 0.0100 | 7.80 | 24.51 | **Pipe Channel, RCP_Round 24"** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 Concrete pipe, finished |
| 21.8 | 1,036 | Total | | | |

## Subcatchment PDA-22: Area to SSDS #2



## Summary for Subcatchment PDA-31: Area to CBs W of Site

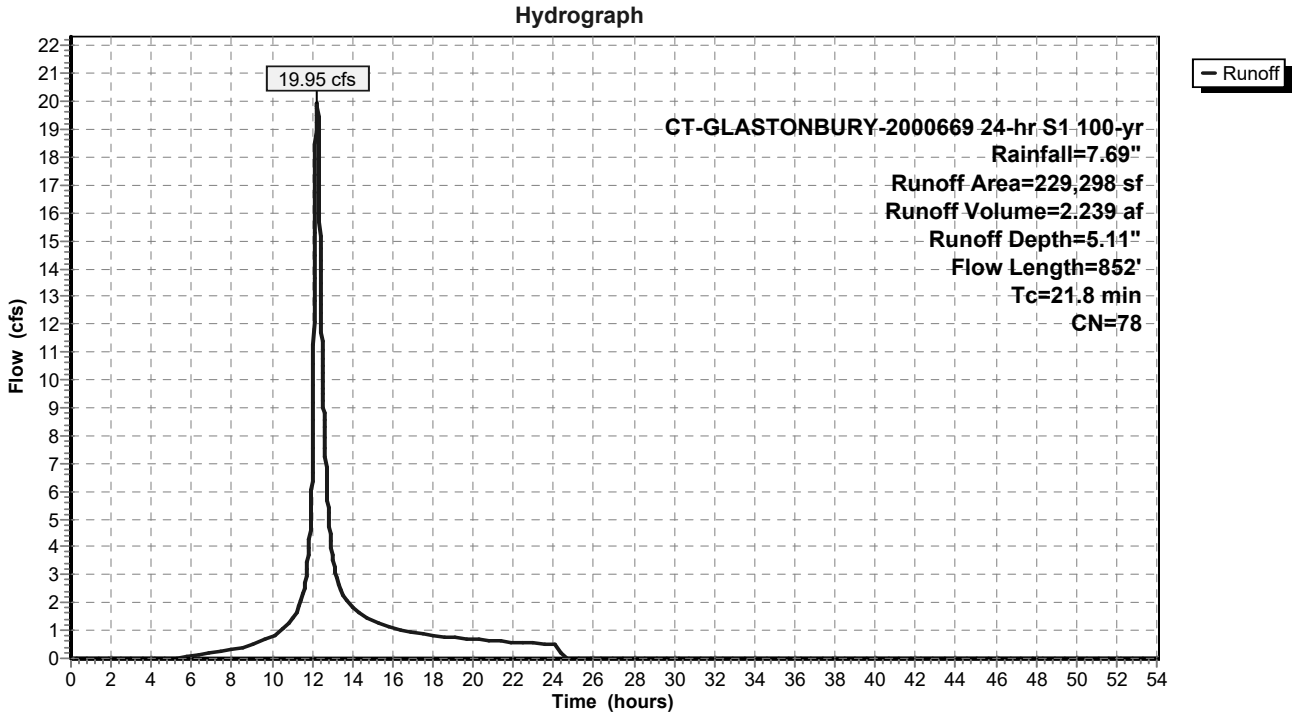
Runoff = 19.95 cfs @ 12.24 hrs, Volume= 2.239 af, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 15,956 | 98 | Paved parking, HSG A |
| 16,147 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,342 | 36 | Woods, Fair, HSG A |
| 91,375 | 98 | Paved parking, HSG B |
| 81,933 | 69 | 50-75% Grass cover, Fair, HSG B |
| 2,545 | 60 | Woods, Fair, HSG B |
| 229,298 | 78 | Weighted Average |
| 121,967 | | 53.19% Pervious Area |
| 107,331 | | 46.81% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 90 | 0.0222 | 0.08 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.5 | 85 | 0.0353 | 2.82 | | **Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps |
| 2.0 | 677 | 0.0100 | 5.70 | 7.00 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished |
| 21.8 | 852 | Total | | | |

## Subcatchment PDA-31: Area to CBs W of Site



## Summary for Subcatchment PDA-41: Area Flowing Offsite to the North

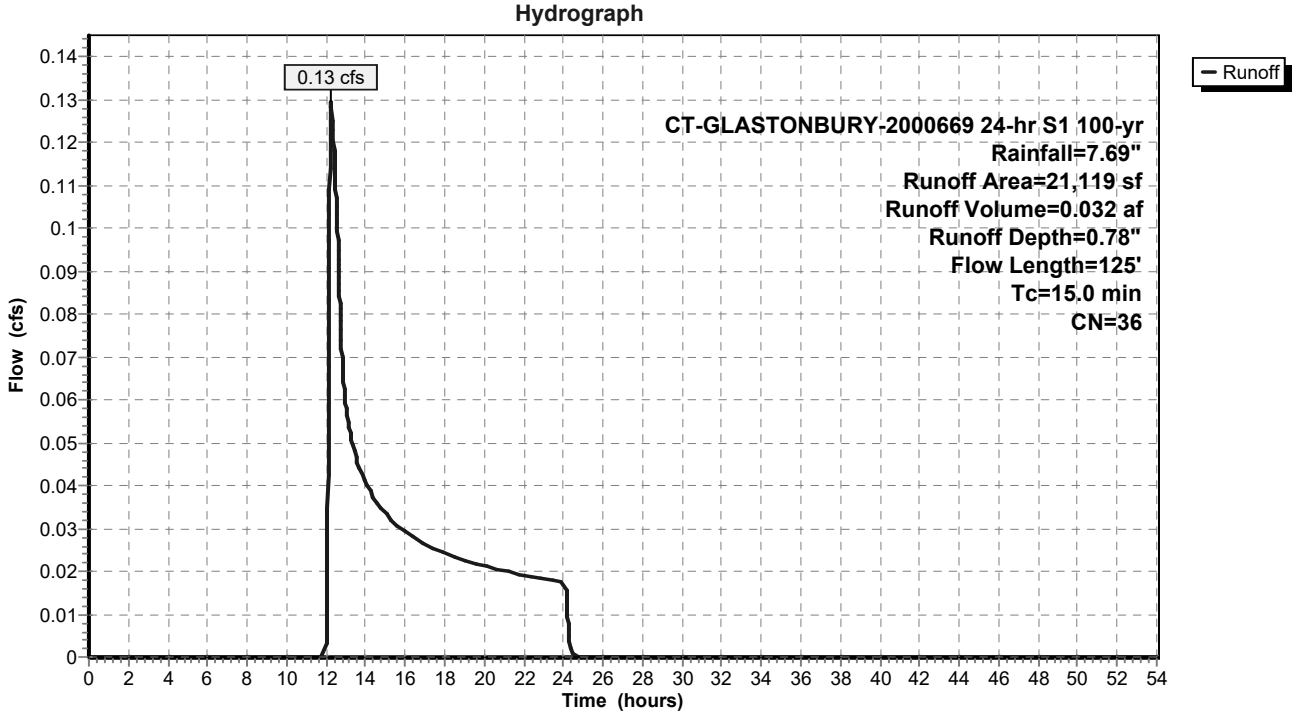
Runoff = 0.13 cfs @ 12.25 hrs, Volume= 0.032 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT-GLASTONBURY-2000669 24-hr S1 100-yr Rainfall=7.69"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Paved parking, HSG A |
| 0 | 49 | 50-75% Grass cover, Fair, HSG A |
| 21,040 | 36 | Woods, Fair, HSG A |
| 0 | 98 | Paved parking, HSG B |
| 0 | 69 | 50-75% Grass cover, Fair, HSG B |
| 79 | 60 | Woods, Fair, HSG B |
| 21,119 | 36 | Weighted Average |
| 21,119 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 30 | 0.0333 | 0.07 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 8.0 | 70 | 0.1214 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.09" |
| 0.2 | 25 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 15.0 | 125 | Total | | | |

## Subcatchment PDA-41: Area Flowing Offsite to the North

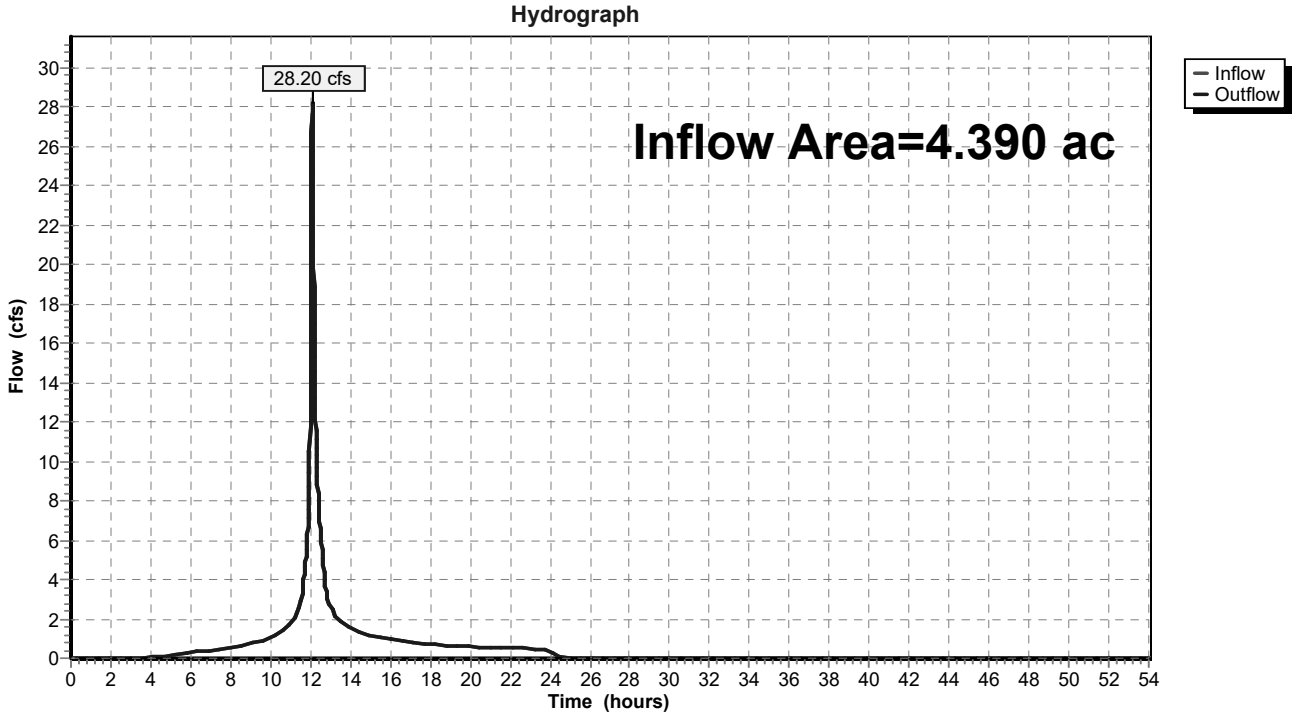


## Summary for Reach DP-1: DP-1

Inflow Area = 4.390 ac, 62.34% Impervious, Inflow Depth = 6.09" for 100-yr event
Inflow = 28.20 cfs @ 12.09 hrs, Volume= 2.226 af
Outflow = 28.20 cfs @ 12.09 hrs, Volume= 2.226 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-1: DP-1

