STORMWATER MANAGEMENT REPORT

For the proposed:

DEVELOPMENT

Lots 7, 8 & 9 Killingworth Road

Haddam, Connecticut

Prepared for:

MPA REALTY ASSOCIATES, INC

Issued: SEPTEMBER 16, 2022

Last revised:

Architecture
Engineering
Environmental
Land Surveying

BL Companies

PREPARED BY

BL Companies

100 Constitution Plaza
10th Floor
Hartford, CT 06103

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EXECUTIVE SUMMARY

MPA Realty Associates, Inc. is seeking to develop vacant parcels located just north of 968 Killingworth Road within the Town of Haddam, Middlesex County, Connecticut by constructing a retail facility. The proposed development will include a 10,700 square foot building with associated parking facilities, utilities, and landscaping. The three existing parcels (Parcel ID# 60-026-7, 60-026-8, and 60-026-9) have a total area of approximately 2.74 acres.

Parcels 8 and 9 are currently vacant. Parcel 7 houses a portion of the gravel parking area for the mixed-use development at 968 Killingworth Road. The current landowner performed minor wetlands filling on parcels 8 and 9 and wetlands mitigation on parcel 7. This work was permitted and approved by the Town of Haddam Inland Wetlands Commission in the spring of 2022. The site currently exists as a mix of grass and woods grass with a small section of gravel parking.

The development will provide the necessary parking facilities, the extension of public utilities, and the construction of a new stormwater management system for the proposed user.

Total limits of disturbance are approximately 1.75 acres.

The proposed project includes the construction of a proposed retail facility with a footprint of ±10,700 square feet (SF). The development of the parcel will increase the total overall impervious coverage by ±32,000 SF.

Site improvements include parking, loading area, utility services, landscaping, site lighting, and a comprehensive stormwater management system.

The stormwater management system has been designed to be in general conformance with the Town of Haddam Zoning Regulations, 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, and the 2004 Connecticut Stormwater Quality.

1.0 SITE INFORMATION

PROJECT DESCRIPTION

The overall subject parcel is located immediately north of 968 Killingworth Road, Town of Haddam, Middlesex County, Connecticut. In the existing condition, the majority of the site has topography of varying slopes that conveys stormwater runoff to a small pond located on the eastern half of 968 Killingworth Road. The subject parcel described above is bounded to the north and east by residential houses, to the south by a mixed-use development at 968 Killingworth Road, and to the west by Killingworth Road, also known as CT Route 81.

The eastern portion of the site discharges offsite to the east, while the remainder of the site, and a number of adjacent parcels, currently drain to the pond at 968 Killingworth Road.

The proposed site improvements will include the proposed retail building, paved parking areas, landscaped areas, pedestrian sidewalks, site utilities, and a stormwater management system. The proposed improvements will require the clearing of vegetated, native land.

SITE LOCATION

SITE SOILS

A site-specific soils report was completed for the limits of the property and is included in Appendix G. Offsite soils were mapped using NRCS and are also shown in Appendix G.

The soils in the area of the Property are classified by United States Department of Agriculture Natural Resources Conservation Service and consist primarily of type "B", "C" and "D" rated soils, with "D" rated soils in areas of urban land and wetlands. Please refer to Appendix G NRCS Soil Survey Map with Hydrologic Soil Group Data, for soils and their classifications in the project area.

Soils located within the project area from the soil report are as follows:

TABLE 1: SOIL CLASSIFICATIONS

Map Unit Symbol	Map Unit Name	Hydrologic Soil Group Rating
3	Ridgebury, Leicester, and Whitman soils	D
29B	Agawam fine sandy loam	B
61C	Canton and Charlton fine sandy loams	B
73C	Charlton-Chatfield complex	B
85C	Paxton and Montauk fine sandy loams	C
W	Water	N/A

1.1 NATURAL RESOURCES

ENVIRONMENTAL CONCERNS

A preliminary environmental screening was performed on the property. No items of concern were found.

ENDANGERED AND TREATENED SPECIES

The Connecticut Department of Energy and Environmental Protection's (CTDEEP) Natural Diversity Data Base (NDDB) compiles maps that are representative of the locations of endangered, threatened and special concern species and significant natural communities in Connecticut. A review of the criteria for concern indicates there are no species of environmental concern within 1/2 mile of the project site. This review was performed most recently on September 9, 2022, with maps dated June 2022.

HISTORIC PRESERVATION REVIEW

Per Chapter 184a, section 10-387 of the Connecticut General Statues states that DEEP shall review, in consultation with the State Historic Preservation Office it's policies and practices for consistency with regards to historic and archeological sites. As such, the historic preservation review procedures have been performed for the site based on the DEEP General Stormwater Discharge Permit for Construction activities, and the site is not within an area of significance.

1.2 RECEIVING SURFACE WATERS

The project site lies within the Mill Creek drainage basin (4015), which is within the Connecticut River Major Basin. The project site is not located within a public water supply watershed.

A review of CTDEEP Aquifer Protection Area mappings for the State of Connecticut reveals that the project is not located within an aquifer protection area.

This site is not within the Coastal Boundary for the State of Connecticut.

1.3 FEMA FLOODPLAIN

The site is not located in a FEMA floodplain. Per the FEMA Flood Insurance Rate Map Number 09007C0245G for the Town of Haddam, Connecticut, map effective date: August 28, 2008, the site resides inside Zone X (areas determined to be outside the 0.2% annual chance floodplain).

Flood Insurance Rate Maps are included in Appendix A for reference.

2.0 HYDROLOGIC DESIGN METHODOLOGY

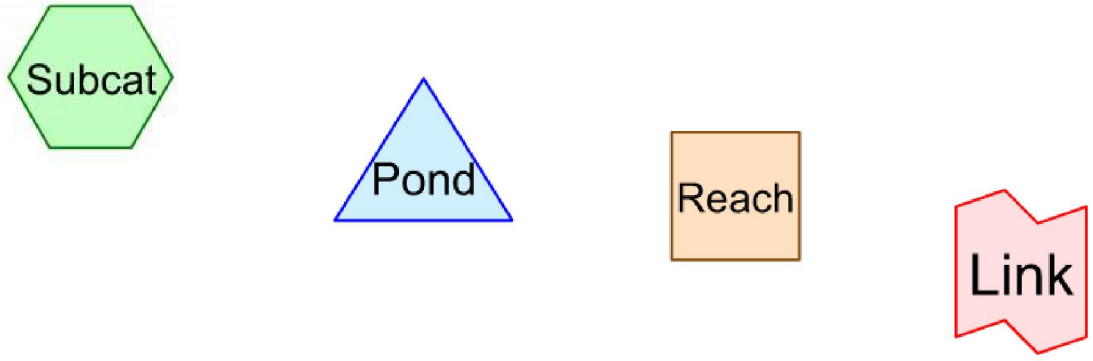
The hydrologic analysis to determine peak stormwater discharge rates was performed using the HydroCAD stormwater modeling system computer program, version 10.00 developed by HydroCAD Software Solutions, LLC. Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method.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

TABLE 2: RAINFALL DEPTHS

Return Period (Year)	24-hour Rainfall Depth
2	3.44
10	5.25
25	6.37
100	8.11

The Hydrocad printouts use a series of symbols for the various modeling entities. Hydrologic Subcatchment areas are represented by a hexagon, stormwater basins are represented by blue triangles, reaches are represented by squares, and links are represented by irregular octagons. A Reach is used to perform an independent hydrograph routing through an open channel based on normal Manning's flow, and a link is used to hydrolocally add multiple entities together to determine the peak discharge to an analysis point.

The hydrologic modeling results determined the change in peak rates of runoff for a 2-, 10-, 25- and 100-year storm events. The hydrologic modeling results in Appendices C and D are the overall analysis summaries from each storm event. The complete hydrographs for each storm and subcatchment can be found in the Hydrologic Report.



2.1 DESIGN CRITERIA

The proposed stormwater management system is designed to be in general conformance with the current Town of Haddam Zoning Regulations, the 2002 State of Connecticut Guidelines for Soil Erosion and Sediment Control, the 2004 State of Connecticut Stormwater Quality Manual, and State of Connecticut Department of Transportation Drainage Manual.

According to the Connecticut Stormwater Quality Manual the stormwater rate of discharge from the site post construction should be less than or equal to the rate of discharge from the site in the pre-construction condition. The stormwater management has been evaluated for the 2-, 10-, 25-, and 100-year design storms.

The stormwater quality requirements for the State of Connecticut for the removal of 80% of the Total Suspended Solids (TSS) have been removed from the stormwater discharge from the site through the utilization of a hydrodynamic separator, infiltration basin and subsurface infiltration system Best Management Practices (BMP's). The proposed treatment train as designed is expected to remove at least 80% of TSS. Calculations can be found in Appendix F. Additionally, per CT DEEP design standards, the required WQV is to be retained within the basin and subsurface system. The basin and subsurface system have been designed such that the lowest outlets are located above the elevation required to retain 100% of the design WQV.

3.0 HYDROLOGIC ANALYSIS

The site layout and approach to stormwater management was completed in an integrated manner by attempting to limit the impacts of vegetation loss and soil changes; by incorporating Best Management Practices (BMPs), which includes both structural and non-structural practices; and by considering the overall impacts to the receiving waters.

3.1 PRE-DEVELOPMENT CONDITIONS

The drainage analysis for the existing site encompasses 3.3-acres located immediately north of 968 Killingworth Road. The impervious coverage percentage for the entire tributary area in the existing condition is approximately 10%. The existing drainage areas with runoff curve numbers, time of concentration paths and soil types can be found in the hydrologic modeling results in Appendix C.

Existing runoff from the project site generally drains from the north side of the property to the south to one (1) Design Point (DP), generally described as follows:

- Design Point 1: Pond
- Design Point 2: Abutters to the East
- Design Point 3: Killingworth Road

3.1.1 ANALYSIS POINTS

Design Point 1 is the small pond located on the lot immediately south of the project site. Under existing conditions, the majority of the project area and some upgradient areas north of the site (±2.4 acres) discharges to this pond. Groundcover primarily consists of woodland with some grass and trace amounts of paving, gravel, and building roofs.

Design Point 2 is the roadway drainage system in Killingworth Road. Under the existing condition there is a small portion of the drainage area (less than 0.2 acres) that discharges to the street. This portion of the drainage area generally consists of the paved roadway.

Design Point 3 is the eastern abutter to the site. Under the existing condition there is a small portion of the land (less than 0.7 acres) that discharges across the property line to the abutting neighbor. The discharge from this area is from the wooded area along the eastern property line and is mainly wooded with a thick understory.

Appendix B contains the Existing Conditions Drainage Area Map.

3.2 POST DEVELOPMENT CONDITIONS

The drainage analysis for the proposed construction encompasses the same tributary drainage area of the 3.3-acres as described in the existing conditions section. The impervious coverage percentage for the entire tributary area in the proposed condition is approximately 37%. The proposed drainage areas with runoff curve numbers, time of concentration paths and soil types can be found in the hydrologic modeling results in Appendix D. The proposed drainage has been designed to reduce peak stormwater discharge rates leaving the site.

Just as the existing conditions hydrology, discussed above, the project area hydrology is also broken down into three overall points of interest with five contributing Drainage Areas.

Overall, there is a net reduction in peak discharge from the site for the 2-year,10-year, 25-year, and 100-year storm events as seen in Table 3 below. Design Points 1 and 3 will experience a net reduction in peak rate discharge. While Design Point 2 will experience a slight increase in peak rate discharge, the total increase in stormwater runoff does not exceed 0.3cfs during the 100-year storm event. As a result, the proposed development will not adversely affect downstream infrastructure and properties located within the regional watershed.

3.2.1 ANALYSIS POINTS

Design Point 1 is the small pond located on the lot immediately south of the project site. Under the proposed condition this design point will collect three individual drainage areas. These drainage areas compromise the building roof, parking area, southern grass area. The proposed development will discharge to one small stormwater management basin and one small subsurface infiltration system for stormwater retention as well as removal of total suspended solids (TSS) and nutrients. These basins will discharge through an appropriately sized velocity dissipation measure (riprap apron) towards the pond offsite to the south. Under the proposed condition the total area discharging to DP-1 is approximately ±2.65 acres. Typically, the area is impervious surfaces (pavement or building), landscaped islands, lawn areas, and a small portion of undisturbed woods with a thick understory.

Design Point 2 is the roadway drainage system in Killingworth Road. Under the proposed condition a small portion of the proposed driveway as well as the eastern half of Killingworth Road (±0.21 acres) will discharge to the street. This portion of the drainage area is generally paved.

Design Point 3 is the eastern abutter to the site. Under the proposed condition there remains a small portion of land (less than 0.5 acres) that discharges across the property line to the abutting neighbor. Due to the development of the parcel, this area is significantly decreased, but area a result of the topography of the site, there remains a small portion of the site that continues to discharge in that direction. The discharge from this area is from the wooded area along the eastern property line and is mainly wooded with a thick understory.

Appendix B contains the Proposed Conditions Drainage Area Map.

3.3 POST-DEVELOPMENT HYDROLOGIC CONCLUSIONS

TABLE 3: PEAK FLOW COMPARISON CHART

Design Point	2-Year Flow (CFS)	10-Year Flow (CFS)	25-Year Flow (CFS)	100-Year Flow (CFS)
DP 1 – Existing Condition	1.68	4.21	5.95	8.80
DP 1 – Proposed Condition	0.98	4.13	5.87	8.54
Difference	-45.83%	-2.38%	-2.86%	-0.23%
DP 2 – Existing Condition	0.72	1.11	1.34	1.71
DP 2 – Proposed Condition	0.84	1.29	1.56	1.99
Difference	+16.67%	+16.22%	+16.42%	+16.37%
DP 3 – Existing Condition	0.06	0.50	0.88	1.55
DP 3 – Proposed Condition	0.06	0.43	0.73	1.28
Difference	-0.00%	-14.00%	-17.05%	-17.42%

4.0 HYDRAULIC ANALYSIS

4.1 PRELIMINARY HYDRAULICS

The hydraulic study of the on-site drainage system has been designed to comply with the requirements set forth in the Town of Haddam Zoning Regulations and the State of Connecticut Department of Transportation Drainage Manual.

The proposed drainage systems have been sized to convey the 10-year storm event to their respective discharge points without ponding or surcharging above the catch basin / manhole grates. NOAA Atlas 14 rainfall intensity for Higganum, Connecticut was utilized. The site drainage system improvements have been designed to comply with the requirements set forth in the State of Connecticut Department of Transportation Drainage Manual, dated 2000, as amended. Drainage areas contributing to each inlet have been determined and are found on the Proposed Drainage Map in Appendix B.

The minimum pipe size maintained onsite is 12 inches.

The runoff coefficients for each inlet drainage area have been calculated as the weighted average of impervious and pervious surfaces contributing to the runoff. Impervious surfaces including asphalt pavement, concrete pavement, gravel parking, and building roof area were computed using a rational runoff coefficient of 0.90. Pervious surfaces including woods, lawn and landscaped area were computing using a rational runoff coefficient of 0.30.

Tailwater elevations for the stormwater management areas and flared end sections are based on the 10-year design storm.

StormCAD version 8i by Haestad Methods, utilizing the Rational Method, was used to model the proposed drainage system. Calculation data can be found in Appendix E.

5.0 SITE CONSTRUCTION AND EROSION CONTROLS

There are two phases of erosion control measures for the proposed development. The first phase proposes the installation of filter socks at existing stormwater inlets, rock construction entrances and silt fence around the proposed area of disturbance prior to the commencement of any earth disturbance activities. At the start of phase 1, one temporary sediment traps, diversion swales and stone check dams will be installed to capture runoff from the site.

During phase 2 of erosion control sequence, the perimeter measures and rock construction entrances will remain in place. All constructed stormwater inlets will have inlet protection installed. All areas that have achieved final grade will need to be immediately covered with 6" of topsoil, seeded and mulched. Slopes that are greater than 3:1 will need to be covered with erosion control matting prior receiving seed and mulch. All erosion control matting will be wildlife friendly, with all-natural material and no photodegradable content

Any topsoil that is stripped will need to be stockpiled onsite to be used later. Stockpiles will need to received temporary seeding and have a filter sock around its base to prevent the loss of materials.

Dewater of any trenches and/or basin will need to be completed in a manner that will avoid creating any areas of accelerated erosion.

During construction of this project, all erosion control measures will need to be inspected weekly and following any major rain event. Any repairs to the erosion control BMPs will need to be completed within 24 hours of any major rain event.

See detail plans for full Construction Sequence.

6.0 CONCLUSIONS & RECOMMENDATION

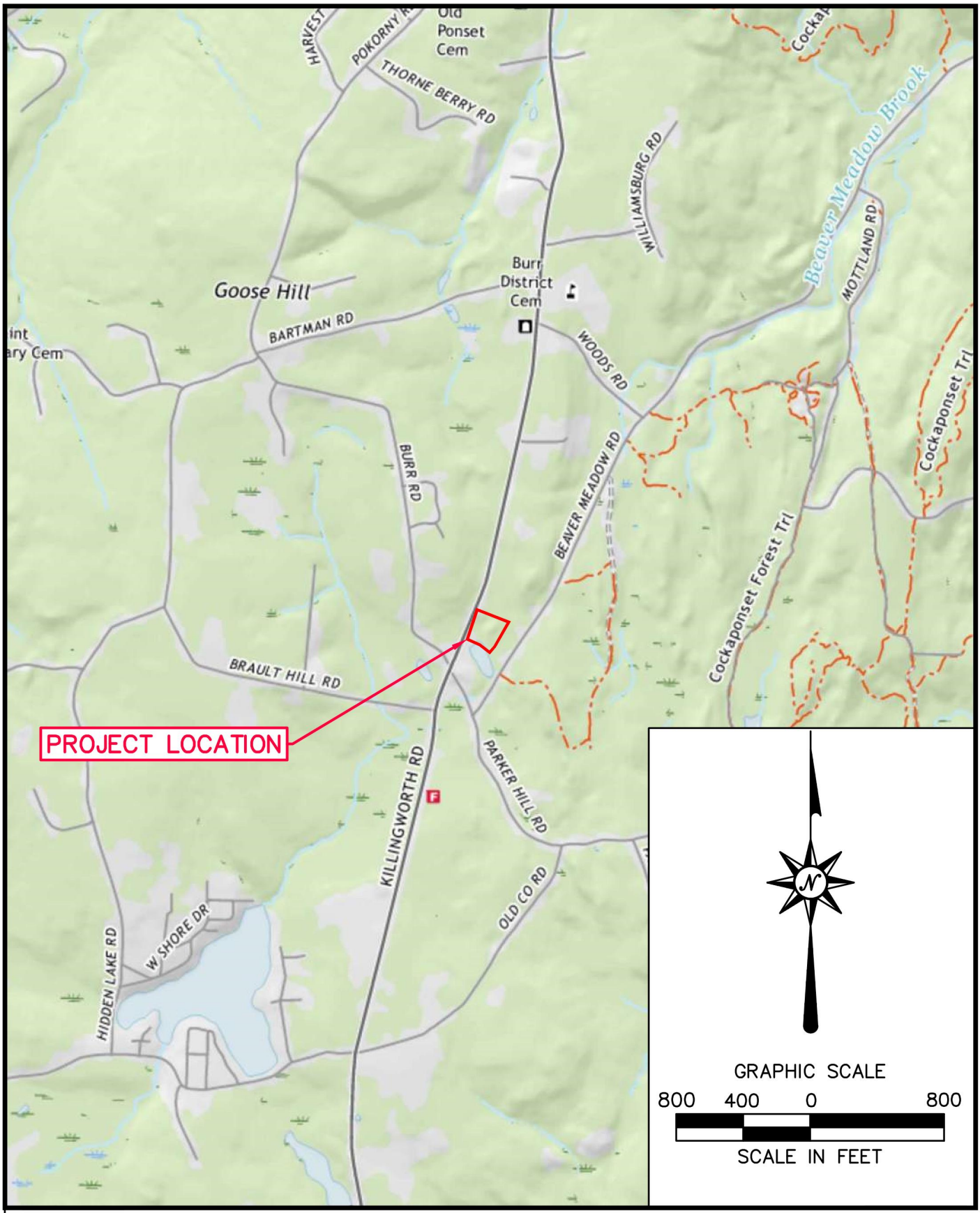
With the implementation of the stormwater management system designed for this project, there will be no negative impacts on-site or on downstream properties or off-site storm drainage systems from the proposed development. The rate of stormwater runoff for the development as a whole is decreased through all storm events. Existing runoff discharge points will be maintained in the proposed design and appropriate measures are included to ensure that drainage will continue to flow to existing locations using the current NOAA Atlas 14 rainfall runoff rates.

The stormwater management system has been designed to reduce peak flow rates. Although it is anticipated that there will be a slight increase to the peak flow rate to the street drainage system, the increase is less than 0.3cfs and therefore we feel the impacts are negligible. The on-site drainage collection system is sized for the 10-year storm to operate without ponding or surcharging. Numerous measures have been implemented to improve stormwater quality including a stormwater management basin, a subsurface infiltration system, and a hydrodynamic separator.

This report, as noted above, has been prepared to complement the submitted project plans as well as to represent the technical basis for the designs presented herein. In consideration of the overall project, we conclude that all technical concerns and design parameters set forth by the Town and State, as presently identified, have been fully met.

APPENDIX A

FIGURES



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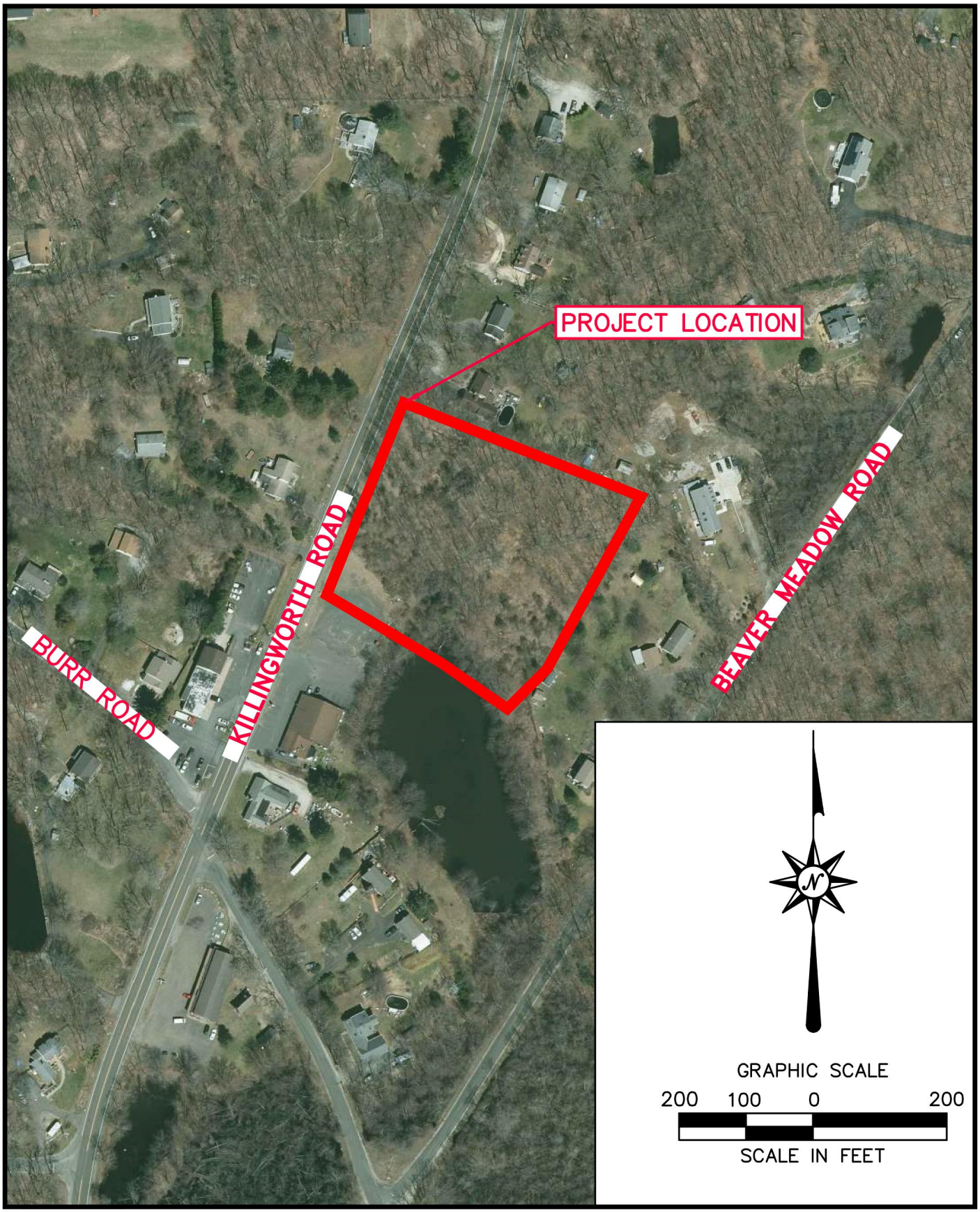
ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING

PROPOSED RETAIL DEVELOPMENT
KILLINGWORTH ROAD, HADDAM
MIDDLESEX COUNTY, CONNECTICUT

Designed	T.A.H.
Drawn	T.A.H.
Checked	T.A.H.
Approved	K.M.M.
Scale	1"=800'
Project No.	2200418
Date	07/05/2022
CAD File	EXH220041801

FIGURE 1
USGS LOCATION MAP



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ARCHITECTURE
ENGINEERING
ENVIRONMENTAL
LAND SURVEYING

PROPOSED RETAIL DEVELOPMENT
KILLINGWORTH ROAD, HADDAM
MONROE COUNTY, CONNECTICUT

Designed	T.A.H.
Drawn	T.A.H.
Checked	T.A.H.
Approved	K.M.M.
Scale	1"=200'
Project No.	2200418
Date	07/05/2022
CAD File	EXH220041801

FIGURE 2
AERIAL LOCATION MAP

National Flood Hazard Layer FIRMette

FEMA

72°33'50"W 41°26'10"N

72°33'12"W 41°25'43"N

Feet 1:6,000

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

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

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
- 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 9/20/2022 at 1:35 PM 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: Higganum, Connecticut, USA*
Latitude: 41.4321°, Longitude: -72.559°
Elevation: 549.37 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	**0.334** (0.259-0.416)	**0.404** (0.313-0.503)	**0.518** (0.401-0.647)	**0.613** (0.470-0.769)	**0.744** (0.554-0.972)	**0.843** (0.614-1.12)	**0.946** (0.671-1.30)	**1.06** (0.714-1.49)	**1.23** (0.793-1.78)	**1.36** (0.860-2.01)
10-min	**0.473** (0.367-0.589)	**0.572** (0.444-0.713)	**0.734** (0.567-0.917)	**0.869** (0.668-1.09)	**1.05** (0.785-1.38)	**1.19** (0.871-1.59)	**1.34** (0.950-1.85)	**1.50** (1.01-2.11)	**1.74** (1.12-2.52)	**1.92** (1.22-2.84)
15-min	**0.557** (0.432-0.693)	**0.674** (0.522-0.839)	**0.865** (0.669-1.08)	**1.02** (0.786-1.28)	**1.24** (0.923-1.62)	**1.40** (1.02-1.87)	**1.58** (1.12-2.17)	**1.77** (1.19-2.48)	**2.04** (1.32-2.96)	**2.26** (1.43-3.34)
30-min	**0.765** (0.593-0.951)	**0.924** (0.716-1.15)	**1.18** (0.915-1.48)	**1.40** (1.08-1.76)	**1.70** (1.26-2.22)	**1.92** (1.40-2.56)	**2.15** (1.53-2.97)	**2.42** (1.63-3.39)	**2.79** (1.81-4.05)	**3.09** (1.96-4.57)
60-min	**0.972** (0.755-1.21)	**1.17** (0.910-1.46)	**1.50** (1.16-1.88)	**1.78** (1.37-2.23)	**2.15** (1.60-2.81)	**2.44** (1.78-3.25)	**2.73** (1.94-3.77)	**3.07** (2.06-4.31)	**3.54** (2.29-5.13)	**3.93** (2.48-5.80)
2-hr	**1.30** (1.02-1.60)	**1.56** (1.22-1.92)	**1.98** (1.54-2.45)	**2.33** (1.80-2.90)	**2.81** (2.11-3.64)	**3.17** (2.33-4.19)	**3.55** (2.54-4.87)	**3.99** (2.70-5.56)	**4.63** (3.01-6.66)	**5.17** (3.28-7.56)
3-hr	**1.52** (1.20-1.87)	**1.82** (1.43-2.24)	**2.30** (1.81-2.84)	**2.71** (2.11-3.36)	**3.26** (2.47-4.22)	**3.68** (2.72-4.85)	**4.12** (2.97-5.63)	**4.64** (3.14-6.42)	**5.40** (3.52-7.72)	**6.04** (3.84-8.79)
6-hr	**1.95** (1.55-2.38)	**2.33** (1.85-2.85)	**2.96** (2.34-3.62)	**3.47** (2.73-4.27)	**4.18** (3.19-5.37)	**4.72** (3.52-6.17)	**5.28** (3.83-7.17)	**5.95** (4.05-8.18)	**6.95** (4.54-9.85)	**7.79** (4.97-11.2)
12-hr	**2.42** (1.95-2.93)	**2.91** (2.34-3.52)	**3.71** (2.96-4.50)	**4.37** (3.47-5.33)	**5.27** (4.05-6.71)	**5.95** (4.47-7.73)	**6.67** (4.87-8.99)	**7.53** (5.15-10.3)	**8.81** (5.78-12.4)	**9.89** (6.33-14.1)
24-hr	**2.83** (2.30-3.40)	**3.44** (2.79-4.13)	**4.43** (3.58-5.33)	**5.25** (4.21-6.35)	**6.37** (4.94-8.06)	**7.21** (5.47-9.31)	**8.11** (5.98-10.9)	**9.20** (6.33-12.4)	**10.9** (7.15-15.1)	**12.3** (7.88-17.4)
2-day	**3.15** (2.58-3.75)	**3.87** (3.17-4.61)	**5.06** (4.13-6.04)	**6.04** (4.89-7.25)	**7.39** (5.79-9.29)	**8.38** (6.43-10.8)	**9.47** (7.07-12.7)	**10.8** (7.48-14.5)	**13.0** (8.56-17.9)	**14.8** (9.53-20.8)
3-day	**3.41** (2.81-4.04)	**4.20** (3.46-4.98)	**5.49** (4.51-6.53)	**6.56** (5.35-7.84)	**8.04** (6.33-10.1)	**9.12** (7.03-11.7)	**10.3** (7.73-13.7)	**11.8** (8.17-15.7)	**14.2** (9.37-19.4)	**16.2** (10.5-22.6)
4-day	**3.66** (3.03-4.32)	**4.50** (3.72-5.32)	**5.87** (4.83-6.95)	**7.00** (5.73-8.34)	**8.56** (6.77-10.7)	**9.71** (7.51-12.4)	**11.0** (8.24-14.6)	**12.6** (8.71-16.7)	**15.0** (9.96-20.5)	**17.2** (11.1-23.9)
7-day	**4.38** (3.66-5.13)	**5.31** (4.43-6.23)	**6.82** (5.67-8.04)	**8.08** (6.67-9.56)	**9.82** (7.81-12.1)	**11.1** (8.62-14.0)	**12.5** (9.40-16.4)	**14.2** (9.90-18.7)	**16.9** (11.2-22.9)	**19.2** (12.4-26.4)
10-day	**5.09** (4.28-5.95)	**6.08** (5.10-7.10)	**7.68** (6.42-9.01)	**9.02** (7.48-10.6)	**10.8** (8.66-13.3)	**12.2** (9.51-15.3)	**13.7** (10.3-17.8)	**15.4** (10.8-20.2)	**18.1** (12.1-24.5)	**20.4** (13.2-28.0)
20-day	**7.33** (6.22-8.49)	**8.40** (7.12-9.74)	**10.1** (8.56-11.8)	**11.6** (9.71-13.5)	**13.6** (10.9-16.4)	**15.1** (11.8-18.6)	**16.7** (12.5-21.2)	**18.4** (13.0-23.9)	**20.9** (14.0-27.9)	**22.9** (14.9-31.2)
30-day	**9.21** (7.87-10.6)	**10.3** (8.81-11.9)	**12.2** (10.3-14.1)	**13.7** (11.5-15.9)	**15.7** (12.7-18.9)	**17.3** (13.6-21.1)	**19.0** (14.2-23.8)	**20.6** (14.6-26.6)	**22.9** (15.4-30.4)	**24.7** (16.1-33.4)
45-day	**11.6** (9.94-13.3)	**12.7** (10.9-14.6)	**14.6** (12.5-16.9)	**16.2** (13.8-18.8)	**18.4** (14.9-21.9)	**20.1** (15.8-24.3)	**21.8** (16.3-26.9)	**23.4** (16.6-29.9)	**25.4** (17.2-33.5)	**26.9** (17.6-36.2)
60-day	**13.5** (11.7-15.5)	**14.7** (12.7-16.9)	**16.7** (14.4-19.2)	**18.4** (15.6-21.2)	**20.6** (16.8-24.4)	**22.4** (17.7-26.9)	**24.1** (18.1-29.6)	**25.7** (18.3-32.7)	**27.5** (18.7-36.2)	**28.8** (18.8-38.6)

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

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

Please refer to NOAA Atlas 14 document for more information.

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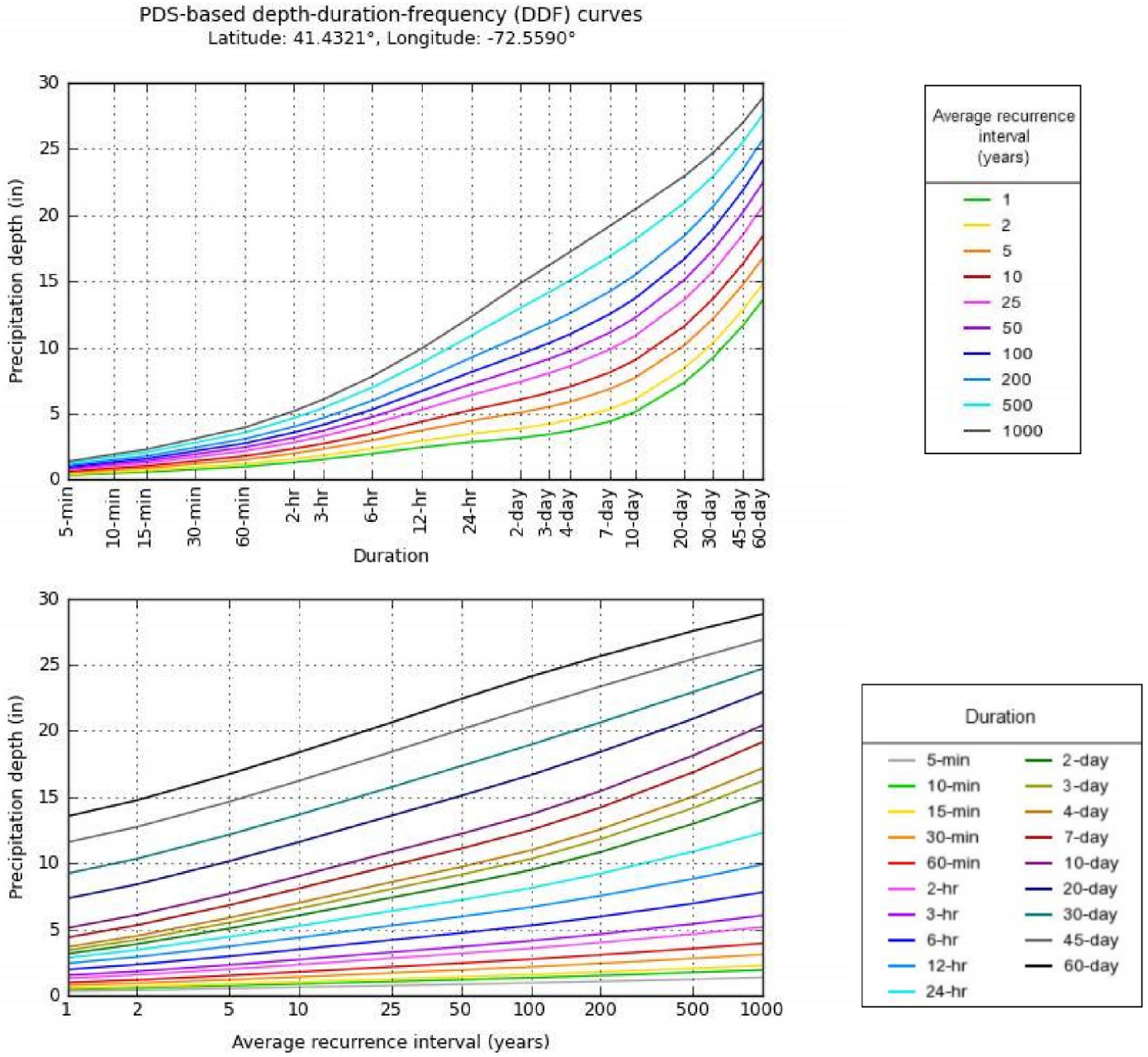
PF graphical



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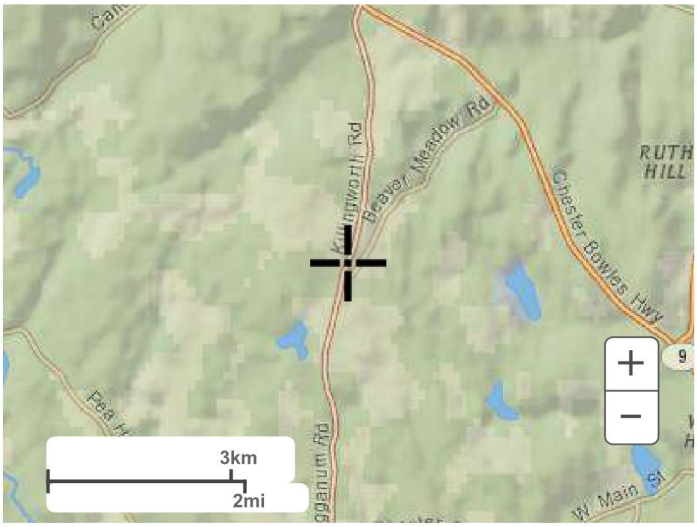
Maps & aerials

Small scale terrain



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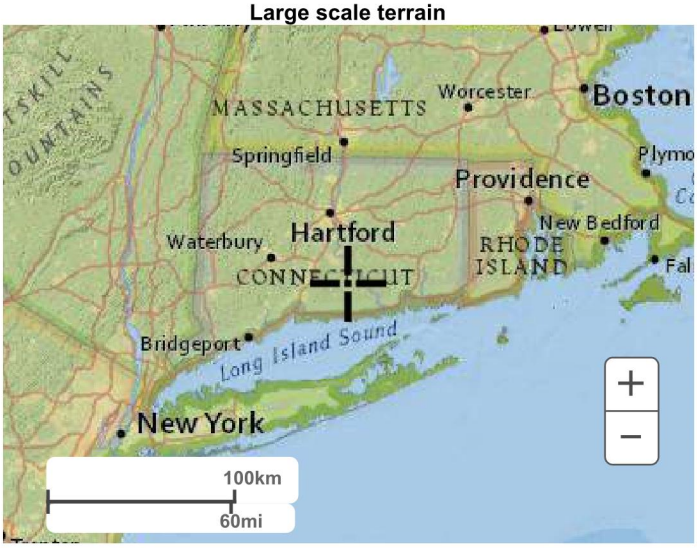

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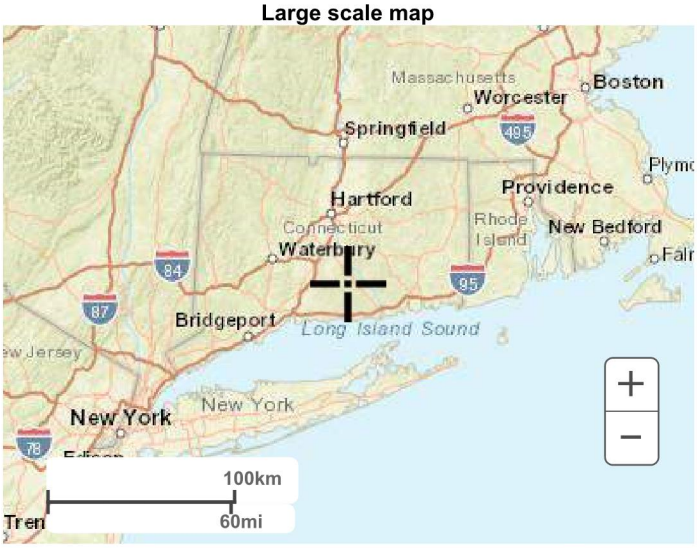

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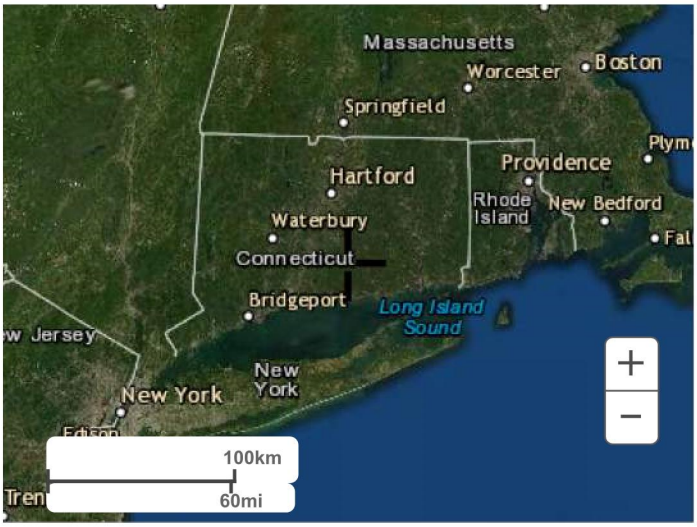

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

NOAA Atlas 14, Volume 10, Version 3
Location name: Higganum, Connecticut, USA*
Latitude: 41.4321°, Longitude: -72.559°
Elevation: 549.37 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/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.01** (3.11-4.99)	**4.85** (3.76-6.04)	**6.22** (4.81-7.76)	**7.36** (5.64-9.23)	**8.93** (6.65-11.7)	**10.1** (7.37-13.5)	**11.4** (8.05-15.6)	**12.7** (8.57-17.9)	**14.7** (9.52-21.3)	**16.3** (10.3-24.1)
10-min	**2.84** (2.20-3.53)	**3.43** (2.66-4.28)	**4.40** (3.40-5.50)	**5.21** (4.01-6.55)	**6.32** (4.71-8.27)	**7.16** (5.23-9.54)	**8.04** (5.70-11.1)	**9.02** (6.07-12.7)	**10.4** (6.74-15.1)	**11.5** (7.31-17.0)
15-min	**2.23** (1.73-2.77)	**2.70** (2.09-3.36)	**3.46** (2.68-4.32)	**4.09** (3.14-5.13)	**4.96** (3.69-6.48)	**5.62** (4.10-7.48)	**6.30** (4.47-8.68)	**7.07** (4.76-9.93)	**8.16** (5.29-11.8)	**9.06** (5.73-13.4)
30-min	**1.53** (1.19-1.90)	**1.85** (1.43-2.30)	**2.37** (1.83-2.96)	**2.80** (2.15-3.51)	**3.39** (2.53-4.43)	**3.84** (2.80-5.12)	**4.31** (3.06-5.94)	**4.83** (3.25-6.79)	**5.58** (3.61-8.09)	**6.19** (3.92-9.14)
60-min	**0.972** (0.755-1.21)	**1.17** (0.910-1.46)	**1.50** (1.16-1.88)	**1.78** (1.37-2.23)	**2.15** (1.60-2.81)	**2.44** (1.78-3.25)	**2.73** (1.94-3.77)	**3.07** (2.06-4.31)	**3.54** (2.29-5.13)	**3.93** (2.48-5.80)
2-hr	**0.648** (0.508-0.800)	**0.778** (0.608-0.960)	**0.988** (0.770-1.22)	**1.16** (0.902-1.45)	**1.40** (1.05-1.82)	**1.58** (1.17-2.10)	**1.77** (1.27-2.43)	**1.99** (1.35-2.78)	**2.32** (1.51-3.33)	**2.58** (1.64-3.78)
3-hr	**0.506** (0.399-0.622)	**0.605** (0.476-0.744)	**0.767** (0.601-0.946)	**0.901** (0.703-1.12)	**1.09** (0.821-1.40)	**1.22** (0.907-1.62)	**1.37** (0.987-1.88)	**1.54** (1.05-2.14)	**1.80** (1.17-2.57)	**2.01** (1.28-2.93)
6-hr	**0.326** (0.259-0.397)	**0.390** (0.310-0.475)	**0.494** (0.391-0.604)	**0.580** (0.457-0.713)	**0.699** (0.533-0.896)	**0.787** (0.588-1.03)	**0.882** (0.640-1.20)	**0.994** (0.677-1.37)	**1.16** (0.759-1.65)	**1.30** (0.830-1.88)
12-hr	**0.201** (0.162-0.243)	**0.242** (0.194-0.292)	**0.308** (0.246-0.374)	**0.362** (0.288-0.442)	**0.438** (0.336-0.557)	**0.494** (0.371-0.641)	**0.554** (0.404-0.746)	**0.625** (0.428-0.851)	**0.731** (0.480-1.03)	**0.821** (0.525-1.17)
24-hr	**0.118** (0.096-0.142)	**0.143** (0.116-0.172)	**0.184** (0.149-0.222)	**0.219** (0.175-0.265)	**0.266** (0.206-0.336)	**0.300** (0.228-0.388)	**0.338** (0.249-0.453)	**0.384** (0.264-0.518)	**0.453** (0.298-0.630)	**0.512** (0.328-0.725)
2-day	**0.066** (0.054-0.078)	**0.081** (0.066-0.096)	**0.105** (0.086-0.126)	**0.126** (0.102-0.151)	**0.154** (0.121-0.194)	**0.175** (0.134-0.224)	**0.197** (0.147-0.264)	**0.226** (0.156-0.302)	**0.270** (0.178-0.373)	**0.308** (0.199-0.433)
3-day	**0.047** (0.039-0.056)	**0.058** (0.048-0.069)	**0.076** (0.063-0.091)	**0.091** (0.074-0.109)	**0.112** (0.088-0.140)	**0.127** (0.098-0.162)	**0.143** (0.107-0.191)	**0.164** (0.114-0.219)	**0.197** (0.130-0.270)	**0.225** (0.145-0.314)
4-day	**0.038** (0.032-0.045)	**0.047** (0.039-0.055)	**0.061** (0.050-0.072)	**0.073** (0.060-0.087)	**0.089** (0.071-0.111)	**0.101** (0.078-0.129)	**0.114** (0.086-0.152)	**0.131** (0.091-0.174)	**0.157** (0.104-0.214)	**0.179** (0.116-0.249)
7-day	**0.026** (0.022-0.031)	**0.032** (0.026-0.037)	**0.041** (0.034-0.048)	**0.048** (0.040-0.057)	**0.058** (0.046-0.072)	**0.066** (0.051-0.083)	**0.074** (0.056-0.098)	**0.085** (0.059-0.111)	**0.100** (0.067-0.136)	**0.114** (0.074-0.157)
10-day	**0.021** (0.018-0.025)	**0.025** (0.021-0.030)	**0.032** (0.027-0.038)	**0.038** (0.031-0.044)	**0.045** (0.036-0.056)	**0.051** (0.040-0.064)	**0.057** (0.043-0.074)	**0.064** (0.045-0.084)	**0.076** (0.050-0.102)	**0.085** (0.055-0.117)
20-day	**0.015** (0.013-0.018)	**0.017** (0.015-0.020)	**0.021** (0.018-0.025)	**0.024** (0.020-0.028)	**0.028** (0.023-0.034)	**0.031** (0.025-0.039)	**0.035** (0.026-0.044)	**0.038** (0.027-0.050)	**0.044** (0.029-0.058)	**0.048** (0.031-0.065)
30-day	**0.013** (0.011-0.015)	**0.014** (0.012-0.017)	**0.017** (0.014-0.020)	**0.019** (0.016-0.022)	**0.022** (0.018-0.026)	**0.024** (0.019-0.029)	**0.026** (0.020-0.033)	**0.029** (0.020-0.037)	**0.032** (0.021-0.042)	**0.034** (0.022-0.046)
45-day	**0.011** (0.009-0.012)	**0.012** (0.010-0.014)	**0.014** (0.012-0.016)	**0.015** (0.013-0.017)	**0.017** (0.014-0.020)	**0.019** (0.015-0.022)	**0.020** (0.015-0.025)	**0.022** (0.015-0.028)	**0.024** (0.016-0.031)	**0.025** (0.016-0.033)
60-day	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)	**0.012** (0.010-0.013)	**0.013** (0.011-0.015)	**0.014** (0.012-0.017)	**0.016** (0.012-0.019)	**0.017** (0.013-0.021)	**0.018** (0.013-0.023)	**0.019** (0.013-0.025)	**0.020** (0.013-0.027)

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

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

Please refer to NOAA Atlas 14 document for more information.

