PROJECT NARRATIVE

SITE PLAN REVIEW
357 Sterling Road
Lancaster, MA

Bobrek Engineering & Construction, LLC
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December 2023

Introduction

On behalf of Lancaster 7th Day Adventist Church, Bobrek Engineering & Construction, LLC (BEC) has prepared this project narrative in accordance with the Lancaster Planning Board for a proposed community center addition located at 357 Sterling Road in Lancaster, MA. A detailed description of the project site and proposed improvements are outlined below.

Existing Conditions

The existing site consists of an 12,020 SF religious use structure with an associated parking area and various landscape features. There are currently two driveway openings with access to the property, one off Goss Lane and the other off Sterling Road. The site is serviced by municipal water and sewer, as well as an existing underground electric service. Drainage from the site is currently handled through a drainage network with multiple catch basins, as well as a detention/infiltration basin on the Eastern side of the building to handle the most recent addition.

Proposed Design

The proposed project consists of a new 113' x 60' community center addition to the west side of the existing building with an associated patio area. The new addition will be utilized solely by the owner and its patrons. The community center will be connected to the existing structure through the kitchen, it will have two bathrooms, and a fire suppression system. A detailed MEP design for the building will be provided prior to issuance of building permit. Due to the location of the structure, the existing row of arborvitae and some other landscaping will need to be removed. However, included in this project is replanting of the existing arborvitae along the northern side of the building to provide screening from abutting properties.

As a part of this project, there are no proposed changes to the existing parking/driveway layout or to any of the existing drainage systems on site. The modifications to the property and drainage patterns are isolated to the location of the addition. For this reason, only the drainage area that is impacted as a part of this project has been analyzed. A complete stormwater analysis of the project is outlined below.

Stormwater Analysis

As outlined above, the proposed project consists of the addition of a 6,780 SF addition to the existing structure along with a 760 SF paver patio. The runoff from the proposed roof will be captured and directed to a subsurface infiltration system which will consist of 16 Cultec 330XL units, 4 rows of 4. The landscape area surrounding the proposed addition will remain unchanged and will drain as it does under existing conditions.

As required by the applicable regulations, BEC has included the MassDEP Stormwater Checklist and analyzed peak flows for the 2, 10, 25, and 100-year storm events. Rainfall intensities for each storm event are listed in the table below.

Storm Event	Rainfall Intensity (in)
2-Year, 24 Hour	3.00
10-Year, 24 Hour	4.50
25-year, 24 Hour	5.30
100-Year, 24 Hour	6.50

Using the NRCS Web Soil Survey, BEC obtained a soil analysis for the property and determined that the locus area is underlain by soils classified as Agawam Fine Sandy Loam (275B) with an associated hydrologic soil group of B. The project was analyzed utilizing the HydroCAD stormwater modeling program and was designed in such a manner that maintains existing flow patterns to the maximum extent practicable while also providing mitigation measures to meet all applicable standards of the Massachusetts Stormwater Management Policy. A detailed description of the design is included in this report.

Stormwater Management Policy Compliance

Introduction

The Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Policy contains standards to comply with as they apply to a specific project. The stormwater standards noted above require ten (10) standards to be met to the greatest extent practicable. The following is a list of the standards and BEC's documentation in *italics* of each.

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The proposed project does not deposit untreated stormwater into any wetlands or waters of the Commonwealth.

Standard 2: Stormwater management systems shall be designed so that the post development peak discharge rates do not exceed pre-development peak discharge rates.

The project was analyzed under proposed conditions to compare the pre- and post-development peak discharge rates in the 2, 10, 25, and 100-year storm events. By infiltrating the proposed roof runoff with the Cultec® infiltration field, the peak discharge rates will be mitigated as required. As discussed above, only the portion of the site that is being impacted as a part of this project is being analyzed. Existing and proposed watershed area figures are included as appendices to this report. As shown above, the proposed design reduces the peak discharge rate and runoff volume in all storm events. Therefore, the project complies with this standard.

PEAK DISCHARGE COMPARISON

	2-year (3.0")		10-Year (4.50")		25-Year (5.30")		100-Year (6.50")	
	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)	Rate (cfs)	Volume (af)
Existing	0.61	0.044	1.27	0.09	1.64	0.117	2.22	0.158
Proposed	0.25	0.02	0.63	0.046	0.86	0.069	1.23	0.107

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized using environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type.

The project proposes infiltration chambers to provide storage and infiltration of runoff produced by the proposed building. The chamber field provides static volume of 1,450 CF below the inlet elevation. By doing this, the project significantly exceeds the required volume and meets the standard. The required volume calculation is shown below.

REQUIRED RECHARGE VOLUME	
Total Impervious (sf)	6,780
Required Depth Factor (in)	0.35
Required Recharge Volume (cf)	198

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

The project proposed to capture up to the 25-year storm of roof runoff with only the 100-year storm needed the overflow relief. No other impervious surface is proposed as a part of this project and therefor no further treatment of runoff is required.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The project will not result in a land-use with higher potential pollutant loads. Therefore, this standard is not applicable.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

This standard does not apply because there are no critical areas in this project area. An image demonstrating this from Massachusetts GIS tool "MassMapper" is included as an Appendix A to this report. Therefore, the project complies with this standard.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standard 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The project is not considered a redevelopment project.

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities shall be developed and implemented.

A construction period pollution prevention plan has been provided for the project in appendix F. Therefore, the project complies with this standard.

Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An Operation & Maintenance Plan is included in Appendix G. Therefore, the project complies with this standard.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

There will be no illicit discharges to the stormwater management system resulting from this project. Therefore, the project complies with this standard. An illicit discharge statement is attached in Appendix H.

Conclusion

In conclusion, the proposed project 357 Sterling Street in Lancaster, MA will not adversely change existing flow patterns while meeting necessary requirements of the Town of Lancaster and Massachusetts Stormwater Management Policies.

Please feel free to contact me at 978-257-3423 or brendan@gobobrek.com should you have any questions on the information discussed above.

Sincerely,
Bobrek Engineering & Construction, LLC

Brendan Pyburn

Brendan Pyburn, P.E.
Vice President

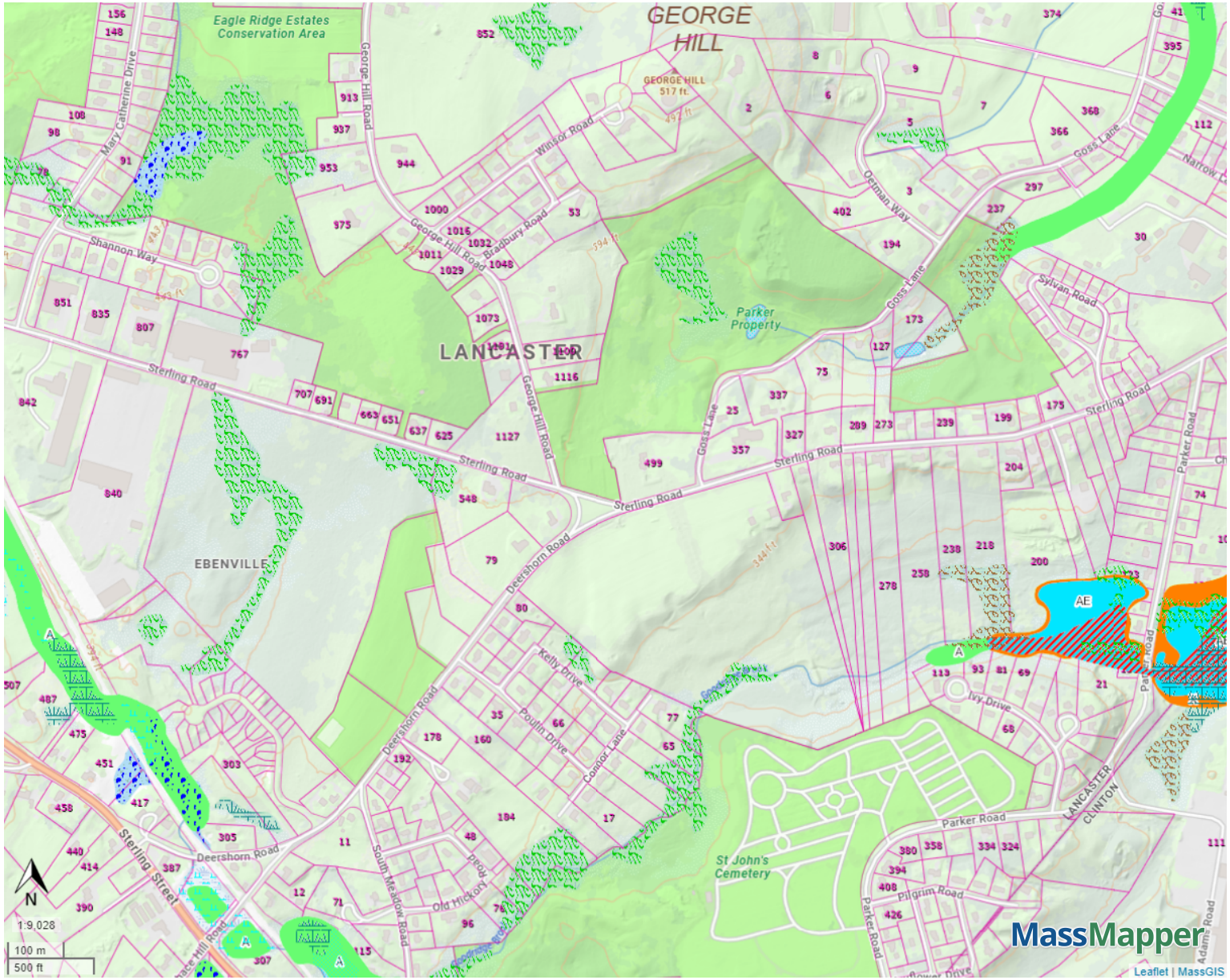
Attachments:

- Appendix A: Site Maps
  - Mass Mapper
  - Soils Map
- Appendix B: Civil Site Plans
- Appendix C: Existing Hydrology
- Appendix D: Proposed Hydrology
- Appendix E: Construction Period Pollution Prevention Plan
- Appendix F: Operation & Maintenance Plan

Appendix A – Site Maps

Mass Mapper
NRCS Soils Map

357 Sterling Road



DEP Wetlands Detailed

- Barrier Beach System
- Barrier Beach-Deep Marsh
- Barrier Beach-Wooded Swamp Mixed Trees
- Barrier Beach-Coastal Beach
- Barrier Beach-Coastal Dune
- Barrier Beach-Marsh
- Barrier Beach-Salt Marsh
- Barrier Beach-Shrub Swamp
- Barrier Beach-Wooded Swamp Coniferous
- Barrier Beach-Wooded Swamp Deciduous
- Bog
- Coastal Bank Bluff or Sea Cliff
- Coastal Beach
- Coastal Dune
- Cranberry Bog
- Deep Marsh
- Barrier Beach-Open Water
- Open Water
- Rocky Intertidal Shore
- Salt Marsh
- Shallow Marsh Meadow or Fen
- Shrub Swamp
- Tidal Flat
- Wooded Swamp Coniferous
- Wooded Swamp Deciduous
- Wooded Swamp Mixed Trees

IWPAs

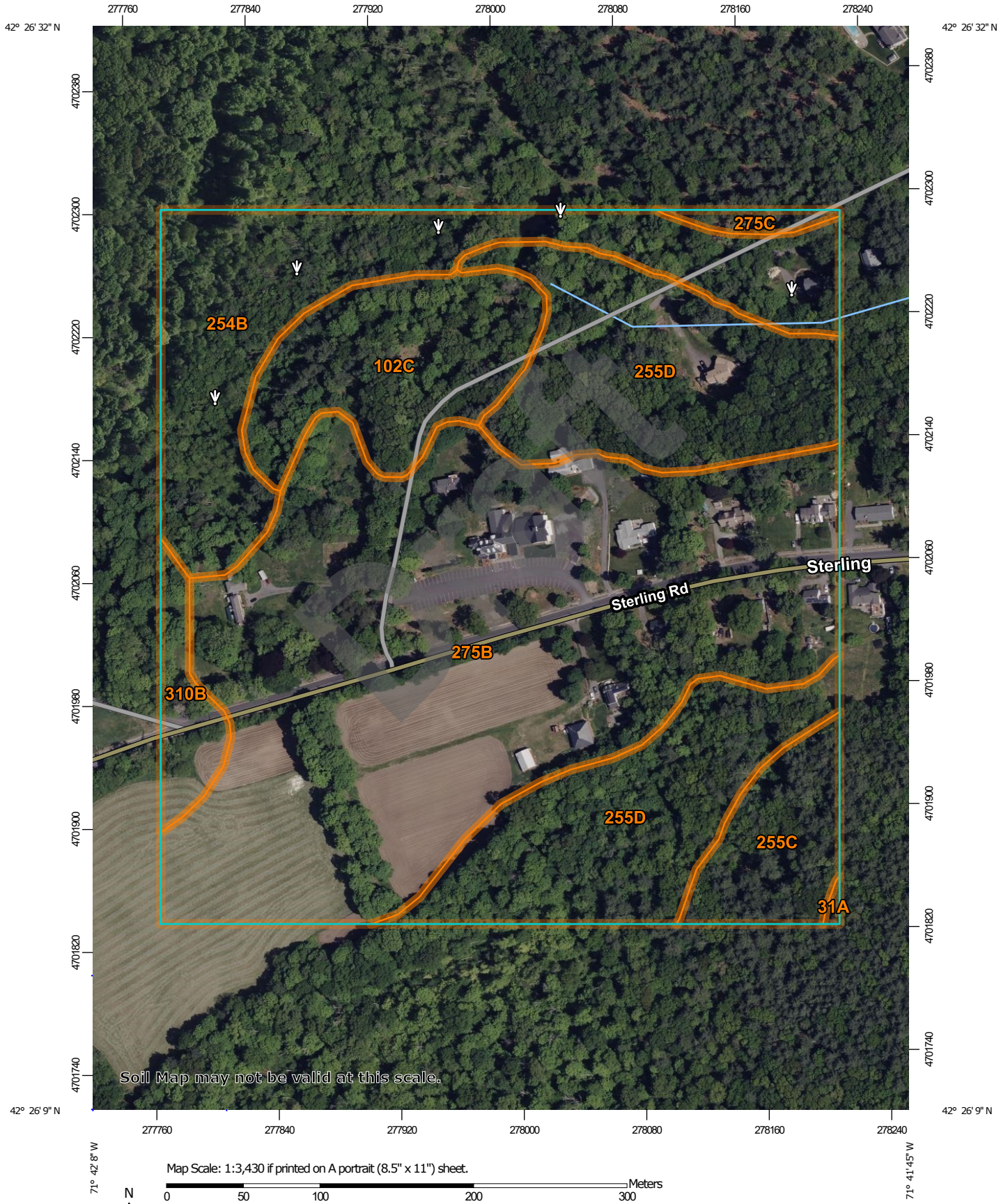
NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