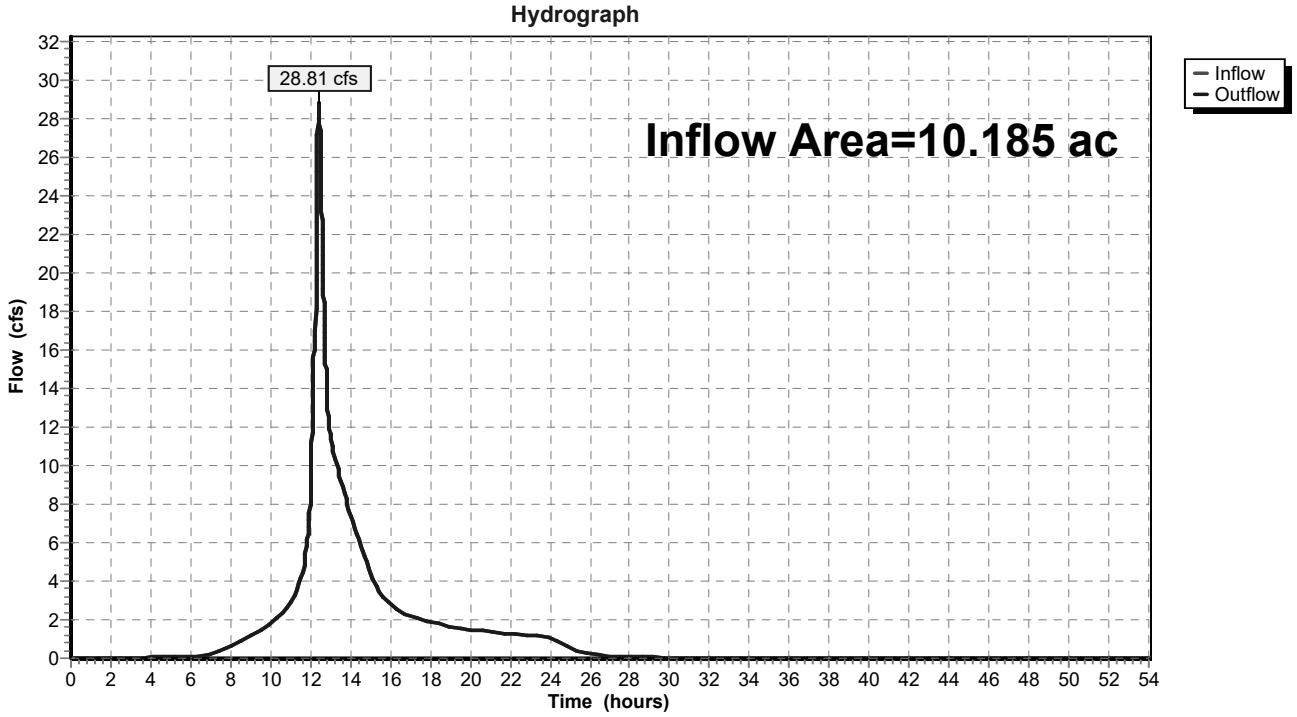


## Summary for Reach DP-2: DP-2

Inflow Area = 10.185 ac, 74.89% Impervious, Inflow Depth = 5.95" for 100-yr event
Inflow = 28.81 cfs @ 12.42 hrs, Volume= 5.052 af
Outflow = 28.81 cfs @ 12.42 hrs, Volume= 5.052 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-2: DP-2

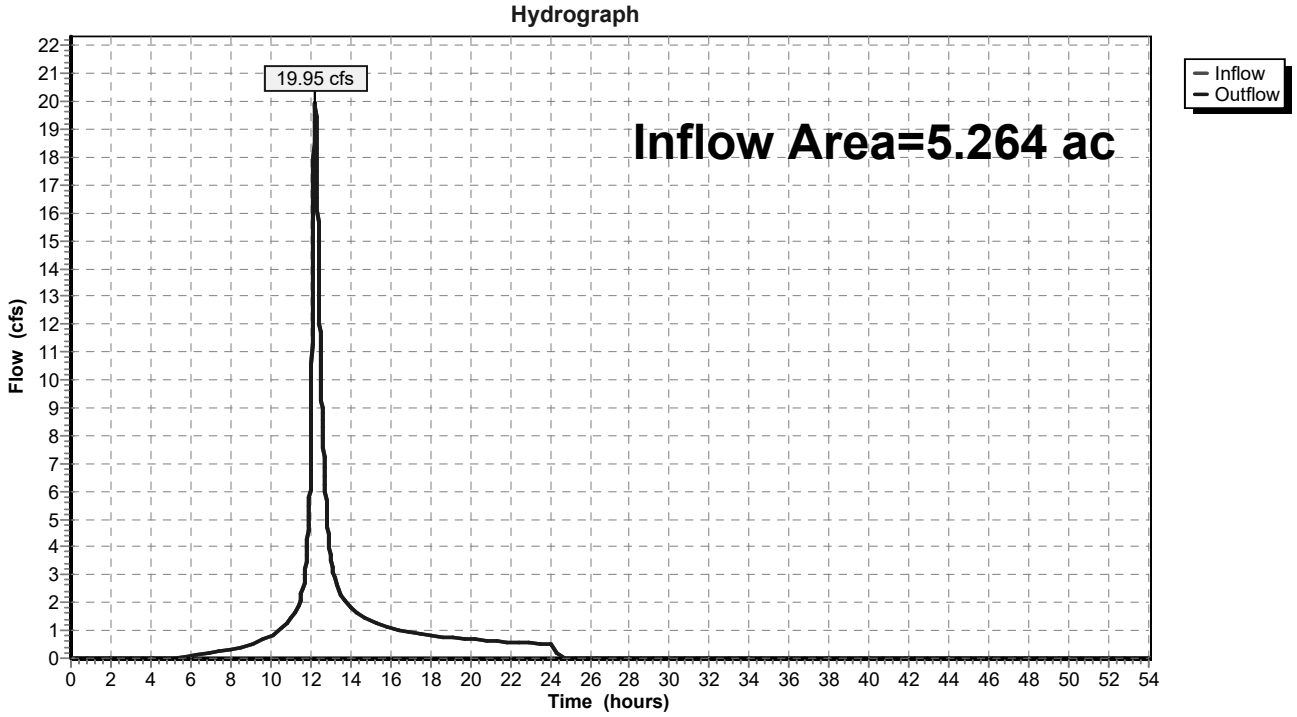


## Summary for Reach DP-3: DP-3

Inflow Area = 5.264 ac, 46.81% Impervious, Inflow Depth = 5.11" for 100-yr event
Inflow = 19.95 cfs @ 12.24 hrs, Volume= 2.239 af
Outflow = 19.95 cfs @ 12.24 hrs, Volume= 2.239 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-3: DP-3