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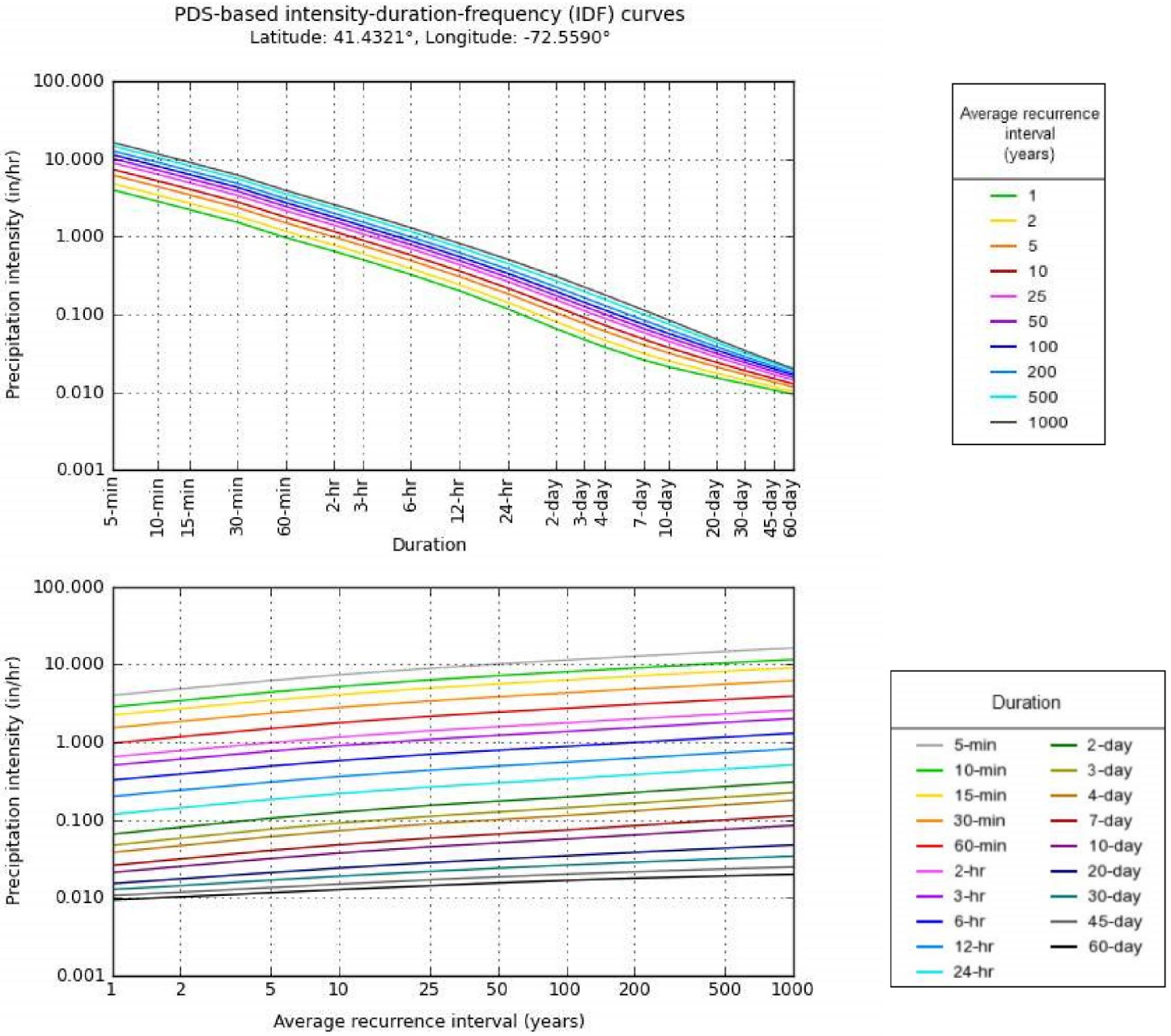
PF graphical



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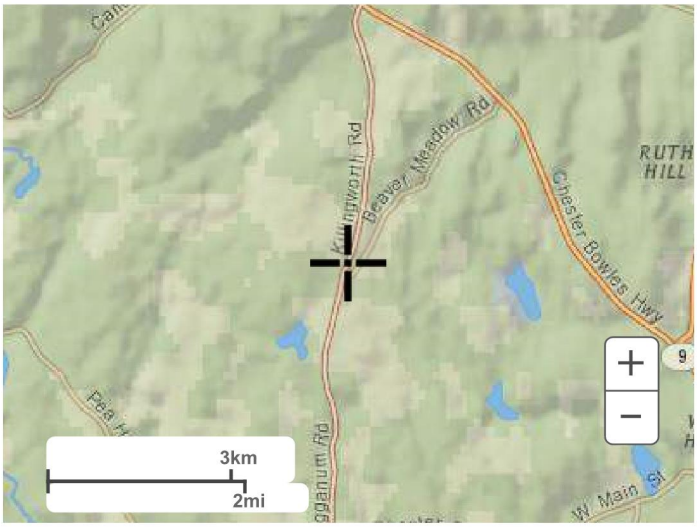
Maps & aerials

Small scale terrain



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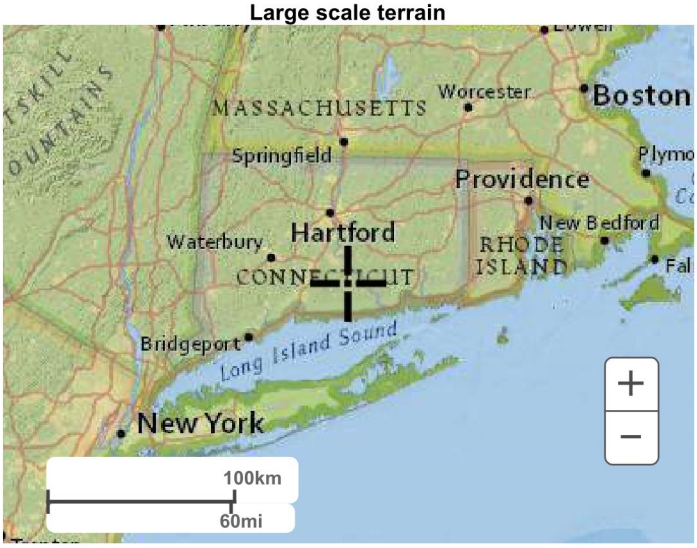

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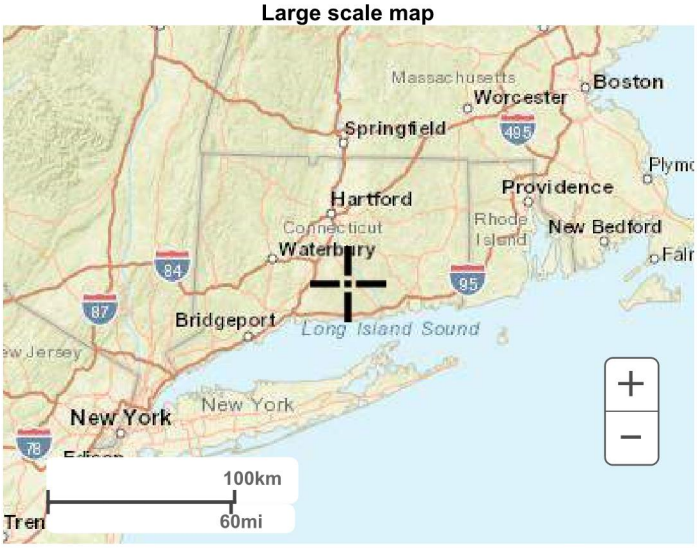

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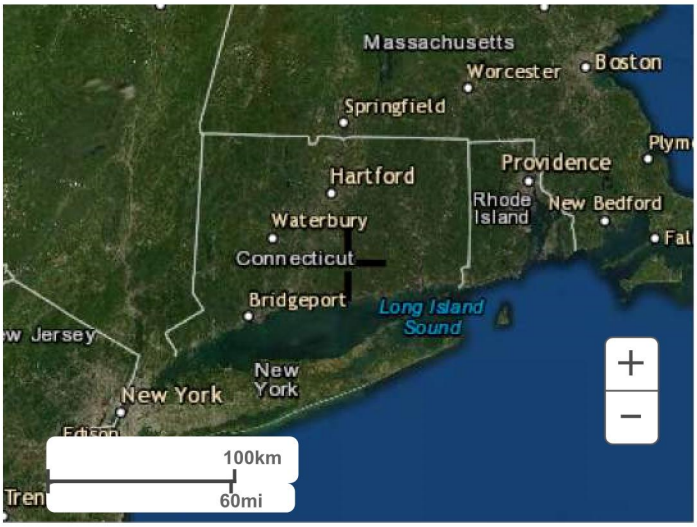

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National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

APPENDIX B

DRAINAGE AREA MAPS

EXISTING HYDROLOGY LEGEND

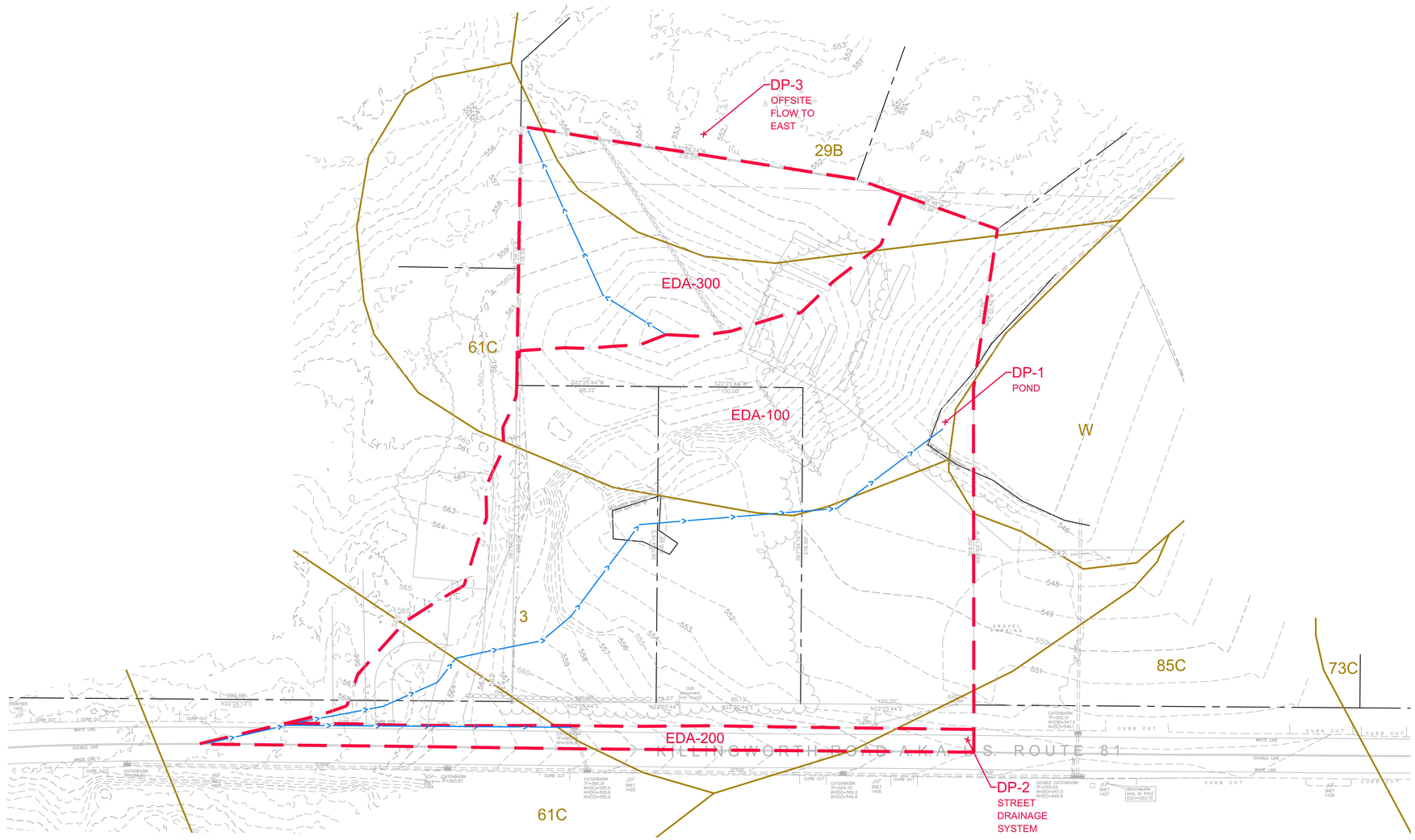
- PROPERTY LINE
- EXISTING SOIL BOUNDARY
- EXISTING DRAINAGE BOUNDARY
- EXISTING TIME OF CONCENTRATION
- EDA-200 — EXISTING DRAINAGE AREA ID
- DP-2 — EXISTING DESIGN POINT

SOIL TYPE LEGEND

3	RIDGEBURY, LEICESTER, AND WHITMAN SOILS 0–8% SLOPES, EXTREMELY STONY
29B	AGAWAM FINE SANDY LOAM 3–8% SLOPES
61C	CANTON AND CHARLTON FINE SANDY LOAMS 8–15% SLOPES, VERY STONY
73C	CHARLTON–CHATFIELD COMPLEX 0–15% SLOPES, VERY ROCKY
85C	PAXTON AND MONTAUK FINE SANDY LOAMS 8–15% SLOPES, VERY STONY
W	WATER

EXISTING HYDROLOGY SUMMARY TABLE

DRAINAGEA AREA	TOTAL AREA (S.F.)	IMPERVIOUS AREA (S.F.)	PERVIOUS AREA (S.F.)	PERCENT IMPERVIOUS (%)	CN	TIME OF CONCETRATIONS (MIN.)
EDA-100	105,918	6,537	99,381	6.2%	70	17.5
EDA-200	7,973	7,973	0	100.0%	98	5.0
EDA-300	29,689	0	29,689	0.00%	55	15.5000



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(203) 630-2615 Fax

PROPOSED RETAIL DEVELOPMENT
KILLINGWORTH ROAD
HADDAM, CONNECTICUT

REVISIONS
No. Date Desc.

Designed	T.A.H.
Drawn	T.A.H.
Reviewed	
Scale	1"=40'
Project No.	2200418
Date	09/16/2022
CAD File:	ED220041801

Title
EXISTING DRAINAGE MAP

Sheet No.
ED-1

Xref [s] : XC220041811 : XT220041801_Ref1 : BD220041801

9/19/2022, THOULE, ID:\KRISZI\AC\2200418\PLOTWD\ED220041801.DWG ED, 1:40(34.00in), KRISZI, 495C

PROPOSED HYDROLOGY LEGEND

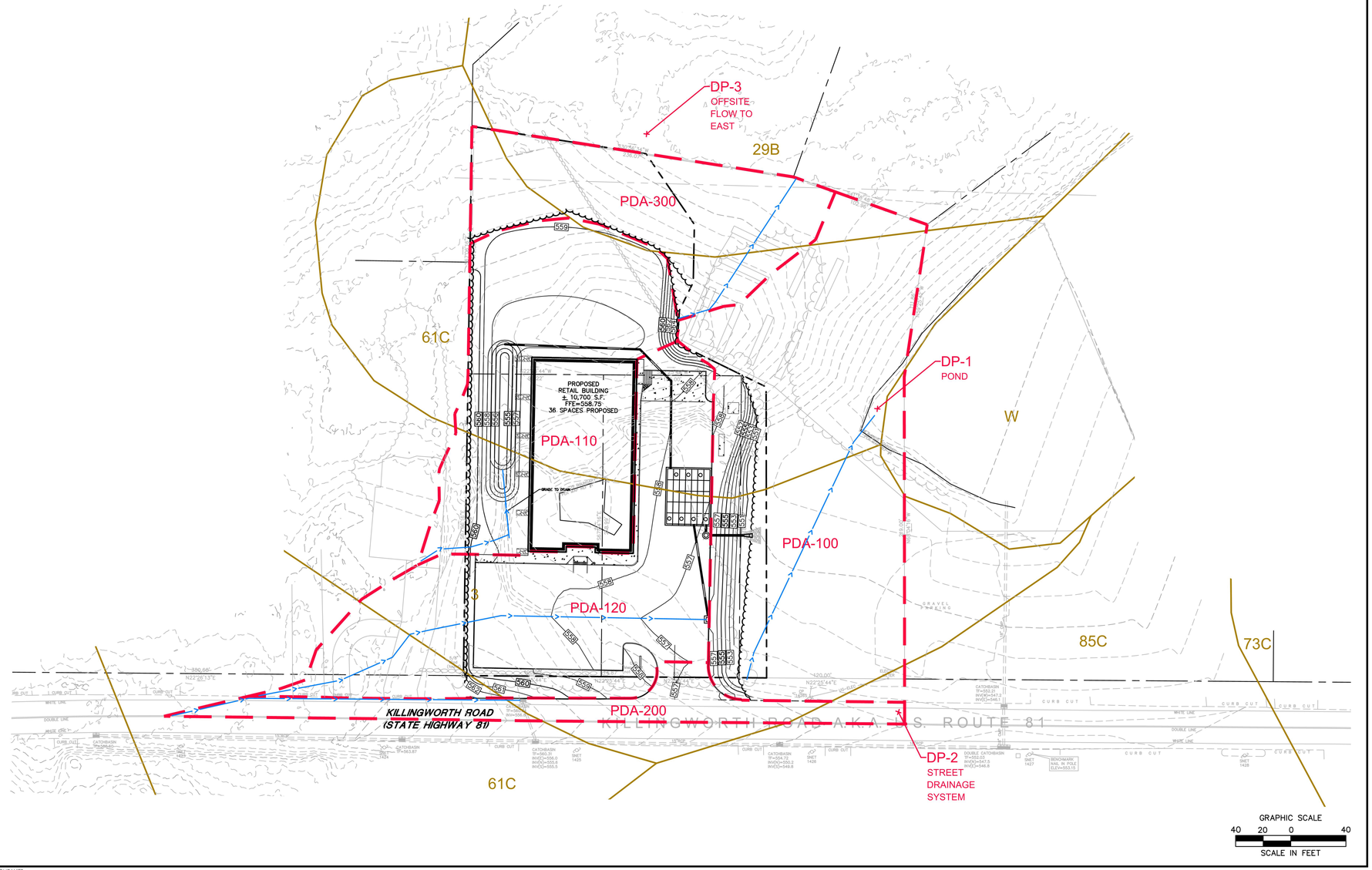
- PROPERTY LINE
- PROPOSED SOIL BOUNDARY
- PROPOSED DRAINAGE BOUNDARY
- PROPOSED TIME OF CONCENTRATION
- PDA-200 — PROPOSED DRAINAGE AREA ID
- DP-2 — PROPOSED DESIGN POINT

SOIL TYPE LEGEND

3	RIDGEBURY, LEICESTER, AND WHITMAN SOILS 0–8% SLOPES, EXTREMELY STONY
29B	AGAWAM FINE SANDY LOAM 3–8% SLOPES
61C	CANTON AND CHARLTON FINE SANDY LOAMS 8–15% SLOPES, VERY STONY
73C	CHARLTON–CHATFIELD COMPLEX 0–15% SLOPES, VERY ROCKY
85C	PAXTON AND MONTAUK FINE SANDY LOAMS 8–15% SLOPES, VERY STONY
W	WATER

PROPOSED HYDROLOGY SUMMARY TABLE

DRAINAGEA AREA	TOTAL AREA (S.F.)	IMPERVIOUS AREA (S.F.)	PERVIOUS AREA (S.F.)	PERCENT IMPERVIOUS (%)	CN	TIME OF CONCETRATIONS (MIN.)
PDA-100	47,764	2,087	45,677	4.4%	69	10.4
PDA-110	32,835	16,254	16,581	49.5%	82	9.0
PDA-120	34,936	26,003	8,933	74.4%	91	12.3
PDA-200	9,286	9,286	0	100.0%	98	5.0
PDA-300	18,759	0	18,759	0.0%	56	10.0



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Meriden, CT 06450
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(203) 630-2615 Fax

PROPOSED RETAIL DEVELOPMENT
KILLINGWORTH ROAD
HADDAM, CONNECTICUT

REVISIONS

No.	Date	Desc.

Designed	T.A.H.
Drawn	T.A.H.
Reviewed	
Scale	1"=40'
Project No.	2200418
Date	09/16/2022
CAD File:	PD220041801

Title

PROPOSED DRAINAGE MAP

Sheet No.

PD-1

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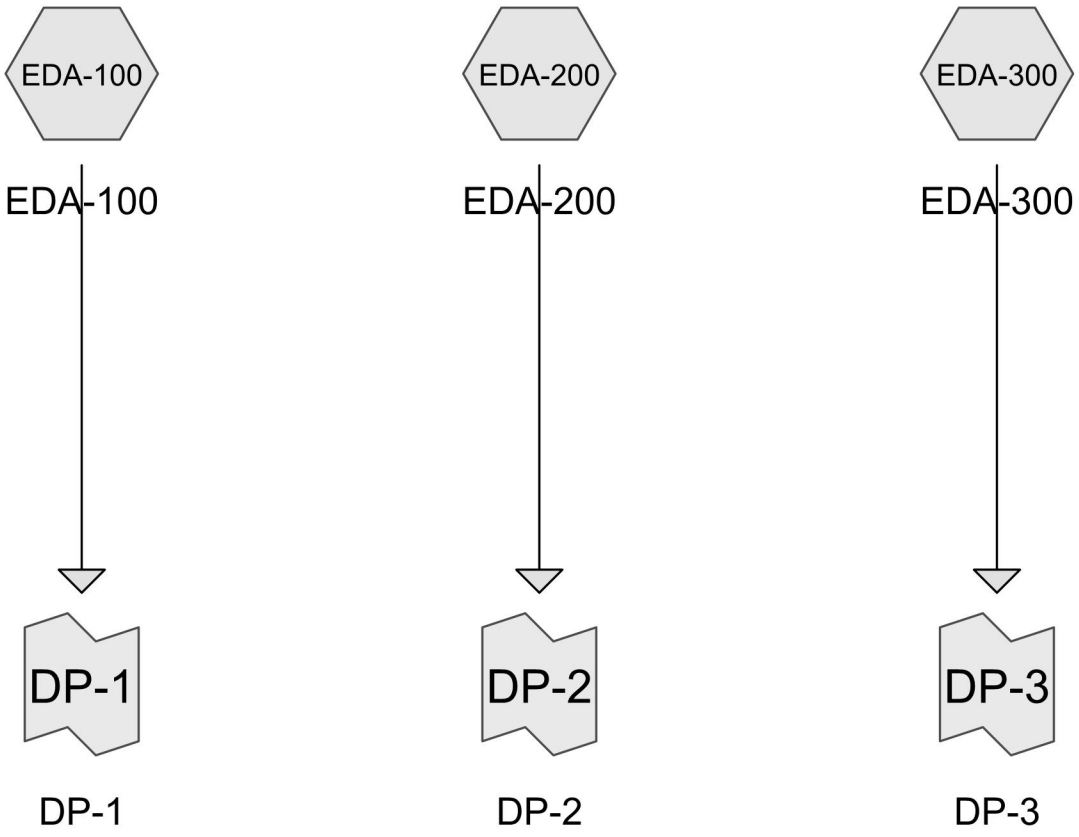
APPENDIX C

PRE-DEVELOPMENT HYDROLOGY ANALYSIS



Subcat Reach Pond Link

Routing Diagram for C-DAT-2200418-EXIST HYDRO
Prepared by BL Companies, Printed 9/2/2022

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: EDA-100 Runoff Area=105,918 sf 3.96% Impervious Runoff Depth>0.96"
Flow Length=514' Tc=17.5 min CN=70 Runoff=1.68 cfs 8,503 cf

Subcatchment EDA-200: EDA-200 Runoff Area=7,973 sf 100.00% Impervious Runoff Depth>3.20"
Flow Length=254' Tc=5.0 min CN=98 Runoff=0.72 cfs 2,128 cf

Subcatchment EDA-300: EDA-300 Runoff Area=29,689 sf 0.00% Impervious Runoff Depth>0.32"
Flow Length=176' Tc=15.5 min CN=55 Runoff=0.06 cfs 797 cf

Link DP-1: DP-1 Inflow=1.68 cfs 8,503 cf
Primary=1.68 cfs 8,503 cf

Link DP-2: DP-2 Inflow=0.72 cfs 2,128 cf
Primary=0.72 cfs 2,128 cf

Link DP-3: DP-3 Inflow=0.06 cfs 797 cf
Primary=0.06 cfs 797 cf

Total Runoff Area = 143,580 sf Runoff Volume = 11,428 cf Average Runoff Depth = 0.96"
91.52% Pervious = 131,410 sf 8.48% Impervious = 12,170 sf

Summary for Subcatchment EDA-100: EDA-100

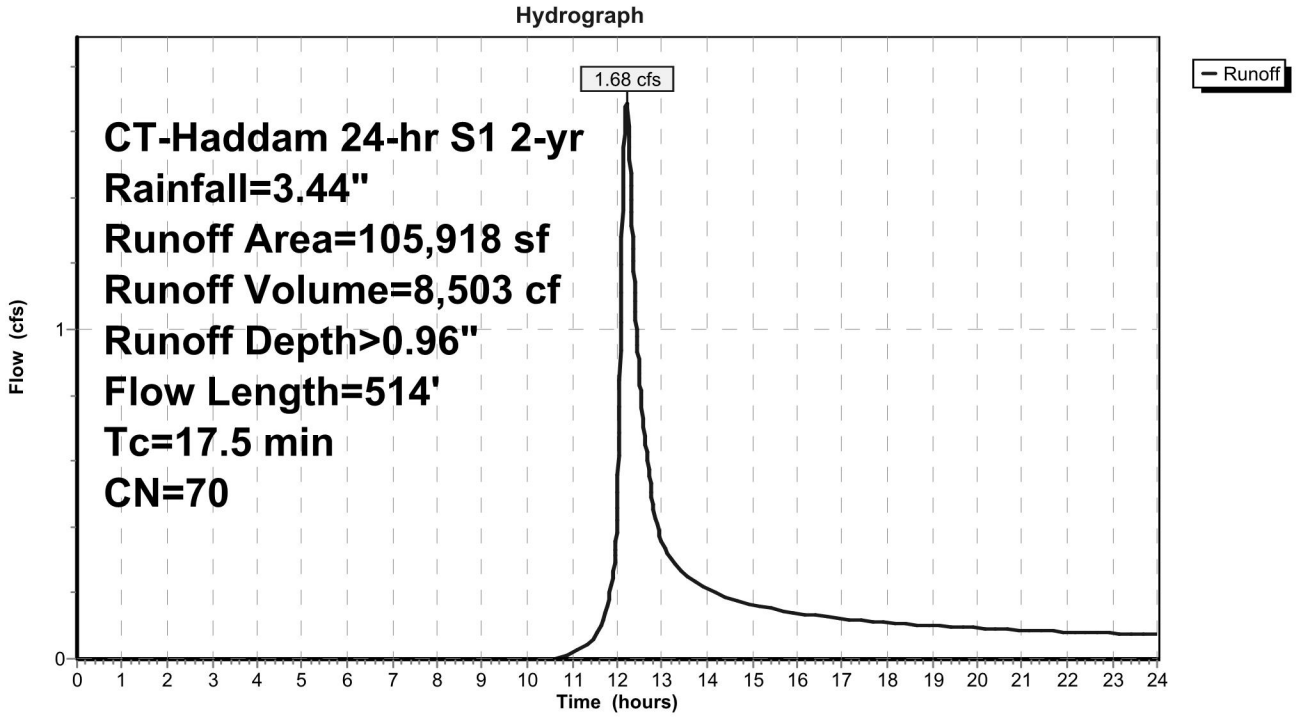
Runoff = 1.68 cfs @ 12.21 hrs, Volume= 8,503 cf, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
34,885	55	Woods, Good, HSG B
32,982	77	Woods, Good, HSG D
9,771	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
21,055	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
1,570	98	Paved parking, HSG B
1,251	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
30	96	Gravel surface, HSG C
1,332	96	Gravel surface, HSG D
624	98	Roofs, HSG D
105,918	70	Weighted Average
101,721		96.04% Pervious Area
4,197		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	58	0.0689	1.31		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	10	0.0333	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	183	0.0259	0.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	94	0.0213	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	27	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.5	514	Total			

Subcatchment EDA-100: EDA-100



Summary for Subcatchment EDA-200: EDA-200

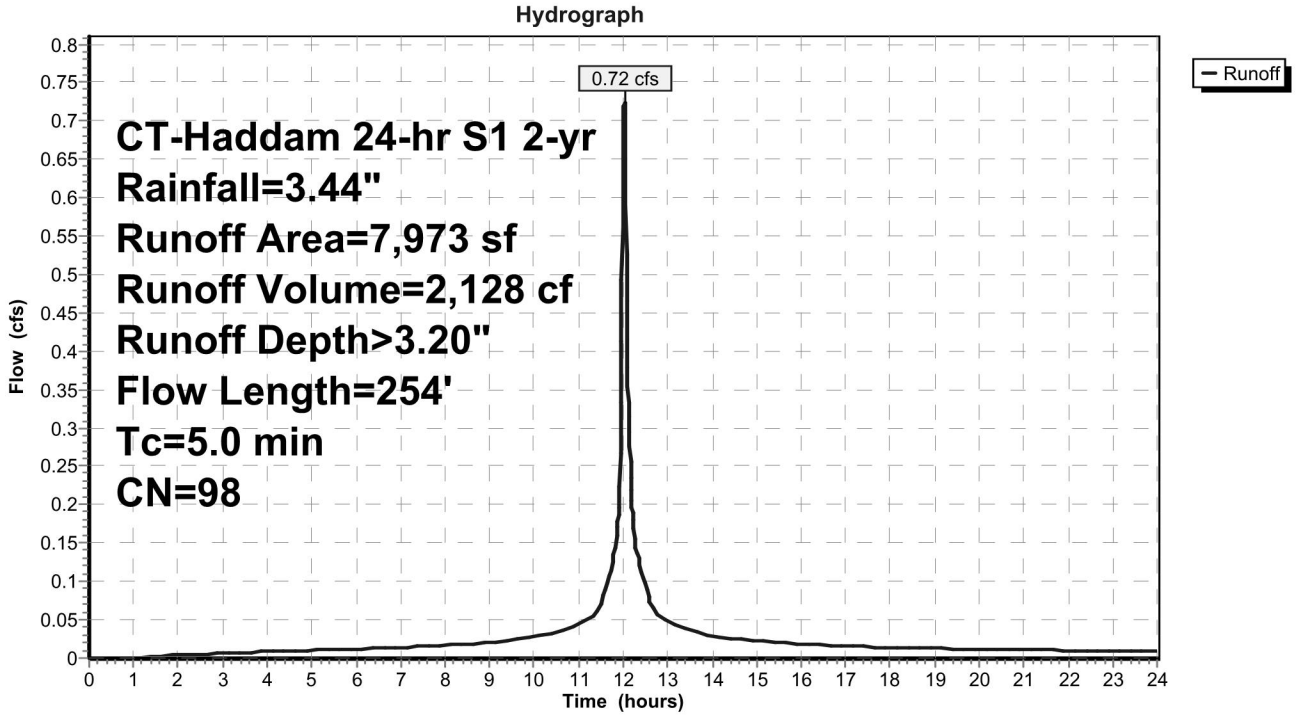
Runoff = 0.72 cfs @ 12.03 hrs, Volume= 2,128 cf, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
3,481	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
3,393	98	Paved parking, HSG D
7,973	98	Weighted Average
7,973		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment EDA-200: EDA-200



Summary for Subcatchment EDA-300: EDA-300

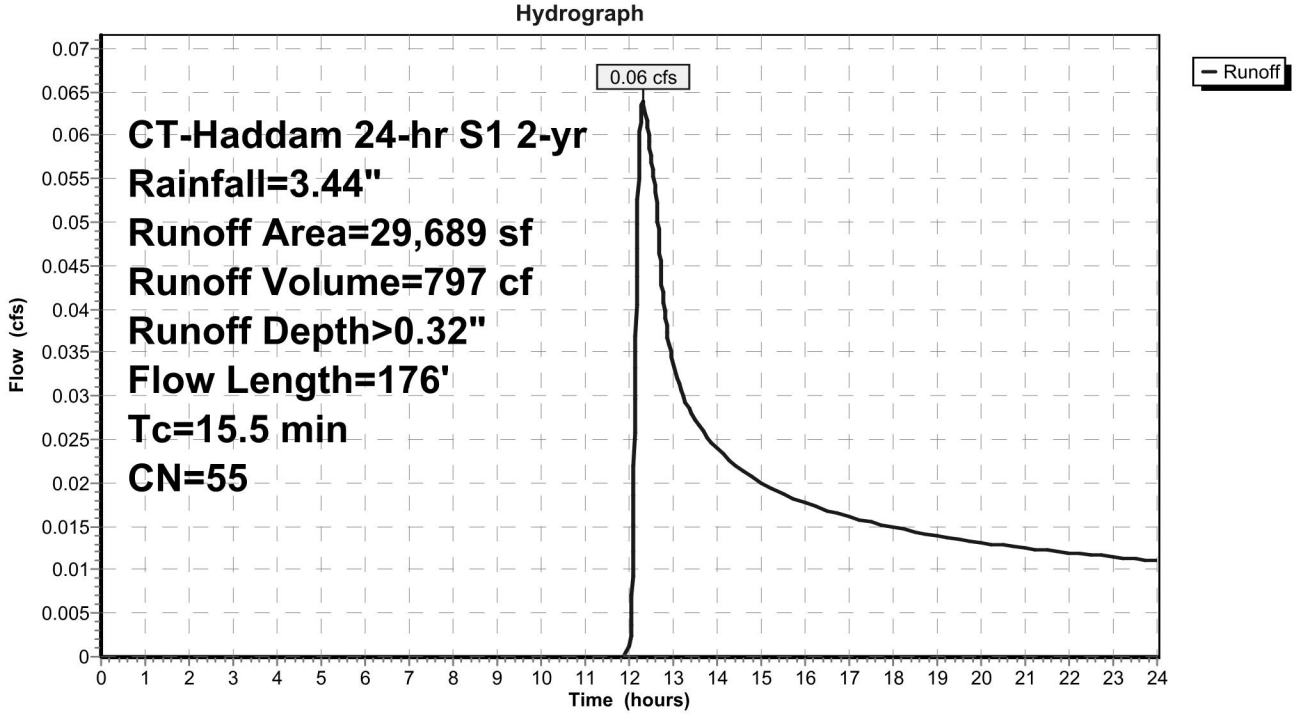
Runoff = 0.06 cfs @ 12.31 hrs, Volume= 797 cf, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
27,340	55	Woods, Good, HSG B
2,349	61	>75% Grass cover, Good, HSG B
29,689	55	Weighted Average
29,689		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0900	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
7.7	50	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
1.3	76	0.0395	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.5	176	Total			

Subcatchment EDA-300: EDA-300

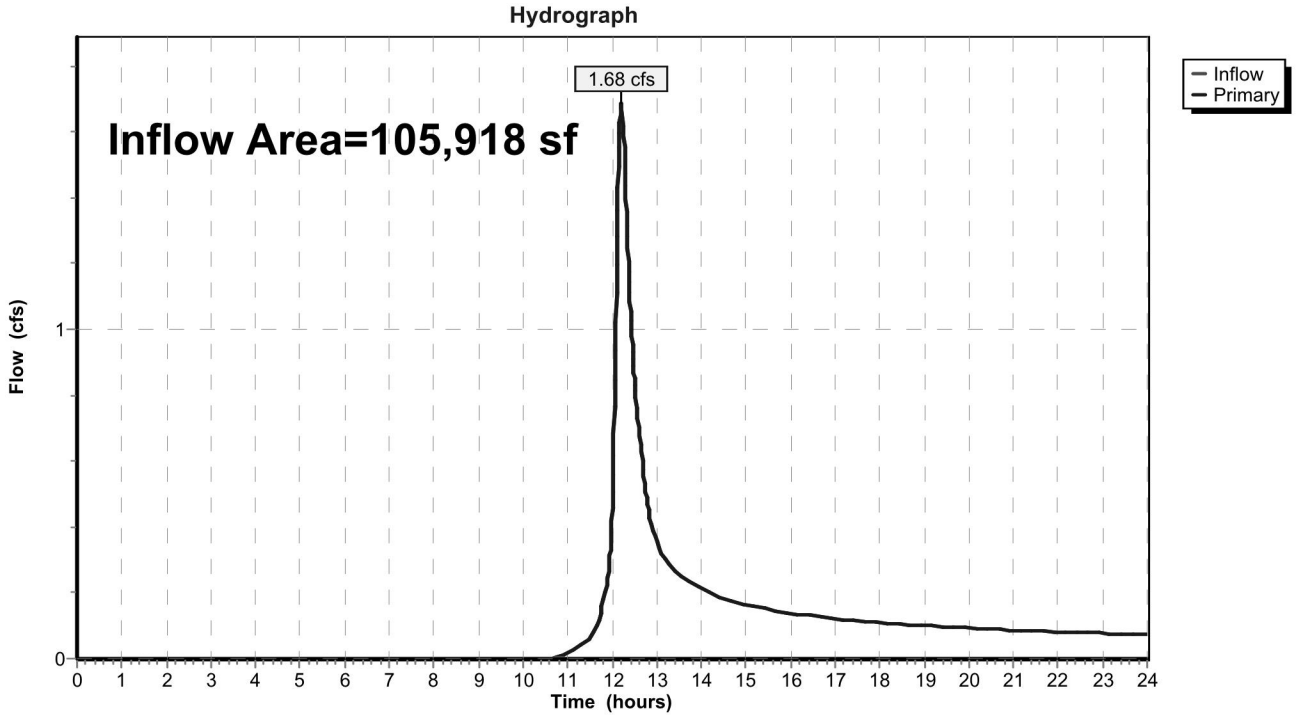


Summary for Link DP-1: DP-1

Inflow Area = 105,918 sf, 3.96% Impervious, Inflow Depth > 0.96" for 2-yr event
Inflow = 1.68 cfs @ 12.21 hrs, Volume= 8,503 cf
Primary = 1.68 cfs @ 12.21 hrs, Volume= 8,503 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

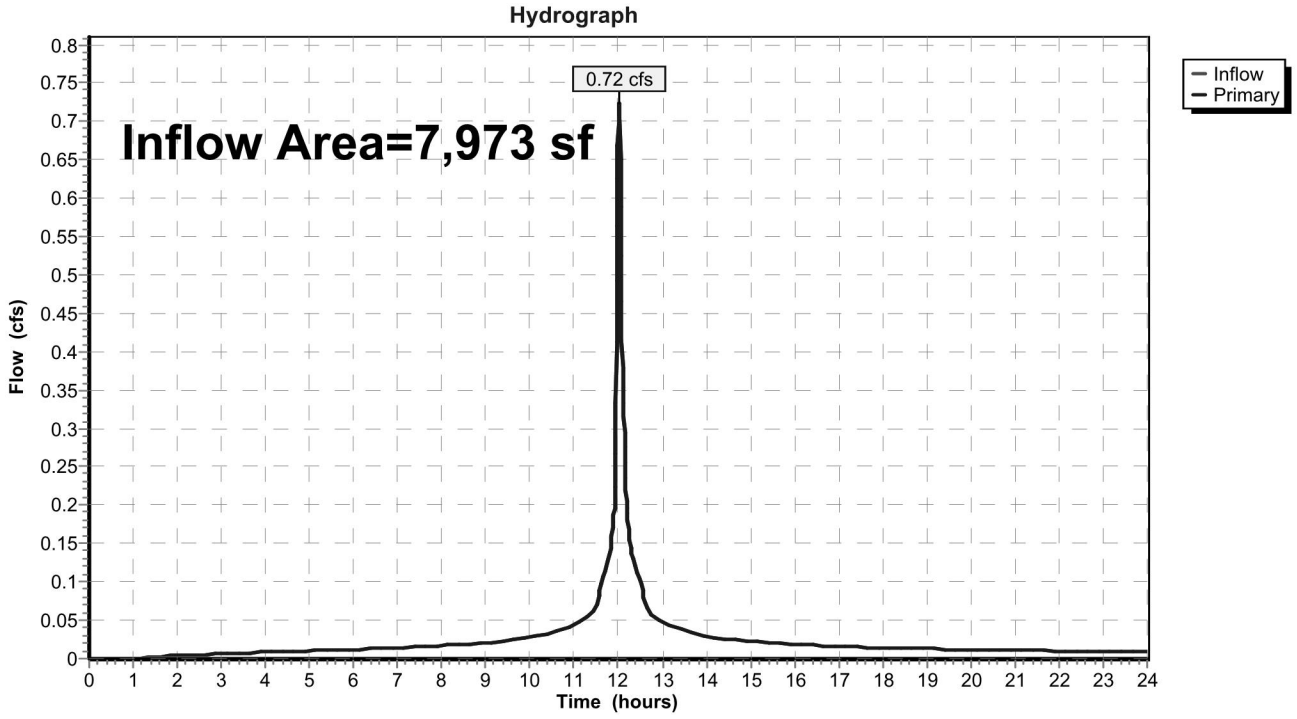


Summary for Link DP-2: DP-2

Inflow Area = 7,973 sf,100.00% Impervious, Inflow Depth > 3.20" for 2-yr event
Inflow = 0.72 cfs @ 12.03 hrs, Volume= 2,128 cf
Primary = 0.72 cfs @ 12.03 hrs, Volume= 2,128 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

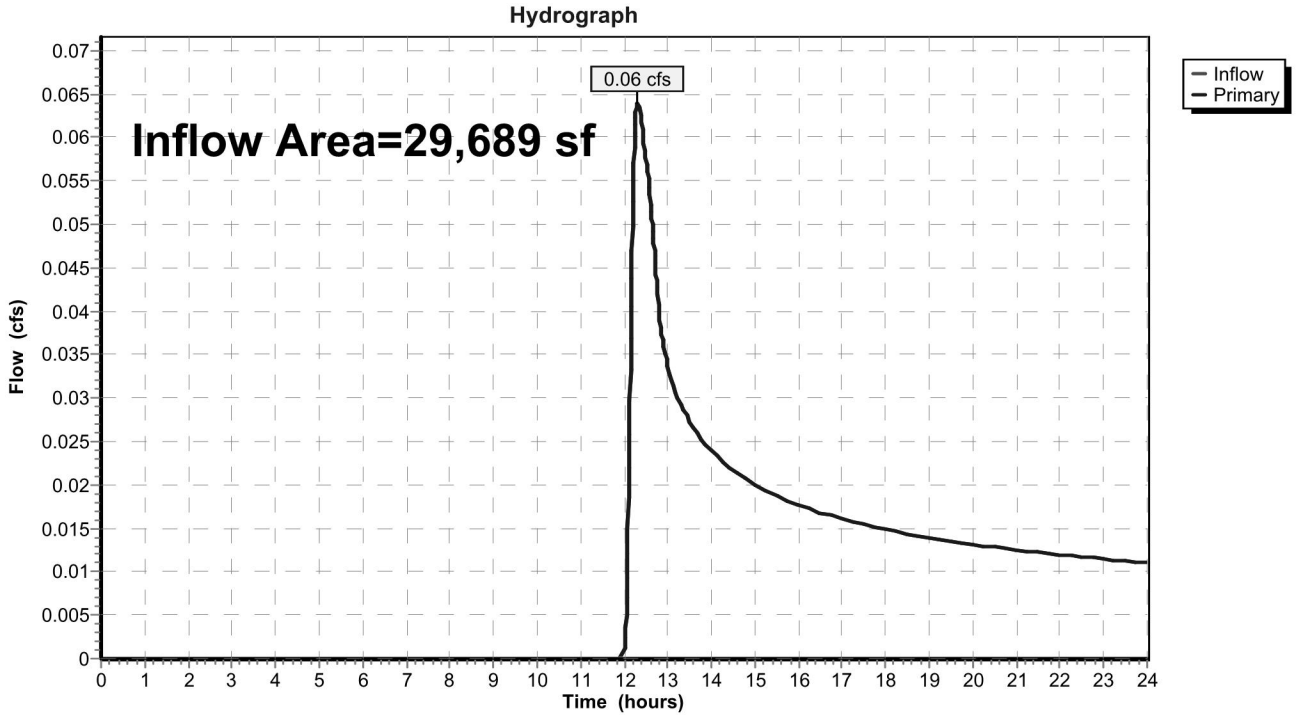


Summary for Link DP-3: DP-3

Inflow Area = 29,689 sf, 0.00% Impervious, Inflow Depth > 0.32" for 2-yr event
Inflow = 0.06 cfs @ 12.31 hrs, Volume= 797 cf
Primary = 0.06 cfs @ 12.31 hrs, Volume= 797 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: EDA-100 Runoff Area=105,918 sf 3.96% Impervious Runoff Depth>2.21"
Flow Length=514' Tc=17.5 min CN=70 Runoff=4.21 cfs 19,493 cf