FEMA National Flood Hazard Layer

Property Tax Parcels

Soil Map—Worcester County, Massachusetts, Northeastern Part
(357 Sterling Road)



Map Scale: 1:3,430 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Worcester County, Massachusetts, Northeastern Part
Survey Area Data: Version 17, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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
31A	Walpole sandy loam, 0 to 3 percent slopes	0.1	0.1%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	4.4	8.6%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	8.0	15.6%
255C	Windsor loamy sand, 8 to 15 percent slopes	2.3	4.4%
255D	Windsor loamy sand, 15 to 25 percent slopes	11.6	22.6%
275B	Agawam fine sandy loam, 3 to 8 percent slopes	23.3	45.6%
275C	Agawam fine sandy loam, 8 to 15 percent slopes	0.3	0.7%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	1.2	2.3%
Totals for Area of Interest		**51.1**	**100.0%**

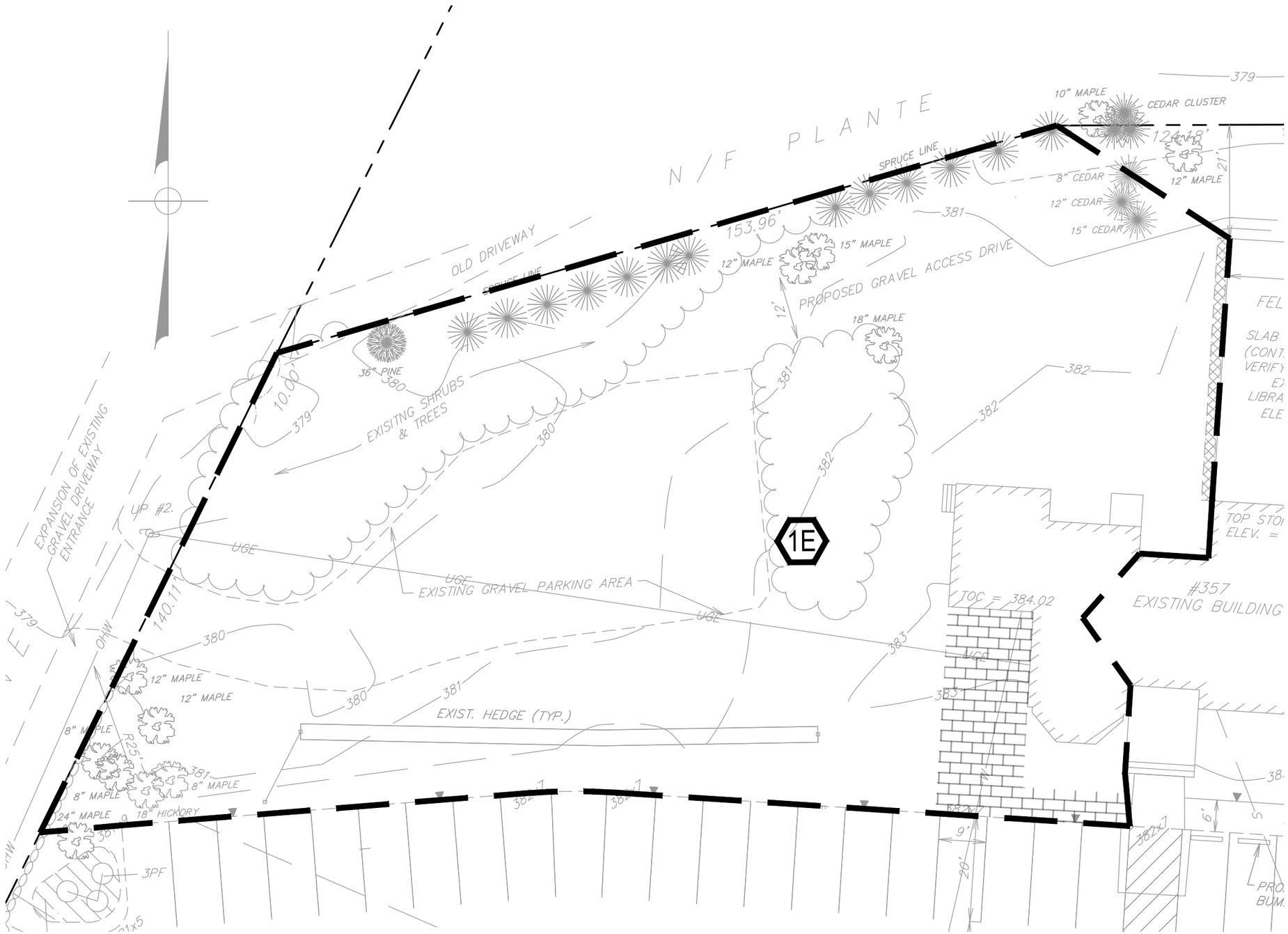
Appendix B – Civil Site Plans

Appendix C – Existing Hydrology

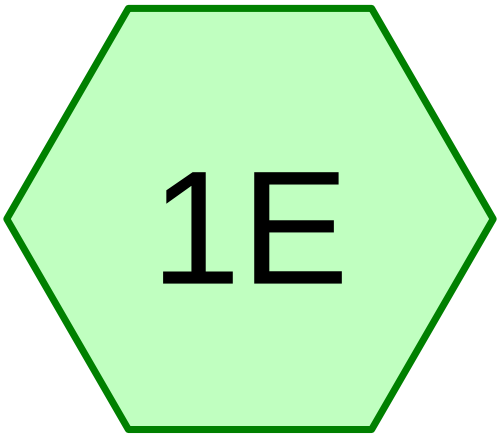
LEGEND

EXISTING CATCHMENT AREA

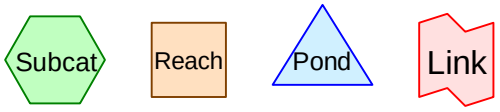
1E EXISTING SUBCATCHMENT



BOBREK Engineering & Construction					*357 STERLING ROAD LANCASTER, MA*	DATE: JUNE 2023	*EXISTING CATCHMENT AREAS*
						SCALE: 1"=20'	
						DR. BY: BTP	
						CHK. BY: JPB	
	REV. No.	DESCRIPTION	DATE	STAMP		PROJECT No.: 23-004	



Existing Subcatchment



Routing Diagram for 23-004 HYD
Prepared by {enter your company name here}, Printed 6/19/2023
HydroCAD® 10.00-26 s/n 10180 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 1E: Existing Subcatchment

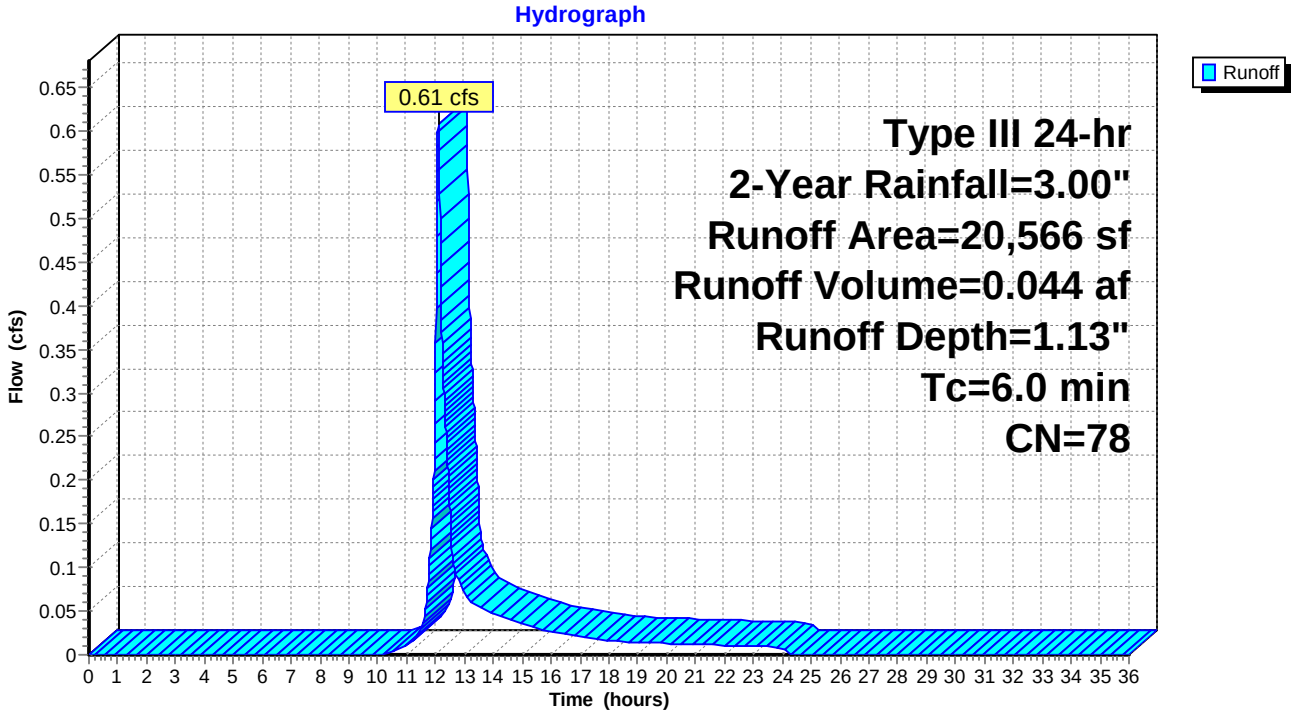
Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,042	98	Roofs, HSG B
5,576	96	Gravel surface, HSG B
13,948	69	50-75% Grass cover, Fair, HSG B
20,566	78	Weighted Average
19,524		94.93% Pervious Area
1,042		5.07% Impervious Area

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

Subcatchment 1E: Existing Subcatchment



Summary for Subcatchment 1E: Existing Subcatchment

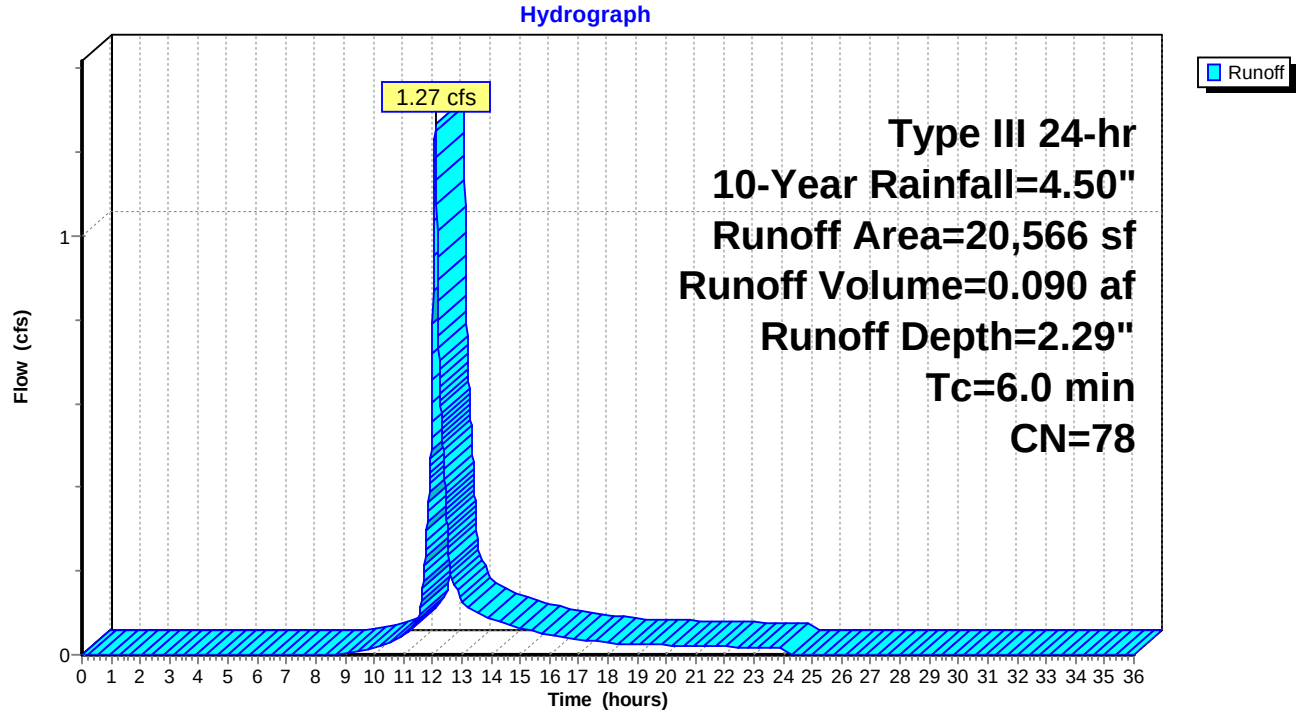
Runoff = 1.27 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,042	98	Roofs, HSG B
5,576	96	Gravel surface, HSG B
13,948	69	50-75% Grass cover, Fair, HSG B
20,566	78	Weighted Average
19,524		94.93% Pervious Area
1,042		5.07% Impervious Area