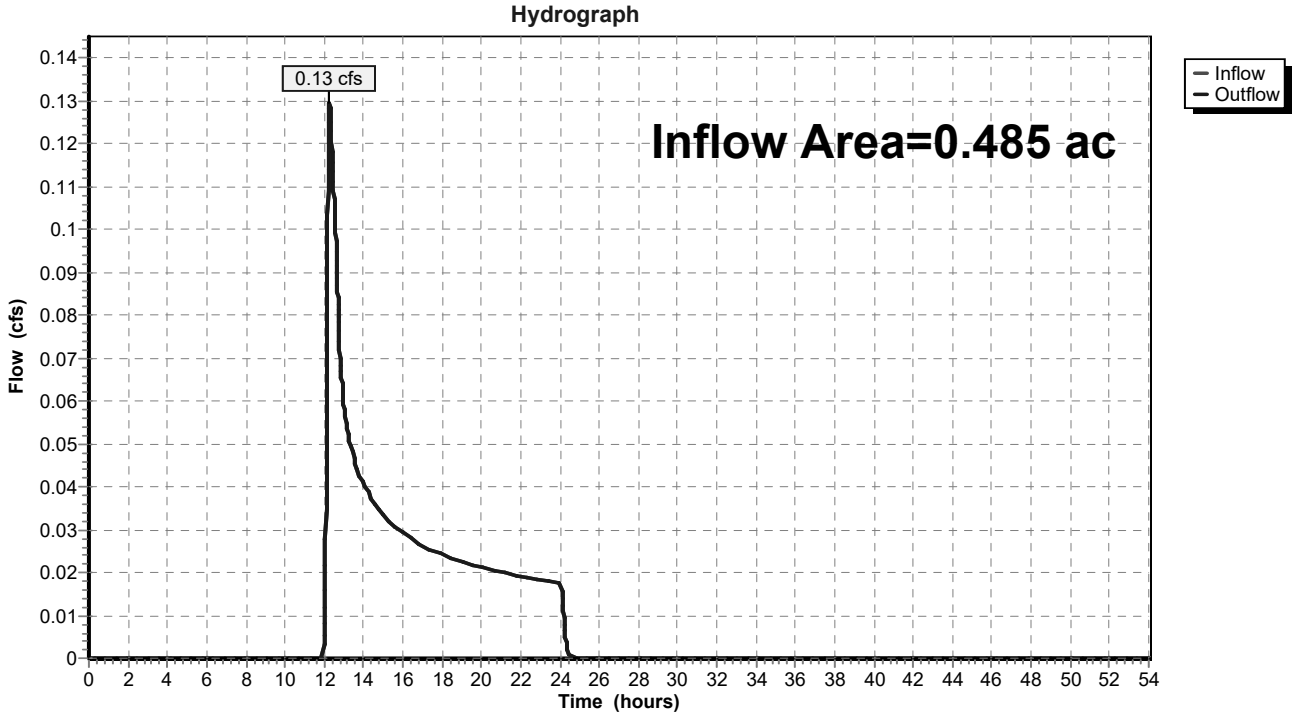


## Summary for Reach DP-4: DP-4

Inflow Area = 0.485 ac, 0.00% Impervious, Inflow Depth = 0.78" for 100-yr event
Inflow = 0.13 cfs @ 12.25 hrs, Volume= 0.032 af
Outflow = 0.13 cfs @ 12.25 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs

## Reach DP-4: DP-4



## Summary for Pond SSDS #1: SSDS #1

Inflow Area = 1.017 ac, 79.76% Impervious, Inflow Depth = 6.74" for 100-yr event
Inflow = 8.46 cfs @ 12.04 hrs, Volume= 0.571 af
Outflow = 6.36 cfs @ 12.10 hrs, Volume= 0.564 af, Atten= 25%, Lag= 3.3 min
Primary = 6.36 cfs @ 12.10 hrs, Volume= 0.564 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 72.50' @ 12.10 hrs Surf.Area= 1,530 sf Storage= 3,063 cf

Plug-Flow detention time= 31.2 min calculated for 0.564 af (99% of inflow)
Center-of-Mass det. time= 23.1 min ( 799.3 - 776.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 69.30' | 1,406 cf | **25.25'W x 60.58'L x 3.50'H Field A**<br>5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids |
| #2A | 69.80' | 1,838 cf | **ADS_StormTech SC-740 +Cap** x 40 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>40 Chambers in 5 Rows |
| | | 3,244 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 69.80' | **15.0" Round Culvert**<br>L= 49.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 69.80' / 69.30' S= 0.0102 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf |
| #2 | Device 1 | 69.80' | **12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 72.30' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #4 | Device 1 | 71.50' | **8.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=6.34 cfs @ 12.10 hrs HW=72.50' (Free Discharge)
└**1=Culvert** (Passes 6.34 cfs of 8.52 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.77 cfs @ 7.54 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.19 cfs @ 1.47 fps)
  └**4=Orifice/Grate** (Orifice Controls 1.39 cfs @ 4.16 fps)

## Pond SSDS #1: SSDS #1 - Chamber Wizard Field A

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

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

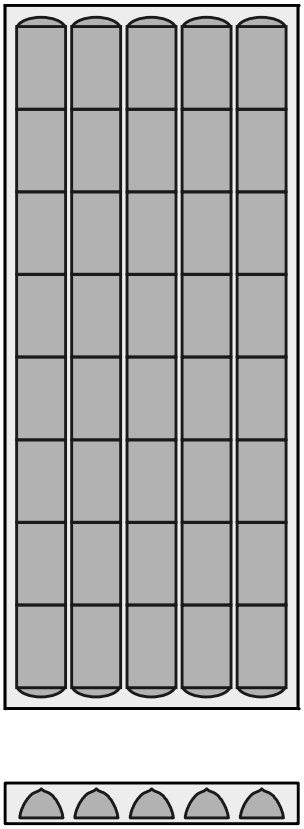
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

40 Chambers x 45.9 cf = 1,837.6 cf Chamber Storage

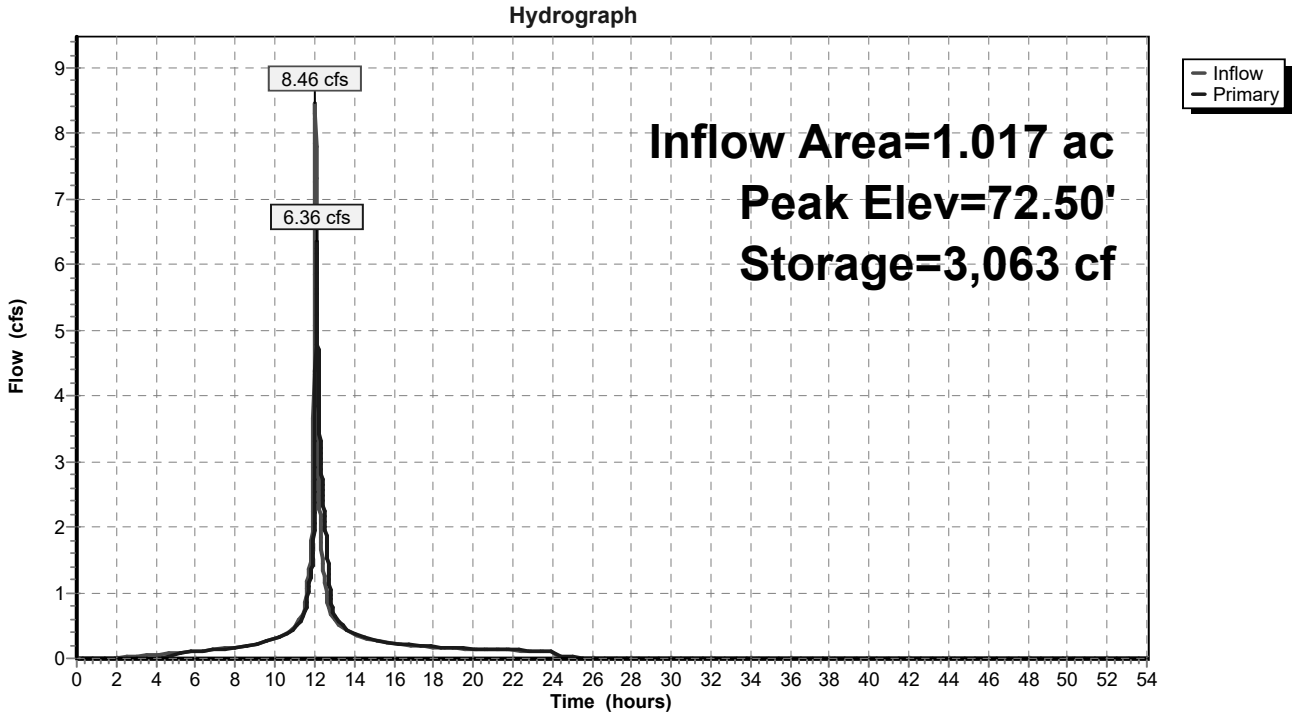
5,353.5 cf Field - 1,837.6 cf Chambers = 3,515.9 cf Stone x 40.0% Voids = 1,406.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,243.9 cf = 0.074 af
Overall Storage Efficiency = 60.6%
Overall System Size = 60.58' x 25.25' x 3.50'

40 Chambers
198.3 cy Field
130.2 cy Stone



## Pond SSDS #1: SSDS #1



## Summary for Pond SSDS #2: SSDS #2

Inflow Area = 8.636 ac, 76.33% Impervious, Inflow Depth = 6.03" for 100-yr event
Inflow = 37.74 cfs @ 12.24 hrs, Volume= 4.340 af
Outflow = 24.85 cfs @ 12.43 hrs, Volume= 4.243 af, Atten= 34%, Lag= 11.8 min
Primary = 24.85 cfs @ 12.43 hrs, Volume= 4.243 af

Routing by Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Peak Elev= 69.66' @ 12.43 hrs Surf.Area= 14,046 sf Storage= 47,768 cf

Plug-Flow detention time= 83.1 min calculated for 4.243 af (98% of inflow)
Center-of-Mass det. time= 69.3 min ( 882.9 - 813.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 64.25' | 19,315 cf | **65.75'W x 213.63'L x 5.50'H Field A**<br>77,254 cf Overall - 28,966 cf Embedded = 48,288 cf x 40.0% Voids |
| #2A | 65.00' | 28,966 cf | **ADS_StormTech MC-3500 d +Cap**x 261 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>261 Chambers in 9 Rows<br>Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf |
| | | 48,281 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 64.50' | **24.0" Round Culvert**<br>L= 80.0' RCP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 64.50' / 64.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf |
| #2 | Device 1 | 65.00' | **15.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 68.65' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |

**Primary OutFlow** Max=24.84 cfs @ 12.43 hrs HW=69.66' (Free Discharge)
└─**1=Culvert** (Passes 24.84 cfs of 30.85 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 12.27 cfs @ 9.81 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 12.57 cfs @ 3.28 fps)

## Pond SSDS #2: SSDS #2 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)**
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 9 rows = 268.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

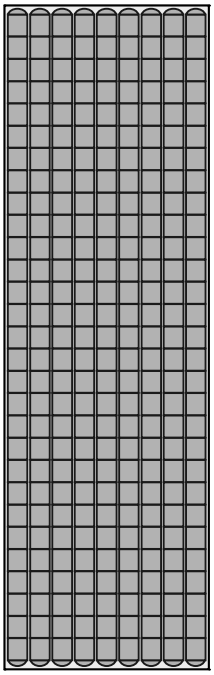
29 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 211.63' Row Length +12.0" End Stone x 2 = 213.63' Base Length
9 Rows x 77.0" Wide + 9.0" Spacing x 8 + 12.0" Side Stone x 2 = 65.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

261 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 9 Rows = 28,965.7 cf Chamber Storage