Subcatchment EDA-200: EDA-200 Runoff Area=7,973 sf 100.00% Impervious Runoff Depth>5.01"
Flow Length=254' Tc=5.0 min CN=98 Runoff=1.11 cfs 3,327 cf

Subcatchment EDA-300: EDA-300 Runoff Area=29,689 sf 0.00% Impervious Runoff Depth>1.10"
Flow Length=176' Tc=15.5 min CN=55 Runoff=0.50 cfs 2,716 cf

Link DP-1: DP-1 Inflow=4.21 cfs 19,493 cf
Primary=4.21 cfs 19,493 cf

Link DP-2: DP-2 Inflow=1.11 cfs 3,327 cf
Primary=1.11 cfs 3,327 cf

Link DP-3: DP-3 Inflow=0.50 cfs 2,716 cf
Primary=0.50 cfs 2,716 cf

Total Runoff Area = 143,580 sf Runoff Volume = 25,537 cf Average Runoff Depth = 2.13"
91.52% Pervious = 131,410 sf 8.48% Impervious = 12,170 sf

Summary for Subcatchment EDA-100: EDA-100

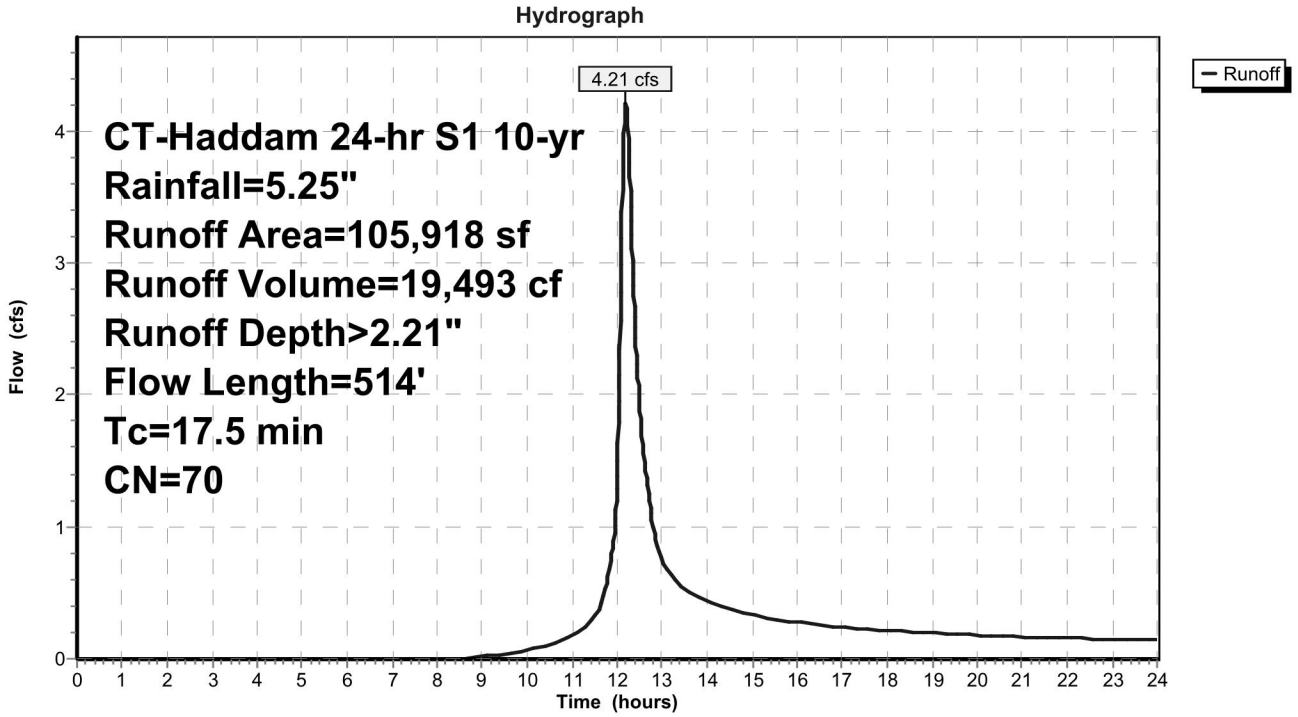
Runoff = 4.21 cfs @ 12.19 hrs, Volume= 19,493 cf, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
34,885	55	Woods, Good, HSG B
32,982	77	Woods, Good, HSG D
9,771	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
21,055	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
1,570	98	Paved parking, HSG B
1,251	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
30	96	Gravel surface, HSG C
1,332	96	Gravel surface, HSG D
624	98	Roofs, HSG D
105,918	70	Weighted Average
101,721		96.04% Pervious Area
4,197		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	58	0.0689	1.31		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	10	0.0333	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	183	0.0259	0.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	94	0.0213	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	27	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.5	514	Total			

Subcatchment EDA-100: EDA-100



Summary for Subcatchment EDA-200: EDA-200

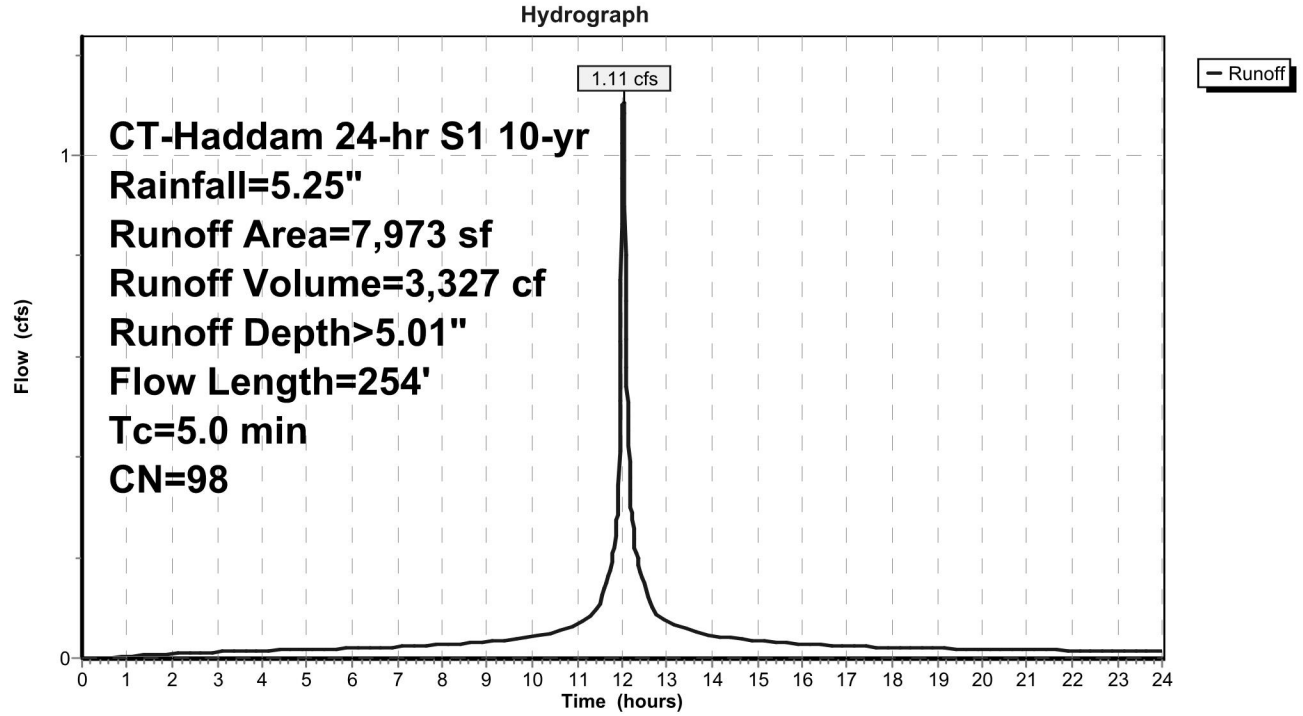
Runoff = 1.11 cfs @ 12.03 hrs, Volume= 3,327 cf, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
3,481	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
3,393	98	Paved parking, HSG D
7,973	98	Weighted Average
7,973		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment EDA-200: EDA-200



Summary for Subcatchment EDA-300: EDA-300

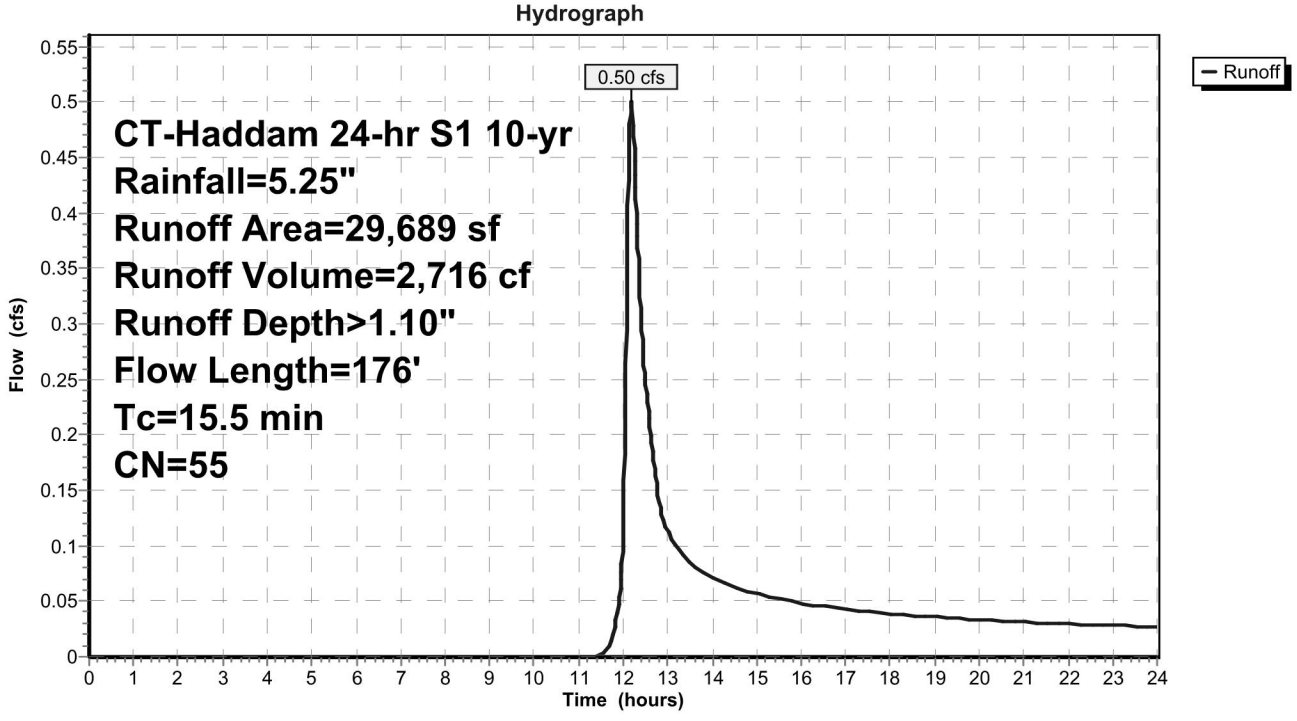
Runoff = 0.50 cfs @ 12.18 hrs, Volume= 2,716 cf, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
27,340	55	Woods, Good, HSG B
2,349	61	>75% Grass cover, Good, HSG B
29,689	55	Weighted Average
29,689		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0900	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
7.7	50	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
1.3	76	0.0395	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.5	176	Total			

Subcatchment EDA-300: EDA-300

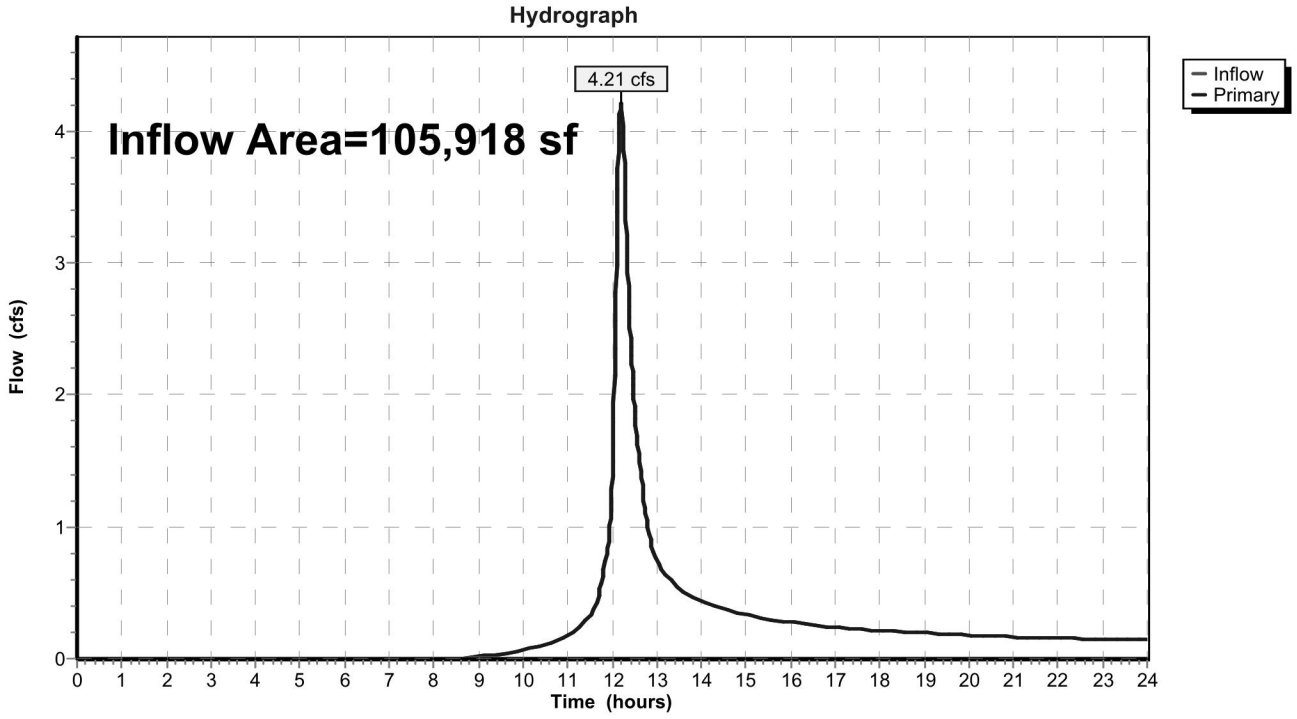


Summary for Link DP-1: DP-1

Inflow Area = 105,918 sf, 3.96% Impervious, Inflow Depth > 2.21" for 10-yr event
Inflow = 4.21 cfs @ 12.19 hrs, Volume= 19,493 cf
Primary = 4.21 cfs @ 12.19 hrs, Volume= 19,493 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

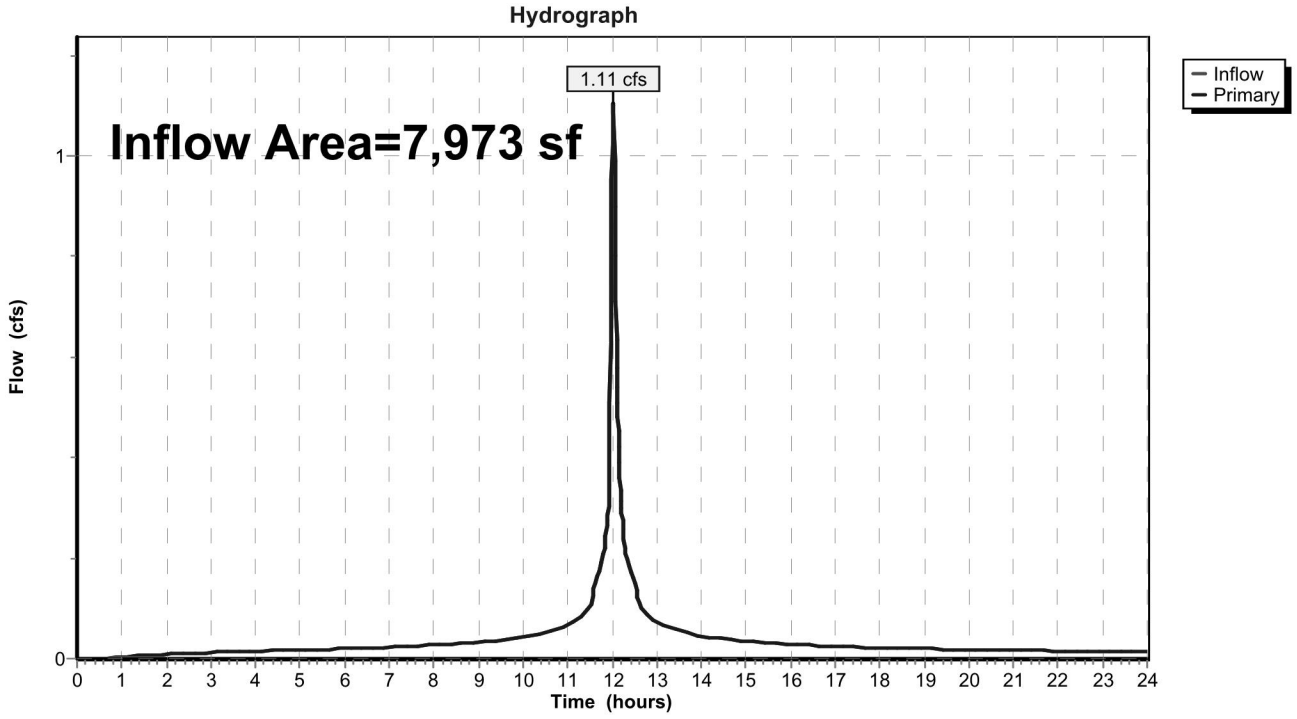


Summary for Link DP-2: DP-2

Inflow Area = 7,973 sf,100.00% Impervious, Inflow Depth > 5.01" for 10-yr event
Inflow = 1.11 cfs @ 12.03 hrs, Volume= 3,327 cf
Primary = 1.11 cfs @ 12.03 hrs, Volume= 3,327 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

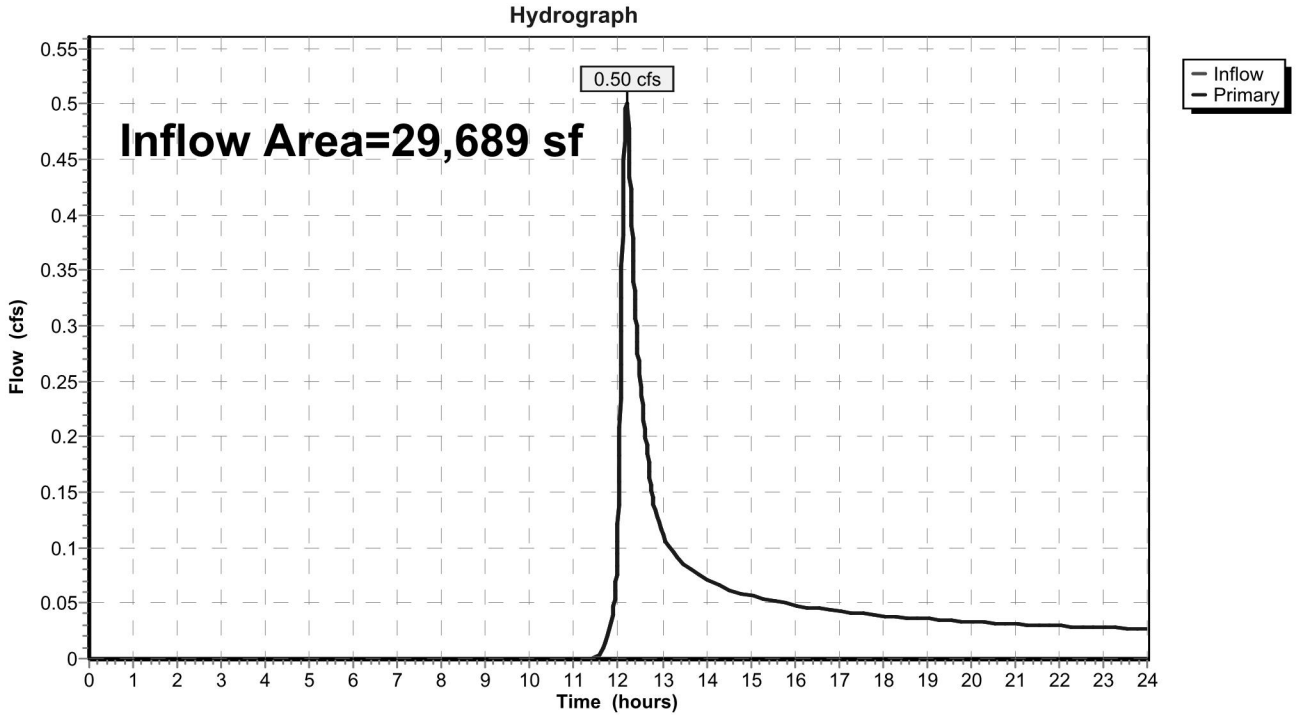


Summary for Link DP-3: DP-3

Inflow Area = 29,689 sf, 0.00% Impervious, Inflow Depth > 1.10" for 10-yr event
Inflow = 0.50 cfs @ 12.18 hrs, Volume= 2,716 cf
Primary = 0.50 cfs @ 12.18 hrs, Volume= 2,716 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: EDA-100 Runoff Area=105,918 sf 3.96% Impervious Runoff Depth>3.08"
Flow Length=514' Tc=17.5 min CN=70 Runoff=5.95 cfs 27,203 cf

Subcatchment EDA-200: EDA-200 Runoff Area=7,973 sf 100.00% Impervious Runoff Depth>6.12"
Flow Length=254' Tc=5.0 min CN=98 Runoff=1.34 cfs 4,069 cf

Subcatchment EDA-300: EDA-300 Runoff Area=29,689 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=176' Tc=15.5 min CN=55 Runoff=0.88 cfs 4,261 cf

Link DP-1: DP-1 Inflow=5.95 cfs 27,203 cf
Primary=5.95 cfs 27,203 cf

Link DP-2: DP-2 Inflow=1.34 cfs 4,069 cf
Primary=1.34 cfs 4,069 cf

Link DP-3: DP-3 Inflow=0.88 cfs 4,261 cf
Primary=0.88 cfs 4,261 cf

Total Runoff Area = 143,580 sf Runoff Volume = 35,534 cf Average Runoff Depth = 2.97"
91.52% Pervious = 131,410 sf 8.48% Impervious = 12,170 sf

Summary for Subcatchment EDA-100: EDA-100

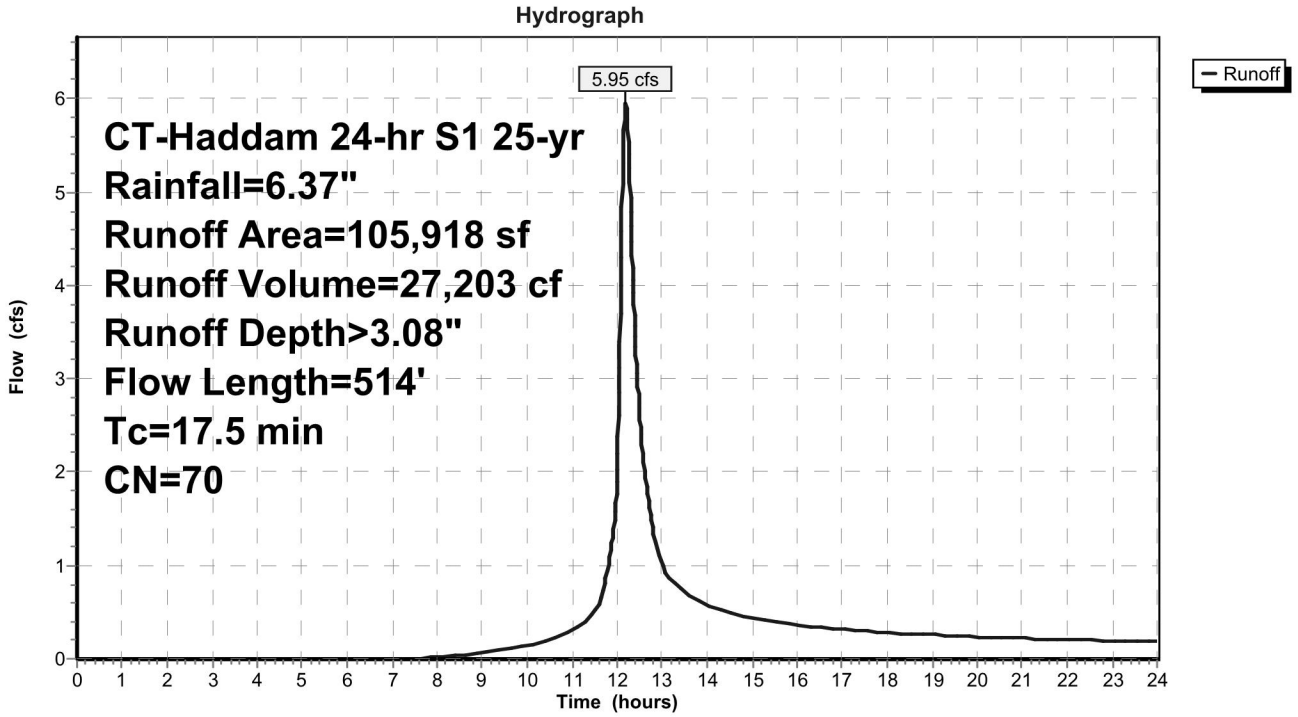
Runoff = 5.95 cfs @ 12.19 hrs, Volume= 27,203 cf, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
34,885	55	Woods, Good, HSG B
32,982	77	Woods, Good, HSG D
9,771	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
21,055	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
1,570	98	Paved parking, HSG B
1,251	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
30	96	Gravel surface, HSG C
1,332	96	Gravel surface, HSG D
624	98	Roofs, HSG D
105,918	70	Weighted Average
101,721		96.04% Pervious Area
4,197		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	58	0.0689	1.31		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	10	0.0333	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	183	0.0259	0.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	94	0.0213	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	27	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.5	514	Total			

Subcatchment EDA-100: EDA-100



Summary for Subcatchment EDA-200: EDA-200

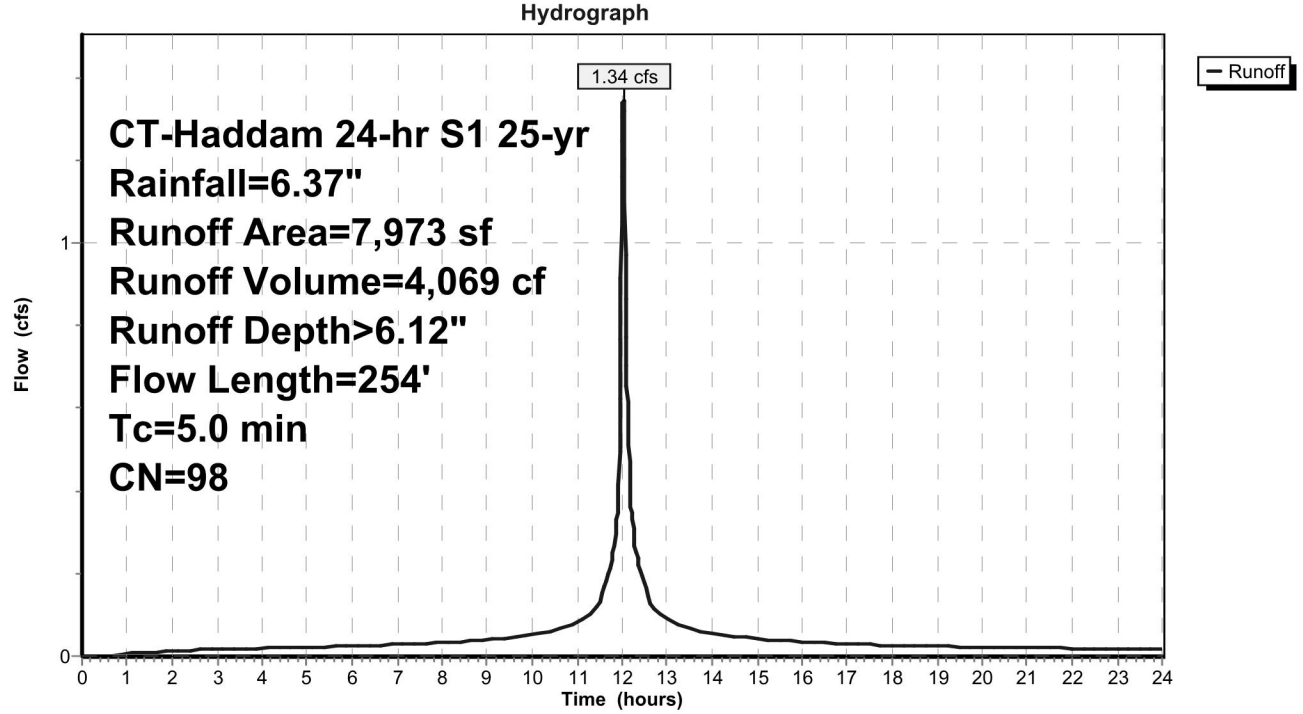
Runoff = 1.34 cfs @ 12.03 hrs, Volume= 4,069 cf, Depth> 6.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
3,481	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
3,393	98	Paved parking, HSG D
7,973	98	Weighted Average
7,973		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment EDA-200: EDA-200



Summary for Subcatchment EDA-300: EDA-300

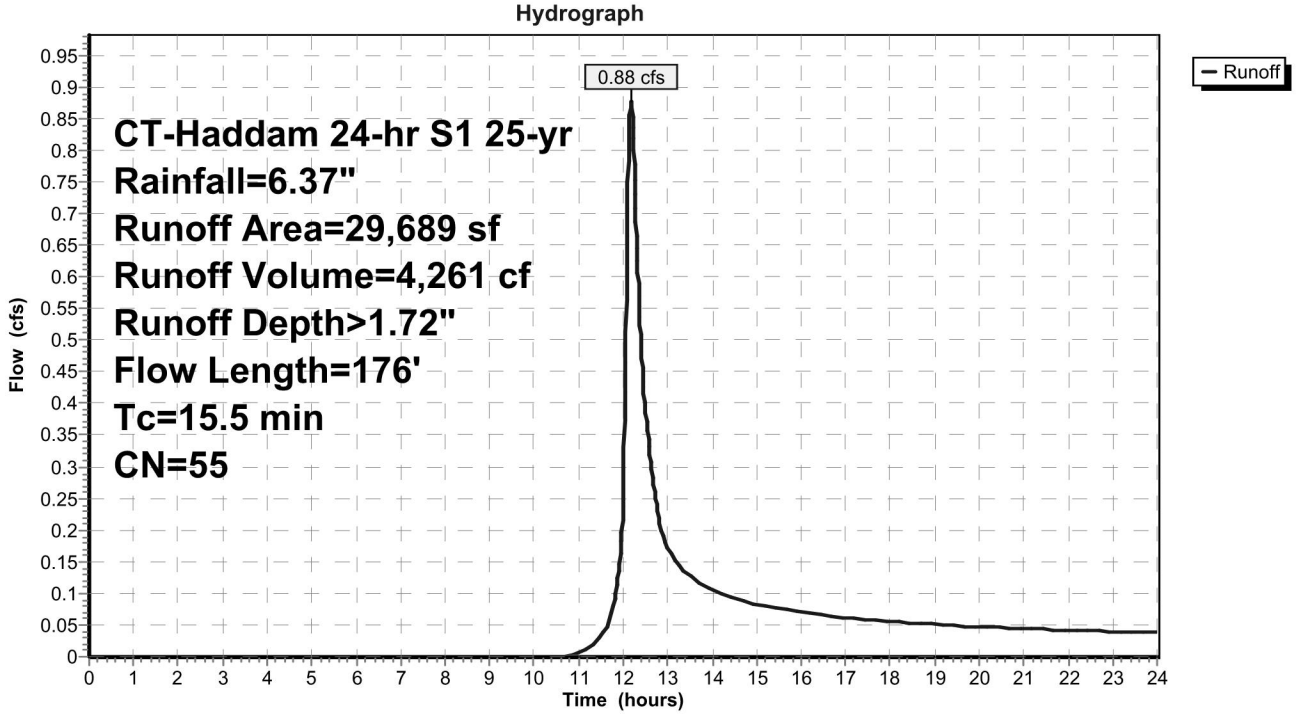
Runoff = 0.88 cfs @ 12.18 hrs, Volume= 4,261 cf, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
27,340	55	Woods, Good, HSG B
2,349	61	>75% Grass cover, Good, HSG B
29,689	55	Weighted Average
29,689		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0900	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
7.7	50	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
1.3	76	0.0395	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.5	176	Total			

Subcatchment EDA-300: EDA-300

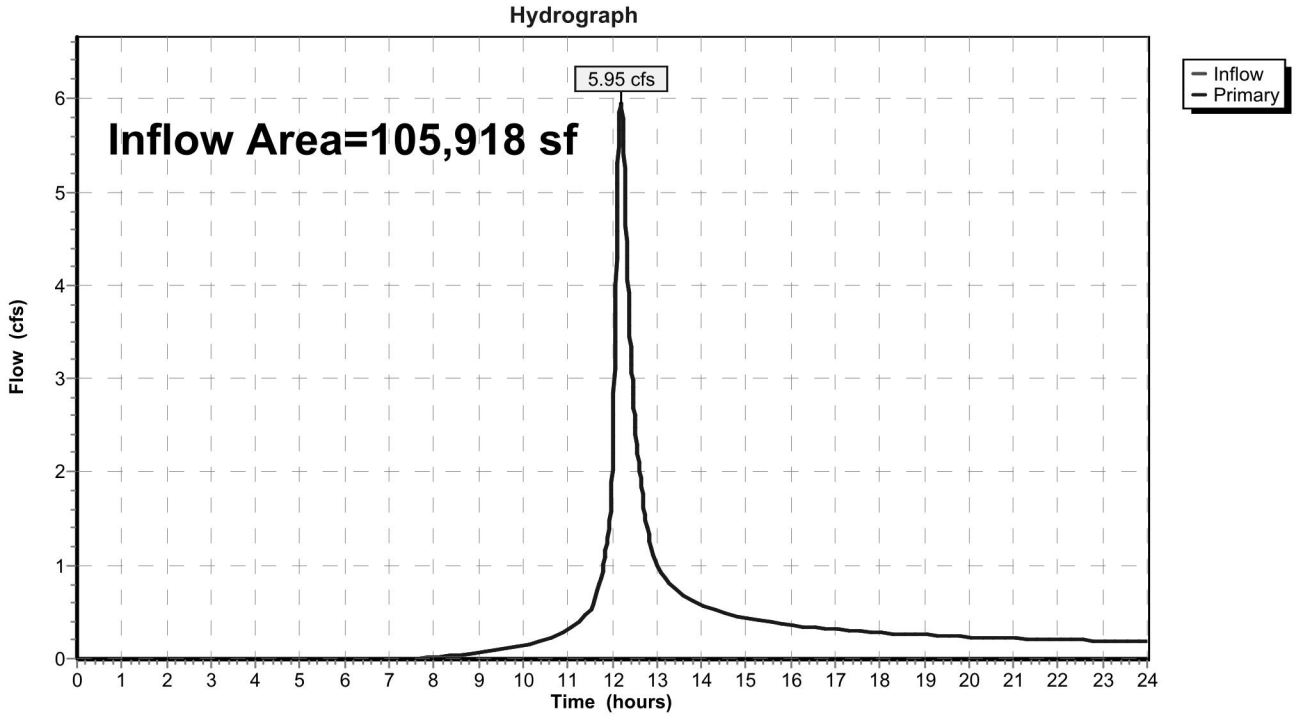


Summary for Link DP-1: DP-1

Inflow Area = 105,918 sf, 3.96% Impervious, Inflow Depth > 3.08" for 25-yr event
Inflow = 5.95 cfs @ 12.19 hrs, Volume= 27,203 cf
Primary = 5.95 cfs @ 12.19 hrs, Volume= 27,203 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

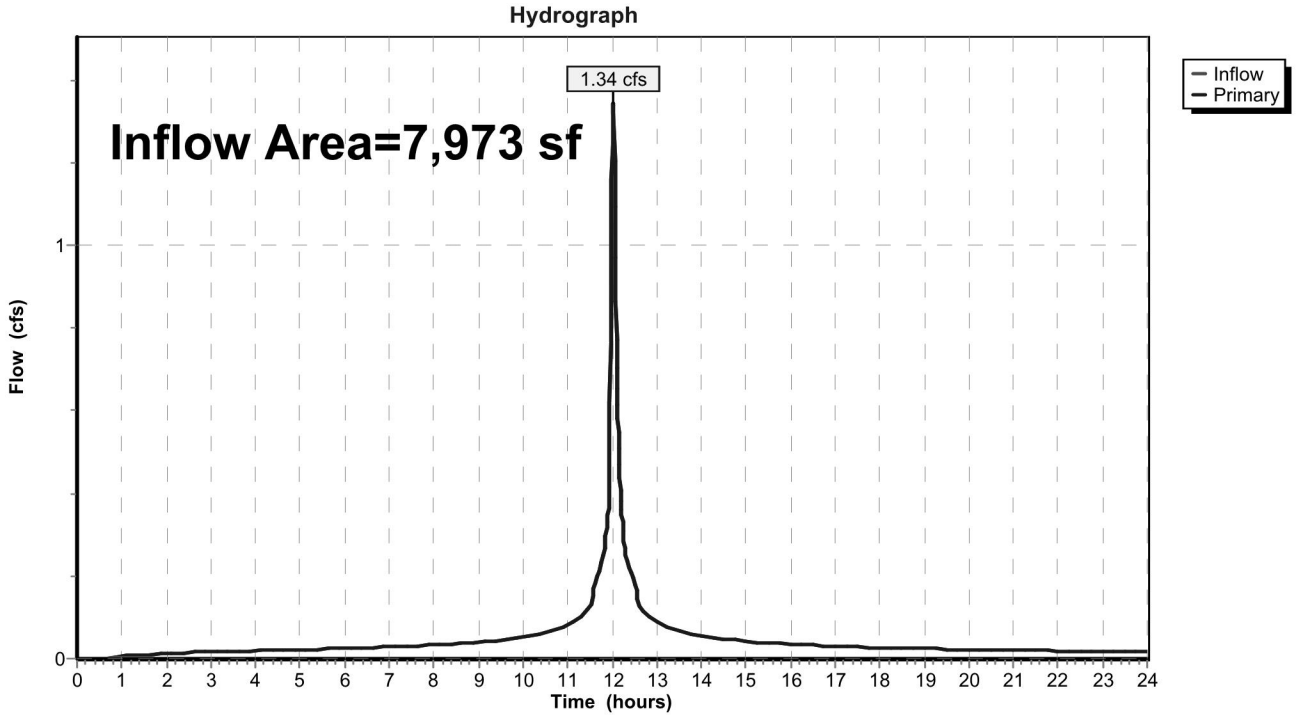


Summary for Link DP-2: DP-2

Inflow Area = 7,973 sf,100.00% Impervious, Inflow Depth > 6.12" for 25-yr event
Inflow = 1.34 cfs @ 12.03 hrs, Volume= 4,069 cf
Primary = 1.34 cfs @ 12.03 hrs, Volume= 4,069 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

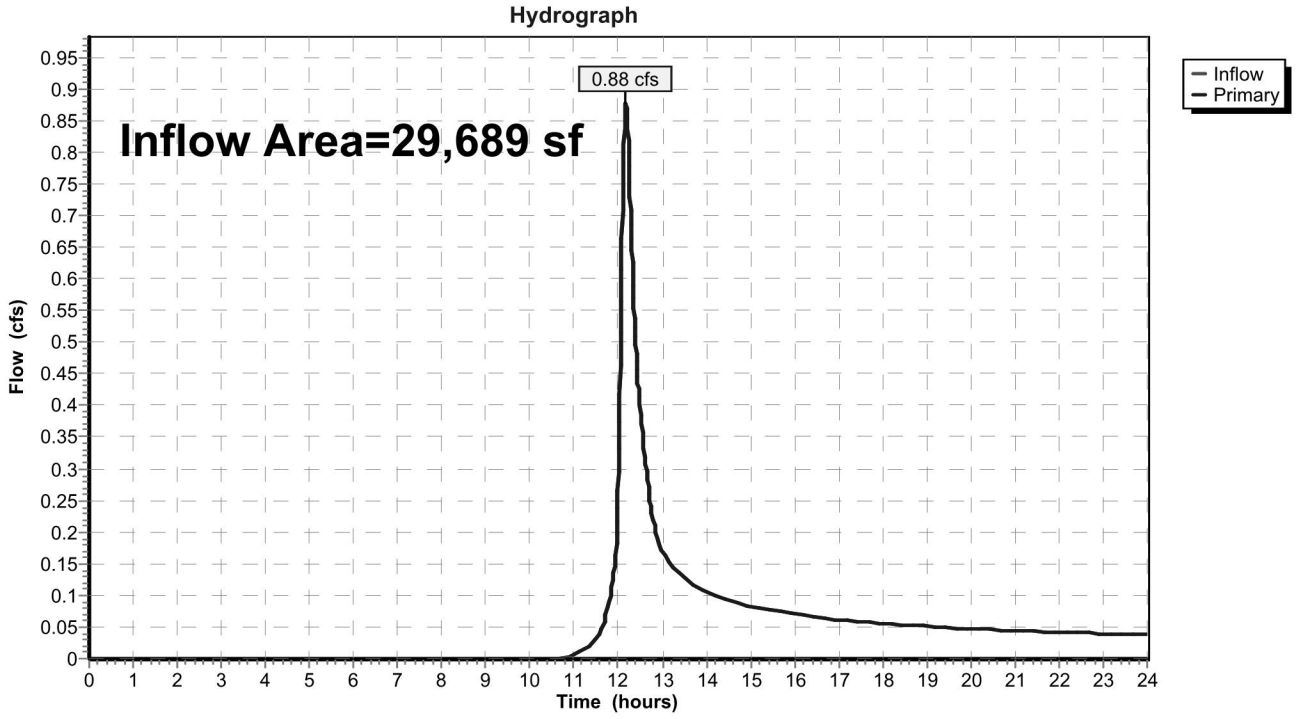


Summary for Link DP-3: DP-3

Inflow Area = 29,689 sf, 0.00% Impervious, Inflow Depth > 1.72" for 25-yr event
Inflow = 0.88 cfs @ 12.18 hrs, Volume= 4,261 cf
Primary = 0.88 cfs @ 12.18 hrs, Volume= 4,261 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: EDA-100 Runoff Area=105,918 sf 3.96% Impervious Runoff Depth>4.53"
Flow Length=514' Tc=17.5 min CN=70 Runoff=8.80 cfs 40,004 cf

Subcatchment EDA-200: EDA-200 Runoff Area=7,973 sf 100.00% Impervious Runoff Depth>7.86"
Flow Length=254' Tc=5.0 min CN=98 Runoff=1.71 cfs 5,223 cf

Subcatchment EDA-300: EDA-300 Runoff Area=29,689 sf 0.00% Impervious Runoff Depth>2.84"
Flow Length=176' Tc=15.5 min CN=55 Runoff=1.55 cfs 7,028 cf

Link DP-1: DP-1 Inflow=8.80 cfs 40,004 cf
Primary=8.80 cfs 40,004 cf

Link DP-2: DP-2 Inflow=1.71 cfs 5,223 cf
Primary=1.71 cfs 5,223 cf

Link DP-3: DP-3 Inflow=1.55 cfs 7,028 cf
Primary=1.55 cfs 7,028 cf

Total Runoff Area = 143,580 sf Runoff Volume = 52,256 cf Average Runoff Depth = 4.37"
91.52% Pervious = 131,410 sf 8.48% Impervious = 12,170 sf