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

Subcatchment 1E: Existing Subcatchment



Summary for Subcatchment 1E: Existing Subcatchment

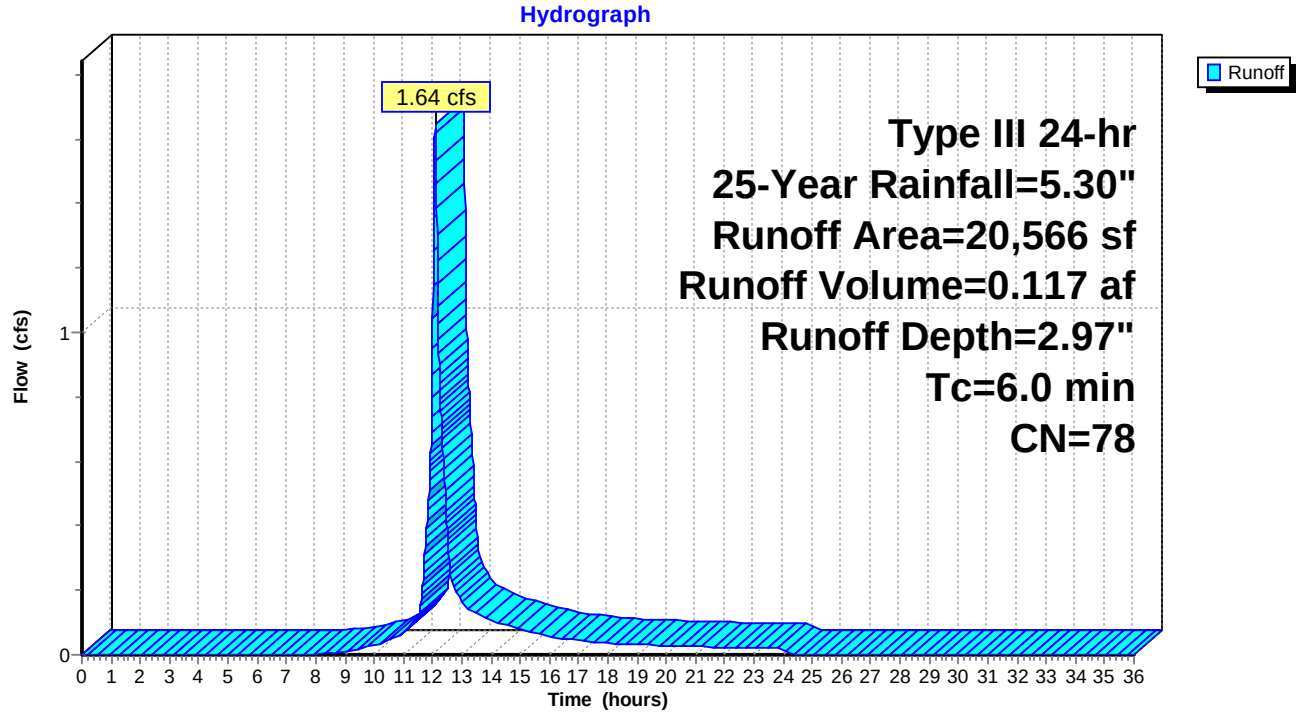
Runoff = 1.64 cfs @ 12.09 hrs, Volume= 0.117 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,042	98	Roofs, HSG B
5,576	96	Gravel surface, HSG B
13,948	69	50-75% Grass cover, Fair, HSG B
20,566	78	Weighted Average
19,524		94.93% Pervious Area
1,042		5.07% Impervious Area

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

Subcatchment 1E: Existing Subcatchment



Summary for Subcatchment 1E: Existing Subcatchment

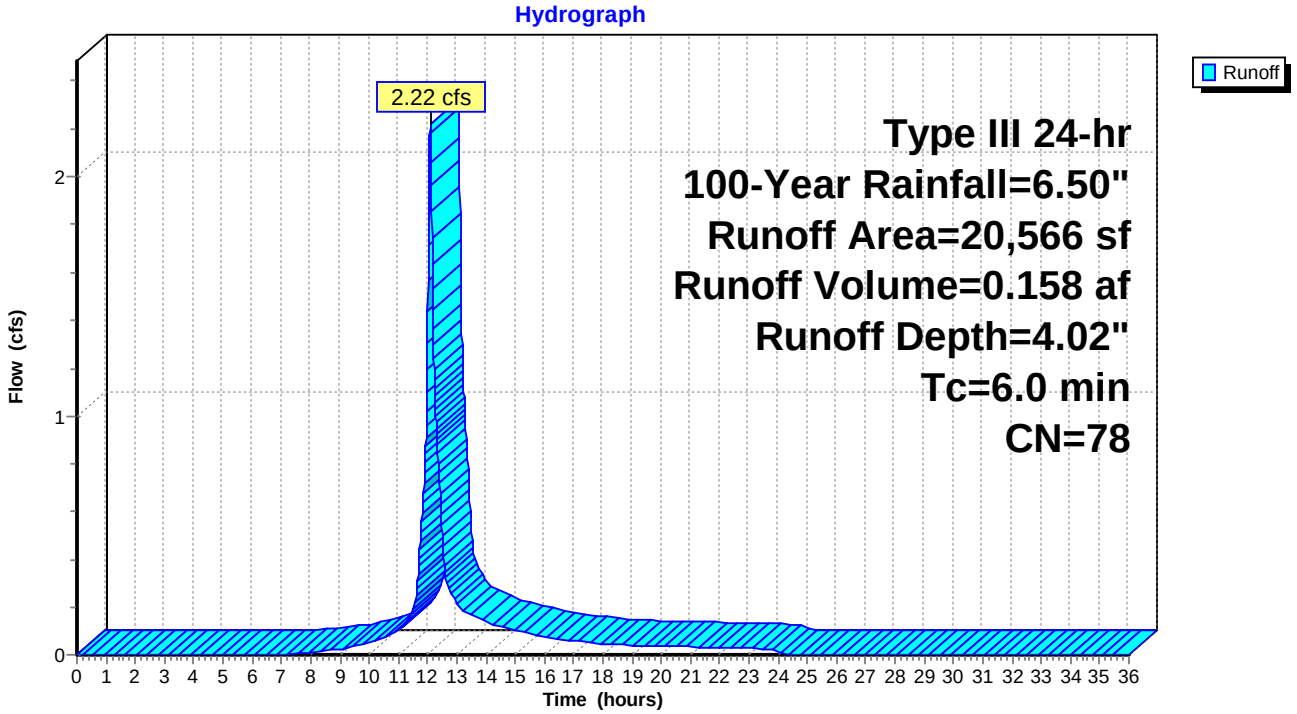
Runoff = 2.22 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,042	98	Roofs, HSG B
5,576	96	Gravel surface, HSG B
13,948	69	50-75% Grass cover, Fair, HSG B
20,566	78	Weighted Average
19,524		94.93% Pervious Area
1,042		5.07% Impervious Area

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

Subcatchment 1E: Existing Subcatchment

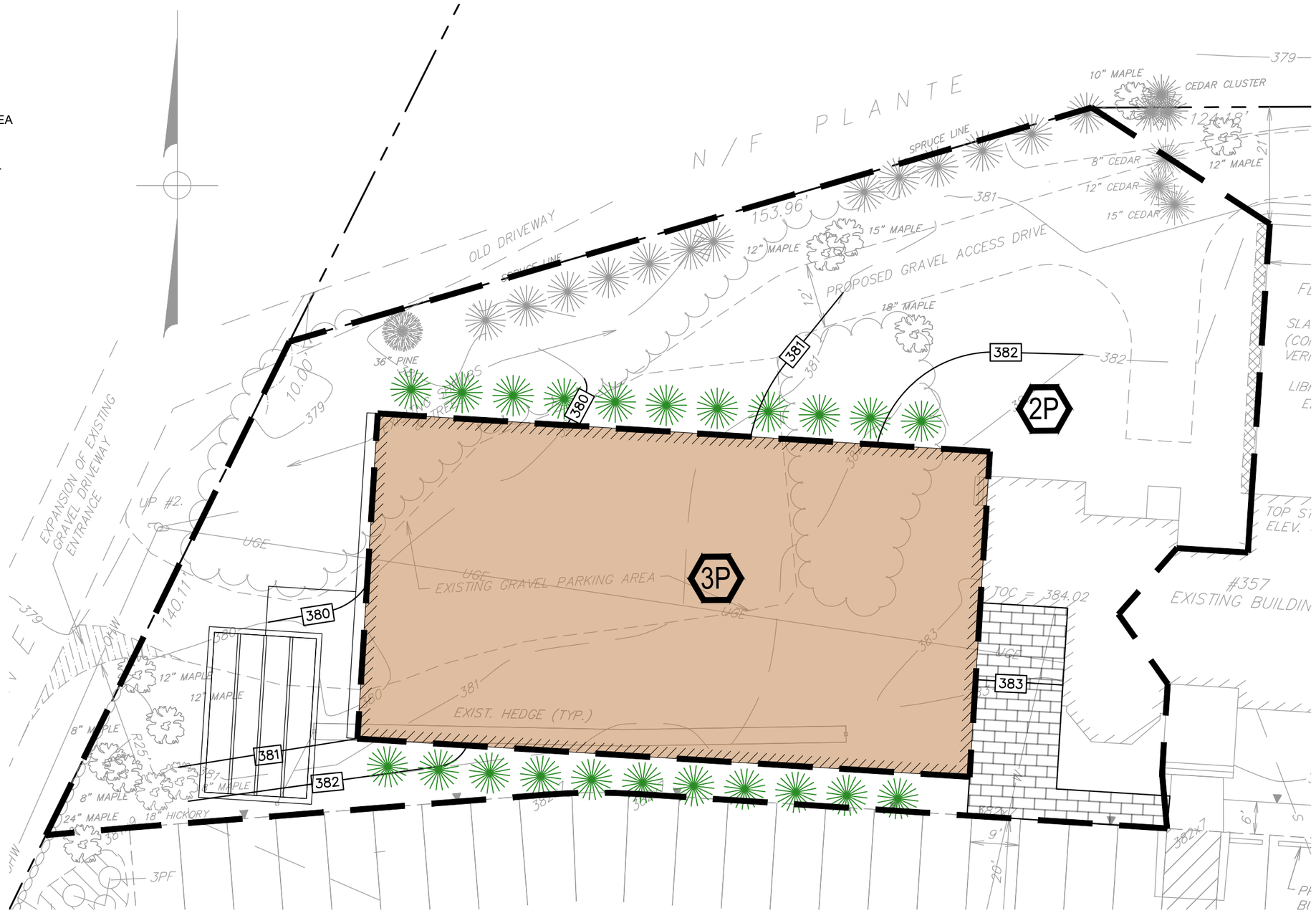


Appendix D – Proposed Hydrology

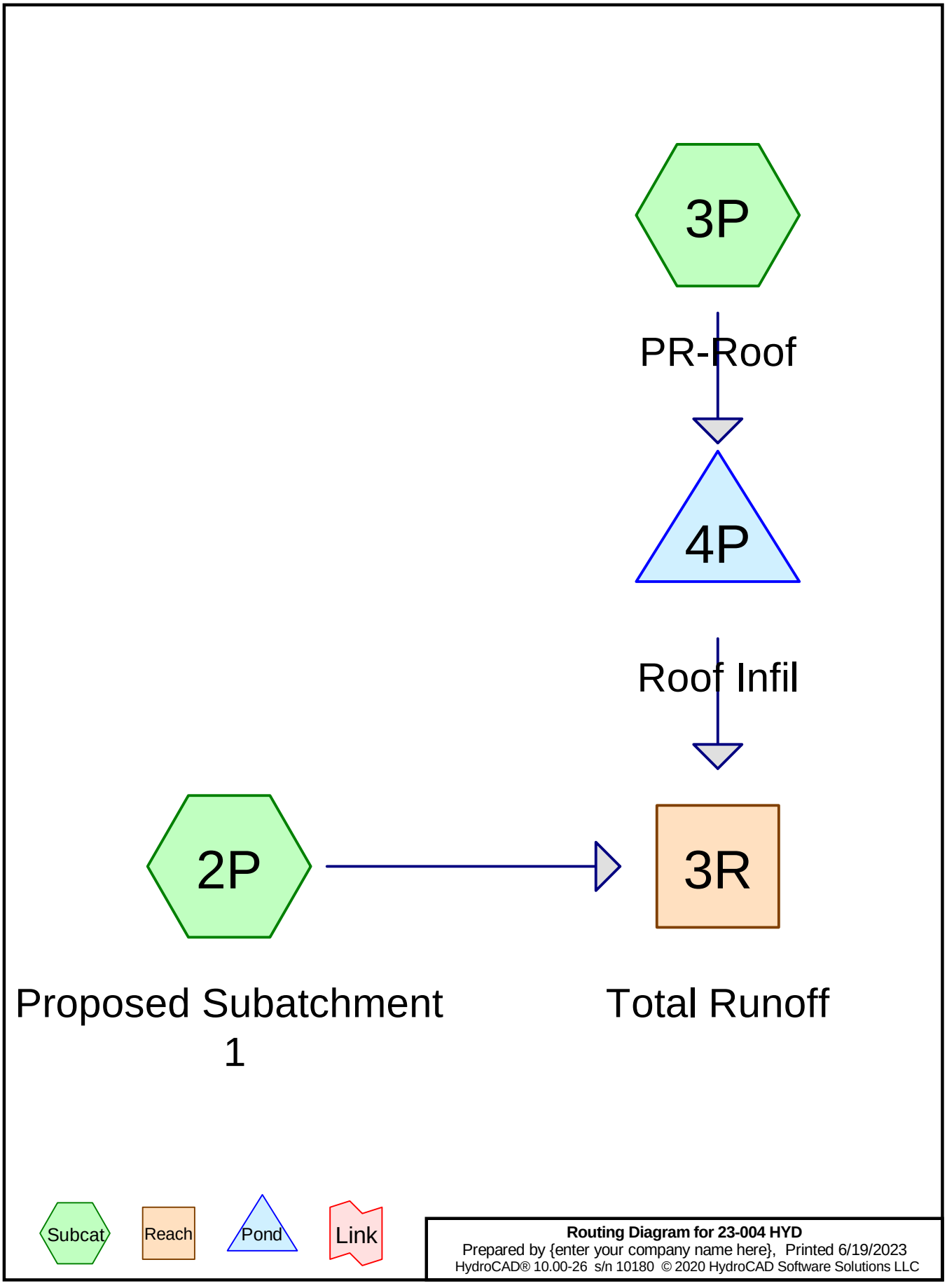
LEGEND

PROPOSED CATCHMENT AREA

1P PROPOSED SUBCATCHMENT



BOBREK Engineering & Construction				357 STERLING ROAD LANCASTER, MA	DATE: JUNE 2023 SCALE: 1"=20' DR. BY: BTP CHK. BY: JPB PROJECT No.: 23-004	N	PROPOSED CATCHMENT AREAS
	REV. No.	DESCRIPTION	DATE	STAMP			



Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.221	61	>75% Grass cover, Good, HSG B (2P)
0.051	96	Gravel surface, HSG B (2P)
0.017	75	Pavers (2P)
0.182	98	Roofs, HSG B (2P, 3P)

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.455	HSG B	2P, 3P
0.000	HSG C	
0.000	HSG D	
0.017	Other	2P

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.221	0.000	0.000	0.000	0.221	>75% Grass cover, Good	2P
0.000	0.051	0.000	0.000	0.000	0.051	Gravel surface	2P
0.000	0.000	0.000	0.000	0.017	0.017	Pavers	2P
0.000	0.182	0.000	0.000	0.000	0.182	Roofs	2P, 3P

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 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 2P: Proposed Subatchment 1 Runoff Area=13,786 sf 8.47% Impervious Runoff Depth=0.76"
Tc=6.0 min CN=71 Runoff=0.25 cfs 0.020 af

Subcatchment 3P: PR-Roof Runoff Area=6,780 sf 100.00% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=98 Runoff=0.45 cfs 0.036 af

Reach 3R: Total Runoff Inflow=0.25 cfs 0.020 af
Outflow=0.25 cfs 0.020 af

Pond 4P: Roof Infil Peak Elev=377.12' Storage=854 cf Inflow=0.45 cfs 0.036 af
Discarded=0.02 cfs 0.036 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.036 af

Summary for Subcatchment 2P: Proposed Subatchment 1

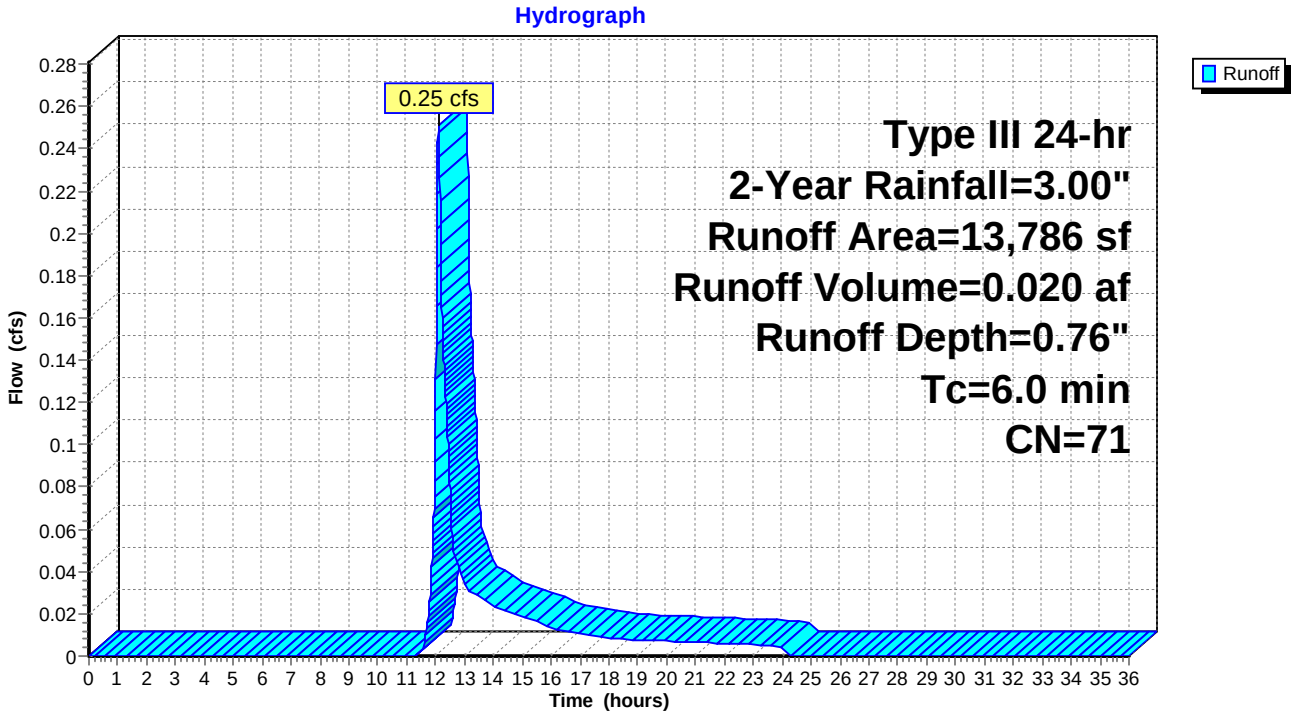
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	760	75	Pavers
	1,167	98	Roofs, HSG B
	2,224	96	Gravel surface, HSG B
	9,635	61	>75% Grass cover, Good, HSG B
	13,786	71	Weighted Average
	12,619		91.53% Pervious Area
	1,167		8.47% Impervious Area

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

Subcatchment 2P: Proposed Subatchment 1



Summary for Subcatchment 3P: PR-Roof

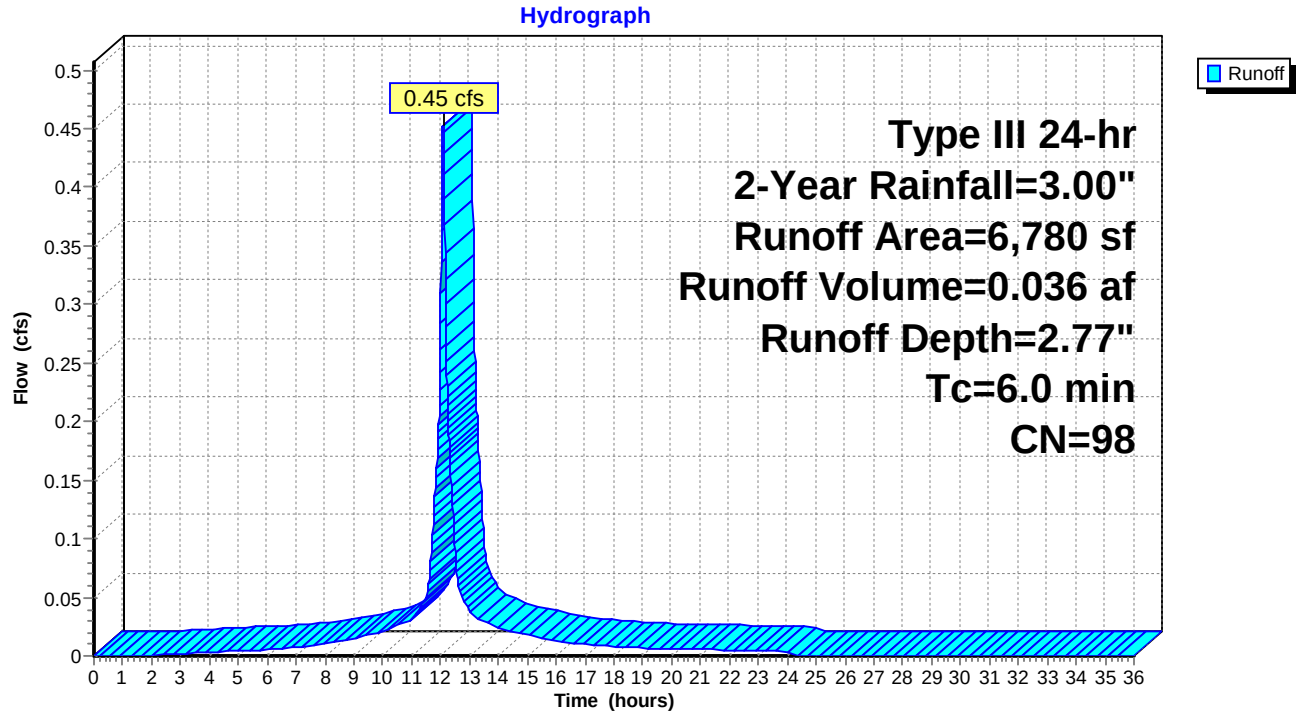
Runoff = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
6,780	98	Roofs, HSG B
6,780		100.00% Impervious Area

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

Subcatchment 3P: PR-Roof

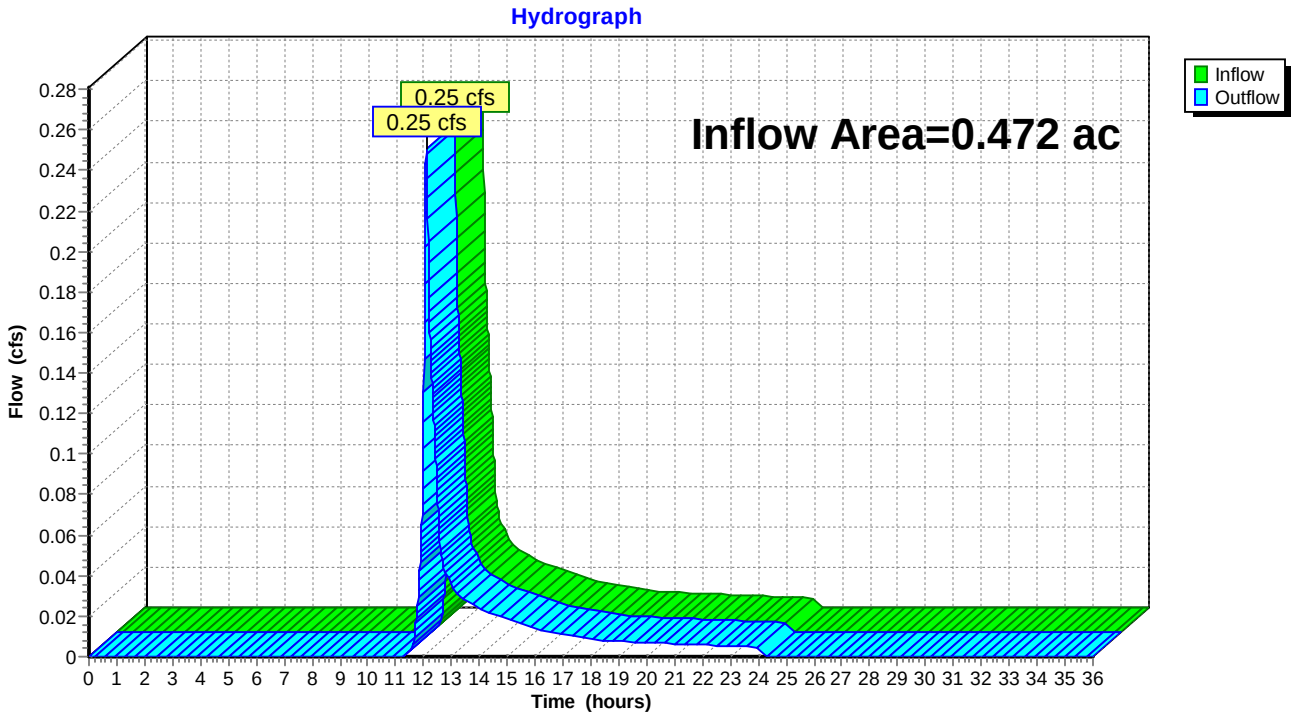


Summary for Reach 3R: Total Runoff

Inflow Area = 0.472 ac, 38.64% Impervious, Inflow Depth = 0.51" for 2-Year event
Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.020 af
Outflow = 0.25 cfs @ 12.10 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 3R: Total Runoff



Summary for Pond 4P: Roof Infil

Inflow Area = 0.156 ac,100.00% Impervious, Inflow Depth = 2.77" for 2-Year event
Inflow = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af
Outflow = 0.02 cfs @ 9.39 hrs, Volume= 0.036 af, Atten= 97%, Lag= 0.0 min
Discarded = 0.02 cfs @ 9.39 hrs, Volume= 0.036 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 377.12' @ 15.48 hrs Surf.Area= 656 sf Storage= 854 cf

Plug-Flow detention time= 482.8 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 482.8 min (1,240.6 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	375.00'	709 cf	**20.83'W x 31.50'L x 4.04'H Field A** 2,652 cf Overall - 879 cf Embedded = 1,773 cf x 40.0% Voids
#2A	376.00'	879 cf	**Cultec R-330XLHD** x 16 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
#3	378.50'	2 cf	**4.0" Round Pipe Storage** -Impervious L= 20.0' S= 0.1500 '/'
		1,590 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	375.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	381.50'	**3.0" W x 2.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 9.39 hrs HW=375.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=375.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Roof Infil - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

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

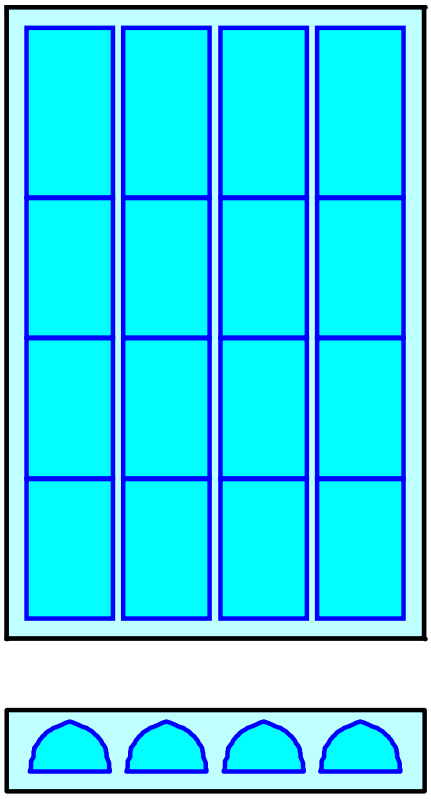
4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +12.0" End Stone x 2 = 31.50' Base Length
4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width
12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