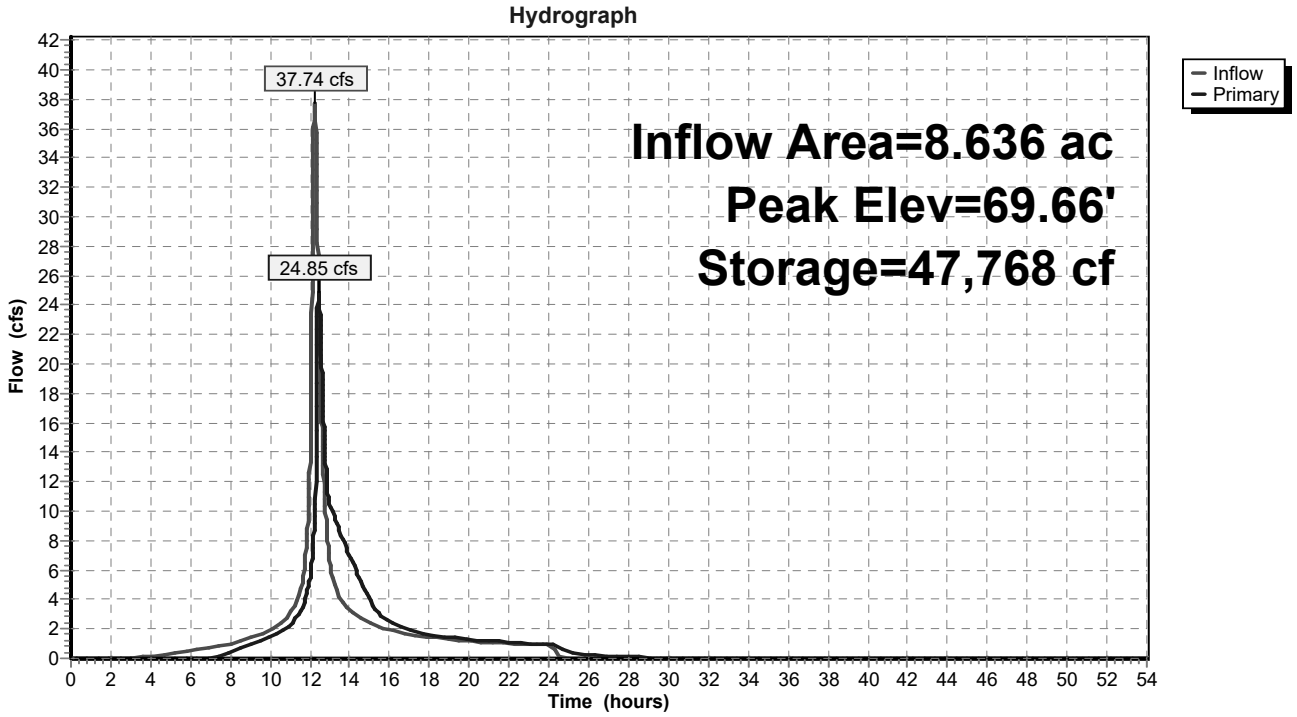
77,253.9 cf Field - 28,965.7 cf Chambers = 48,288.3 cf Stone x 40.0% Voids = 19,315.3 cf Stone Storage

Chamber Storage + Stone Storage = 48,281.0 cf = 1.108 af
Overall Storage Efficiency = 62.5%
Overall System Size = 213.63' x 65.75' x 5.50'

261 Chambers
2,861.3 cy Field
1,788.5 cy Stone



## Pond SSDS #2: SSDS #2



# APPENDIX D

## WATER QUALITY CALCULATIONS

CTDEEP Water Quality Volume Calculations
CTDEEP Water Quality Flow Calculations
Groundwater Recharge Calculations
Nitrogen Loading Calculations
Treatment Train Efficiency Worksheet

## Water Quality Calculations

### Determine Water Quality Volume

From CT 2004 Stormwater Quality Manual:

$$WQV = \frac{(1")(R)(A)}{12}$$

$$R = 0.05 + 0.009(I)$$

WQV = water quality volume (ac-ft)
R = volumetric runoff coefficient
I = percent impervious cover
A = site area in acres

| Area | | Total Area | | Impervious Area | | Impervious Cover | Volumetric Runoff Coefficient | Water Quality Volume (WQV) | |
|---|---|---|---|---|---|---|---|---|---|
| ID | | ac | $ft^2$ | ac | $ft^2$ | % | R | acre-feet | $ft^3$ |
| Area to Subsurface Stormwater Detention System #1 | PDA 12 | 1.017 | 44,319 | 0.812 | 35,349 | 79.84 | 0.769 | 0.065 | 2,831 |
| Area to Subsurface Stormwater Detention System #2 | PDA 22 | 8.636 | 376,167 | 6.591 | 287,123 | 76.32 | 0.737 | 0.530 | 23,087 |
| | | | | | | | **Total** | **0.595** | **25,918.00** |

## Groundwater Recharge Volume Calculations

### Groundwater Recharge Volume

From CT 2004 Stormwater Quality Manual:

$$GVR = \frac{(D)(A)(I)}{12}$$

GRV Groundwater Recharge Volume (ac-ft)
D = Depth of Runoff to be Recharged (table 7-4)
A = site area in acres
I = impervious cover (decimal)

| | A | | | | | I | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Site Area (AC) | Site Area by NRCS Hydrologic Soil Group | | | | Impervious Cover by NRCS Hydrologic Soil Group | | | | Site Imperviousness (Decimel) by NRCS Hydrologic Soil Group | | | | GRV Required (ac-ft) |
| | | A | B | C | D | A | B | C | D | A | B | C | D | |
| | 12.50 | 2.50 | 10.00 | 0 | 0 | 0.40 | 8.26 | 0.00 | 0.00 | 0.03 | 0.83 | 0.00 | 0.00 | 0.175 |

**Table 7-4**
**Groundwater Recharge Depth**

| NRCS Hydrologic Soil Group | Average Annual Recharge | Groundwater Recharge Depth (D) |
|---|---|---|
| A | 18 inches/year | 0.4 inches |
| B | 12 inches/year | 0.25 inches |
| C | 6 inches/year | 0.10 inches |
| D | 3 inches/year | 0 inches (waived) |

Source: MADEP, 1997.
NRCS – Natural Resources Conservation Service

## Nitrogen Loading Calculations

**Determine Nitrogen Loading to Groundwater**

Adapted from Cape Cod Comission Water Resources Office Techical Bulletin 91-001 (FINAL), April 1992; using Town of Glastonbury constants:

| | |
|---|---|
| Lot Size: | 544,504 ft² |
| Total Impervious Surface Area: | 376,832 ft² |
| - Roof area: | 105,487 ft² |
| - Paved Area: | 271,345 ft² |
| Total Pervious Surface Area: | 167,672 ft² |
| - Lawn Area: | 74,065 ft² |
| - Natural Area: | 93,607 ft² |

Impervious surface yearly recharge runoff depth = 46 in/yr
Pervious surface yearly recharge runoff depth = 9.2 in/yr
Nitrogen concentration of roof runoff = 0.75 mg/L
Nitrogen concentration of pavement runoff = 1.50 mg/L
Lawn fertilizer application rate = 3lb per 1,000 ft² per year
Fertilizer nitrogen leaching rate = 20%

- Nitrogen concentration from impervious surfaces:
  - Roof area: (105,487 ft²)(46 in/yr)(1/12 ft/in)(28.32 L/ft³)(1/365 yr/d) = 31,374.4 L/d Runoff
    (31,374.4 L/d)(0.75 mg/L) = 23530.8 mg/d Nitrogen
  - Pavement area: (271,345 ft²)(46 in/yr)(1/12 ft/in)(28.32 L/ft³)(1/365 yr/d) = 80,704.7 L/d Runoff
    (80,704.7 L/d)(1.50 mg/L) = 121,057.0 mg/d Nitrogen

- Nitrogen concentration from pervious surfaces:
  - Lawn area: (74,065 ft²)(3 lb/1,000 ft² per yr)(454,000 mg/lb)(1/365 yr/d)(0.20) = 55,274.8 mg/d Nitogen
  - Natural area: (93,607 ft²)(18 in/yr)(1/12 ft/in)(28.32 L/ft³)(1/365 yr/d) = 10,894.3 L/d Runoff

- Total Loading

$$\frac{\text{Total Nitrogen Load}}{\text{Total Runoff Volume}} = \frac{23{,}530.8 \text{ mg/d} + 121{,}057 \text{ mg/d} + 55{,}274.8 \text{ mg/d}}{31{,}374.4 \text{ L/d} + 80{,}704.7 \text{ L/d} + 10{,}894.3 \text{ L/d}} = \frac{199{,}862.6 \text{ mg/d}}{122{,}973.4 \text{ L/d}} = \boxed{1.625 \text{ mg/L Nitrogen}}$$

## Best Management Practice (BMP) Treatment Train Efficiency Worksheet

**Prepared for:**
**Proposed Development**
**107 Eastern Boulevard**
**Glastonbury, CT**

**Prepared by:**
**BL Companies**
**100 Constitution Plaza, 10th Floor**
**Hartford Connecticut**

**Date prepared:**
**September 30, 2020**

## Overall Site Treatment Train Efficiency

Et=[1-(1-E1)(1-E2)(1-E3)(1-E4)(1-E?)]*100

| BMP | BMP Description | Type pf Treatment | Efficiency Rate % |
|---|---|---|---|
| E1 | Impervious Surface Sweeping*** | secondary (conventional) | 10 |
| E2 | Deep Sump and Hooded Catch Basins | Secondary | 25 |
| E3 | Isolator Row** | Secondary | 80 |