Summary for Subcatchment EDA-100: EDA-100

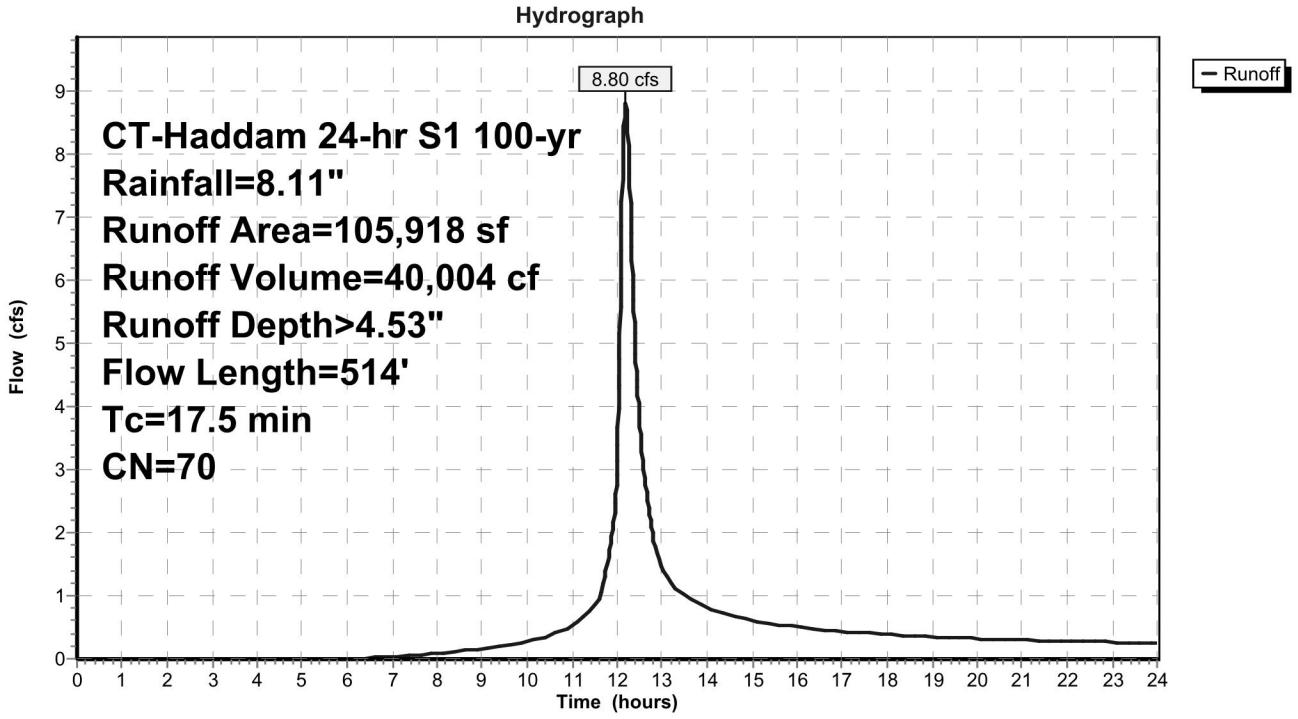
Runoff = 8.80 cfs @ 12.19 hrs, Volume= 40,004 cf, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
34,885	55	Woods, Good, HSG B
32,982	77	Woods, Good, HSG D
9,771	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
21,055	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
1,570	98	Paved parking, HSG B
1,251	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
30	96	Gravel surface, HSG C
1,332	96	Gravel surface, HSG D
624	98	Roofs, HSG D
105,918	70	Weighted Average
101,721		96.04% Pervious Area
4,197		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	58	0.0689	1.31		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	10	0.0333	0.91		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	183	0.0259	0.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	94	0.0213	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	27	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.5	514	Total			

Subcatchment EDA-100: EDA-100



Summary for Subcatchment EDA-200: EDA-200

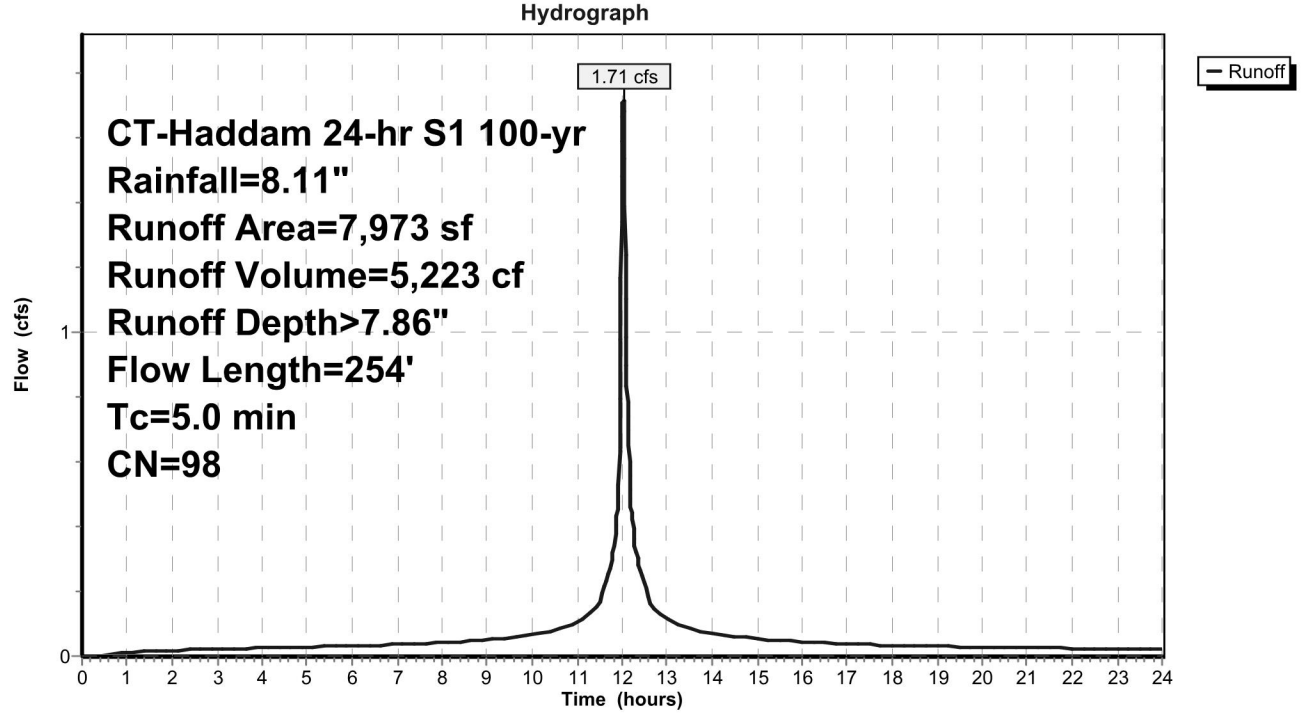
Runoff = 1.71 cfs @ 12.03 hrs, Volume= 5,223 cf, Depth> 7.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
3,481	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
3,393	98	Paved parking, HSG D
7,973	98	Weighted Average
7,973		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment EDA-200: EDA-200



Summary for Subcatchment EDA-300: EDA-300

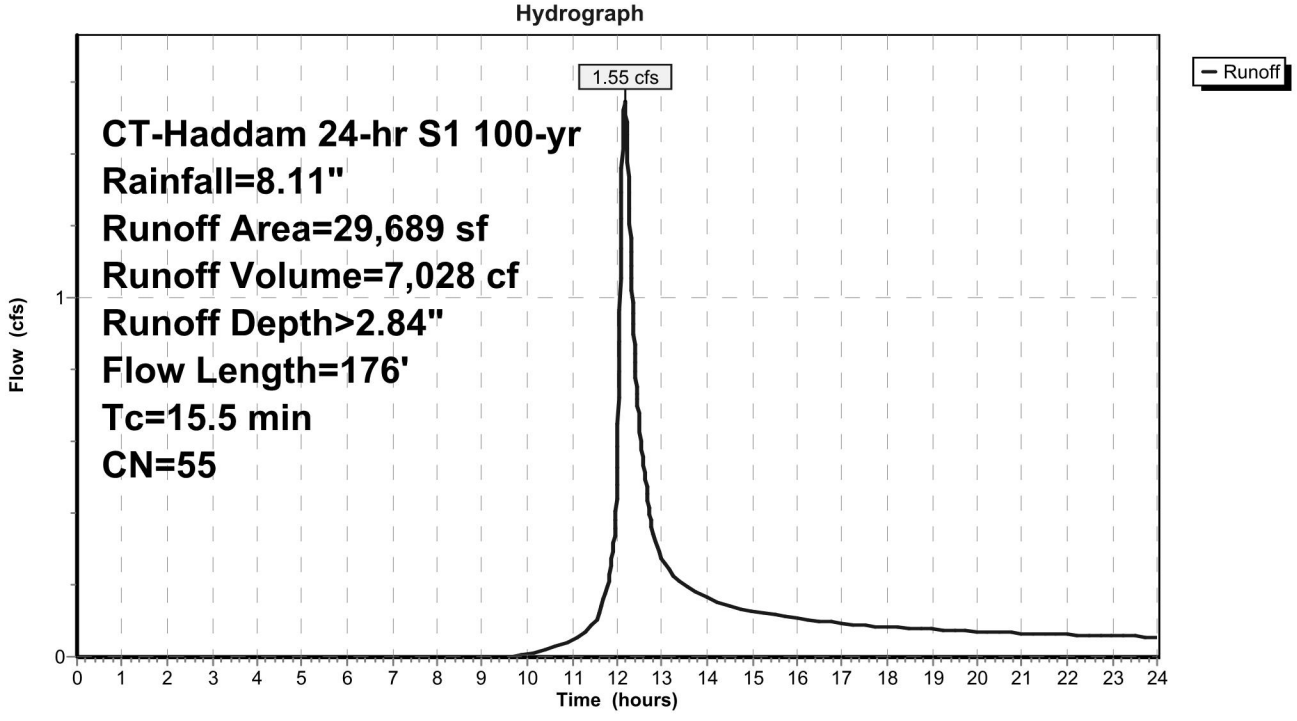
Runoff = 1.55 cfs @ 12.17 hrs, Volume= 7,028 cf, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
27,340	55	Woods, Good, HSG B
2,349	61	>75% Grass cover, Good, HSG B
29,689	55	Weighted Average
29,689		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0900	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
7.7	50	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
1.3	76	0.0395	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.5	176	Total			

Subcatchment EDA-300: EDA-300

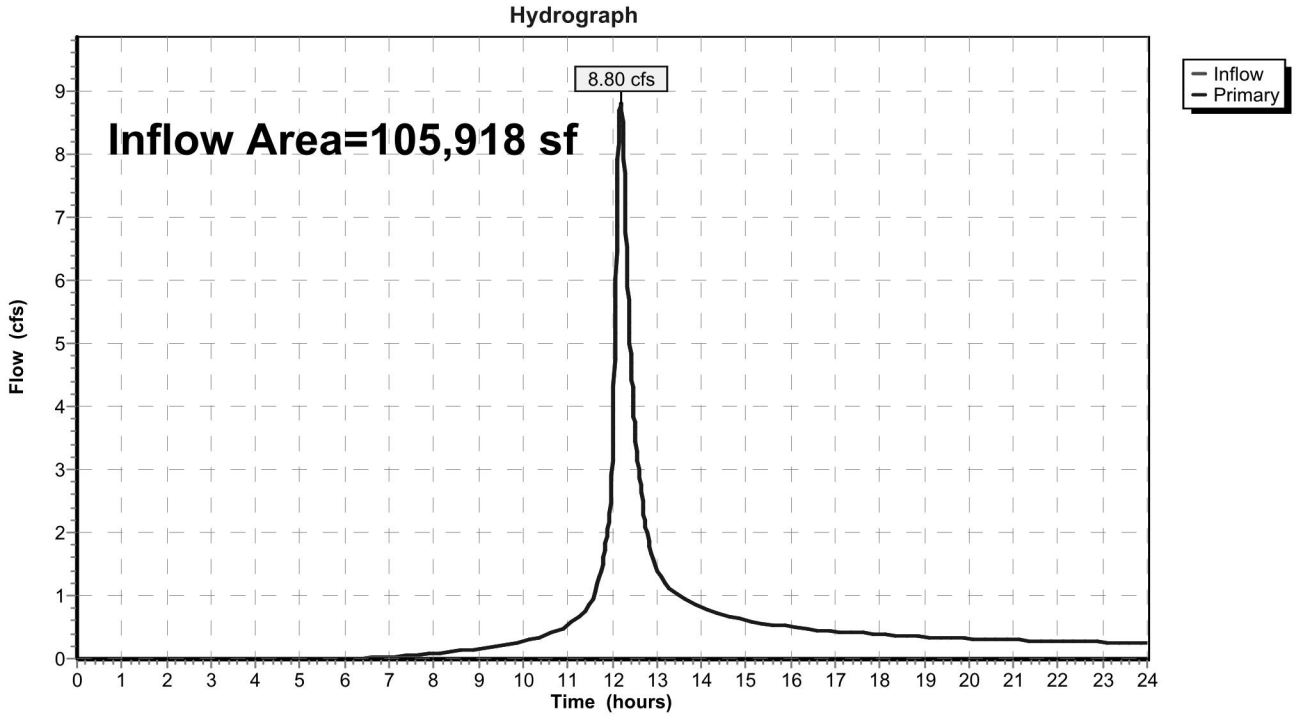


Summary for Link DP-1: DP-1

Inflow Area = 105,918 sf, 3.96% Impervious, Inflow Depth > 4.53" for 100-yr event
Inflow = 8.80 cfs @ 12.19 hrs, Volume= 40,004 cf
Primary = 8.80 cfs @ 12.19 hrs, Volume= 40,004 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

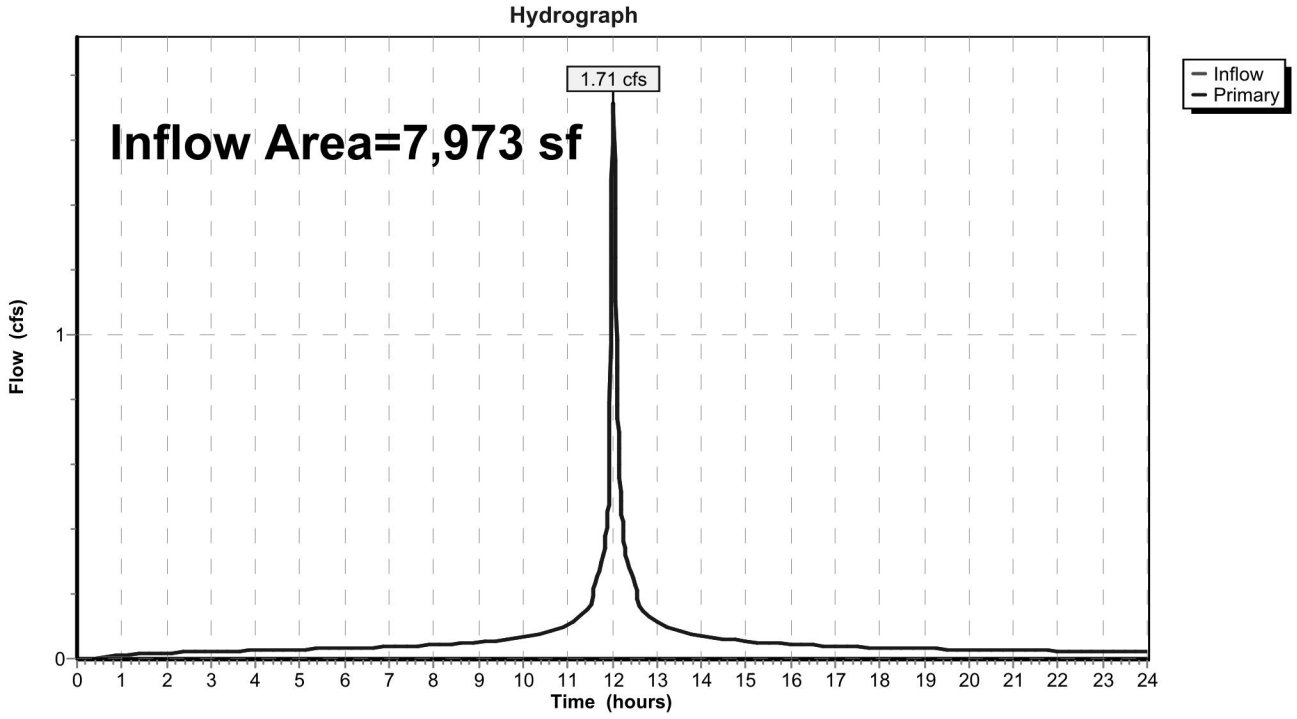


Summary for Link DP-2: DP-2

Inflow Area = 7,973 sf,100.00% Impervious, Inflow Depth > 7.86" for 100-yr event
Inflow = 1.71 cfs @ 12.03 hrs, Volume= 5,223 cf
Primary = 1.71 cfs @ 12.03 hrs, Volume= 5,223 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

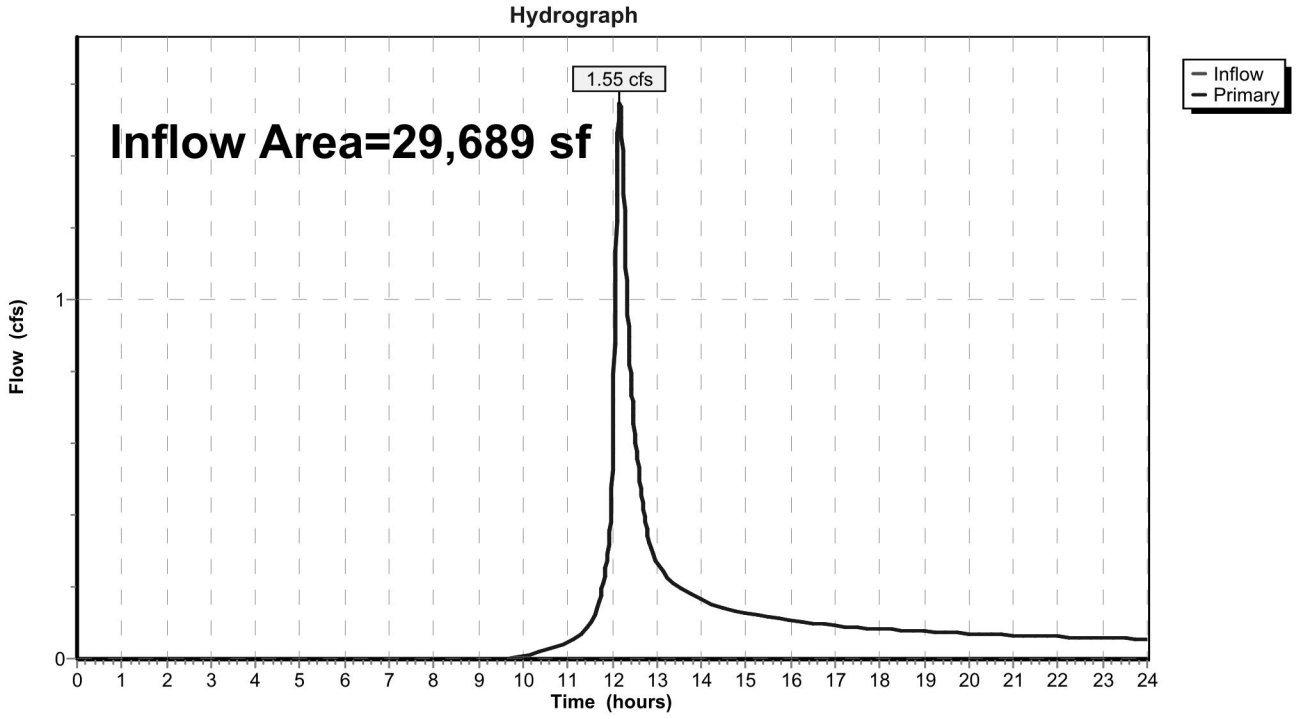


Summary for Link DP-3: DP-3

Inflow Area = 29,689 sf, 0.00% Impervious, Inflow Depth > 2.84" for 100-yr event
Inflow = 1.55 cfs @ 12.17 hrs, Volume= 7,028 cf
Primary = 1.55 cfs @ 12.17 hrs, Volume= 7,028 cf, Atten= 0%, Lag= 0.0 min

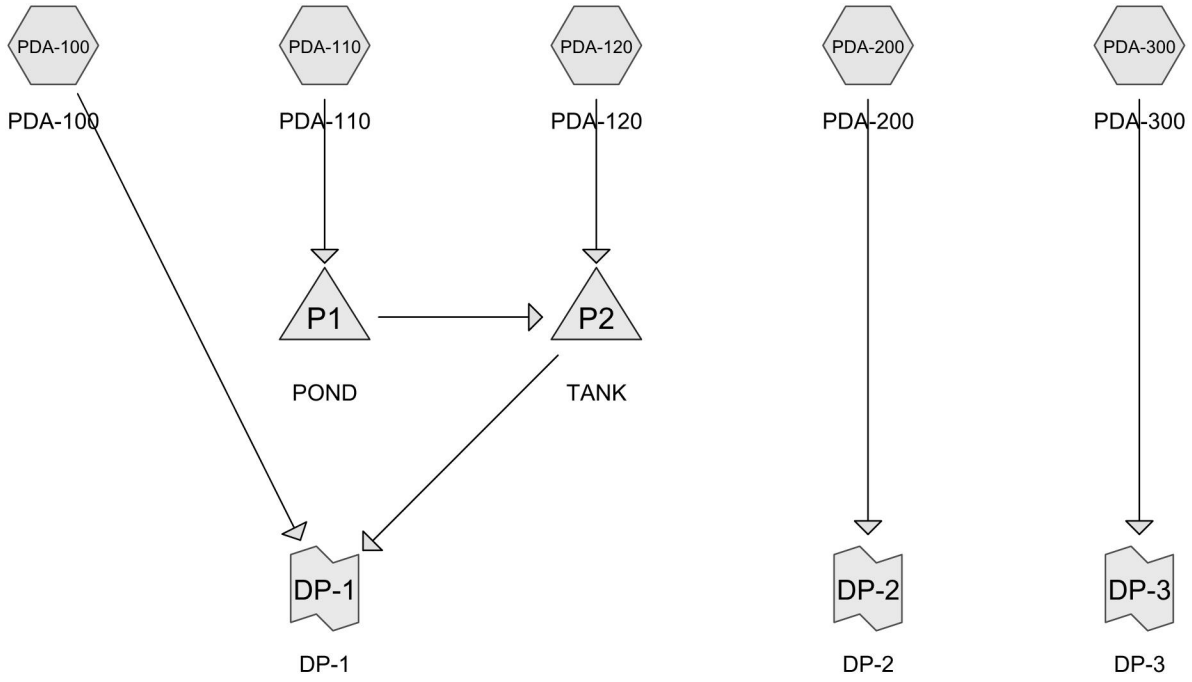
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



APPENDIX D

POST-DEVELOPMENT HYDROLOGY ANALYSIS



Subcat Reach Pond Link

Routing Diagram for C-DAT-2200418-PROP HYDRO
Prepared by BL Companies, Printed 9/8/2022

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: PDA-100 Runoff Area=47,764 sf 1.57% Impervious Runoff Depth>0.91"
Flow Length=213' Tc=10.4 min CN=69 Runoff=0.91 cfs 3,637 cf

Subcatchment PDA-110: PDA-110 Runoff Area=32,835 sf 49.50% Impervious Runoff Depth>1.73"
Flow Length=115' Tc=9.0 min CN=82 Runoff=1.45 cfs 4,728 cf

Subcatchment PDA-120: PDA-120 Runoff Area=34,936 sf 71.55% Impervious Runoff Depth>2.48"
Flow Length=339' Tc=12.3 min CN=91 Runoff=1.88 cfs 7,208 cf

Subcatchment PDA-200: PDA-200 Runoff Area=9,286 sf 100.00% Impervious Runoff Depth>3.20"
Flow Length=254' Tc=5.0 min CN=98 Runoff=0.84 cfs 2,479 cf

Subcatchment PDA-300: PDA-300 Runoff Area=18,759 sf 0.00% Impervious Runoff Depth>0.36"
Flow Length=136' Tc=10.0 min CN=56 Runoff=0.06 cfs 557 cf

Pond P1: POND Peak Elev=556.46' Storage=1,546 cf Inflow=1.45 cfs 4,728 cf
Discarded=0.18 cfs 4,717 cf Primary=0.00 cfs 0 cf Outflow=0.18 cfs 4,717 cf

Pond P2: TANK Peak Elev=552.88' Storage=1,851 cf Inflow=1.88 cfs 7,208 cf
Discarded=0.19 cfs 6,190 cf Primary=0.57 cfs 1,004 cf Outflow=0.76 cfs 7,195 cf

Link DP-1: DP-1 Inflow=0.98 cfs 4,641 cf
Primary=0.98 cfs 4,641 cf

Link DP-2: DP-2 Inflow=0.84 cfs 2,479 cf
Primary=0.84 cfs 2,479 cf

Link DP-3: DP-3 Inflow=0.06 cfs 557 cf
Primary=0.06 cfs 557 cf

Total Runoff Area = 143,580 sf Runoff Volume = 18,609 cf Average Runoff Depth = 1.56"
64.28% Pervious = 92,290 sf 35.72% Impervious = 51,290 sf

Summary for Subcatchment PDA-100: PDA-100

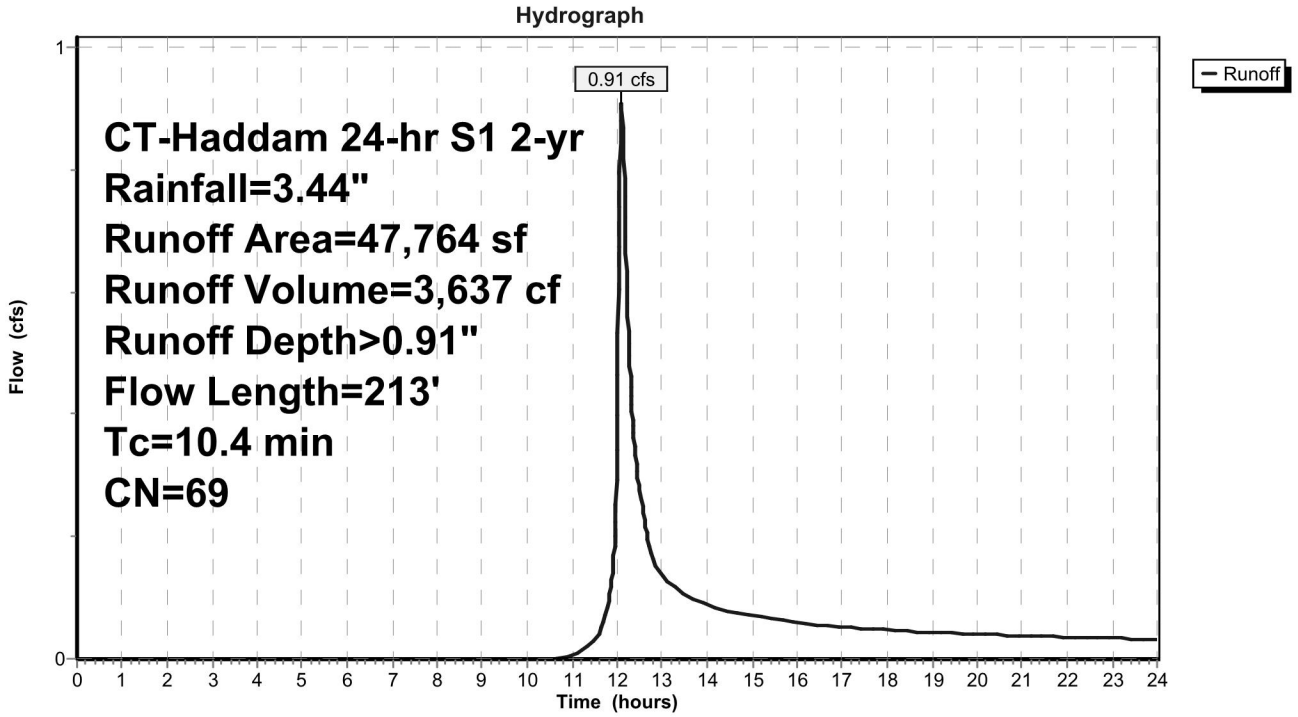
Runoff = 0.91 cfs @ 12.10 hrs, Volume= 3,637 cf, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
12,971	55	Woods, Good, HSG B
94	77	Woods, Good, HSG D
11,128	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
20,796	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
30	96	Gravel surface, HSG C
1,305	96	Gravel surface, HSG D
47,764	69	Weighted Average
47,012		98.43% Pervious Area
752		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
6.9	80	0.0281	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
1.5	84	0.0179	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	29	0.1552	1.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	213	Total			

Subcatchment PDA-100: PDA-100



Summary for Subcatchment PDA-110: PDA-110

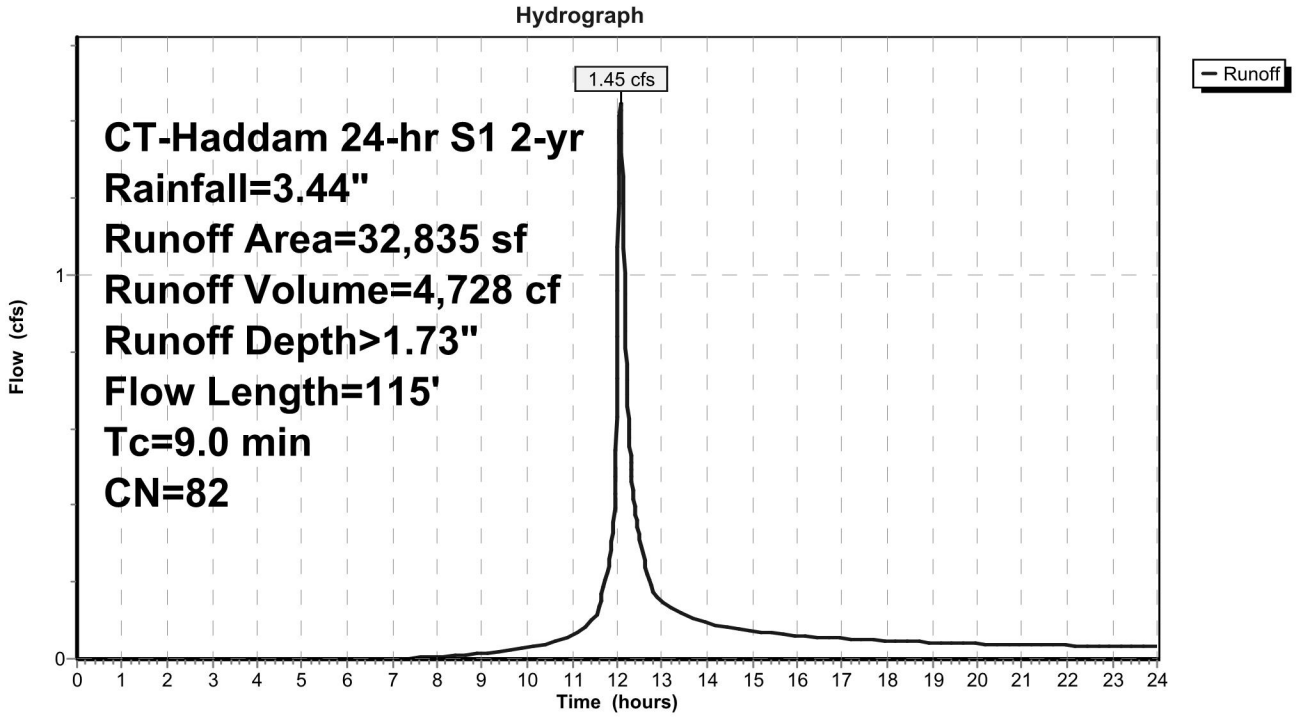
Runoff = 1.45 cfs @ 12.07 hrs, Volume= 4,728 cf, Depth> 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
256	55	Woods, Good, HSG B
1,450	77	Woods, Good, HSG D
11,185	61	>75% Grass cover, Good, HSG B
3,690	80	>75% Grass cover, Good, HSG D
4,815	98	Water Surface, HSG B
256	98	Water Surface, HSG D
6,399	98	Roofs, HSG B
4,784	98	Roofs, HSG D
32,835	82	Weighted Average
16,581		50.50% Pervious Area
16,254		49.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	17	0.0735	1.68		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
2.0	19	0.2632	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.3	32	0.0688	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
4.2	32	0.0156	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.3	15	0.0156	0.87		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	115	Total			

Subcatchment PDA-110: PDA-110



Summary for Subcatchment PDA-120: PDA-120

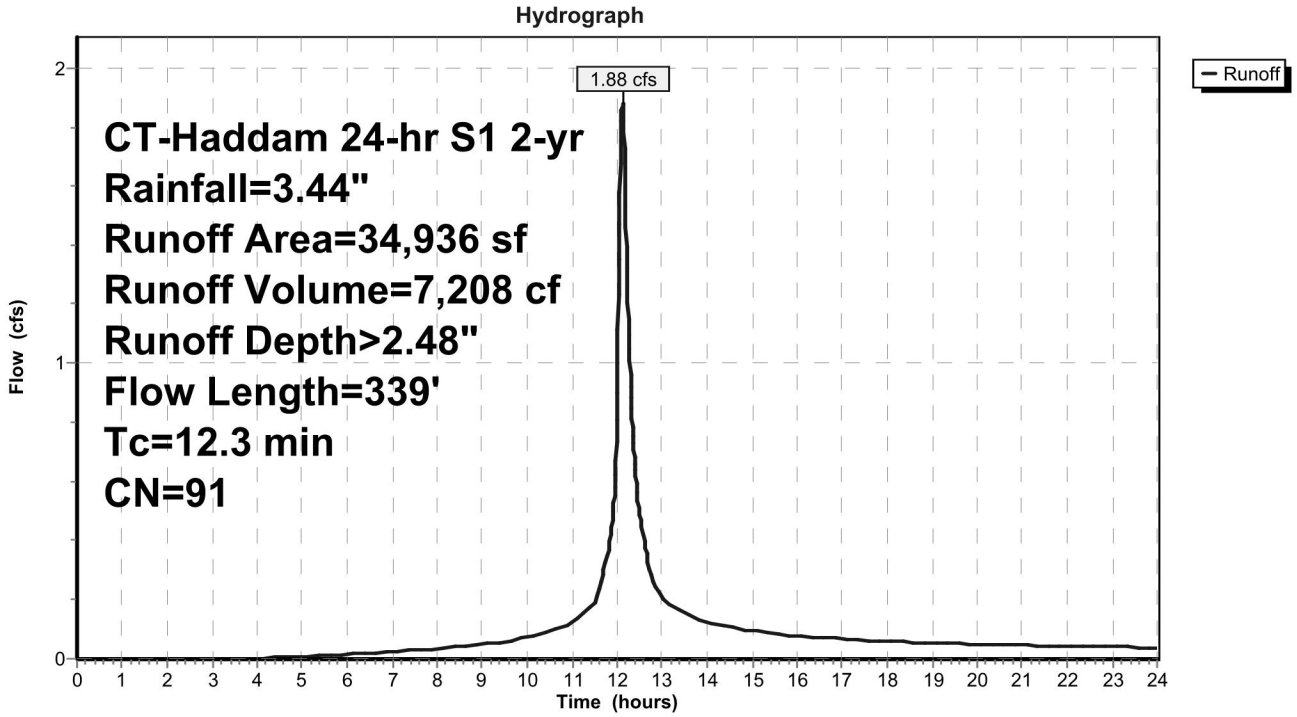
Runoff = 1.88 cfs @ 12.12 hrs, Volume= 7,208 cf, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
2,151	55	Woods, Good, HSG B
2,232	77	Woods, Good, HSG D
1,134	61	>75% Grass cover, Good, HSG B
3,416	80	>75% Grass cover, Good, HSG D
6,393	98	Paved parking, HSG B
18,513	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
27	96	Gravel surface, HSG D
92	98	Roofs, HSG B
34,936	91	Weighted Average
9,938		28.45% Pervious Area
24,998		71.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	23	0.0869	1.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	6	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	168	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.3	339	Total			

Subcatchment PDA-120: PDA-120



Summary for Subcatchment PDA-200: PDA-200

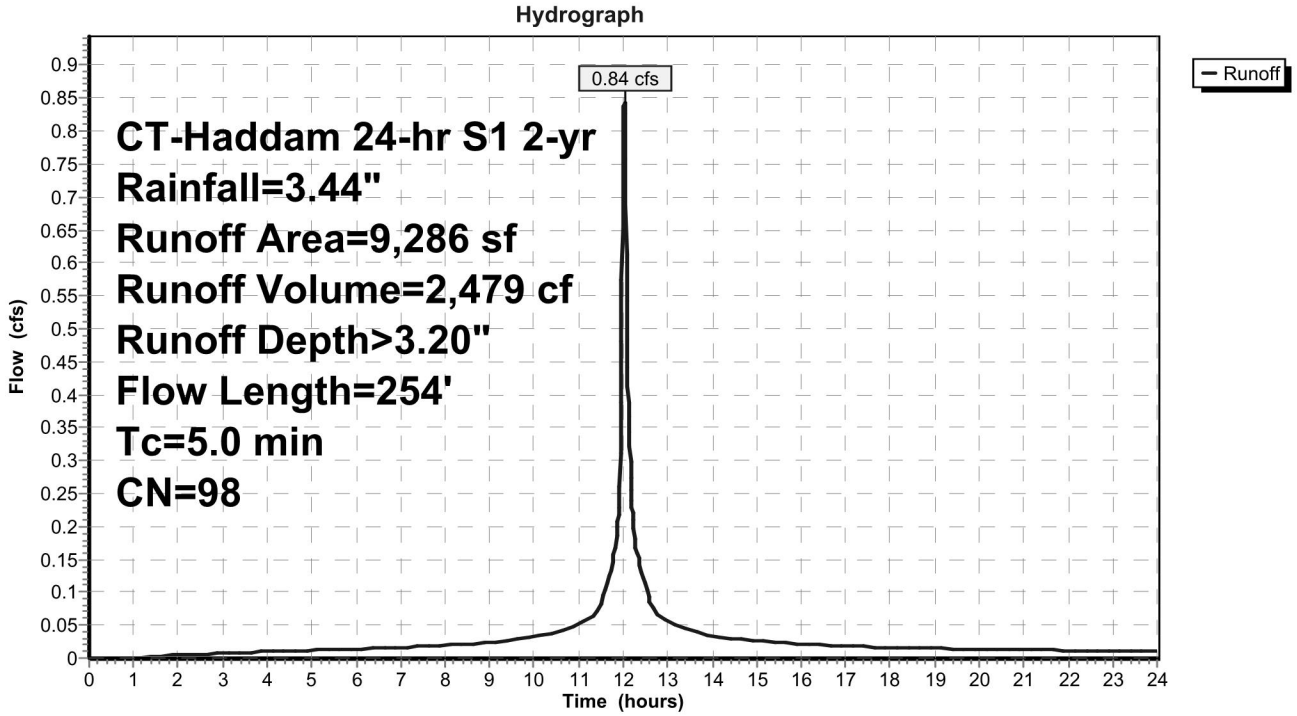
Runoff = 0.84 cfs @ 12.03 hrs, Volume= 2,479 cf, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
3,520	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
4,667	98	Paved parking, HSG D
9,286	98	Weighted Average
9,286		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PDA-200: PDA-200



Summary for Subcatchment PDA-300: PDA-300

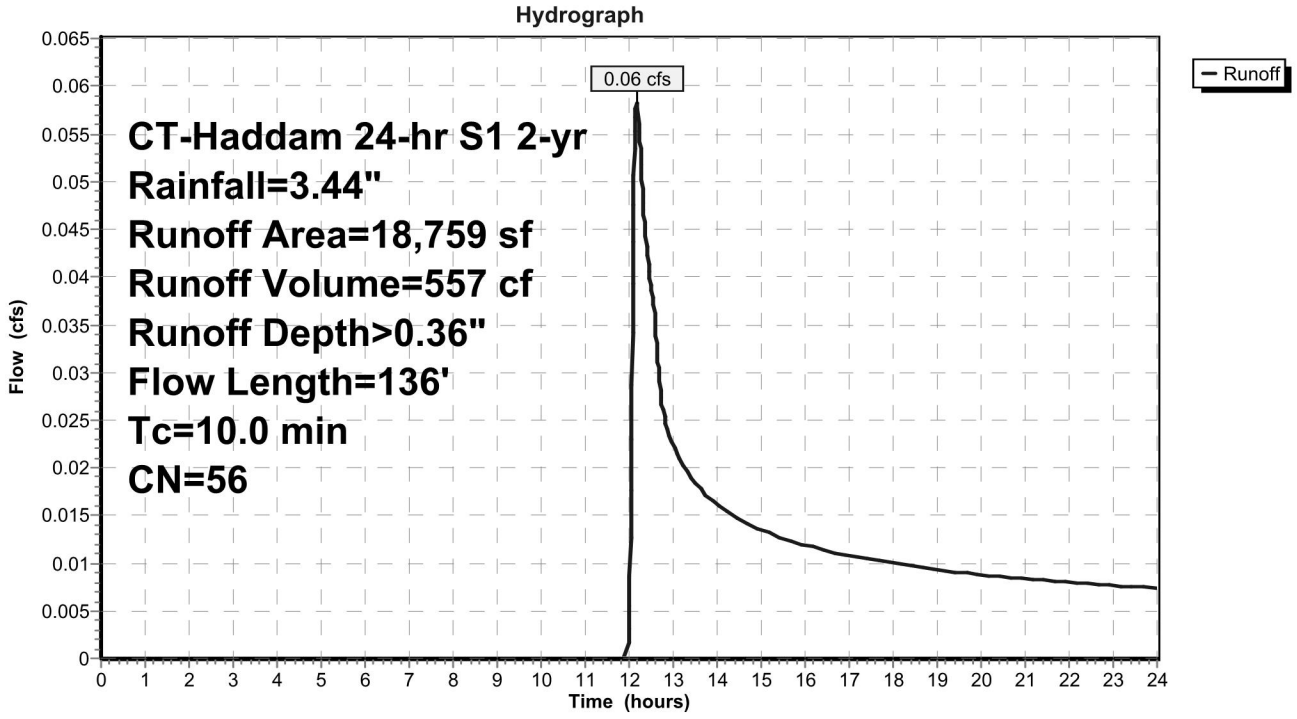
Runoff = 0.06 cfs @ 12.17 hrs, Volume= 557 cf, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 2-yr Rainfall=3.44"

Area (sf)	CN	Description
16,010	55	Woods, Good, HSG B
2,749	61	>75% Grass cover, Good, HSG B
18,759	56	Weighted Average
18,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
3.7	71	0.1056	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
3.3	14	0.0400	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.6	36	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	136	Total			

Subcatchment PDA-300: PDA-300



Summary for Pond P1: POND

Inflow Area = 32,835 sf, 49.50% Impervious, Inflow Depth > 1.73" for 2-yr event
Inflow = 1.45 cfs @ 12.07 hrs, Volume= 4,728 cf
Outflow = 0.18 cfs @ 12.81 hrs, Volume= 4,717 cf, Atten= 88%, Lag= 44.2 min
Discarded = 0.18 cfs @ 12.81 hrs, Volume= 4,717 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 556.46' @ 12.81 hrs Surf.Area= 1,552 sf Storage= 1,546 cf

Plug-Flow detention time= 89.4 min calculated for 4,717 cf (100% of inflow)
Center-of-Mass det. time= 88.2 min (946.8 - 858.6)

Volume	Invert	Avail.Storage	Storage Description
#1	555.00'	4,799 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

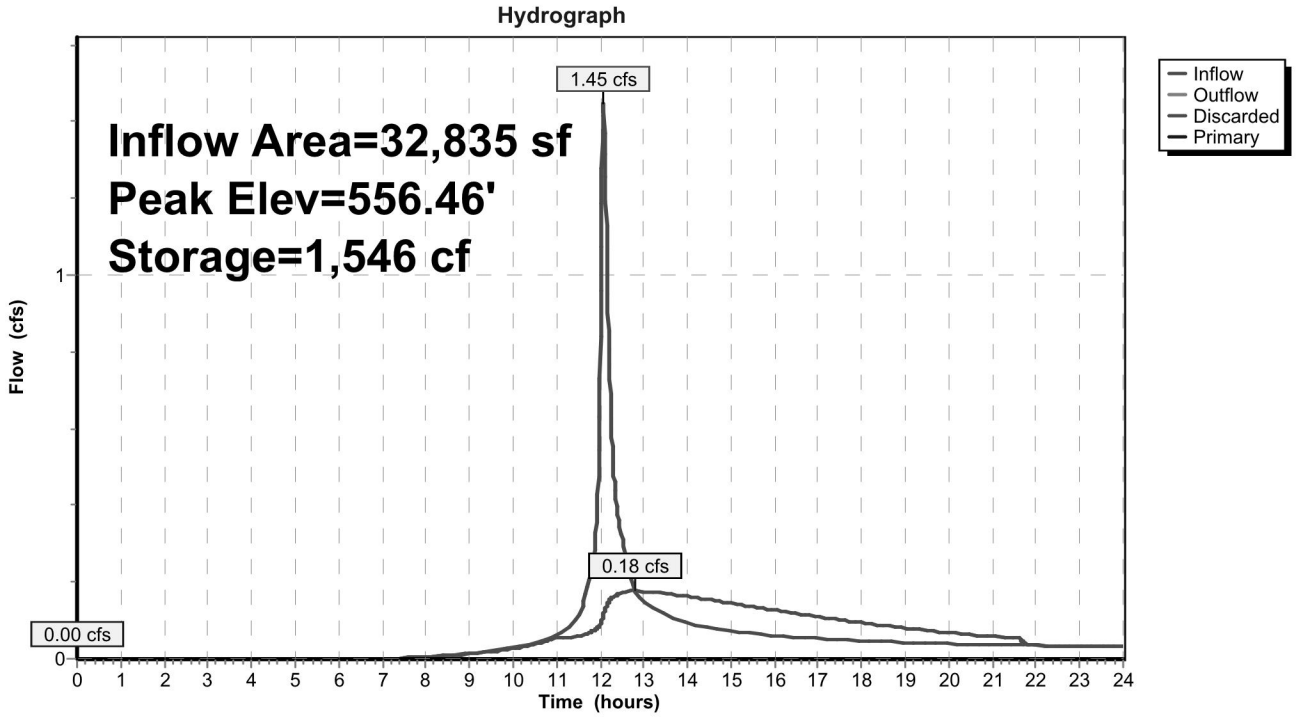
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
555.00	587	0	0
556.00	1,231	909	909
557.00	1,931	1,581	2,490
558.00	2,687	2,309	4,799

Device	Routing	Invert	Outlet Devices
#1	Discarded	555.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 552.00'
#2	Primary	555.00'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 555.00' / 554.90' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	557.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.18 cfs @ 12.81 hrs HW=556.46' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=555.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)
↑—**3=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: POND


Hydrograph
Inflow Area=32,835 sf
Peak Elev=556.46'
Storage=1,546 cf
1.45 cfs
0.18 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Pond P2: TANK