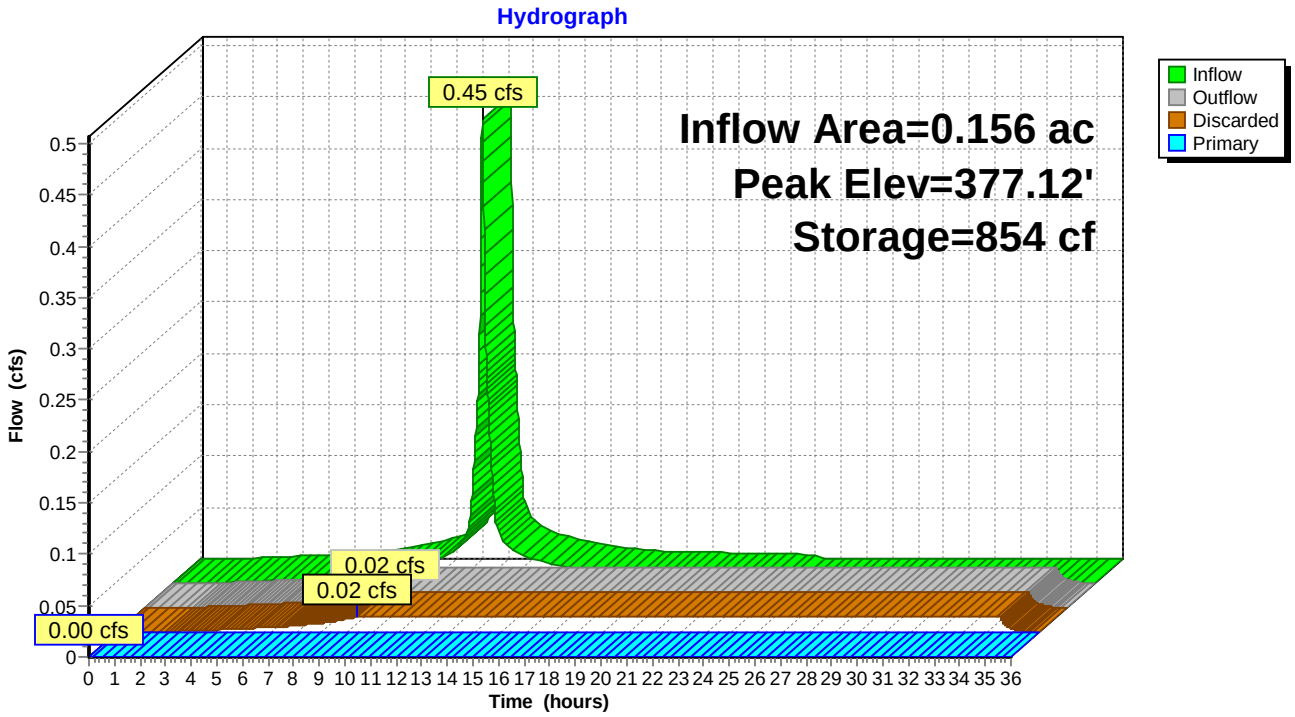
2,652.3 cf Field - 879.2 cf Chambers = 1,773.1 cf Stone x 40.0% Voids = 709.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,588.5 cf = 0.036 af
Overall Storage Efficiency = 59.9%
Overall System Size = 31.50' x 20.83' x 4.04'

16 Chambers
98.2 cy Field
65.7 cy Stone



Pond 4P: Roof Infil



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 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 2P: Proposed Subatchment 1 Runoff Area=13,786 sf 8.47% Impervious Runoff Depth=1.75"
Tc=6.0 min CN=71 Runoff=0.63 cfs 0.046 af

Subcatchment 3P: PR-Roof Runoff Area=6,780 sf 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.68 cfs 0.055 af

Reach 3R: Total Runoff Inflow=0.63 cfs 0.046 af
Outflow=0.63 cfs 0.046 af

Pond 4P: Roof Infil Peak Elev=378.74' Storage=1,509 cf Inflow=0.68 cfs 0.055 af
Discarded=0.02 cfs 0.040 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.040 af

Summary for Subcatchment 2P: Proposed Subatchment 1

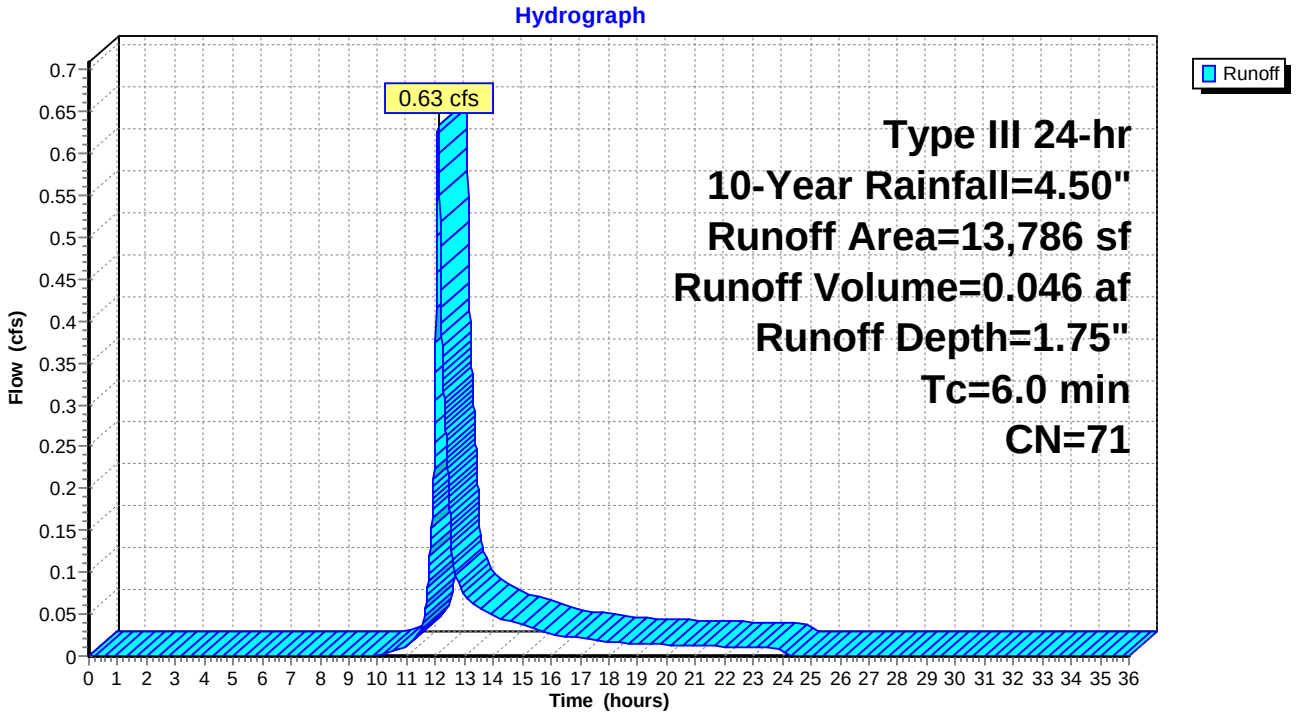
Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.046 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	760	75	Pavers
	1,167	98	Roofs, HSG B
	2,224	96	Gravel surface, HSG B
	9,635	61	>75% Grass cover, Good, HSG B
	13,786	71	Weighted Average
	12,619		91.53% Pervious Area
	1,167		8.47% Impervious Area

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

Subcatchment 2P: Proposed Subatchment 1



Summary for Subcatchment 3P: PR-Roof

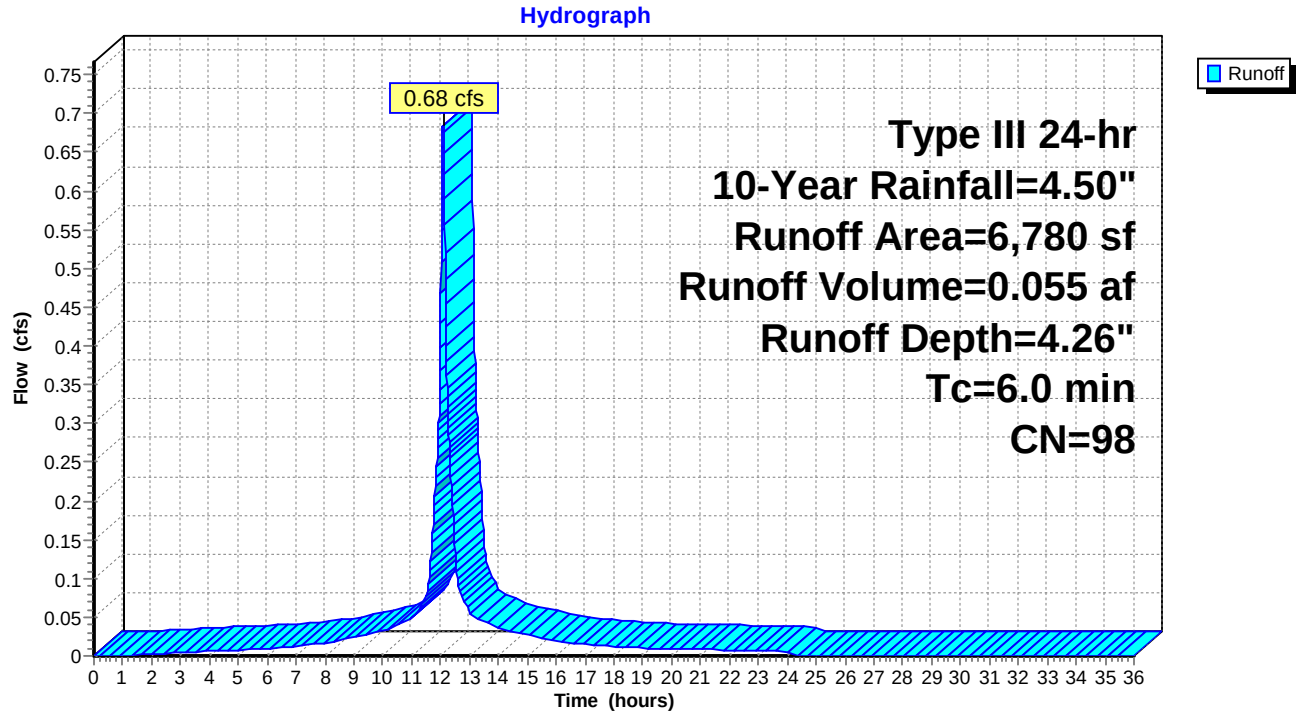
Runoff = 0.68 cfs @ 12.08 hrs, Volume= 0.055 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
6,780	98	Roofs, HSG B
6,780		100.00% Impervious Area

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

Subcatchment 3P: PR-Roof

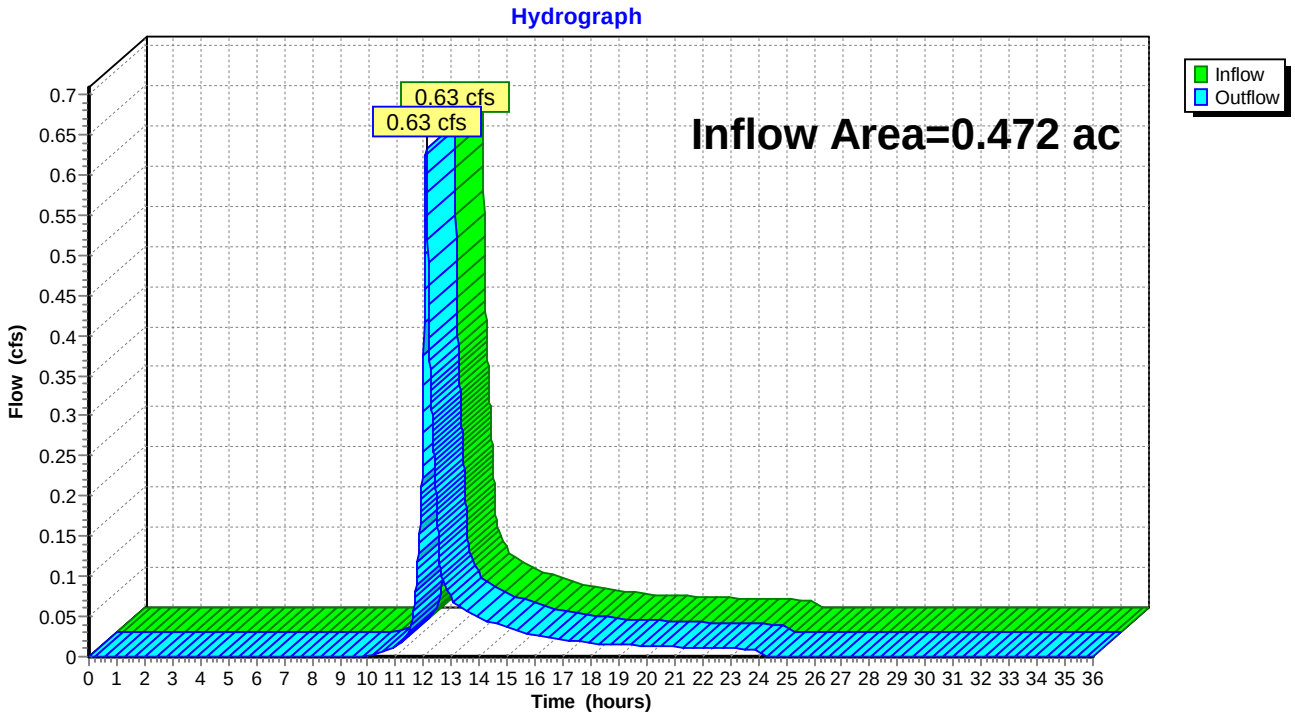


Summary for Reach 3R: Total Runoff

Inflow Area = 0.472 ac, 38.64% Impervious, Inflow Depth = 1.17" for 10-Year event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.046 af
Outflow = 0.63 cfs @ 12.09 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 3R: Total Runoff



Summary for Pond 4P: Roof Infil

Inflow Area = 0.156 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 0.68 cfs @ 12.08 hrs, Volume= 0.055 af
Outflow = 0.02 cfs @ 8.10 hrs, Volume= 0.040 af, Atten= 98%, Lag= 0.0 min
Discarded = 0.02 cfs @ 8.10 hrs, Volume= 0.040 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 378.74' @ 16.90 hrs Surf.Area= 656 sf Storage= 1,509 cf

Plug-Flow detention time= 570.5 min calculated for 0.040 af (72% of inflow)
Center-of-Mass det. time= 478.1 min (1,227.9 - 749.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	375.00'	709 cf	**20.83'W x 31.50'L x 4.04'H Field A** 2,652 cf Overall - 879 cf Embedded = 1,773 cf x 40.0% Voids
#2A	376.00'	879 cf	**Cultec R-330XLHD** x 16 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
#3	378.50'	2 cf	**4.0" Round Pipe Storage** -Impervious L= 20.0' S= 0.1500 '/'
		1,590 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	375.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	381.50'	**3.0" W x 2.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 8.10 hrs HW=375.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=375.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Roof Infil - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