**Overall Treatment Train Efficiency (Et)=** **87 % Total Suspended Solids (TSS) Remova**

* 80% require per CT DEP
** Manufacturers claim 80% TSS removal
*** Schueler 1996 & EPA 1993
**** University of New Hampshire

| *BMP* | *Type pf Treatment* | *TSS Removal Rate* | *Starting TSS Load* | *Amount Removed* | *Remaining Load* |
|---|---|---|---|---|---|
| Impervious Surface Sweeping*** | secondary (conventional) | 0.10 | 1.00 | 0.10 | 0.90 |
| Deep Sump and Hooded Catch Basins | Secondary | 0.25 | 0.90 | 0.23 | 0.68 |
| Isolator Row** | Secondary | 0.8 | 0.68 | 0.54 | 0.14 |

**Overall Treatment Train Efficiency (%** **87**

**TSS Removal Rates (adapted from Schueler, 1996, & EPA, 1993)**

| BMP List | Design Rate | Range of Average TSS Removal Rates | Brief Design Requirements |
|---|---|---|---|
| Extended Detention Pond | 70% | 60-80% | Sediment forebay |
| Wet Pond (a) | 70% | 60-80% | Sediment forebay |
| Constructed Wetland (b) | 80% | 65-80% | Designed to infiltrate or retain |
| Water Quality Swale | 70% | 60-80% | Designed to infiltrate or retain |
| Infiltration Trench | 80% | 75-80% | Pretreatment critical |
| Infiltration Basin | 80% | 75-80% (predicted) | Pretreatment critical |
| Dry Well | 80% | 80% (predicted) | Rooftop runoff |
| | | | (uncontaminated only) |
| Sand Filter (c) | 80% | 80% | Pretreatment |
| Organic Filter (d) | 80% | 80%+ | Pretreatment |
| Water Quality Inlet | 25% | 15-35% w/ cleanout | Off-line only; 0.1" minimum Water Quality Volume (WQV) storage |
| Sediment Trap (Forebay) | 25% | 25% w/ cleanout | Storm flows for 2-year event must not cause erosion; 0.1" minimum WQV storage |
| Drainage Channel | 25% | 25% | Check dams; non-erosive for 2-yr. |
| Deep Sump and Hooded Catch Basin | 25% | 25% w/ cleanout | Deep sump general rule = 4 x pipe diameter or 4.0' for pipes 18" or less |
| Street Sweeping | 10% | 10% | Discretionary non-structural credit, must be part of approved plan |

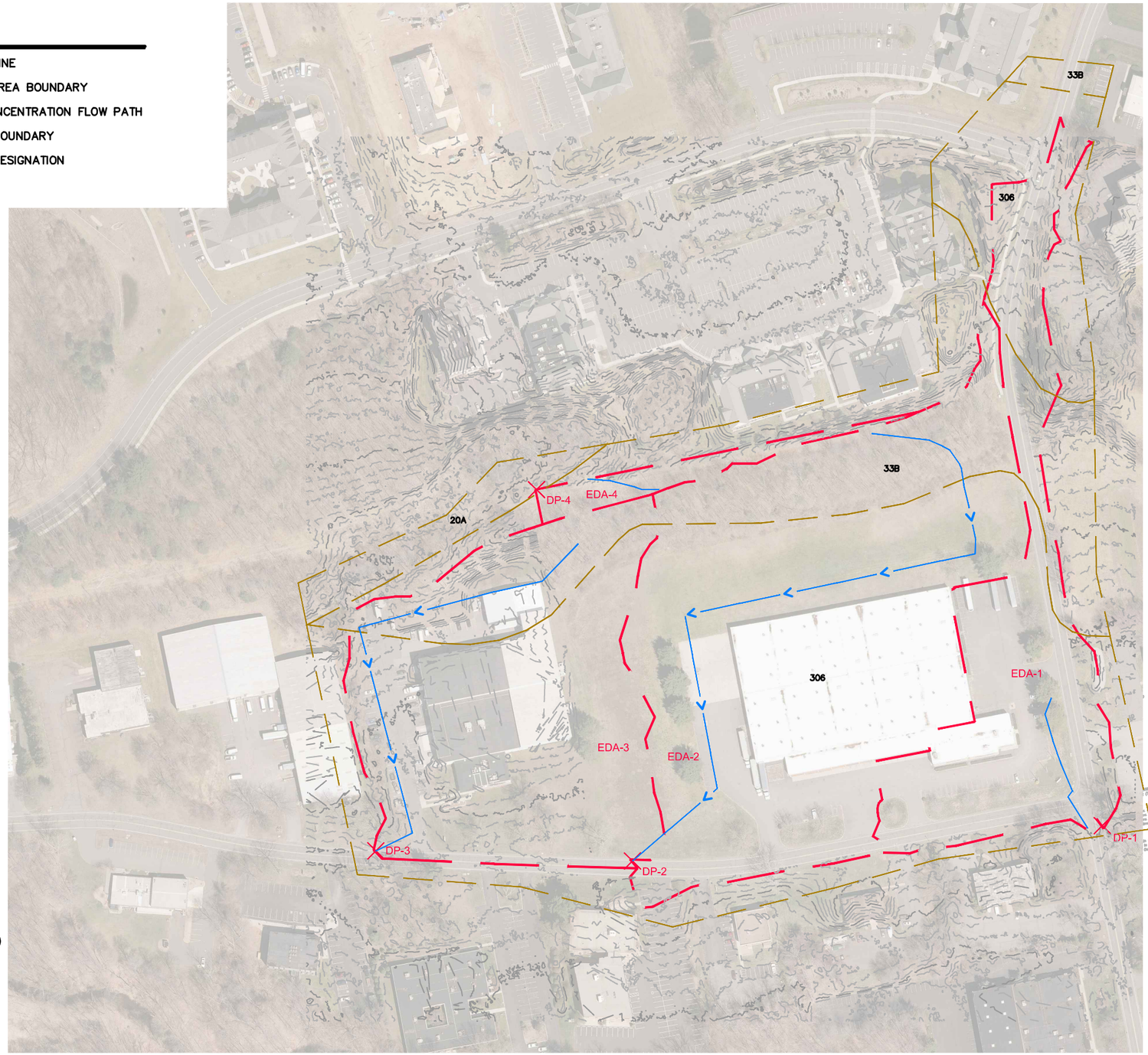
# APPENDIX E

## DRAINAGE MAPS

ED-1 – Existing Drainage Mapping
PD-1 – Proposed Drainage Mapping
GD-1 – Grading and Drainage Plan

## HYDROLOGY LEGEND

- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- SOIL TYPE BOUNDARY
- 306 — SOIL TYPE DESIGNATION




GRAPHIC SCALE

200 100 0 200

SCALE IN FEET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(860) 249-2200
(860) 249-2400 Fax


# EXISTING DRAINAGE MAPPING

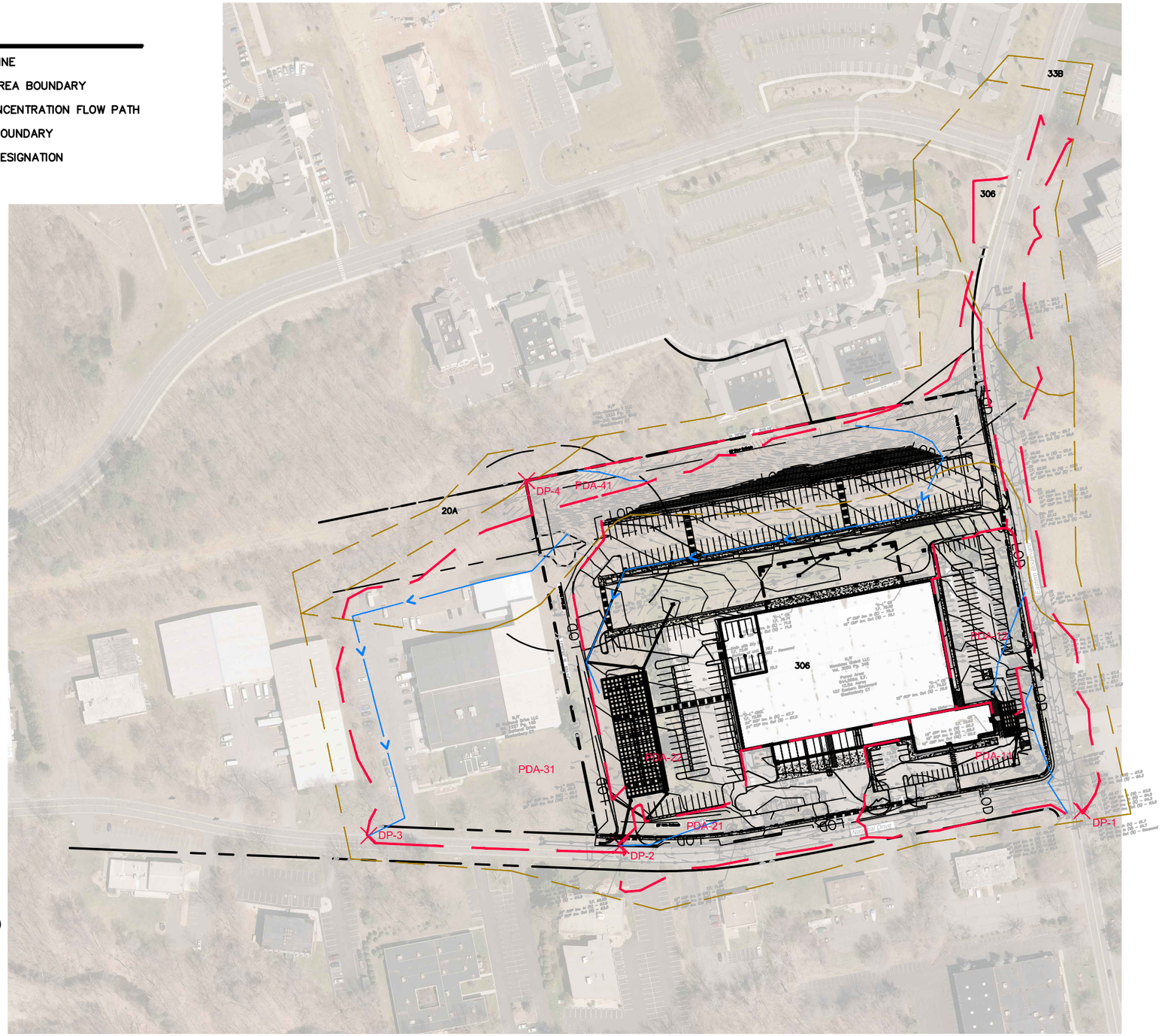
PROPOSED DEVELOPMENT
107 EASTERN BOULEVARD
GLASTONBURY, CONNECTICUT

| | |
|---|---|
| Designed | S.E.L. |
| Drawn | S.E.L. |
| Reviewed | J.A.B. |
| Scale | 1"=200' |
| Project No. | 2000669 |
| Date | 08/21/2020 |
| CAD File | ED200066901 |