Inflow Area = 67,771 sf, 60.87% Impervious, Inflow Depth > 1.28" for 2-yr event
Inflow = 1.88 cfs @ 12.12 hrs, Volume= 7,208 cf
Outflow = 0.76 cfs @ 12.35 hrs, Volume= 7,195 cf, Atten= 60%, Lag= 14.0 min
Discarded = 0.19 cfs @ 12.35 hrs, Volume= 6,190 cf
Primary = 0.57 cfs @ 12.35 hrs, Volume= 1,004 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 552.88' @ 12.35 hrs Surf.Area= 1,232 sf Storage= 1,851 cf

Plug-Flow detention time= 66.2 min calculated for 7,192 cf (100% of inflow)
Center-of-Mass det. time= 65.0 min (883.0 - 818.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	551.00'	268 cf	**30.80'W x 40.00'L x 4.00'H Field A** 4,928 cf Overall - 4,257 cf Embedded = 671 cf x 40.0% Voids
#2A	551.00'	3,275 cf	**Concrete Galley 4x8x4** x 35 Inside #1 Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf 35 Chambers in 7 Rows
		3,543 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	551.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 548.50'
#2	Primary	551.00'	**15.0" Round Culvert** L= 8.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 551.00' / 550.96' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Primary	552.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	554.50'	**4.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.19 cfs @ 12.35 hrs HW=552.88' (Free Discharge)
└**1=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=0.57 cfs @ 12.35 hrs HW=552.88' (Free Discharge)
├**2=Culvert** (Passes 0.00 cfs of 5.84 cfs potential flow)
│ └**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 0.57 cfs @ 2.10 fps)

Pond P2: TANK - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x8x4 (Concrete Galley, UCPI 4x8x4 Galley or equivalent)
Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf
Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf

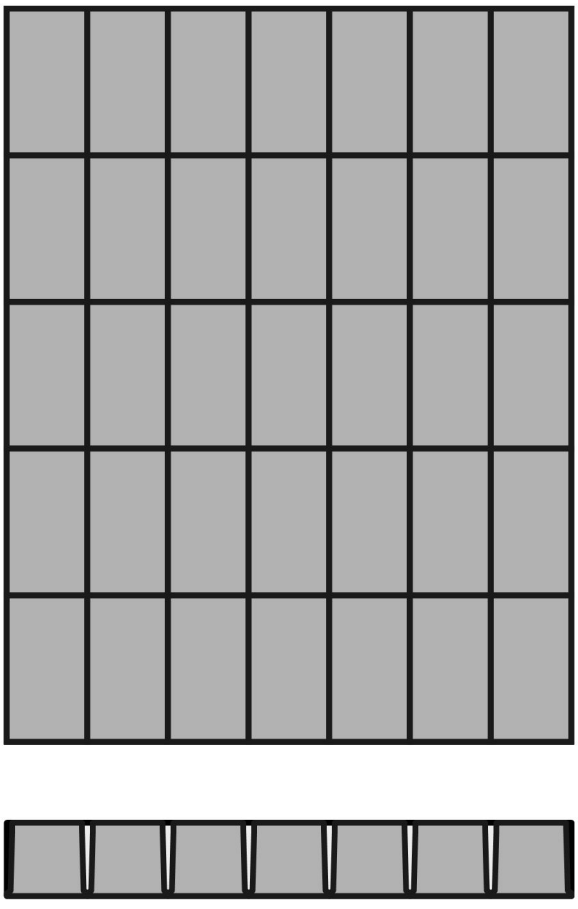
5 Chambers/Row x 8.00' Long = 40.00' Row Length
7 Rows x 52.8" Wide = 30.80' Base Width
48.0" Chamber Height = 4.00' Field Height

35 Chambers x 93.6 cf = 3,274.7 cf Chamber Storage
35 Chambers x 121.6 cf = 4,257.3 cf Displacement

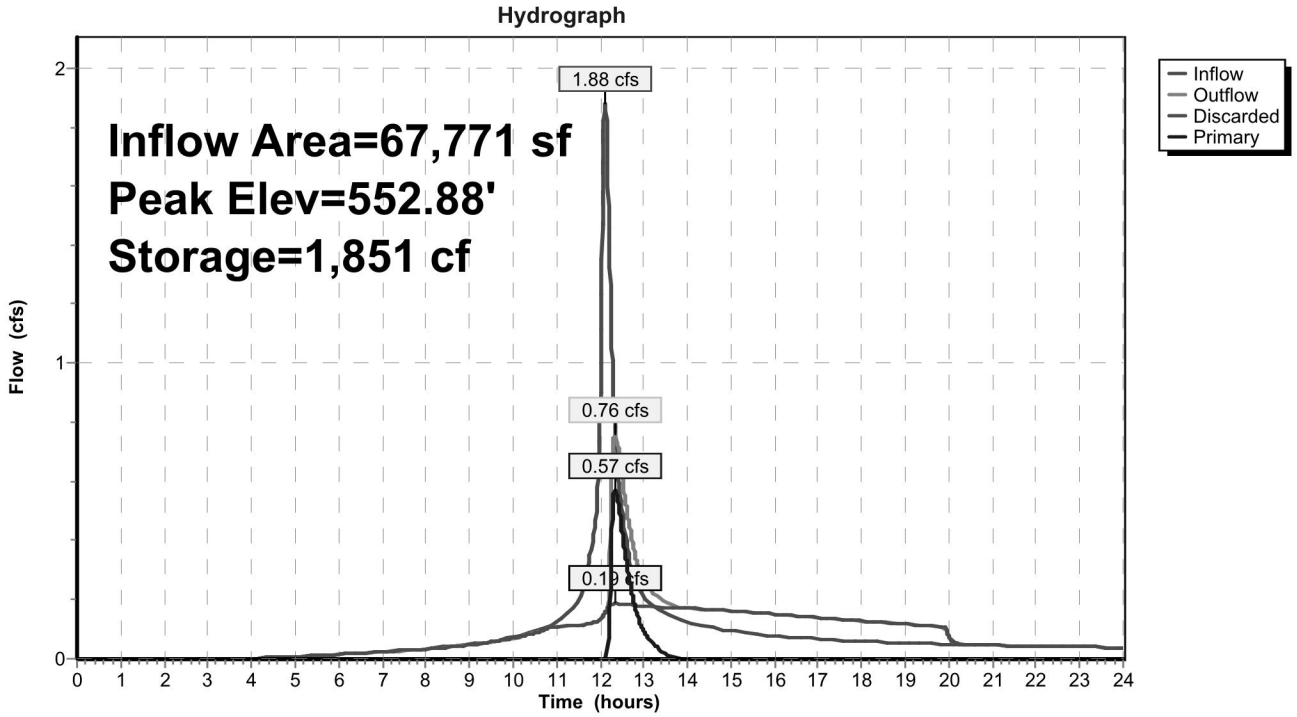
4,928.0 cf Field - 4,257.3 cf Chambers = 670.7 cf Stone x 40.0% Voids = 268.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,543.0 cf = 0.081 af
Overall Storage Efficiency = 71.9%
Overall System Size = 40.00' x 30.80' x 4.00'

35 Chambers
182.5 cy Field
24.8 cy Stone



Pond P2: TANK

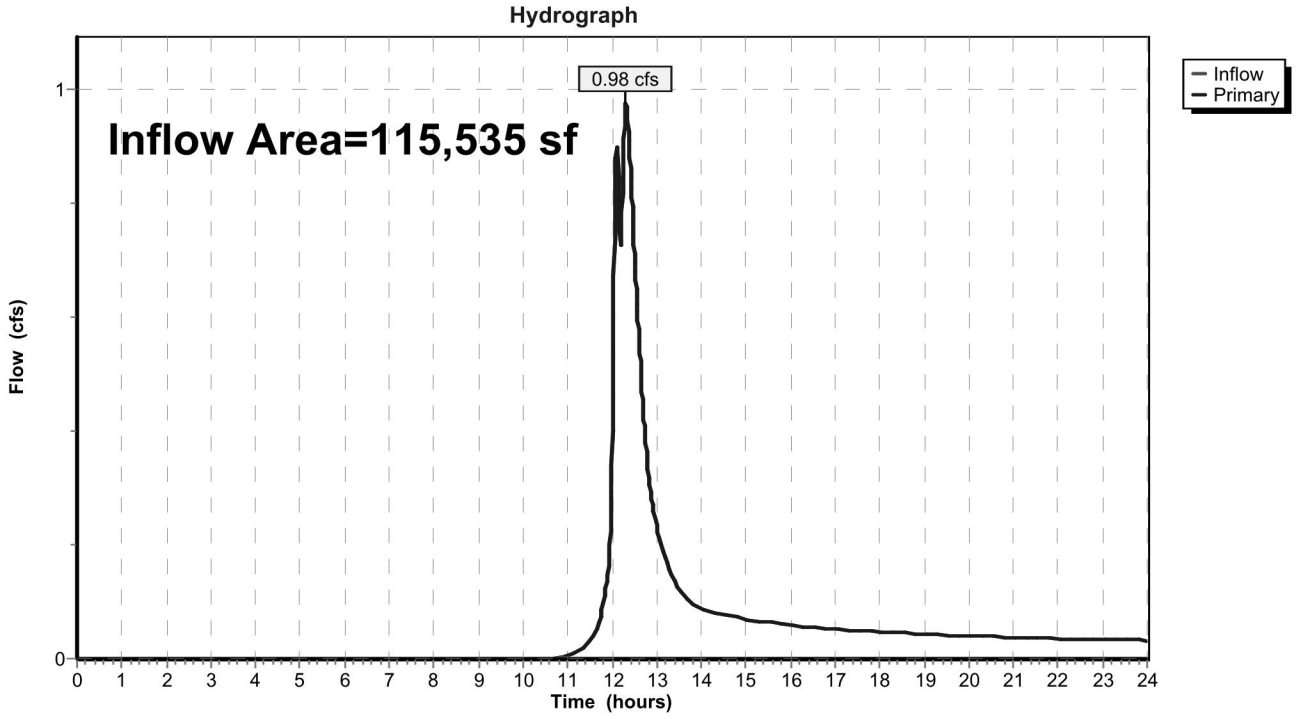

Hydrograph
Inflow Area=67,771 sf
Peak Elev=552.88'
Storage=1,851 cf
1.88 cfs
0.76 cfs
0.57 cfs
0.19 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link DP-1: DP-1

Inflow Area = 115,535 sf, 36.36% Impervious, Inflow Depth > 0.48" for 2-yr event
Inflow = 0.98 cfs @ 12.31 hrs, Volume= 4,641 cf
Primary = 0.98 cfs @ 12.31 hrs, Volume= 4,641 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

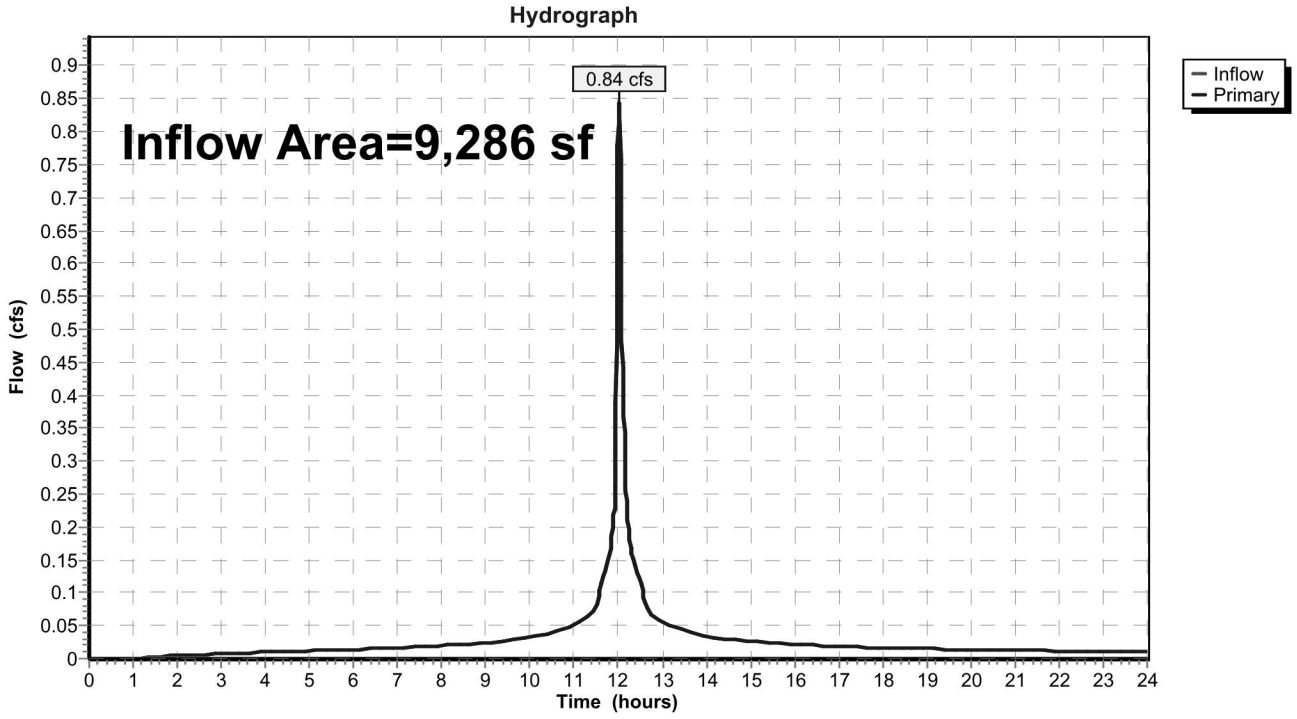


Summary for Link DP-2: DP-2

Inflow Area = 9,286 sf,100.00% Impervious, Inflow Depth > 3.20" for 2-yr event
Inflow = 0.84 cfs @ 12.03 hrs, Volume= 2,479 cf
Primary = 0.84 cfs @ 12.03 hrs, Volume= 2,479 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

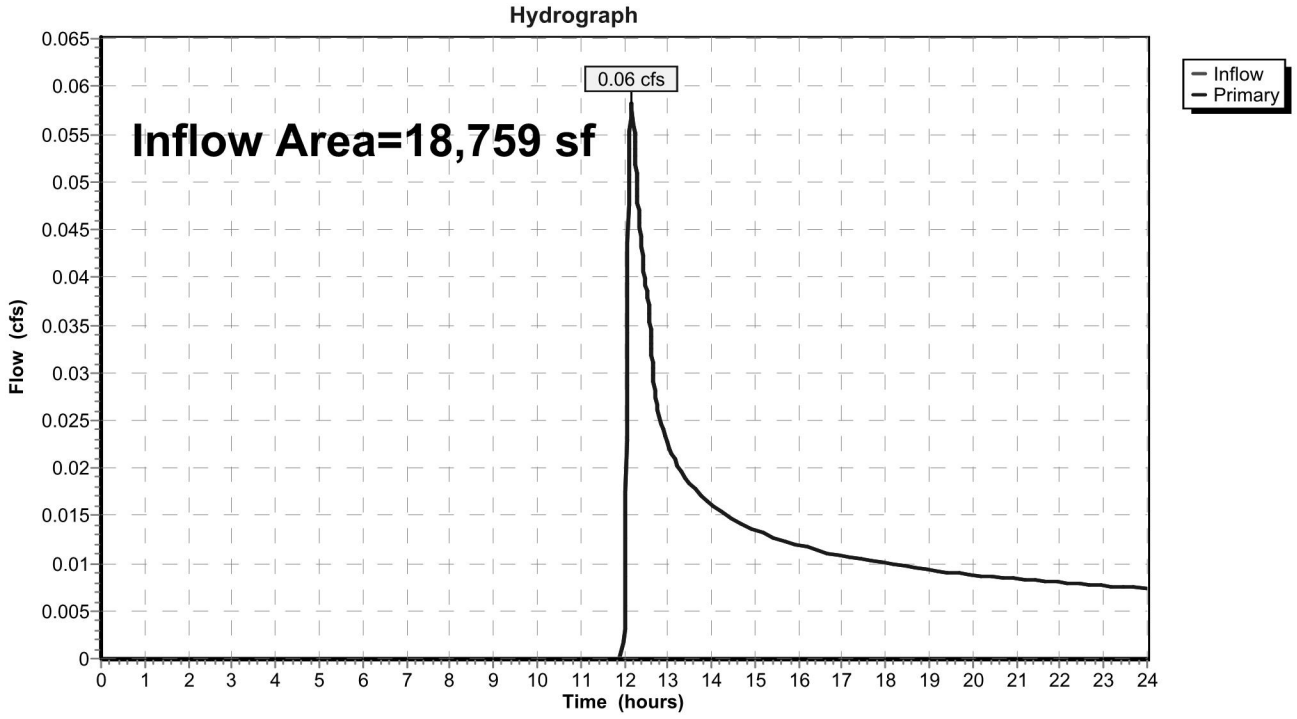


Summary for Link DP-3: DP-3

Inflow Area = 18,759 sf, 0.00% Impervious, Inflow Depth > 0.36" for 2-yr event
Inflow = 0.06 cfs @ 12.17 hrs, Volume= 557 cf
Primary = 0.06 cfs @ 12.17 hrs, Volume= 557 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: PDA-100 Runoff Area=47,764 sf 1.57% Impervious Runoff Depth>2.13"
Flow Length=213' Tc=10.4 min CN=69 Runoff=2.35 cfs 8,487 cf

Subcatchment PDA-110: PDA-110 Runoff Area=32,835 sf 49.50% Impervious Runoff Depth>3.29"
Flow Length=115' Tc=9.0 min CN=82 Runoff=2.76 cfs 9,015 cf

Subcatchment PDA-120: PDA-120 Runoff Area=34,936 sf 71.55% Impervious Runoff Depth>4.21"
Flow Length=339' Tc=12.3 min CN=91 Runoff=3.11 cfs 12,261 cf

Subcatchment PDA-200: PDA-200 Runoff Area=9,286 sf 100.00% Impervious Runoff Depth>5.01"
Flow Length=254' Tc=5.0 min CN=98 Runoff=1.29 cfs 3,875 cf

Subcatchment PDA-300: PDA-300 Runoff Area=18,759 sf 0.00% Impervious Runoff Depth>1.17"
Flow Length=136' Tc=10.0 min CN=56 Runoff=0.43 cfs 1,824 cf

Pond P1: POND Peak Elev=557.43' Storage=3,391 cf Inflow=2.76 cfs 9,015 cf
Discarded=0.28 cfs 8,746 cf Primary=0.00 cfs 0 cf Outflow=0.28 cfs 8,746 cf

Pond P2: TANK Peak Elev=553.36' Storage=2,321 cf Inflow=3.11 cfs 12,261 cf
Discarded=0.21 cfs 8,468 cf Primary=2.27 cfs 3,772 cf Outflow=2.47 cfs 12,241 cf

Link DP-1: DP-1 Inflow=4.13 cfs 12,259 cf
Primary=4.13 cfs 12,259 cf

Link DP-2: DP-2 Inflow=1.29 cfs 3,875 cf
Primary=1.29 cfs 3,875 cf

Link DP-3: DP-3 Inflow=0.43 cfs 1,824 cf
Primary=0.43 cfs 1,824 cf

Total Runoff Area = 143,580 sf Runoff Volume = 35,463 cf Average Runoff Depth = 2.96"
64.28% Pervious = 92,290 sf 35.72% Impervious = 51,290 sf

Summary for Subcatchment PDA-100: PDA-100

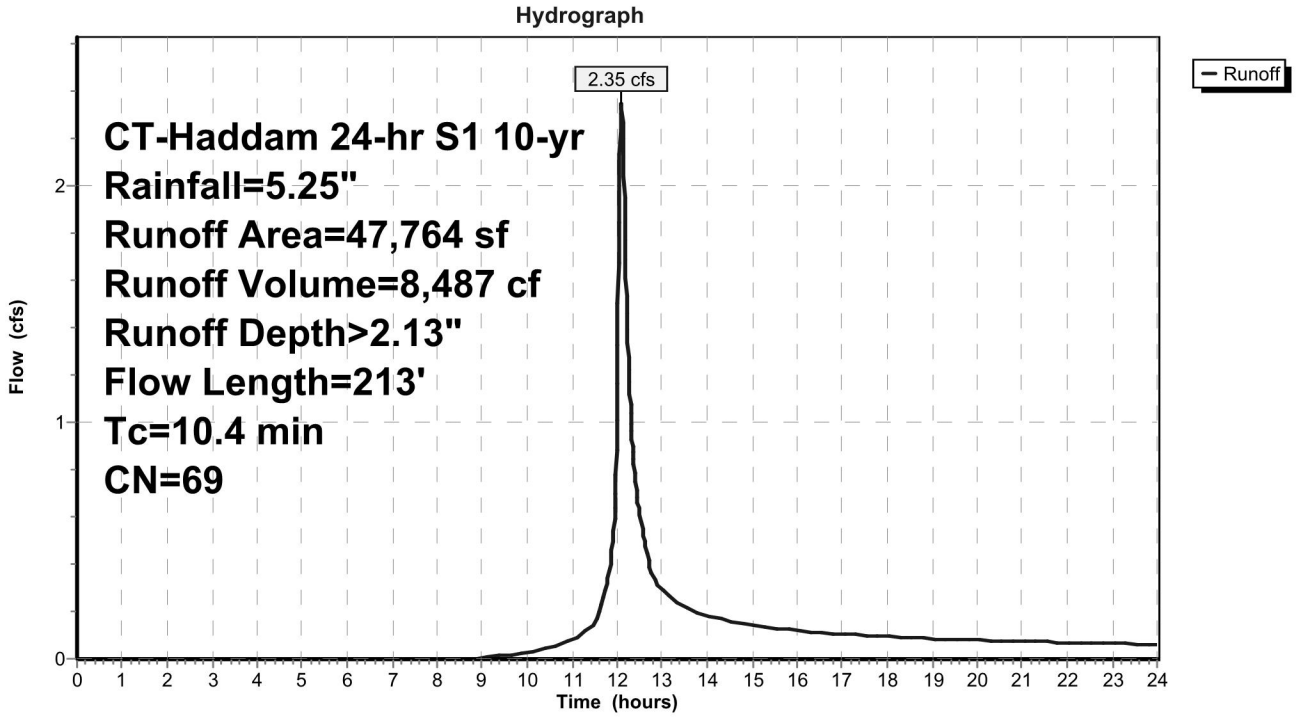
Runoff = 2.35 cfs @ 12.10 hrs, Volume= 8,487 cf, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
12,971	55	Woods, Good, HSG B
94	77	Woods, Good, HSG D
11,128	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
20,796	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
30	96	Gravel surface, HSG C
1,305	96	Gravel surface, HSG D
47,764	69	Weighted Average
47,012		98.43% Pervious Area
752		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
6.9	80	0.0281	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
1.5	84	0.0179	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	29	0.1552	1.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	213	Total			

Subcatchment PDA-100: PDA-100



Summary for Subcatchment PDA-110: PDA-110

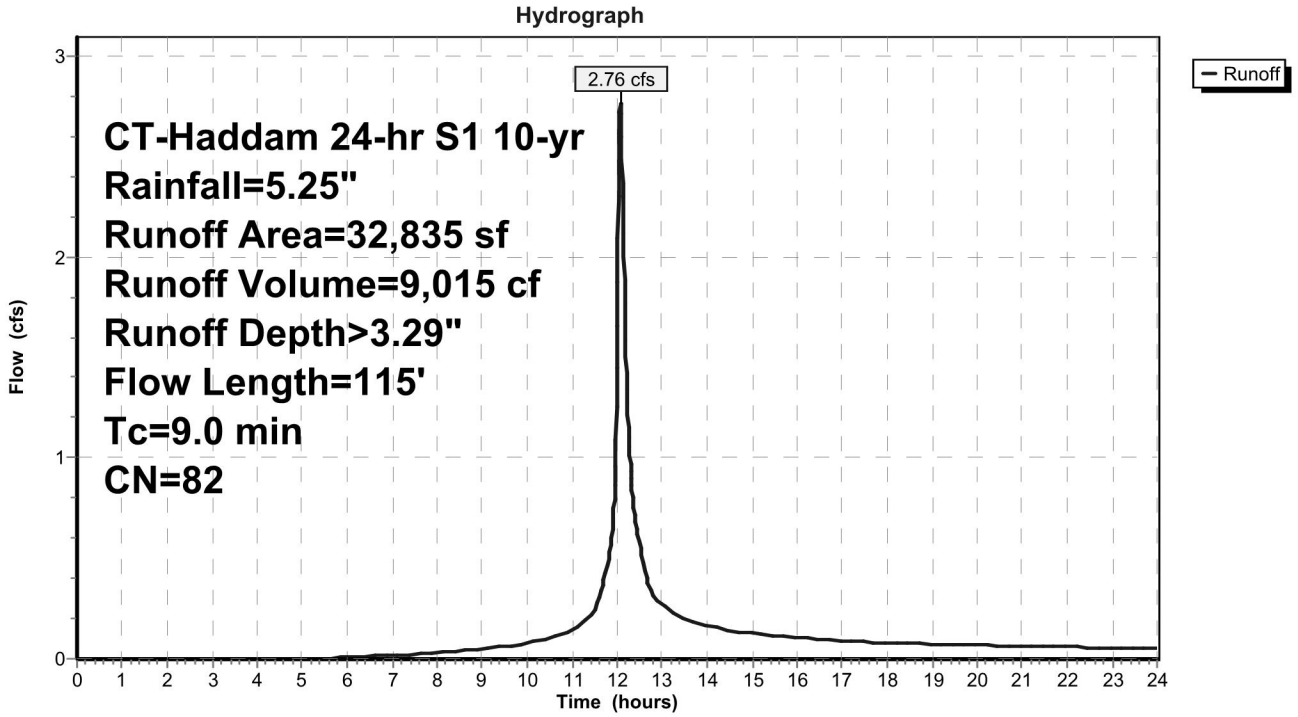
Runoff = 2.76 cfs @ 12.07 hrs, Volume= 9,015 cf, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
256	55	Woods, Good, HSG B
1,450	77	Woods, Good, HSG D
11,185	61	>75% Grass cover, Good, HSG B
3,690	80	>75% Grass cover, Good, HSG D
4,815	98	Water Surface, HSG B
256	98	Water Surface, HSG D
6,399	98	Roofs, HSG B
4,784	98	Roofs, HSG D
32,835	82	Weighted Average
16,581		50.50% Pervious Area
16,254		49.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	17	0.0735	1.68		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
2.0	19	0.2632	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.3	32	0.0688	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
4.2	32	0.0156	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.3	15	0.0156	0.87		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	115	Total			

Subcatchment PDA-110: PDA-110



Summary for Subcatchment PDA-120: PDA-120

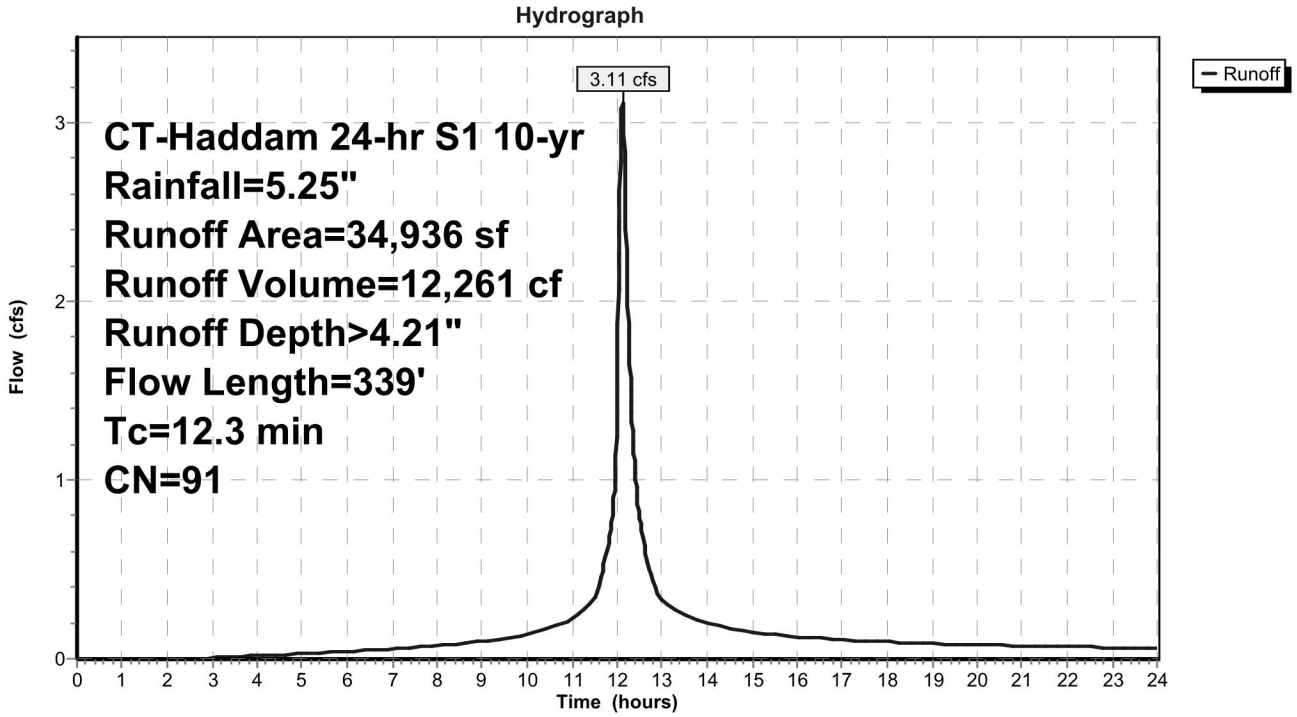
Runoff = 3.11 cfs @ 12.11 hrs, Volume= 12,261 cf, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
2,151	55	Woods, Good, HSG B
2,232	77	Woods, Good, HSG D
1,134	61	>75% Grass cover, Good, HSG B
3,416	80	>75% Grass cover, Good, HSG D
6,393	98	Paved parking, HSG B
18,513	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
27	96	Gravel surface, HSG D
92	98	Roofs, HSG B
34,936	91	Weighted Average
9,938		28.45% Pervious Area
24,998		71.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	23	0.0869	1.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	6	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	168	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.3	339	Total			

Subcatchment PDA-120: PDA-120



Summary for Subcatchment PDA-200: PDA-200

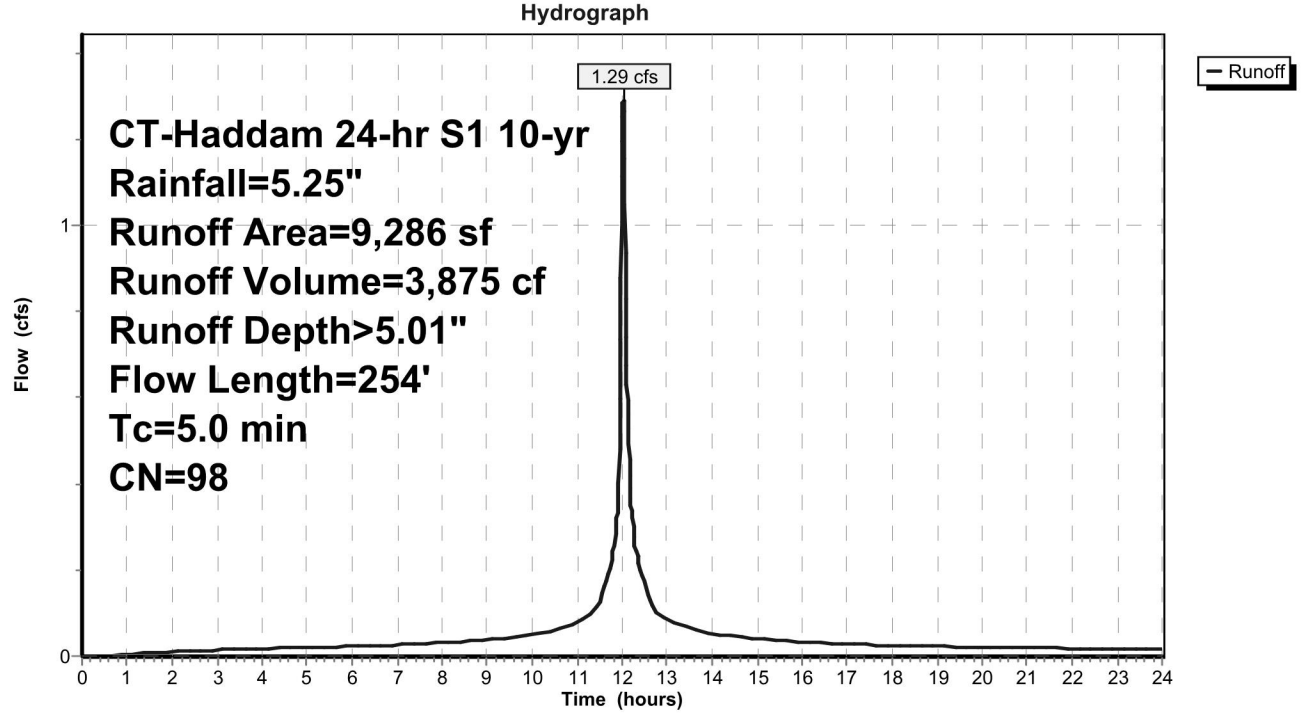
Runoff = 1.29 cfs @ 12.03 hrs, Volume= 3,875 cf, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
3,520	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
4,667	98	Paved parking, HSG D
9,286	98	Weighted Average
9,286		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PDA-200: PDA-200



Summary for Subcatchment PDA-300: PDA-300

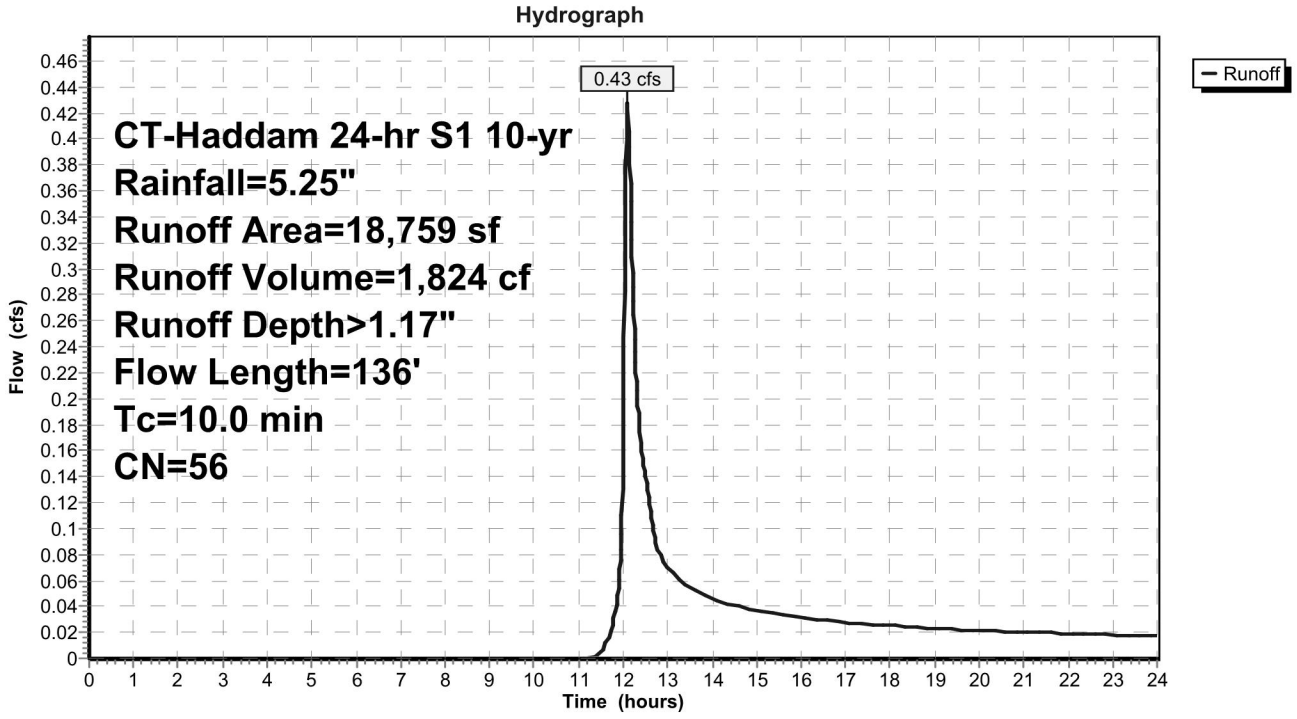
Runoff = 0.43 cfs @ 12.10 hrs, Volume= 1,824 cf, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 10-yr Rainfall=5.25"

Area (sf)	CN	Description
16,010	55	Woods, Good, HSG B
2,749	61	>75% Grass cover, Good, HSG B
18,759	56	Weighted Average
18,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
3.7	71	0.1056	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
3.3	14	0.0400	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.6	36	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	136	Total			

Subcatchment PDA-300: PDA-300



Summary for Pond P1: POND

Inflow Area = 32,835 sf, 49.50% Impervious, Inflow Depth > 3.29" for 10-yr event
Inflow = 2.76 cfs @ 12.07 hrs, Volume= 9,015 cf
Outflow = 0.28 cfs @ 12.92 hrs, Volume= 8,746 cf, Atten= 90%, Lag= 51.1 min
Discarded = 0.28 cfs @ 12.92 hrs, Volume= 8,746 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 557.43' @ 12.92 hrs Surf.Area= 2,256 sf Storage= 3,391 cf

Plug-Flow detention time= 140.8 min calculated for 8,742 cf (97% of inflow)
Center-of-Mass det. time= 123.4 min (958.1 - 834.6)

Volume	Invert	Avail.Storage	Storage Description
#1	555.00'	4,799 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

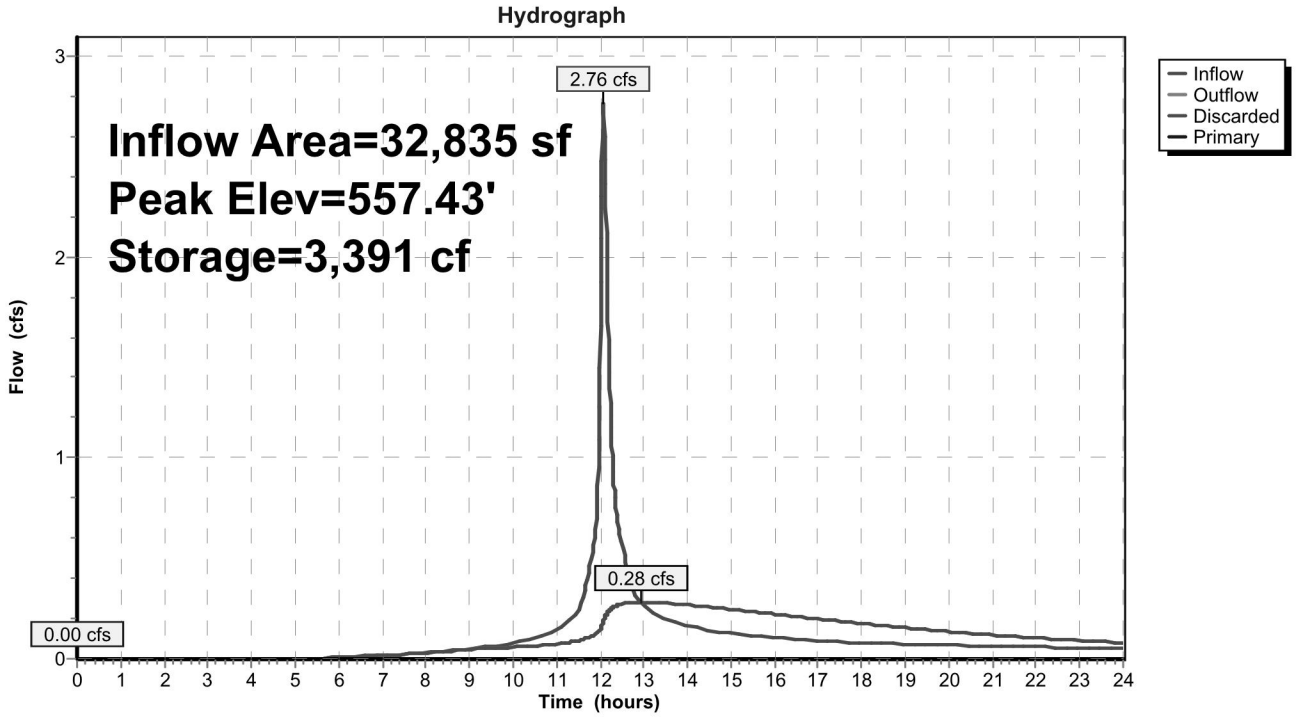
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
555.00	587	0	0
556.00	1,231	909	909
557.00	1,931	1,581	2,490
558.00	2,687	2,309	4,799

Device	Routing	Invert	Outlet Devices
#1	Discarded	555.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 552.00'
#2	Primary	555.00'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 555.00' / 554.90' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	557.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.28 cfs @ 12.92 hrs HW=557.43' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=555.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)
↑—**3=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: POND


Hydrograph
Inflow Area=32,835 sf
Peak Elev=557.43'
Storage=3,391 cf
2.76 cfs
0.28 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
0 1 2 3

Summary for Pond P2: TANK

Inflow Area = 67,771 sf, 60.87% Impervious, Inflow Depth > 2.17" for 10-yr event
Inflow = 3.11 cfs @ 12.11 hrs, Volume= 12,261 cf
Outflow = 2.47 cfs @ 12.19 hrs, Volume= 12,241 cf, Atten= 20%, Lag= 4.7 min
Discarded = 0.21 cfs @ 12.19 hrs, Volume= 8,468 cf
Primary = 2.27 cfs @ 12.19 hrs, Volume= 3,772 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 553.36' @ 12.19 hrs Surf.Area= 1,232 sf Storage= 2,321 cf

Plug-Flow detention time= 60.8 min calculated for 12,241 cf (100% of inflow)
Center-of-Mass det. time= 59.7 min (859.0 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	551.00'	268 cf	**30.80'W x 40.00'L x 4.00'H Field A** 4,928 cf Overall - 4,257 cf Embedded = 671 cf x 40.0% Voids
#2A	551.00'	3,275 cf	**Concrete Galley 4x8x4** x 35 Inside #1 Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf 35 Chambers in 7 Rows
		3,543 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	551.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 548.50'
#2	Primary	551.00'	**15.0" Round Culvert** L= 8.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 551.00' / 550.96' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Primary	552.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	554.50'	**4.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 12.19 hrs HW=553.36' (Free Discharge)
└**1=Exfiltration** (Controls 0.21 cfs)

Primary OutFlow Max=2.26 cfs @ 12.19 hrs HW=553.36' (Free Discharge)
├**2=Culvert** (Passes 0.00 cfs of 6.86 cfs potential flow)
│ └**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 2.26 cfs @ 3.15 fps)

Pond P2: TANK - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x8x4 (Concrete Galley, UCPI 4x8x4 Galley or equivalent)
Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf
Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf

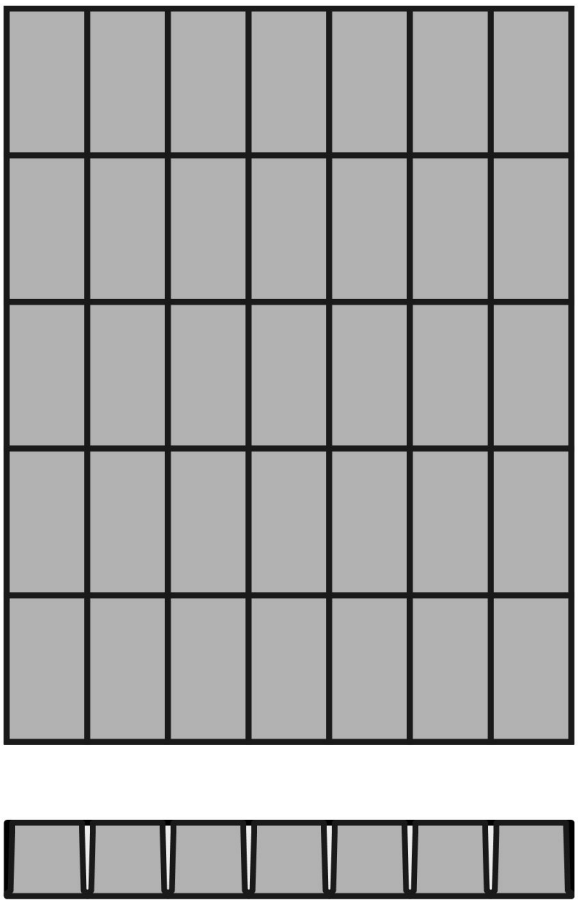
5 Chambers/Row x 8.00' Long = 40.00' Row Length
7 Rows x 52.8" Wide = 30.80' Base Width
48.0" Chamber Height = 4.00' Field Height

35 Chambers x 93.6 cf = 3,274.7 cf Chamber Storage
35 Chambers x 121.6 cf = 4,257.3 cf Displacement

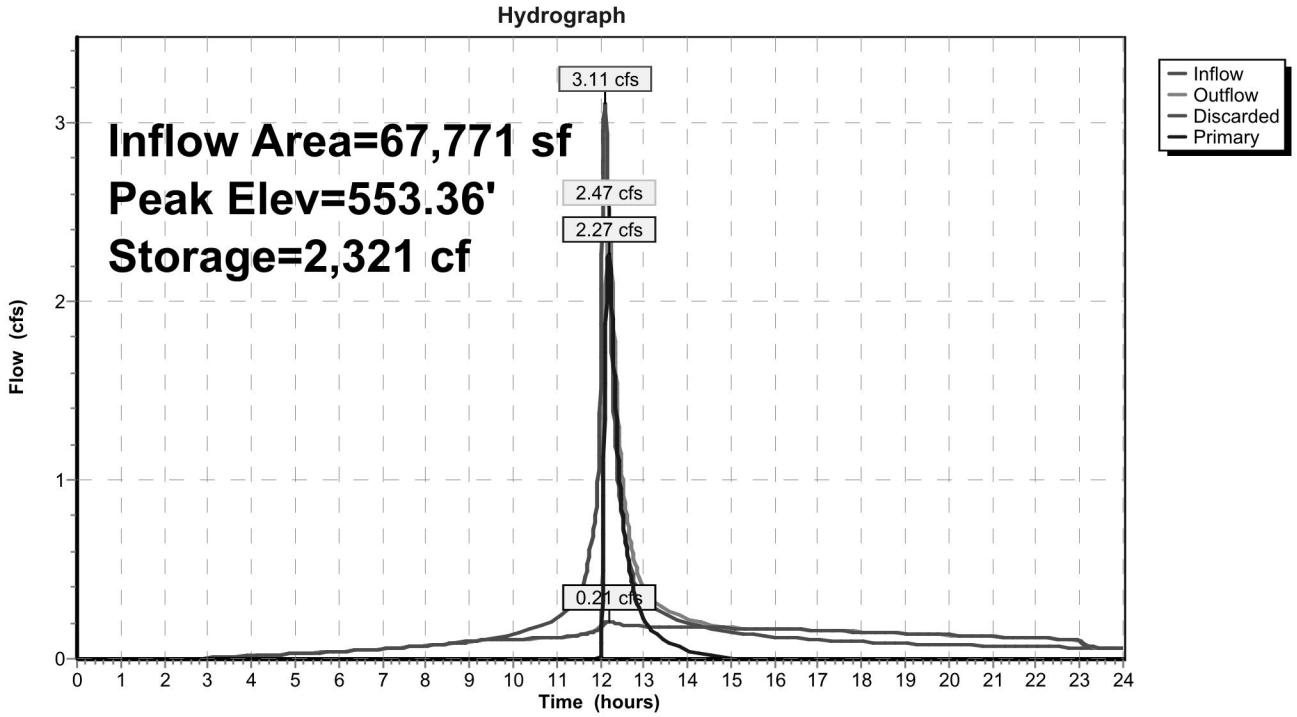
4,928.0 cf Field - 4,257.3 cf Chambers = 670.7 cf Stone x 40.0% Voids = 268.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,543.0 cf = 0.081 af
Overall Storage Efficiency = 71.9%
Overall System Size = 40.00' x 30.80' x 4.00'