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

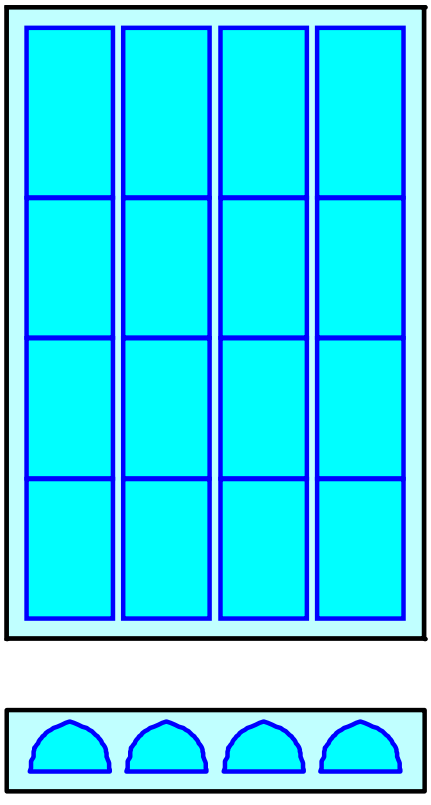
4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +12.0" End Stone x 2 = 31.50' Base Length
4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width
12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

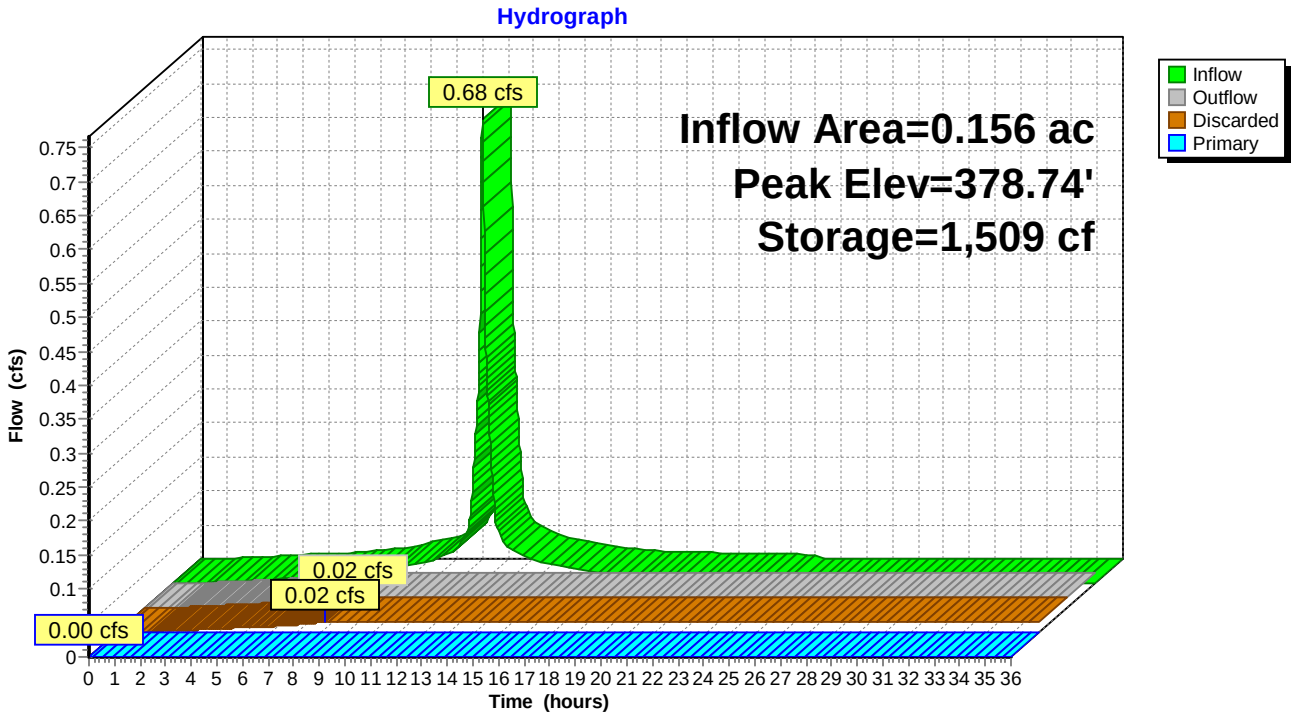
2,652.3 cf Field - 879.2 cf Chambers = 1,773.1 cf Stone x 40.0% Voids = 709.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,588.5 cf = 0.036 af
Overall Storage Efficiency = 59.9%
Overall System Size = 31.50' x 20.83' x 4.04'

16 Chambers
98.2 cy Field
65.7 cy Stone



Pond 4P: Roof Infil



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 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 2P: Proposed Subatchment 1 Runoff Area=13,786 sf 8.47% Impervious Runoff Depth=2.35"
Tc=6.0 min CN=71 Runoff=0.86 cfs 0.062 af

Subcatchment 3P: PR-Roof Runoff Area=6,780 sf 100.00% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=0.81 cfs 0.066 af

Reach 3R: Total Runoff Inflow=0.86 cfs 0.069 af
Outflow=0.86 cfs 0.069 af

Pond 4P: Roof Infil Peak Elev=381.67' Storage=1,590 cf Inflow=0.81 cfs 0.066 af
Discarded=0.02 cfs 0.041 af Primary=0.05 cfs 0.007 af Outflow=0.07 cfs 0.047 af

Summary for Subcatchment 2P: Proposed Subatchment 1

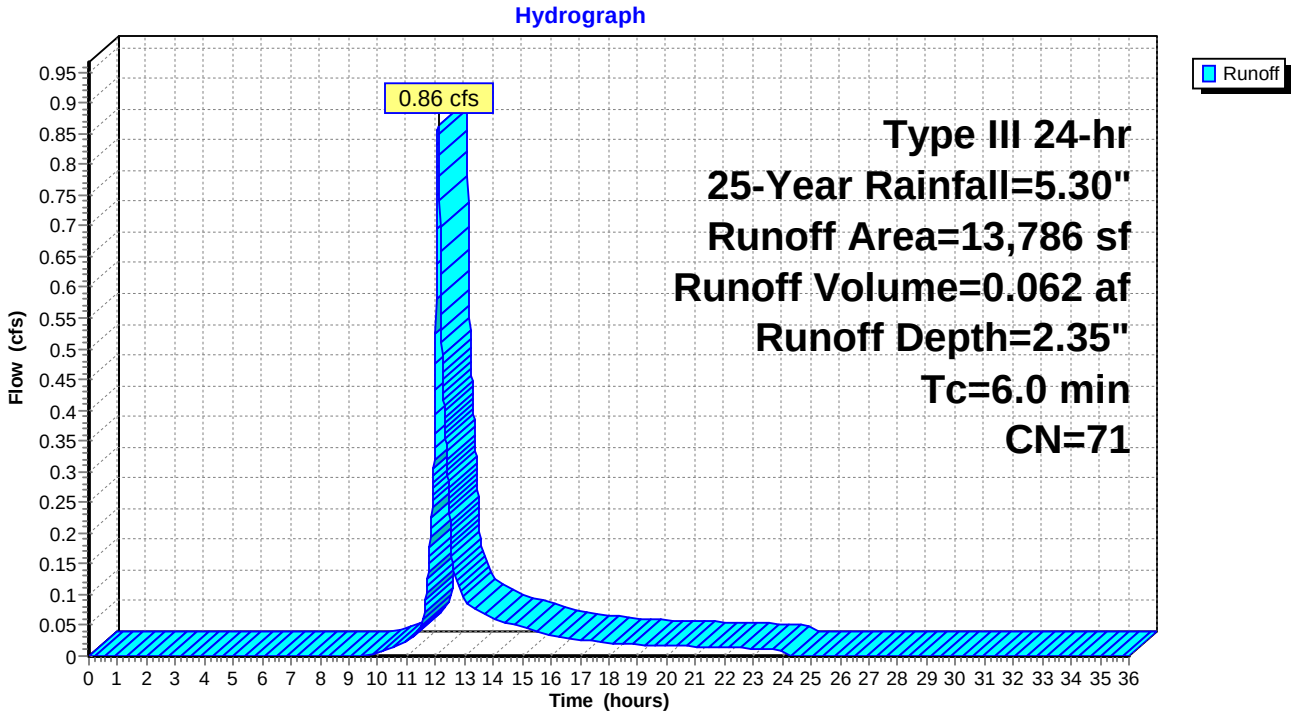
Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.062 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

	Area (sf)	CN	Description
*	760	75	Pavers
	1,167	98	Roofs, HSG B
	2,224	96	Gravel surface, HSG B
	9,635	61	>75% Grass cover, Good, HSG B
	13,786	71	Weighted Average
	12,619		91.53% Pervious Area
	1,167		8.47% Impervious Area

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

Subcatchment 2P: Proposed Subatchment 1



Summary for Subcatchment 3P: PR-Roof

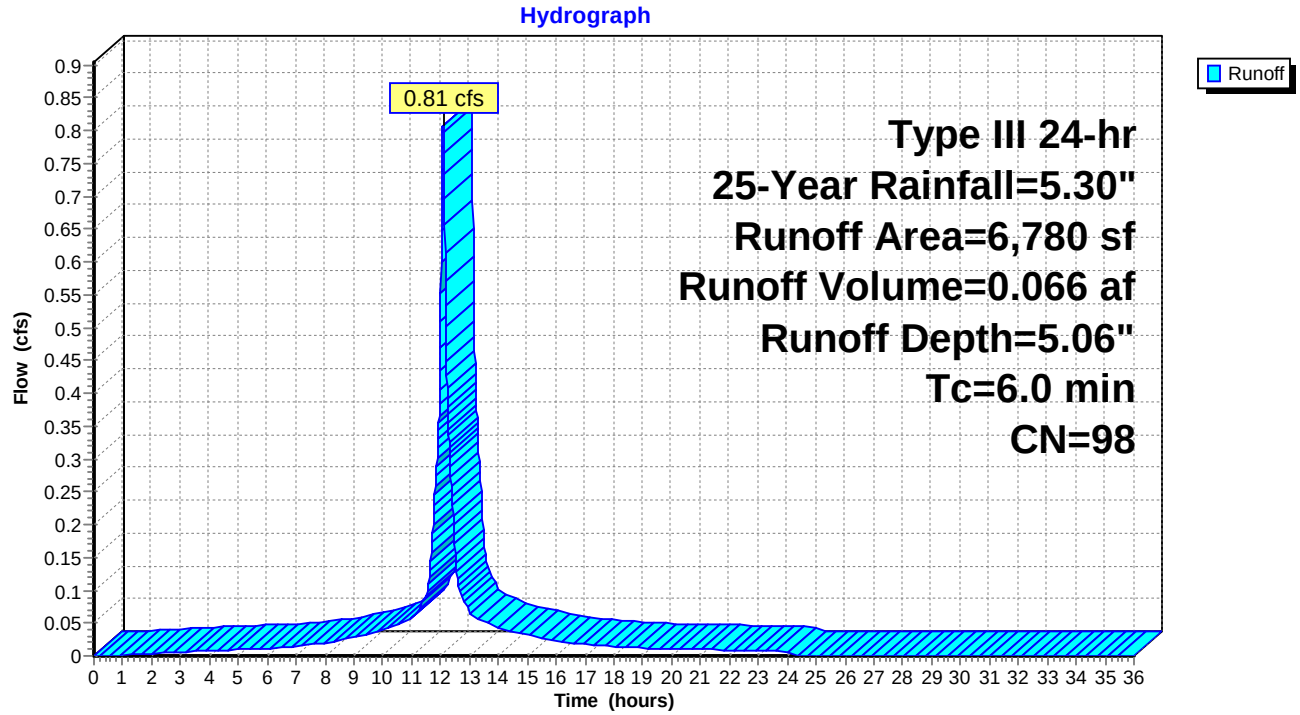
Runoff = 0.81 cfs @ 12.08 hrs, Volume= 0.066 af, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
6,780	98	Roofs, HSG B
6,780		100.00% Impervious Area

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

Subcatchment 3P: PR-Roof

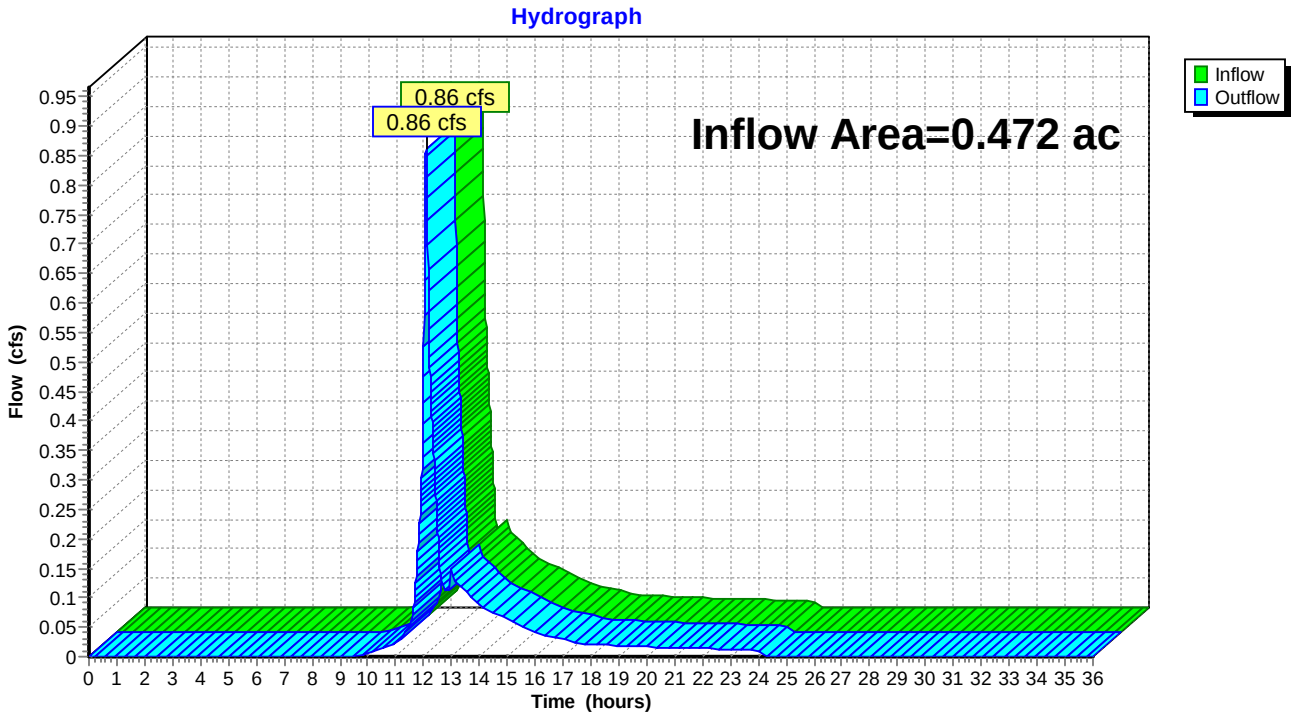


Summary for Reach 3R: Total Runoff

Inflow Area = 0.472 ac, 38.64% Impervious, Inflow Depth = 1.74" for 25-Year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.069 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 3R: Total Runoff