**ED-1**

## HYDROLOGY LEGEND

- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- SOIL TYPE BOUNDARY
- 306 — SOIL TYPE DESIGNATION




GRAPHIC SCALE

200 100 0 200

SCALE IN FEET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(860) 249-2200
(860) 249-2400 Fax


# PROPOSED DRAINAGE MAPPING

PROPOSED DEVELOPMENT
107 EASTERN BOULEVARD
GLASTONBURY, CONNECTICUT

| | |
|---|---|
| Designed | S.E.L. |
| Drawn | S.E.L. |
| Reviewed | J.A.B. |
| Scale | 1"=200' |
| Project No. | 2000669 |
| Date | 08/21/2020 |
| CAD File | PD200066901 |

**PD-1**

## GRADING AND DRAINAGE LEGEND

- PROPERTY LINE
- LOD — PROPOSED LIMIT OF DISTURBANCE AND CONTRACT LIMIT LINE
- 310 / 309 — EXISTING ELEVATION CONTOUR (1' INTERVAL)
- 620 / 618 — PROPOSED ELEVATION CONTOUR (1' INTERVAL)
- ×310.00 — PROPOSED SPOT ELEVATION
- STORMWATER DRAINAGE PIPE
- CATCH BASIN STRUCTURE WITH HOODED OUTLET
- STORMWATER DRAINAGE MANHOLE OR OUTLET CONTROL STRUCTURE
- PROVIDE MODULAR BLOCK RETAINING WALL

SPOT GRADE ABBREVIATIONS:

| | |
|---|---|
| BC | BOTTOM OF CURB |
| TC | TOP OF CURB |
| BW | BOTTOM OF WALL |
| TW | TOP OF WALL |
| MEX | MEET EXISTING CONDITION |

N/F
HTA–Gateway 1 LLC
Vol. 3333 Pg. 32
290–310 Western Blvd
Glastonbury CT

N/F
HTA–Gateway 1 LLC
Vol. 3333 Pg. 32
320–330 Western Blvd
Glastonbury CT

N/F
Mondelez Global LLC
Vol. 3050 Pg. 348

Parcel Area:
544,505± S.F.
12.5± Acres
107 Eastern Boulevard
Glastonbury CT

N 78°32'28" E 810.10'

N 11°27'13" W 634.4'

Δ=13°00'01"
R=970.00'
L=220.09'

Δ=90°00'42"
R=20.00'

CB–204 (TYPE C)
TF=73.98
INV IN=69.60(NE)
INV OUT =69.50(E)

MH–205
TF=74.29
INV IN=67.60(W)
INV IN=69.03(NE)
INV OUT =67.50(S)

6'–24" HDPE @ 0.00%

PROVIDE AND INSTALL UNDERGROUND STORMWATER MANAGEMENT SYSTEM #2 ADS STORMTECH MC–3500 CHAMBERS, 261 CHAMBERS PLUS 29 ISOLATOR ROW CHAMBERS FOR WATER QUALITY (290 TOTAL),
TOP OF CRUSHED STONE BASE ELEV: 69.75
TOP OF SYSTEM ELEV: 68.75
BOTTOM OF SYSTEM ELEV: 65.00
BOTTOM OF CRUSHED STONE BASE ELEV: 64.25
INLET TO SYSTEM (N)–15" RCP ELEV: 67.50
INLET TO SYSTEM (S)–15" RCP ELEV: 66.99
OUTLET FROM SYSTEM–15" RCP ELEV: 65.00

PROVIDE AND INSTALL ISOLATOR ROW CHAMBERS FOR WATER QUALITY

6'–24" HDPE @ 0.00%

CB–211 (TYPE C)
TF=70.88
INV OUT =67.63(SE)

71'–15" HDPE @ 0.50%

OCS–221
TF=71.17
INV IN=65.00(N)
15"W X 12"H ORIFICE INV=65.00
4' WEIR WALL INV=68.65
INV OUT =64.50(S)

80'–24" RCP @ 0.50%

EX. CB–222 (TYPE C–L)
RESET TO FINISHED GRADE
TF=70.00
INV IN=64.10(N)

CB–203 (TYPE C)
TF=78.10
INV IN=73.60(E)
INV OUT =73.50(SW)

134'–15" HDPE @ 1.22%

CB–202 (TYPE C)
TF=79.84
INV IN=75.34(E)
INV OUT =75.24(W)

276'–15" HDPE @ 1.31%

CB–201 (TYPE C)
TF=83.44
INV OUT =78.94(W)

EX. CB–208 (TYPE C–L)
RESET TO FINISHED GRADE
TF=75.74
EX. INV IN =70.30(E)
INV OUT =70.49(SW)

175'–15" HDPE @ 0.57%

100'–24" HDPE @ 1.89%

6'–24" HDPE @ 0.00%
MH–213
TF=71.96
INV IN=66.99(SW)
INV OUT =66.99(N)

124'–24" HDPE @ 1.17%

57'–15" HDPE @ 0.50%

CB–212 (TYPE C)
TF=70.75
INV IN=67.27(NW)
INV OUT =67.27(NE)

72'–8" HDPE @ 1.30%

72'–8" HDPE @ 1.30%

60'–8" HDPE @ 1.00%

EX. CB–207 (TYPE C–L)
RESET TO FINISHED GRADE
TF=78.26
EX. INV IN =71.80(E)
EX. INV OUT =71.50(W)
INV IN=73.80(NE)

PROVIDE AND INSTALL DOWNSPOUT CONNECTION, REFER TO ARCHITECTURAL PLANS
INV OUT =74.80(E)

EX. CB–206 (TYPE C–L)
RESET TO FINISHED GRADE
TF=78.26
EX. INV OUT =75.100(W)

PROVIDE AND INSTALL DOWNSPOUT CONNECTION, REFER TO ARCHITECTURAL PLANS
INV IN=73.80(E)
INV IN=73.80(W)
INV OUT =74.80(W)

PROVIDE AND INSTALL DOWNSPOUT CONNECTION, REFER TO ARCHITECTURAL PLANS
INV IN=73.80(E)
INV IN=73.80(W)
INV OUT =74.40(SW)

EX. CB–101
TF=74.23
INV OUT =71.16(SE)

PROVIDE AND INSTALL TRANSFORMER, COORDINATE WITH ELECTRIC COMPANY

23'–15" RCP @ 0.50%

6'–15" RCP @ 0.00%

OCS–102
TF=74.94
INV IN=69.80(N)
12"W X 6"H ORIFICE INV=69.80
8"W X 6"H ORIFICE INV=71.50
4' WEIR WALL INV=72.30
INV OUT =69.80(S)

49'–15" RCP @ 1.02%

EX. CB–103 (TYPE C)
RESET TO FINISHED GRADE
TF=73.39
INV IN=69.30(N)
EX. INV IN=69.30(W)
EX. INV OUT=69.20(SE)

PROVIDE AND INSTALL ISOLATOR ROW CHAMBERS FOR WATER QUALITY

PROVIDE AND INSTALL UNDERGROUND STORMWATER MANAGEMENT SYSTEM #1 ADS STORMTECH SC–740 CHAMBERS, 40 CHAMBERS TOTAL INCLUDING ISOLATOR ROW CHAMBERS FOR WATER QUALITY,
TOP OF CRUSHED STONE BASE ELEV: 72.80
TOP OF SYSTEM ELEV: 72.30
BOTTOM OF SYSTEM ELEV: 69.80
BOTTOM OF CRUSHED STONE BASE ELEV: 69.30
INLET TO SYSTEM–15" RCP ELEV: 71.05
OUTLET FROM SYSTEM–15" RCP ELEV: 69.80

Eastern Boulevard

National Drive

**FOR PERMITTING PURPOSES ONLY**
**NOT RELEASED FOR CONSTRUCTION**

GRAPHIC SCALE
40 20 0 40
SCALE IN FEET


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(860) 249-2400 Fax


# PROPOSED DEVELOPMENT
107 EASTERN BOULEVARD
TOWN OF GLASTONBURY, CT

| No. | Date | Desc. |
|---|---|---|

REVISIONS

| | |
|---|---|
| Designed | S.E.L. |
| Drawn | S.E.L. |
| Reviewed | |
| Scale | 1"=40' |
| Project No. | 2000669 |
| Date | 09/30/2020 |
| CAD File: 2000669O1 | |

Title

## GRADING, DRAINAGE, AND UTILITIES PLAN

Sheet No.

# GU-1

Xref (s) : BD2000669O1 | XC2000669O1 | XC2000669O2

# APPENDIX F

# STORMWATER SYSTEM
# OPERATION AND MAINTENANCE MANUAL

# Appendix F:

# Stormwater System Operations and Maintenance Plan

*For the Proposed:*

## Development

*Located at:*

107 Eastern Boulevard
Glastonbury, Connecticut

*Prepared for Submission to:*

**Town of Glastonbury, Connecticut**

August 24, 2020

*Prepared for:*

**WE Acquisitions, LLC**
107 Eastern Boulevard
Glastonbury, Connecticut

*Prepared by:*


Architecture
Engineering
Environmental
Land Surveying
Companies

**BL Companies**
100 Constitution Plaza, 10th Floor
Hartford, Connecticut 06103
Phone: (860) 249-2200
Fax: (860) 249-2400


BL Project Number: 2000669

# Table of Contents

## General Overview

The project parcel is located at 107 Eastern Boulevard The project parcel is approximately 12.5 acres in size and is currently a developed lot with a warehouse and associated paved parking areas and driveways, landscaped areas, and site utilities. The remaining site area is wooded and lawn area. The property is located at the northeastern corner of the intersection of National Drive and Eastern Boulevard. It is roughly bordered by the Planned Employment Zone (PE) on all sides. There is a small portion of wetland located on site towards the northwest of the site.

In general, the existing topography generally slopes from the north to the south of the site and eventually offsite to Salmon Brook. Elevations on site range from 70' to 110'. There are currently catch basins and drainage piping on site for the existing development, but no stormwater management system located within the project parcel. Proposed site improvements will include minor building modifications, additional paved parking areas and driveways, landscaped areas, pedestrian sidewalks, site lighting, and a stormwater management system.

The proposed stormwater management system is designed to be in compliance with the 2002 State of Connecticut Guidelines for Soil Erosion and Sediment Control, and the 2004 State of Connecticut Stormwater Quality Manual.

The following Operations and Maintenance Plan was prepared specifically for this proposed development in the Town of Glastonbury, Connecticut. The Plan was developed to satisfy the requirements of the Connecticut Department of Energy and Environmental Protection's 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

Purpose & Goals

The purpose of this Manual is to ensure that the stormwater management components are operated in accordance with all approvals and permits. The primary goal is to inform all the property managers about how the system operates and what maintenance items are necessary to protect downstream wetlands and watercourses. The secondary goal is to provide a practical, efficient means of maintenance planning and record keeping to verify permit compliance.

Responsible Parties

The Property Owner will be responsible for implementing the Plan on the property.

Maintenance inspections shall be performed by a qualified professional.

Some utilities located on the site will be owned and maintained by various utility companies in accordance with their standards. The property owner may maintain the service connections.

List of Permits & Special Conditions

The project will receive several permits, which may contain special conditions that require compliance by the property owner and maintenance contractors. This permit may include the following:

- Town of Glastonbury – Site Plan Permit, Building Permit

Maintenance Logs and Checklists

The property owner will keep a record of all maintenance procedures performed, date of inspection/ cleanings, etc. Copies of inspection reports and maintenance records shall be kept on-site.

Forms

The following forms will be developed for annual maintenance. Copies of the forms will be kept on-site as part of the Storm Water Management Plan.

- Annual Checklist
- Quarterly Checklist
- Monthly Checklist

Employee Training

The property owner will have an employee-training program, with annual up-dates, to ensure that the qualified employees charged with maintaining the buildings and grounds do so in accordance with the approved permit conditions. All employees that have maintenance duties will be adequately informed of their responsibilities.

Spill Control

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and clean-up:

- Manufacturer's recommended methods for spill clean-up will be clearly posted and site personnel will be made aware of the procedures and the location of the information and clean-up supplies.
- Materials and equipment necessary for spill clean-up will be kept in the material storage area on-site. Equipment and materials will include but not be limited to: absorbent booms or mats, brooms, dust pans, mops, rags, gloves, goggles, sand, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned immediately after discovery.

- The spill area will be kept well-ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substance.
- Spills of toxic or hazardous material, regardless of size, will be reported to the appropriate State or local government agency.
- If a spill occurs, this plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean the spill if there is another one. A description of the spill, the cause, and the remediation measures will also be included.

A spill report shall be prepared by the property owner following each occurrence. The spill report shall present a description of the release, including quantity and type of material, date of spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

The property owner shall identify an appropriately qualified and trained site employee involved with day-to-day site operations to be the spill prevention and clean-up coordinator. The name(s) of responsible spill personnel shall be posted on-site. Each employee shall be instructed that all spills are to be reported to the spill prevention and clean-up coordinator.

## Storm Water Management

System Components

The storm water management system has several components that are shown on the Grading and Drainage Plan (GD-1), that performs various functions in treating storm water runoff:

Catch Basins and Manholes

The property owner is responsible for cleaning the catch basins and manholes on the property. A Connecticut Licensed hauler shall clean the sumps and dispose of removed sand legally. The road sand may be reused for winter sanding but may not be stored on-site. As part of the hauling contract, the hauler shall notify the property owner in writing where the material is being disposed.

Each catch basin shall be inspected every four months, with one inspection occurring during the month of April. Any debris occurring within one foot from the bottom of each sump shall be removed by Vacuum "Vactor" type of maintenance equipment.

During the inspection of each of the catch basin sumps, the hoods (where provided) on each of the outlet pipes shall also be observed for trash accumulation as well as overall condition. In the event that a hood is damaged or off the hanger, it shall be reset or repaired.

Isolator Row and Underground Detention System

The underground detention system and Isolator Row shall be inspected every six months in the months of April and September. Each of the inspection ports provided shall be opened and visually checked from the surface. Observation of grit inside of the detention system shall be noted and any deposits found to be 2 inches or more, as measured from the invert of pipe, shall be cleaned and removed. The underground detention system qualifies as a Confined Space under OSHA regulations, and any

maintenance involving entry into the pipes should comply with OSHA Confined Space Entry Regulations.

## Site Maintenance

Parking Lots

Parking lots and sidewalks shall be swept as necessary by the property owner, or at least once per year, to clean sediment, trash, and other debris. The property owner will sweep parking lots on the property in the spring to remove winter accumulations of road sand.

Landscaping

The management company retained by the property owner will maintain landscaped areas. Normally the landscaping maintenance will consist of pruning, mulching, planting, mowing lawns, raking leaves, etc. Use of fertilizers and pesticides will be controlled and limited to minimal amounts necessary for healthy landscape maintenance.

The lawn areas, once established, will be maintained at a typical height of 3 ½". This will allow the grass to be maintained with minimal impact from weeds and/or pests. The low-maintenance areas will be maintained as a meadow or allowed to revert back to natural conditions. Topsoil, brush, leaves, clippings, woodchips, mulch, equipment, and other material shall be stored off site.

Outdoor Storage

There will be no outdoor storage of hazardous chemicals, de-icing agents, fertilizer, pesticides, or herbicides anywhere around the buildings.

Deicing and Snow Removal & Storage

The use of clean sand may be used to aid traction in conjunction with salt and/or chemicals for deicing, snow melting and other related winter weather management. Snow shall be shoveled and plowed from sidewalk and parking areas as soon as practical during and after winter storms. Sand accumulation shall be removed from the site at the end of the winter season or appropriate time when seasonal snow has melted. Alternative deicing methods must be submitted prior to use onsite for review to the Town of Glastonbury for approval.

# MAINTENANCE SCHEDULE

| During the First Year of Operation: | | |
|---|---|---|
| Task: | Completion Date: | Manager's Initials: |
| JANUARY: | | |
| Employee Training Program with Spill Program | | |
| *Catch Basin Inspection | | |
| *Isolator Row and Subsurface Stormwater Detention | | |
| FEBRUARY: | | |
| *Isolator Row and Subsurface Stormwater Detention | | |
| MARCH: | | |
| *Isolator Row and Subsurface Stormwater Detention | | |
| APRIL: | | |
| *Catch Basin Inspection | | |
| *Isolator Row and Subsurface Stormwater Detention | | |
| Sweeping of Paved Surfaces | | |
| Shrub Fertilization | | |
| Lawn Liming (if necessary) | | |
| JUNE: | | |
| *Catch Basin Inspection | | |
| Sweeping of Paved Surfaces | | |
| SEPTEMBER: | | |
| *Isolator Row and Subsurface Stormwater Detention | | |
| Sweeping of Paved Surfaces | | |
| Tree and Lawn Fertilization | | |
| DECEMBER: | | |
| *Catch Basin Inspection | | |
| *Isolator Row and Subsurface Stormwater Detention | | |
| Sweeping of Paved Surfaces | | |

*NOTE: Use appropriate worksheet found in this plan to conduct the inspection.

| After the First Year of Operation: | | | |
|---|---|---|---|
| **FOR YEAR_____** | | | |
| Task: | | Completion Date: | Manager's Initials: |
| JANUARY: | | | |
| Employee Training Program with Spill Program | | | |
| APRIL: | | | |
| *Catch Basin Inspection | | | |
| *Isolator Row and Subsurface Stormwater Detention | | | |
| Sweeping of Paved Surfaces | | | |
| Shrub Fertilization | | | |
| Lawn Liming (if necessary) | | | |
| JUNE: | | | |
| *Catch Basin Inspection | | | |
| Sweeping of Paved Surfaces | | | |
| SEPTEMBER: | | | |
| *Isolator Row and Subsurface Stormwater Detention | | | |
| Sweeping of Paved Surfaces | | | |
| Tree and Lawn Fertilization | | | |
| DECEMBER: | | | |
| *Catch Basin Inspection | | | |
| Sweeping of Paved Surfaces | | | |

*NOTE: Use appropriate worksheet found in this plan to conduct the inspection.

# CATCH BASIN / CATCH BASIN INSERT INSPECTION LOG

Name of Inspector: Date:

| Catch Basin ID | Condition (circle one) | | Debris above 1' within sump? (If yes then catch basin is to be cleaned) | | Date of Catch Basin/Cleaning (if debris is greater than 1') | | Condition of Hood (if applicable, remove trash/debris if necessary) | Comments: |
|---|---|---|---|---|---|---|---|---|
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | | | | | | | | |
| | Excellent | | | | | | | |
| | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | | | | | | | |

On-site Procedures for Inspection and Maintenance of Catch Basin Inserts

• Secure traffic and pedestrian traffic with cones, barrels, etc.

• Clean surface area around each catch basin.

• Remove grates and set aside

• Clean grates, remove litter and debris that may be trapped within the grate

• Visually inspect condition of outlet hood and remove trash and debris from hood if necessary.

• Remove by vactor hose the debris that has been trapped in the trough area. Dispose of in accordance with local, state and federal regulatory agency requirements. Most debris that is captured in the trough or sump area will fall into the non-hazardous waste category.

• Visually inspect and check the condition of the trough area.

• Replace grate and lockdown as needed.

• Un-secure traffic control area.

• Complete service report and submit to facility owner.

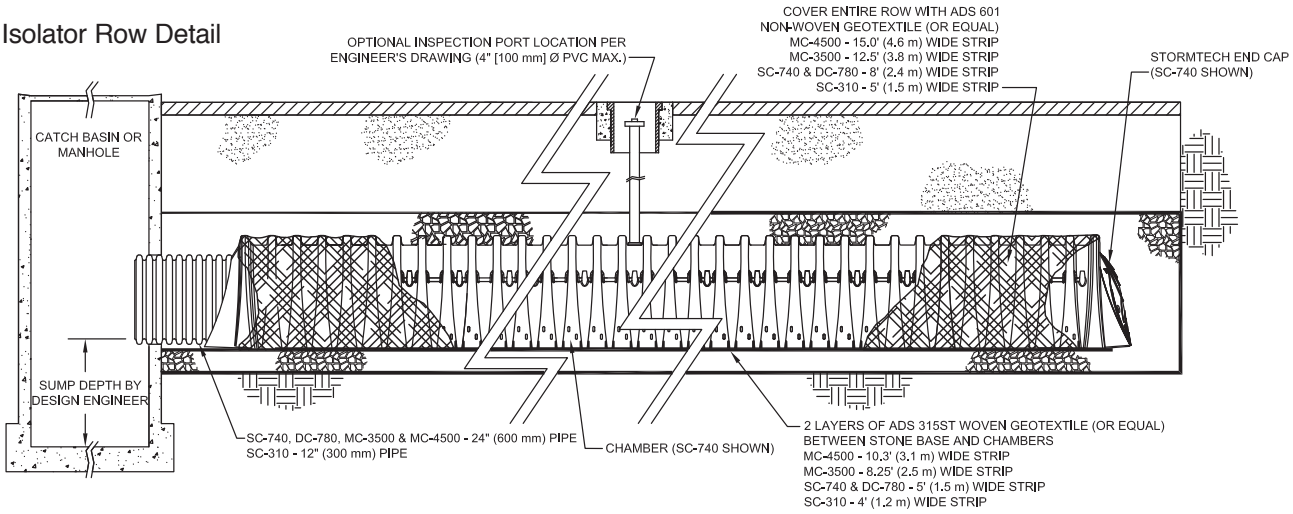
| SUBSURFACE STROWMATER DETENTION SYSTEM AND ISOLATOR ROW INSPECTION LOG | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of Inspector: | | | | | | | Date: | | | | | |
| Basin ID | Overall condition of Inlet Pipe (circle one) | | | Condition of Facility (circle one) | | | Debris and Sediment Removed from Basin?[1] | | Inlets and Outlets are Clear and Functioning? | | Date of Cleaning Performed | Comments |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |
| | Excellent | Fair | Poor | Excellent | Fair | Poor | Yes | No | Yes | No | | |

1 – Sediment deposits shall be removed from the subsurface detention basin when the deposited material reaches a height of 2” measured from the top of the stone bedding.

# StormTech and Stormwater Quality

StormTech's patented Isolator™ Row is a row of chambers wrapped in a geotextile which filters the stormwater trapping pollutants in the row. The Isolator Row provides a way to inspect and maintain the system.

Isolator Row Detail




**Note:** For many applications, the non-woven geotextile over the DC-780, MC-3500 and MC-4500 Isolator Row chambers can be eliminated or substituted with the AASHTO Class 1 woven geotextile. Contact your StormTech representative for assistance.

## Isolator Row Field Verification Testing at the University of New Hampshire Stormwater Center

- Field testing (TARP tier II protocol) of the Isolator Row has been ongoing since December 2006.
- Removal efficiencies for TSS have improved as the filter cake has built up on the bottom fabric of the Isolator Row.
- Current data shows a TSS removal efficiency which exceeds 80%.

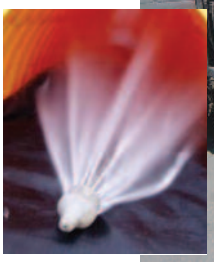
### Removal Efficiency Results:

- Total Suspended Solids = 80%
- Phosphorous = 49%
- Total Petroleum Hydrocarbons = 90%
- Zinc = 53%

**This system achieves a removal efficiency of 80% for TSS which meets most municipal recommended levels for water quality treatment.**

### Inspection and Maintenance

The Isolator Row can be inspected through the upstream manhole or optional inspection port.



Maintenance is easily accomplished with the JetVac process.

The frequency of inspection and maintenance varies by location. Contact StormTech for assistance with inspection and maintenance scheduling.

StormTech
Detention • Retention • Water Quality
An ADS company

# Isolator® Row O&M Manual




THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™

ADS®

# THE ISOLATOR® ROW

## INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

## THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole provides access to the Isolator Row and typically includes a high flow weir. When flow rates or volumes exceed the Isolator Row weir capacity the water will flow over the weir and discharge through a manifold to the other chambers.

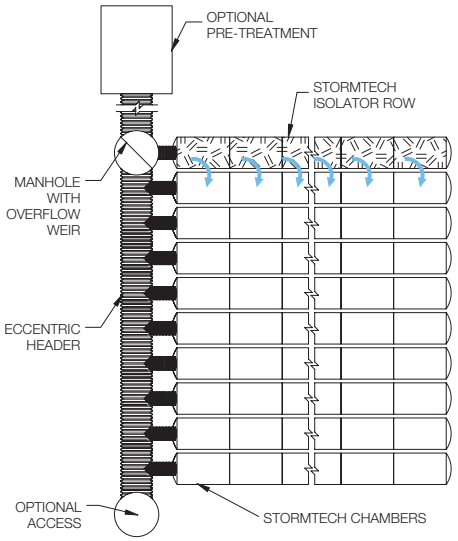
*Another acceptable design uses one open grate inlet structure. Using a “high/low” design (low invert elevation on the Isolator Row and a higher invert elevation on the manifold) an open grate structure can provide the advantages of the Isolator Row by creating a differential between the Isolator Row and manifold thus allowing for settlement in the Isolator Row.*

The Isolator Row may be part of a treatment train system. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

**Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.**

**StormTech Isolator Row with Overflow Spillway** (not to scale)



# ISOLATOR ROW INSPECTION/MAINTENANCE

## INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

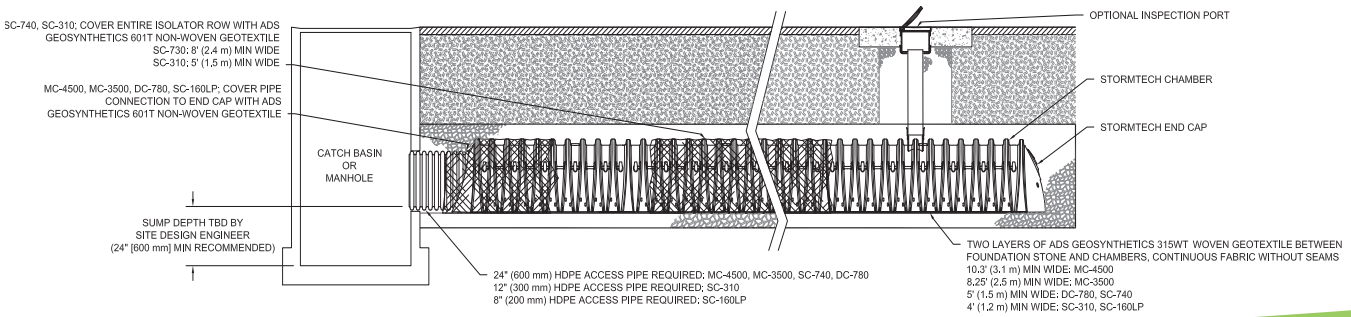
## MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

**StormTech Isolator Row** (not to scale)

*Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.*



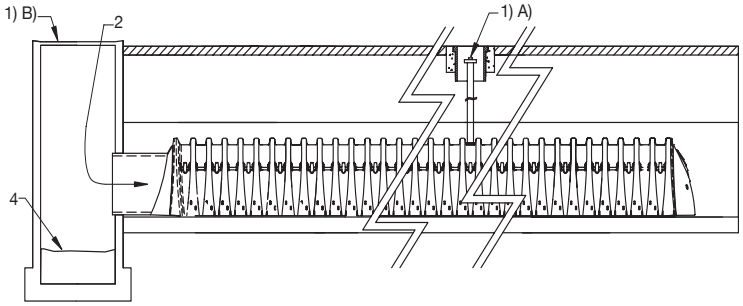
# ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

**STEP 1**
Inspect Isolator Row for sediment.
- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    1. Mirrors on poles or cameras may be used to avoid a confined space entry
    2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

**STEP 2**
Clean out Isolator Row using the JetVac process.
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

**STEP 3**
Replace all caps, lids and covers, record observations and actions.

**STEP 4**
Inspect & clean catch basins and manholes upstream of the StormTech system.




**SAMPLE MAINTENANCE LOG**

| Date | Stadia Rod Readings | | Sediment Depth (1)–(2) | Observations/Actions | Inspector |
|---|---|---|---|---|---|
| | Fixed point to chamber bottom (1) | Fixed point to top of sediment (2) | | | |
| 3/15/11 | 6.3 ft | none | | New installation. Fixed point is CI frame at grade | DJM |
| 9/24/11 | | 6.2 | 0.1 ft | Some grit felt | SM |
| 6/20/13 | | 5.8 | 0.5 ft | Mucky feel, debris visible in manhole and in Isolator Row, maintenance due | NV |
| 7/7/13 | 6.3 ft | | 0 | System jetted and vacuumed | DJM |



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Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

## StormTech Maintenance Log

**Project Name:**
**Location:**


| | Stadia Rod Readings | | | | |
|---|---|---|---|---|---|
| **Date** | **Fixed point to chamber bottom (1)** | **Fixed point to top of sediment (2)** | **Sediment Depth (1) - (2)** | **Observations / Actions** | **Inspector** |
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