35 Chambers
182.5 cy Field
24.8 cy Stone



Pond P2: TANK

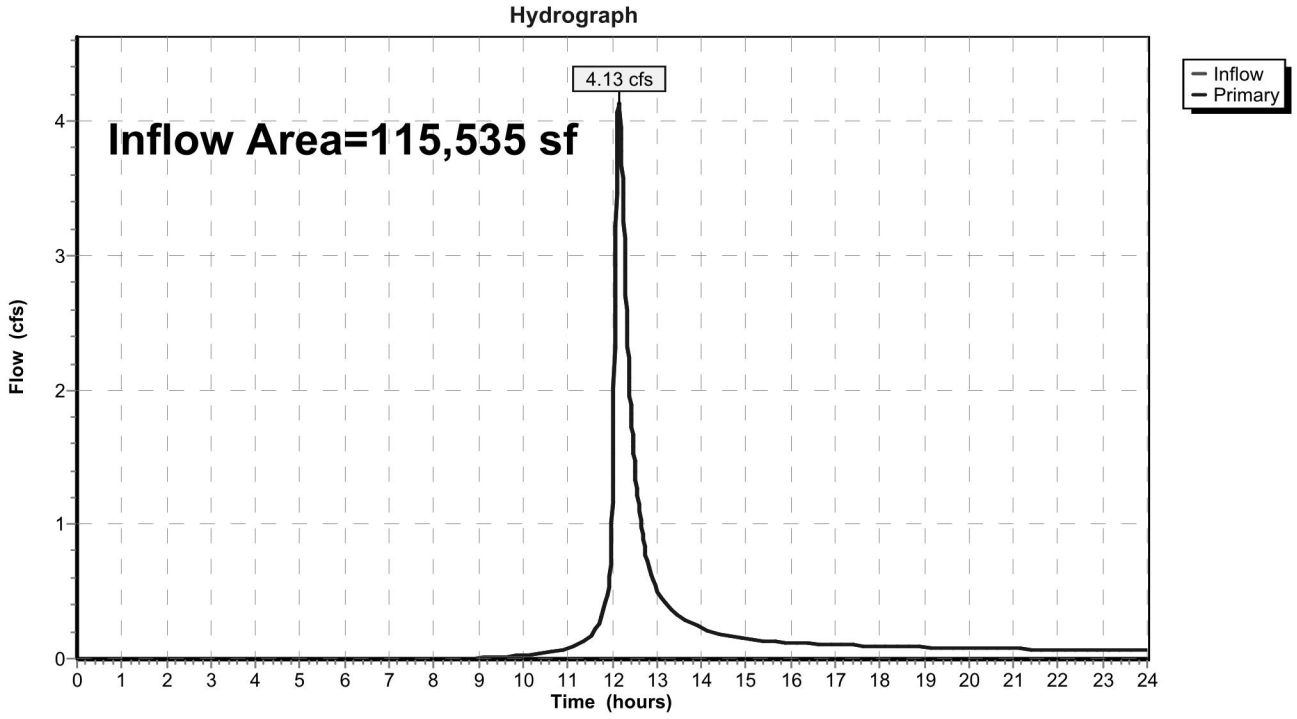

Hydrograph
Inflow Area=67,771 sf
Peak Elev=553.36'
Storage=2,321 cf
3.11 cfs
2.47 cfs
2.27 cfs
0.21 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link DP-1: DP-1

Inflow Area = 115,535 sf, 36.36% Impervious, Inflow Depth > 1.27" for 10-yr event
Inflow = 4.13 cfs @ 12.15 hrs, Volume= 12,259 cf
Primary = 4.13 cfs @ 12.15 hrs, Volume= 12,259 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

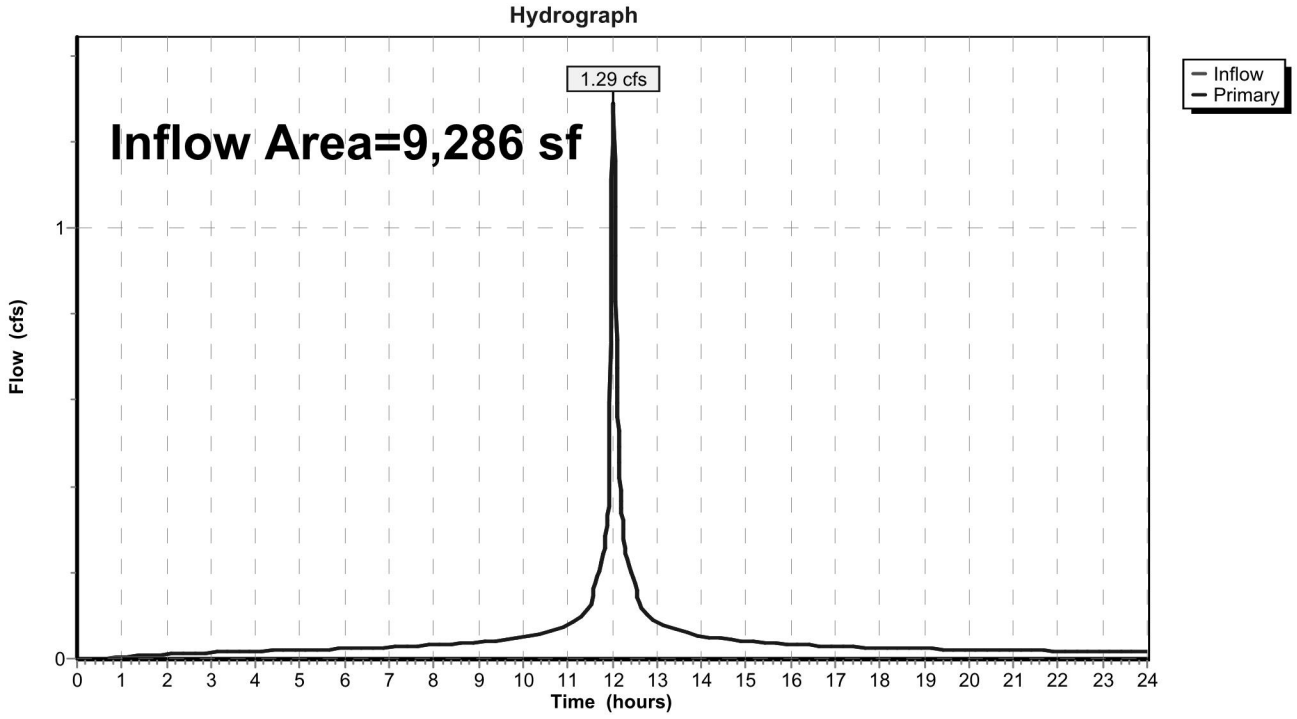


Summary for Link DP-2: DP-2

Inflow Area = 9,286 sf,100.00% Impervious, Inflow Depth > 5.01" for 10-yr event
Inflow = 1.29 cfs @ 12.03 hrs, Volume= 3,875 cf
Primary = 1.29 cfs @ 12.03 hrs, Volume= 3,875 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

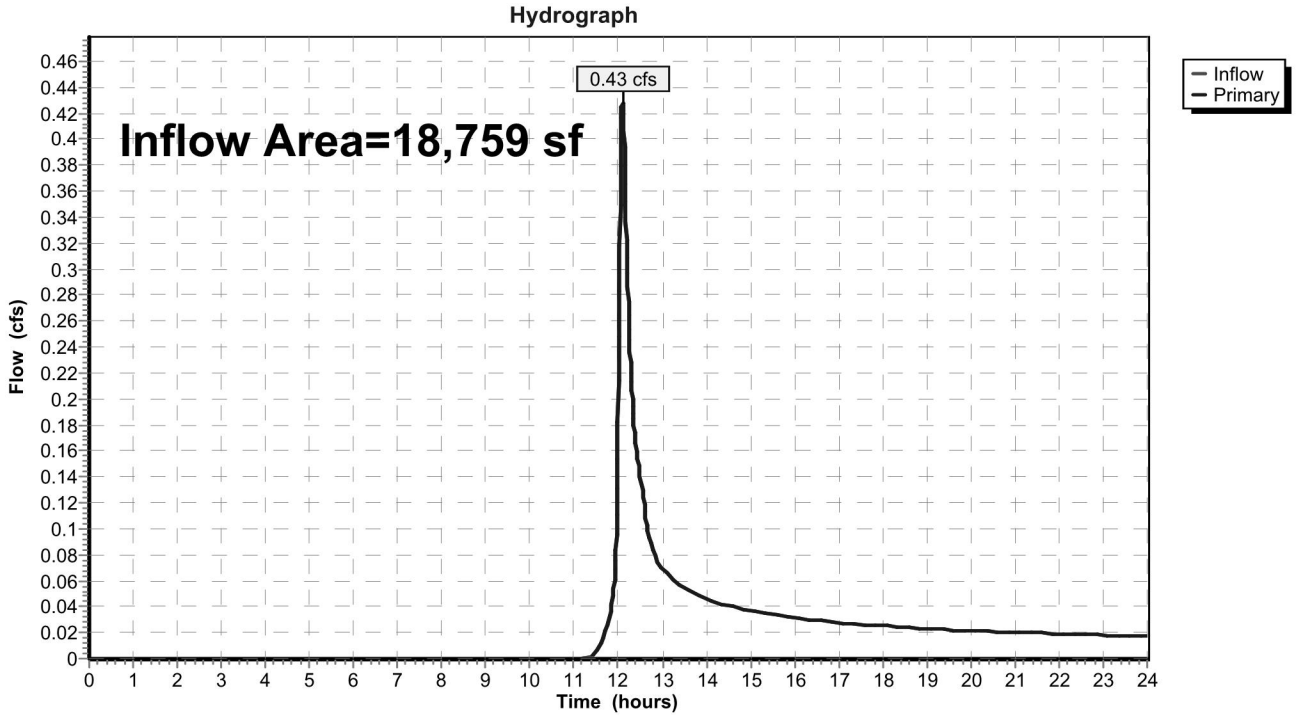


Summary for Link DP-3: DP-3

Inflow Area = 18,759 sf, 0.00% Impervious, Inflow Depth > 1.17" for 10-yr event
Inflow = 0.43 cfs @ 12.10 hrs, Volume= 1,824 cf
Primary = 0.43 cfs @ 12.10 hrs, Volume= 1,824 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: PDA-100 Runoff Area=47,764 sf 1.57% Impervious Runoff Depth>2.99"
Flow Length=213' Tc=10.4 min CN=69 Runoff=3.35 cfs 11,914 cf

Subcatchment PDA-110: PDA-110 Runoff Area=32,835 sf 49.50% Impervious Runoff Depth>4.32"
Flow Length=115' Tc=9.0 min CN=82 Runoff=3.60 cfs 11,814 cf

Subcatchment PDA-120: PDA-120 Runoff Area=34,936 sf 71.55% Impervious Runoff Depth>5.30"
Flow Length=339' Tc=12.3 min CN=91 Runoff=3.86 cfs 15,439 cf

Subcatchment PDA-200: PDA-200 Runoff Area=9,286 sf 100.00% Impervious Runoff Depth>6.12"
Flow Length=254' Tc=5.0 min CN=98 Runoff=1.56 cfs 4,740 cf

Subcatchment PDA-300: PDA-300 Runoff Area=18,759 sf 0.00% Impervious Runoff Depth>1.81"
Flow Length=136' Tc=10.0 min CN=56 Runoff=0.73 cfs 2,831 cf

Pond P1: POND Peak Elev=557.66' Storage=3,924 cf Inflow=3.60 cfs 11,814 cf
Discarded=0.31 cfs 10,143 cf Primary=0.65 cfs 1,165 cf Outflow=0.96 cfs 11,309 cf

Pond P2: TANK Peak Elev=553.61' Storage=2,565 cf Inflow=3.86 cfs 16,605 cf
Discarded=0.22 cfs 9,528 cf Primary=2.95 cfs 6,881 cf Outflow=3.17 cfs 16,409 cf

Link DP-1: DP-1 Inflow=5.87 cfs 18,795 cf
Primary=5.87 cfs 18,795 cf

Link DP-2: DP-2 Inflow=1.56 cfs 4,740 cf
Primary=1.56 cfs 4,740 cf

Link DP-3: DP-3 Inflow=0.73 cfs 2,831 cf
Primary=0.73 cfs 2,831 cf

Total Runoff Area = 143,580 sf Runoff Volume = 46,738 cf Average Runoff Depth = 3.91"
64.28% Pervious = 92,290 sf 35.72% Impervious = 51,290 sf

Summary for Subcatchment PDA-100: PDA-100

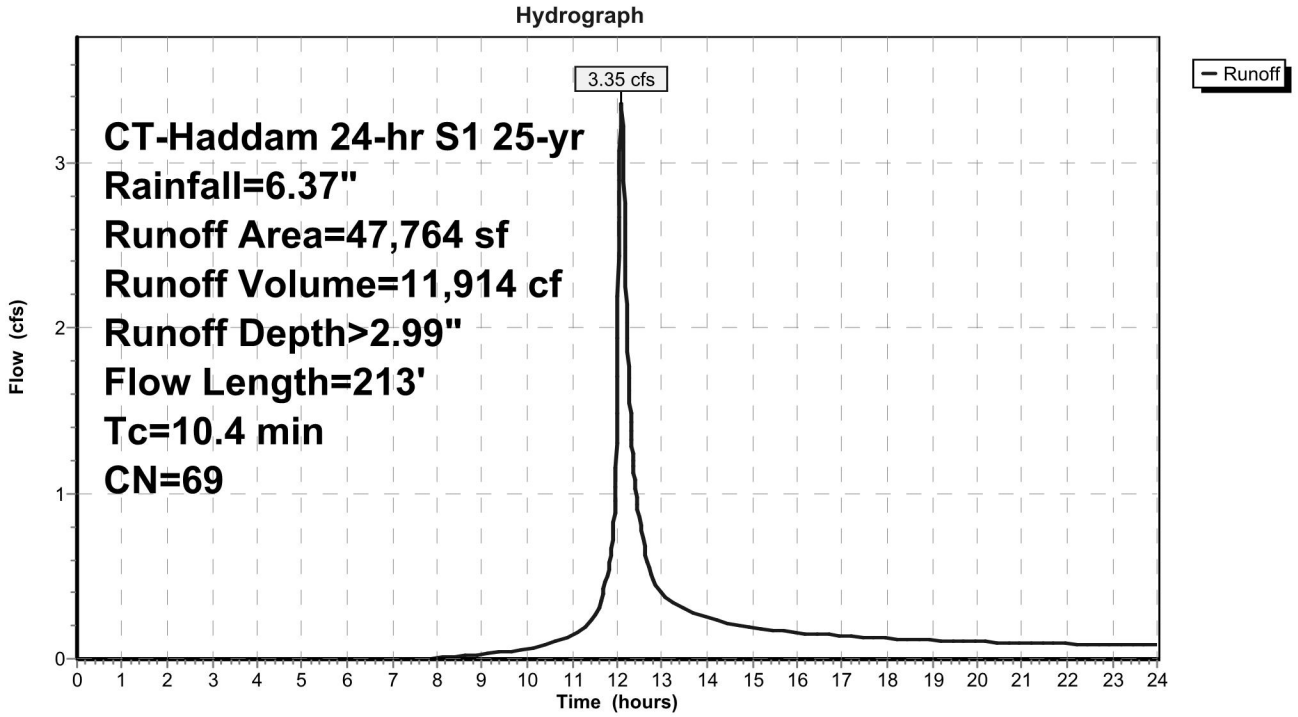
Runoff = 3.35 cfs @ 12.09 hrs, Volume= 11,914 cf, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
12,971	55	Woods, Good, HSG B
94	77	Woods, Good, HSG D
11,128	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
20,796	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
30	96	Gravel surface, HSG C
1,305	96	Gravel surface, HSG D
47,764	69	Weighted Average
47,012		98.43% Pervious Area
752		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
6.9	80	0.0281	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
1.5	84	0.0179	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	29	0.1552	1.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	213	Total			

Subcatchment PDA-100: PDA-100



Summary for Subcatchment PDA-110: PDA-110

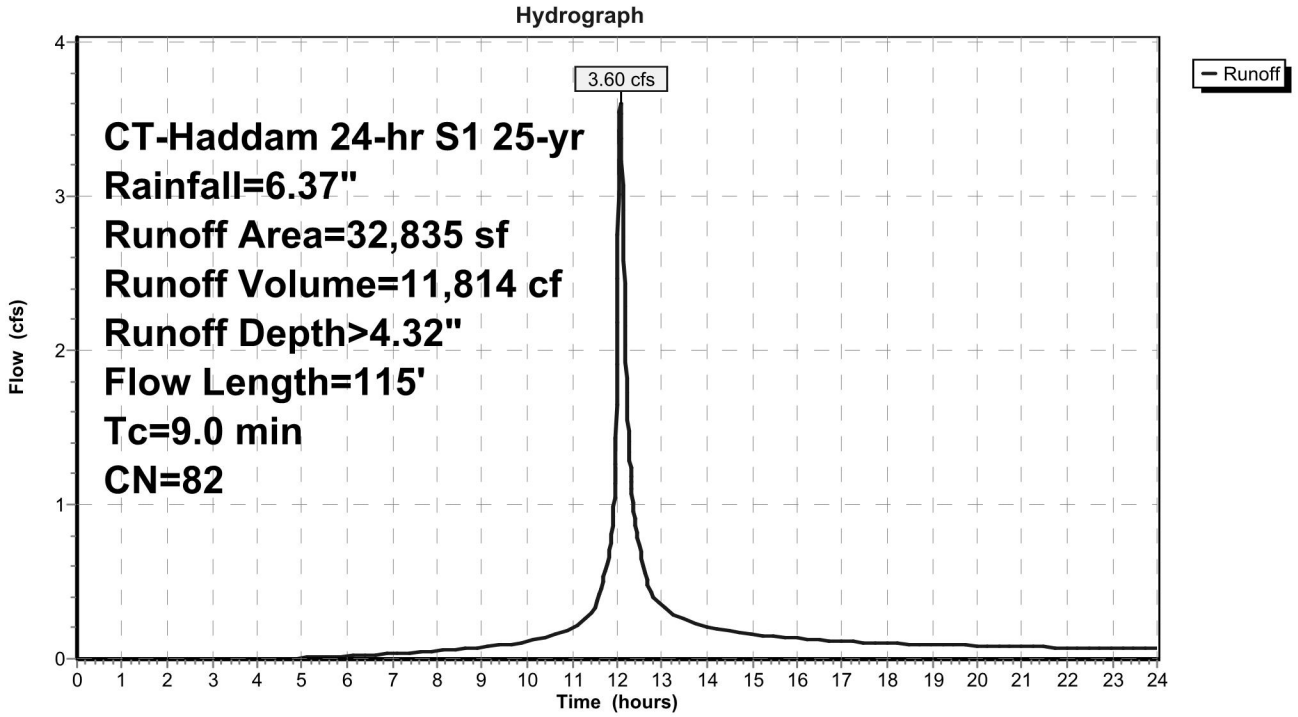
Runoff = 3.60 cfs @ 12.07 hrs, Volume= 11,814 cf, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
256	55	Woods, Good, HSG B
1,450	77	Woods, Good, HSG D
11,185	61	>75% Grass cover, Good, HSG B
3,690	80	>75% Grass cover, Good, HSG D
4,815	98	Water Surface, HSG B
256	98	Water Surface, HSG D
6,399	98	Roofs, HSG B
4,784	98	Roofs, HSG D
32,835	82	Weighted Average
16,581		50.50% Pervious Area
16,254		49.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	17	0.0735	1.68		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
2.0	19	0.2632	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.3	32	0.0688	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
4.2	32	0.0156	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.3	15	0.0156	0.87		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	115	Total			

Subcatchment PDA-110: PDA-110



Summary for Subcatchment PDA-120: PDA-120

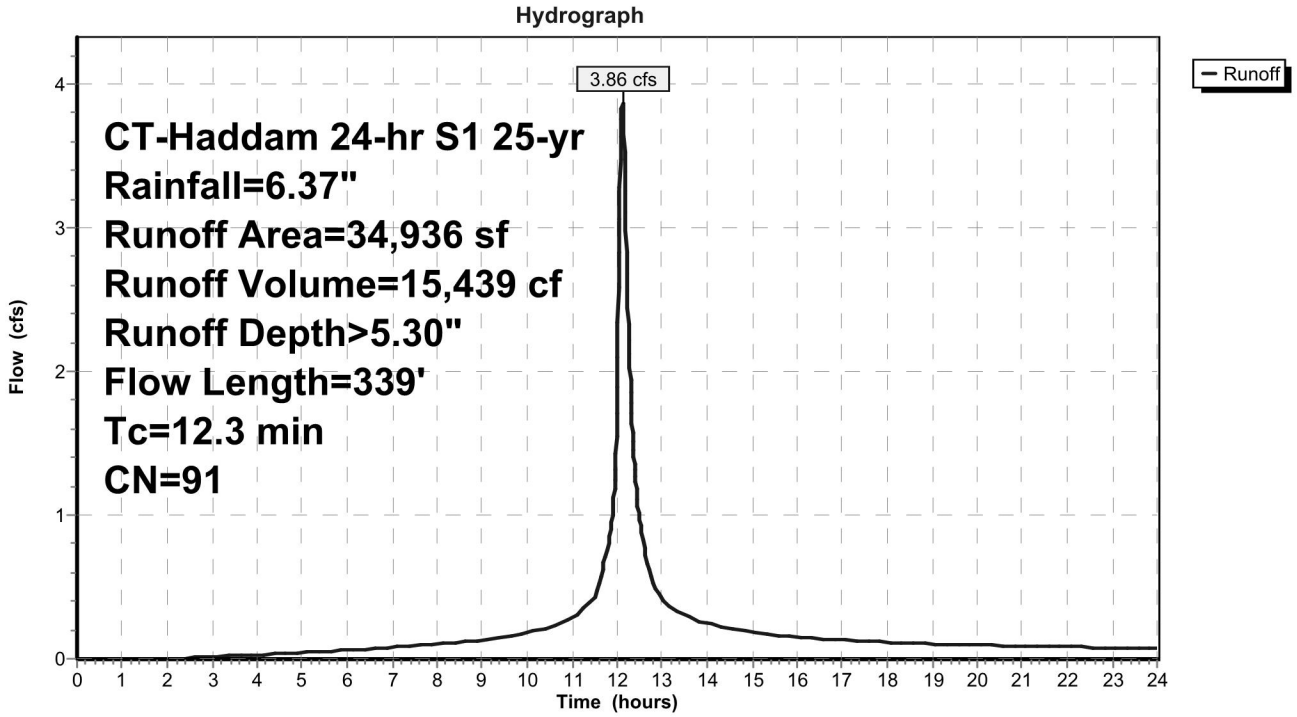
Runoff = 3.86 cfs @ 12.11 hrs, Volume= 15,439 cf, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
2,151	55	Woods, Good, HSG B
2,232	77	Woods, Good, HSG D
1,134	61	>75% Grass cover, Good, HSG B
3,416	80	>75% Grass cover, Good, HSG D
6,393	98	Paved parking, HSG B
18,513	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
27	96	Gravel surface, HSG D
92	98	Roofs, HSG B
34,936	91	Weighted Average
9,938		28.45% Pervious Area
24,998		71.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	23	0.0869	1.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	6	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	168	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.3	339	Total			

Subcatchment PDA-120: PDA-120



Summary for Subcatchment PDA-200: PDA-200

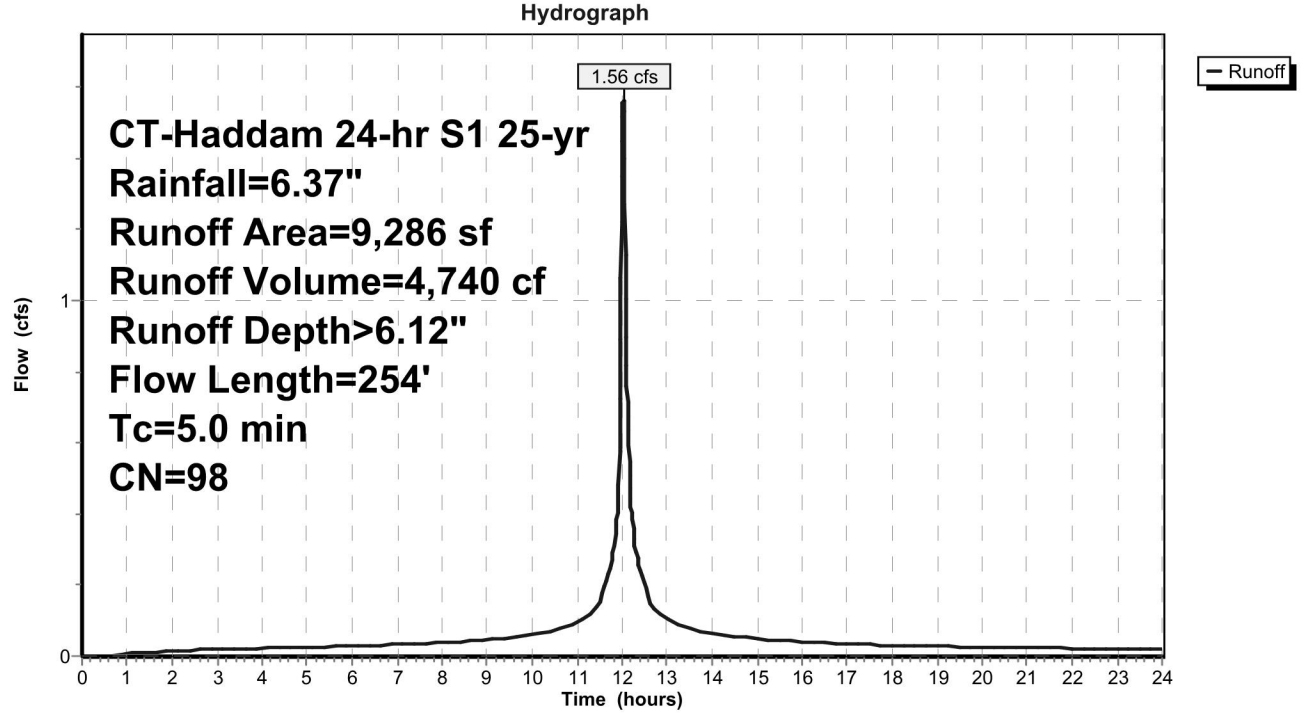
Runoff = 1.56 cfs @ 12.03 hrs, Volume= 4,740 cf, Depth> 6.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
3,520	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
4,667	98	Paved parking, HSG D
9,286	98	Weighted Average
9,286		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PDA-200: PDA-200



Summary for Subcatchment PDA-300: PDA-300

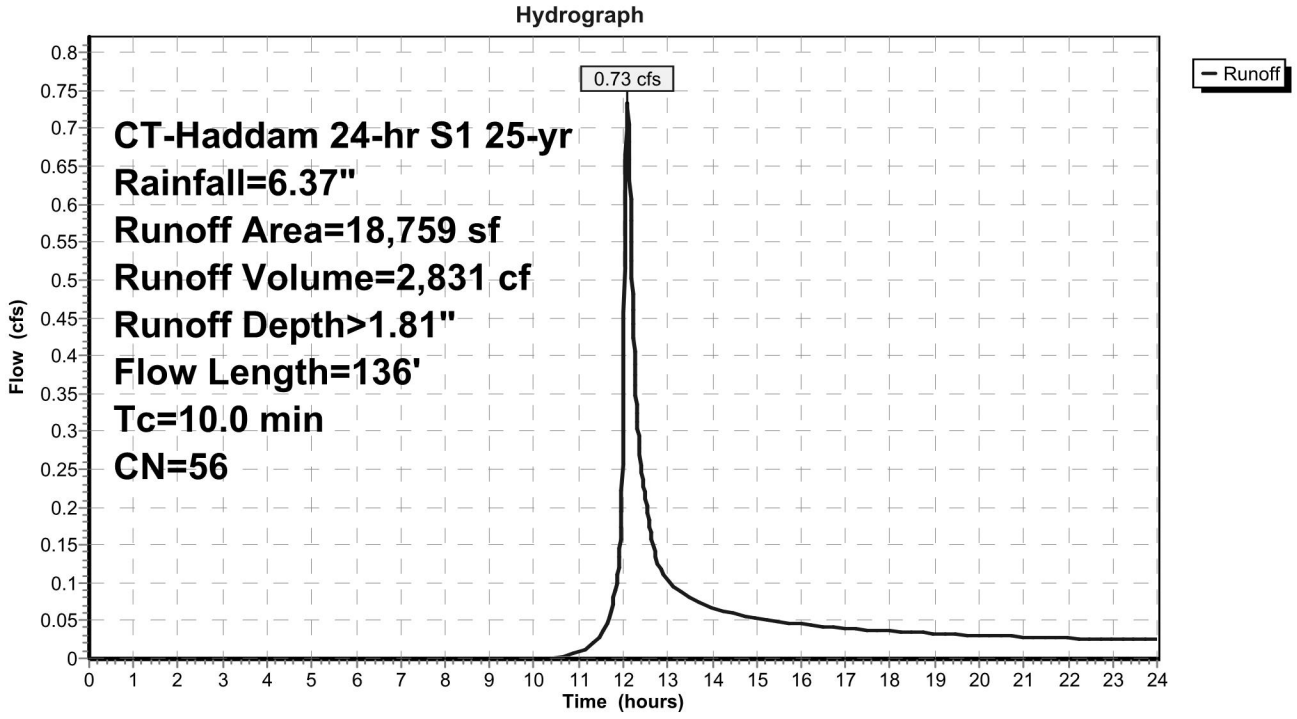
Runoff = 0.73 cfs @ 12.09 hrs, Volume= 2,831 cf, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 25-yr Rainfall=6.37"

Area (sf)	CN	Description
16,010	55	Woods, Good, HSG B
2,749	61	>75% Grass cover, Good, HSG B
18,759	56	Weighted Average
18,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
3.7	71	0.1056	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
3.3	14	0.0400	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.6	36	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	136	Total			

Subcatchment PDA-300: PDA-300



Summary for Pond P1: POND

Inflow Area = 32,835 sf, 49.50% Impervious, Inflow Depth > 4.32" for 25-yr event
Inflow = 3.60 cfs @ 12.07 hrs, Volume= 11,814 cf
Outflow = 0.96 cfs @ 12.37 hrs, Volume= 11,309 cf, Atten= 73%, Lag= 17.6 min
Discarded = 0.31 cfs @ 12.37 hrs, Volume= 10,143 cf
Primary = 0.65 cfs @ 12.37 hrs, Volume= 1,165 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 557.66' @ 12.37 hrs Surf.Area= 2,428 sf Storage= 3,924 cf

Plug-Flow detention time= 133.7 min calculated for 11,309 cf (96% of inflow)
Center-of-Mass det. time= 109.0 min (933.8 - 824.8)

Volume	Invert	Avail.Storage	Storage Description
#1	555.00'	4,799 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

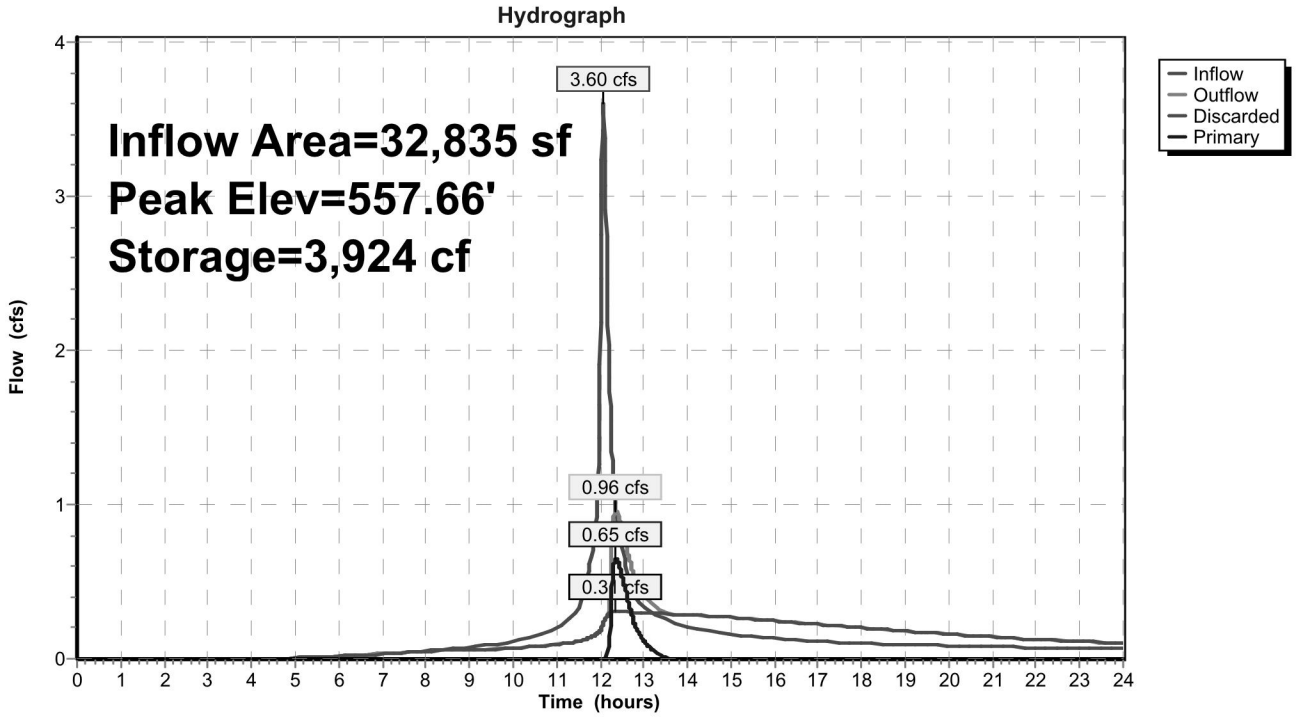
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
555.00	587	0	0
556.00	1,231	909	909
557.00	1,931	1,581	2,490
558.00	2,687	2,309	4,799

Device	Routing	Invert	Outlet Devices
#1	Discarded	555.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 552.00'
#2	Primary	555.00'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 555.00' / 554.90' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	557.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.31 cfs @ 12.37 hrs HW=557.66' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.31 cfs)

Primary OutFlow Max=0.65 cfs @ 12.37 hrs HW=557.66' (Free Discharge)
↑—**2=Culvert** (Passes 0.65 cfs of 7.43 cfs potential flow)
↑—**3=Orifice/Grate** (Weir Controls 0.65 cfs @ 1.30 fps)

Pond P1: POND


Hydrograph
Inflow Area=32,835 sf
Peak Elev=557.66'
Storage=3,924 cf
3.60 cfs
0.96 cfs
0.65 cfs
0.3 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Pond P2: TANK

Inflow Area = 67,771 sf, 60.87% Impervious, Inflow Depth > 2.94" for 25-yr event
Inflow = 3.86 cfs @ 12.11 hrs, Volume= 16,605 cf
Outflow = 3.17 cfs @ 12.19 hrs, Volume= 16,409 cf, Atten= 18%, Lag= 4.3 min
Discarded = 0.22 cfs @ 12.19 hrs, Volume= 9,528 cf
Primary = 2.95 cfs @ 12.19 hrs, Volume= 6,881 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 553.61' @ 12.19 hrs Surf.Area= 1,232 sf Storage= 2,565 cf

Plug-Flow detention time= 56.9 min calculated for 16,402 cf (99% of inflow)
Center-of-Mass det. time= 49.4 min (838.4 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	551.00'	268 cf	**30.80'W x 40.00'L x 4.00'H Field A** 4,928 cf Overall - 4,257 cf Embedded = 671 cf x 40.0% Voids
#2A	551.00'	3,275 cf	**Concrete Galley 4x8x4** x 35 Inside #1 Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf 35 Chambers in 7 Rows
		3,543 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	551.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 548.50'
#2	Primary	551.00'	**15.0" Round Culvert** L= 8.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 551.00' / 550.96' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Primary	552.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	554.50'	**4.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.22 cfs @ 12.19 hrs HW=553.61' (Free Discharge)
└**1=Exfiltration** (Controls 0.22 cfs)

Primary OutFlow Max=2.95 cfs @ 12.19 hrs HW=553.61' (Free Discharge)
├**2=Culvert** (Passes 0.00 cfs of 7.34 cfs potential flow)
│ └**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 2.95 cfs @ 3.76 fps)

Pond P2: TANK - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x8x4 (Concrete Galley, UCPI 4x8x4 Galley or equivalent)
Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf
Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf

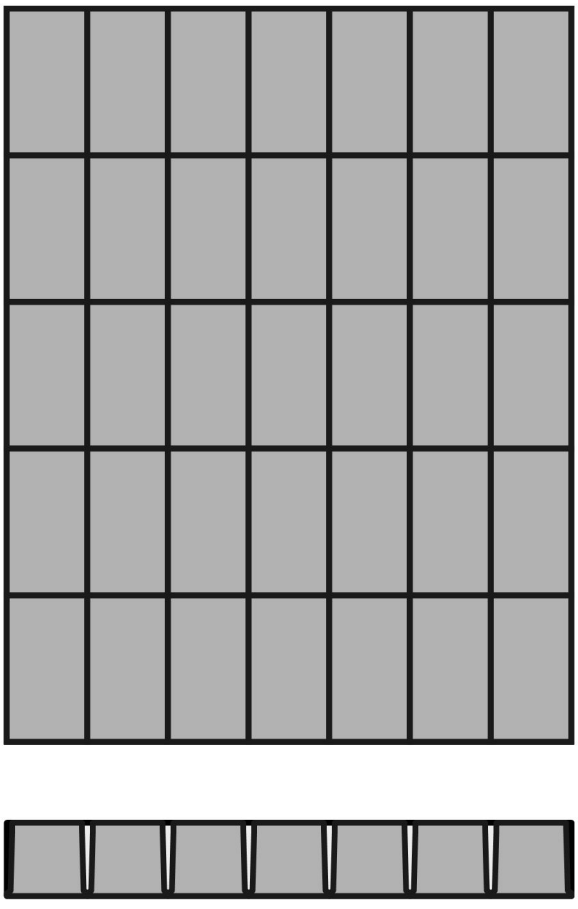
5 Chambers/Row x 8.00' Long = 40.00' Row Length
7 Rows x 52.8" Wide = 30.80' Base Width
48.0" Chamber Height = 4.00' Field Height

35 Chambers x 93.6 cf = 3,274.7 cf Chamber Storage
35 Chambers x 121.6 cf = 4,257.3 cf Displacement

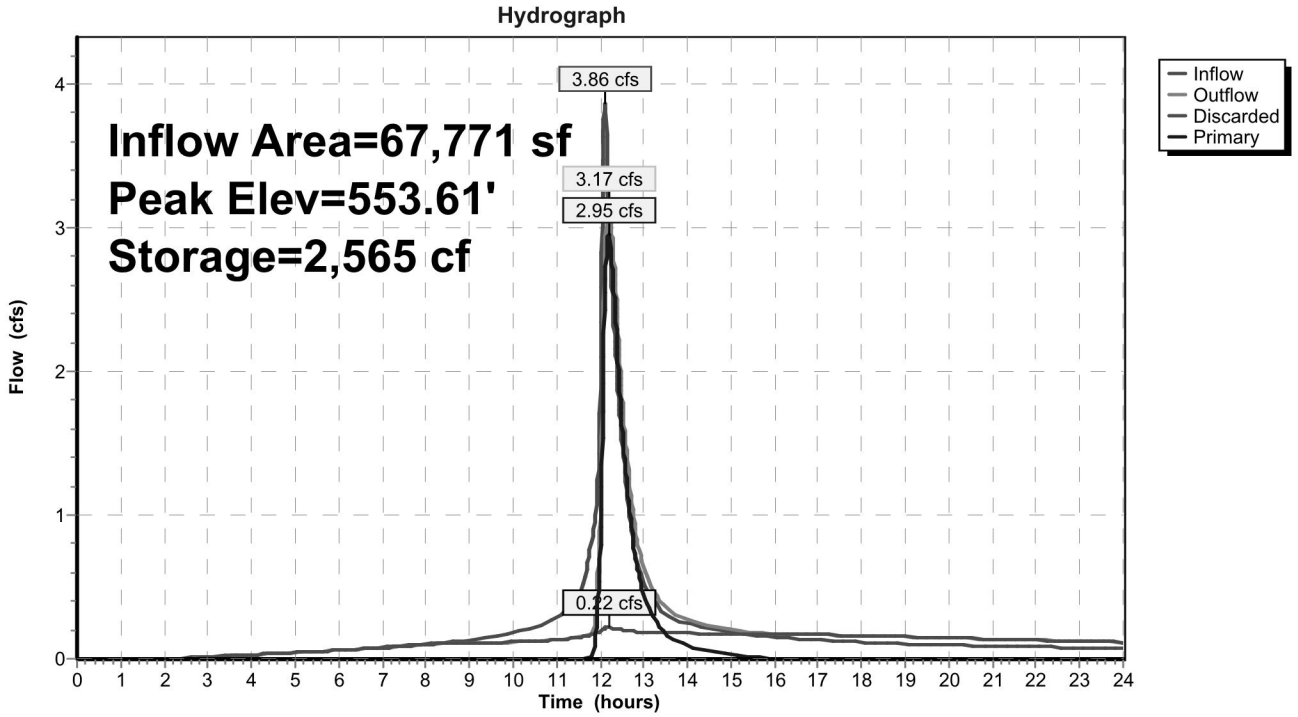
4,928.0 cf Field - 4,257.3 cf Chambers = 670.7 cf Stone x 40.0% Voids = 268.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,543.0 cf = 0.081 af
Overall Storage Efficiency = 71.9%
Overall System Size = 40.00' x 30.80' x 4.00'

35 Chambers
182.5 cy Field
24.8 cy Stone



Pond P2: TANK

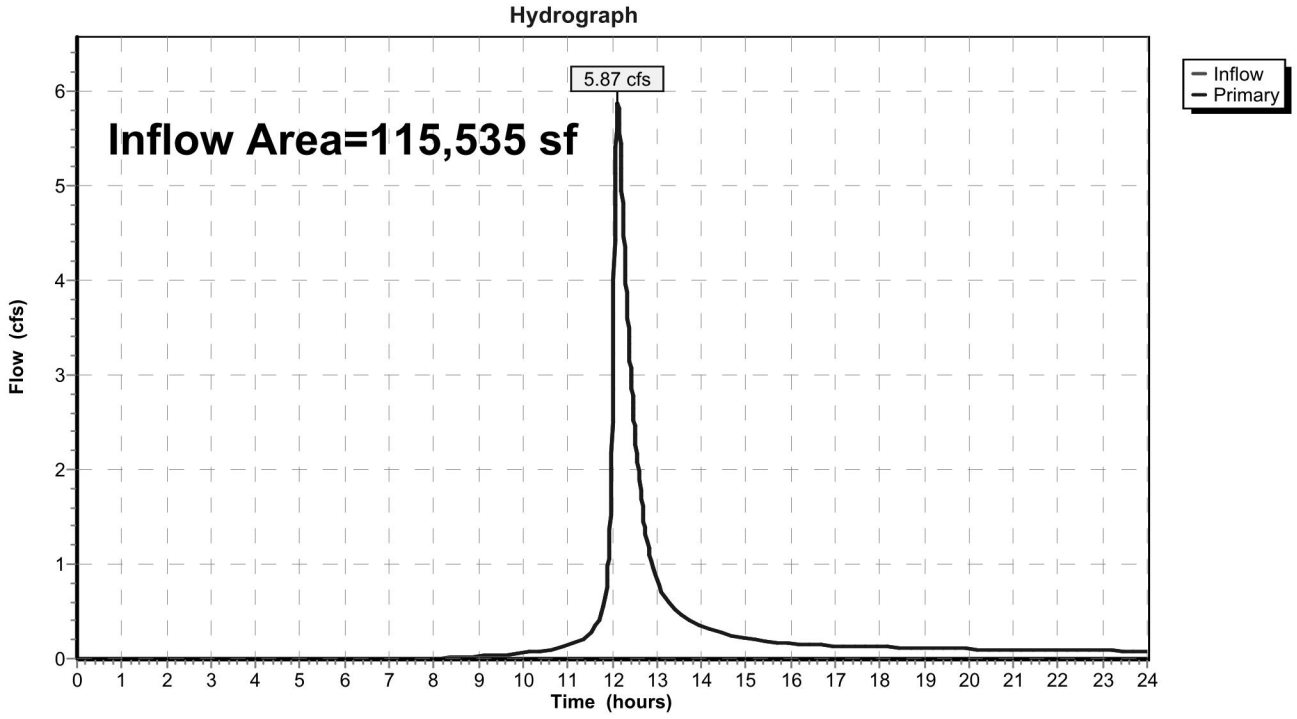

Hydrograph
Inflow Area=67,771 sf
Peak Elev=553.61'
Storage=2,565 cf
3.86 cfs
3.17 cfs
2.95 cfs
0.22 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link DP-1: DP-1