Summary for Pond 4P: Roof Infil

Inflow Area = 0.156 ac,100.00% Impervious, Inflow Depth = 5.06" for 25-Year event
Inflow = 0.81 cfs @ 12.08 hrs, Volume= 0.066 af
Outflow = 0.07 cfs @ 12.96 hrs, Volume= 0.047 af, Atten= 92%, Lag= 52.3 min
Discarded = 0.02 cfs @ 7.36 hrs, Volume= 0.041 af
Primary = 0.05 cfs @ 12.96 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 381.67' @ 12.96 hrs Surf.Area= 656 sf Storage= 1,590 cf

Plug-Flow detention time= 502.3 min calculated for 0.047 af (72% of inflow)
Center-of-Mass det. time= 410.0 min (1,157.0 - 747.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	375.00'	709 cf	**20.83'W x 31.50'L x 4.04'H Field A** 2,652 cf Overall - 879 cf Embedded = 1,773 cf x 40.0% Voids
#2A	376.00'	879 cf	**Cultec R-330XLHD** x 16 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
#3	378.50'	2 cf	**4.0" Round Pipe Storage** -Impervious L= 20.0' S= 0.1500 '/'
		1,590 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	375.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	381.50'	**3.0" W x 2.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 7.36 hrs HW=375.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.05 cfs @ 12.96 hrs HW=381.67' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.31 fps)

Pond 4P: Roof Infil - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

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

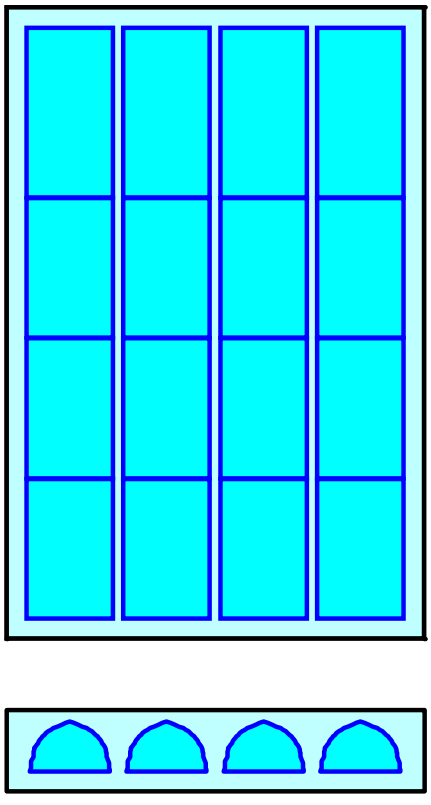
4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +12.0" End Stone x 2 = 31.50' Base Length
4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width
12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

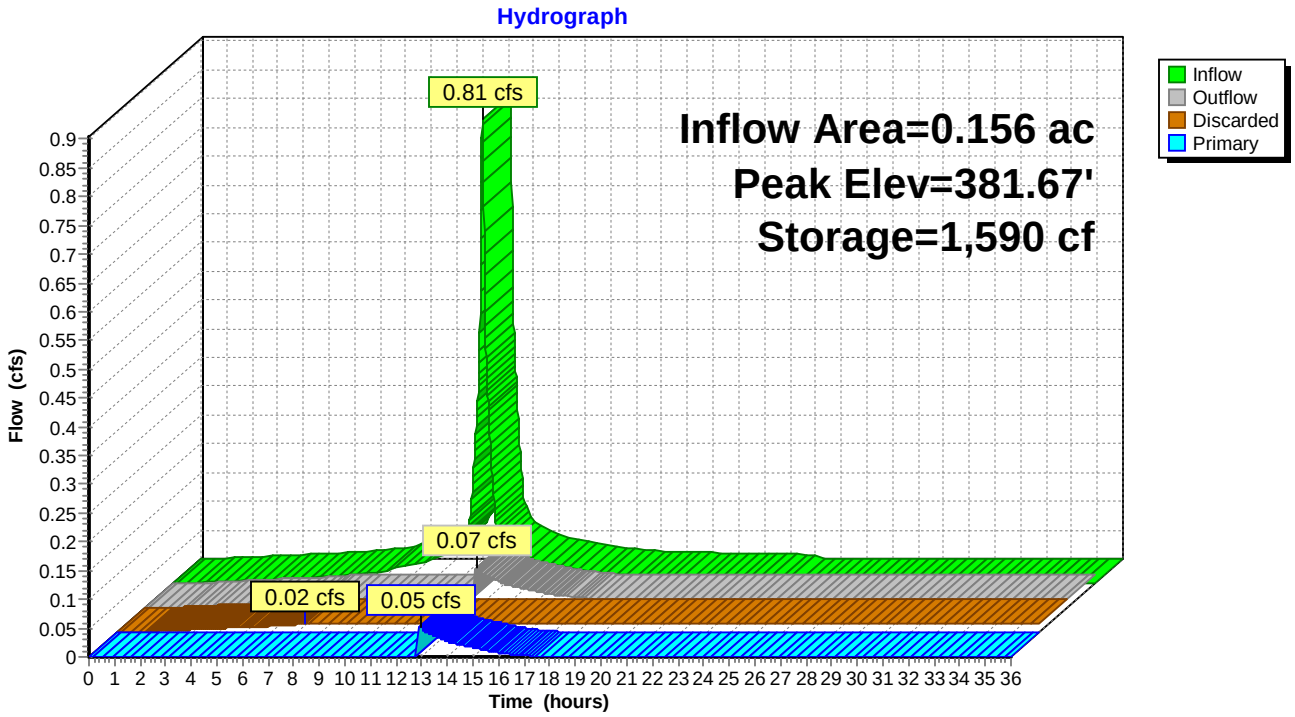
2,652.3 cf Field - 879.2 cf Chambers = 1,773.1 cf Stone x 40.0% Voids = 709.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,588.5 cf = 0.036 af
Overall Storage Efficiency = 59.9%
Overall System Size = 31.50' x 20.83' x 4.04'

16 Chambers
98.2 cy Field
65.7 cy Stone



Pond 4P: Roof Infil



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 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 2P: Proposed Subatchment 1 Runoff Area=13,786 sf 8.47% Impervious Runoff Depth=3.31"
Tc=6.0 min CN=71 Runoff=1.23 cfs 0.087 af

Subcatchment 3P: PR-Roof Runoff Area=6,780 sf 100.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=98 Runoff=0.99 cfs 0.081 af

Reach 3R: Total Runoff Inflow=1.23 cfs 0.107 af
Outflow=1.23 cfs 0.107 af

Pond 4P: Roof Infil Peak Elev=387.45' Storage=1,590 cf Inflow=0.99 cfs 0.081 af
Discarded=0.02 cfs 0.042 af Primary=0.50 cfs 0.020 af Outflow=0.52 cfs 0.062 af

Summary for Subcatchment 2P: Proposed Subatchment 1

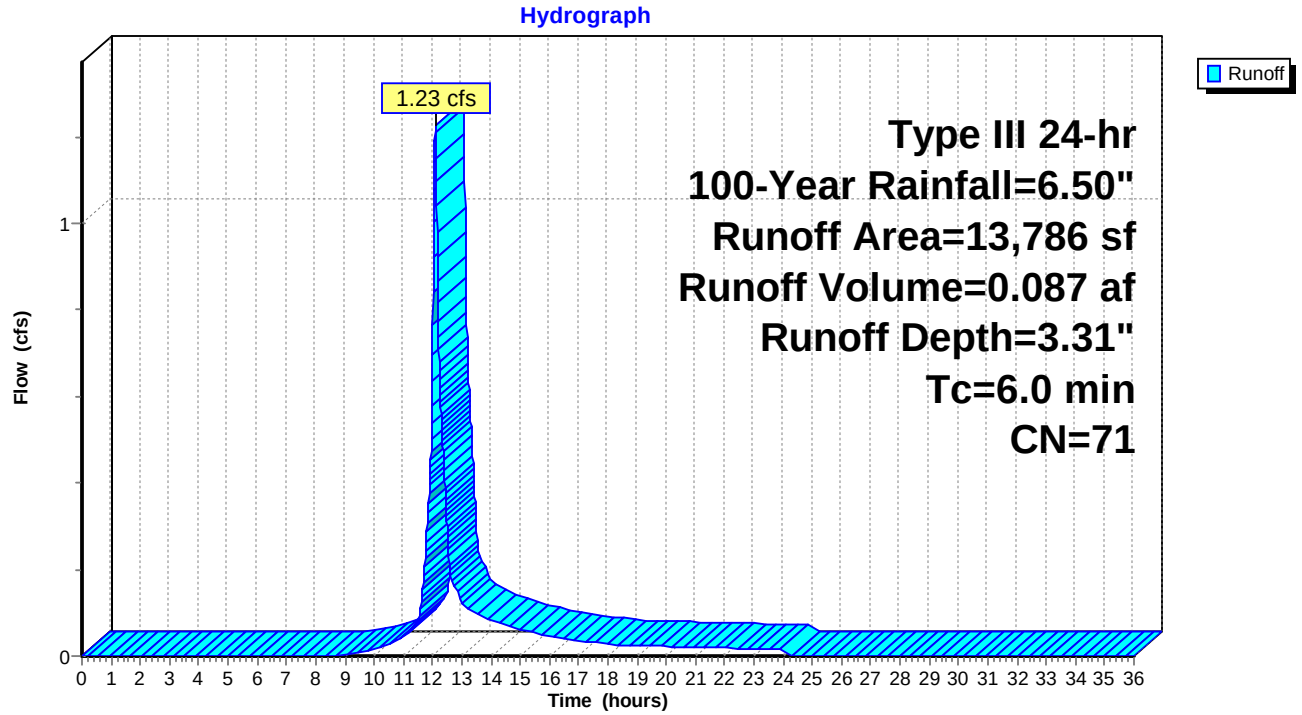
Runoff = 1.23 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

	Area (sf)	CN	Description
*	760	75	Pavers
	1,167	98	Roofs, HSG B
	2,224	96	Gravel surface, HSG B
	9,635	61	>75% Grass cover, Good, HSG B
	13,786	71	Weighted Average
	12,619		91.53% Pervious Area
	1,167		8.47% Impervious Area

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

Subcatchment 2P: Proposed Subatchment 1



Summary for Subcatchment 3P: PR-Roof

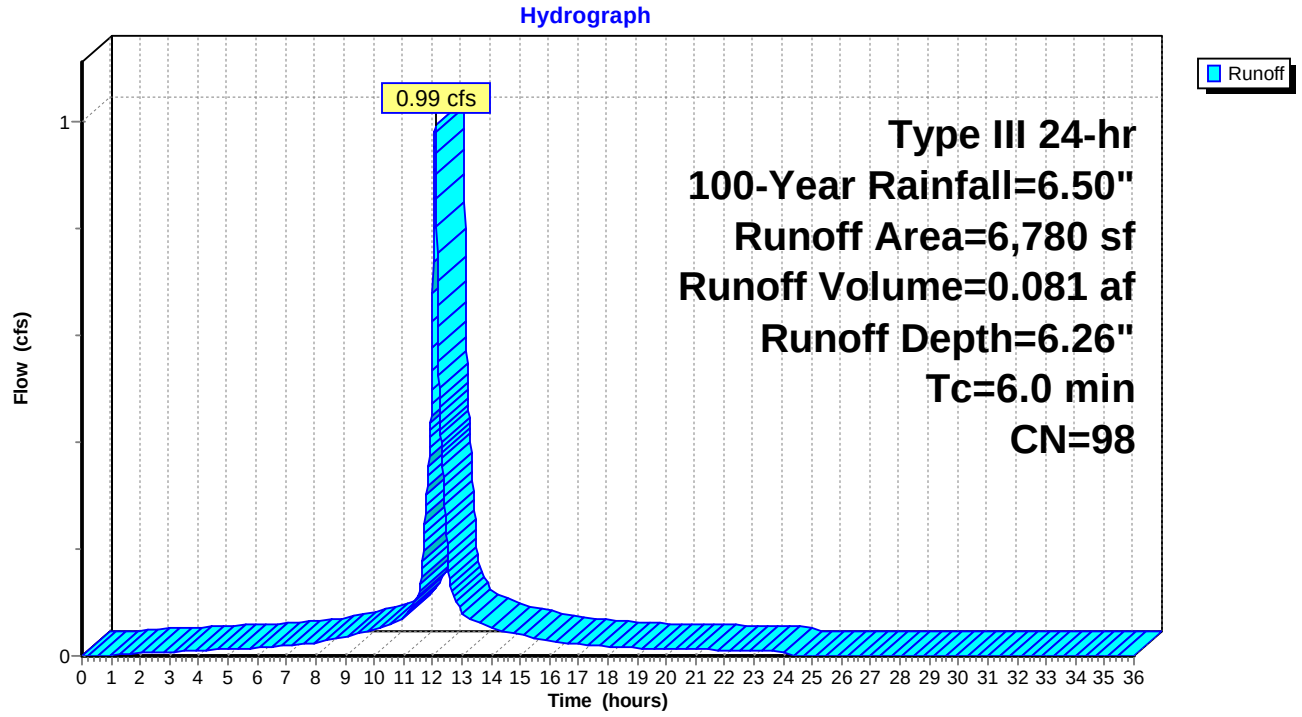
Runoff = 0.99 cfs @ 12.08 hrs, Volume= 0.081 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
6,780	98	Roofs, HSG B
6,780		100.00% Impervious Area