Inflow Area = 115,535 sf, 36.36% Impervious, Inflow Depth > 1.95" for 25-yr event
Inflow = 5.87 cfs @ 12.12 hrs, Volume= 18,795 cf
Primary = 5.87 cfs @ 12.12 hrs, Volume= 18,795 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

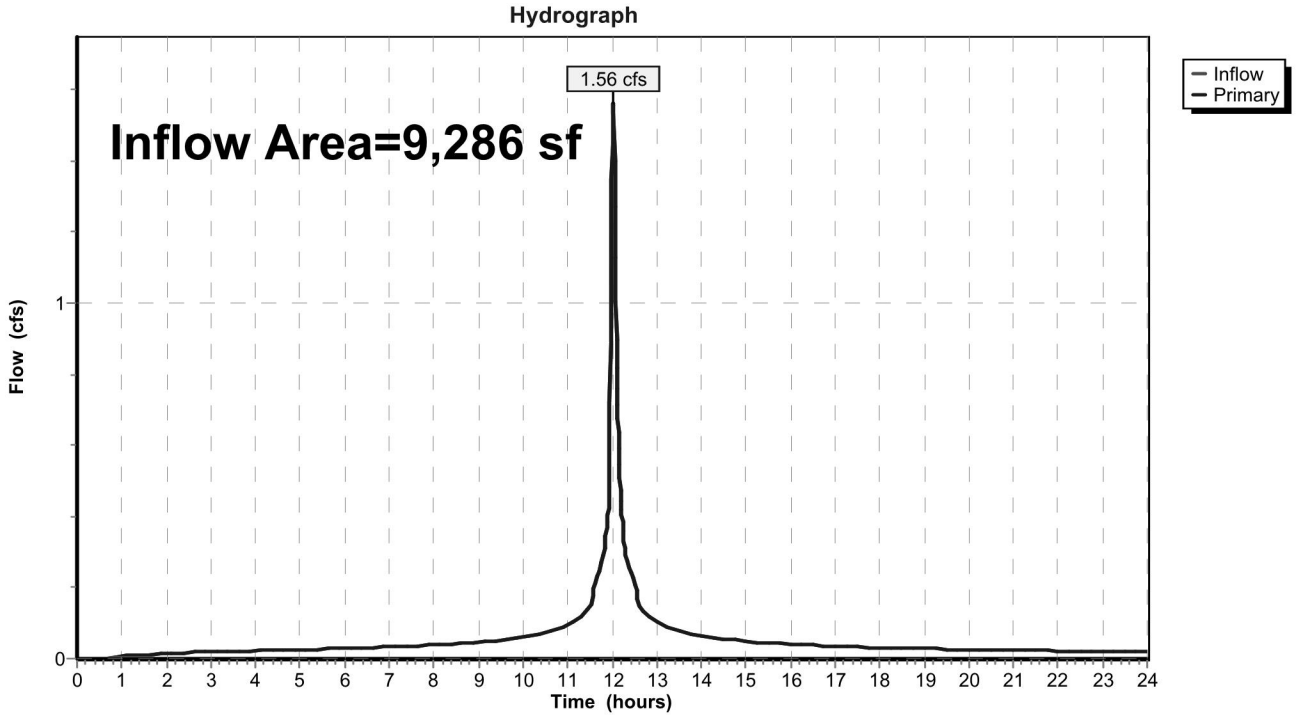


Summary for Link DP-2: DP-2

Inflow Area = 9,286 sf,100.00% Impervious, Inflow Depth > 6.12" for 25-yr event
Inflow = 1.56 cfs @ 12.03 hrs, Volume= 4,740 cf
Primary = 1.56 cfs @ 12.03 hrs, Volume= 4,740 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

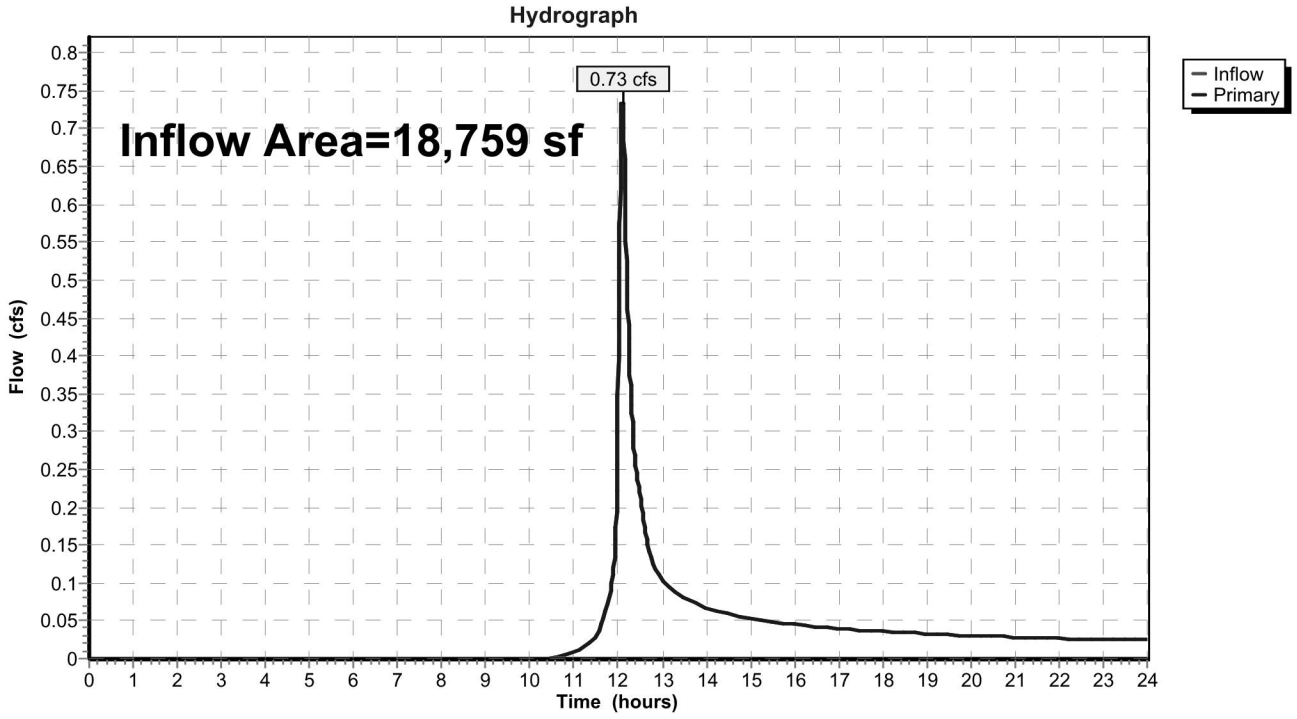


Summary for Link DP-3: DP-3

Inflow Area = 18,759 sf, 0.00% Impervious, Inflow Depth > 1.81" for 25-yr event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 2,831 cf
Primary = 0.73 cfs @ 12.09 hrs, Volume= 2,831 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 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-100: PDA-100 Runoff Area=47,764 sf 1.57% Impervious Runoff Depth>4.43"
Flow Length=213' Tc=10.4 min CN=69 Runoff=5.01 cfs 17,624 cf

Subcatchment PDA-110: PDA-110 Runoff Area=32,835 sf 49.50% Impervious Runoff Depth>5.95"
Flow Length=115' Tc=9.0 min CN=82 Runoff=4.90 cfs 16,279 cf

Subcatchment PDA-120: PDA-120 Runoff Area=34,936 sf 71.55% Impervious Runoff Depth>7.01"
Flow Length=339' Tc=12.3 min CN=91 Runoff=5.02 cfs 20,414 cf

Subcatchment PDA-200: PDA-200 Runoff Area=9,286 sf 100.00% Impervious Runoff Depth>7.86"
Flow Length=254' Tc=5.0 min CN=98 Runoff=1.99 cfs 6,084 cf

Subcatchment PDA-300: PDA-300 Runoff Area=18,759 sf 0.00% Impervious Runoff Depth>2.96"
Flow Length=136' Tc=10.0 min CN=56 Runoff=1.28 cfs 4,624 cf

Pond P1: POND Peak Elev=557.88' Storage=4,485 cf Inflow=4.90 cfs 16,279 cf
Discarded=0.34 cfs 11,761 cf Primary=2.34 cfs 3,653 cf Outflow=2.67 cfs 15,415 cf

Pond P2: TANK Peak Elev=554.66' Storage=3,516 cf Inflow=6.89 cfs 24,067 cf
Discarded=0.26 cfs 10,736 cf Primary=5.57 cfs 12,697 cf Outflow=5.83 cfs 23,433 cf

Link DP-1: DP-1 Inflow=8.54 cfs 30,322 cf
Primary=8.54 cfs 30,322 cf

Link DP-2: DP-2 Inflow=1.99 cfs 6,084 cf
Primary=1.99 cfs 6,084 cf

Link DP-3: DP-3 Inflow=1.28 cfs 4,624 cf
Primary=1.28 cfs 4,624 cf

Total Runoff Area = 143,580 sf Runoff Volume = 65,024 cf Average Runoff Depth = 5.43"
64.28% Pervious = 92,290 sf 35.72% Impervious = 51,290 sf

Summary for Subcatchment PDA-100: PDA-100

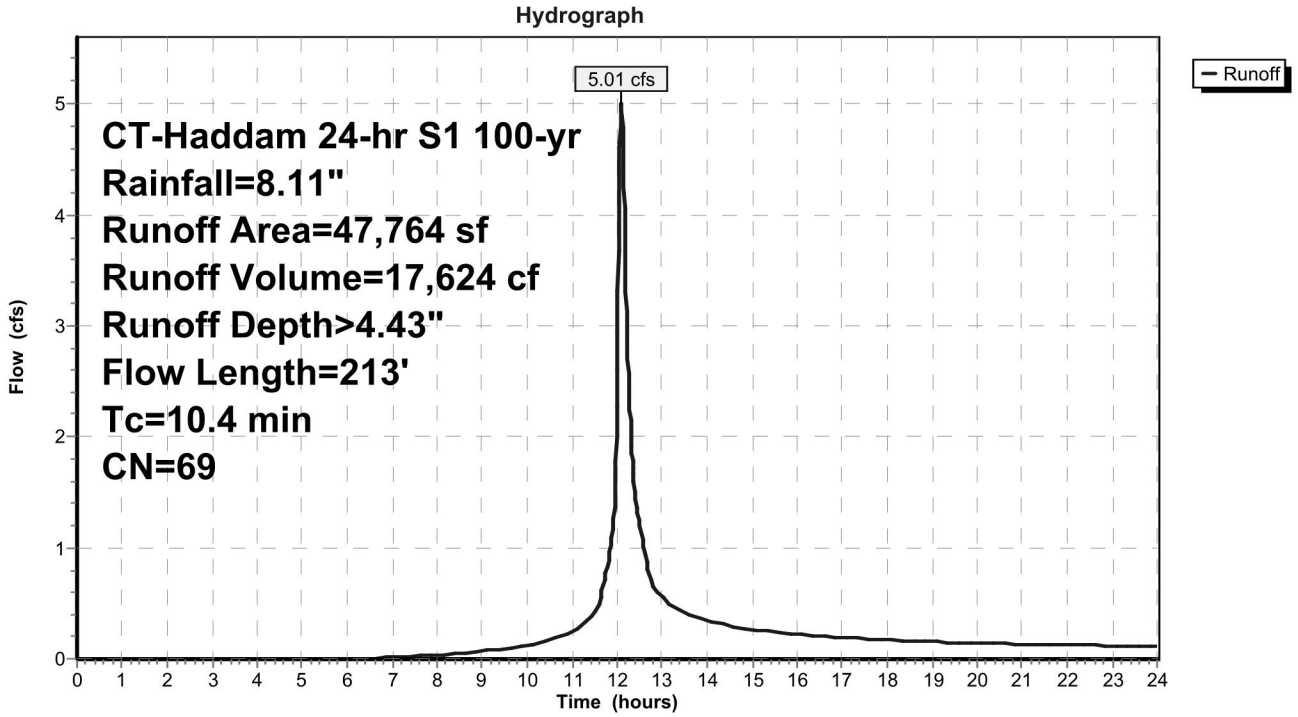
Runoff = 5.01 cfs @ 12.09 hrs, Volume= 17,624 cf, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
12,971	55	Woods, Good, HSG B
94	77	Woods, Good, HSG D
11,128	61	>75% Grass cover, Good, HSG B
688	74	>75% Grass cover, Good, HSG C
20,796	80	>75% Grass cover, Good, HSG D
752	98	Water Surface, HSG B
30	96	Gravel surface, HSG C
1,305	96	Gravel surface, HSG D
47,764	69	Weighted Average
47,012		98.43% Pervious Area
752		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
6.9	80	0.0281	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
1.5	84	0.0179	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	29	0.1552	1.97		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	213	Total			

Subcatchment PDA-100: PDA-100



Summary for Subcatchment PDA-110: PDA-110

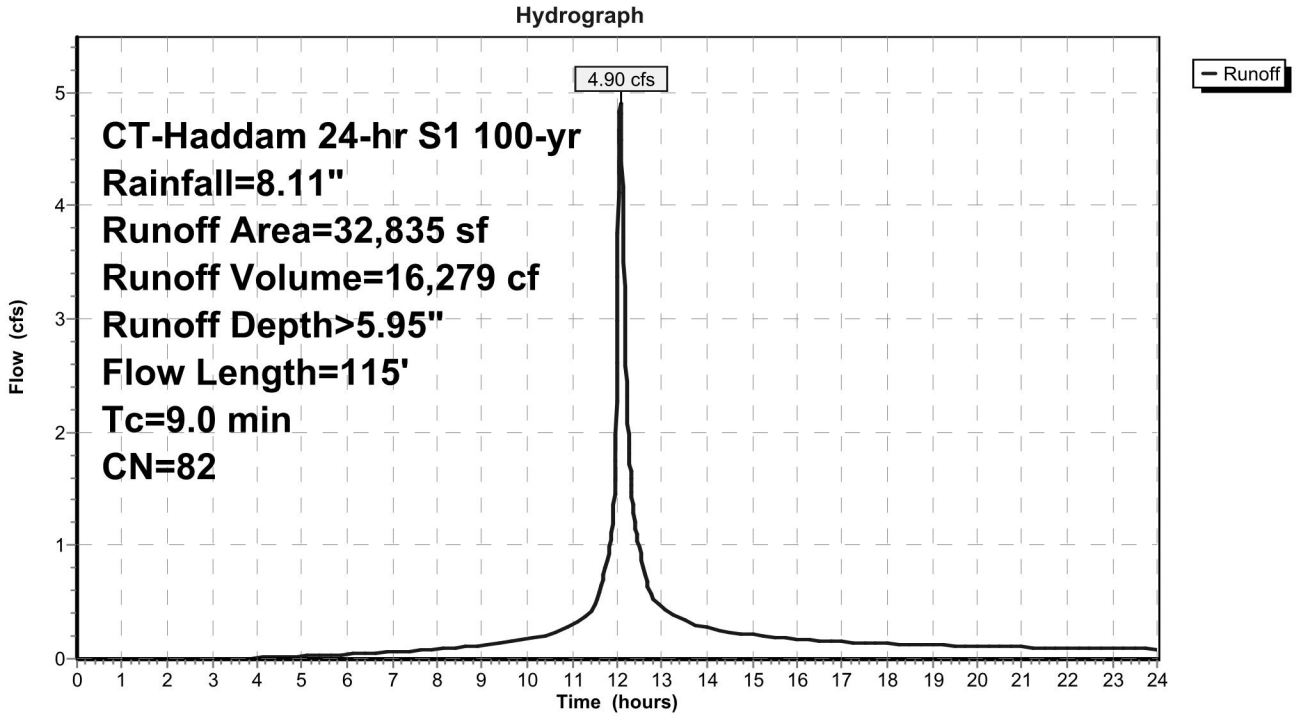
Runoff = 4.90 cfs @ 12.07 hrs, Volume= 16,279 cf, Depth> 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
256	55	Woods, Good, HSG B
1,450	77	Woods, Good, HSG D
11,185	61	>75% Grass cover, Good, HSG B
3,690	80	>75% Grass cover, Good, HSG D
4,815	98	Water Surface, HSG B
256	98	Water Surface, HSG D
6,399	98	Roofs, HSG B
4,784	98	Roofs, HSG D
32,835	82	Weighted Average
16,581		50.50% Pervious Area
16,254		49.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	17	0.0735	1.68		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
2.0	19	0.2632	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.3	32	0.0688	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
4.2	32	0.0156	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.3	15	0.0156	0.87		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	115	Total			

Subcatchment PDA-110: PDA-110



Summary for Subcatchment PDA-120: PDA-120

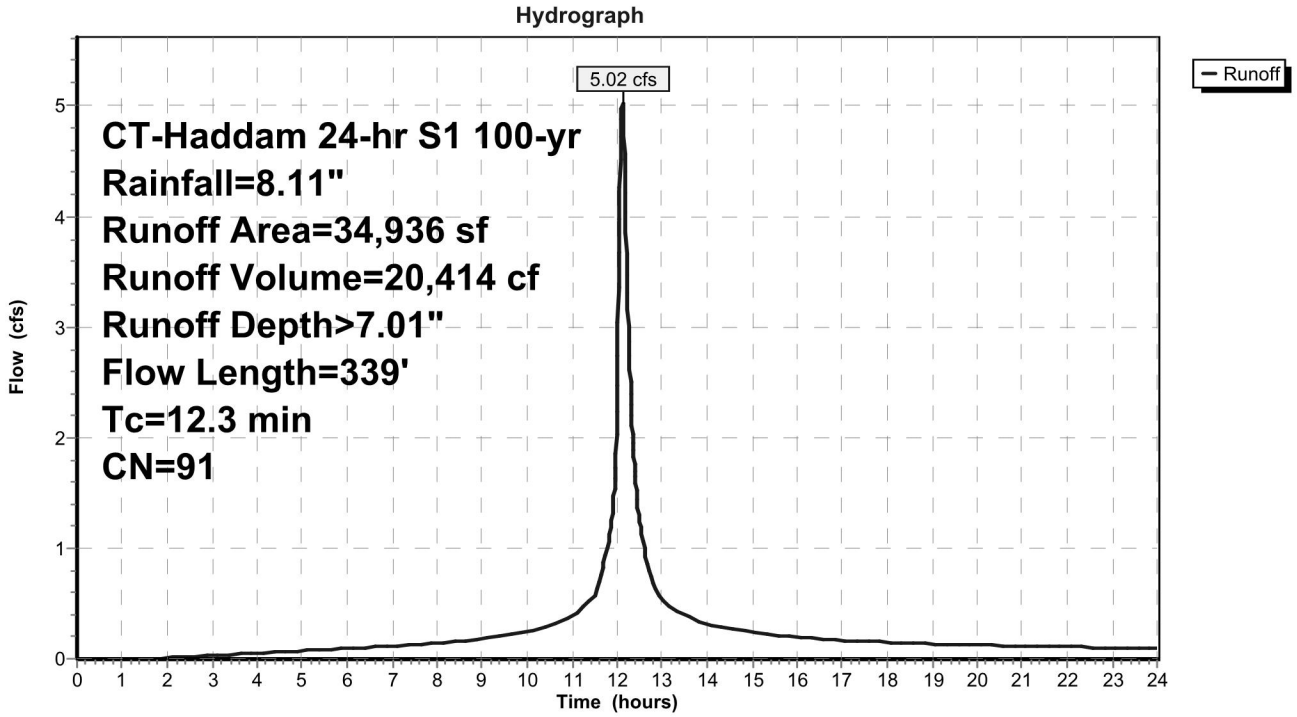
Runoff = 5.02 cfs @ 12.11 hrs, Volume= 20,414 cf, Depth> 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
2,151	55	Woods, Good, HSG B
2,232	77	Woods, Good, HSG D
1,134	61	>75% Grass cover, Good, HSG B
3,416	80	>75% Grass cover, Good, HSG D
6,393	98	Paved parking, HSG B
18,513	98	Paved parking, HSG D
978	96	Gravel surface, HSG B
27	96	Gravel surface, HSG D
92	98	Roofs, HSG B
34,936	91	Weighted Average
9,938		28.45% Pervious Area
24,998		71.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	25	0.0300	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
0.5	25	0.0100	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
7.2	50	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.2	42	0.0357	3.84		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	23	0.0869	1.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	6	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	168	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.3	339	Total			

Subcatchment PDA-120: PDA-120



Summary for Subcatchment PDA-200: PDA-200

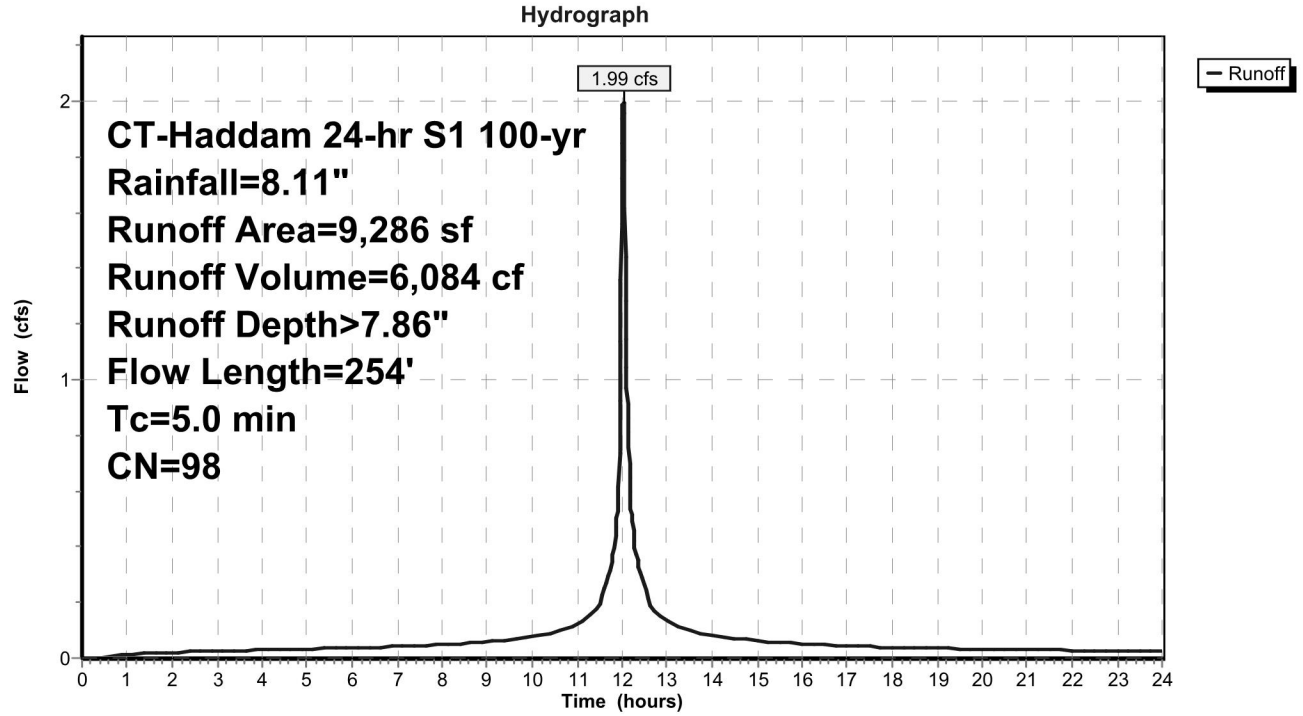
Runoff = 1.99 cfs @ 12.03 hrs, Volume= 6,084 cf, Depth> 7.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
3,520	98	Paved parking, HSG B
1,099	98	Paved parking, HSG C
4,667	98	Paved parking, HSG D
9,286	98	Weighted Average
9,286		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0439	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.5	43	0.0319	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.44"
0.7	154	0.0368	3.89		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	254	Total, Increased to minimum Tc = 5.0 min			

Subcatchment PDA-200: PDA-200



Summary for Subcatchment PDA-300: PDA-300

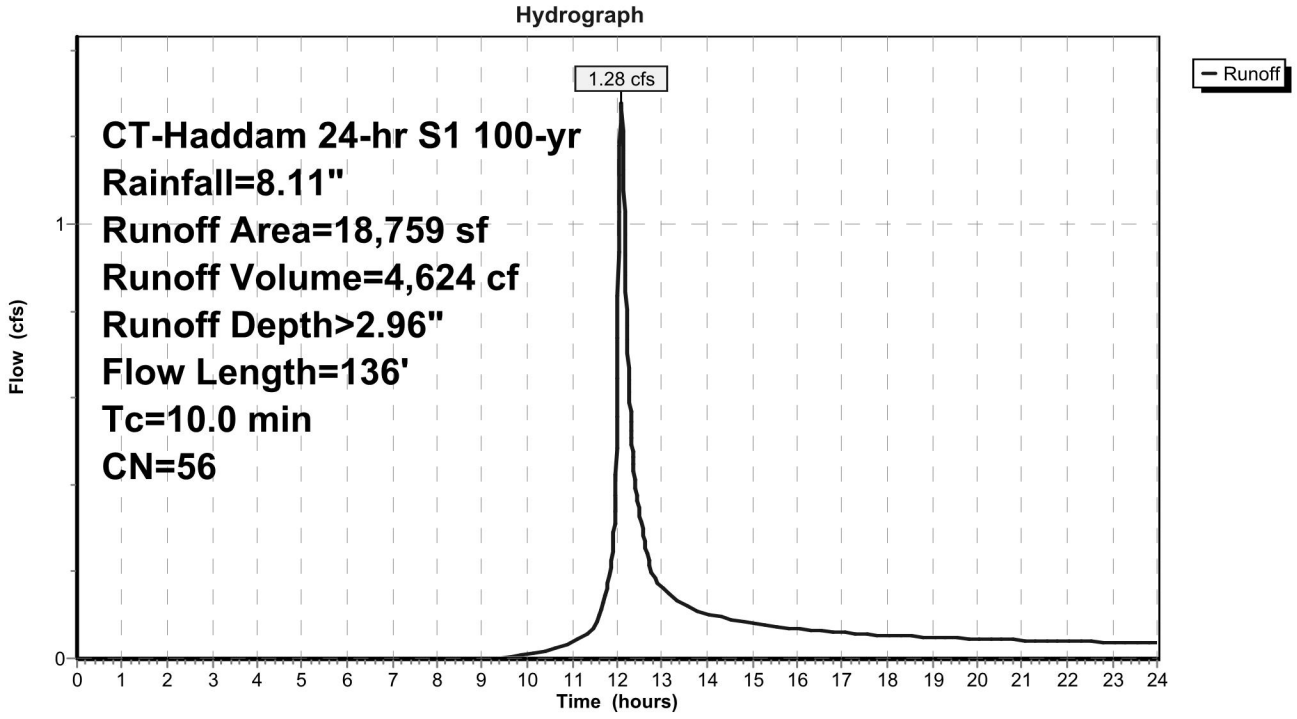
Runoff = 1.28 cfs @ 12.09 hrs, Volume= 4,624 cf, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CT-Haddam 24-hr S1 100-yr Rainfall=8.11"

Area (sf)	CN	Description
16,010	55	Woods, Good, HSG B
2,749	61	>75% Grass cover, Good, HSG B
18,759	56	Weighted Average
18,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
3.7	71	0.1056	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.44"
3.3	14	0.0400	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
0.6	36	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	136	Total			

Subcatchment PDA-300: PDA-300



Summary for Pond P1: POND

Inflow Area = 32,835 sf, 49.50% Impervious, Inflow Depth > 5.95" for 100-yr event
Inflow = 4.90 cfs @ 12.07 hrs, Volume= 16,279 cf
Outflow = 2.67 cfs @ 12.19 hrs, Volume= 15,415 cf, Atten= 45%, Lag= 7.4 min
Discarded = 0.34 cfs @ 12.19 hrs, Volume= 11,761 cf
Primary = 2.34 cfs @ 12.19 hrs, Volume= 3,653 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 557.88' @ 12.19 hrs Surf.Area= 2,597 sf Storage= 4,485 cf

Plug-Flow detention time= 117.9 min calculated for 15,415 cf (95% of inflow)
Center-of-Mass det. time= 87.3 min (900.3 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	555.00'	4,799 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

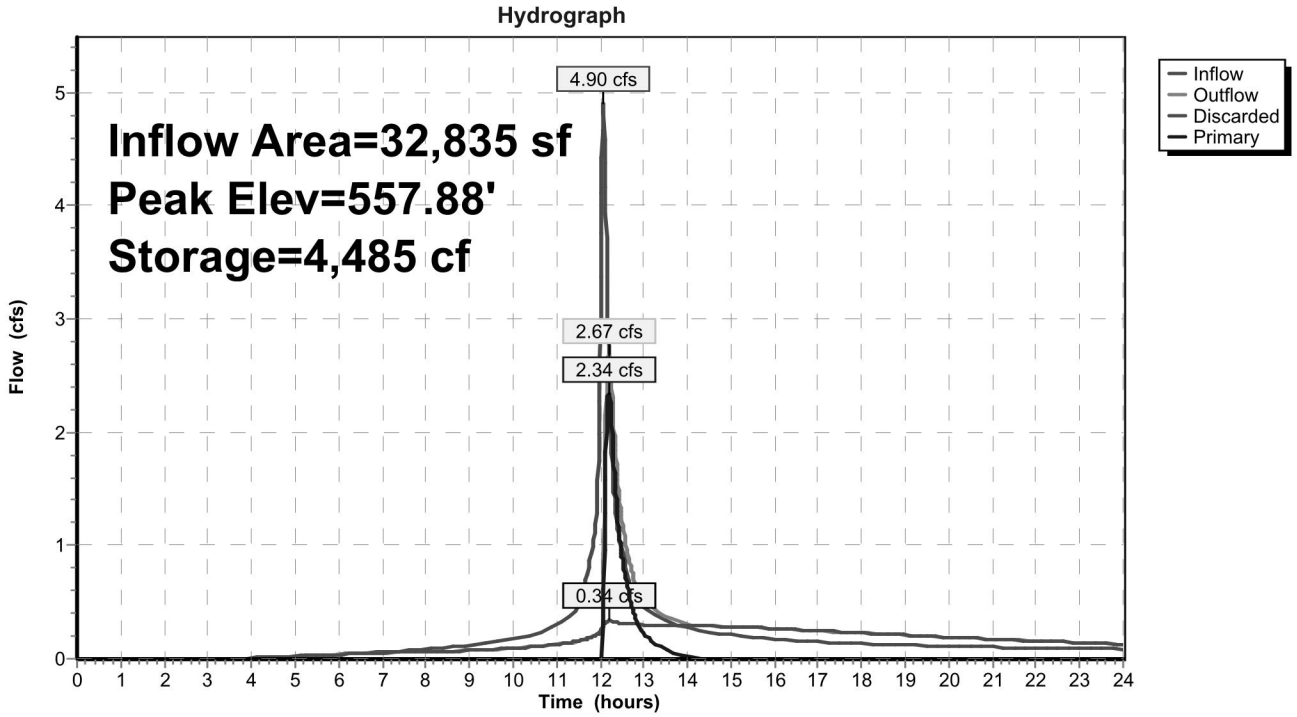
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
555.00	587	0	0
556.00	1,231	909	909
557.00	1,931	1,581	2,490
558.00	2,687	2,309	4,799

Device	Routing	Invert	Outlet Devices
#1	Discarded	555.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 552.00'
#2	Primary	555.00'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 555.00' / 554.90' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	557.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.34 cfs @ 12.19 hrs HW=557.88' (Free Discharge)
└**1=Exfiltration** (Controls 0.34 cfs)

Primary OutFlow Max=2.33 cfs @ 12.19 hrs HW=557.88' (Free Discharge)
└**2=Culvert** (Passes 2.33 cfs of 7.83 cfs potential flow)
└**3=Orifice/Grate** (Orifice Controls 2.33 cfs @ 2.97 fps)

Pond P1: POND


Hydrograph
Inflow Area=32,835 sf
Peak Elev=557.88'
Storage=4,485 cf
4.90 cfs
2.67 cfs
2.34 cfs
0.34 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Pond P2: TANK

Inflow Area = 67,771 sf, 60.87% Impervious, Inflow Depth > 4.26" for 100-yr event
Inflow = 6.89 cfs @ 12.15 hrs, Volume= 24,067 cf
Outflow = 5.83 cfs @ 12.22 hrs, Volume= 23,433 cf, Atten= 15%, Lag= 4.5 min
Discarded = 0.26 cfs @ 12.22 hrs, Volume= 10,736 cf
Primary = 5.57 cfs @ 12.22 hrs, Volume= 12,697 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 554.66' @ 12.22 hrs Surf.Area= 1,232 sf Storage= 3,516 cf

Plug-Flow detention time= 50.4 min calculated for 23,423 cf (97% of inflow)
Center-of-Mass det. time= 34.0 min (811.5 - 777.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	551.00'	268 cf	**30.80'W x 40.00'L x 4.00'H Field A** 4,928 cf Overall - 4,257 cf Embedded = 671 cf x 40.0% Voids
#2A	551.00'	3,275 cf	**Concrete Galley 4x8x4** x 35 Inside #1 Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf 35 Chambers in 7 Rows
		3,543 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	551.00'	**3.750 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 548.50'
#2	Primary	551.00'	**15.0" Round Culvert** L= 8.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 551.00' / 550.96' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Primary	552.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	554.50'	**4.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.26 cfs @ 12.22 hrs HW=554.66' (Free Discharge)
└**1=Exfiltration** (Controls 0.26 cfs)

Primary OutFlow Max=5.53 cfs @ 12.22 hrs HW=554.66' (Free Discharge)
├**2=Culvert** (Passes 0.66 cfs of 9.08 cfs potential flow)
│ └**4=Broad-Crested Rectangular Weir** (Weir Controls 0.66 cfs @ 1.06 fps)
└**3=Orifice/Grate** (Orifice Controls 4.87 cfs @ 6.20 fps)

Pond P2: TANK - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x8x4 (Concrete Galley, UCPI 4x8x4 Galley or equivalent)
Inside= 42.0"W x 43.0"H => 12.47 sf x 7.50'L = 93.6 cf
Outside= 52.8"W x 48.0"H => 15.20 sf x 8.00'L = 121.6 cf

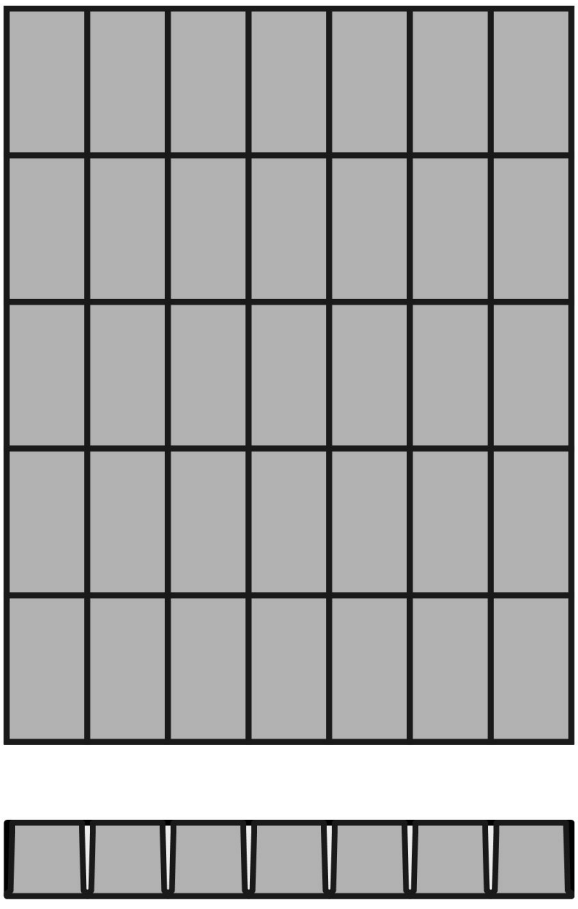
5 Chambers/Row x 8.00' Long = 40.00' Row Length
7 Rows x 52.8" Wide = 30.80' Base Width
48.0" Chamber Height = 4.00' Field Height

35 Chambers x 93.6 cf = 3,274.7 cf Chamber Storage
35 Chambers x 121.6 cf = 4,257.3 cf Displacement

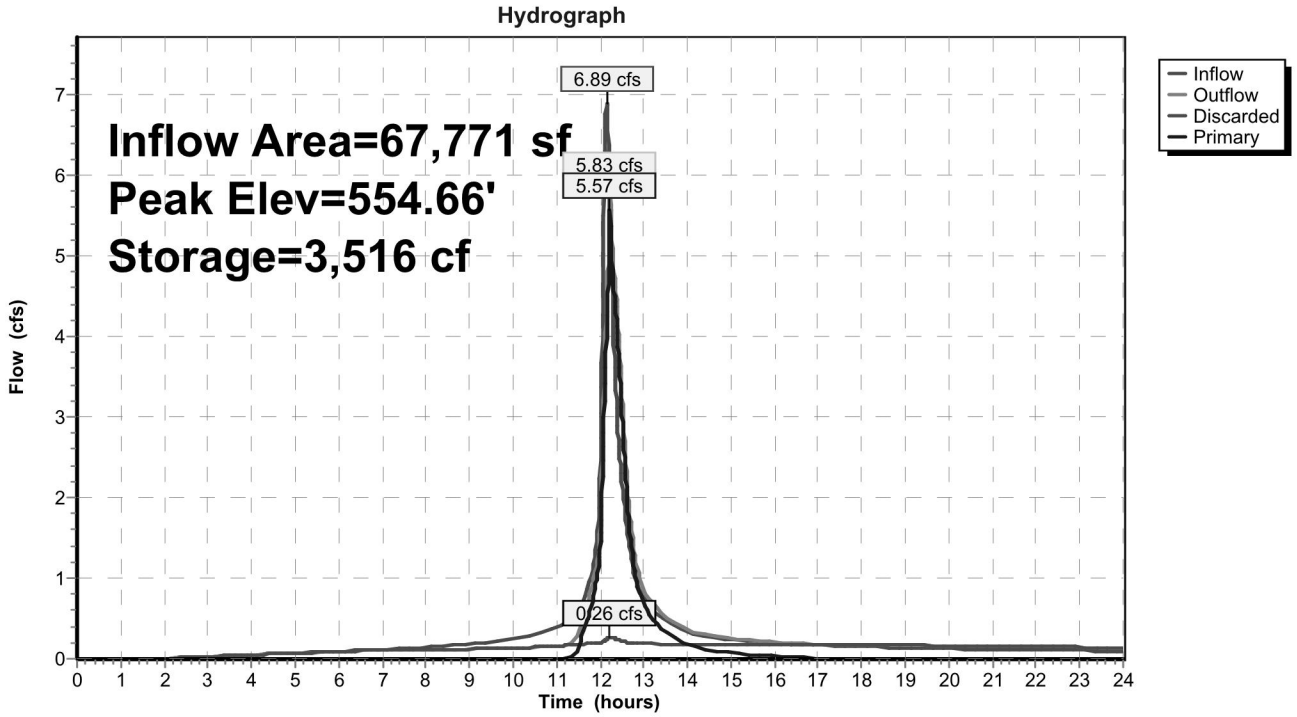
4,928.0 cf Field - 4,257.3 cf Chambers = 670.7 cf Stone x 40.0% Voids = 268.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,543.0 cf = 0.081 af
Overall Storage Efficiency = 71.9%
Overall System Size = 40.00' x 30.80' x 4.00'

35 Chambers
182.5 cy Field
24.8 cy Stone



Pond P2: TANK

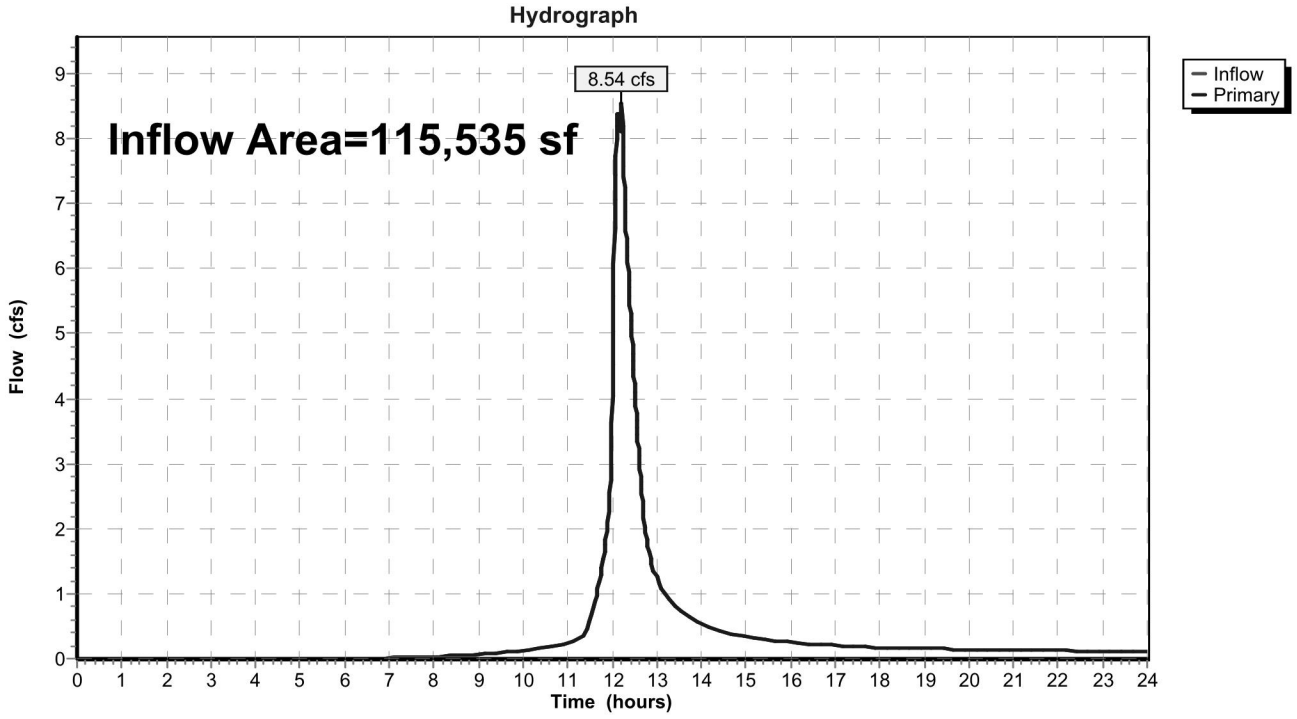

Hydrograph
Inflow Area=67,771 sf
Peak Elev=554.66'
Storage=3,516 cf
6.89 cfs
5.83 cfs
5.57 cfs
0.26 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link DP-1: DP-1

Inflow Area = 115,535 sf, 36.36% Impervious, Inflow Depth > 3.15" for 100-yr event
Inflow = 8.54 cfs @ 12.22 hrs, Volume= 30,322 cf
Primary = 8.54 cfs @ 12.22 hrs, Volume= 30,322 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

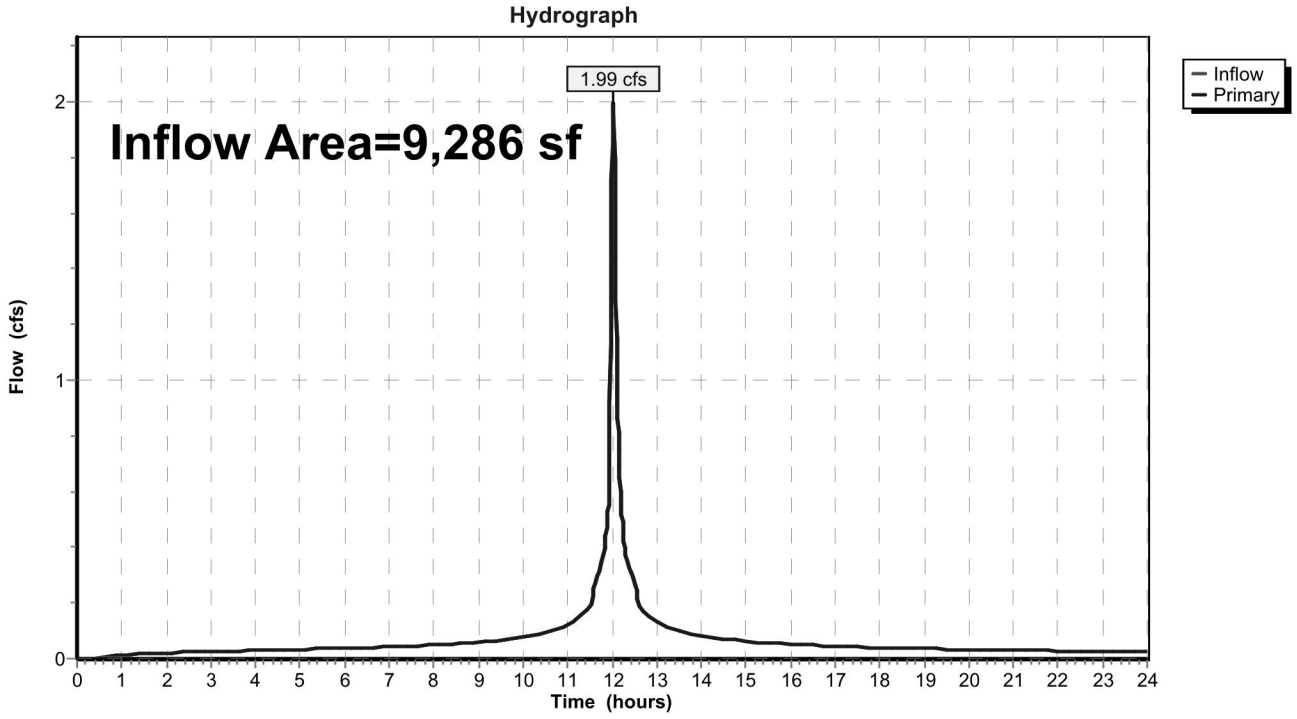


Summary for Link DP-2: DP-2

Inflow Area = 9,286 sf,100.00% Impervious, Inflow Depth > 7.86" for 100-yr event
Inflow = 1.99 cfs @ 12.03 hrs, Volume= 6,084 cf
Primary = 1.99 cfs @ 12.03 hrs, Volume= 6,084 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

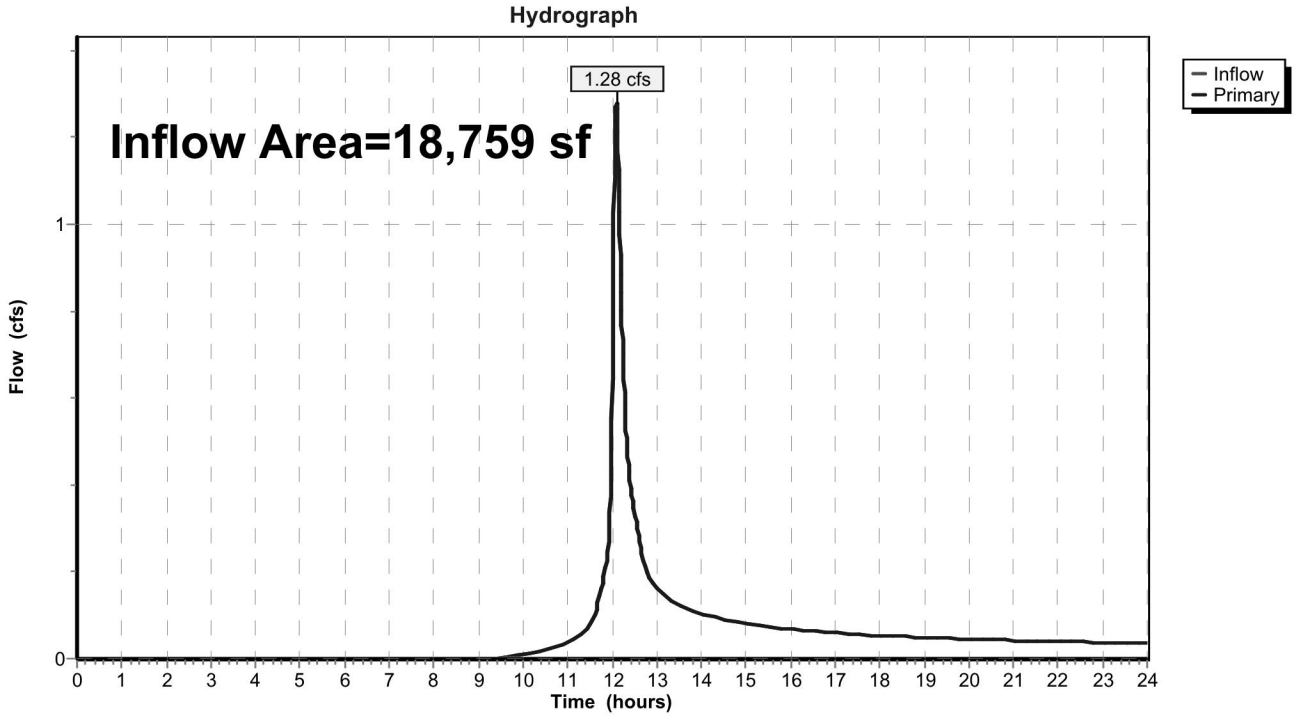


Summary for Link DP-3: DP-3

Inflow Area = 18,759 sf, 0.00% Impervious, Inflow Depth > 2.96" for 100-yr event
Inflow = 1.28 cfs @ 12.09 hrs, Volume= 4,624 cf
Primary = 1.28 cfs @ 12.09 hrs, Volume= 4,624 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3

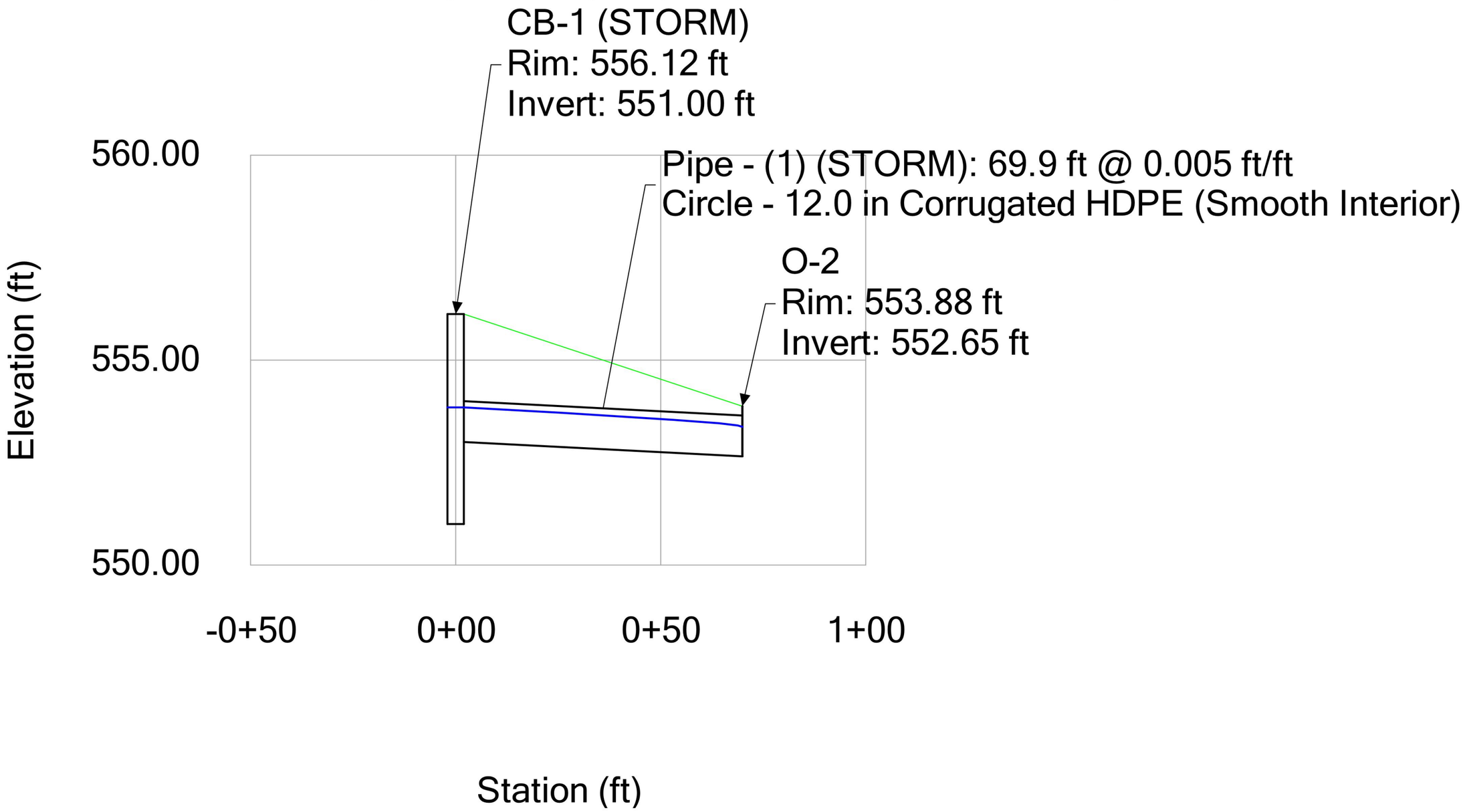


APPENDIX E

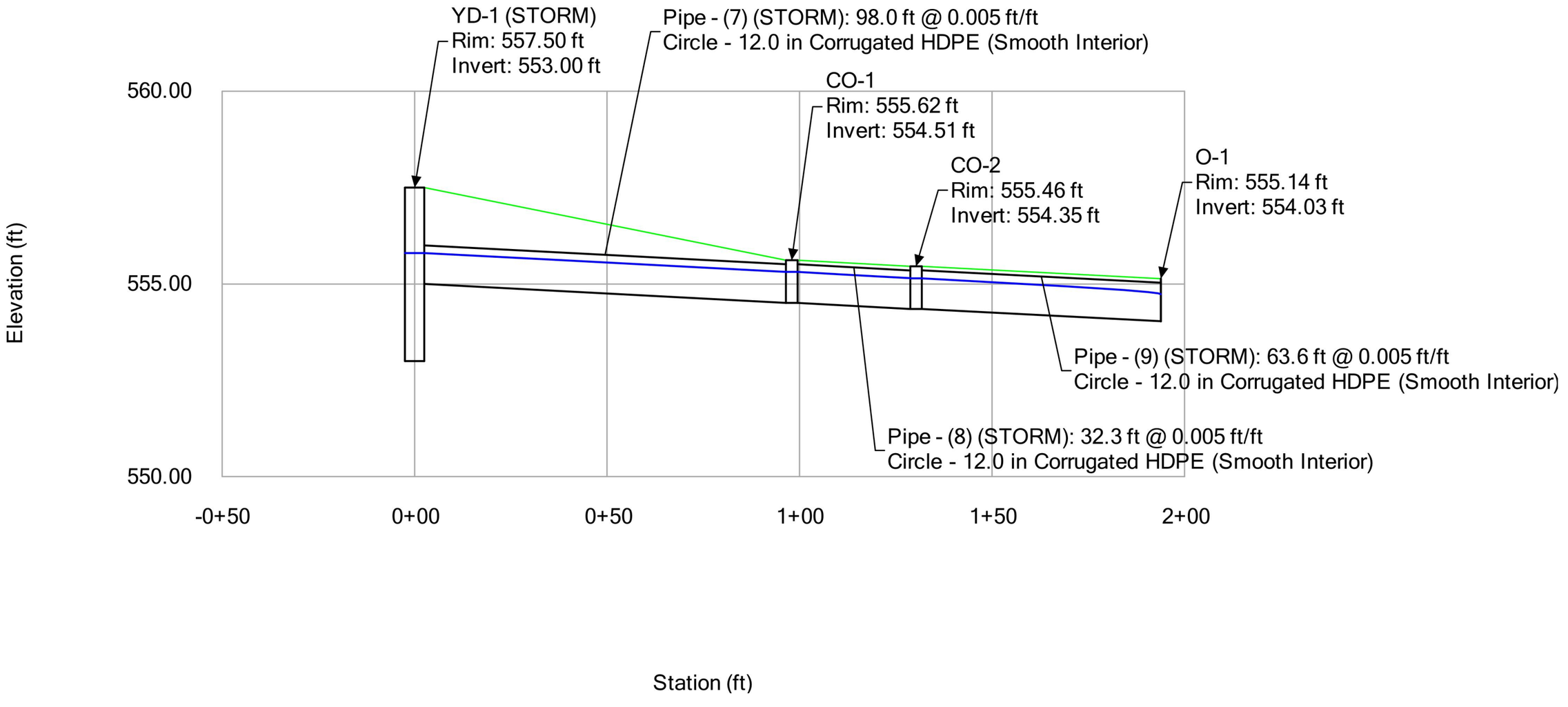
CONVEYANCE MODELING RESULTS

Profile Report

Engineering Profile - CB-1 (STORM) to O-2 (C-DAT-2200418-PROP HYDRAULICS.stsw)

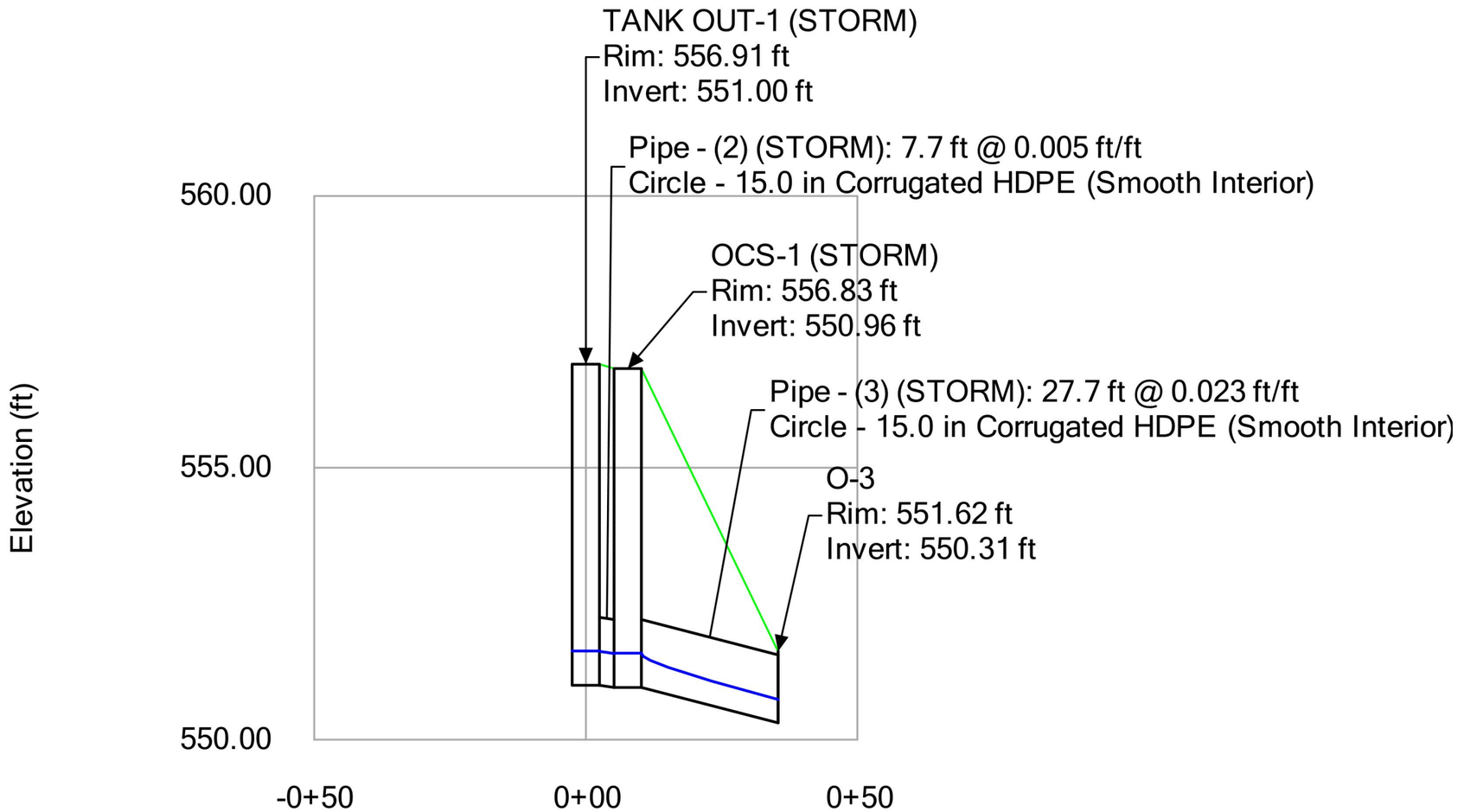


Profile Report
Engineering Profile - YD-1 (STORM) to O-1 (C-DAT-2200418-PROP HYDRAULICS.stsw)



Profile Report

Engineering Profile - TANK OUT-1 (STORM) to O-3 (C-DAT-2200418-PROP HYDRAULICS.stsw)



Conduit FlexTable: Hydraulic Grade Line Computations

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	System Rational Flow (cfs)	Total System Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Slope (Calculated) (ft/ft)	Invert (Start) (ft)	Invert (Stop) (ft)	EGL (In) (ft)	EGL (Out) (ft)	HGL (In) (ft)	HGL (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
Pipe - (1) (STORM)	CB-1 (STORM)	O-2	12.0	69.9	2.85	2.85	2.73	3.94	0.005	553.12	552.77	554.22	553.84	553.97	553.50	556.12	553.88
Pipe - (2) (STORM)	TANK OUT-1 (STORM)	OCS-1 (STORM)	15.0	7.7	0.00	2.47	4.95	4.03	0.005	551.00	550.96	551.88	551.84	551.63	551.59	556.91	556.83
Pipe - (3) (STORM)	OCS-1 (STORM)	O-3	15.0	27.7	0.00	2.47	10.73	7.10	0.023	550.96	550.31	551.84	551.43	551.59	550.74	556.83	551.62
Pipe - (7) (STORM)	YD-1 (STORM)	CO-1	12.0	98.0	0.00	2.67	2.73	3.96	0.005	555.00	554.51	556.05	555.56	555.80	555.31	557.50	555.62
Pipe - (8) (STORM)	CO-1	CO-2	12.0	32.3	0.00	2.67	2.73	3.96	0.005	554.51	554.35	555.56	555.39	555.31	555.15	555.62	555.46
Pipe - (9) (STORM)	CO-2	O-1	12.0	63.6	0.00	2.67	2.73	3.96	0.005	554.35	554.03	555.39	555.05	555.15	554.73	555.46	555.14

APPENDIX F

WATER QUALITY CALCULATIONS

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
WQv = Calculated Water Quality Volume

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	Proposed Water Quality Volume (WQV)	
PDA-120	PDA-120	0.802	34,936	0.597	26,003	74.44	0.720	0.048	2,091	acre-feet	ft^3
TOTAL		0.802	34,936	0.597	26,003	74.44	0.72	0.048	2,091	0.115	5,028

*The Proposed Water Quality Volume (WQV) is calculated at the available storage depth below the lowest orifice

Water Quality Calculations- CT General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

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
WQv = Calculated Water Quality Volume

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		
SITE	SITE	1.699	74,004	0.742	32,329	43.67	0.443	0.063	2,744	Proposed Water Quality Volume (WQV)	
TOTAL SITE		1.699	74,004	0.742	32,329	43.67	0.443	0.063	2,744	0.115	5,028

*The Proposed Water Quality Volume (WQV) is calculated at the available storage depth below the lowest orifice

Water Quality Calculations

Determine Water Quality Flow

From CT 2004 Stormwater Quality Manual:

$$CN = \frac{1000}{\left[10 + 5P + 10Q - 10\left(Q^2 + 1.25QP\right)^{\frac{1}{2}}\right]}$$

$$Q = \frac{[WQV\,(acre-feet)\times[12(inches/foot)]]}{DrainageArea(acres)}$$

$$WQF = (q_u)(A)(Q)$$

CN = Runoff Curve Number
P = design preciptation, inches, (1" for water quality storm)
Q = runoff depth (in watershed inches)
T_c = time of concentration
I_a = Initial abstraction, inches, from Table 4-1, Chapter 4, TR-55
q_u = unit peak discharge,
WQF = water quality flow (cfs)

WQ Treatment Device	Facility ID	Total Area			Imp Area		Imp Cover	R	WQV	Q	P	CN	T_c		I_a	I_a/P	q_u [1]	WQF
		ft^2	ac	mi^2	ft^2	ac	%	-	acre-feet	in	in	-	mins	hours	in	-	$cfs/mi^2/in$	cfs
Hydrodynamic Separator HDS-1	PDA-120	34,936	0.802	0.0013	26,003	0.597	74.44	0.720	0.048	0.72	1.00	97	12.3	0.21	0.062	0.062	550	0.5

1 From Exhibit 4-III: Unit peak discharge (q_u) for SCS type III rainfall distribution, Urban Hydrology for Small Watersheds (TR-55), USDS< SCS, June 1986.

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)	Provided Recharge Volume (ac-ft) (Undeground Detention Only)	Req. Meet
		A	B	C	D	A	B	C	D	A	B	C	D			
Existing	1.70	0.00	0.97	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	-	-
Proposed	1.70	0.00	0.97	0.00	0.73	0.00	0.26	0.00	0.48	0.00	0.27	0.00	0.66	0.005	0.115	YES
														0.0054	0.115	YES

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

Best Management Practice (BMP) Treatment Train Efficiency Worksheet

Prepared for:
Proposed Development
968 Killingworth Road
Haddam, Connecticut

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

Date prepared:
September 2, 2022

Overall Site Treatment Train Efficiency to Underground Stormwater Detention System

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	Hydrodynamic Separator**	Primary	80

Overall Treatment Train Efficiency (Et)= **82 % Total Suspended Solids (TSS) Removal**

* 80% required per CT DEEP
** Manufacturer Claims 80% TSS Removal
*** Schueler 1996 & EPA 1993

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

TABLE 2 - PERFORMANCE MATRIX FOR CTDOT QUALIFIED HYDRODYNAMIC SEPARATORS

Max WQF (cfs)	Product Model									
	Barracuda	*Cascade*	*CDS*	*Concentrator*	*Downstream Defender*	*DVS*	*First Defense*	*HydroStorm*	*SciClone*	*Xcelerator*
0.1	Barracuda S3(3)	CS-3(3)	CDS-3(3)	AS-2(2.5)	4ft(4)	DVS-36(3)	3ft(3)	HS3(3)	SC-3(3)	XC-2(2.5)
0.2	Barracuda S3(3)	CS-3(3)	CDS-3(3)	AS-2(2.5)	4ft(4)	DVS-36(3)	3ft(3)	HS3(3)	SC-3(3)	XC-2(2.5)
0.3	Barracuda S3(3)	CS-3(3)	CDS-3(3)	AS-2(2.5)	4ft(4)	DVS-36(3)	3ft(3)	HS3(3)	SC-3(3)	XC-2(2.5)
0.4	Barracuda S3(3)	CS-3(3)	CDS-3(3)	AS-3(3.5)	4ft(4)	DVS-36(3)	3ft(3)	HS3(3)	SC-4(4)	XC-2(2.5)
0.5	Barracuda S3(3)	CS-3(3)	CDS-3(3)	AS-3(3.5)	4ft(4)	DVS-36(3)	3ft(3)	HS3(3)	SC-4(4)	XC-2(2.5)
0.6	Barracuda S3(3)	CS-3(3)	CDS-4(4)	AS-3(3.5)	4ft(4)	DVS-48(4)	3ft(3)	HS4(4)	SC-4(4)	XC-3(3.5)
0.7	Barracuda S3(3)	CS-3(3)	CDS-4(4)	AS-3(3.5)	4ft(4)	DVS-48(4)	3ft(3)	HS4(4)	SC-4(4)	XC-3(3.5)
0.8	Barracuda S4(4)	CS-3(3)	CDS-4(4)	AS-4(4.5)	4ft(4)	DVS-48(4)	3ft(3)	HS4(4)	SC-5(5)	XC-3(3.5)
0.9	Barracuda S4(4)	CS-3(3)	CDS-4(4)	AS-4(4.5)	4ft(4)	DVS-48(4)	4ft(4)	HS5(5)	SC-5(5)	XC-3(3.5)
1.0	Barracuda S4(4)	CS-3(3)	CDS-5(5)	AS-4(4.5)	4ft(4)	DVS-48(4)	4ft(4)	HS5(5)	SC-5(5)	XC-3(3.5)
1.1	Barracuda S4(4)	CS-4(4)	CDS-5(5)	AS-4(4.5)	4ft(4)	DVS-60(5)	4ft(4)	HS5(5)	SC-6(6)	XC-3(3.5)
1.2	Barracuda S4(4)	CS-4(4)	CDS-5(5)	AS-5(5)	6ft(6)	DVS-60(5)	4ft(4)	HS5(5)	SC-6(6)	XC-4(4.5)
1.3	Barracuda S5(5)	CS-4(4)	CDS-5(5)	AS-5(5)	6ft(6)	DVS-60(5)	4ft(4)	HS5(5)	SC-6(6)	XC-4(4.5)
1.4	Barracuda S5(5)	CS-4(4)	CDS-5(5)	AS-5(5)	6ft(6)	DVS-60(5)	4ft(4)	HS6(6)	SC-6(6)	XC-4(4.5)
1.5	Barracuda S5(5)	CS-4(4)	CDS-5(5)	AS-6(6)	6ft(6)	DVS-60(5)	4ft(4)	HS6(6)	SC-6(6)	XC-4(4.5)
1.6	Barracuda S5(5)	CS-4(4)	CDS-6(6)	AS-6(6)	6ft(6)	DVS-72(6)	5ft(5)	HS6(6)	SC-7(7)	XC-4(4.5)
1.7	Barracuda S5(5)	CS-4(4)	CDS-6(6)	AS-6(6)	6ft(6)	DVS-72(6)	5ft(5)	HS6(6)	SC-7(7)	XC-4(4.5)
1.8	Barracuda S5(5)	CS-4(4)	CDS-6(6)	AS-6(6)	6ft(6)	DVS-72(6)	5ft(5)	HS6(6)	SC-7(7)	XC-4(4.5)

Stage-Area-Storage for Pond P1: POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
555.00	587	0
555.05	619	30
555.10	651	62
555.15	684	95
555.20	716	130
555.25	748	167
555.30	780	205
555.35	812	245
555.40	845	286
555.45	877	329
555.50	909	374
555.55	941	420
555.60	973	468
555.65	1,006	518
555.70	1,038	569
555.75	1,070	621
555.80	1,102	676
555.85	1,134	732
555.90	1,167	789
555.95	1,199	848
556.00	1,231	909
556.05	1,266	971
556.10	1,301	1,036
556.15	1,336	1,102
556.20	1,371	1,169
556.25	1,406	1,239
556.30	1,441	1,310
556.35	1,476	1,383
556.40	1,511	1,457
556.45	1,546	1,534
556.50	1,581	1,612
556.55	1,616	1,692
556.60	1,651	1,774
556.65	1,686	1,857
556.70	1,721	1,942
556.75	1,756	2,029
556.80	1,791	2,118
556.85	1,826	2,208
556.90	1,861	2,300
556.95	1,896	2,394
557.00	1,931	2,490
557.05	1,969	2,587
557.10	2,007	2,687
557.15	2,044	2,788
557.20	2,082	2,891
557.25	2,120	2,996
557.30	2,158	3,103
557.35	2,196	3,212
557.40	2,233	3,323
557.45	2,271	3,435
557.50	2,309	3,550
557.55	2,347	3,666
557.60	2,385	3,785
557.65	2,422	3,905
557.70	2,460	4,027
557.75	2,498	4,151
557.80	2,536	4,277
557.85	2,574	4,404
557.90	2,611	4,534
557.95	2,649	4,666
558.00	**2,687**	**4,799**

STORAGE VOLUME BELOW OUTLET ELEVATION OF 557.50

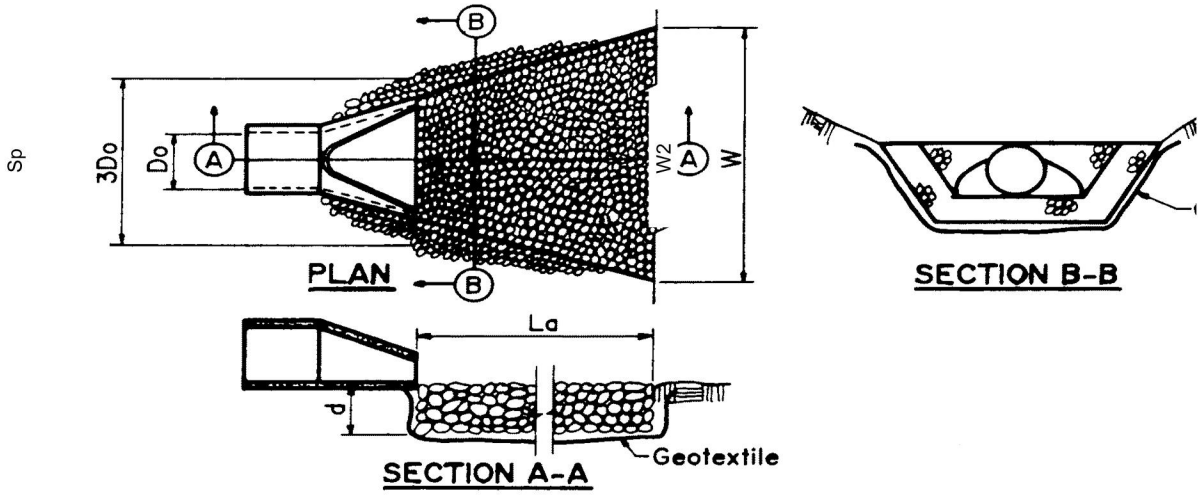
Stage-Area-Storage for Pond P2: TANK

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
551.00	**1,232**	0
551.05	1,232	48
551.10	1,232	95
551.15	1,232	143
551.20	1,232	191
551.25	1,232	240
551.30	1,232	289
551.35	1,232	339
551.40	1,232	389
551.45	1,232	439
551.50	1,232	488
551.55	1,232	538
551.60	1,232	588
551.65	1,232	637
551.70	1,232	687
551.75	1,232	736
551.80	1,232	786
551.85	1,232	836
551.90	1,232	885
551.95	1,232	935
552.00	1,232	984
552.05	1,232	1,034
552.10	1,232	1,083
552.15	1,232	1,132
552.20	1,232	1,182
552.25	1,232	1,231
552.30	1,232	1,281
552.35	1,232	1,330
552.40	1,232	1,379
552.45	1,232	1,429
552.50	1,232	1,478
552.55	1,232	1,527
552.60	1,232	1,576
552.65	1,232	1,626
552.70	1,232	1,675
552.75	1,232	1,724
552.80	1,232	1,773
552.85	1,232	1,822
552.90	1,232	1,871
552.95	1,232	1,920
553.00	1,232	1,969
553.05	1,232	2,019
553.10	1,232	2,068
553.15	1,232	2,117
553.20	1,232	2,166
553.25	1,232	2,215
553.30	1,232	2,264
553.35	1,232	2,312
553.40	1,232	2,361
553.45	1,232	2,410
553.50	1,232	2,459
553.55	1,232	2,508
553.60	1,232	2,557
553.65	1,232	2,606
553.70	1,232	2,654
553.75	1,232	2,703
553.80	1,232	2,752
553.85	1,232	2,801
553.90	1,232	2,849
553.95	1,232	2,898
554.00	1,232	2,947
554.05	1,232	2,995
554.10	1,232	3,044
554.15	1,232	3,092
554.20	1,232	3,141
554.25	1,232	3,190
554.30	1,232	3,238
554.35	1,232	3,287
554.40	1,232	3,335
554.45	1,232	3,384
554.50	1,232	3,432
554.55	1,232	3,481
554.60	1,232	3,511
554.65	1,232	3,515
554.70	1,232	3,519
554.75	1,232	3,523
554.80	1,232	3,527
554.85	1,232	3,531
554.90	1,232	3,535
554.95	1,232	3,539
555.00	1,232	**3,543**

STORAGE VOLUME BELOW OUTLET INVERT OF 552.50

Riprap Apron Outlet Protection

PROJECT NAME: Proposed Development
LOCATION: 968 Killingworth Road, Haddam, CT
PREPARED BY: Thoule DATE: 9/16/2022
LAST REVISED BY: DATE:



OUTLET NO.	Sp (Diameter, in.)	Q (CFS)	V (FPS)	Apron Type (letter only)	La (ft.)	W1 (ft.)	W2 (ft.)	Riprap Specification
FES-1	15	6.89	7.10	A	12	4	12	Modified

Note: Riprap apron design calculations based off of standards provided by the Connecticut Department of Transportation Drainage Manual and the Connecticut Guidelines for Soil Erosion and Sediment Control.

Design: Type A: $La=[1.80(Q-5)/Sp^{1.5}] + 10$
$W1=3Sp$
$W2=3Sp + 0.7La$

Type B: $La=[3.0(Q-5)/Sp^{1.5}] + 10$
$W1=3Sp$
$W2=3Sp + 0.4La$

APPENDIX G

SOILS DATA

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

July 11, 2022

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: 1:1,530 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Aug 30, 2019—Oct 15, 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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	2.2	24.7%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	2.0	22.0%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	2.2	25.2%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	0.1	0.6%
85C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony	1.7	18.5%
W	Water	0.8	9.0%
Totals for Area of Interest		**8.9**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

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

State of Connecticut

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

Map Unit Setting

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

Map Unit Composition

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

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

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

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

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

Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

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

Typical profile

Oi - 0 to 1 inches: peat

A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

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

29B—Agawam fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqx
Elevation: 0 to 820 feet

Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Agawam and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agawam

Setting

Landform: Outwash plains, kames, kame terraces, outwash terraces, moraines
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread, rise, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 45 inches: loamy fine sand
2C2 - 45 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

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

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip

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

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 2 percent
Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

61C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w820
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Canton, Very Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Leicester, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions, ground moraines, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton, very stony

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

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield, Very Stony

Setting

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

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Sutton, very stony

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

Leicester, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Hollis, very stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

85C—Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w67f
Elevation: 0 to 1,520 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton, very stony, and similar soils: 55 percent
Montauk, very stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Very Stony

Setting

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

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam

Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Description of Montauk, Very Stony

Setting

Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: fine sandy loam
Bw1 - 6 to 28 inches: fine sandy loam
Bw2 - 28 to 36 inches: sandy loam
2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, very stony

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

Charlton, very stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 3 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Stockbridge, very stony

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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.

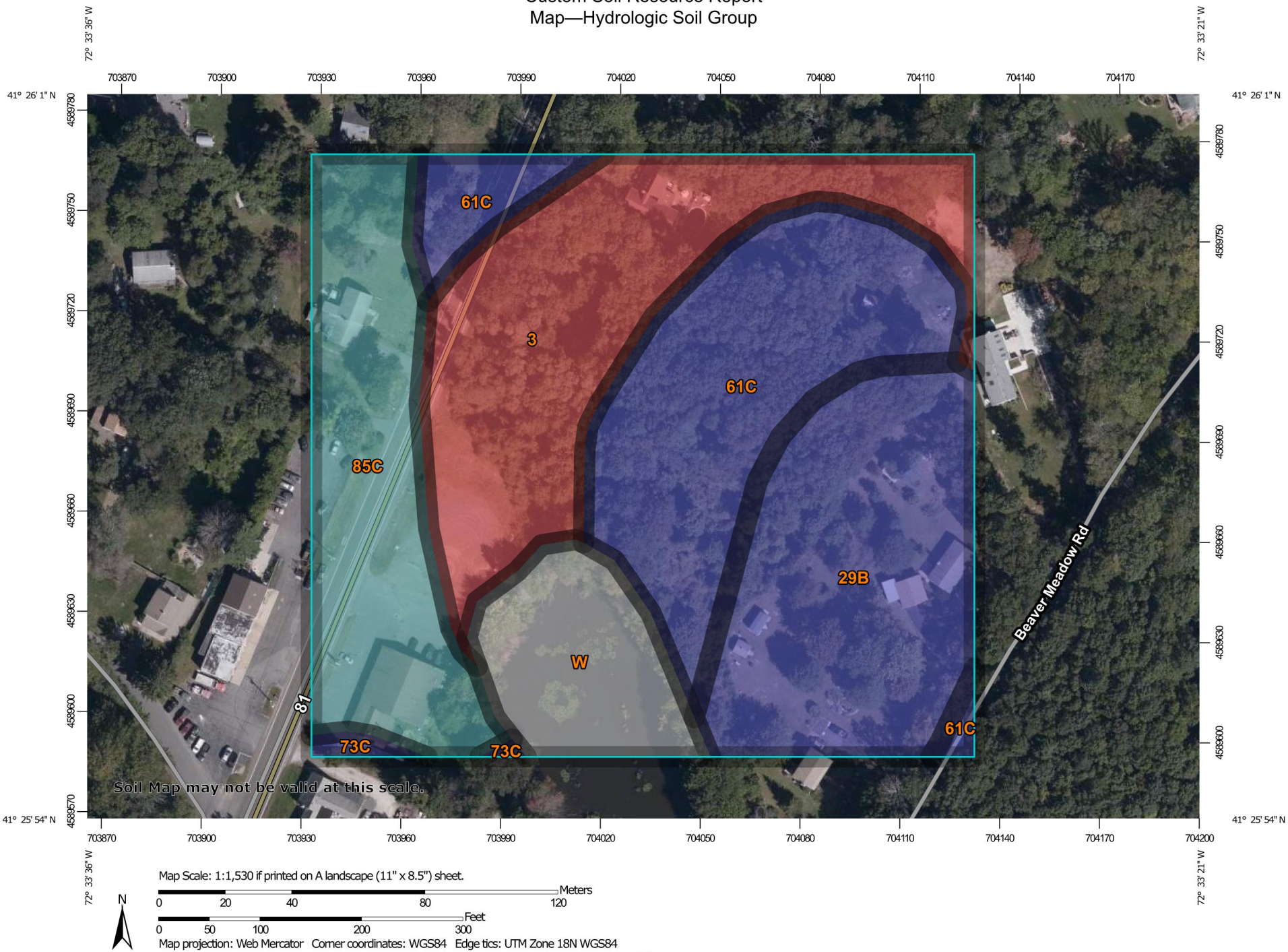
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:1,530 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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)

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 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Aug 30, 2019—Oct 15, 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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	2.2	24.7%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	2.0	22.0%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	2.2	25.2%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	0.1	0.6%
85C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony	C	1.7	18.5%
W	Water		0.8	9.0%
Totals for Area of Interest			**8.9**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX H

STORMWATER OPERATIONS AND MAINTENANCE PLAN

Stormwater System
Operations and Maintenance Plan

For the:
Proposed Facility

Located at:
Lots 7, 8 & 9 Killingworth Road, CT Route 81
Haddam, Connecticut

Prepared for Submission to:
Town of Haddam, Connecticut

September 16, 2022

Prepared for:
MPA Realty Associates, Inc
60 Granite Street
Walpole, Massachusetts

Prepared by:

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

BL Project Number: 2200418

Contents

General Overview

This Stormwater Operation and Maintenance Plan shall support the Site Plan Application submitted to the Town of Haddam by MPA Realty Associates, Inc for a proposed retail facility located on CT Route 81. The purpose of this Plan is to establish the Operational and Maintenance requirements of the site during and after construction in order to comply with local and state requirements. The plan shall apply to the project site which has a total area of approximately 73,329 SF or 1.68 Acres.

The subject parcel described above is bounded to the north and east by a residential homes, to the south by a mixed-use facility containing restaurant and retail uses, and to the west by CT Route 81.

The proposed topography of the site varies from elevation 562 to 550 and will generally follow the existing drainage patterns to the greatest extent feasible. All stormwater inlets and pipes will collect and route the site's runoff to the respective design points. Primary water quality treatment will be provided in a hydrodynamic separator.

The proposed development includes the construction of a +/- 10,700 SF retail building. The development will include parking, landscaping, and additional site and utility improvements typical of commercial development.

The proposed development is located entirely within the FEMA Flood Zone X, an area determined to be outside the 0.2% annual chance floodplain.

The proposed stormwater management system installed for the site complies with the Town of Haddam Zoning Regulations, the 2002 Connecticut Guidelines for Soil Erosion, and the 2004 Connecticut Stormwater Quality Manual, latest editions.

The following Operations and Maintenance Plan, hereby referred to as Plan, was prepared specifically for the development located within the Town of Haddam, 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 Plan is to ensure that the stormwater management components are operated in accordance with all approvals and permits. The primary goal is to inform all property managers on 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, verifying permit compliance.

Responsible Parties

The Property Owner, and other parties as listed below, will be responsible for implementing the Plan for the subject property.

Company:	MPA Realty Associates, Inc
Business Address:	60 Granite Street
	Walpole, MA 02081

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 and shall coordinate with the corresponding utility provider.

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 Haddam –Site Plan Approval, Inland Wetlands Permit, Building Permit
- State of Connecticut Department of Transportation – Encroachment Permit

Maintenance Logs and Checklists

The property owner shall 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 and readily available at the request of local municipalities or state authorities.

Upon the request by the Town of Haddam, all documented inspections, reports, or other supporting information pertaining to this plan shall be provided to the Town annually and submitted per their requirements. The responsibility party shall contact the Town of Haddam for any pertinent information not specifically noted within this section.

Forms

The following forms shall be developed by the responsible party to record periodic maintenance and inspections. An example of a typical inspection and maintenance form for a catch basin is included within the appendices of this report for reference. All inspection and maintenance forms prepared by the responsible party shall be kept on-site as part of the Stormwater Management Plan.

- Annual Checklist
- Quarterly Checklist
- Monthly Checklist

Employee Training

The property owner will have an employee-training program, with annual updates, 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 cleanup supplies.
- Materials and equipment necessary for spill cleanup 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 shall 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.

Stormwater Management System and Maintenance

System Components

The stormwater management system has several components that are shown on the Grading and Drainage Plan and perform various functions in capturing, routing, and treating stormwater runoff.

Hydrodynamic Separator (Oil/Water Separator)

The hydrodynamic separator inlet will be cleaned periodically during construction, and at the end of construction once the landscaped areas are fully stabilized.

For the first year of operation following construction, inspect each unit once each month for the months of January, February, March and April, and once every four months thereafter. A graduated measuring device (stadia rod) shall be inserted into each grit chamber and measurements of any accumulations shall be recorded. Any debris, which has accumulated to within one foot of the water surface inside the grit chamber portion of each tank, shall be removed by vacuum "Vactor" type of equipment.

After the first year of operation, each unit shall be inspected at a minimum, three times yearly with one inspection occurring in the month of April in the same manner as described above for the first season of operation. Any accumulations found to be occurring within one foot of the water surface shall be removed from the unit and properly disposed off-site. Also, any floating material discovered during inspections shall be removed from the tank.

A detailed maintenance logbook shall be kept for each unit. Information is to include, but not be limited to, the date of inspection, record of grit depth, condition of baffles, observation of any floatable, and date of cleaning performed.

Stormwater Management Basin

The stormwater basins are designed to filter and detain stormwater runoff from contributing watersheds. Wet meadow environments are proposed within the basins to provide biological and physical filtration of runoff prior to discharge. Runoff storage capacity for flood flows is also provided in the system by means of a control outlet structure. The basins are planted to provide soil stabilization, filtration and wildlife habitat.

Management actions include the following measures:

1. Replacement of any diseased or dead vegetation within the basin with native species, as per the approved plan;
2. Inspection and clearing of debris from the basin floor, inlet and outlet structures when necessary. To be inspected quarterly for the first two years and adjusted as necessary, but no less frequently than biennially. Remove sediment from basin floor and low flow channel if accumulation exceeds one foot.
3. Repairs to any soil erosion of the sidewalls or floor of the basin, and;
4. Repairs to the inlet and outlet structures, as needed.

Underground Infiltration System

A subsurface infiltration system or underground infiltration system is a series of underground chambers or vaults that are used to infiltrate stormwater runoff. A secondary function is to retain stormwater runoff for a period of time to delay and reduce the peak discharged rates for various design storms. Although difficult to identify from the surface, many systems will have one manhole with a series of orifices called an outlet structure. The infiltration system is typically attached upstream of this structure. An employee can also identify an underground infiltration system by identifying inspection ports at the surface and removing the lid for the required routine inspections.

The subsurface infiltration system shall be inspected every six (6) months and in the months of April and October. Each of the inspection ports provided shall be opened and visually checked from the surface. Observation of grit inside of the infiltration 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 infiltration 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. The chamber system will be visually inspected through the manholes. If deemed necessary, the chambers can be TV inspected.

The manufacture's recommended inspection and maintenance guide has been included at within the Appendices of this Plan for reference.

Rip Rap Outlet Protection

The riprap aprons or swales are excavated depressions which are lined with rock riprap to prevent scouring. The depressions permit the dissipation of excessive energy and turbulence associated with the flow of stormwater being discharged from a conduit system.

Management actions include the following measures:

1. Inspect the surface of the scour hole quarterly for the first year and adjust as necessary (but at least annually) to ensure surface is free of debris and the discharge is flowing via sheet flow and not concentrated. Remove accumulated sediment when sediment depth within the scour hole reaches 50% of the total depth. Frequency of cleaning depends on loading rate.
2. Inspect the discharge lip area for low points and down gradient flow areas for active scour or soil erosion. Repair scour and rills with compacted sandy till, and riprap as needed to prevent scouring.

Additional Site Maintenance

Parking Lots

Parking lots and sidewalks shall be swept as necessary by the property owner to removed trash and other debris. The property owner will sweep parking lots on the property in the spring to remove winter accumulations of road sand and is requirement to maintain the functionality of the required stormwater quality treatment.

Landscaping

The management company retained by the property owner shall maintain all landscaped areas. Typical landscaping maintenance shall 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 and as approved by the Town.

Established lawn areas shall be maintained at a typical height of 3-1/2". This will allow the grass to be maintained with minimal impact from weeds and/or pests. 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.

De-icing and Snow Removal & Storage

The use of clean sand may be used to aid in traction. Snow shall be shoveled and plowed from sidewalk and parking areas within 24 hours of the storm's conclusion. Sand accumulation shall be removed from the site at the end of the winter season or appropriate time when seasonal snow has melted. Alternative de-icing methods not specified within this section shall be submitted to the Town of Haddam for approval prior to use.

MAINTENANCE SCHEDULE

During the First Year of Operation:		
Task:	Completion Date:	Manager's Initials:
JANUARY:		
Employee Training Program with Spill Program		
Stormwater Management Basin Inspection		
*Hydrodynamic Separator Inspection		
*Subsurface Stormwater Infiltration		
FEBRUARY:		
*Hydrodynamic Separator Inspection		
*Subsurface Stormwater Infiltration		
MARCH:		
*Hydrodynamic Separator Inspection		
*Subsurface Stormwater Infiltration		
APRIL:		
* Hydrodynamic Separator Inspection		
*Stormwater Management Basin Inspection		
*Subsurface Stormwater Infiltration		
Sweeping of Paved Surfaces and Dumpster Enclosure		
Shrub Fertilization		
Lawn Liming (if necessary)		
JUNE:		
*Hydrodynamic Separator Inspection		
Sweeping of Paved Surfaces and Dumpster Enclosure		
SEPTEMBER:		
*Stormwater Management Basin Inspection		
*Subsurface Stormwater Infiltration		
Tree and Lawn Fertilization		
Sweeping of Paved Surfaces and Dumpster Enclosure		
DECEMBER:		
*Hydrodynamic Separator Inspection		
*Stormwater Management Basin Inspection		
*Subsurface Stormwater Infiltration		
Sweeping of Paved Surfaces and Dumpster Enclosure		

*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:			
*Hydrodynamic Separator Inspection			
*Stormwater Management Basin Inspection			
*Subsurface Stormwater Infiltration			
Sweeping of Paved Surfaces and Dumpster Enclosure			
Shrub Fertilization			
Lawn Liming (if necessary)			
JUNE:			
Sweeping of Paved Surfaces and Dumpster Enclosure			
AUGUST:			
*Hydrodynamic Separator Inspection			
SEPTEMBER:			
*Stormwater Management Basin Inspection			
*Subsurface Stormwater Infiltration			
Tree and Lawn Fertilization			
Sweeping of Paved Surfaces and Dumpster Enclosure			
DECEMBER:			
*Hydrodynamic Separator Inspection			
Sweeping of Paved Surfaces and Dumpster Enclosure			

*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 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.