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

Subcatchment 3P: PR-Roof

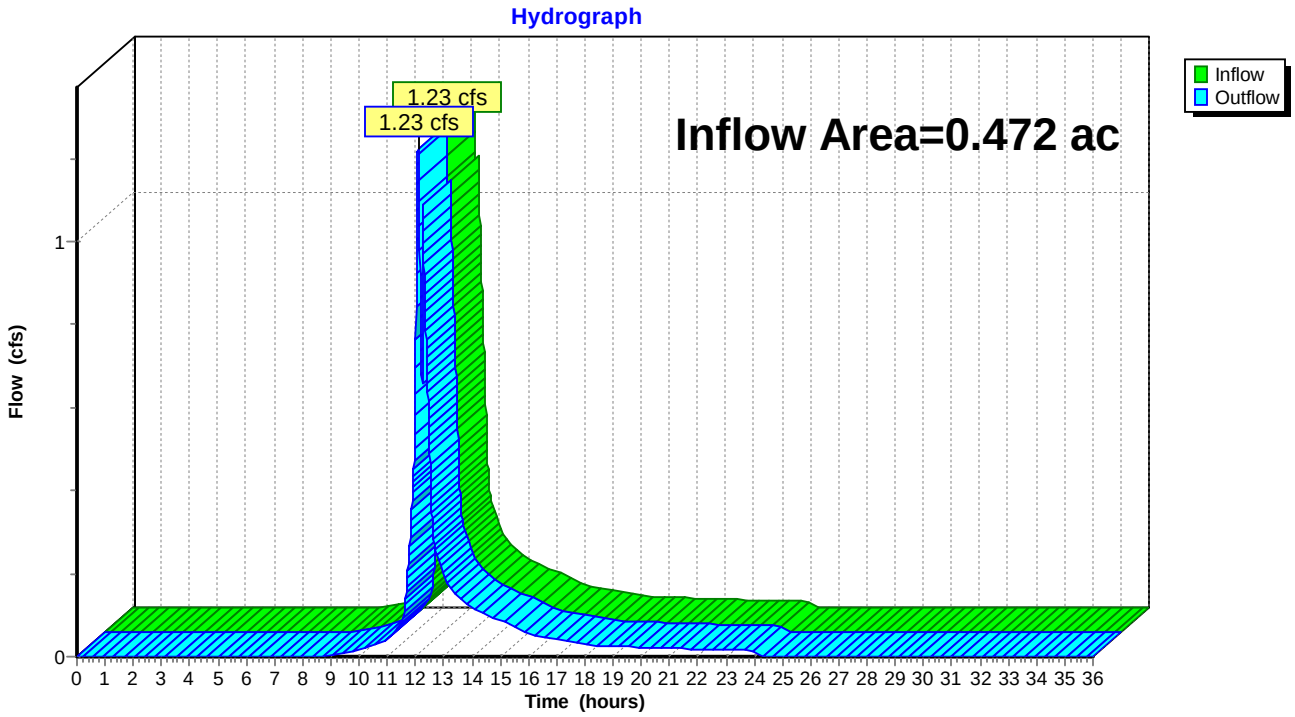


Summary for Reach 3R: Total Runoff

Inflow Area = 0.472 ac, 38.64% Impervious, Inflow Depth = 2.73" for 100-Year event
Inflow = 1.23 cfs @ 12.09 hrs, Volume= 0.107 af
Outflow = 1.23 cfs @ 12.09 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Reach 3R: Total Runoff



Summary for Pond 4P: Roof Infil

Inflow Area = 0.156 ac,100.00% Impervious, Inflow Depth = 6.26" for 100-Year event
Inflow = 0.99 cfs @ 12.08 hrs, Volume= 0.081 af
Outflow = 0.52 cfs @ 12.24 hrs, Volume= 0.062 af, Atten= 48%, Lag= 9.7 min
Discarded = 0.02 cfs @ 6.54 hrs, Volume= 0.042 af
Primary = 0.50 cfs @ 12.24 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 387.45' @ 12.24 hrs Surf.Area= 656 sf Storage= 1,590 cf

Plug-Flow detention time= 400.5 min calculated for 0.062 af (76% of inflow)
Center-of-Mass det. time= 314.7 min (1,058.7 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	375.00'	709 cf	**20.83'W x 31.50'L x 4.04'H Field A** 2,652 cf Overall - 879 cf Embedded = 1,773 cf x 40.0% Voids
#2A	376.00'	879 cf	**Cultec R-330XLHD** x 16 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
#3	378.50'	2 cf	**4.0" Round Pipe Storage** -Impervious L= 20.0' S= 0.1500 '/'
		1,590 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	375.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	381.50'	**3.0" W x 2.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.02 cfs @ 6.54 hrs HW=375.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.44 cfs @ 12.24 hrs HW=386.46' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.44 cfs @ 10.64 fps)

Pond 4P: Roof Infil - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

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

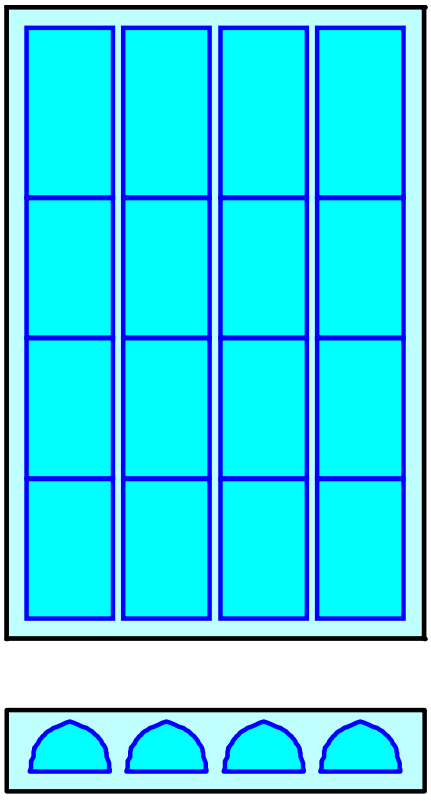
4 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 29.50' Row Length +12.0" End Stone x 2 = 31.50' Base Length
4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width
12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

16 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 879.2 cf Chamber Storage

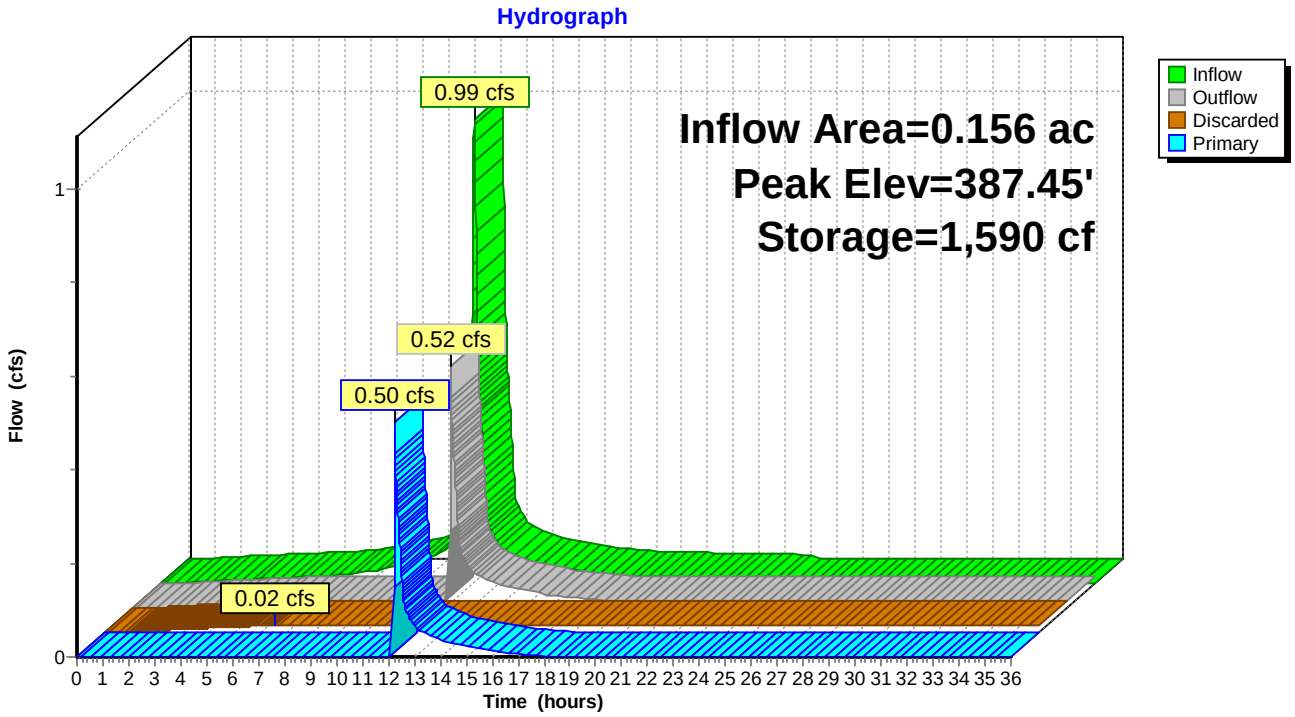
2,652.3 cf Field - 879.2 cf Chambers = 1,773.1 cf Stone x 40.0% Voids = 709.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,588.5 cf = 0.036 af
Overall Storage Efficiency = 59.9%
Overall System Size = 31.50' x 20.83' x 4.04'

16 Chambers
98.2 cy Field
65.7 cy Stone



Pond 4P: Roof Infil



Appendix E – Construction Period Pollution Prevention Plan

Construction Period Pollution Prevention and Erosion Control Plan
357 Sterling Road, Lancaster, MA

Introduction

This construction period pollution prevention and erosion control plan has been developed for this specific project to prevent negative impacts to abutting properties during construction of a new 113' x 60' gymnasium.

Construction Period Pollution Prevention Measures

The general contractor will implement best management practices (BMP's) prior to and during construction to prevent off-site discharges and reduce potential pollutants from entering the surrounding environment. The BMP's are designed to minimize construction impacts, stabilize disturbed areas, and retain sediment onsite, ensuring compliance with MassDEP Stormwater Standards regulations. The site work will be coordinated to minimize disturbances to the greatest extent possible. All stormwater management controls implemented at the project site shall comply with the standards established in the MassDEP Stormwater Policy Handbook.

Erosion and Sediment Control

Refer to the civil design drawings for Erosion and Sediment Control information. The erosion control for the construction includes a silt soxx erosion control along the downgradient property lines of the site.

Inspection and Maintenance of Erosion Controls

The contractor shall inspect the silt sack pursuant to the following:

- All control measures will be inspected at least once per week, and following any storm of 0.25 inches or greater, within a 24-hour time period.
- All measures will be maintained in good working order, and repairs as required will be initiated within 24-hours of report.
- Public roadways adjacent to the project site will be inspected daily. Accumulated sediments and other granular material tracked off-site shall be swept-up immediately.
- Temporary and permanent seeding will be inspected for bare spots, washouts, and poor growth. Said areas occurring will be re-established within 14 days.
- Temporary sediment removal devices will be inspected daily during construction dewatering process. Sediments will be cleaned out when sediment reaches 50% of total capacity volume or as recommended by the manufacturer. Sediments will be disposed of in an appropriate and legal location.
- A maintenance inspection report will be completed after each inspection.
- The qualified inspection personnel will be trained to maintain the erosion and sediment control measures used on-site in good working order.

Inspection and Maintenance Log

Inspection Date	Maintenance Required (Y or N)	Comments	Inspected By:

Appendix F – Operation & Maintenance Plan

Stormwater Management System Operation and Maintenance Plan
357 Sterling Road, Lancaster, MA

Introduction

This stormwater management system operations and maintenance plan has been developed for this specific project to address the long-term operation and maintenance requirements for features proposed in this project after construction. The proposed project consists of constructing a new 113'x60' gymnasium for members of the church to utilize. No changes to the parking are or other areas of the site are proposed.

Proposed Design

A sixteen (16)-chamber Cultec® infiltration field is proposed to infiltrate runoff from the proposed gymnasium roof. The continuing efficacy of the stormwater management system at this site is dependent upon regular maintenance and inspections. This plan describes the purpose, function, and operation of each component of the stormwater management system. Inspection and maintenance requirements are included.

Operation Responsibilities

Upon the completion of the project, the property owner will continue to be the legal owner of all components described herein. It will be their responsibility to properly maintain and operate the stormwater management system, and to provide source(s) of funding for its continued operation and maintenance.

Inspection Frequency

- Underground Infiltration Chambers – Inspect underground detention chambers during and after the first several rainstorms following their installation to ensure proper management of stormwater. Thereafter, they should be periodically reviewed during and following storm events of 1.0 inch and greater, no less than semi-annually, to establish an appropriate maintenance interval based on the loading from this site.

- Piping Inlets and Outlets – Inspect semi-annually and after every storm event of 1.0 inch or greater. Inspections should include an assessment of sediment or other debris inhibiting the free flow of water, cracking or settlement of the features, erosion, or inadequate vegetative cover at the outfall.

- Pervious Pavers – Inspect semi-annually and after every storm event of 1.0 inch or greater. Inspections should include an assessment of sediment or other debris in between paver blocks.

Preventative Maintenance

- Underground Infiltration Chambers – Vacuum accumulated sediments from underground chambers, if necessary, from debris impeding flow.

- Piping Inlets and Outlets – Remove any accumulation of sediments. Repair any cracks or other imperfections to features. Inspect pipe and seals for cracking or failure. Repair or replace as required. Regrade and reseed eroded areas. Replace or reset displaced riprap.

- Pervious Pavers – Vacuum accumulation of sediments. Maintain joint space to allow for maximum infiltration.

Stormwater Management Systems Accessibility

All stormwater management system infiltration devices are accessible or able to be inspected via inspection ports on each device. The property Owner will be responsible for maintaining access to all stormwater management system components.

Inspection and Maintenance Schedule

The table below provides a recommended maintenance schedule. The Owner shall ensure the activities identified below are undertaken according to the indicated frequency, or more often if needed, to maintain system functionality.

Inspection Activities	**Frequency**
Inspect underground chambers and associated piping for sediment & debris	Twice per year
Pervious Pavers	Twice per year
Maintenance Activities	**Frequency**
Vacuum accumulated sediments from underground chambers	Annually
Repair bare spots and erosion at vegetated surfaces	Twice per year
Pervious Pavers	Twice per year
Remove trash and debris	Twice per year

Inspection and Maintenance Log

Inspection Date	Maintenance Required (Y or N)	Comments	Inspected By: