STORMWATER REPORT

Proposed Commercial Development

1263 Hopmeadow Street
Simsbury, CT

PREPARED FOR

Prospect Enterprises, LLC
231 Farmington Avenue
Farmington, CT 06032

PREPARED BY

100 Great Meadow Road
Suite 200
Wethersfield, Connecticut
860.807.4300

May 2023
REV August 2023

Table of Contents

1

Project Summary

Project Description

The Applicant, Prospect Enterprises LLC, is proposing to construct a commercial development including a 2,400 restaurant with drive thru, a 2,325 restaurant with drive thru, an 11,600sf retail building, and drive up ATM, along with all associated utilities, drive aisles, parking area, stormwater management facilities and landscaping to support this use.

Site Description

The ±4.5-acre Project Area (Site) is located at 1263 Hopmeadow Street and consists of four parcels (Assessor's Tax ID 105-403-017, -017R, -018, -020-1) in Simsbury, Connecticut (Figure 1). The Site is currently zoned B-2 General Business and is within Level A Aquifer Protection Zone.

Under existing conditions, the site, formerly a car dealership, contains vacant buildings surrounded by predominantly broken pavement surface. The site is primarily impervious (80%) surrounded by commercial developments to both the north (Big Y Supermarket) and south (Dunkin'). There is a vacant broken lot to the south (west of Dunkin') which borders the southern portion of the western half of the site. A residential apartment complex borders the site to the west which is buffered by mature trees. Hopmeadow Street (Route 202) borders the site to the East.

There is a grade change across the existing site, ranging from elevation 196 at the rear of the site, to elevation 175 at the street. Under existing conditions, the majority of the untreated stormwater runoff from the site flows overland into the Hopmeadow Street right of way.

From available data, the NRCS surface soils on the Site were classified as hydraulic group ratings of "D", indicating soils having a low infiltration rate when thoroughly wet. See Appendix B for NRCS Classification documentation. However, according to the report titled "Off Site Storm Drainage Analysis" prepared for the Big Y (neighboring property to the north), prepared by F.A. Hesketh & Associates, Inc., revised through April 26, 2013, the underlying soils are made up of sand and gravel which are highly permeable. In addition, a geotechnical

report prepared by GEI dated April 22, 2021 that collected test pit data from the rear portion of the parcel classified the soils as sand to sand with gravel and silt to silty sand. GEI prepared an updated field investigation on June 28, 2023 and July 6, 2023 in which field measurements for underlying soils were over 20in/hr in most areas. Since these documented sources identify the on-site soils as highly permeable (sandy), it would be justified to use a type "A" rating in the hydrologic analysis. To be conservative, for modeling purposes, the soil types were selected to be a type "B".

The project was designed to incorporate aspects of the Simsbury Stormwater Design Guidelines and the Connecticut Stormwater Quality Manual. Low impact development stormwater management techniques used will focus on decentralizing stormwater management areas and incorporate smaller stormwater management techniques to reduce peak runoff rates, maximize groundwater recharge and treatment for water quality. Stormwater quantity and quality measures within the site have been designed in many cases to meet the adjusted performance standard of 110% as required in Table 1.1 "Other Zones" of the Simsbury Stormwater Management Guidelines dated September 28, 2011 (exceptions stated herein).

Figure 1: Site Locus Map

0 200 400 FEET

Study Location Map
Commercial Development

Simsbury, CT

Figure 1

2

Existing Drainage Conditions

Under existing conditions, untreated stormwater runoff from the majority of the site flows overland towards the east and to the closed drainage system in Hopmeadow Street. The site generally slopes from the west to the east, from a peak elevation of 196 at the western property line, down to elevation 175 at the street line. The site is tiered with the lower eastern portion of the site at approximate elevation 177 and the upper western portion at elevation 195 with a steep central drive connecting the two tiers.

Hydrologic Information

For the existing conditions hydrologic analysis, the site was considered one large drainage area discharging to 1 design point, where peak discharge rates were evaluated (see Figure 2).

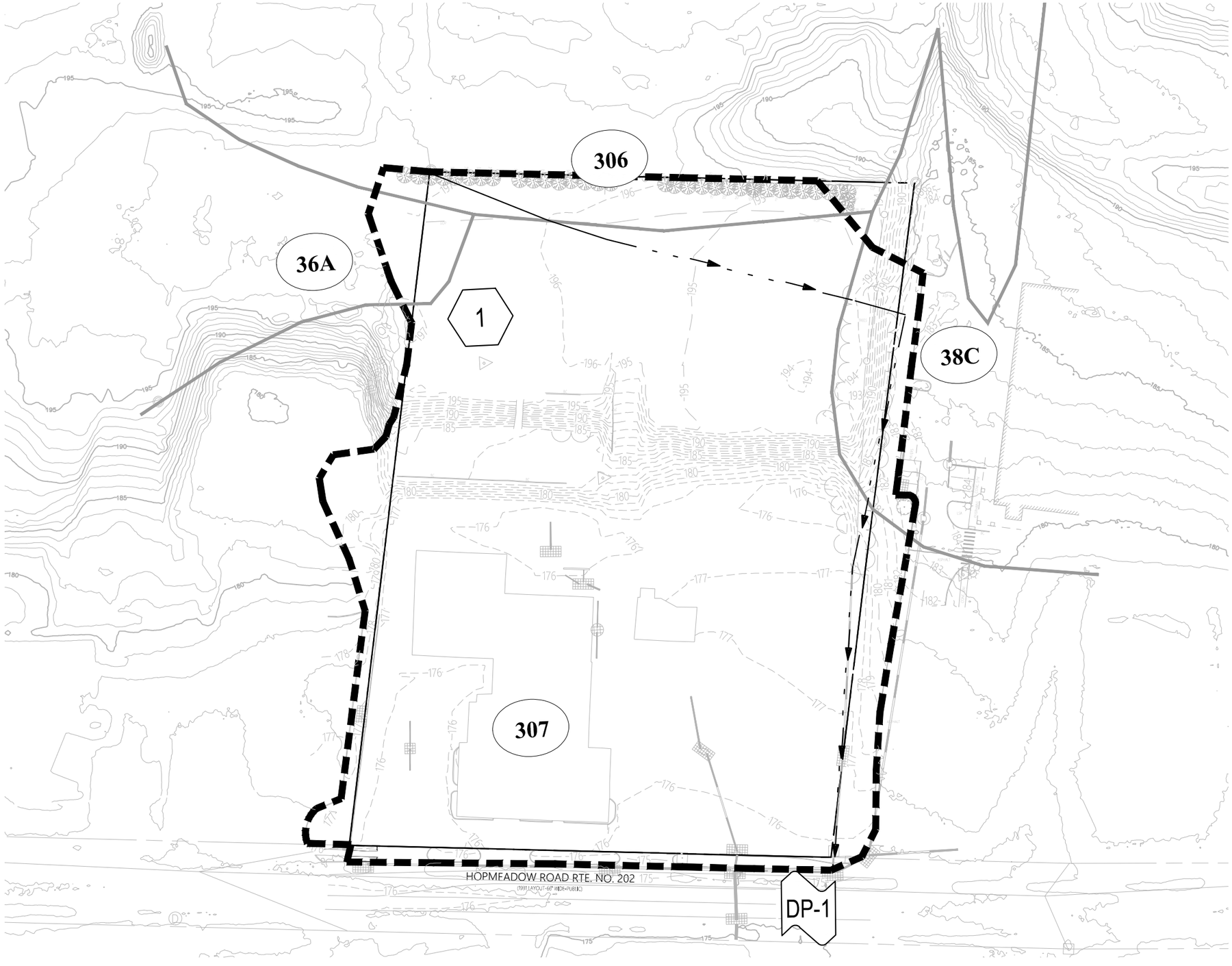
Drainage Area 1 - This ±5-acre area comprises the site area along with the surrounding area that discharges across the site. This area consists mainly of impervious cover with untreated stormwater flowing towards the eastern property line where it is captured by the catch basins in Hopmeadow Street (Design Point DP-1).

Table 1 summarizes the key hydrologic parameters used in the existing conditions analysis.

Table 1
Existing Conditions Hydrologic Data

Drainage Area	*Discharge Location*	*Design Point*	*Area (acres)*	*Curve Number*	*Time of Concentration (min)*
1	Hopmeadow Street	DP-1	5.0	88	23.8

Figure 2: Existing Drainage Areas



Legend

SYMBOLS

X — **DESIGN POINT**

X — **DRAINAGE AREA DESIGNATION**

LINETYPES

DRAINAGE AREA BOUNDARY

TIME OF CONCENTRATION FLOW LINE

SOIL TYPE BOUNDARY

SCS SOIL CLASSIFICATIONS

36A	**WINDSOR LOAMY SAND,0 TO 3 SLOPES, HSG A**
38C	**HINCKLEY LOAMY SAND,0 TO 3 PERCENT SLOPES, HSG A**
306	**UDORTHENTS, URBAN LAND COMPLEX, HSG B**
307	**URBAN LAND, HSG D**

0 40 80 Feet

Existing Drainage Conditions

Figure 2

Commercial Development
1263 Hopmeadow St, Simsbury CT

May 26, 2023

3

Proposed Drainage Conditions

Under proposed conditions, the Site has been designed to mimic existing conditions topography and drainage patterns. Stormwater best management practices (BMPs) and Low Impact Development (LID) are incorporated to the maximum extent practicable.

As shown on the Layout and Materials Site Plan, the site will consist of approximately 60% impervious surface.

Under proposed conditions, stormwater runoff from the majority of the site will be collected by deep sump hooded catch basins and conveyed through a hydrodynamic water quality unit providing pretreatment prior to discharging to the closed drainage system in Hopmeadow Street. An above ground infiltration basin at the southeast corner of the site will collect runoff from the southern portion of the property along with the roof runoff from the southern building. The infiltration basin as designed will infiltrate up to the 10-year storm event. The remaining two proposed buildings will direct their roof runoff to separate subsurface infiltration systems designed to infiltrate the 2-year storm event prior to connecting to the on-site closed drainage system.

Per the Simsbury Stormwater Guidelines, the site has been designed to meet water quality recharge volume requirements for 50% of the post development effective impervious area (see Appendix C for calculations).

Recharge Per Guidelines	Recharge Provided
1,855 c.f.	1,894 c.f.

Hydrologic Information

For the proposed conditions hydrologic analysis, the site was divided into three (3) drainage areas that drain to one design point as shown in the proposed conditions evaluation (see Figure 3).

Drainage Area 1 This drainage area consist of the majority of the site. Stormwater runoff is collected by catch basins with 4' sumps and piped through the closed drainage system to a hydrodynamic water quality unit prior to being discharged to the state closed drainage system in Hopmeadow Street (Design Point DP-1).

Drainage Area 2 This drainage area consists primarily of the pervious strip along the southern property line. Area from the southern adjacent property along with the roof runoff from the adjacent 2,400sf restaurant also contributes to this drainage area. Runoff from these portions of the site drain to an infiltration basin designed to infiltrate up to the 10-year storm event. Overflow is captured by a catch basin and outlets to the on-site closed drainage system prior to discharging to the state closed drainage system in Hopmeadow Street (Design Point DP-1). The outlet elevation was set using the following parameters: ensuring the 2-year storm event would fully infiltrate, minimizing depth of the basin and attempting to ensure as close to 1' of freeboard as possible at the 100-year storm event.

Drainage Area 3 This area consists of the roof for the retail building. Roof runoff is collected by roof drains connected to an underground header pipe that disperses to an underground stormwater infiltration system (StormTech STC-740) designed to infiltrate up to the 2-year storm event. Stormwater that does not infiltrate is piped to the on-site closed drainage system that outlets to the closed drainage system in Hopmeadow Street (Design Point DP-1).

Drainage Area 4 This area consists of the roof for the northern restaurant building. Similar to Drainage Area 3, roof runoff is collected by roof drains connected to an underground header pipe that disperses to an underground stormwater infiltration system (StormTech STC-310) designed to infiltrate up to the 2-year storm event. Stormwater that does not infiltrate back is piped to the on-site closed drainage system that outlets to the closed drainage system in Hopmeadow Street (Design Point DP-1).

Table 2 summarizes the key hydrologic parameters for each drainage area used in the proposed conditions analysis.

Table 2
Proposed Conditions Hydrologic Data

Drainage Area	*Discharge Location*	*Design Point*	*Area (acres)*	*Curve Number*	*Time of Concentration (min)*
1	Hopmeadow Street	DP-1	4.14	83	18.1
2	Hopmeadow Street	DP-1	0.41	61	5
2A	Hopmeadow Street	DP-1	0.10	98	5
3	Hopmeadow Street	DP-1	0.27	98	5
4	Hopmeadow Street	DP-1	0.05	98	5

The drainage system has been designed with a treatment train including hooded catch basins with 4' sumps, hydrodynamic water quality units, infiltration systems, and an infiltration basin. The proposed BMPs are consistent with those outlined in the Simsbury Stormwater BMP Selection Matrix outlined in Appendix C.

Details of the stormwater water management system features are as follows:

Water Quantity and Quality Control

Water quantity and quality control measures are outlined below. See Appendix E for details of the ongoing Stormwater Management System Long Term Operation and Maintenance Plan.

Source Control

A comprehensive source control program will be implemented at the site, which includes regular pavement sweeping, catch basin cleaning, and enclosure and maintenance of all dumpsters, compactors, and loading areas as well as trash and sediment removal from all LID stormwater features. Further discussion of the site maintenance is included in the Stormwater Management Long Term Operation and Maintenance Plan included in Appendix E.

Catch Basins with Sumps and Oil/debris Traps

Catch basins at the site are to be constructed with sumps (minimum 4-feet) and oil/debris traps (where applicable) to prevent the discharge of sediments and floating contaminants.

Water Quality Units

The hydrodynamic water quality unit will be a manhole-type structure which relies on flowing stormwater to swirl within the units, allowing sediment to settle by gravity efficiently removing total suspended solids (TSS) and freeing oil from the stormwater run-off. The units prevent the resuspension of settled material and allow for safe and easy removal of collected material. All stormwater that enters the closed drainage system will pass through a water quality unit before being directed to the primary treatment component.

Subsurface Infiltration Systems

Two subsurface infiltration systems are independently designed to infiltrate runoff from the retail building (StormTech STC-740) and northern restaurant building (StormTech STC-310). The design of the chambers includes a permeable bottom that allows for exfiltration of the 2-year storm event prior to entering the closed drainage system.

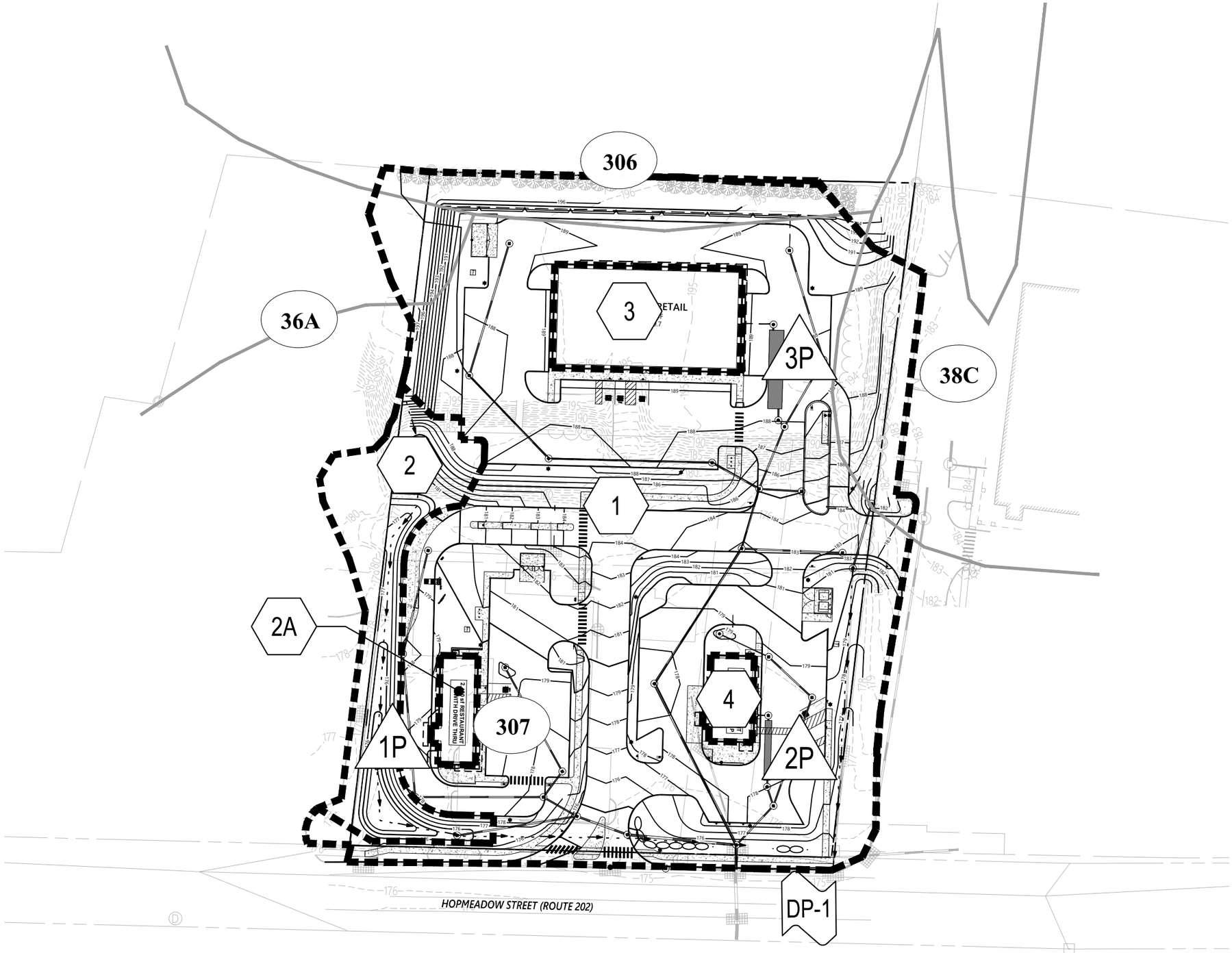
Infiltration Basin

An above ground infiltration basin is located at the southeastern corner of the site along Hopmeadow Street. The basin is designed to infiltrate stormwater runoff up to the 10-year storm event. Overflow from the surface basin will flow into a catch basin and outlet to the closed on-site drainage system. Details of the pond are outlined below:

Top of Pond Elevation: 176.3
Bottom of Pond Elevation: 174.0

Storm Event	Max. Water Elevation
2 year	174.4
10 year	175.1
25 year	175.3
50 year	175.3
100 year	175.3

Figure 3: Proposed Drainage Areas



Legend

SYMBOLS

- X — **DESIGN POINT**
- X — **DRAINAGE AREA DESIGNATION**
- X — **POND**

LINETYPES

- **DRAINAGE AREA BOUNDARY**
- **TIME OF CONCENTRATION FLOW LINE**
- **SOIL TYPE BOUNDARY**

SCS SOIL CLASSIFICATIONS

36A	**WINDSOR LOAMY SAND,0 TO 3 SLOPES, HSG A**
38C	**HINCKLEY LOAMY SAND,0 TO 3 PERCENT SLOPES, HSG A**
306	**UDORTHENTS, URBAN LAND COMPLEX, HSG B**
307	**URBAN LAND, HSG D**

0 40 80 Feet

vhb

Proposed Drainage Conditions

Commercial Development
1263 Hopmeadow St, Simsbury CT

Figure 3

May 26, 2023
Aug 23, 2023 REV

4

Hydrologic/Hydraulic Analysis

Hydrologic Analysis

The rainfall-runoff was evaluated for the 2, 10, 25, 50 and 100-year storm recurrence. Rainfall volumes used for this analysis were based on the National Weather Service NOAA Hydrometeorological Design Studies Center, Type III, 24-hour storm event for the town of Simsbury, CT. Rainfall volumes were 3.28, 5.28, 6.53, 7.44, 8.45 respectively. Runoff coefficients for the pre- and post- development conditions, as shown in the tables below were determined using NRCS Technical Release 55 (TR-55) methodology as provided in the HydroCAD reports found in Appendix F.

Peak rates have been reduced for all required storms (2, 10, 25, 50, 100-year storm events). In addition, the 2-, 10-, 25-year design storm events for the site have been reduced by an additional 10% as required in Table 1.1 "Other Zones" of the Simsbury Stormwater Management Guidelines dated September 28, 2011.

Table 3 presents a summary of the existing and proposed conditions peak discharge rates.

Table 3
Peak Discharge Rates (cfs*)

Design Point	2-year	10-year	25-year	50-year	100-year
Design Point 1: Hopmeadow Street					
Existing	7.5	14.1	18.1	21.1	24.4
Proposed	5.5	12.0	16.3	19.7	23.1

* Expressed in cubic feet per second

Hydraulic Analysis

The closed drainage system was designed for the 25-year storm event, in accordance with the Town of Simsbury Stormwater Management Guidelines.

Drainage pipes were sized using Manning's Equation for full-flow capacity and the Rational Method. Additionally, the performance of the system was analyzed using StormCAD, a HEC-22 based program. Pipe sizing calculations are included in Appendix C of this report.

Floodplain Information / Analysis

The site is located within FEMA Flood Zone X area of minimal flood hazard as shown on the FEMA Floodway Map, Panel No. 09003C0193F dated September 26, 2008 (included in Appendix B).

Appendix A:

Town of Simsbury Site Planning and Design Criteria Checklist

Conformance with the following criteria shall be initialed in the spaces provided by a registered Connecticut Professional Engineer. If site conditions partially or completely prevent implementation of any specific criteria, documentation demonstrating technical infeasibility must be provided.

	Item #	Description	Verified	Technically Infeasible	Not Appilcable
Watershed	1.1	Development avoids sensitive natural resource areas and their buffers, including but not limited to: designated natural resource protection areas, riverfront buffers, steep slopes, wildlife habitats, and forests.	✓		
	1.2	Development and redevelopment is within Simsbury Center or other areas designated to be compact and walkable, including developments utilizing the Simsbury Center Code, Planned Area Development Designation, or other cluster development designs, or other compact and walkable areas as determined by Town Staff in order to concentrate development and minimize total impervious area in the watershed.			✓
	1.3	Public open space and recreation areas are designed as Special Detention Areas per Stormwater Article Section 1.2C to provide both public use and neighborhood-scale stormwater mitigation.			✓
	1.4	Neighborhood planning within Simsbury Center follows the general principles established in the Simsbury Center Watershed Planning and Design Framework.			✓
Neighborhood	2.1	An existing conditions plan is provided documenting sensitive natural resources including existing wetlands, streams, ponds, vernal pools, flood zones, soil types and infiltration rates, steep slopes, treelines and trees 12” caliper and greater, septic tanks and fields, and natural topography.	✓		
	2.2	Using the existing conditions plan as a guide, development is located to maximize preservation of contiguous natural sensitive areas.	✓		

	Item #	Description	Verified	Technically Infeasible	Not Appilcable
Neighborhood (continued)	2.3	Using the existing conditions plan as a guide, development and stormwater management systems are located such that centralized volume mitigation and flood control such as detention/retention basins, if required, is located towards the edges of compact development areas or in adjacent open space.	✓		
	2.4	Community open space is sited in areas of well-draining soils, located in coordination with topography to receive stormwater runoff from new development, and designed as a Special Detention Area per Section 1.1.2C to provide neighborhood-scale stormwater infiltration and flood control.			✓
	2.5	Existing stands of mature trees are incorporated into the neighborhood and site design and preserved to the maximum extent practicable. Tree protection provisions are submitted as required by Landscaping Section 9.02.	✓		
	2.6	Development is alley-loaded and/or incorporates parking lots sited behind buildings.	✓		
	2.7	The neighborhood parking approach incorporates shared parking strategies, on-street parking, and centralized structured parking to minimize new impervious area.			✓
Green Streets	3.1	New thoroughfares and retrofit of existing thoroughfares meet Section 1.2B Water Quality and Quantity requirements.	✓ (some)		
	3.2	Thoroughfare and driveway pavement widths are the minimum required to accommodate public safety and emergency access.	✓		
	3.3	Rear lanes, alleys, emergency access lanes, on-street parking spaces, sidewalks, pedestrian and multi-use paths, and residential driveways are constructed of permeable materials using a section appropriate for structural and drainage requirements. In areas of poorly draining soils the permeable design may still provide water quality treatment as a “flow-through” condition with an underdrain.			✓

	Item #	Description	Verified	Technically Infeasible	Not Appilcable
	3.4	Street tree design incorporates stormwater management practices such as tree box filters to filter and infiltrate stormwater runoff from adjacent impervious areas.			✓
	3.5	Street trees are provided with adequate soil volume and structural soil design to support long-term root growth and tree canopy without excessive impact to utilities or sidewalks.			✓
Site Design	4.1	Soil testing completed by a Certified Soil Scientist is enclosed, and development is planned such that new impervious surfaces are located on less permeable soils, maximizing preservation of undisturbed well-draining soils.	—		
	4.2	Infiltration BMPs are located in areas of well-draining soils.	✓		
	4.3	Building roof downspouts discharge runoff to vegetated areas. Credit for Self-Treating and/or Self-Retaining Areas may be applied per the requirements of Section 1.1.2B.	—		
	4.4	Runoff from impervious paved surfaces is directed towards vegetated areas for natural filtration and/or infiltration before conveyance offsite or into the storm drainage system. Credit for Self-Treating and/or Self-Retaining Areas may be applied per the requirements of Section 1.1.2B.	—		
	4.5	Driveways are the minimum required to accommodate public safety and emergency access. (Residential driveways providing access to parking areas serving three residences or less should be a maximum of 10 feet wide where practicable)	✓		
	4.6	Residential driveways serving three residences or less are shared wherever practicable.			✓
	4.7	When alleys are not utilized, “two-track” driveways are utilized for driveways serving three residences or less wherever practicable.			✓
	4.8	Tandem parking for single-family residential uses is incorporated wherever practicable.			✓

	Item #	Description	Verified	Technically Infeasible	Not Appilcable
Parking Design	5.1	Preferably all new parking spaces, at least 50% of new parking spaces in excess of 10 parking spaces, and all parking spaces in excess of the amount required by this Ordinance shall be constructed of permeable materials with a minimum 8-inch crushed stone infiltration bed or as otherwise required by the Town Engineer. In areas of poorly draining soils the permeable design may still provide water quality treatment as a "flow-through" condition with an underdrain. All permeable pavement systems shall meet the requirements of Stormwater Article 1.2.B.7.	—		
	5.2	Signs marking permeable pavement and clearly listing applicable maintenance requirements shall be installed immediately adjacent to areas containing 5 or more permeable parking spaces, and a permeable pavement maintenance program shall be included as part of the Stormwater Operation and Maintenance Plan.	—		
	5.3	Parking lot islands and landscape buffer locations should be coordinated with topography and configured as depressed bioretention and/or natural swale systems.	—		
	5.4	Ten percent of parking spaces provided in excess of 10 spaces should be compact parking spaces.	—		
	5.5	Sites shall include bicycle racks allowing for a bicycle frame to be secured with at least two points of contact, See Parking Standards Section 9.01 for specific requirements.	✓		
BMP Design	6.1	Stormwater BMPs are designed per the requirements of the Connecticut Stormwater Quality Manual, latest version, or using alternate design methods approved by the Town Engineer.	✓		
	6.2	Stormwater BMPs for projects in Simsbury Center are selected according to transect zone and soil conditions per the BMP Selection Matrix Table.			✓
	6.3	Site landscaping design uses native plantings and xeriscaping strategies, and the area of ornamental lawn surface is minimized.	✓		

	Item #	Description	Verified	Technically Infeasible	Not Appilcable
BMP Design (continued)	6.4	Rain barrels, cisterns, and/or other rainwater harvesting techniques to reuse rainwater for irrigation and other non-potable uses are incorporated into the site design.			✓
	6.5	Qualifying trees, with appropriate soil volume, structural soils, and/or root barriers as required, are incorporated into the parking and landscape design as stormwater BMPs (see Tree Impervious Area Credit Section 1.2B).	✓		
	6.6	An Erosion and Soil Sedimentation Control Plan conforming to the standards of Connecticut Guidelines for Soil Erosion and Sediment Control is included with the project design.	✓		
	6.7	Water quality and infiltration BMPs incorporate appropriate pretreatment per the Connecticut Stormwater Quality Manual, latest revision, or alternate designs approved by the Town Engineer	✓		
Maintenance	7.1	The site design accommodates maintenance access for all stormwater BMPs.	✓		
	7.2	Stormwater Operation and Maintenance Plan is included.	✓		
	7.3	Responsible Party for implementation, maintenance, and correction of stormwater treatment practices is designated including contact information.	✓		

Appendix B:

NRCS Soil Survey Information

GEI Test Pit Data

FEMA Floodway Map

NRCS Soil Survey Information

Map Scale: 1:2,170 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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 24, 2019—Oct 24, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
34A	Merrimac fine sandy loam, 0 to 3 percent slopes	A	0.7	3.5%
36A	Windsor loamy sand, 0 to 3 percent slopes	A	1.4	7.0%
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	1.9	10.0%
306	Udorthents-Urban land complex	B	4.2	21.9%
307	Urban land	D	11.2	57.6%
Totals for Area of Interest			**19.4**	**100.0%**

Description

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

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

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

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

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

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

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

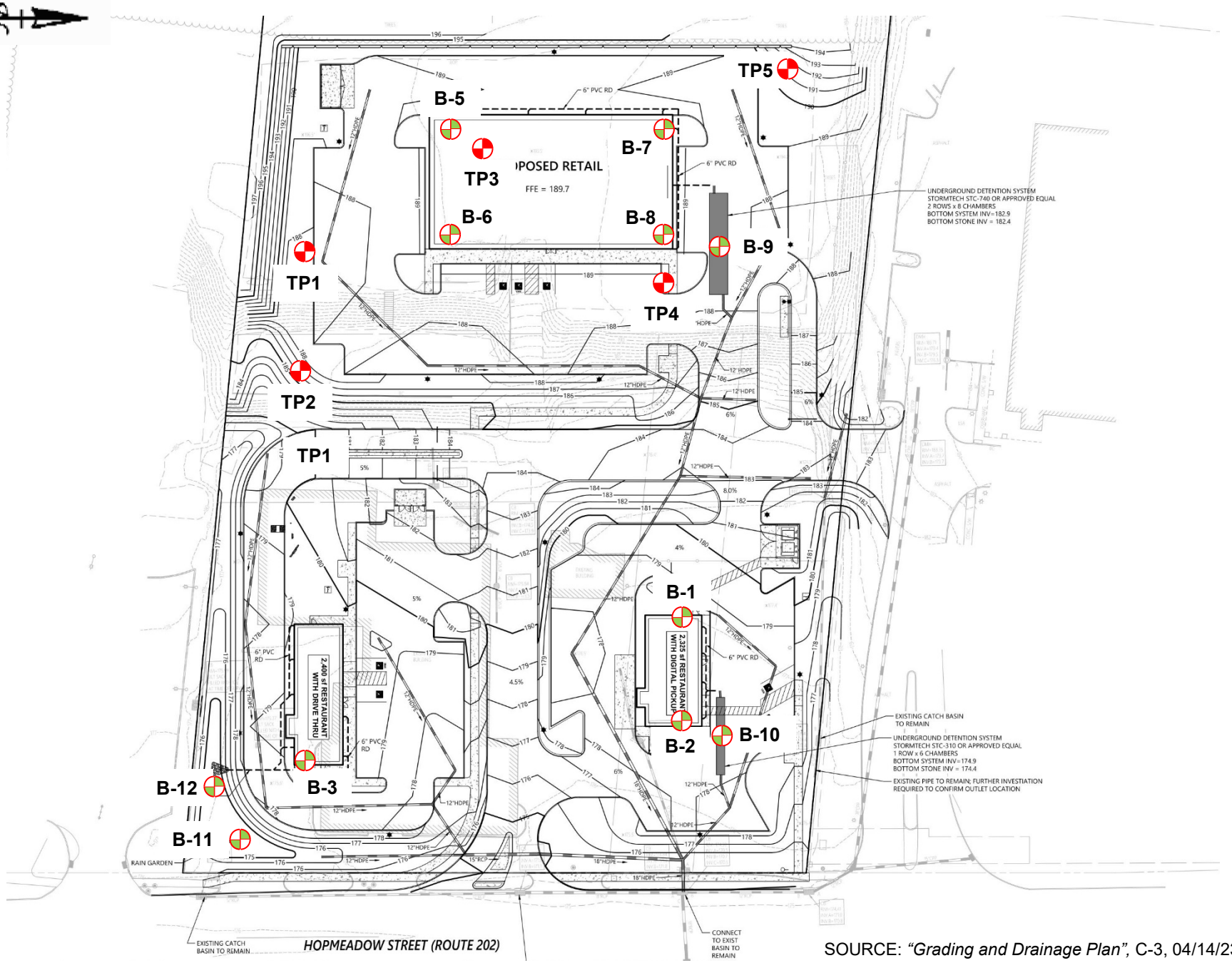
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

GEI Test Pit Data



SOURCE: *"Grading and Drainage Plan"*, C-3, 04/14/23, VHB

LEGEND

- Approx. Test Pit Location (2021)
- Approx. Test Boring Location (2023)

GEI Consultants

TEST LOCATION PLAN
1263 HOPMEADOW STREET
SIMSBURY, CT

GEI PROJECT NO: **2302394**

FIGURE NO.
1

1263 Hopmeadow Street, Simsbury, CT
GEI Proj # 2302394- 1.1
Soil Permeability Calculations

GEI Consultants

WELL CALCULATION

$$k'_v = \frac{d^2\left(\frac{\pi}{11}\frac{k'_v}{k_v}\frac{D}{m} + L\right)}{D^2(t_2 - t_1)} \ln\frac{H_1}{H_2}$$

("Soil in casing in uniform soil," Lambe and Whitman, 1969.)

TEST LOCATION	**B-9**				
Length of Casing	426.7	(cm)	Depth of Test	12.0	FT
Diameter, stone pack	16.8	D (cm)	GS Elevation	194.5	
Diam., casing	5.08	d (cm)	Depth to GW	> 18 ft	
Test Length	61.0	L (cm)			
Transformation ratio	1	m			
k'_v/k_v	1	*Assumed*			
Soil Classification:		WIDELY-GRADED SAND (SW); ~90% F-sand, ~5% F-gravel, ~5% NP fines, moist.			

Test 1

Depth to Water (cm)	Time t	Vertical Perm. k'_v (cm/sec)	Vertical Perm. k'_v (in/hr)
3.30	10		
5.59	20	3.17E-01	448.59
7.62	30	1.87E-01	264.47
9.40	40	1.26E-01	178.83
11.18	50	1.04E-01	147.75
12.19	60	5.23E-02	74.19
13.21	70	4.82E-02	68.25
13.97	80	3.37E-02	47.83
14.99	90	4.22E-02	59.86
15.75	100	2.98E-02	42.29
16.00	110	9.63E-03	13.64
16.51	120	1.88E-02	26.65
17.27	130	2.71E-02	38.47
17.78	140	1.74E-02	24.72
18.80	150	3.34E-02	47.38
		AVERAGE	**30.17**

Test 2

Depth to Water (cm)	Time t (seconds)	Vertical Perm. k'_v (cm/sec)	Vertical Perm. k'_v (in/hr)
4.57	10		
7.37	20	2.87E-01	406.67
9.14	30	1.30E-01	184.37
10.67	40	9.27E-02	131.44
12.45	50	9.27E-02	131.44
13.72	60	5.85E-02	82.85
14.73	70	4.30E-02	60.93
15.75	80	4.01E-02	56.87
16.51	90	2.84E-02	40.29
17.27	100	2.71E-02	38.47
18.29	110	3.44E-02	48.74
18.80	120	1.65E-02	23.36
19.30	130	1.60E-02	22.74
19.81	140	1.56E-02	22.15
20.32	150	1.52E-02	21.59
20.83	160	1.49E-02	21.06
		AVERAGE	**21.88**

GEI Consultants, Inc.
GEI Proj # 2302394- 1.1
Guelph Permeameter Testing
Test Date 6/20/2023

Test Location B-10
Test Elevation 176.5
Reservoir Combined
Unit Set 6 in.
Depth of Test 2 FT
Depth to GW Not encountered
GEI Rep. T. Rezzani, T. Yurman
Soil Type SILTY SAND (SM); ~65% F-C sand, ~30% NP fines, ~5% F gravel, moist.

Water Level in Well 4.1 cm

Time (min)	Time Change (min)	Water Level in Res. (cm)	Change in Res. Water Level (cm)	Rate of Change (cm/min)
0.0833		1.0		
0.167	0.08	1.8	0.8	9.60
0.250	0.08	2.9	1.1	13.20
0.333	0.08	3.5	0.6	7.20
0.417	0.08	3.8	0.3	3.60
0.500	0.08	4.0	0.2	2.40
0.583	0.08	4.4	0.4	4.80
0.667	0.08	4.7	0.3	3.60
0.750	0.08	4.9	0.2	2.40
0.833	0.08	5.2	0.3	3.60
0.917	0.08	5.4	0.2	2.40
1.000	0.08	5.6	0.2	2.40
1.083	0.08	5.9	0.3	3.60
1.167	0.08	6.0	0.1	1.20
1.250	0.08	6.3	0.3	3.60
1.333	0.08	6.4	0.1	1.20
1.417	0.08	6.6	0.2	2.40
1.500	0.08	6.8	0.2	2.40
1.583	0.08	6.9	0.1	1.20
1.667	0.08	7.1	0.2	2.40
1.750	0.08	7.2	0.1	1.20
		Steady Rate of Change, R_1 (cm/min)		**2.16**

Water Level in Well 7.1 cm

Time (min)	Time Change (min)	Water Level in Res. (cm)	Change in Res. Water Level (cm)	Rate of Change (cm/min)
0.1667		11.6		
0.333	0.17	11.7	0.1	0.60
0.500	0.17	11.8	0.1	0.60
0.667	0.17	11.9	0.1	0.60
0.833	0.17	12.1	0.2	1.20
1.000	0.17	12.2	0.1	0.60
1.167	0.17	12.3	0.1	0.60
1.333	0.17	12.6	0.3	1.80
1.500	0.17	12.7	0.1	0.60
1.667	0.17	12.8	0.1	0.60
1.833	0.17	12.9	0.1	0.60
2.000	0.17	13.0	0.1	0.60
2.167	0.17	13.1	0.1	0.60
2.333	0.17	13.2	0.1	0.60
2.500	0.17	13.3	0.1	0.60
		Steady Rate of Change, R2 (cm/min)		**0.60**

GEI Consultants, Inc. **Calc. by:** T. Rezzani **Date:** 6/26/2023
GEI Proj # 2302394- 1.1 **Check by:** M. Glunt **Date:** 6/28/2023
Guelph Permeameter Testing - B-10

Single Head Method - Test 1

Test Data and Information

• Reservoir		-	Combined		.
• Reservoir Cross-Sectional Area		-	35.22	cm^2	(Provided on Permeameter)
• Water Head Height	H_1	-	4.1	cm	
• Borehole Radius	a	-	3.2	cm	Assumed slightly larger than 3cm rad. hand auger
• Soil Texture-Structure Category		-	3		(Table 2)
• Steady State Rate of Water Level Change	R_1	-	**2.16**	cm/min	(Obtained during testing)

Test Calculations and Results

• Microscopic Capillary Length Factor	α*	-	0.12	cm^{-1}	(Table 2: Based on Soil Texture-Structure Category)
• Shape Factor	C_1	-	0.667		(Table 2: Based on Soil Texture-Structure Category)
• Volumetric Flow Rate	Q_1	-	1.2679	cm^3/sec	(Table 3: One Head, Combined Reservoir)
• Soil Saturated Hydraulic Conductivity	K_{fs}	-	2.474E-03	cm/sec	(Table 3: One Head, Combined Reservoir)
• Soil Matrix Flux Potential	Φ_m	-	2.062E-02	cm^2/sec	(Table 3: One Head, Combined Reservoir)

Single Head Method - Test 2

Test Data and Information

• Reservoir		-	Combined		
• Reservoir Cross-Sectional Area		-	35.22	cm^2	(Provided on Permeameter)
• Water Head Height	H_2	-	7.1	cm	
• Borehole Radius	a	-	3.2	cm	Assumed slightly larger than 3cm rad. hand auger
• Soil Texture-Structure Category		-	3		(Table 2)
• Steady State Rate of Water Level Change	R_2	-	0.60	cm/min	(Obtained during testing)

Test Calculations and Results

• Microscopic Capillary Length Factor	α*	-	0.12	cm^{-1}	(Table 2: Based on Soil Texture-Structure Category)
• Shape Factor	C_2	-	0.980		(Table 2: Based on Soil Texture-Structure Category)
• Volumetric Flow Rate	Q_2	-	0.35	cm^3/sec	(Table 3: One Head, Combined Reservoir)
• Soil Saturated Hydraulic Conductivity	K_{fs}	-	4.792E-04	cm/sec	(Table 3: One Head, Combined Reservoir)
• Soil Matrix Flux Potential	Φ_m	-	3.993E-03	cm^2/sec	(Table 3: One Head, Combined Reservoir)

Test Averages

• Soil Saturated Hydraulic Conductivity	K_{fs}	-	**1.477E-03**	cm/sec
			2.1	in/hour

GEI Consultants, Inc.
GEI Proj # 2302394- 1.1
Guelph Permeameter Testing
Test Date 6/20/2023

Test Location	B-11
Test Elevation	175.8
Reservoir	Combined
Unit Set	4 in.
Depth of Test	1.4 FT
Depth to GW	Not encountered
GEI Rep.	T. Rezzani, T. Yurman
Soil Type	WIDELY GRADED SAND WITH GRAVEL (SW); ~80% F-C sand, ~15% F gravel, ~5% NP fines, dry to moist.

Water Level in Well 5 cm

Time (min)	Time Change (min)	Water Level in Res. (cm)	Change in Res. Water Level (cm)	Rate of Change (cm/min)
0.0833		1.6		
0.167	0.08	1.6	0	0.00
0.333	0.17	1.6	0	0.00
0.500	0.17	1.6	0	0.00
0.667	0.17	1.7	0.05	0.30
0.833	0.17	2.1	0.45	2.70
1.000	0.17	2.3	0.2	1.20
1.167	0.17	2.4	0.05	0.30
		Steady Rate of Change, R_1 (cm/min)		**0.64**

Water Level in Well 10.4 cm

Time (min)	Time Change (min)	Water Level in Res. (cm)	Change in Res. Water Level (cm)	Rate of Change (cm/min)
0.2500		4.7		
0.500	0.25	4.8	0.1	0.40
0.750	0.25	4.9	0.1	0.40
1.000	0.25	5.0	0.05	0.20
1.250	0.25	5.0	0.05	0.20
1.500	0.25	5.1	0.1	0.40
1.750	0.25	5.2	0.1	0.40
2.000	0.25	5.3	0.05	0.20
2.250	0.25	5.3	0.05	0.20
2.500	0.25	5.4	0.1	0.40
2.750	0.25	5.5	0.05	0.20
3.000	0.25	5.5	0.05	0.20
		Steady Rate of Change, R2 (cm/min)		**0.29**

GEI Consultants, Inc. **Calc. by:** T. Rezzani **Date:** 6/26/2023
GEI Proj # 2302394- 1.1 **Check by:** M. Glunt **Date:** 6/28/2023
Guelph Permeameter Testing - B-11

Single Head Method - Test 1

Test Data and Information

• Reservoir		-	Combined		
• Reservoir Cross-Sectional Area		-	35.22	cm^2	(Provided on Permeameter)
• Water Head Height	H_1	-	5	cm	
• Borehole Radius	a	-	3.2	cm	Assumed slightly larger than 3cm rad. hand auger
• Soil Texture-Structure Category		-	3		(Table 2)
• Steady State Rate of Water Level Change	R_1	-	**0.64**	cm/min	(Obtained during testing)

Test Calculations and Results

• Microscopic Capillary Length Factor	α^*	-	0.12	cm^{-1}	(Table 2: Based on Soil Texture-Structure Category)
• Shape Factor	C_1	-	0.768		(Table 2: Based on Soil Texture-Structure Category)
• Volumetric Flow Rate	Q_1	-	0.3774	cm^3/sec	(Table 3: One Head, Combined Reservoir)
• Soil Saturated Hydraulic Conductivity	K_{fs}	-	6.530E-04	cm/sec	(Table 3: One Head, Combined Reservoir)
• Soil Matrix Flux Potential	Φ_m	-	5.441E-03	cm^2/sec	(Table 3: One Head, Combined Reservoir)

Single Head Method - Test 2

Test Data and Information

• Reservoir		-	Combined		
• Reservoir Cross-Sectional Area		-	35.22	cm^2	(Provided on Permeameter)
• Water Head Height	H_2	-	8	cm	
• Borehole Radius	a	-	3.2	cm	Assumed slightly larger than 3cm rad. hand auger
• Soil Texture-Structure Category		-	3		(Table 2)
• Steady State Rate of Water Level Change	R_2	-	0.29	cm/min	(Obtained during testing)

Test Calculations and Results

• Microscopic Capillary Length Factor	α^*	-	0.12	cm^{-1}	(Table 2: Based on Soil Texture-Structure Category)
• Shape Factor	C_2	-	1.063		(Table 2: Based on Soil Texture-Structure Category)
• Volumetric Flow Rate	Q_2	-	0.167714286	cm^3/sec	(Table 3: One Head, Combined Reservoir)
• Soil Saturated Hydraulic Conductivity	K_{fs}	-	2.084E-04	cm/sec	(Table 3: One Head, Combined Reservoir)
• Soil Matrix Flux Potential	Φ_m	-	1.737E-03	cm^2/sec	(Table 3: One Head, Combined Reservoir)

Test Averages

• Soil Saturated Hydraulic Conductivity	K_{fs}	-	**4.307E-04**	cm/sec
			0.6	in/hour

GEI Consultants, Inc.
GEI Proj # 2302394- 1.1
Guelph Permeameter Testing
Test Date 6/20/2023

Test Location B-12
Test Elevation 176
Reservoir Combined
Unit Set 5 in.
Depth of Test 1.5 FT
Depth to GW Not encountered
GEI Rep. T. Rezzani, T. Yurman
Soil Type WIDELY-GRADED SAND WITH GRAVEL (SW); ~85% F-C sand, ~10% F-gravel, ~5% NP fines, moist.

Water Level in Well **6.7 cm** *

Time (min)	Time Change (min)	Water Level in Res. (cm)	Change in Res. Water Level (cm)	Rate of Change (cm/min)
0.1667		2.0		
0.333	0.17	2.5	0.5	3.00
0.500	0.17	3.0	0.5	3.00
0.667	0.17	3.2	0.2	1.20
0.833	0.17	3.2	0	0.00
1.000	0.17	3.3	0.1	0.60
1.167	0.17	3.4	0.1	0.60
1.333	0.17	3.5	0.1	0.60
1.500	0.17	3.5	0	0.00
1.667	0.17	3.6	0.1	0.60
1.833	0.17	3.6	0	0.00
2.000	0.17	3.6	0	0.00
2.167	0.17	3.7	0.1	0.60
2.333	0.17	3.8	0.1	0.60
2.500	0.17	3.9	0.05	0.30
2.667	0.17	3.9	0.05	0.30
2.833	0.17	4.0	0.1	0.60
3.000	0.17	4.1	0.05	0.30
	Steady Rate of Change, R_1 (cm/min)			**0.39**

Water Level in Well **10.4 cm**

Time (min)	Time Change (min)	Water Level in Res. (cm)	Change in Res. Water Level (cm)	Rate of Change (cm/min)
0.1667		8.4		
0.333	0.17	9.0	0.6	3.60
0.500	0.17	9.2	0.2	1.20
0.667	0.17	9.4	0.2	1.20
0.833	0.17	9.6	0.2	1.20
1.000	0.17	9.8	0.2	1.20
1.167	0.17	10.0	0.2	1.20
1.333	0.17	10.2	0.2	1.20
1.500	0.17	10.4	0.2	1.20
1.667	0.17	10.7	0.3	1.80
1.833	0.17	10.8	0.1	0.60
2.000	0.17	11.1	0.3	1.80
2.167	0.17	11.3	0.2	1.20
2.333	0.17	11.5	0.2	1.20
2.500	0.17	11.7	0.2	1.20
2.667	0.17	11.9	0.2	1.20
	Steady Rate of Change, R2 (cm/min)			**1.28**

GEI Consultants, Inc. **Calc. by:** T. Rezzani **Date:** 6/26/2023
GEI Proj # 2302394- 1.1 **Check by:** M. Glunt **Date:** 6/28/2023
Guelph Permeameter Testing - B-12

Single Head Method - Test 1

Test Data and Information

• Reservoir		-	Combined		
• Reservoir Cross-Sectional Area		-	35.22	cm^2	(Provided on Permeameter)
• Water Head Height	H_1	-	6.7	cm	
• Borehole Radius	a	-	3.2	cm	Assumed slightly larger than 3cm rad. hand auger
• Soil Texture-Structure Category		-	3		(Table 2)
• Steady State Rate of Water Level Change	R_1	-	**0.39**	cm/min	(Obtained during testing)

Test Calculations and Results

• Microscopic Capillary Length Factor	α*	-	0.12	cm^{-1}	(Table 2: Based on Soil Texture-Structure Category)
• Shape Factor	C_1	-	0.941		(Table 2: Based on Soil Texture-Structure Category)
• Volumetric Flow Rate	Q_1	-	0.2264	cm^3/sec	(Table 3: One Head, Combined Reservoir)
• Soil Saturated Hydraulic Conductivity	K_{fs}	-	3.214E-04	cm/sec	(Table 3: One Head, Combined Reservoir)
• Soil Matrix Flux Potential	Φ_m	-	2.678E-03	cm^2/sec	(Table 3: One Head, Combined Reservoir)

Single Head Method - Test 2

Test Data and Information

• Reservoir		-	Combined		
• Reservoir Cross-Sectional Area		-	35.22	cm^2	(Provided on Permeameter)
• Water Head Height	H_2	-	10.4	cm	
• Borehole Radius	a	-	3.2	cm	Assumed slightly larger than 3cm rad. hand auger
• Soil Texture-Structure Category		-	3		(Table 2)
• Steady State Rate of Water Level Change	R_2	-	1.28	cm/min	(Obtained during testing)

Test Calculations and Results

• Microscopic Capillary Length Factor	α*	-	0.12	cm^{-1}	(Table 2: Based on Soil Texture-Structure Category)
• Shape Factor	C_2	-	1.266		(Table 2: Based on Soil Texture-Structure Category)
• Volumetric Flow Rate	Q_2	-	0.748425	cm^3/sec	(Table 3: One Head, Combined Reservoir)
• Soil Saturated Hydraulic Conductivity	K_{fs}	-	7.493E-04	cm/sec	(Table 3: One Head, Combined Reservoir)
• Soil Matrix Flux Potential	Φ_m	-	6.244E-03	cm^2/sec	(Table 3: One Head, Combined Reservoir)

Test Averages

• Soil Saturated Hydraulic Conductivity	K_{fs}	-	**5.353E-04**	cm/sec
			0.8	in/hour

Table 2

Soil Texture-Structure Category	$\alpha^*(cm^{-1})$	Shape Factor
Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01	$C_1 = \left(\frac{H_2/a}{2.081 + 0.121\left(H_2/a\right)}\right)^{0.672}$
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04	$C_1 = \left(\frac{H_1/a}{1.992 + 0.091\left(H_1/a\right)}\right)^{0.683}$ $C_2 = \left(\frac{H_2/a}{1.992 + 0.091\left(H_2/a\right)}\right)^{0.683}$
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093\left(H_1/a\right)}\right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093\left(H_2/a\right)}\right)^{0.754}$
Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macro pores, etc.	0.36	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093\left(H_1/a\right)}\right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093\left(H_2/a\right)}\right)^{0.754}$

Calculation formulas related to shape factor (C). Where H_1 is the first water head height (cm), H_2 is the second water head height (cm), a is borehole radius (cm) and α^* is microscopic capillary length factor which is decided according to the soil texture-structure category. For one-head method, only C_1 needs to be calculated while for two-head method, C_1 and C_2 are calculated (Zang et al., 1998).

Table 3

One Head, Combined Reservoir	$Q_1 = \bar{R}_1 \times 35.22$	$K_{fs} = \frac{C_1 \times Q_1}{2\pi H_1^2 + \pi a^2 C_1 + 2\pi\left(\frac{H_1}{\alpha^*}\right)}$ $\Phi_m = \frac{C_1 \times Q_1}{(2\pi H_1^2 + \pi a^2 C_1)\alpha^* + 2\pi H_1}$
One Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$	
Two Head, Combined Reservoir	$Q_1 = \bar{R}_1 \times 35.22$ $Q_2 = \bar{R}_2 \times 35.22$	$G_1 = \frac{H_2 C_1}{\pi\left(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1)\right)}$ $G_2 = \frac{H_1 C_2}{\pi\left(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1)\right)}$ $K_{fs} = G_2Q_2 - G_1Q_1$
Two Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$ $Q_2 = \bar{R}_2 \times 2.16$	$G_3 = \frac{(2H_2^2 + a^2C_2)C_1}{2\pi\left(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1)\right)}$ $G_4 = \frac{(2H_1^2 + a^2C_1)C_2}{2\pi\left(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1)\right)}$ $\Phi_m = G_3Q_1 - G_4Q_2$

Calculation formulas related to one-head and two-head methods. Where R is steady-state rate of fall of water in reservoir (cm/s), K_{fs} is Soil saturated hydraulic conductivity (cm/s), Φ_m is Soil matric flux potential (cm^2/s), α^* is Macroscopic capillary length parameter (from Table 2), a is Borehole radius (cm), H_1 is the first head of water established in borehole (cm) , H_2 is the second head of water established in borehole (cm) and C is Shape factor (from Table 2).

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 177 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 17.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-1

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							FILL	3 in. ASPHALT
		S1	1 to 3	24/8	9-9-7-8			S1: SILTY SAND (SM); ~70% F-sand, ~30% NP fines, brown, dry.
		S2	3 to 5	24/15	5-5-5-5			S2: NARROWLY-GRADED SAND (SP); ~95% F-M sand, ~5% NP fines, light-brown, dry.
	5	S3	5 to 7	24/8	8-7-4-5			S3: Similar to S2; ~95% F-C sand (mostly M-C), ~5% NP fines, light-brown, dry.
170		S4	7 to 9	24/5	8-8-6-6			S4: Similar to S3, minor brick debris, no sample (debris in sampler).
	10	S5	10 to 12	24/19	2-3-5-6		SAND	S5: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, light-brown, moist.
	15	S6	15 to 17	24/6	9-9-11-8			S6: Similar to S5, damp.
160								Planned depth. Backfilled with drill cuttings.
	20							

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 176.5 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 17.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-2

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): ▽ 17.0

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	4 in. ASPHALT
		S1	0.5 to 2.5	24/20	12-11-12-10			S1: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, brown, dry to moist.
		S2	2.5 to 4.5	24/18	16-10-8-7			S2: SILTY SAND (SM); ~65% F-sand, ~35% NP fines, brown, dry to moist.
	5	S3	4.5 to 6.5	24/8	7-8-13-17			S3: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, light brown, dry to moist.
170		S4	6.5 to 8.5	24/15	12-10-10-10			S4: NARROWLY-GRADED SAND (SP); ~95% F-M sand, ~5% NP fines, light brown, moist.
	10	S5	10 to 12	24/15	6-7-5-5			S5: Similar to S4.
	15	S6	15 to 17	24/21	4-6-4-4			S6: Similar to S4, wet at bottom of sample.
160								Planned depth. Backfilled with drill cuttings.
	20							

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 176 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 17.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING

B-3

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	3 in. ASPHALT
		S1	0.5 to 2.5	24/18	10-6-10-12			S1: SILTY SAND (SM); ~70% F-C sand, ~30% NP fines, brown, dry to moist.
		S2	2.5 to 4.5	24/16	10-15-9-12			S2: WIDELY-GRADED SAND (SW); ~95% F-C sand, ~5% NP fines, brown, dry to moist.
	5	S3	4.5 to 6.5	24/7	8-11-12-13			S3: Similar to S2.
170		S4	6.5 to 8.5	24/16	11-8-9-9			S4: Similar to S2, moist.
	10	S5	10 to 12	24/11	9-9-9-10			S5: Similar to S2, light brown, moist.
	15	S6	15 to 17	24/18	6-6-6-7			S6: Similar to S2, F-sand, brown, moist.
160								Planned depth. Backfilled with drill cuttings.
	20							

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 196 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 22.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-5

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
								2 in. ASPHALT
		S1	0.5 to 2.5	24/16	7-7-6-6		SAND	S1: WIDELY-GRADED SAND (SW); ~95% F-C sand, ~5% NP fines, brown, dry.
		S2	2.5 to 4.5	24/17	7-9-9-9			S2: Similar to S1.
	5	S3	4.5 to 6.5	24/11	8-9-23-15			S3: Similar to S1; ~85% F-C sand, ~10% F-gravel, ~5% NP fines, light brown.
190		S4	6.5 to 8.5	24/16	20-12-11-10			S4: Similar to S1, moist.
	10	S5	10 to 12	24/17	8-6-6-6			S5: Similar to S1, moist.
	15	S6	15 to 17	24/10	7-6-5-5			S6: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~85% F-sand, ~15% NP fines, brown, damp.
180								
	20	S7	20 to 22	24/20	10-10-9-9			S7: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, brown, moist.
								Planned depth. Backfilled with drill cuttings.

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 196 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 22.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-6

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	2 in. ASPHALT
		S1	0.5 to 2.5	24/17	8-10-10-10			S1: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, brown, dry to moist.
		S2	2.5 to 4.5	24/17	10-6-6-7			S2: NARROWLY-GRADED SAND (SP); ~95% F-sand, ~5% NP fines, light brown, dry to moist.
	5	S3	4.5 to 6.5	24/6	5-7-7-9			S3: Similar to S2; (SW), ~90% F-C sand, ~5% NP fines, ~5% F-gravel.
190		S4	6.5 to 8.5	24/15	9-7-5-5			S4: Similar to S2.
	10	S5	10 to 12	24/1	8-9-12-13			S5: Low recovery, similar to S2.
	15	S6	15 to 17	24/16	6-7-7-7			S6: Similar to S2; brown, moist.
180								
	20	S7	20 to 22	24/17	6-7-11-14			S7: Similar to S2; moist.
								Planned depth. Backfilled with drill cuttings.

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 194.5 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 22.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING

B-7

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	2 in. ASPHALT
		S1	0.5 to 2.5	24/12	7-7-6-7			S1: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, brown, dry to moist.
		S2	2.5 to 4.5	24/17	6-9-12-12			S2: NARROWLY-GRADED SAND (SP); ~95% F-sand, ~5% NP fines, light brown, dry to moist.
190	5	S3	4.5 to 6.5	24/19	6-6-10-14			S3: Similar to S2; (SW), ~90% F-C sand, ~5% NP fines, ~5% F-gravel.
		S4	6.5 to 8.5	24/14	10-11-11-13			S4: Similar to S2.
	10	S5	10 to 12	24/0	8-11-11-10			S5: Low recovery, similar to S2.
180	15	S6	15 to 17	24/17	4-5-4-5			S6: Similar to S2; brown, moist.
	20	S7	20 to 22	24/16	7-11-11-10			S7: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, brown, dry to moist.
170								Planned depth. Backfilled with drill cuttings.

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 194.5 **DATE START/END:** 6/19/2023 - 6/19/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 22.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-8

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
190	5	S1	0.5 to 2.5	24/16	8-11-11-10		SAND	2 in. ASPHALT S1: NARROWLY-GRADED SAND WITH SILT (SP/SM); ~90% F-sand, ~10% NP fines, brown, dry to moist.
		S2	2.5 to 4.5	24/16	10-9-12-13			S2: WIDELY-GRADED SAND (SW); ~90% F-C sand, ~5% NP fines, ~5% F-gravel, light brown, dry to moist.
		S3	4.5 to 6.5	24/8	8-18-18-14			S3: Similar to S2; ~90% F-C sand, ~10% F-C gravel.
		S4	6.5 to 8.5	24/14	9-8-8-9			S4: NARROWLY-GRADED SAND (SP); ~95% F-M sand, ~5% NP fines, light brown, moist.
	10	S5	10 to 12	24/12	6-8-9-9			S5: Low recovery, similar to S2.
180	15	S6	15 to 17	24/13	5-7-9-10			S6: NARROWLY-GRADED SAND (SP); ~95% F-sand, ~5% NP fines, light brown, moist.
	20	S7	20 to 22	24/18	5-5-7-5			S7: Similar to S6.
170								Planned depth. Backfilled with drill cuttings.

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 194.5 **DATE START/END:** 6/20/2023 - 6/20/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 18.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING

B-9

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
190	5						SAND	3 in. ASPHALT (0-6) Auger cuttings sampled as: WIDELY-GRADED SAND WITH GRAVEL (SW); ~85% F-C sand, ~10% F-gravel, ~5% NP fines, brown, dry to moist.
		S1	6 to 8	24/14	11-10-8-11			S1: WIDELY-GRADED SAND WITH GRAVEL (SW); ~75% F-C sand, ~20% F-C gravel, ~5% NP fines, light reddish brown, dry.
		S2	8 to 10	24/17	8-9-12-8			S2: WIDELY-GRADED SAND (SW); ~95% F-M sand (mostly M), ~5% NP fines, brown, moist.
	10	S3	10 to 12	24/0	6-9-12-13			S3: No recovery, assumed native sands to gravelly sands
180	15	S4	14 to 16	24/0	13-17-11-12			S4: No recovery, assumed native sands to gravelly sands
		S5	16 to 18	24/12	9-12-14-15			S5: WIDELY-GRADED SAND (SW); ~90% F-sand, ~5% F-gravel, ~5% NP fines, brown, moist.
170	20							Planned depth. Backfilled with drill cuttings.

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 176.5 **DATE START/END:** 6/20/2023 - 6/20/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 6.0 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-10

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	3 in. ASPHALT (0-2) Auger cuttings sampled as: WIDELY-GRADED SAND WITH SILT AND GRAVEL (SP); ~80% F-C sand, ~10% F-C gravel, ~10% NP fines, brown, dry to moist.
		S1	2 to 4	24/14	5-5-4-6			S1: SILTY SAND (SM); ~65% F-C sand, ~30% NP fines, ~5% F-gravel, brown, moist.
	5	S2	4 to 6	24/19	4-4-6-8			S2: SILTY SAND (SM); ~80% F-C sand, ~15% NP fines, ~5% F-gravel, brown, moist.
170								Planned depth. Backfilled with drill cuttings.
	10							
	15							
160								
	20							

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 175.8 **DATE START/END:** 6/20/2023 - 6/20/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 5.5 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-11

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	3 in. ASPHALT (0-1.5) Auger cuttings sampled as: SILTY SAND (SM); ~75% F-C sand, ~25% NP fines, brown, dry to moist. S1: WIDELY-GRADED SAND WITH GRAVEL (SW); ~80% F-C sand, ~15% F-gravel, ~5% NP fines, brown, moist.
		S1	1.5 to 3.5	24/16	10-9-8-8			
		S2	3.5 to 5.5	24/18	13-12-12-15			S2: Similar to S1; ~85% F-C sand, ~10% F-gravel, ~5% NP fines,
170	5							Planned depth. Backfilled with drill cuttings.
	10							
160	15							
	20							

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

BORING INFORMATION

LOCATION: See plan.

GROUND SURFACE EL. (ft): 176 **DATE START/END:** 6/20/2023 - 6/20/2023

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard

TOTAL DEPTH (ft): 5.5 **DRILLER NAME:** Mike Glynn

LOGGED BY: T. Yurman **RIG TYPE:**

BORING B-12

DRILLING INFORMATION

HAMMER TYPE: Safety Hammer - semi-automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:**

AUGER I.D./O.D.: 3.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow-stem Auger

WATER LEVEL DEPTHS (ft): Groundwater not encountered

ABBREVIATIONS:

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer

S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger

Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter

NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
							SAND	4 in. ASPHALT (0-1.5) Auger cuttings sampled as: SILTY SAND (SM); ~80% F-C sand, ~20% NP fines, brown, dry to moist. G1: WIDELY-GRADED SAND WITH GRAVEL (SW); ~85% F-C sand, ~10% F-gravel, ~5% NP fines, brown, dry to moist. G2: Similar to S1.
		G-1	1.5 to 3.5	24/24				
	5	G-2	3.5 to 5.5	24/24				
170								Planned depth. Backfilled with drill cuttings.
	10							
	15							
160								
	20							

NOTES:

PROJECT NAME: Prospect-1263 Hopmeadow St Simsbury

CITY/STATE: Simsbury, Connecticut

GEI PROJECT NUMBER: 2302394

GEI Consultants

1263 Hopmeadow Street
Simsbury, CT
GEI Project No. 2101336
Test Pit Results

GEI Consultants
Consulting Engineers & Scientists

Date:	4/9/2021
GEI Representative:	A. Hernberg
GS Elev.	196.0
Contractor:	Pierce Builders, Inc. / Bob
Equipment:	Deere 310SG Backhoe

ID	Depth	Description
TP1	0 - 2.5"	ASPHALT.
	2.5" - 1'-8"	SILTY SAND (SM); ~75% mostly f sand, ~15% non-plastic fines, ~10% gravel and cobbles (up to 4"), light brown, damp. Possible fill.
	1'-8" - 3'	NARROWLY GRADED SAND WITH SILT (SW-SM); ~90% mostly f sand, ~10% fines, light brown, damp.
	3' - 5'	WIDELY GRADED SAND (SW); 93.5% f-c sand, 5.0% f gravel (up to 1/2"), 1.5% fines, light brown,
	5' - 7'-3"	WIDELY GRADED SAND WITH GRAVEL (SW); 73.9% f-c sand, 24.5% f-c gravel (up to 3"), 1.6% fines, light brown, moist. Contains seams/pockets of f sand throughout.
	7'-3" - 7'-6"	NARROWLY GRADED SAND (SP); ~95% f sand, ~5% fines, light brown, moist.

Notes:
1. Test Pit Dimensions: 7.5' x 2.5' x 7.5' (deep).
2. Groundwater was not encountered.

1263 Hopmeadow Street
Simsbury, CT
GEI Project No. 2101336
Test Pit Results

GEI Consultants
Consulting Engineers & Scientists

Date:	4/9/2021
GEI Representative:	A. Hernberg
GS Elev.	184.5
Contractor:	Pierce Builders, Inc. / Bob
Equipment:	Deere 310SG Backhoe

ID	Depth	Description
TP2	0 - 3"	ASPHALT.
	3" - 1'-1"	WIDELY GRADED GRAVEL WITH SILT AND SAND (GW-GM); ~50% f-c gravel (up to 3"), ~40% f-c sand, ~10% low-plasticity fines, red-brown, damp, contains organic fibers. Possible fill.
	1'-1" - 6'-6"	NARROWLY GRADED SAND (SP); ~95% f sand, ~5% fines, brown to light brown (banded) to 4', light brown 4-6.5', damp to moist. Color bands 1/16"-1" thick.
	6'-6" - 8'	SILTY SAND (SM); ~60% f sand, ~40% non-plastic fines, light brown, moist.

Notes:
1. Test Pit Dimensions: 7.5' x 3' x 8' (deep).
2. Groundwater was not encountered.

1263 Hopmeadow Street
Simsbury, CT
GEI Project No. 2101336
Test Pit Results

GEI Consultants
Consulting Engineers & Scientists

Date:	4/9/2021
GEI Representative:	A. Hernberg
GS Elev.	196.0
Contractor:	Pierce Builders, Inc. / Bob
Equipment:	Deere 310SG Backhoe

ID	Depth	Description
TP3	0 - 2"	ASPHALT.
	2" - 8"	SILTY SAND WITH GRAVEL (SM); ~50% f-c sand, ~30% f-c gravel and cobbles (up to 4"), ~20% low-plasticity fines, gray-brown, damp. Possible fill.
	8" - 4'-6"	NARROWLY GRADED SAND (SP); 97.5% f sand, 1.1% f gravel (up to 1/2"), 1.4% fines, light brown, moist.
	4'-6" - 6'-9"	WIDELY GRAVED SAND WITH GRAVEL (SW); ~70% f-c sand, ~30% f-c gravel and cobbles (up to 5"), light brown, moist.
	6'-9" - 7'-5"	NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% f sand, ~10% non-plastic fines, light brown, moist.
	7'-5" - 8'-6"	SILTY SAND (SM); ~70% f sand, ~30% non-plastic fines, light brown, moist.

Notes:
1. Test Pit Dimensions: 8' x 3' x 8.5' (deep).
2. Groundwater was not encountered.

1263 Hopmeadow Street
Simsbury, CT
GEI Project No. 2101336
Test Pit Results

GEI Consultants
Consulting Engineers & Scientists

Date:	4/9/2021
GEI Representative:	A. Hernberg
GS Elev.	194.5
Contractor:	Pierce Builders, Inc. / Bob
Equipment:	Deere 310SG Backhoe

ID	Depth	Description
TP4	0 - 2.5"	ASPHALT.
	2.5" - 1'-2"	SILTY SAND WITH GRAVEL (SM); ~60% f-c sand, ~20% f-c gravel (up to 3"), ~20% low-plasticity fines, gray-brown, damp. Contains small (~3" diameter) pockets of dark gray silt sand with organic fibers. FILL.
	1'-2" - 3'-3"	NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% f sand, ~10% non-plastic fines, ~5% f gravel, dark brown 1'-2" to 2', brown 2'-3'-3", moist.
	3'-3" - 5'-6"	WIDELY GRAVED SAND WITH GRAVEL (SW); 51.8% f-c sand, 46.7% f-c gravel (up to 3"), 1.5% fines, light brown, moist.
	5'-6" - 7'-6"	NARROWLY GRADED SAND (SP); ~90% f sand, ~5% f gravel (up to 1/4"), ~5% fines, light brown, moist.

Notes:
1. Test Pit Dimensions: 8' x 3' x 7.5' (deep).
2. Groundwater was not encountered.

1263 Hopmeadow Street
Simsbury, CT
GEI Project No. 2101336
Test Pit Results

GEI Consultants
Consulting Engineers & Scientists

Date:	4/9/2021
GEI Representative:	A. Hernberg
GS Elev.	193.0
Contractor:	Pierce Builders, Inc. / Bob
Equipment:	Deere 310SG Backhoe

ID	Depth	Description
TP5	0 - 2.5"	ASPHALT.
	2.5" - 8"	SILTY SAND WITH GRAVEL (SM); ~60% f-c sand, ~20% f-c gravel (up to 2"), ~20% low-plasticity fines, gray-brown, damp. FILL.
	8" - 6'-6"	SILTY SAND (SM); ~85% f sand, ~15% low-plasticity fines, brown, moist. Contains trace f gravel. Pockets of roots to ~5' deep, roots typically less than 1/4" diameter. Possible fill.
	6'-6" - 8'	NARROWLY GRADED SAND (SP); ~95% f sand, ~5% fines, light brown, moist.

Notes:
1. Test Pit Dimensions: 8' x 3' x 8' (deep).
2. Groundwater was not encountered.

1263 Hopmeadow Street, Simsbury, CT
GEI Proj # 2302394- 1.1
Soil Permeability Calculations

GEI Consultants

WELL CALCULATION

$$k'_v = \frac{d^2\left(\frac{\pi}{11}\frac{k'_v}{k_v}\frac{D}{m} + L\right)}{D^2(t_2 - t_1)} \ln\frac{H_1}{H_2}$$

("Soil in casing in uniform soil," Lambe and Whitman, 1969.)

TEST LOCATION	**B-10A**				
Length of Casing	152.4	(cm)	Depth of Test	4.0	FT
Diameter, stone pack	13.335	D (cm)	GS Elevation	176.5	
Diam., casing	5.08	d (cm)	Depth to GW	17	
Test Length	30.5	L (cm)			
Transformation ratio	1	m			
k'_v/k_v	1	*Assumed*			
Soil Classification:		SILTY SAND (SM); ~80% F-C sand, ~15% NP fines, ~5% F gravel, brown, dry.			

Test 1

Depth to Water (cm)	Time t	Vertical Perm. k'_v (cm/sec)	Vertical Perm. k'_v (in/hr)
1.91	0		
3.18	30	8.47E-02	120.09
5.08	60	7.80E-02	110.49
5.72	90	1.95E-02	27.69
6.35	120	1.75E-02	24.77
7.62	150	3.02E-02	42.86
8.26	180	1.33E-02	18.82
9.53	210	2.37E-02	33.64
10.16	240	1.07E-02	15.17
10.80	270	1.01E-02	14.25
11.43	300	9.48E-03	13.44
12.07	360	4.48E-03	6.36
13.21	420	7.51E-03	10.64
13.97	480	4.65E-03	6.59
16.26	600	6.28E-03	8.91
18.42	720	5.17E-03	7.33
19.56	840	2.50E-03	3.54
25.40	1200	3.61E-03	5.12
		AVERAGE	**5.33**

Test 2

Depth to Water (cm)	Time t (seconds)	Vertical Perm. k'_v (cm/sec)	Vertical Perm. k'_v (in/hr)
0.00	0		
0.32	30	#NUM!	#NUM!
0.64	60	1.15E-01	162.95
1.59	90	1.52E-01	215.41
1.59	120	0.00E+00	0.00
1.91	150	3.02E-02	42.86
2.22	180	2.56E-02	36.24
2.54	210	2.21E-02	31.39
2.54	240	0.00E+00	0.00
3.81	300	3.36E-02	47.66
4.45	360	1.28E-02	18.12
5.08	420	1.11E-02	15.70
5.72	480	9.77E-03	13.84
6.99	600	8.32E-03	11.79
8.26	720	6.93E-03	9.82
9.21	840	4.53E-03	6.42
12.70	1200	4.45E-03	6.30
		AVERAGE	**6.36**

1263 Hopmeadow Street, Simsbury, CT
GEI Proj # 2302394- 1.1
Soil Permeability Calculations

GEI Consultants

WELL CALCULATION

$$k'_v = \frac{d^2(\frac{\pi}{11}\frac{k'_v}{k_v}\frac{D}{m} + L)}{D^2(t_2 - t_1)}\ln\frac{H_1}{H_2}$$

("Soil in casing in uniform soil," Lambe and Whitman, 1969.)

TEST LOCATION	**B-11A**				
Length of Casing	152.4	(cm)	Depth of Test	2.6	FT
Diameter, stone pack	8.89	D (cm)	GS Elevation	175.8	
Diam., casing	5.08	d (cm)	Depth to GW	> 17 ft	
Test Length	30.5	L (cm)			
Transformation ratio	1	m			
k'v/kv	1	*Assumed*			
Soil Classification:		WIDELY GRADED SAND WITH GRAVEL (GW); ~80% F-C sand, ~15% F- gravel, ~5% NP fines, brown, moist.			

Test 1

Depth to Water (cm)	Time t	Vertical Perm. k'v (cm/sec)	Vertical Perm. k'v (in/hr)
3.81	0		
9.53	30	3.29E-01	466.73
13.34	60	1.21E-01	171.39
15.24	90	4.80E-02	68.02
17.78	120	5.54E-02	78.52
18.54	150	1.51E-02	21.38
20.32	180	2.40E-02	34.01
22.86	240	2.12E-02	30.00
26.52	300	2.67E-02	37.80
28.96	360	1.58E-02	22.40
36.27	480	2.02E-02	28.68
41.76	600	1.27E-02	17.94
		AVERAGE	**23.01**

Test 2

Depth to Water (cm)	Time t (seconds)	Vertical Perm. k'v (cm/sec)	Vertical Perm. k'v (in/hr)
0.00	0		
2.54	30		
5.08	60	2.49E-01	353.07
7.62	90	1.46E-01	206.53
10.16	120	1.03E-01	146.54
12.70	150	8.02E-02	113.66
14.61	180	5.02E-02	71.19
19.05	240	4.77E-02	67.67
25.40	300	5.17E-02	73.27
28.58	360	2.12E-02	30.00
40.01	480	3.02E-02	42.85
49.53	600	1.92E-02	27.20
		AVERAGE	**33.35**

1263 Hopmeadow Street, Simsbury, CT
GEI Proj # 2302394- 1.1
Soil Permeability Calculations

GEI Consultants

WELL CALCULATION

$$k'_v = \frac{d^2(\frac{\pi}{11}\frac{k'_v}{k_v}\frac{D}{m} + L)}{D^2(t_2 - t_1)}\ln\frac{H_1}{H_2}$$

("Soil in casing in uniform soil," Lambe and Whitman, 1969.)

TEST LOCATION	**B-12A**				
Length of Casing	152.4	(cm)	Depth of Test	2.6	FT
Diameter, stone pack	8.89	D (cm)	GS Elevation	176.0	
Diam., casing	5.08	d (cm)	Depth to GW	> 17 ft	
Test Length	30.5	L (cm)			
Transformation ratio	1	m			
k'v/kv	1	*Assumed*			
Soil Classification:		WIDELY GRADED SAND WITH GRAVEL (GW); ~85% F-C sand, ~10% F- gravel, ~5% NP fines, light brown, moist.			

Test 1

Depth to Water (cm)	Time t	Vertical Perm. k'v (cm/sec)	Vertical Perm. k'v (in/hr)
0.00	0		
5.08	30		
10.80	60	2.71E-01	383.95
16.51	90	1.53E-01	216.42
20.96	120	8.57E-02	121.44
26.04	150	7.80E-02	110.57
30.48	180	6.73E-02	95.43
39.37	240	4.60E-02	65.18
46.99	300	3.18E-02	45.06
55.25	360	2.91E-02	41.22
67.95	480	1.86E-02	26.35
77.47	600	1.18E-02	16.71
		AVERAGE	**21.53**

Test 2

Depth to Water (cm)	Time t (seconds)	Vertical Perm. k'v (cm/sec)	Vertical Perm. k'v (in/hr)
0.00	0		
4.45	30		
8.26	60	2.22E-01	315.32
12.70	90	1.55E-01	219.43
16.51	120	9.43E-02	133.64
20.96	150	8.57E-02	121.44
24.77	180	6.00E-02	85.09
31.75	240	4.46E-02	63.28
38.10	300	3.28E-02	46.43
44.45	360	2.77E-02	39.26
55.25	480	1.95E-02	27.69
64.77	600	1.43E-02	20.26
		AVERAGE	**23.97**

FEMA Floodway Map

National Flood Hazard Layer FIRMette

FEMA

72°47'32"W 41°54'16"N

72°46'54"W 41°53'49"N

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

1:6,000

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
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/5/2022 at 4:04 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.

Appendix C:

Site/Block BMP Selection Matrix

Water Quality Unit Sizing

Recharge Calculations

StormCAD: Schematic

StormCAD: Conduit Table

StormCAD: Structure Table

Site/Block BMP Selection Matrix (Town of Simsbury)

Table 1.3: Site/Block BMP Selection Matrix

	SC-1	SC-2	SC-3	SC-4	SC-5	CIV	OS	Other Zones	TSS	TP	TN
PAVING											
Compacted Earth									-	-	-
Crushed Stone/Shell									-	-	-
Standard Asphalt/Concrete Pavement									-	-	-
Pavers/Brick									-	-	-
Grassed Cellular Plastic/Concrete									-	-	-
Permeable Pavement[1]									90%	40%	40%
CONVEYANCE											
Stone/Riprap Swale											
Vegetated Bioswale									90%	30%	55%
Pipe[2]									-	-	-
Shallow Stone/Cobble Channel									-	-	-
Shallow Masonry Trough									-	-	-
Engineered Sculpted Watercourse									-	-	-
RATE/VOLUME											
Dry Extended Detention Basin[3]									50%	20%	25%
Wet Extended Detention Basin[3]									80%	52%	31%
Special Detention Area									varies	varies	varies
Rain Barrel/Cistern									-	-	-
Stormwater Harvesting for Irrigation									-	-	-
Stormwater Harvesting for Building Uses							n/a		-	-	-
Underground Infiltration Trench/Drywell									90%	55%	40%
Underground Vault/Pipe/Cistern									20%	15%	5%
WATER QUALITY[4]											
Wet Vegetated System									85%	48%	30%
Gravel Vegetated System									86%	53%	55%
Organic/Sand Filter									86%	59%	32%
Bioretention									90%	30%	55%
Roof Downspout Disconnection							n/a		varies	varies	varies
Tree Box Filter									90%	30%	55%
Green Roof							n/a		90%	30%	55%
Flow-through Planter									90%	30%	55%
Forebay/Vegetated Filter Pretreatment									25%	-	-
Grass Channel Pretreatment									70%	24%	40%
Deep Sump Catch Basin Pretreatment									25%	-	-
Proprietary Hydrodynamic Devices									25%	-	-

Encouraged
Allowed
Not allowed without Town Engineer approval
72% Median Pollutant Removal Efficiency (Percent)
- No treatment
ND No data

Water Quality Unit Sizing

Computations

Project:	Proposed Commercial Dev	Project #	42810.00
Location:	Simsbury, Connecticut	Sheet	1 of 1
Calculated by:	KE	Date:	2/10/2023
Checked by:		Date:	
Title	Water Quality Flow Calculations		

WQU-1

Area Impervious:	2.671	Acres	
Total Area [A]:	4.174	Acres	
I:	64.00	%	
R:	0.63		
WQV:	0.22	Ac-ft	
Q:	0.63	Inches	
CN:	96		if >98, use 98
P:	1.00	inch	for water quality storms
I_a:	0.083		get from table 4-1, TR-55
T_c:	5.00	minutes	
q_u:	700.00		get from exhibit 4-11, TR-55
WQF:	2.86	CFS	ANSWER

Recharge Calculations

Recharge Calculations

Proj. No.: 42810.0

Project Name: Commercial Development **Date:** 2/21/2023

Project Location: Simsbury, CT **Calculated by:** KE

Checked by: RS

Proposed Impervious Surface Summary

50% of Net Proposed Impervious Areas by Hydrologic Soil Group (HSG) in acres

Subcatchment	HSG A	HSG B	HSG C	HSG D	Total Area
TOTAL	**0.00**	**1.33**	**0.0**	**0.0**	**1.3**

Recharge Volume per Simsbury Stormwater Guidelines (Cubic Feet)

HSG	Area (acres)	Recharge Depth * (inches)	Volume (c.f.)
A	0.0	0.660	0
B	1.3	0.385	1,855
C	0.0	0.275	0
D	0.0	0.110	0
TOTAL			**1,855**

* Depth rate reflects 110% Per Town of Simsbury Recharge Requirements

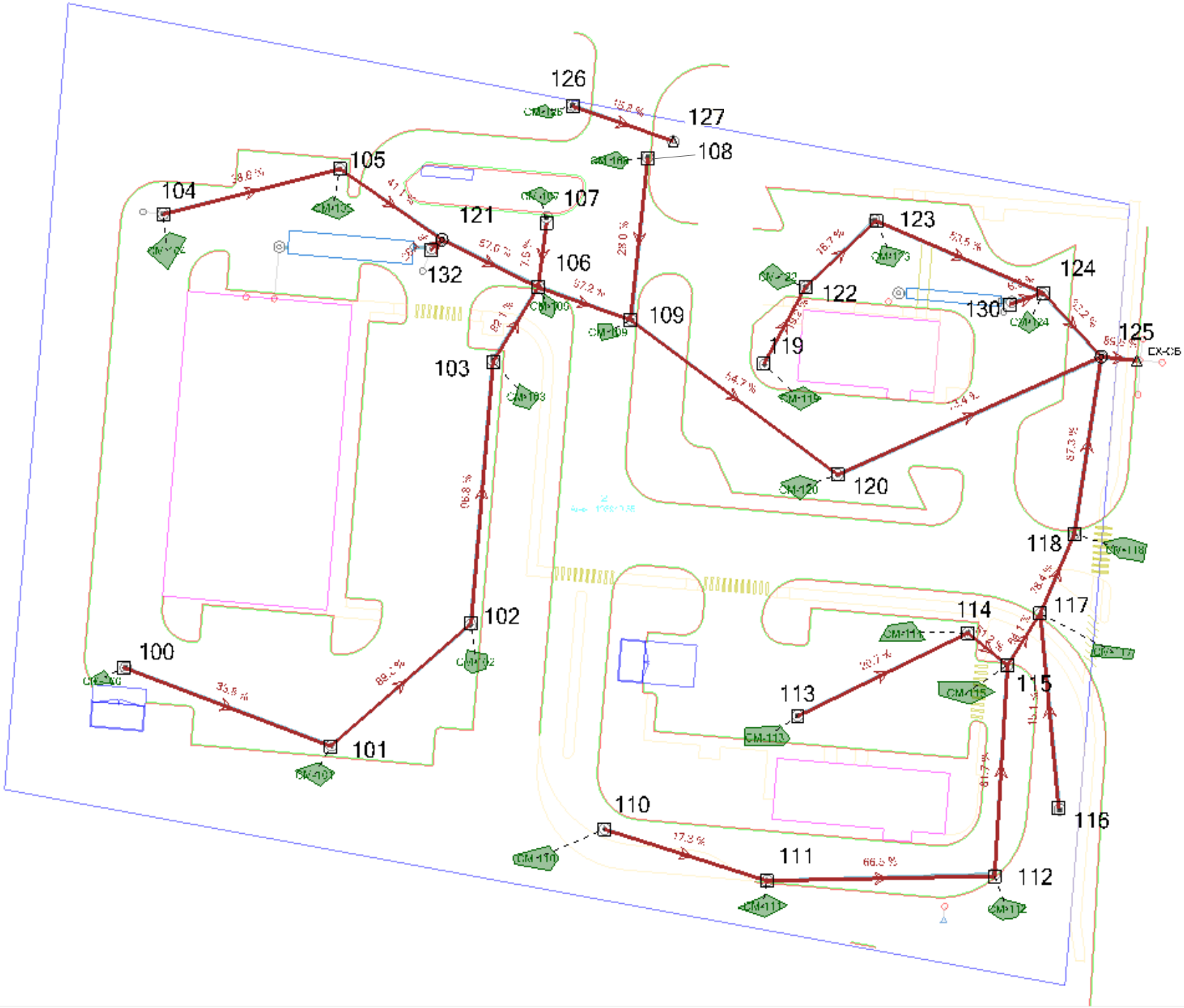
Provided Recharge Volume (Cubic Feet)

Volumes provided are storage at the 2-year storm events (See HydroCAD Report)

Rain Garden	413
2p	1,263
3P	218
Total	**1,894** c.f.

StormCAD: Schematic

Scenario: Base



StormCAD: Conduit Table (25-year Storm Event)

FlexTable: Conduit Table

Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	Diameter (in)	Flow (cfs)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Cover (Start) (ft)	Cover (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
100	101	184.70	183.50	107.1	0.011	4.33	12.0	1.27	3.77	33.8	2.50	2.50	185.18	184.24
101	102	183.50	183.00	89.7	0.006	3.83	12.0	2.37	2.66	89.2	2.50	3.00	184.24	183.79
102	103	183.00	181.90	124.3	0.009	4.86	12.0	3.25	3.35	96.8	3.00	4.10	183.79	182.73
103	106	181.90	181.20	41.6	0.017	6.57	12.0	3.79	4.62	82.1	4.10	2.80	182.73	182.18
106	109	181.20	179.10	47.4	0.044	10.88	12.0	7.29	7.50	97.2	2.80	2.80	182.18	179.92
119	122	175.60	175.40	41.5	0.005	1.53	6.0	0.07	0.39	19.2	2.30	3.00	175.79	175.78
120	125	173.80	171.80	139.6	0.014	7.78	18.0	9.23	12.57	73.4	2.10	1.70	174.97	172.75
125	EX-CB	171.00	170.50	17.3	0.029	11.44	18.0	16.01	17.87	89.6	2.50	2.50	172.43	171.74
104	105	184.70	184.00	88.5	0.008	3.78	12.0	1.22	3.17	38.6	2.50	2.50	185.17	184.60
105	121	184.00	182.90	59.7	0.018	5.85	12.0	1.99	4.84	41.1	2.50	3.60	184.60	183.72
108	109	179.00	178.60	77.0	0.005	2.80	12.0	0.72	2.57	28.0	2.50	3.30	179.75	179.72
123	124	174.50	174.00	87.9	0.006	3.48	12.0	1.44	2.69	53.5	2.70	2.50	175.02	174.51
124	125	173.60	172.00	41.4	0.039	7.95	12.0	2.26	7.01	32.2	2.90	2.00	174.24	172.39
110	111	176.00	174.20	82.3	0.022	5.02	12.0	0.91	5.27	17.3	2.00	2.50	176.40	174.80
111	112	174.20	173.60	110.6	0.005	3.57	12.0	1.74	2.62	66.5	2.50	3.30	174.80	174.29
112	115	173.60	173.10	100.1	0.005	3.58	12.0	2.06	2.52	81.7	3.30	3.20	174.29	173.97
113	114	175.30	173.50	91.5	0.020	5.02	12.0	1.04	5.00	20.7	2.50	2.50	175.73	174.11
109	120	178.60	173.80	124.5	0.039	10.99	15.0	8.21	12.68	64.7	3.05	2.35	179.72	174.97
117	118	172.10	171.55	41.0	0.013	6.75	15.0	5.86	7.48	78.4	1.50	1.75	173.08	172.71
118	125	171.55	171.00	85.2	0.006	5.38	18.0	7.37	8.44	87.3	1.50	2.50	172.71	172.43
115	117	173.10	172.10	29.3	0.034	8.89	12.0	4.22	6.58	64.1	3.20	1.75	173.97	173.08
122	123	175.40	174.50	46.6	0.019	4.67	12.0	0.83	4.95	16.7	2.50	2.70	175.78	175.02
126	127	177.00	175.90	51.4	0.021	4.85	12.0	0.82	5.21	15.8	3.00	4.40	177.38	176.17
114	115	173.50	173.20	24.6	0.012	5.04	12.0	2.01	3.93	51.2	2.50	3.10	174.11	173.97
107	106	181.50	181.20	30.8	0.010	2.65	12.0	0.27	3.52	7.6	2.50	2.80	182.18	182.18
130	124	174.90	174.50	17.0	0.023	3.84	12.0	0.33	5.46	6.0	2.10	2.00	175.14	174.67
116	117	172.90	172.10	92.6	0.009	3.04	12.0	0.50	3.31	15.1	1.60	1.75	173.19	173.08
121	106	182.90	181.20	51.9	0.033	8.48	12.0	3.68	6.45	57.0	3.60	2.80	183.72	182.18
132	121	183.10	182.90	7.0	0.029	6.59	12.0	1.71	6.01	28.4	3.90	3.60	183.66	183.72

StormCAD: Structure Table

Structure Table

Label	Elevation (Rim) (ft)
100	188.20
101	187.00
102	187.00
103	187.00
104	188.20
105	187.50
106	185.00
107	185.00
108	182.50
109	182.90
110	179.00
111	177.70
112	177.90
113	178.80
114	177.00
115	177.30
116	175.50
117	174.85
118	174.55
119	178.40
120	177.40
121	187.5
122	178.9
123	178.2
124	177.5
125	175.0
126	181.0
130	178.0
132	188.0

Appendix D:

Erosion and Sedimentation Control Measures

Erosion and Sedimentation Control Measures

The following erosion and sedimentation controls are for use during the earthwork and construction phases of the project. The following controls are provided as recommendations for the site contractor.

Silt Fencing

Silt fence sill be installed around the limit of work as shown on the plans. In areas where high runoff velocities or high sediment loads are expected, straw barriers will be installed up-gradient of silt fencing. This semi-permeable barrier made of a synthetic porous fabric will provide additional protection. The silt fences and hay bale barrier will be replaced as determined by periodic field inspections.

Catch Basin Protection

Newly constructed and existing catch basins will be protected with silt sacks throughout construction.

Gravel and Construction Entrance/Exit

A temporary crushed-stone construction entrance/exit will be constructed. A cross slope will be placed in the entrance to direct runoff to a protected catch basin inlet or settling area. If deemed necessary after construction begins, a wash pad may be included to wash off vehicle wheels before leaving the project site.

Vegetative Slope Stabilization

Stabilization of open soil surfaces will be implemented within 14 days after grading or construction activities have temporarily or permanently ceased, unless there is sufficient snow cover to prohibit implementation. Vegetative slope stabilization will be used to minimize erosion on slopes of 3:1 or flatter. Annual grasses, such as annual rye, will be used to ensure rapid germination and production of root mass. Permanent stabilization will be completed with the planting of perennial grasses or legumes. Establishment of temporary and permanent vegetative cover may be established by hydro-seeding or sodding. A suitable topsoil, good seedbed preparation, and adequate lime, fertilizer and water will be provided for effective establishment of these vegetative stabilization methods. Mulch will also be used after

permanent seeding to protect soil from the impact of falling rain and to increase the capacity of the soil to absorb water.

Maintenance

- The contractor or subcontractor will be responsible for implementing each control shown on the Sedimentation and Erosion Control Plan. In accordance with EPA regulations, the contractor must sign a copy of a certification to verify that a plan has been prepared and that permit regulations are understood.

- The on-site contractor will inspect all sediment and erosion control structures periodically and after each rainfall event. Records of the inspections will be prepared and maintained on-site by the contractor.

- Silt shall be removed from behind barriers if greater than 6-inches deep or as needed.

- Damaged or deteriorated items will be repaired immediately after identification.

- Sediment that is collected in structures shall be disposed of properly and covered if stored on-site.

- Erosion control structures shall remain in place until all disturbed earth has been securely stabilized. After removal of structures, disturbed areas shall be regraded and stabilized as necessary.

The sedimentation and erosion control plan is included in project plan set; a reduced version and Erosion Control Maintenance checklist is included here for quick reference.

Construction Best Management Practices - Maintenance/Evaluation Checklist

Proposed Commercial Development– Simsbury, CT – 1263 Hopmeadow Street

Best Management Practices – Maintenance/ Evaluation Checklist

Construction Practices

Best Management Practice	Inspection Frequency	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed ☐yes ☐no (List Items)	Date of Cleaning/Repair	Performed by
Silt Fencing	Once per week or after a 1″ or greater storm event						
Catch Basin Protection	Once per week or after a 1″ or greater storm event						
Stabilized Construction Exit	Once per week or after a 1″ or greater storm event						
Temporary Sediment Basin	Once per week or after a 1″ or greater storm event						
Vegetated Slope Stabilization	Once per week or after a 1″ or greater storm event						

Stormwater Control Manager _____

Appendix E:

Long Term Stormwater Operation and Maintenance Measures

Project Information

Site

Project Name:	Proposed Commercial Development
Address or Locus:	200 Hopmeadow Street
City, State & Zip:	Simsbury, CT

Developer

Client Name:	Prospect Enterprises, LLC
Client Address:	231 Farmington Avenue
Client City, State & Zip:	Farmington, CT 06032
Client Telephone No.:	(860) 249-2242 Ext 102
Client Cell Phone:	
Client E-Mail:	g.nanni@theprospectco.com

Site Supervisor

Site Manager Name:	
Site Manager Address:	
Site Manager City, State & Zip:	
Site Manager Telephone No.:	
Site Manager Cell Phone:	
Site Manager E-Mail:	

Long Term Stormwater Maintenance Measures –

Per the Town of Simsbury, a 5-year period of yearly reporting of inspections/maintenance for the drainage system shall be submitted to the Planning Department.

The following maintenance program is proposed to ensure the continued effectiveness of the structural water quality controls previously described:

- Inspect stormwater basins once annually, in the spring, for cracking or erosion of side slopes, embankments, and accumulated sediment. Necessary sediment removal, earth repair, and/or reseeding will be performed immediately upon identification.
- Inspect sediment traps/forebays monthly for erosion of side slopes and accumulated sediment. Necessary sediment removal, earth repair and/or reseeding shall be performed immediately upon identification. Clean traps/ forebays approximately four times per year or as needed.
- Clean all catch basins once annually to remove accumulated sand, sediment, and floatable products or as needed based on use.
- Paved areas will be swept, at a minimum, two (2) times per year.
- Routinely pick up and remove litter from the parking areas, islands and perimeter landscape areas in addition to regular pavement sweeping.
- Routinely inspect all dumpster and compactor locations for spills. Remove all trash litter from the enclosure and dispose of properly.

Pavement Systems

Standard Asphalt Pavement

- Sweep or vacuum standard asphalt pavement areas at least two times per year with a commercial cleaning unit and properly dispose of removed material.
- Recommended sweeping schedule:
  - Oct/Nov
  - Apr/May
- More frequent sweeping of paved surfaces will result in less accumulation in catch basins, less cleaning of subsurface structures, and less disposal costs.
- Check dumpster areas frequently for spillage and/or pavement staining and clean as necessary.

Structural Stormwater Management Devices

Catch Basins

- All catch basins shall be inspected and cleaned a minimum of at least once per year.
- Sediment (if more than six inches deep) and/or floatable pollutants shall be pumped from the basin and disposed of at an approved offsite facility in accordance with all applicable regulations.
- Any structural damage or other indication of malfunction will be reported to the site manager and repaired as necessary
- During colder periods, the catch basin grates must be kept free of snow and ice.
- During warmer periods, the catch basin grates must be kept free of leaves, litter, sand, and debris.

Subsurface Infiltration Systems

- The subsurface infiltration systems will be inspected at least once each year by removing the manhole/access port covers and determining the thickness of sediment that has accumulated in the sediment removal row.
- If sediment is more than six inches deep, it must be suspended via flushing with clean water and removed using a vactor truck.
- Manufacturer's specifications and instructions for cleaning the sediment removal row should be consulted.
- Emergency overflow pipes will be examined at least once each year and verified that no blockage has occurred.
- System will be observed after rainfalls to see if it is properly draining.

Structural Water Quality Devices

- FOLLOW MANUFACTURER'S INSTRUCTIONS ON O&M REQUIREMENTS AND METHODOLOGY
- Inspect devices monthly for the first three months after construction.
- After initial three month period, all water quality units are to be inspected at least four times per year and cleaned a minimum of at least once per year or when sediment reaches 8" in depth.
- Follow manufacturer instructions for inspection and cleaning and contact manufacturer if system is malfunctioning.

Stormwater Outfalls

- Inspect outfall locations monthly for the first three months after construction to ensure proper functioning and correct any areas that have settled or experienced washouts.

- Inspect outfalls annually after initial three month period.
- Annual inspections should be supplemented after large storms, when washouts may occur.
- Maintain vegetation around outfalls to prevent blockages at the outfall.
- Maintain rip rap pad below each outfall and replace any washouts.
- Remove and dispose of any trash or debris at the outfall.

Roof Drain Leaders

- Perform routine roof inspections quarterly.
- Keep roofs clean and free of debris.
- Keep roof drainage systems clear.
- Keep roof access limited to authorized personnel.
- Clean inlets draining to the subsurface bed twice per year as necessary.

Vegetated Stormwater Management Devices

Infiltration Basin

Initial Post-Construction Inspection

- Infiltration basins should be inspected after every major storm for the first few months to ensure proper stabilization and function.

Long-Term Maintenance

- The grass on the side slopes should be mowed, and grass clippings, organic matter, and accumulated trash and debris removed, at least twice during the growing season.
- Eroded or barren spots should be reseeded immediately after inspection to prevent additional erosion and accumulation of sediment.
- Sediment should be removed from the basin as necessary. Removal procedures should not take place until the floor of the basin is thoroughly dry.

Inspections and Cleaning

- Basins should be inspected at least once a year to ensure proper stabilization and function.
- Light equipment, which will not compact the underlying soil, should be used to remove the top layer.

Vegetated Areas Maintenance

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the functioning of stormwater management practices. This includes the health/density of vegetative cover and activities such as the

application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

- Inspect planted areas on a semi-annual basis and remove any litter.
- Maintain planted areas adjacent to pavement to prevent soil washout.
- Immediately clean any soil deposited on pavement.
- Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative mixture of grass species in the event of unsuccessful establishment.
- The grass vegetation should be cut to a height between three and four inches.

Long Term Best Management Practices Checklist

Proposed Commercial Development– Simsbury, CT – 1263 Hopmeadow Street

Best Management Practices – Maintenance/ Evaluation Checklist

Long Term Practices

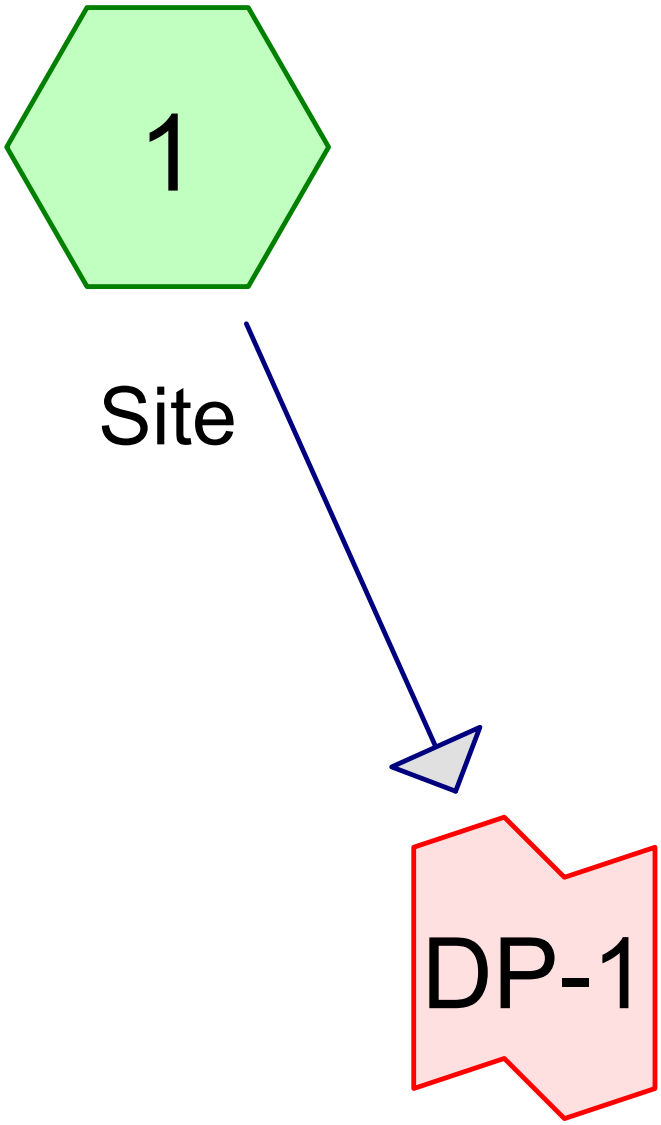
Best Management Practice	Inspection Frequency	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed ☐yes ☐no (List Items)	Date of Cleaning/Repair	Performed by
Street Sweeping	2x per year, preferably in late spring and late fall.						
Trash/Litter	Routinely pick up and remove litter from entire property as required.						
Catch Basins	Inspect annually. Clean annually or when sediment is greater than 6″.						
Hydrodynamic Water Quality Unit	CHECK SPECIFIC MANUFACTURER'S INSTRUCTIONS ON O&M REQUIREMENTS AND METHODOLOGY. Recommendation: Inspect monthly for first 3 months. Inspect 4x per year and clean at least 1x per year or when sediment reaches 8″.						
Dumpster Location	Routinely inspect all dumpster and compactor locations for spills. Remove all trash litter from the enclosure and dispose of properly.						
Rain Garden	Inspect after every major storm for the first 3 months. Side slopes and buffer shall be mowed/trash removed at least twice during growing season						
Underground Infiltration Systems	Inspect after every major storm for the first 3 months. Inspect at least once per year thereafter.						
Roof Drains	Inspect quarterly for cleanliness and debris-free.						
Vegetated Areas	Inspect bi-annually. Replant bare areas upon identification.						
Outfalls	Inspect monthly for the first 3 months. Inspect at least once per year thereafter.						

Stormwater Control Manager _____

Appendix F:

Hydrologic Analysis

HydroCAD Analysis: Existing Conditions



Subcat Reach Pond Link

Routing Diagram for 42810.00 - EX
Prepared by VHB, Printed 2/21/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YEAR	Type III 24-hr		Default	24.00	1	3.28	2
2	10-YEAR	Type III 24-hr		Default	24.00	1	5.28	2
3	25-YEAR	Type III 24-hr		Default	24.00	1	6.53	2
4	50-YEAR	Type III 24-hr		Default	24.00	1	7.44	2
5	100-YEAR	Type III 24-hr		Default	24.00	1	8.45	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.055	69	50-75% Grass cover, Fair, HSG B (1)
0.358	61	>75% Grass cover, Good, HSG B (1)
3.688	98	Paved parking, HSG B (1)
0.869	58	Woods/grass comb., Good, HSG B (1)
4.969	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.969	HSG B	1
0.000	HSG C	
0.000	HSG D	
0.000	Other	
4.969		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.055	0.000	0.000	0.000	0.055	50-75% Grass cover, Fair	1
0.000	0.358	0.000	0.000	0.000	0.358	>75% Grass cover, Good	1
0.000	3.688	0.000	0.000	0.000	3.688	Paved parking	1
0.000	0.869	0.000	0.000	0.000	0.869	Woods/grass comb., Good	1
0.000	**4.969**	**0.000**	**0.000**	**0.000**	**4.969**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1	0.00	0.00	235.0	0.0208	0.011	0.0	12.0	0.0

Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.969 ac 74.21% Impervious Runoff Depth=2.07"
Flow Length=811' Tc=23.8 min CN=88 Runoff=7.53 cfs 0.857 af

Link DP-1: Hopmeadow Inflow=7.53 cfs 0.857 af
Primary=7.53 cfs 0.857 af

Total Runoff Area = 4.969 ac Runoff Volume = 0.857 af Average Runoff Depth = 2.07"
25.79% Pervious = 1.282 ac 74.21% Impervious = 3.688 ac

Summary for Subcatchment 1: Site

[47] Hint: Peak is 124% of capacity of segment #6

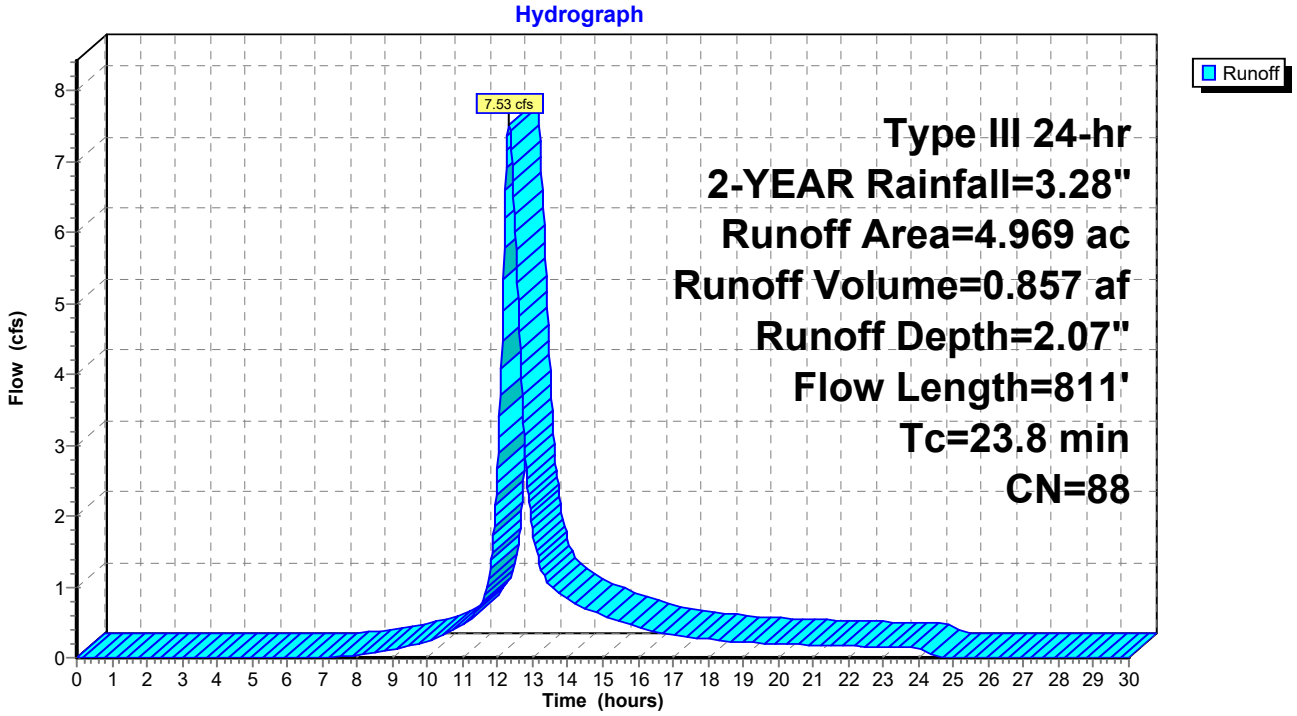
Runoff = 7.53 cfs @ 12.33 hrs, Volume= 0.857 af, Depth= 2.07"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.28"

Area (ac)	CN	Description
0.055	69	50-75% Grass cover, Fair, HSG B
0.358	61	>75% Grass cover, Good, HSG B
3.688	98	Paved parking, HSG B
0.869	58	Woods/grass comb., Good, HSG B
4.969	88	Weighted Average
1.282		25.79% Pervious Area
3.688		74.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.28"
1.6	48	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	242	0.0085	1.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	40	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	196	0.0410	1.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	235	0.0208	7.73	6.07	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
23.8	811	Total			

Subcatchment 1: Site

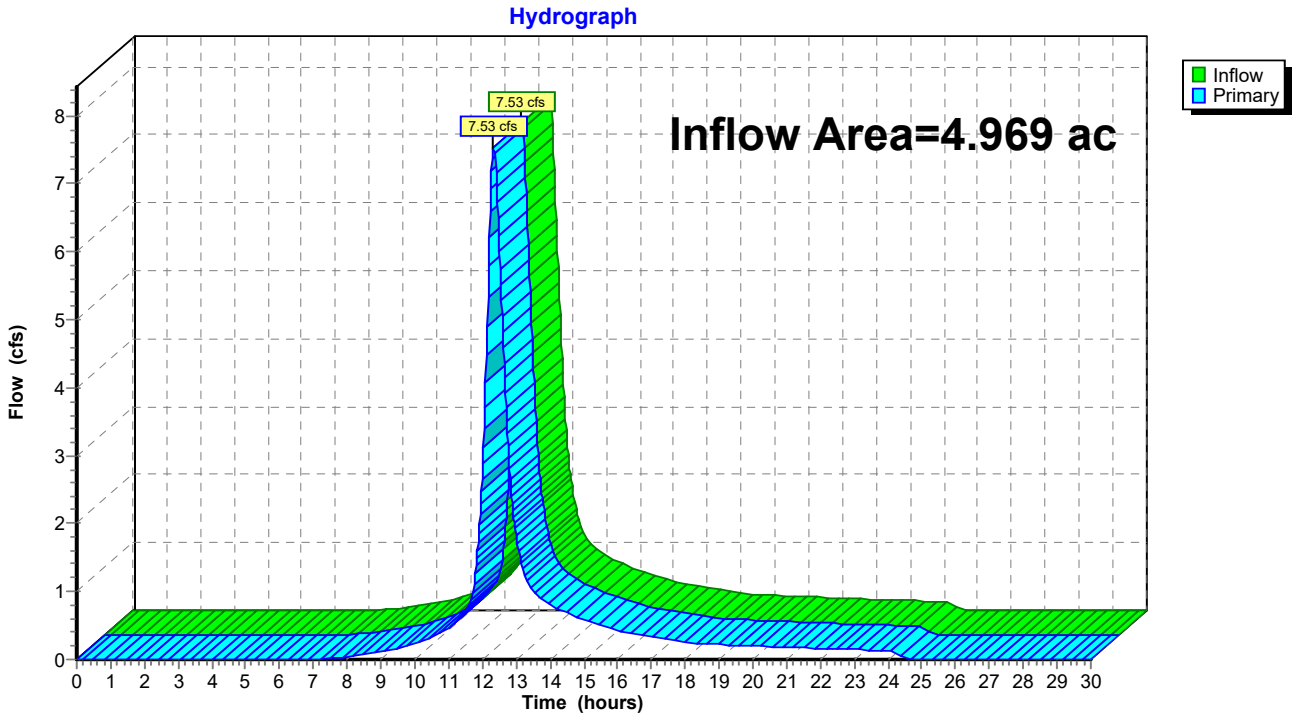


Summary for Link DP-1: Hopmeadow

Inflow Area = 4.969 ac, 74.21% Impervious, Inflow Depth = 2.07" for 2-YEAR event
Inflow = 7.53 cfs @ 12.33 hrs, Volume= 0.857 af
Primary = 7.53 cfs @ 12.33 hrs, Volume= 0.857 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.969 ac 74.21% Impervious Runoff Depth=3.94"
Flow Length=811' Tc=23.8 min CN=88 Runoff=14.05 cfs 1.630 af

Link DP-1: Hopmeadow Inflow=14.05 cfs 1.630 af
Primary=14.05 cfs 1.630 af

Total Runoff Area = 4.969 ac Runoff Volume = 1.630 af Average Runoff Depth = 3.94"
25.79% Pervious = 1.282 ac 74.21% Impervious = 3.688 ac

Summary for Subcatchment 1: Site

[47] Hint: Peak is 231% of capacity of segment #6

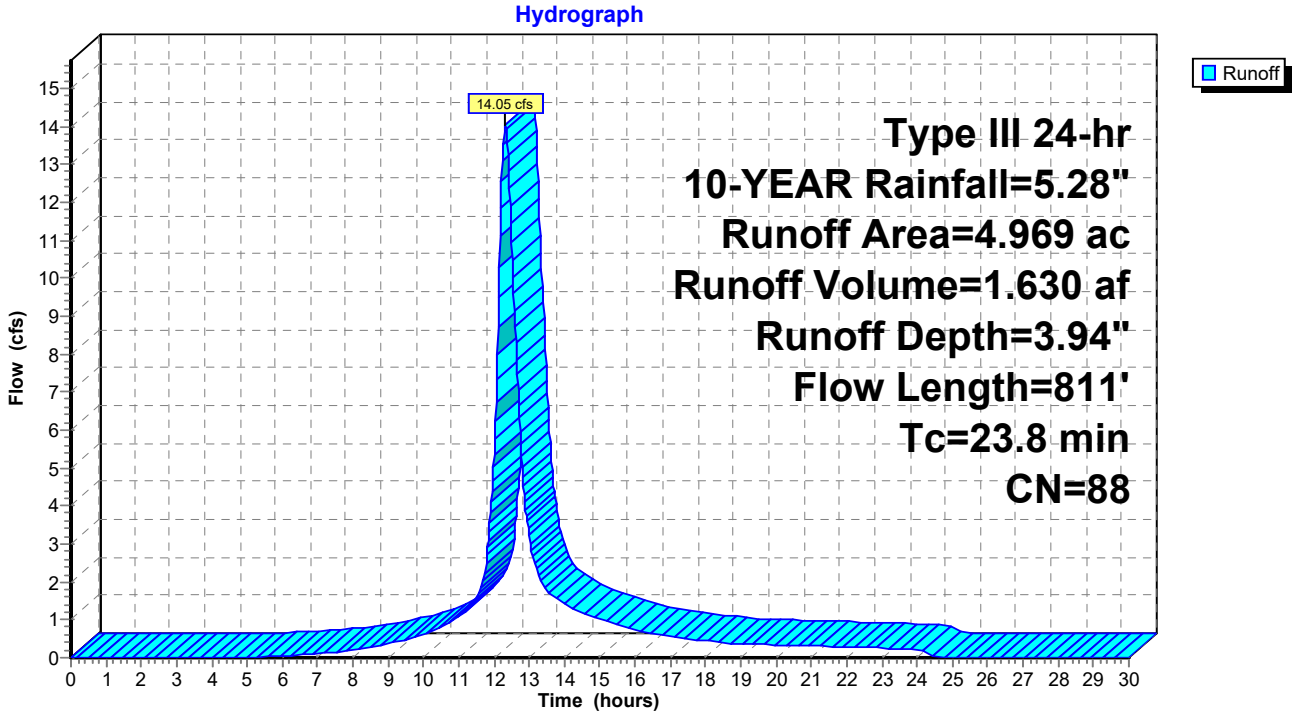
Runoff = 14.05 cfs @ 12.32 hrs, Volume= 1.630 af, Depth= 3.94"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.28"

Area (ac)	CN	Description
0.055	69	50-75% Grass cover, Fair, HSG B
0.358	61	>75% Grass cover, Good, HSG B
3.688	98	Paved parking, HSG B
0.869	58	Woods/grass comb., Good, HSG B
4.969	88	Weighted Average
1.282		25.79% Pervious Area
3.688		74.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.28"
1.6	48	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	242	0.0085	1.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	40	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	196	0.0410	1.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	235	0.0208	7.73	6.07	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
23.8	811	Total			

Subcatchment 1: Site

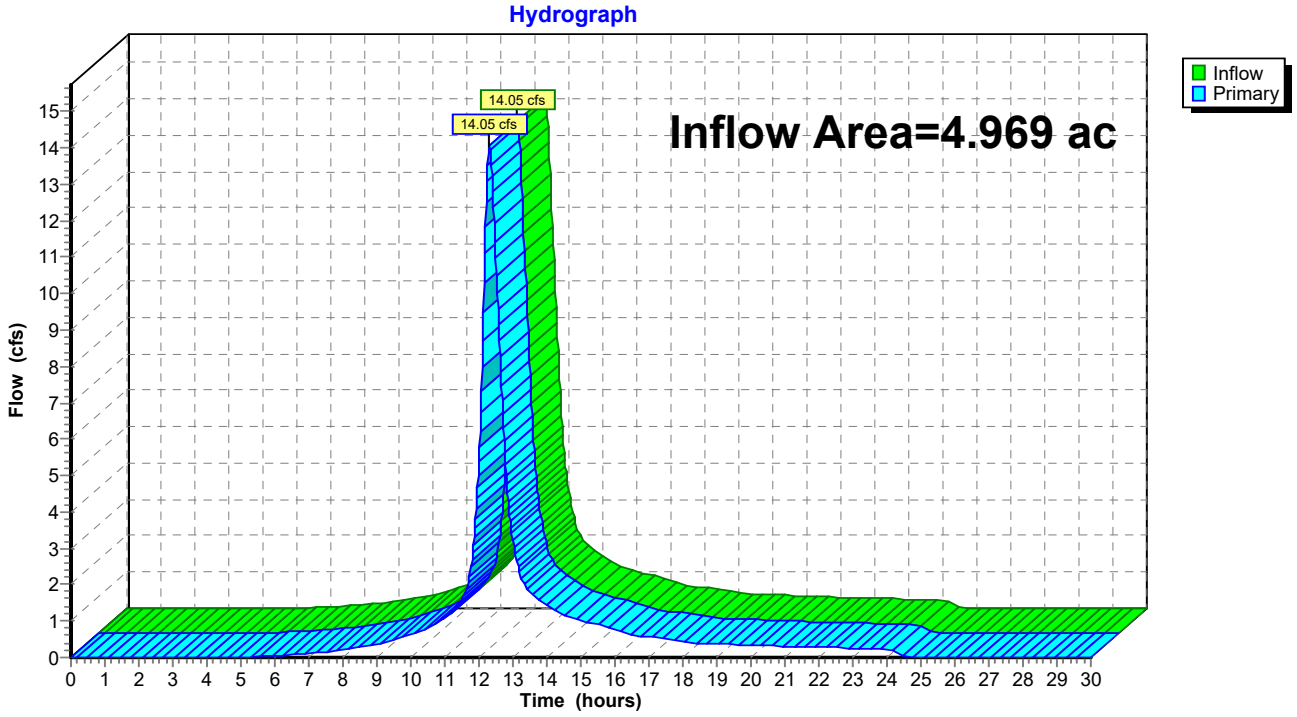


Summary for Link DP-1: Hopmeadow

Inflow Area = 4.969 ac, 74.21% Impervious, Inflow Depth = 3.94" for 10-YEAR event
Inflow = 14.05 cfs @ 12.32 hrs, Volume= 1.630 af
Primary = 14.05 cfs @ 12.32 hrs, Volume= 1.630 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.969 ac 74.21% Impervious Runoff Depth=5.14"
Flow Length=811' Tc=23.8 min CN=88 Runoff=18.14 cfs 2.127 af

Link DP-1: Hopmeadow Inflow=18.14 cfs 2.127 af
Primary=18.14 cfs 2.127 af

Total Runoff Area = 4.969 ac Runoff Volume = 2.127 af Average Runoff Depth = 5.14"
25.79% Pervious = 1.282 ac 74.21% Impervious = 3.688 ac

Summary for Subcatchment 1: Site

[47] Hint: Peak is 299% of capacity of segment #6

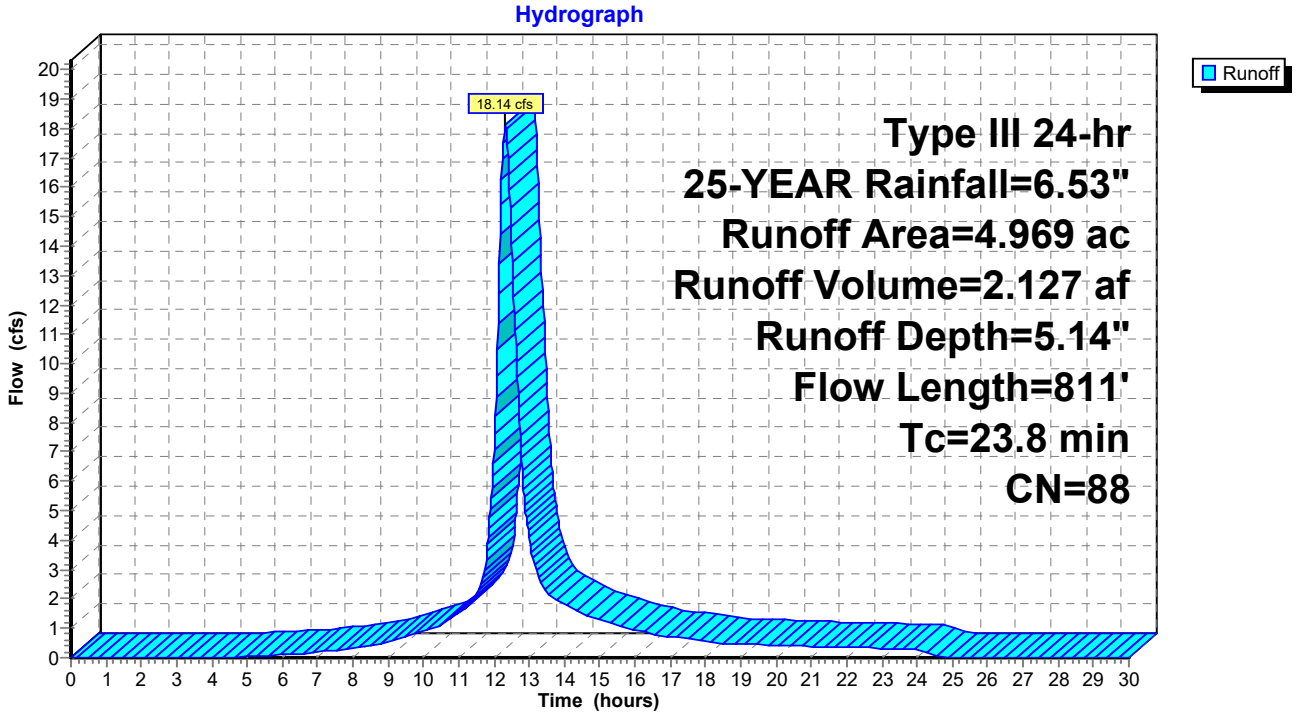
Runoff = 18.14 cfs @ 12.31 hrs, Volume= 2.127 af, Depth= 5.14"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.53"

Area (ac)	CN	Description
0.055	69	50-75% Grass cover, Fair, HSG B
0.358	61	>75% Grass cover, Good, HSG B
3.688	98	Paved parking, HSG B
0.869	58	Woods/grass comb., Good, HSG B
4.969	88	Weighted Average
1.282		25.79% Pervious Area
3.688		74.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.28"
1.6	48	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	242	0.0085	1.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	40	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	196	0.0410	1.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	235	0.0208	7.73	6.07	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
23.8	811	Total			

Subcatchment 1: Site

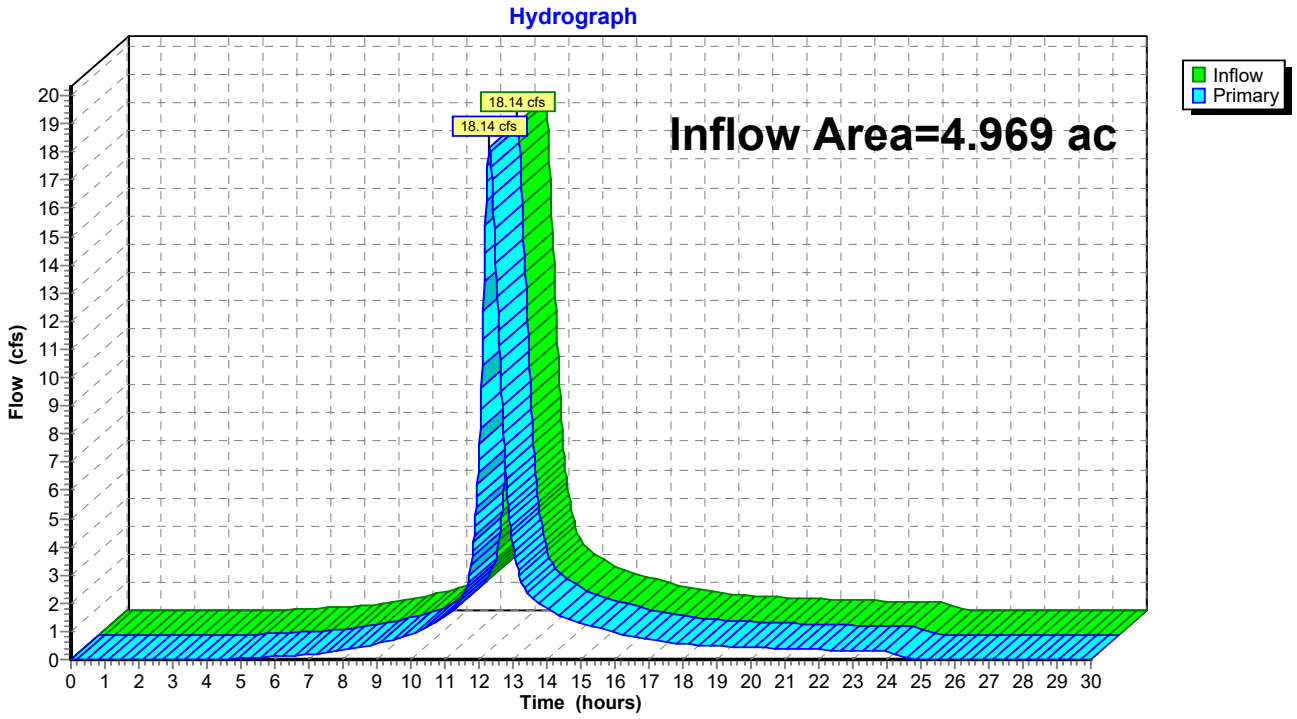


Summary for Link DP-1: Hopmeadow

Inflow Area = 4.969 ac, 74.21% Impervious, Inflow Depth = 5.14" for 25-YEAR event
Inflow = 18.14 cfs @ 12.31 hrs, Volume= 2.127 af
Primary = 18.14 cfs @ 12.31 hrs, Volume= 2.127 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.969 ac 74.21% Impervious Runoff Depth=6.02"
Flow Length=811' Tc=23.8 min CN=88 Runoff=21.09 cfs 2.494 af

Link DP-1: Hopmeadow Inflow=21.09 cfs 2.494 af
Primary=21.09 cfs 2.494 af

Total Runoff Area = 4.969 ac Runoff Volume = 2.494 af Average Runoff Depth = 6.02"
25.79% Pervious = 1.282 ac 74.21% Impervious = 3.688 ac

Summary for Subcatchment 1: Site

[47] Hint: Peak is 347% of capacity of segment #6

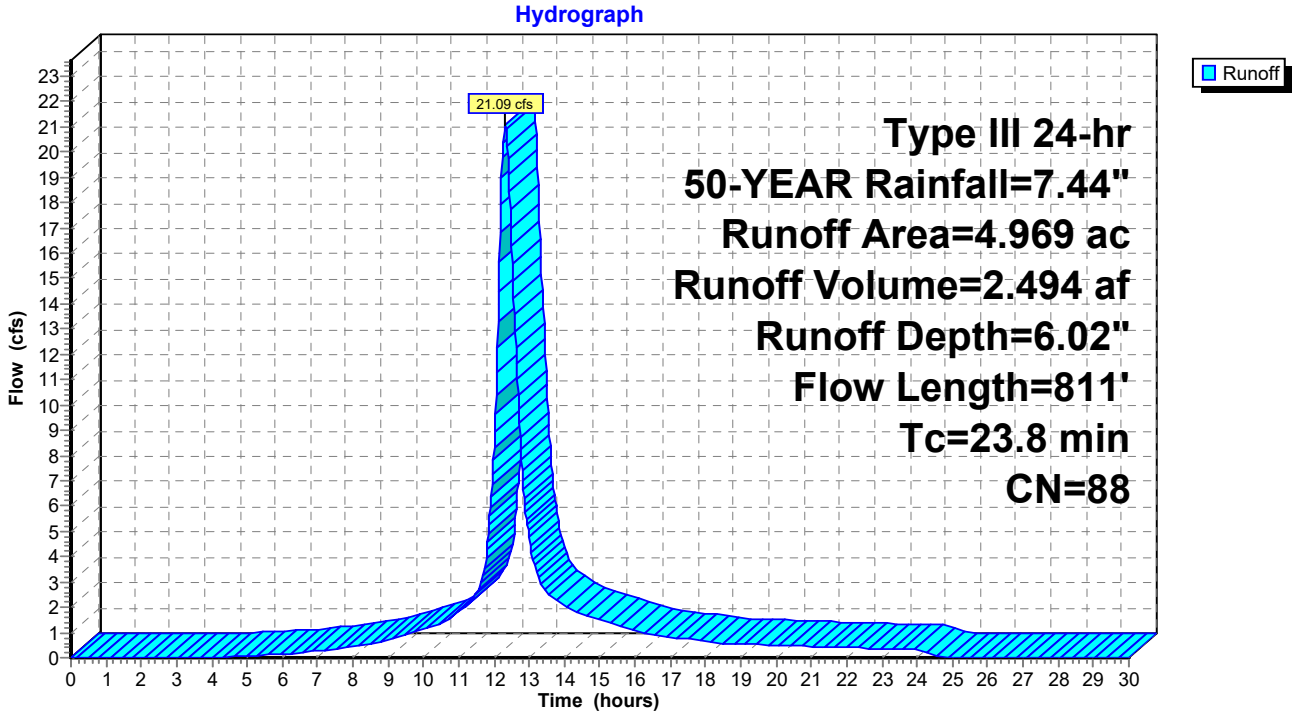
Runoff = 21.09 cfs @ 12.31 hrs, Volume= 2.494 af, Depth= 6.02"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-YEAR Rainfall=7.44"

Area (ac)	CN	Description
0.055	69	50-75% Grass cover, Fair, HSG B
0.358	61	>75% Grass cover, Good, HSG B
3.688	98	Paved parking, HSG B
0.869	58	Woods/grass comb., Good, HSG B
4.969	88	Weighted Average
1.282		25.79% Pervious Area
3.688		74.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.28"
1.6	48	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	242	0.0085	1.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	40	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	196	0.0410	1.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	235	0.0208	7.73	6.07	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
23.8	811	Total			

Subcatchment 1: Site

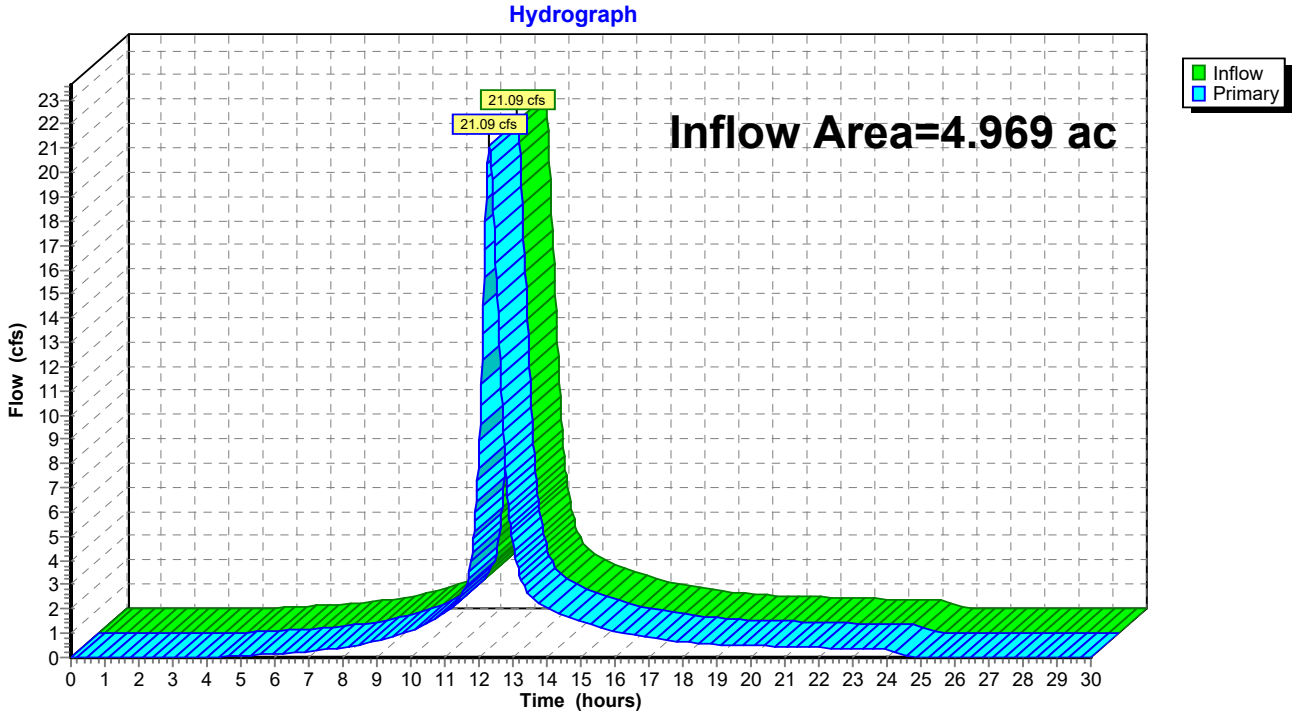


Summary for Link DP-1: Hopmeadow

Inflow Area = 4.969 ac, 74.21% Impervious, Inflow Depth = 6.02" for 50-YEAR event
Inflow = 21.09 cfs @ 12.31 hrs, Volume= 2.494 af
Primary = 21.09 cfs @ 12.31 hrs, Volume= 2.494 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.969 ac 74.21% Impervious Runoff Depth=7.01"
Flow Length=811' Tc=23.8 min CN=88 Runoff=24.38 cfs 2.902 af

Link DP-1: Hopmeadow Inflow=24.38 cfs 2.902 af
Primary=24.38 cfs 2.902 af

Total Runoff Area = 4.969 ac Runoff Volume = 2.902 af Average Runoff Depth = 7.01"
25.79% Pervious = 1.282 ac 74.21% Impervious = 3.688 ac

Summary for Subcatchment 1: Site

[47] Hint: Peak is 401% of capacity of segment #6

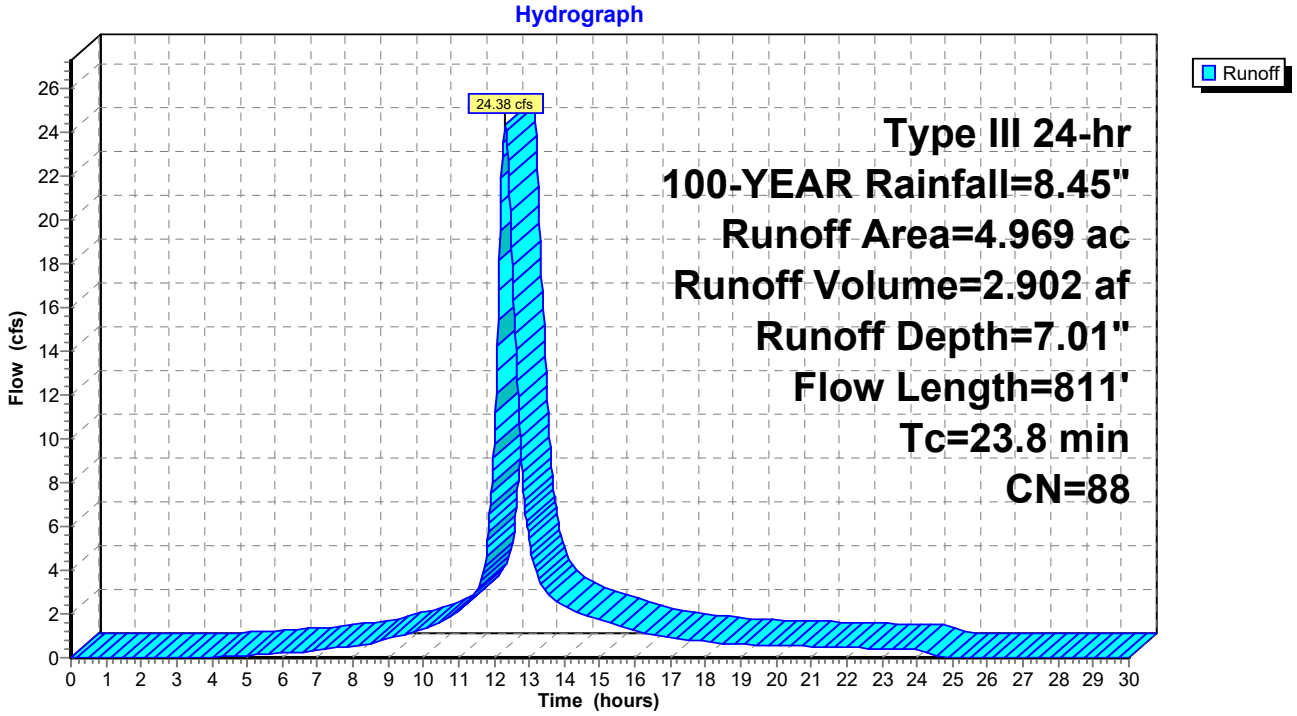
Runoff = 24.38 cfs @ 12.31 hrs, Volume= 2.902 af, Depth= 7.01"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=8.45"

Area (ac)	CN	Description
0.055	69	50-75% Grass cover, Fair, HSG B
0.358	61	>75% Grass cover, Good, HSG B
3.688	98	Paved parking, HSG B
0.869	58	Woods/grass comb., Good, HSG B
4.969	88	Weighted Average
1.282		25.79% Pervious Area
3.688		74.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.28"
1.6	48	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	242	0.0085	1.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	40	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	196	0.0410	1.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	235	0.0208	7.73	6.07	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
23.8	811	Total			

Subcatchment 1: Site

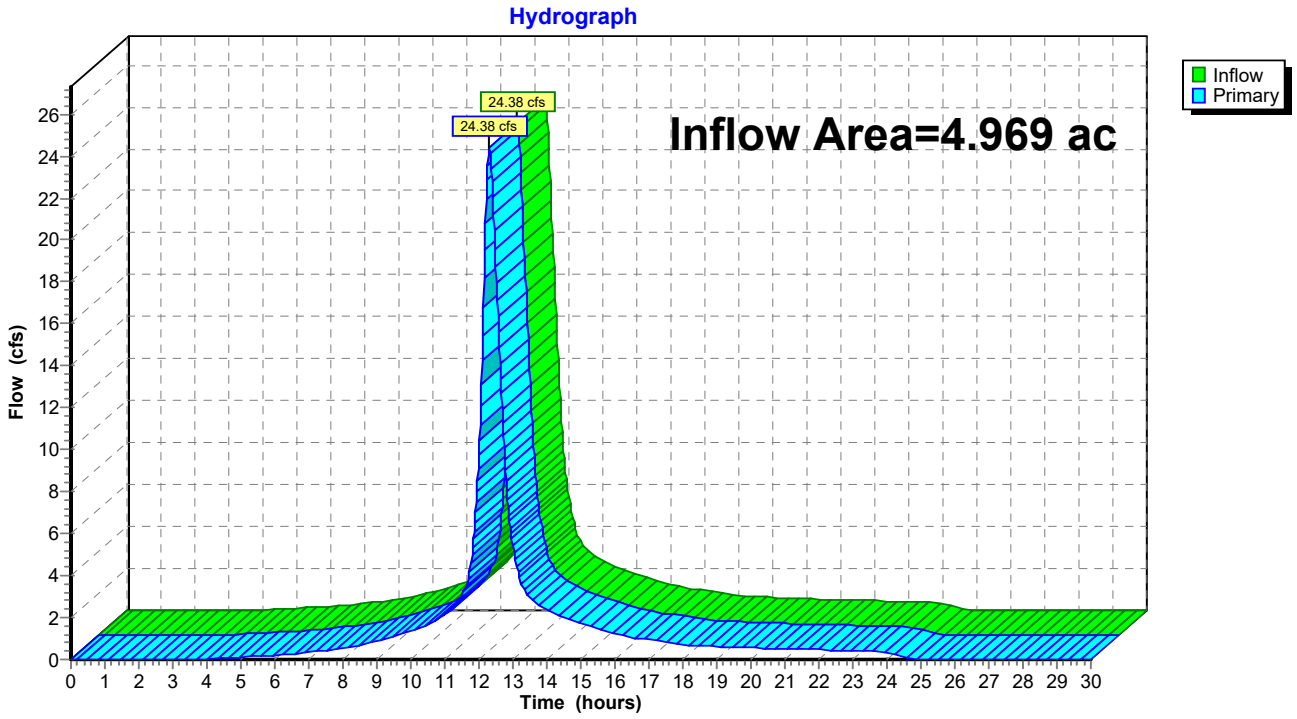


Summary for Link DP-1: Hopmeadow

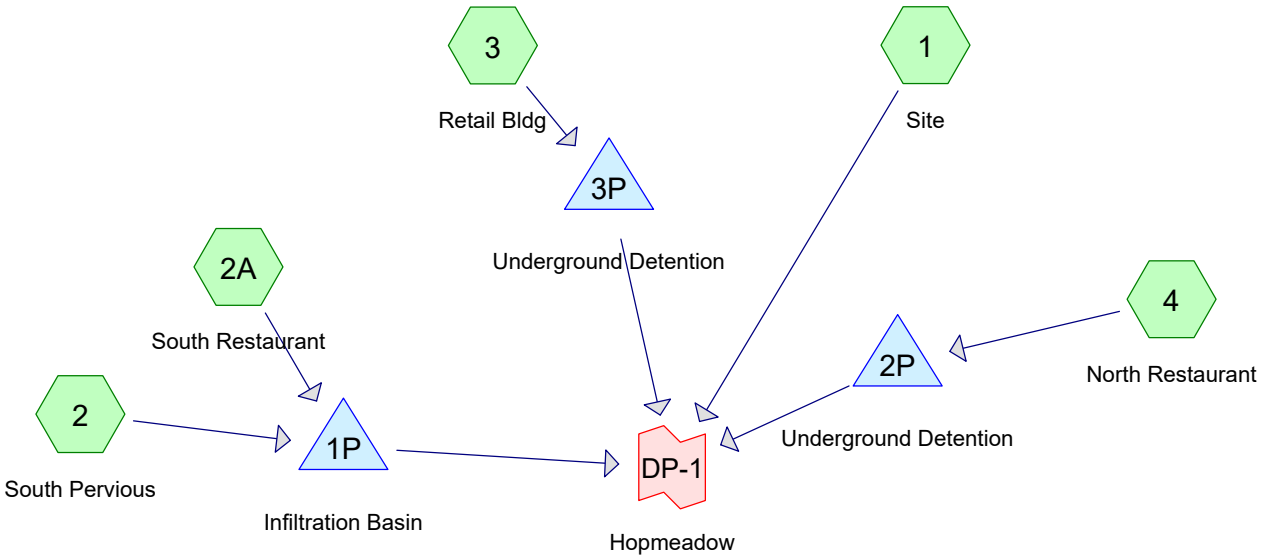
Inflow Area = 4.969 ac, 74.21% Impervious, Inflow Depth = 7.01" for 100-YEAR event
Inflow = 24.38 cfs @ 12.31 hrs, Volume= 2.902 af
Primary = 24.38 cfs @ 12.31 hrs, Volume= 2.902 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Link DP-1: Hopmeadow



HydroCAD Analysis: Proposed Conditions



Subcat Reach Pond Link

Routing Diagram for 42810.00 - PR
Prepared by VHB, Inc, Printed 8/21/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YEAR	Type III 24-hr		Default	24.00	1	3.28	2
2	10-YEAR	Type III 24-hr		Default	24.00	1	5.28	2
3	25-YEAR	Type III 24-hr		Default	24.00	1	6.53	2
4	50-YEAR	Type III 24-hr		Default	24.00	1	7.44	2
5	100-YEAR	Type III 24-hr		Default	24.00	1	8.45	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,356	98	(2A)
90,788	61	>75% Grass cover, Good, HSG B (1, 2)
121,268	98	Unconnected pavement, HSG B (1, 3, 4)
216,412	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
212,056	HSG B	1, 2, 3, 4
0	HSG C	
0	HSG D	
4,356	Other	2A
216,412		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	0	0	4,356	4,356		
0	90,788	0	0	0	90,788	>75% Grass cover, Good	
0	121,268	0	0	0	121,268	Unconnected pavement	
0	**212,056**	**0**	**0**	**4,356**	**216,412**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1	0.00	0.00	430.0	0.0220	0.011	0.0	12.0	0.0	
2	1	0.00	0.00	158.0	0.0200	0.011	0.0	18.0	0.0	
3	1P	172.90	172.10	86.0	0.0093	0.013	0.0	12.0	0.0	

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.141 ac 59.52% Impervious Runoff Depth=1.68"
Flow Length=774' Tc=18.1 min CN=83 Runoff=5.70 cfs 25,180 cf

Subcatchment2: South Pervious Runoff Area=0.408 ac 0.00% Impervious Runoff Depth=0.48"
Tc=5.0 min CN=61 Runoff=0.16 cfs 707 cf

Subcatchment2A: South Restaurant Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=98 Runoff=0.33 cfs 1,106 cf

Subcatchment3: Retail Bldg Runoff Area=0.266 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=98 Runoff=0.88 cfs 2,946 cf

Subcatchment4: North Restaurant Runoff Area=0.053 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=98 Runoff=0.17 cfs 583 cf

Pond 1P: Infiltration Basin Peak Elev=174.43' Storage=447 cf Inflow=0.47 cfs 1,813 cf
Discarded=0.08 cfs 1,813 cf Primary=0.00 cfs 0 cf Outflow=0.08 cfs 1,813 cf

Pond 2P: Underground Detention Peak Elev=176.08' Storage=0.005 af Inflow=0.17 cfs 583 cf
Discarded=0.02 cfs 583 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 583 cf

Pond 3P: Underground Detention Peak Elev=185.41' Storage=0.029 af Inflow=0.88 cfs 2,946 cf
Discarded=0.05 cfs 2,905 cf Primary=0.02 cfs 41 cf Outflow=0.07 cfs 2,946 cf

Link DP-1: Hopmeadow Inflow=5.70 cfs 25,221 cf
Primary=5.70 cfs 25,221 cf

Total Runoff Area = 216,412 sf Runoff Volume = 30,522 cf Average Runoff Depth = 1.69"
41.95% Pervious = 90,788 sf 58.05% Impervious = 125,624 sf

Summary for Subcatchment 1: Site

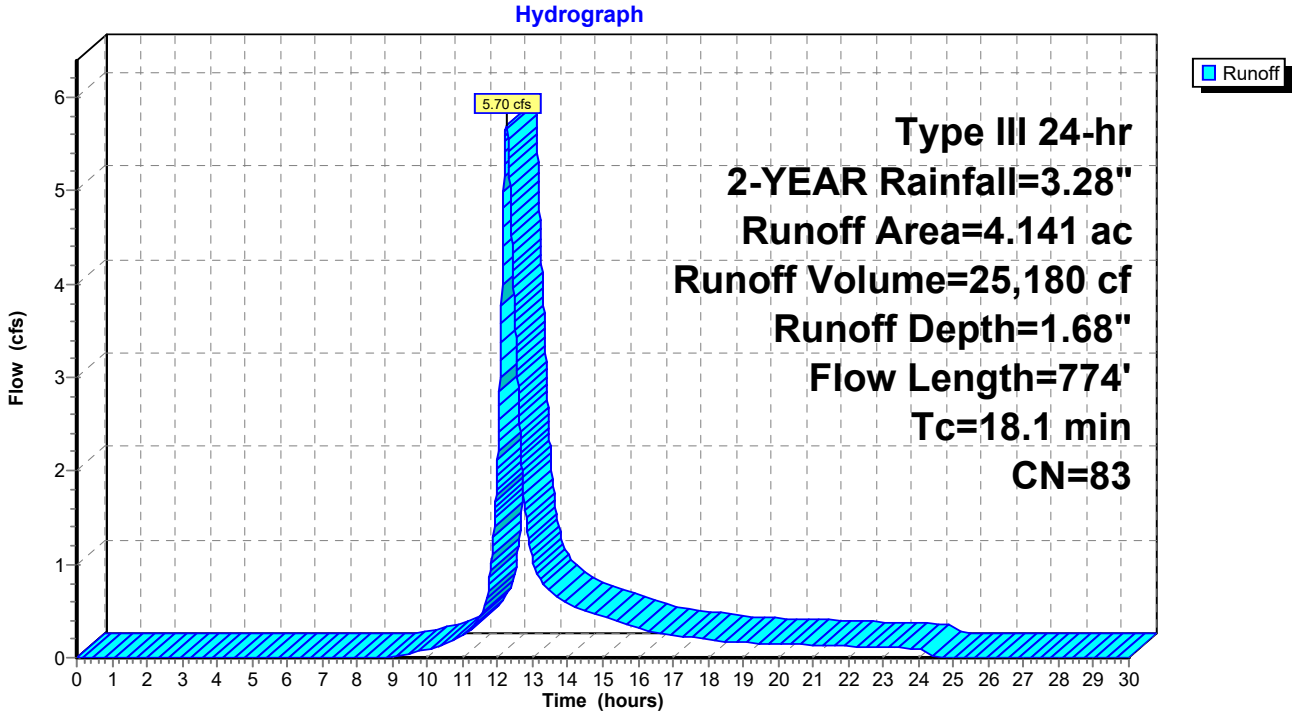
Runoff = 5.70 cfs @ 12.25 hrs, Volume= 25,180 cf, Depth= 1.68"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.28"

Area (ac)	CN	Description
1.676	61	>75% Grass cover, Good, HSG B
2.465	98	Unconnected pavement, HSG B
4.141	83	Weighted Average
1.676		40.48% Pervious Area
2.465		59.52% Impervious Area
2.465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	35	0.0200	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.28"
0.1	33	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	110	0.0171	1.96		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	8	0.0625	5.08		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	430	0.0220	7.95	6.25	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.3	158	0.0200	9.93	17.56	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
18.1	774	Total			

Subcatchment 1: Site



Summary for Subcatchment 2: South Pervious

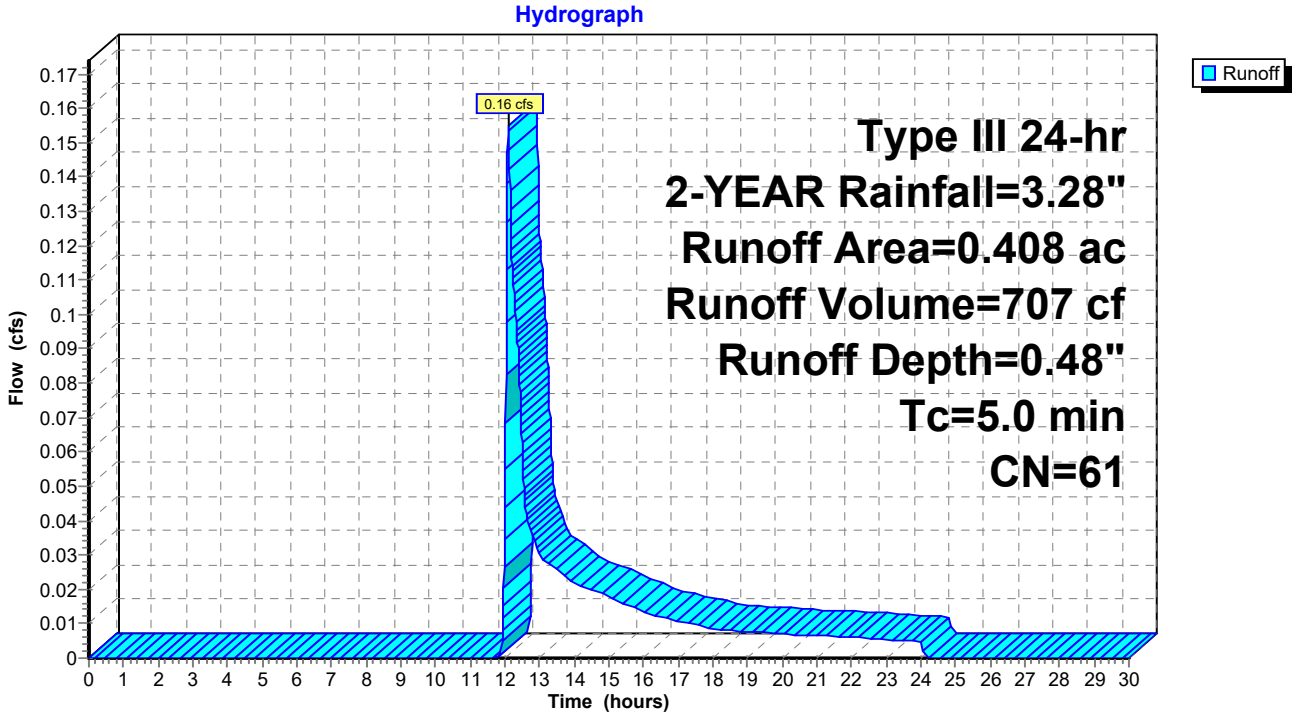
Runoff = 0.16 cfs @ 12.10 hrs, Volume= 707 cf, Depth= 0.48"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.28"

Area (ac)	CN	Description
0.408	61	>75% Grass cover, Good, HSG B
0.408		100.00% Pervious Area

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

Subcatchment 2: South Pervious



Summary for Subcatchment 2A: South Restaurant

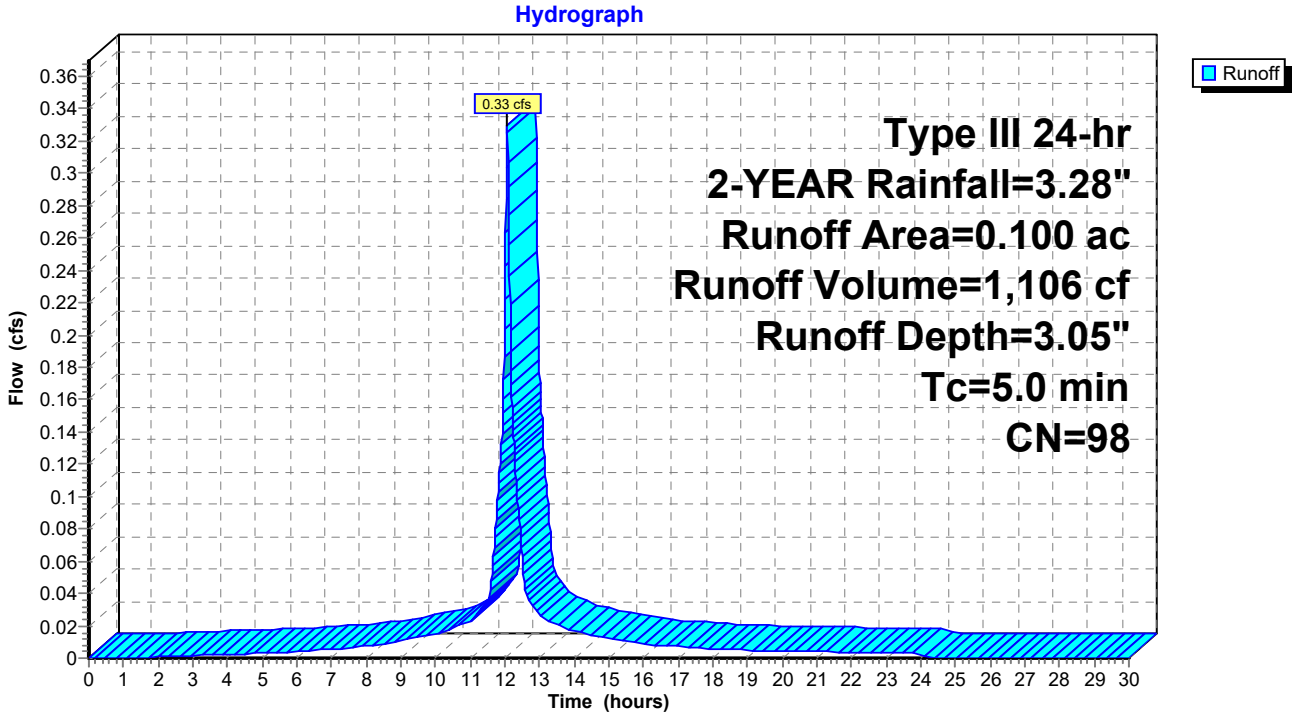
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 1,106 cf, Depth= 3.05"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.28"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

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

Subcatchment 2A: South Restaurant



Summary for Subcatchment 3: Retail Bldg

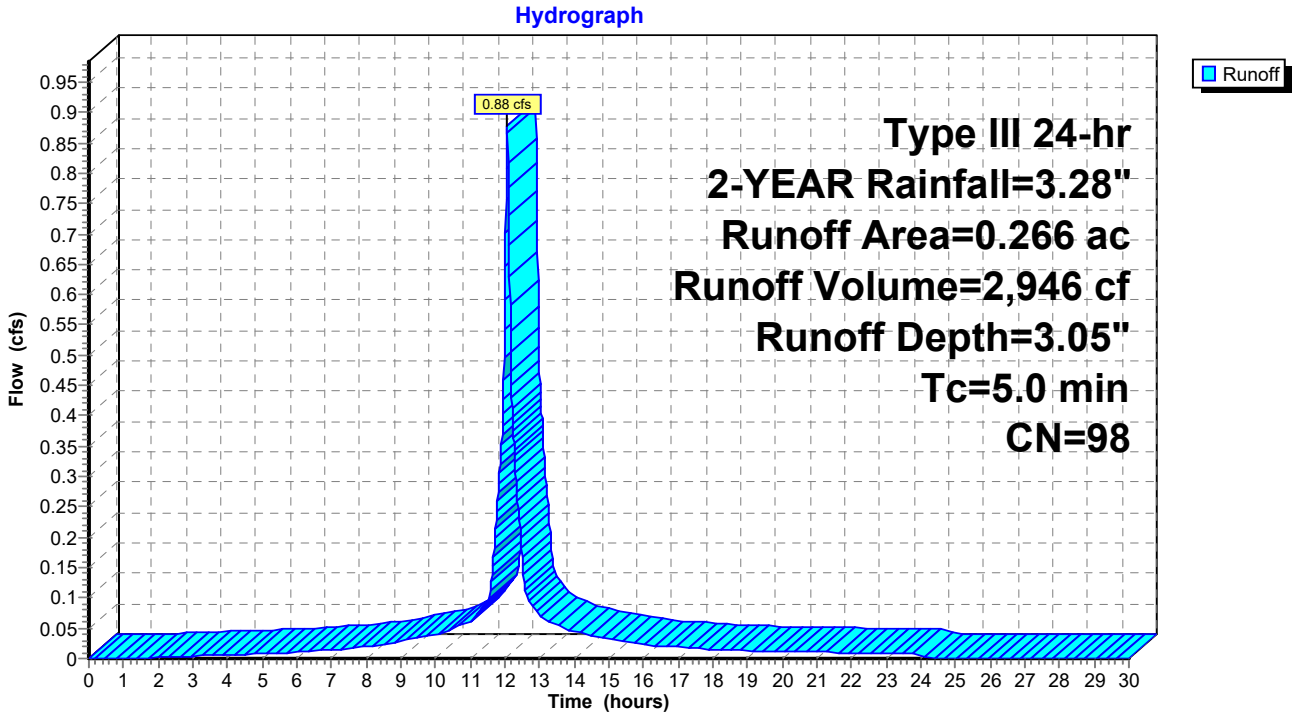
Runoff = 0.88 cfs @ 12.07 hrs, Volume= 2,946 cf, Depth= 3.05"
Routed to Pond 3P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.28"

Area (ac)	CN	Description
0.266	98	Unconnected pavement, HSG B
0.266		100.00% Impervious Area
0.266		100.00% Unconnected

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

Subcatchment 3: Retail Bldg



Summary for Subcatchment 4: North Restaurant

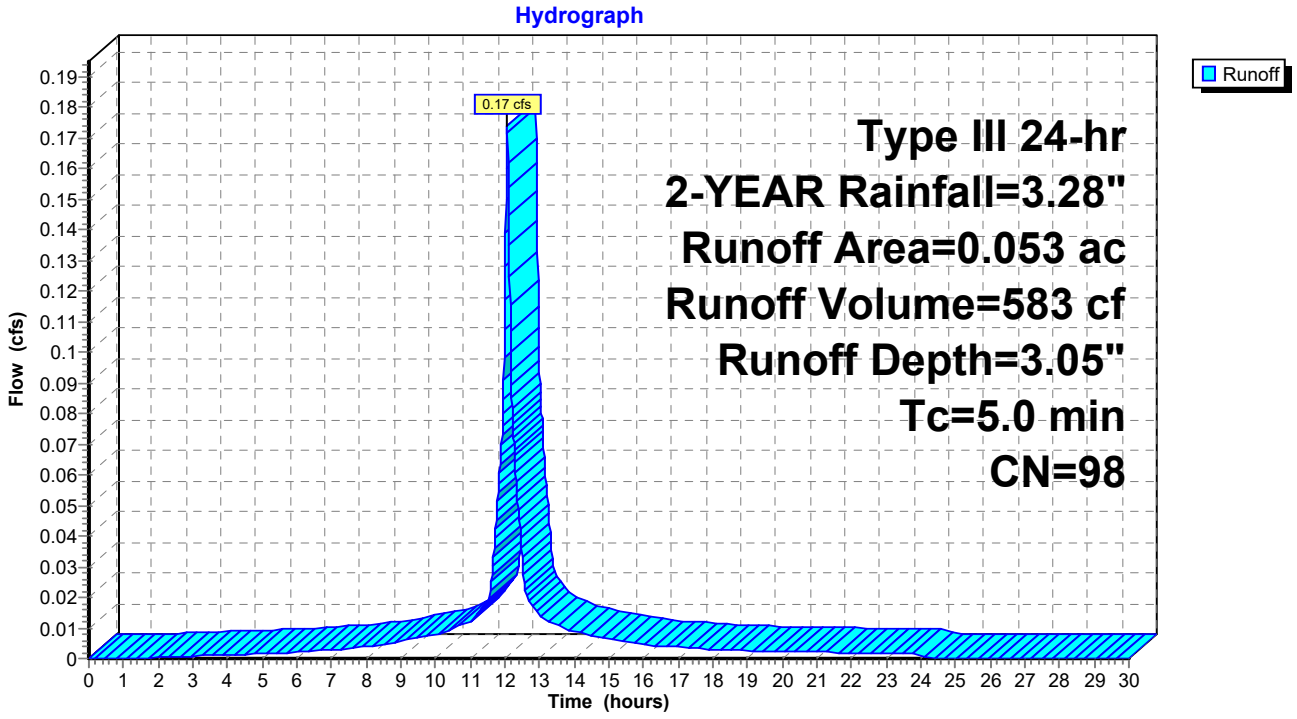
Runoff = 0.17 cfs @ 12.07 hrs, Volume= 583 cf, Depth= 3.05"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.28"

Area (ac)	CN	Description
0.053	98	Unconnected pavement, HSG B
0.053		100.00% Impervious Area
0.053		100.00% Unconnected

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

Subcatchment 4: North Restaurant



Summary for Pond 1P: Infiltration Basin

Inflow Area = 22,128 sf, 19.69% Impervious, Inflow Depth = 0.98" for 2-YEAR event
Inflow = 0.47 cfs @ 12.08 hrs, Volume= 1,813 cf
Outflow = 0.08 cfs @ 12.60 hrs, Volume= 1,813 cf, Atten= 83%, Lag= 31.3 min
Discarded = 0.08 cfs @ 12.60 hrs, Volume= 1,813 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 174.43' @ 12.60 hrs Surf.Area= 1,187 sf Storage= 447 cf

Plug-Flow detention time= 38.6 min calculated for 1,813 cf (100% of inflow)
Center-of-Mass det. time= 38.6 min (854.3 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	4,584 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

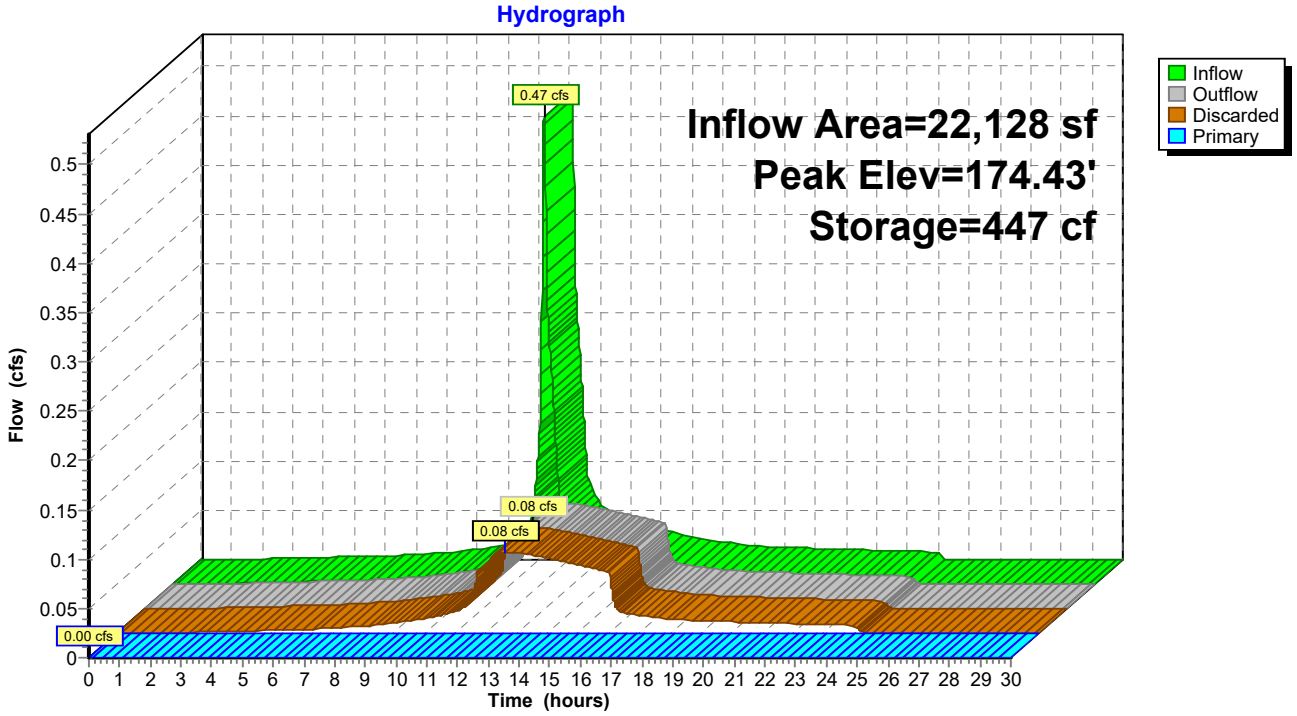
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	880	160.0	0	0	880
175.00	1,655	263.0	1,247	1,247	4,354
176.00	3,161	430.0	2,368	3,615	13,570
176.30	3,300	440.0	969	4,584	14,274

Device	Routing	Invert	Outlet Devices
#1	Device 3	175.20'	**19.4" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Primary	172.90'	**12.0" Round Culvert** L= 86.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 172.90' / 172.10' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.08 cfs @ 12.60 hrs HW=174.43' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=174.00' (Free Discharge)
└**3=Culvert** (Passes 0.00 cfs of 2.58 cfs potential flow)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Detention

Inflow Area = 2,297 sf,100.00% Impervious, Inflow Depth = 3.05" for 2-YEAR event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 583 cf
Outflow = 0.02 cfs @ 11.33 hrs, Volume= 583 cf, Atten= 91%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.33 hrs, Volume= 583 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 176.08' @ 12.90 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 90.6 min calculated for 583 cf (100% of inflow)
Center-of-Mass det. time= 90.5 min (845.5 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	174.40'	0.004 af	**4.83'W x 45.92'L x 2.33'H Field A** 0.012 af Overall - 0.002 af Embedded = 0.010 af x 40.0% Voids
#2A	174.90'	0.002 af	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		0.006 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	174.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	176.23'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 11.33 hrs HW=174.42' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=174.40' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-310 +Cap (ADS StormTech®SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

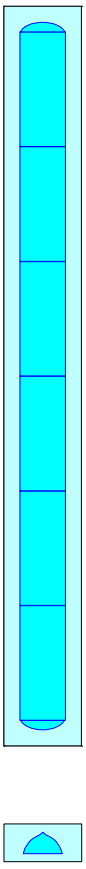
6 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 43.92' Row Length +12.0" End Stone x 2 = 45.92' Base Length
1 Rows x 34.0" Wide + 12.0" Side Stone x 2 = 4.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

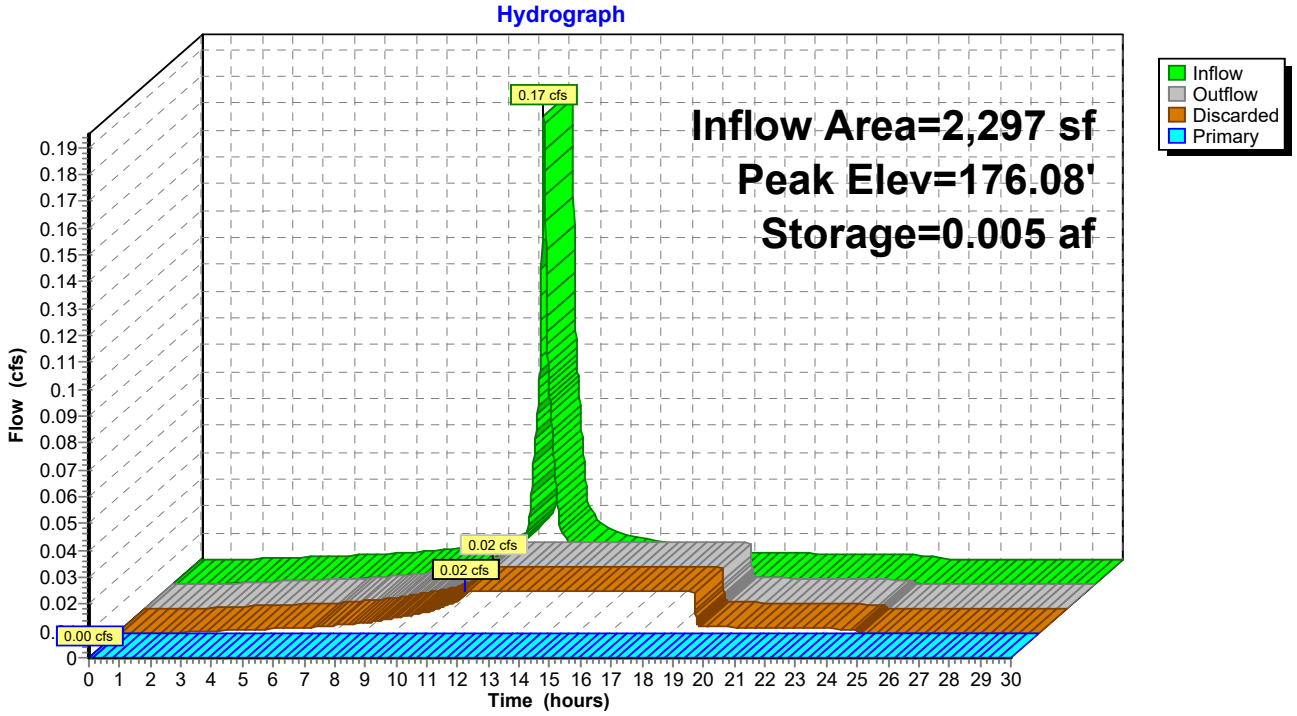
517.9 cf Field - 88.5 cf Chambers = 429.4 cf Stone x 40.0% Voids = 171.8 cf Stone Storage

Chamber Storage + Stone Storage = 260.2 cf = 0.006 af
Overall Storage Efficiency = 50.2%
Overall System Size = 45.92' x 4.83' x 2.33'

6 Chambers
19.2 cy Field
15.9 cy Stone



Pond 2P: Underground Detention



Summary for Pond 3P: Underground Detention

Inflow Area = 11,600 sf,100.00% Impervious, Inflow Depth = 3.05" for 2-YEAR event
Inflow = 0.88 cfs @ 12.07 hrs, Volume= 2,946 cf
Outflow = 0.07 cfs @ 13.00 hrs, Volume= 2,946 cf, Atten= 92%, Lag= 56.0 min
Discarded = 0.05 cfs @ 10.43 hrs, Volume= 2,905 cf
Primary = 0.02 cfs @ 13.00 hrs, Volume= 41 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 185.41' @ 13.00 hrs Surf.Area= 0.015 ac Storage= 0.029 af

Plug-Flow detention time= 215.1 min calculated for 2,945 cf (100% of inflow)
Center-of-Mass det. time= 215.1 min (970.0 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	182.40'	0.015 af	**11.00'W x 60.58'L x 3.50'H Field A** 0.054 af Overall - 0.017 af Embedded = 0.037 af x 40.0% Voids
#2A	182.90'	0.017 af	**ADS_StormTech SC-740 +Cap** x 16 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 16 Chambers in 2 Rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	182.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	182.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	185.40'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 10.43 hrs HW=182.44' (Free Discharge)
↑└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.02 cfs @ 13.00 hrs HW=185.41' (Free Discharge)
↑└**1=Orifice/Grate** (Passes 0.02 cfs of 5.37 cfs potential flow)
↑└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.34 fps)

Pond 3P: Underground Detention - Chamber Wizard Field A

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

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

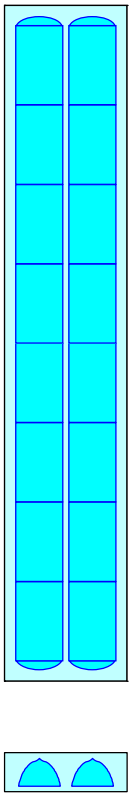
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

16 Chambers x 45.9 cf = 735.0 cf Chamber Storage

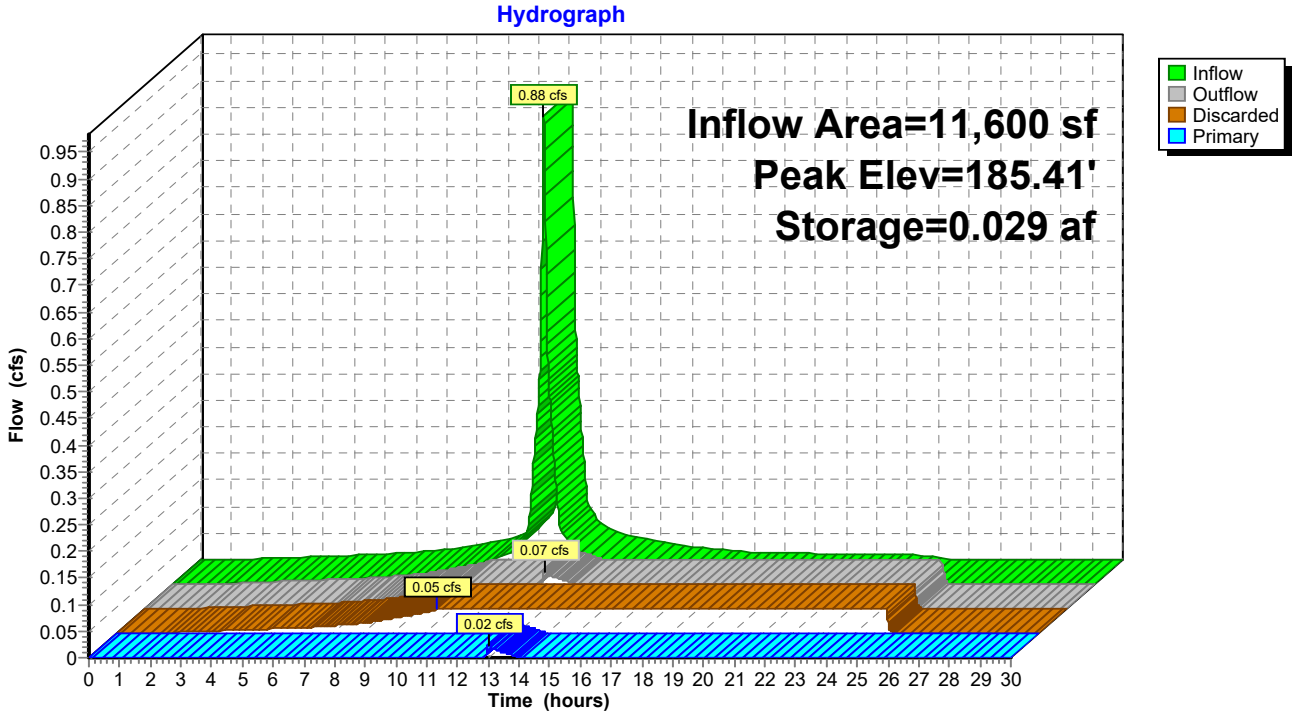
2,332.2 cf Field - 735.0 cf Chambers = 1,597.2 cf Stone x 40.0% Voids = 638.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,373.9 cf = 0.032 af
Overall Storage Efficiency = 58.9%
Overall System Size = 60.58' x 11.00' x 3.50'

16 Chambers
86.4 cy Field
59.2 cy Stone



Pond 3P: Underground Detention

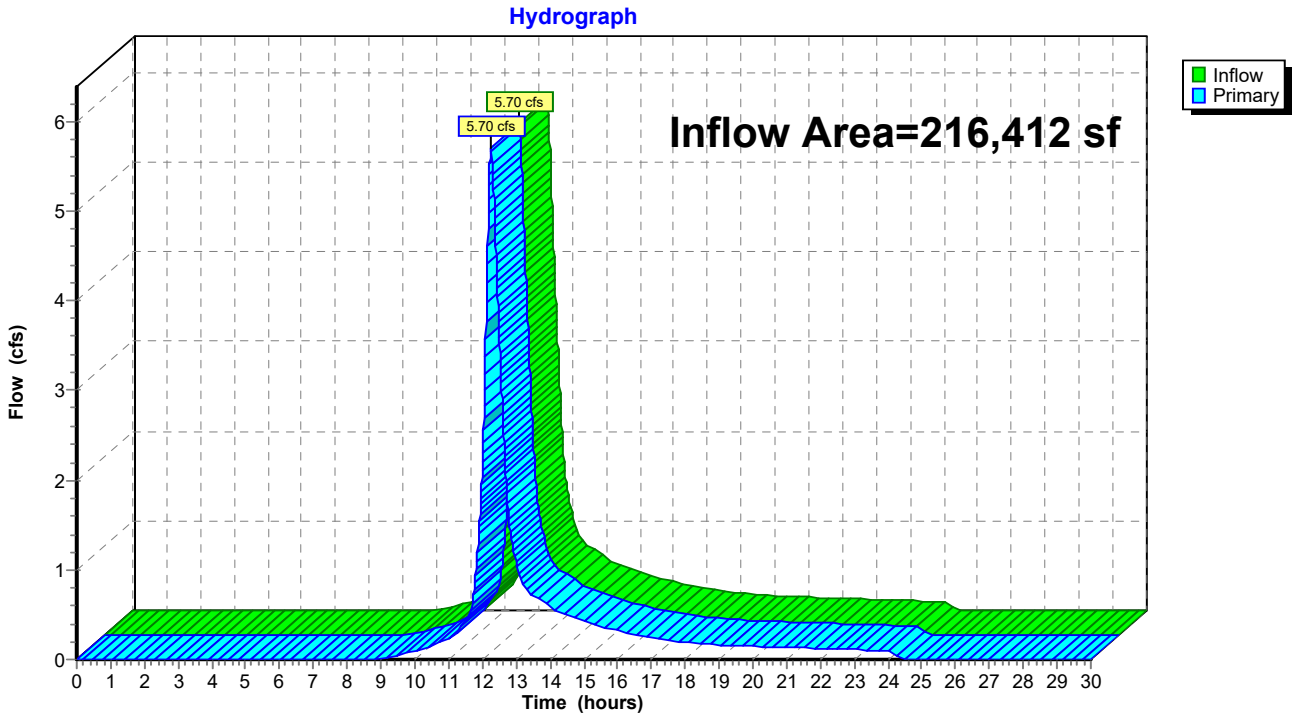


Summary for Link DP-1: Hopmeadow

Inflow Area = 216,412 sf, 58.05% Impervious, Inflow Depth = 1.40" for 2-YEAR event
Inflow = 5.70 cfs @ 12.25 hrs, Volume= 25,221 cf
Primary = 5.70 cfs @ 12.25 hrs, Volume= 25,221 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.141 ac 59.52% Impervious Runoff Depth=3.43"
Flow Length=774' Tc=18.1 min CN=83 Runoff=11.66 cfs 51,538 cf

Subcatchment2: South Pervious Runoff Area=0.408 ac 0.00% Impervious Runoff Depth=1.54"
Tc=5.0 min CN=61 Runoff=0.71 cfs 2,281 cf

Subcatchment2A: South Restaurant Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.04"
Tc=5.0 min CN=98 Runoff=0.54 cfs 1,831 cf

Subcatchment3: Retail Bldg Runoff Area=0.266 ac 100.00% Impervious Runoff Depth=5.04"
Tc=5.0 min CN=98 Runoff=1.43 cfs 4,875 cf

Subcatchment4: North Restaurant Runoff Area=0.053 ac 100.00% Impervious Runoff Depth=5.04"
Tc=5.0 min CN=98 Runoff=0.28 cfs 965 cf

Pond 1P: Infiltration Basin Peak Elev=175.14' Storage=1,486 cf Inflow=1.24 cfs 4,112 cf
Discarded=0.13 cfs 4,112 cf Primary=0.00 cfs 0 cf Outflow=0.13 cfs 4,112 cf

Pond 2P: Underground Detention Peak Elev=176.31' Storage=0.005 af Inflow=0.28 cfs 965 cf
Discarded=0.02 cfs 775 cf Primary=0.24 cfs 190 cf Outflow=0.26 cfs 965 cf

Pond 3P: Underground Detention Peak Elev=185.63' Storage=0.030 af Inflow=1.43 cfs 4,875 cf
Discarded=0.05 cfs 3,517 cf Primary=1.28 cfs 1,358 cf Outflow=1.33 cfs 4,875 cf

Link DP-1: Hopmeadow Inflow=12.34 cfs 53,086 cf
Primary=12.34 cfs 53,086 cf

Total Runoff Area = 216,412 sf Runoff Volume = 61,490 cf Average Runoff Depth = 3.41"
41.95% Pervious = 90,788 sf 58.05% Impervious = 125,624 sf

Summary for Subcatchment 1: Site

[47] Hint: Peak is 187% of capacity of segment #5

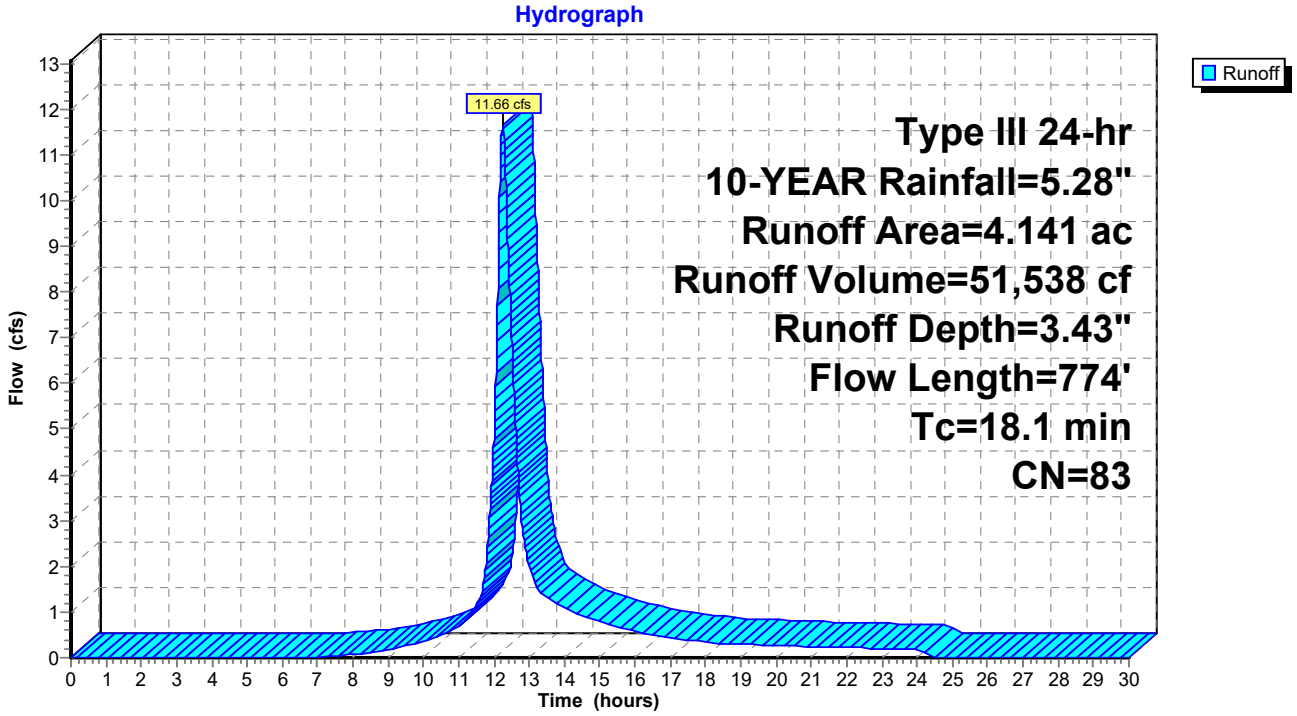
Runoff = 11.66 cfs @ 12.25 hrs, Volume= 51,538 cf, Depth= 3.43"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.28"

Area (ac)	CN	Description
1.676	61	>75% Grass cover, Good, HSG B
2.465	98	Unconnected pavement, HSG B
4.141	83	Weighted Average
1.676		40.48% Pervious Area
2.465		59.52% Impervious Area
2.465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	35	0.0200	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.28"
0.1	33	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	110	0.0171	1.96		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	8	0.0625	5.08		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	430	0.0220	7.95	6.25	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.3	158	0.0200	9.93	17.56	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
18.1	774	Total			

Subcatchment 1: Site



Summary for Subcatchment 2: South Pervious

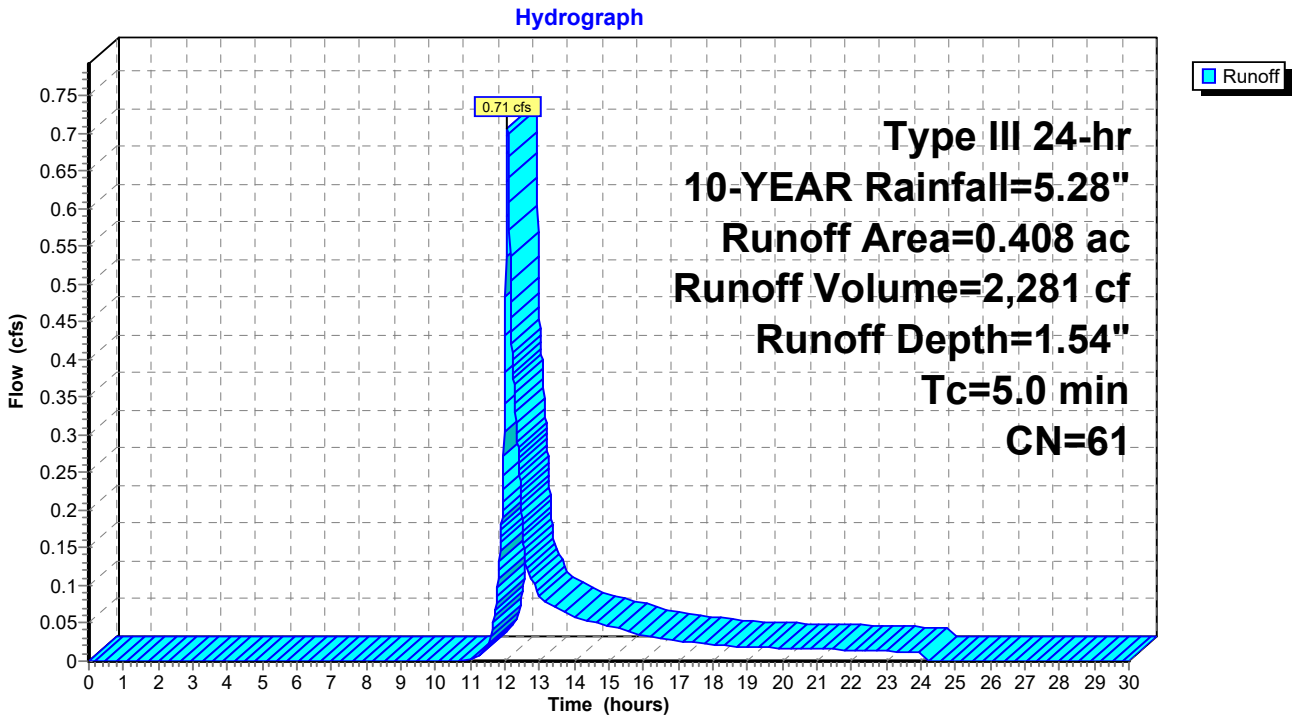
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 2,281 cf, Depth= 1.54"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.28"

Area (ac)	CN	Description
0.408	61	>75% Grass cover, Good, HSG B
0.408		100.00% Pervious Area

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

Subcatchment 2: South Pervious



Summary for Subcatchment 2A: South Restaurant

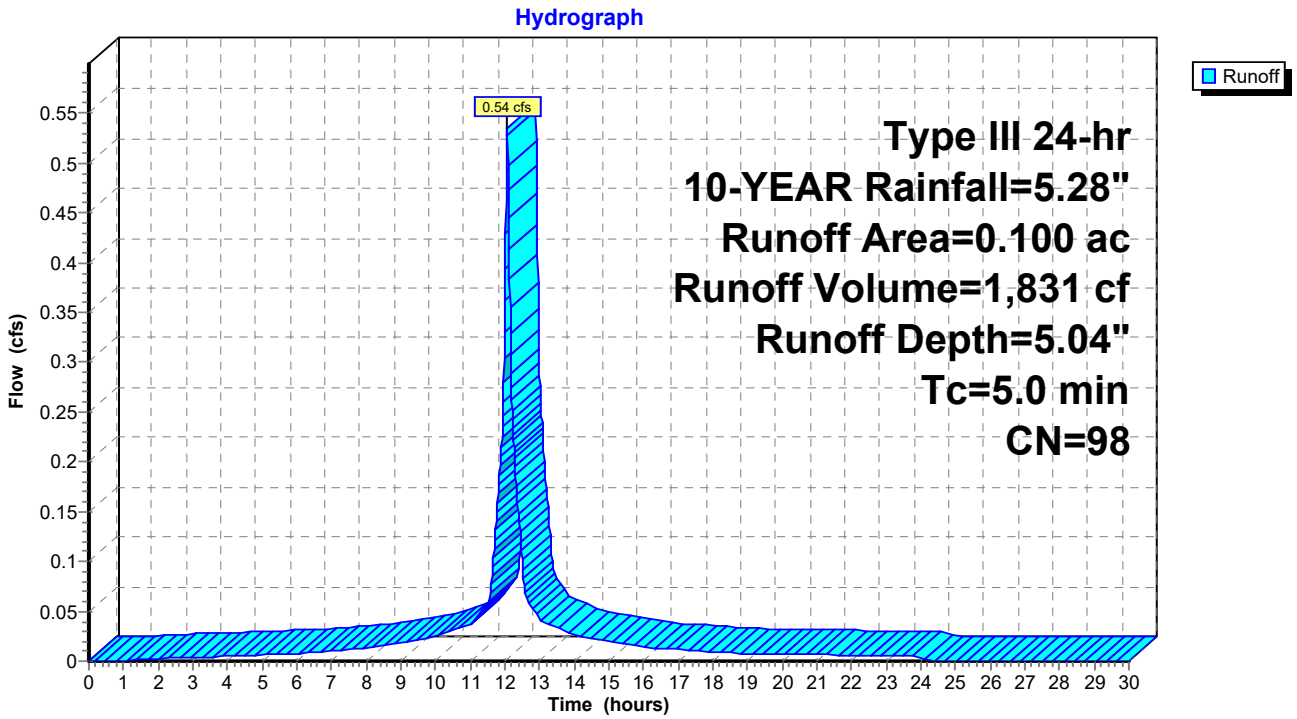
Runoff = 0.54 cfs @ 12.07 hrs, Volume= 1,831 cf, Depth= 5.04"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.28"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

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

Subcatchment 2A: South Restaurant



Summary for Subcatchment 3: Retail Bldg

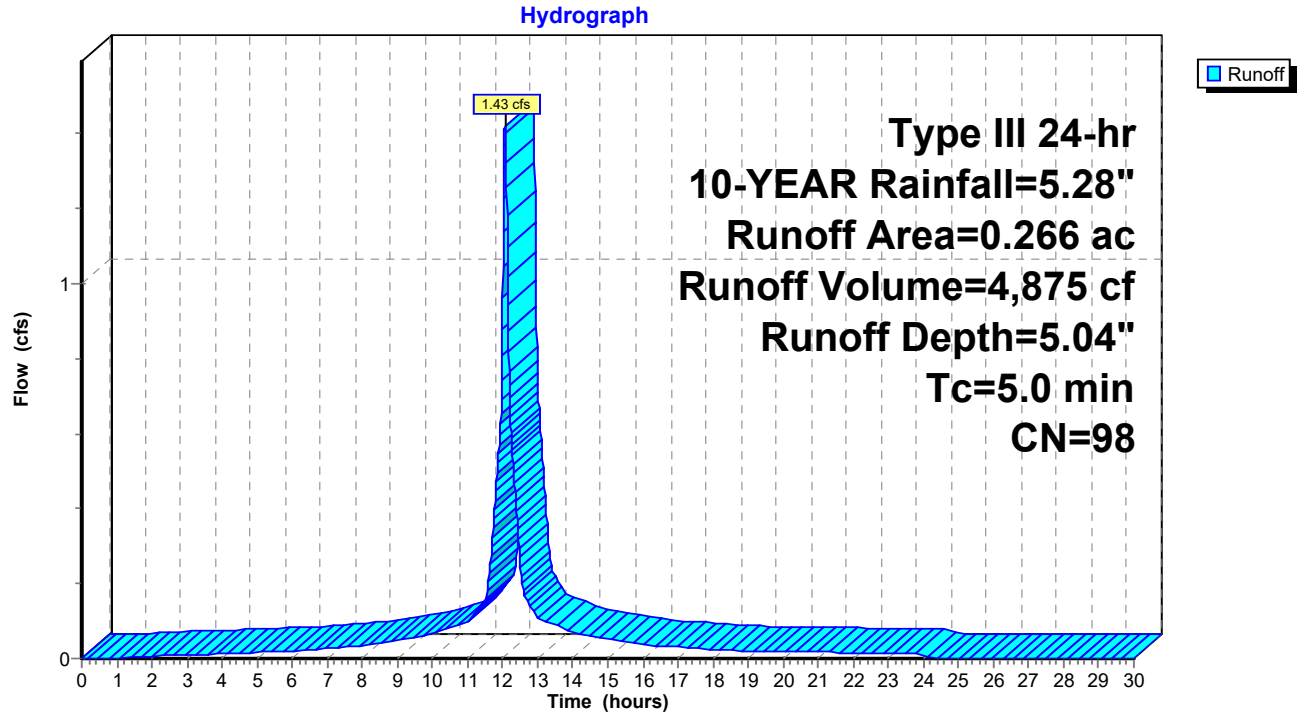
Runoff = 1.43 cfs @ 12.07 hrs, Volume= 4,875 cf, Depth= 5.04"
Routed to Pond 3P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.28"

Area (ac)	CN	Description
0.266	98	Unconnected pavement, HSG B
0.266		100.00% Impervious Area
0.266		100.00% Unconnected

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

Subcatchment 3: Retail Bldg



Summary for Subcatchment 4: North Restaurant

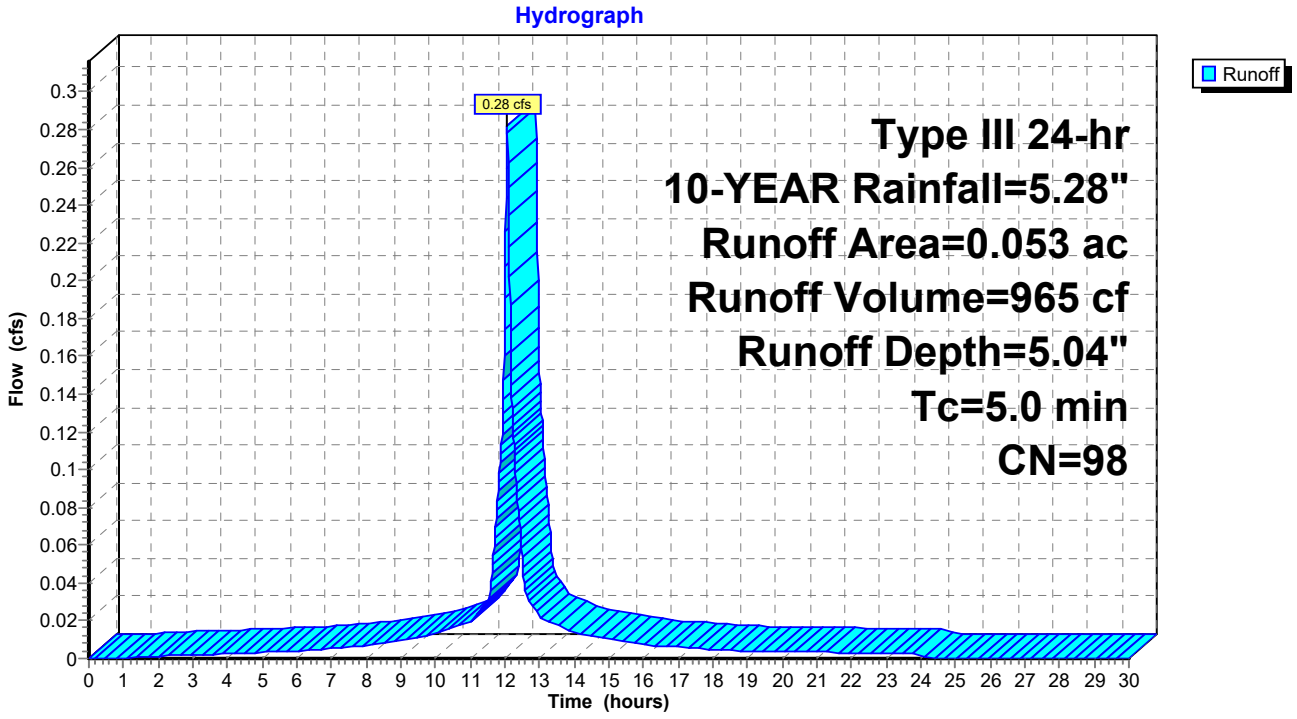
Runoff = 0.28 cfs @ 12.07 hrs, Volume= 965 cf, Depth= 5.04"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.28"

Area (ac)	CN	Description
0.053	98	Unconnected pavement, HSG B
0.053		100.00% Impervious Area
0.053		100.00% Unconnected

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

Subcatchment 4: North Restaurant



Summary for Pond 1P: Infiltration Basin

Inflow Area = 22,128 sf, 19.69% Impervious, Inflow Depth = 2.23" for 10-YEAR event
Inflow = 1.24 cfs @ 12.08 hrs, Volume= 4,112 cf
Outflow = 0.13 cfs @ 13.02 hrs, Volume= 4,112 cf, Atten= 90%, Lag= 56.3 min
Discarded = 0.13 cfs @ 13.02 hrs, Volume= 4,112 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 175.14' @ 13.02 hrs Surf.Area= 1,833 sf Storage= 1,486 cf

Plug-Flow detention time= 116.7 min calculated for 4,112 cf (100% of inflow)
Center-of-Mass det. time= 116.7 min (930.2 - 813.5)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	4,584 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

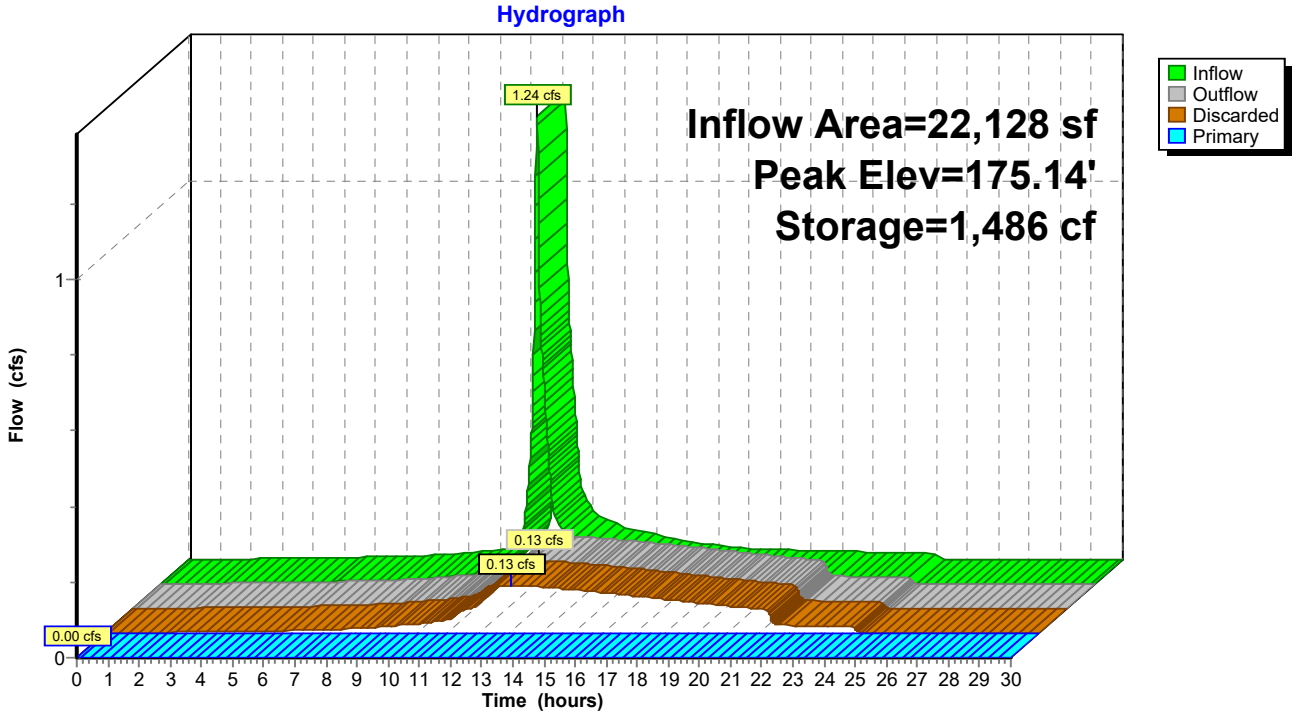
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	880	160.0	0	0	880
175.00	1,655	263.0	1,247	1,247	4,354
176.00	3,161	430.0	2,368	3,615	13,570
176.30	3,300	440.0	969	4,584	14,274

Device	Routing	Invert	Outlet Devices
#1	Device 3	175.20'	**19.4" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Primary	172.90'	**12.0" Round Culvert** L= 86.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 172.90' / 172.10' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.13 cfs @ 13.02 hrs HW=175.14' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=174.00' (Free Discharge)
└**3=Culvert** (Passes 0.00 cfs of 2.58 cfs potential flow)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Detention

Inflow Area = 2,297 sf,100.00% Impervious, Inflow Depth = 5.04" for 10-YEAR event
Inflow = 0.28 cfs @ 12.07 hrs, Volume= 965 cf
Outflow = 0.26 cfs @ 12.11 hrs, Volume= 965 cf, Atten= 9%, Lag= 2.6 min
Discarded = 0.02 cfs @ 10.43 hrs, Volume= 775 cf
Primary = 0.24 cfs @ 12.11 hrs, Volume= 190 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 176.31' @ 12.11 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 83.3 min calculated for 965 cf (100% of inflow)
Center-of-Mass det. time= 83.3 min (829.5 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	174.40'	0.004 af	**4.83'W x 45.92'L x 2.33'H Field A** 0.012 af Overall - 0.002 af Embedded = 0.010 af x 40.0% Voids
#2A	174.90'	0.002 af	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		0.006 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	174.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	176.23'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 10.43 hrs HW=174.42' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.23 cfs @ 12.11 hrs HW=176.31' (Free Discharge)
└**1=Orifice/Grate** (Passes 0.23 cfs of 3.60 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.23 cfs @ 0.77 fps)

Pond 2P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-310 +Cap (ADS StormTech®SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

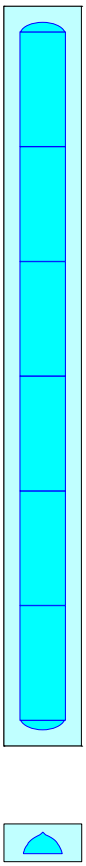
6 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 43.92' Row Length +12.0" End Stone x 2 = 45.92' Base Length
1 Rows x 34.0" Wide + 12.0" Side Stone x 2 = 4.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

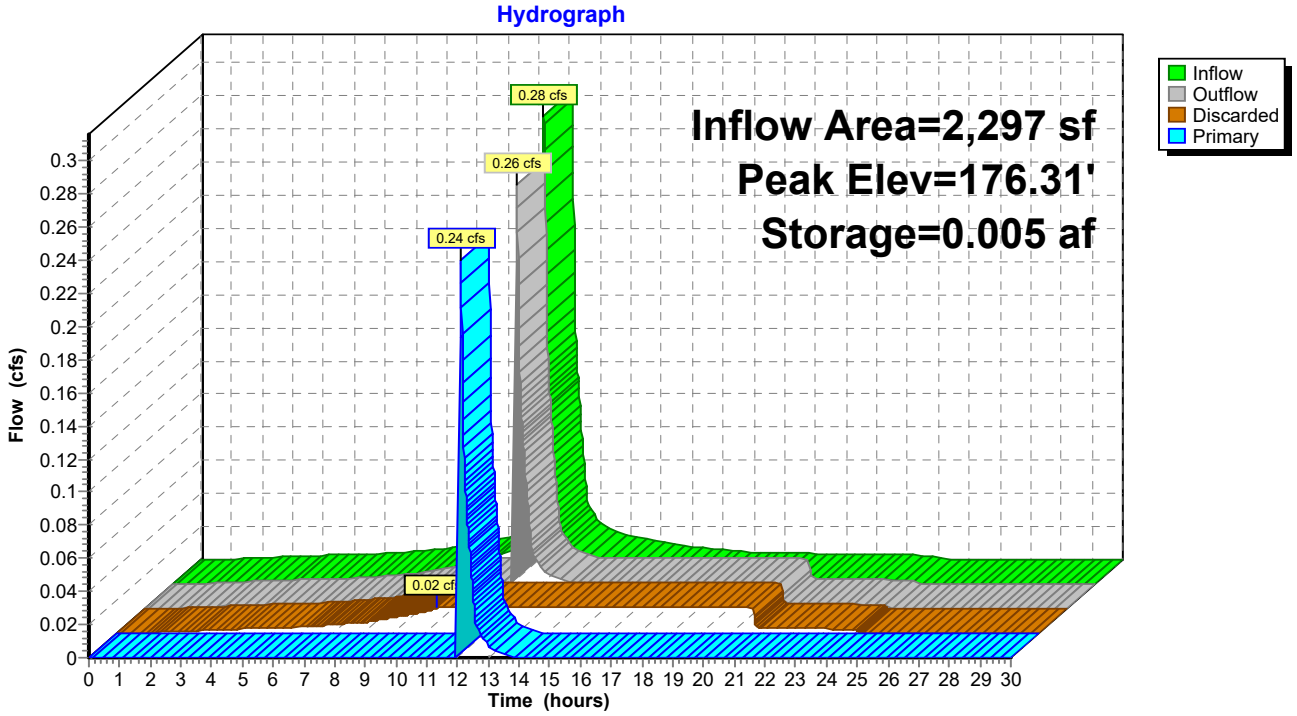
517.9 cf Field - 88.5 cf Chambers = 429.4 cf Stone x 40.0% Voids = 171.8 cf Stone Storage

Chamber Storage + Stone Storage = 260.2 cf = 0.006 af
Overall Storage Efficiency = 50.2%
Overall System Size = 45.92' x 4.83' x 2.33'

6 Chambers
19.2 cy Field
15.9 cy Stone



Pond 2P: Underground Detention



Summary for Pond 3P: Underground Detention

Inflow Area = 11,600 sf,100.00% Impervious, Inflow Depth = 5.04" for 10-YEAR event
Inflow = 1.43 cfs @ 12.07 hrs, Volume= 4,875 cf
Outflow = 1.33 cfs @ 12.10 hrs, Volume= 4,875 cf, Atten= 7%, Lag= 2.0 min
Discarded = 0.05 cfs @ 8.88 hrs, Volume= 3,517 cf
Primary = 1.28 cfs @ 12.10 hrs, Volume= 1,358 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 185.63' @ 12.10 hrs Surf.Area= 0.015 ac Storage= 0.030 af

Plug-Flow detention time= 166.9 min calculated for 4,873 cf (100% of inflow)
Center-of-Mass det. time= 166.9 min (913.1 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	182.40'	0.015 af	**11.00'W x 60.58'L x 3.50'H Field A** 0.054 af Overall - 0.017 af Embedded = 0.037 af x 40.0% Voids
#2A	182.90'	0.017 af	**ADS_StormTech SC-740 +Cap** x 16 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 16 Chambers in 2 Rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	182.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	182.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	185.40'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 8.88 hrs HW=182.44' (Free Discharge)
↑└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.27 cfs @ 12.10 hrs HW=185.63' (Free Discharge)
↑└**1=Orifice/Grate** (Passes 1.27 cfs of 5.65 cfs potential flow)
↑└**3=Broad-Crested Rectangular Weir** (Weir Controls 1.27 cfs @ 1.36 fps)

Pond 3P: Underground Detention - Chamber Wizard Field A

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

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

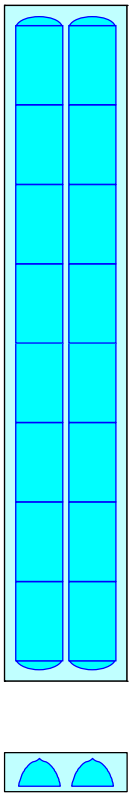
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

16 Chambers x 45.9 cf = 735.0 cf Chamber Storage

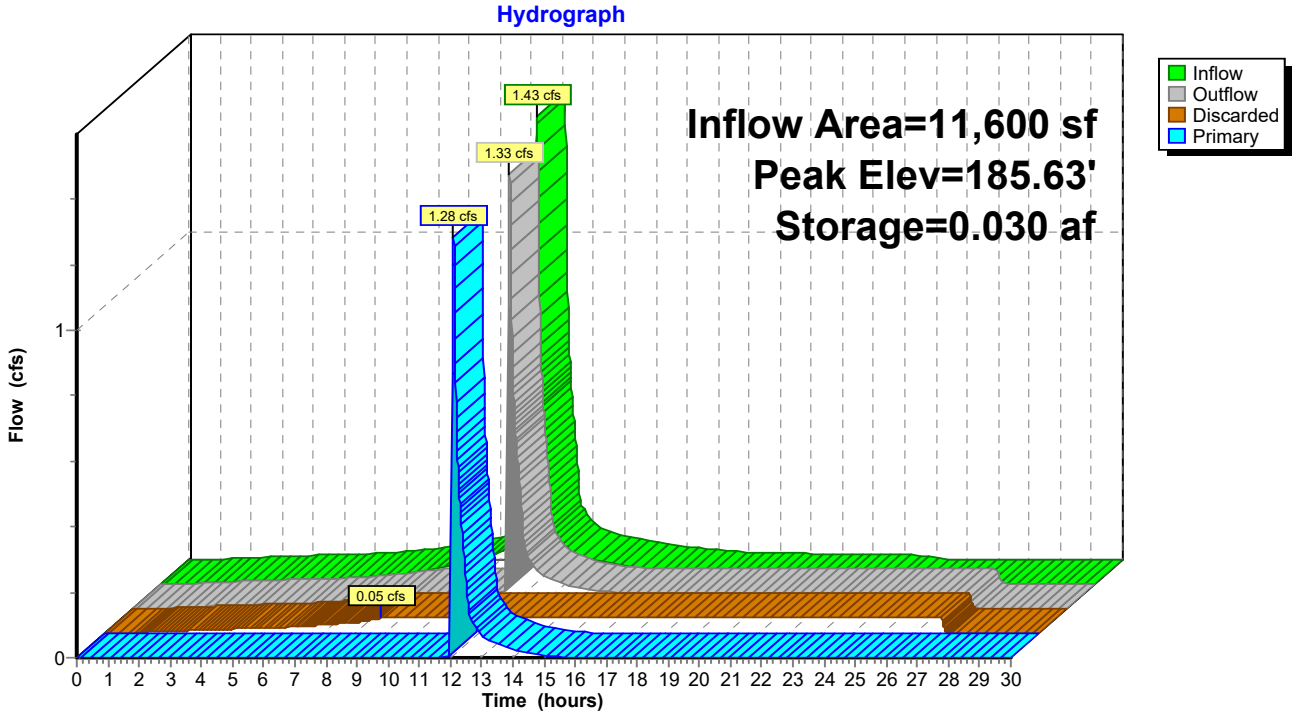
2,332.2 cf Field - 735.0 cf Chambers = 1,597.2 cf Stone x 40.0% Voids = 638.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,373.9 cf = 0.032 af
Overall Storage Efficiency = 58.9%
Overall System Size = 60.58' x 11.00' x 3.50'

16 Chambers
86.4 cy Field
59.2 cy Stone



Pond 3P: Underground Detention

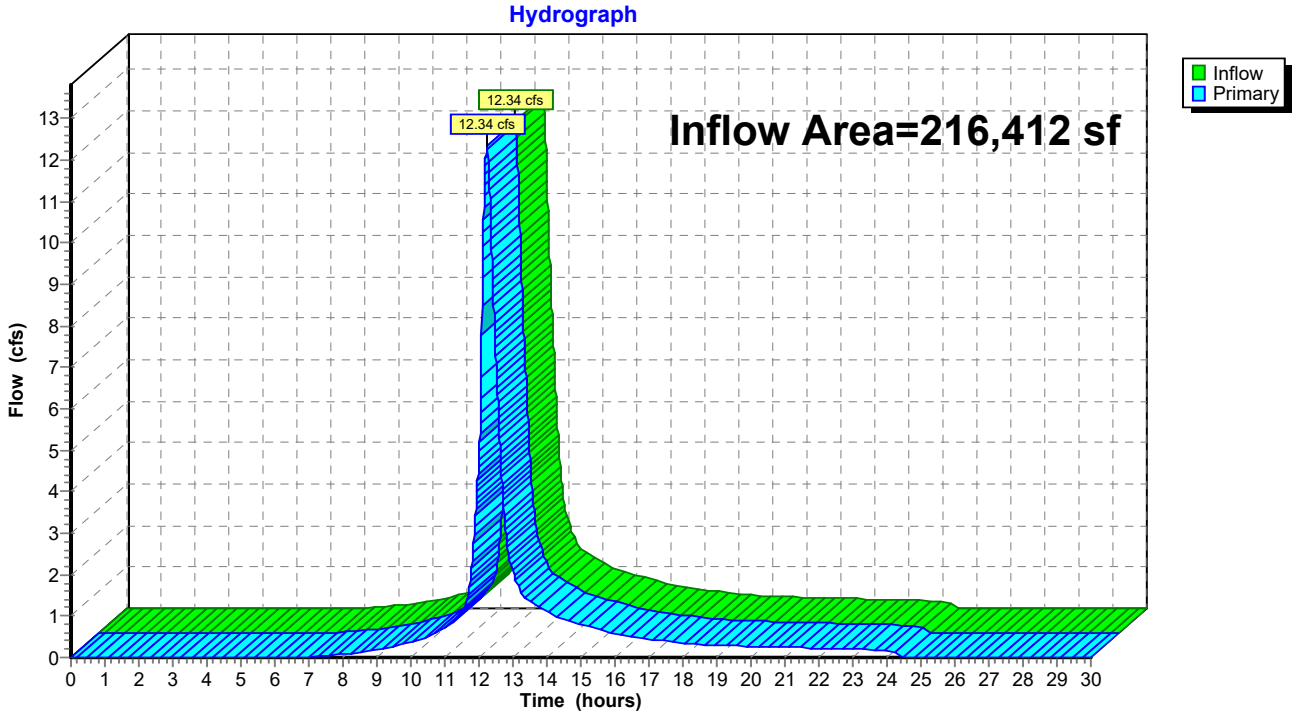


Summary for Link DP-1: Hopmeadow

Inflow Area = 216,412 sf, 58.05% Impervious, Inflow Depth = 2.94" for 10-YEAR event
Inflow = 12.34 cfs @ 12.24 hrs, Volume= 53,086 cf
Primary = 12.34 cfs @ 12.24 hrs, Volume= 53,086 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.141 ac 59.52% Impervious Runoff Depth=4.59"
Flow Length=774' Tc=18.1 min CN=83 Runoff=15.48 cfs 68,934 cf

Subcatchment2: South Pervious Runoff Area=0.408 ac 0.00% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=61 Runoff=1.14 cfs 3,507 cf

Subcatchment2A: South Restaurant Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=6.29"
Tc=5.0 min CN=98 Runoff=0.66 cfs 2,284 cf

Subcatchment3: Retail Bldg Runoff Area=0.266 ac 100.00% Impervious Runoff Depth=6.29"
Tc=5.0 min CN=98 Runoff=1.77 cfs 6,082 cf

Subcatchment4: North Restaurant Runoff Area=0.053 ac 100.00% Impervious Runoff Depth=6.29"
Tc=5.0 min CN=98 Runoff=0.35 cfs 1,204 cf

Pond 1P: Infiltration Basin Peak Elev=175.27' Storage=1,742 cf Inflow=1.80 cfs 5,791 cf
Discarded=0.14 cfs 4,991 cf Primary=0.56 cfs 800 cf Outflow=0.70 cfs 5,791 cf

Pond 2P: Underground Detention Peak Elev=176.33' Storage=0.005 af Inflow=0.35 cfs 1,204 cf
Discarded=0.02 cfs 865 cf Primary=0.33 cfs 339 cf Outflow=0.35 cfs 1,204 cf

Pond 3P: Underground Detention Peak Elev=185.68' Storage=0.030 af Inflow=1.77 cfs 6,082 cf
Discarded=0.05 cfs 3,810 cf Primary=1.71 cfs 2,272 cf Outflow=1.76 cfs 6,082 cf

Link DP-1: Hopmeadow Inflow=16.67 cfs 72,345 cf
Primary=16.67 cfs 72,345 cf

Total Runoff Area = 216,412 sf Runoff Volume = 82,010 cf Average Runoff Depth = 4.55"
41.95% Pervious = 90,788 sf 58.05% Impervious = 125,624 sf

Summary for Subcatchment 1: Site

[47] Hint: Peak is 248% of capacity of segment #5

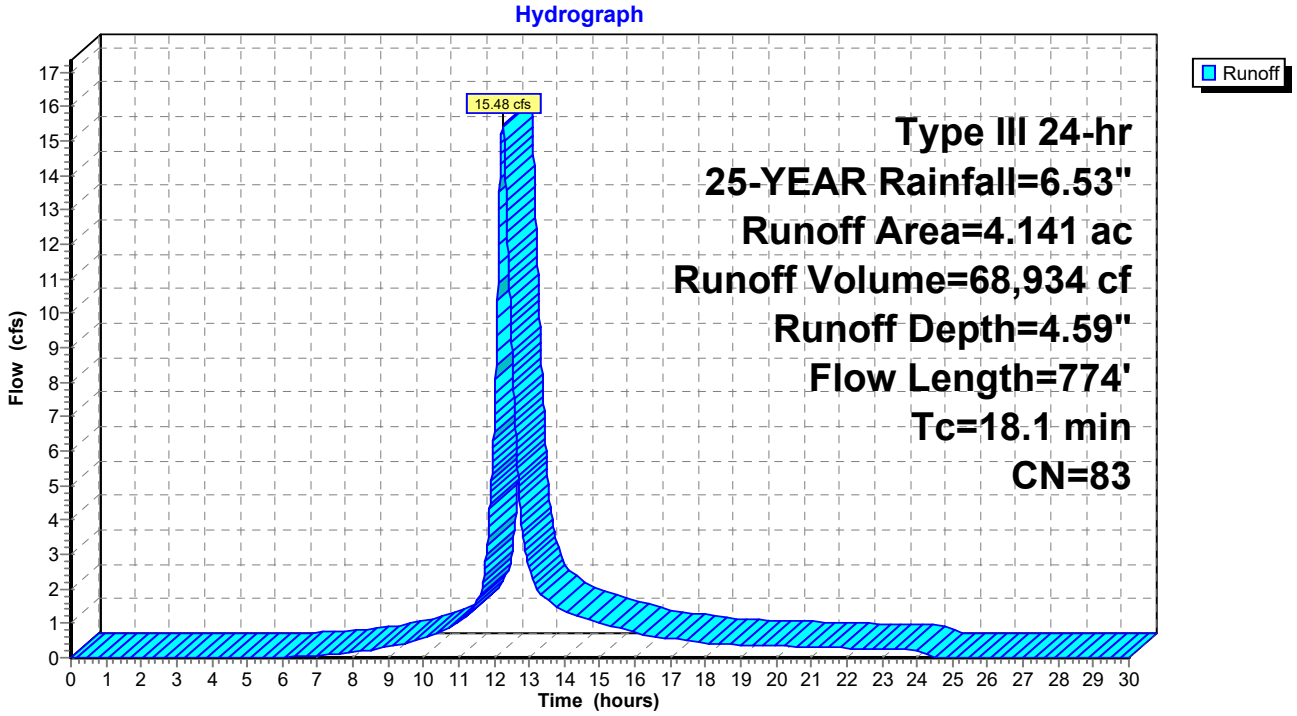
Runoff = 15.48 cfs @ 12.25 hrs, Volume= 68,934 cf, Depth= 4.59"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.53"

Area (ac)	CN	Description
1.676	61	>75% Grass cover, Good, HSG B
2.465	98	Unconnected pavement, HSG B
4.141	83	Weighted Average
1.676		40.48% Pervious Area
2.465		59.52% Impervious Area
2.465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	35	0.0200	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.28"
0.1	33	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	110	0.0171	1.96		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	8	0.0625	5.08		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	430	0.0220	7.95	6.25	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.3	158	0.0200	9.93	17.56	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
18.1	774	Total			

Subcatchment 1: Site



Summary for Subcatchment 2: South Pervious

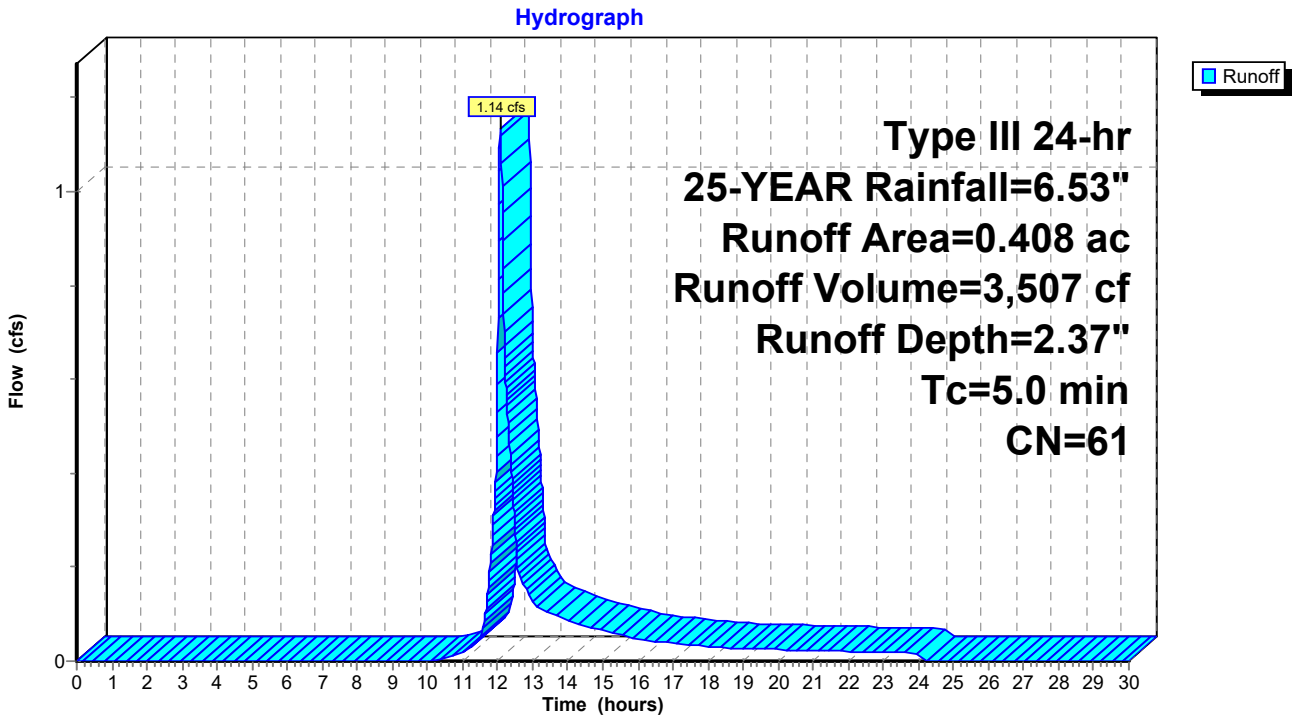
Runoff = 1.14 cfs @ 12.08 hrs, Volume= 3,507 cf, Depth= 2.37"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.53"

Area (ac)	CN	Description
0.408	61	>75% Grass cover, Good, HSG B
0.408		100.00% Pervious Area

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

Subcatchment 2: South Pervious



Summary for Subcatchment 2A: South Restaurant

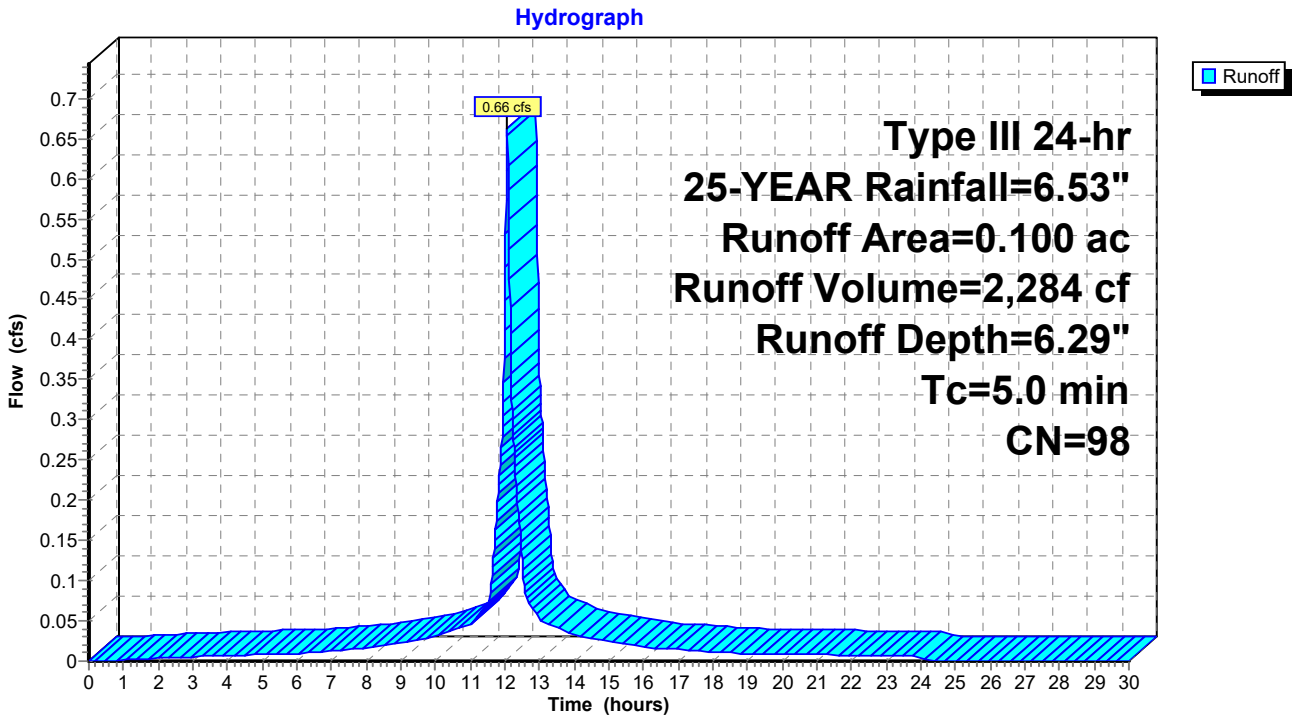
Runoff = 0.66 cfs @ 12.07 hrs, Volume= 2,284 cf, Depth= 6.29"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.53"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

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

Subcatchment 2A: South Restaurant



Summary for Subcatchment 3: Retail Bldg

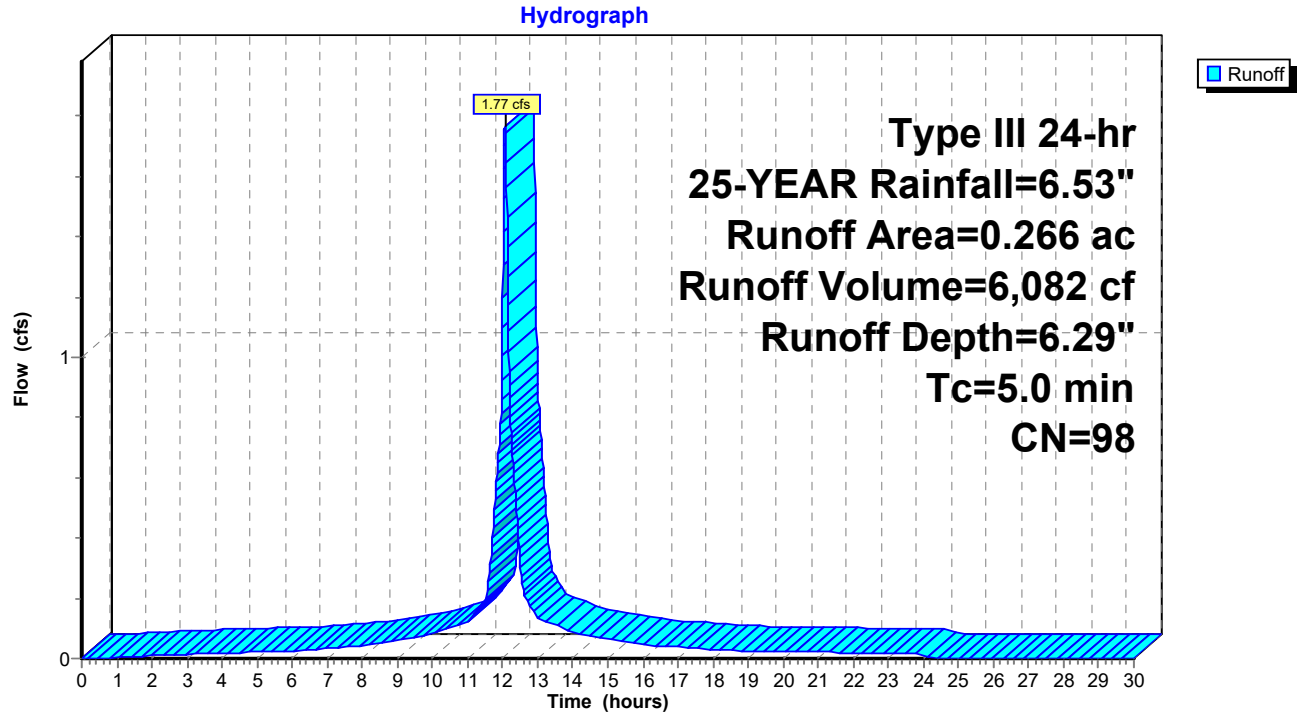
Runoff = 1.77 cfs @ 12.07 hrs, Volume= 6,082 cf, Depth= 6.29"
Routed to Pond 3P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.53"

Area (ac)	CN	Description
0.266	98	Unconnected pavement, HSG B
0.266		100.00% Impervious Area
0.266		100.00% Unconnected

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

Subcatchment 3: Retail Bldg



Summary for Subcatchment 4: North Restaurant

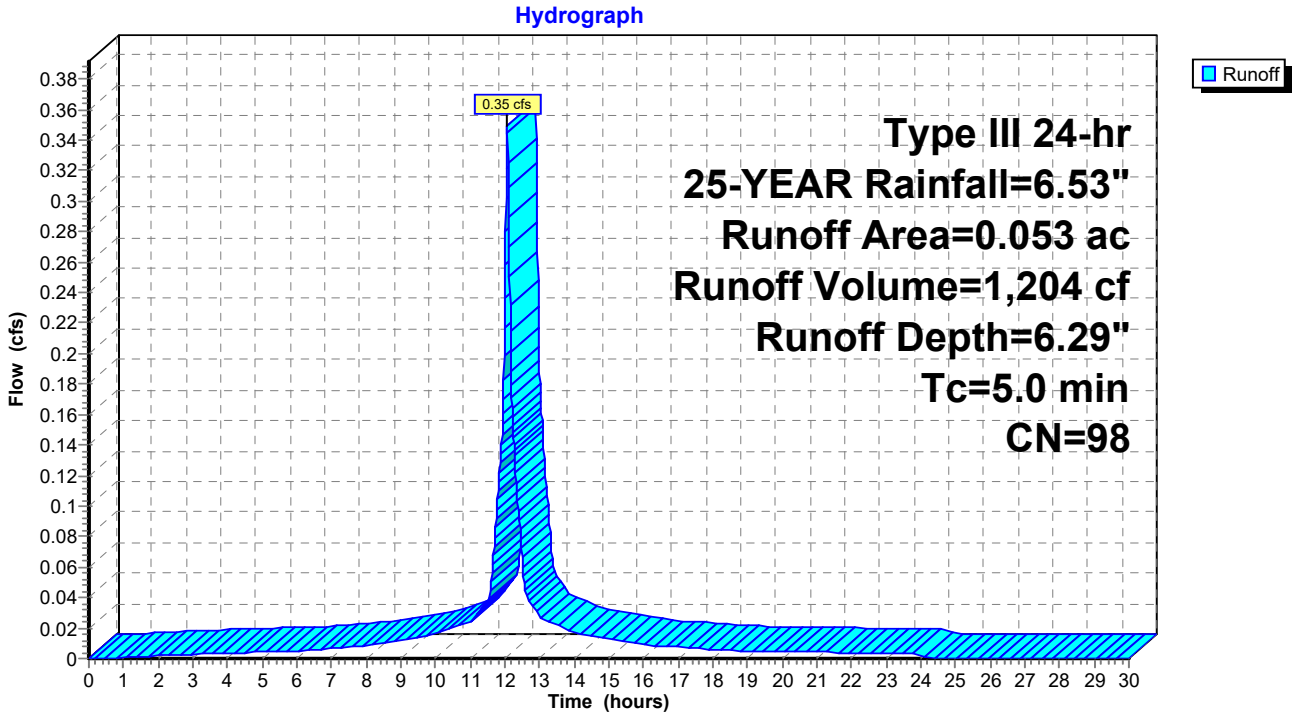
Runoff = 0.35 cfs @ 12.07 hrs, Volume= 1,204 cf, Depth= 6.29"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.53"

Area (ac)	CN	Description
0.053	98	Unconnected pavement, HSG B
0.053		100.00% Impervious Area
0.053		100.00% Unconnected

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

Subcatchment 4: North Restaurant



Summary for Pond 1P: Infiltration Basin

Inflow Area = 22,128 sf, 19.69% Impervious, Inflow Depth = 3.14" for 25-YEAR event
Inflow = 1.80 cfs @ 12.08 hrs, Volume= 5,791 cf
Outflow = 0.70 cfs @ 12.33 hrs, Volume= 5,791 cf, Atten= 61%, Lag= 15.1 min
Discarded = 0.14 cfs @ 12.33 hrs, Volume= 4,991 cf
Primary = 0.56 cfs @ 12.33 hrs, Volume= 800 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 175.27' @ 12.33 hrs Surf.Area= 2,014 sf Storage= 1,742 cf

Plug-Flow detention time= 111.8 min calculated for 5,789 cf (100% of inflow)
Center-of-Mass det. time= 111.7 min (922.1 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	4,584 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

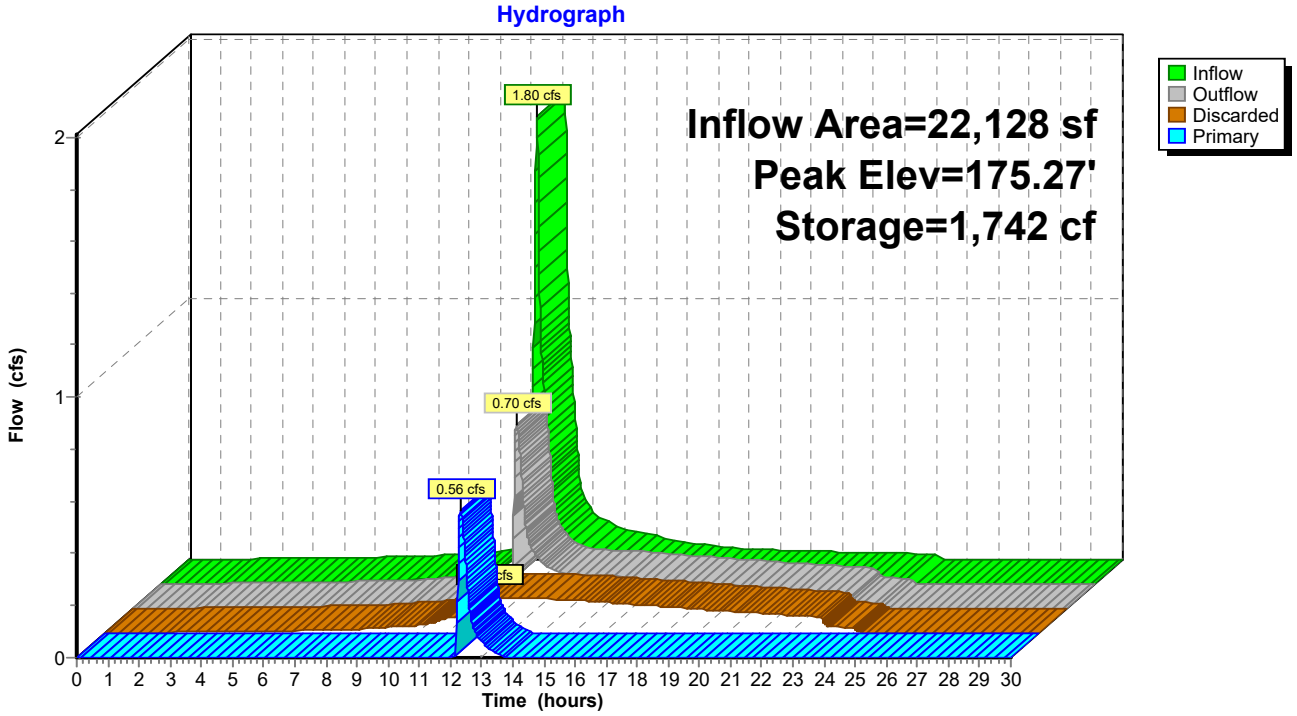
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	880	160.0	0	0	880
175.00	1,655	263.0	1,247	1,247	4,354
176.00	3,161	430.0	2,368	3,615	13,570
176.30	3,300	440.0	969	4,584	14,274

Device	Routing	Invert	Outlet Devices
#1	Device 3	175.20'	**19.4" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Primary	172.90'	**12.0" Round Culvert** L= 86.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 172.90' / 172.10' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.14 cfs @ 12.33 hrs HW=175.27' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.56 cfs @ 12.33 hrs HW=175.27' (Free Discharge)
└**3=Culvert** (Passes 0.56 cfs of 4.43 cfs potential flow)
└**1=Orifice/Grate** (Weir Controls 0.56 cfs @ 0.87 fps)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Detention

Inflow Area = 2,297 sf,100.00% Impervious, Inflow Depth = 6.29" for 25-YEAR event
Inflow = 0.35 cfs @ 12.07 hrs, Volume= 1,204 cf
Outflow = 0.35 cfs @ 12.07 hrs, Volume= 1,204 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 9.82 hrs, Volume= 865 cf
Primary = 0.33 cfs @ 12.07 hrs, Volume= 339 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 176.33' @ 12.07 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 77.1 min calculated for 1,204 cf (100% of inflow)
Center-of-Mass det. time= 77.1 min (820.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	174.40'	0.004 af	**4.83'W x 45.92'L x 2.33'H Field A** 0.012 af Overall - 0.002 af Embedded = 0.010 af x 40.0% Voids
#2A	174.90'	0.002 af	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		0.006 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	174.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	176.23'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 9.82 hrs HW=174.42' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.33 cfs @ 12.07 hrs HW=176.33' (Free Discharge)
└**1=Orifice/Grate** (Passes 0.33 cfs of 3.64 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.33 cfs @ 0.87 fps)

Pond 2P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-310 +Cap (ADS StormTech®SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

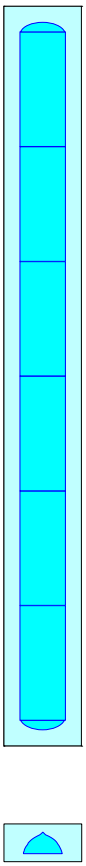
6 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 43.92' Row Length +12.0" End Stone x 2 = 45.92' Base Length
1 Rows x 34.0" Wide + 12.0" Side Stone x 2 = 4.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

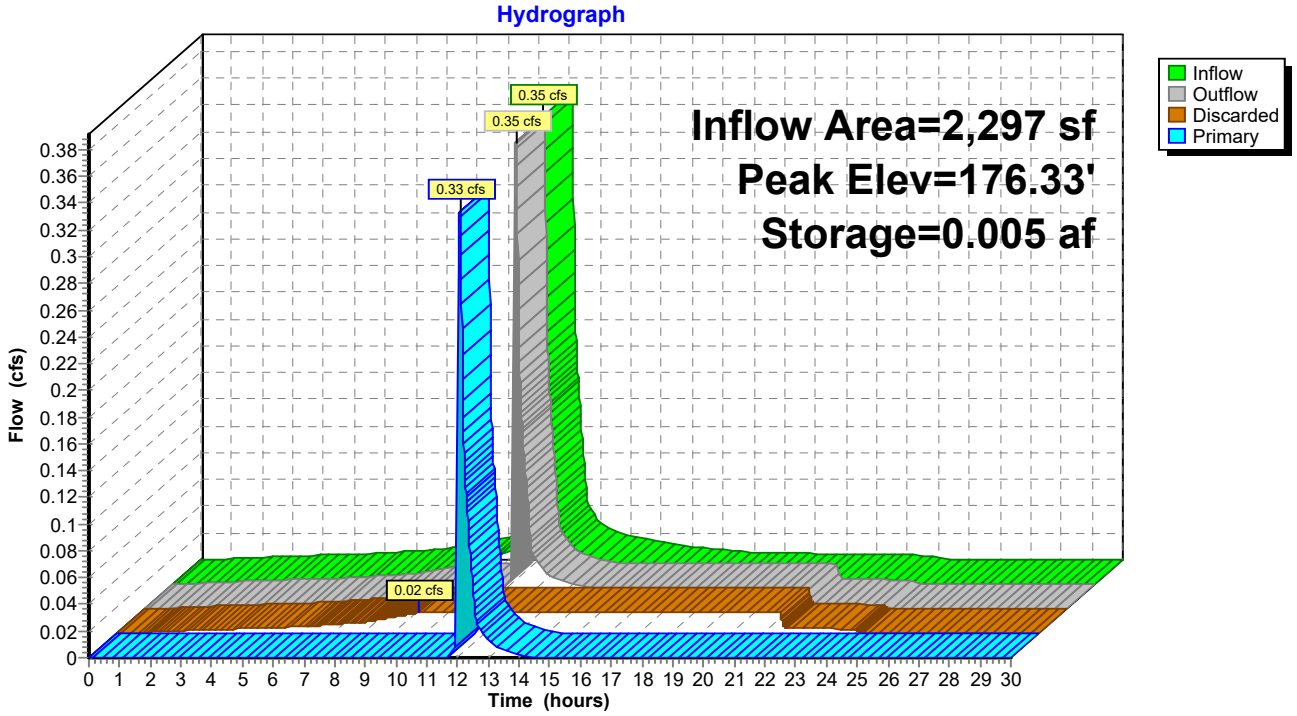
517.9 cf Field - 88.5 cf Chambers = 429.4 cf Stone x 40.0% Voids = 171.8 cf Stone Storage

Chamber Storage + Stone Storage = 260.2 cf = 0.006 af
Overall Storage Efficiency = 50.2%
Overall System Size = 45.92' x 4.83' x 2.33'

6 Chambers
19.2 cy Field
15.9 cy Stone



Pond 2P: Underground Detention



Summary for Pond 3P: Underground Detention

Inflow Area = 11,600 sf,100.00% Impervious, Inflow Depth = 6.29" for 25-YEAR event
Inflow = 1.77 cfs @ 12.07 hrs, Volume= 6,082 cf
Outflow = 1.76 cfs @ 12.08 hrs, Volume= 6,082 cf, Atten= 1%, Lag= 0.5 min
Discarded = 0.05 cfs @ 8.29 hrs, Volume= 3,810 cf
Primary = 1.71 cfs @ 12.08 hrs, Volume= 2,272 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 185.68' @ 12.08 hrs Surf.Area= 0.015 ac Storage= 0.030 af

Plug-Flow detention time= 149.8 min calculated for 6,080 cf (100% of inflow)
Center-of-Mass det. time= 149.9 min (892.9 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	182.40'	0.015 af	**11.00'W x 60.58'L x 3.50'H Field A** 0.054 af Overall - 0.017 af Embedded = 0.037 af x 40.0% Voids
#2A	182.90'	0.017 af	**ADS_StormTech SC-740 +Cap** x 16 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 16 Chambers in 2 Rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	182.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	182.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	185.40'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 8.29 hrs HW=182.44' (Free Discharge)
↑└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.71 cfs @ 12.08 hrs HW=185.68' (Free Discharge)
↑└**1=Orifice/Grate** (Passes 1.71 cfs of 5.71 cfs potential flow)
↑└**3=Broad-Crested Rectangular Weir** (Weir Controls 1.71 cfs @ 1.51 fps)

Pond 3P: Underground Detention - Chamber Wizard Field A

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

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

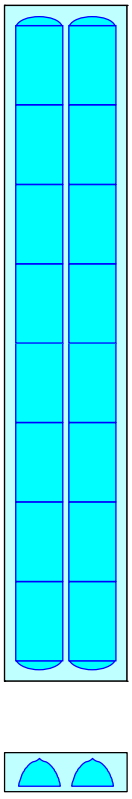
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

16 Chambers x 45.9 cf = 735.0 cf Chamber Storage

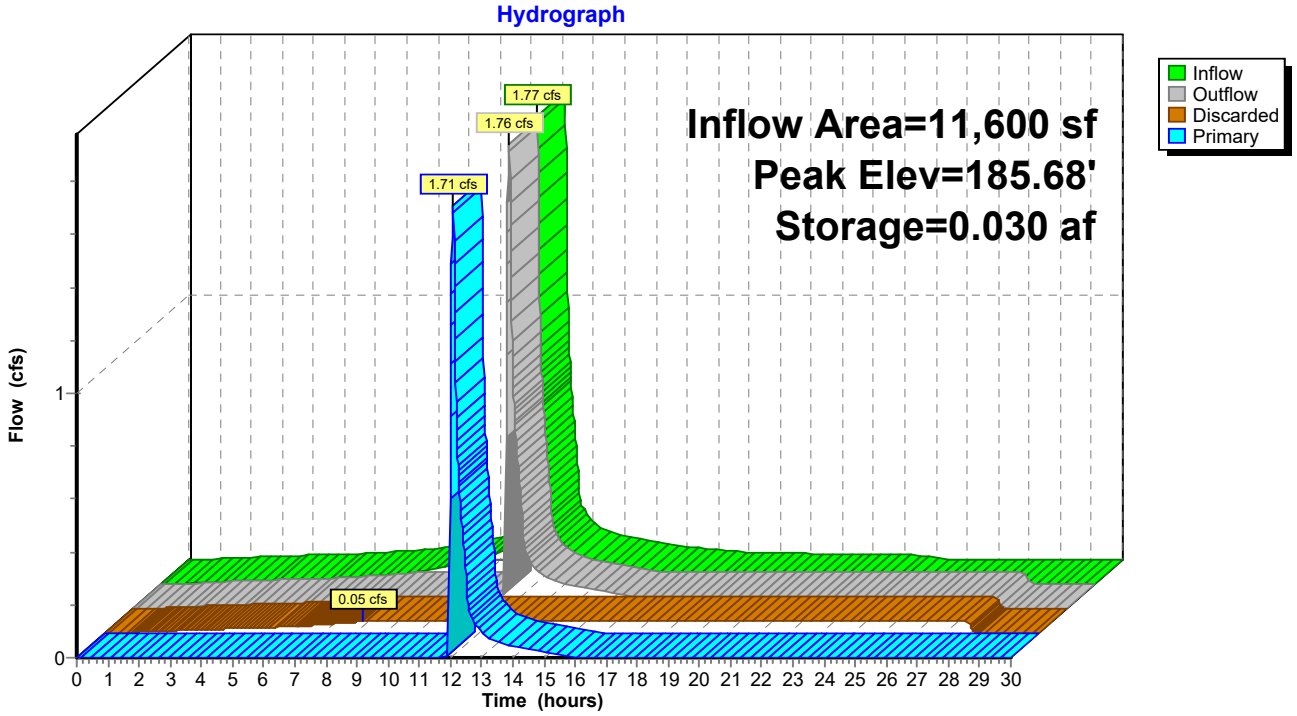
2,332.2 cf Field - 735.0 cf Chambers = 1,597.2 cf Stone x 40.0% Voids = 638.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,373.9 cf = 0.032 af
Overall Storage Efficiency = 58.9%
Overall System Size = 60.58' x 11.00' x 3.50'

16 Chambers
86.4 cy Field
59.2 cy Stone



Pond 3P: Underground Detention

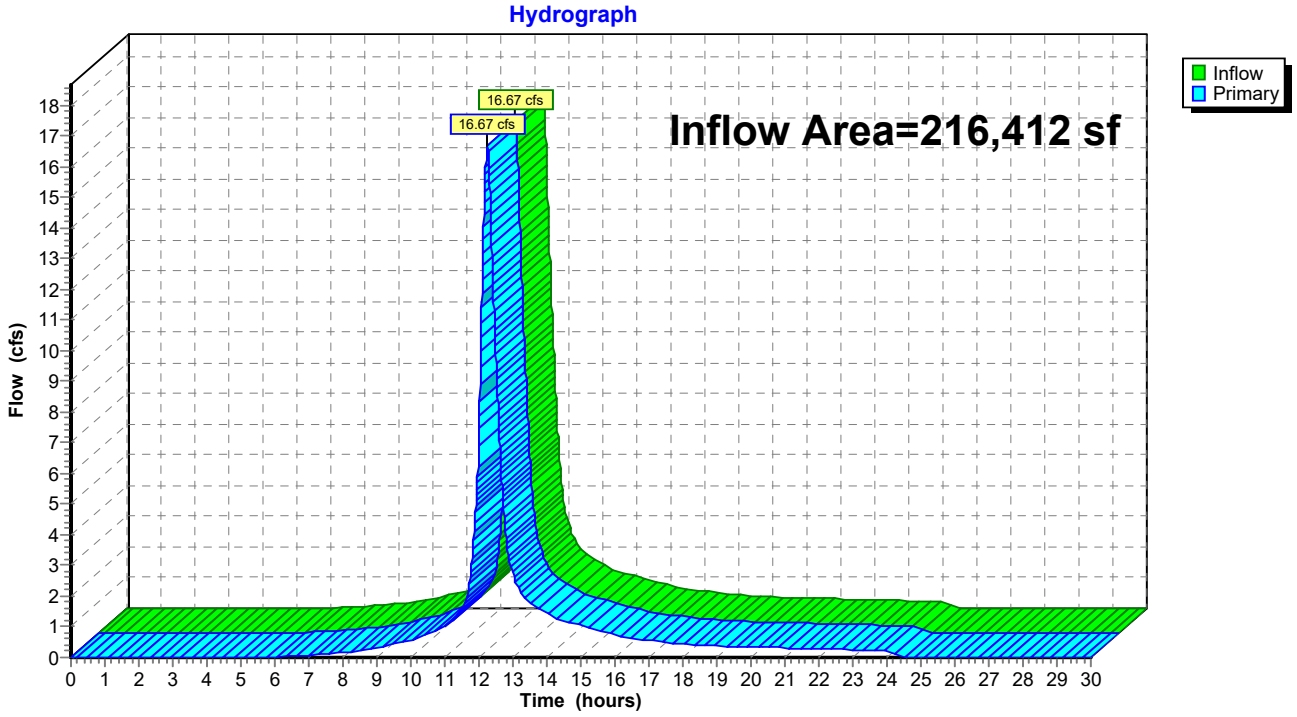


Summary for Link DP-1: Hopmeadow

Inflow Area = 216,412 sf, 58.05% Impervious, Inflow Depth = 4.01" for 25-YEAR event
Inflow = 16.67 cfs @ 12.25 hrs, Volume= 72,345 cf
Primary = 16.67 cfs @ 12.25 hrs, Volume= 72,345 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.141 ac 59.52% Impervious Runoff Depth=5.44"
Flow Length=774' Tc=18.1 min CN=83 Runoff=18.25 cfs 81,839 cf

Subcatchment2: South Pervious Runoff Area=0.408 ac 0.00% Impervious Runoff Depth=3.02"
Tc=5.0 min CN=61 Runoff=1.47 cfs 4,478 cf

Subcatchment2A: South Restaurant Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=7.20"
Tc=5.0 min CN=98 Runoff=0.76 cfs 2,614 cf

Subcatchment3: Retail Bldg Runoff Area=0.266 ac 100.00% Impervious Runoff Depth=7.20"
Tc=5.0 min CN=98 Runoff=2.01 cfs 6,961 cf

Subcatchment4: North Restaurant Runoff Area=0.053 ac 100.00% Impervious Runoff Depth=7.20"
Tc=5.0 min CN=98 Runoff=0.40 cfs 1,378 cf

Pond 1P: Infiltration Basin Peak Elev=175.31' Storage=1,823 cf Inflow=2.23 cfs 7,092 cf
Discarded=0.14 cfs 5,462 cf Primary=1.10 cfs 1,630 cf Outflow=1.25 cfs 7,092 cf

Pond 2P: Underground Detention Peak Elev=176.34' Storage=0.005 af Inflow=0.40 cfs 1,378 cf
Discarded=0.02 cfs 920 cf Primary=0.38 cfs 458 cf Outflow=0.40 cfs 1,378 cf

Pond 3P: Underground Detention Peak Elev=185.71' Storage=0.030 af Inflow=2.01 cfs 6,961 cf
Discarded=0.05 cfs 3,998 cf Primary=1.96 cfs 2,962 cf Outflow=2.00 cfs 6,961 cf

Link DP-1: Hopmeadow Inflow=20.27 cfs 86,889 cf
Primary=20.27 cfs 86,889 cf

Total Runoff Area = 216,412 sf Runoff Volume = 97,270 cf Average Runoff Depth = 5.39"
41.95% Pervious = 90,788 sf 58.05% Impervious = 125,624 sf

Summary for Subcatchment 1: Site

[47] Hint: Peak is 292% of capacity of segment #5
[47] Hint: Peak is 104% of capacity of segment #6

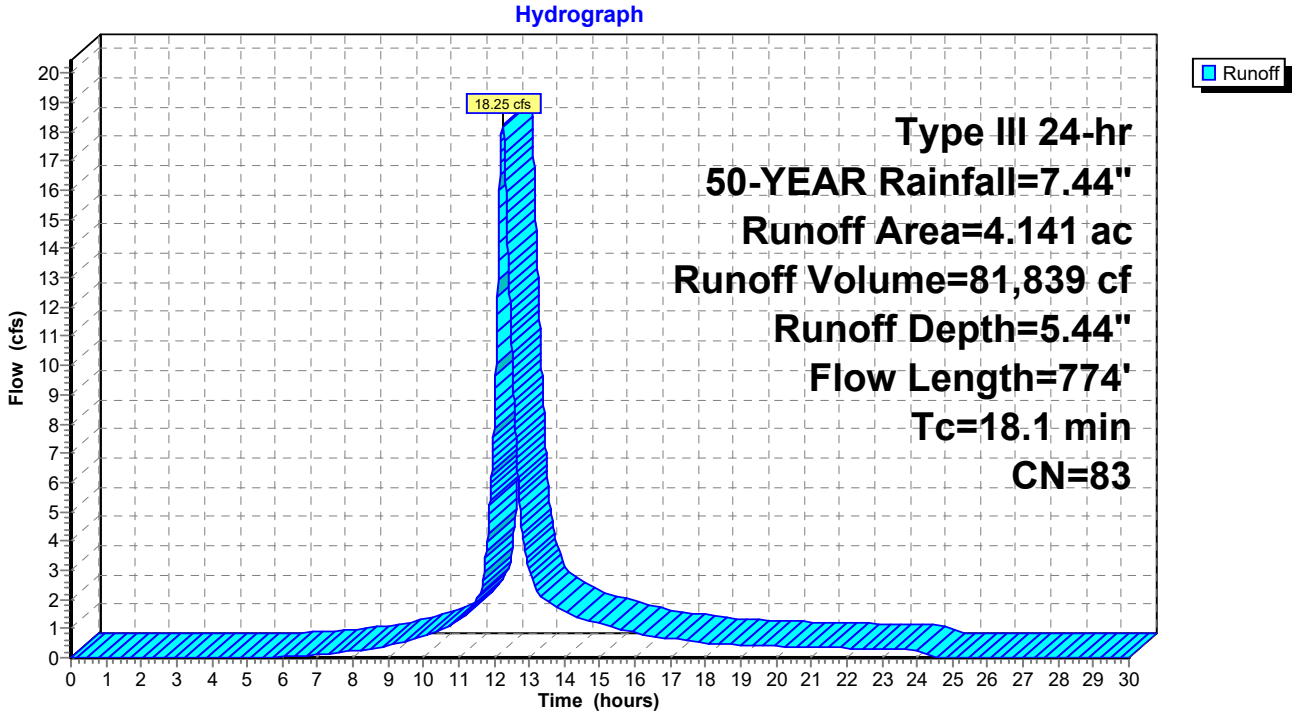
Runoff = 18.25 cfs @ 12.24 hrs, Volume= 81,839 cf, Depth= 5.44"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YEAR Rainfall=7.44"

Area (ac)	CN	Description
1.676	61	>75% Grass cover, Good, HSG B
2.465	98	Unconnected pavement, HSG B
4.141	83	Weighted Average
1.676		40.48% Pervious Area
2.465		59.52% Impervious Area
2.465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	35	0.0200	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.28"
0.1	33	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	110	0.0171	1.96		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	8	0.0625	5.08		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	430	0.0220	7.95	6.25	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.3	158	0.0200	9.93	17.56	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
18.1	774	Total			

Subcatchment 1: Site



Summary for Subcatchment 2: South Pervious

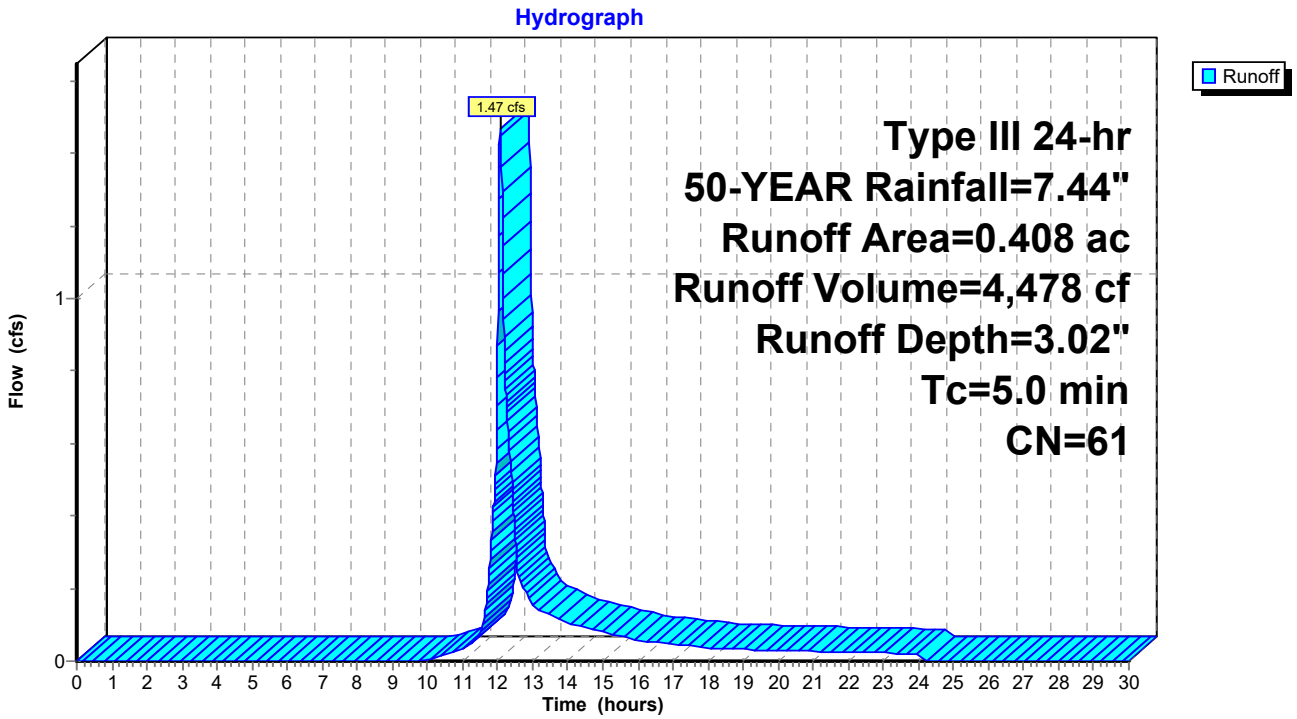
Runoff = 1.47 cfs @ 12.08 hrs, Volume= 4,478 cf, Depth= 3.02"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YEAR Rainfall=7.44"

Area (ac)	CN	Description
0.408	61	>75% Grass cover, Good, HSG B
0.408		100.00% Pervious Area

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

Subcatchment 2: South Pervious



Summary for Subcatchment 2A: South Restaurant

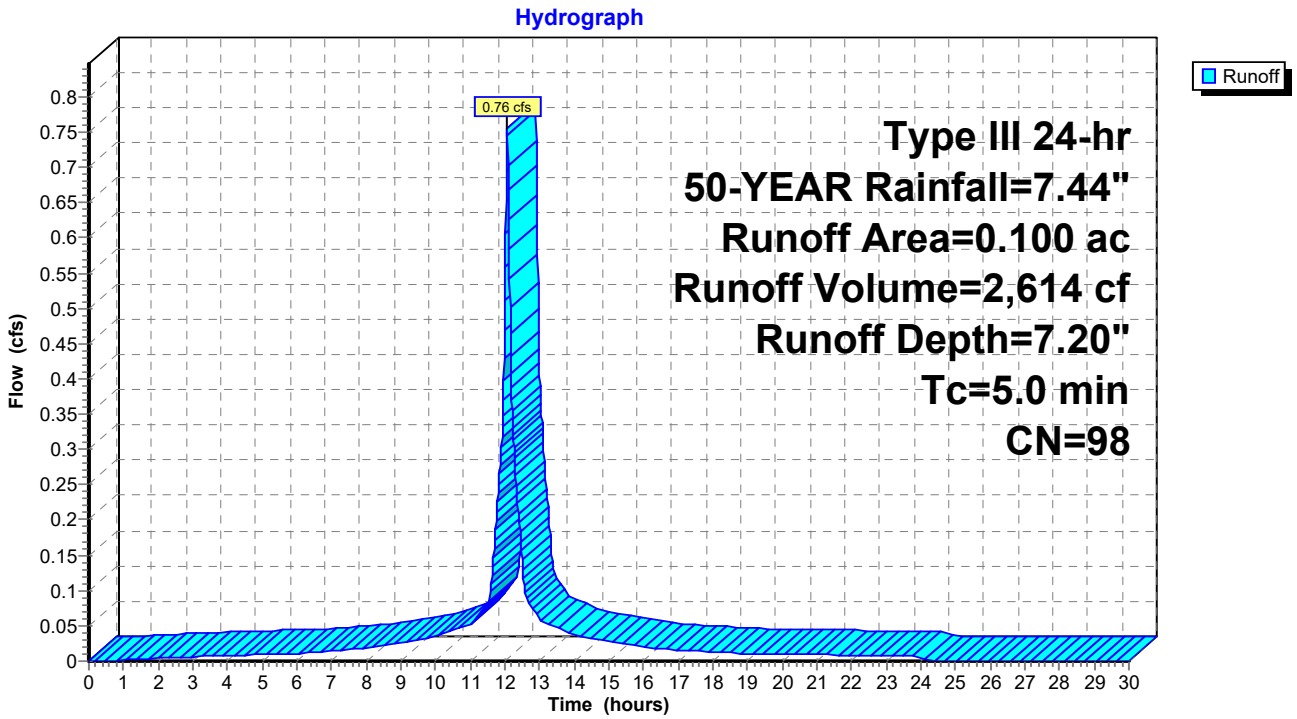
Runoff = 0.76 cfs @ 12.07 hrs, Volume= 2,614 cf, Depth= 7.20"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YEAR Rainfall=7.44"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

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

Subcatchment 2A: South Restaurant



Summary for Subcatchment 3: Retail Bldg

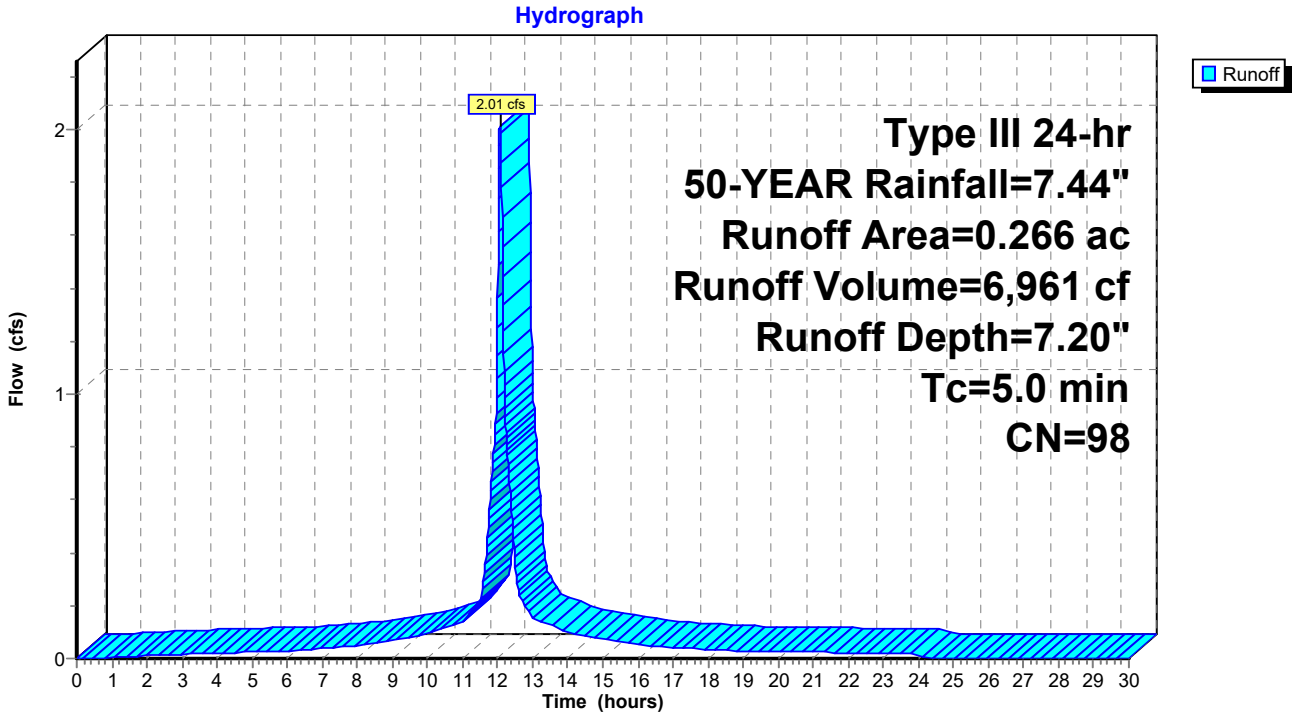
Runoff = 2.01 cfs @ 12.07 hrs, Volume= 6,961 cf, Depth= 7.20"
Routed to Pond 3P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YEAR Rainfall=7.44"

Area (ac)	CN	Description
0.266	98	Unconnected pavement, HSG B
0.266		100.00% Impervious Area
0.266		100.00% Unconnected

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

Subcatchment 3: Retail Bldg



Summary for Subcatchment 4: North Restaurant

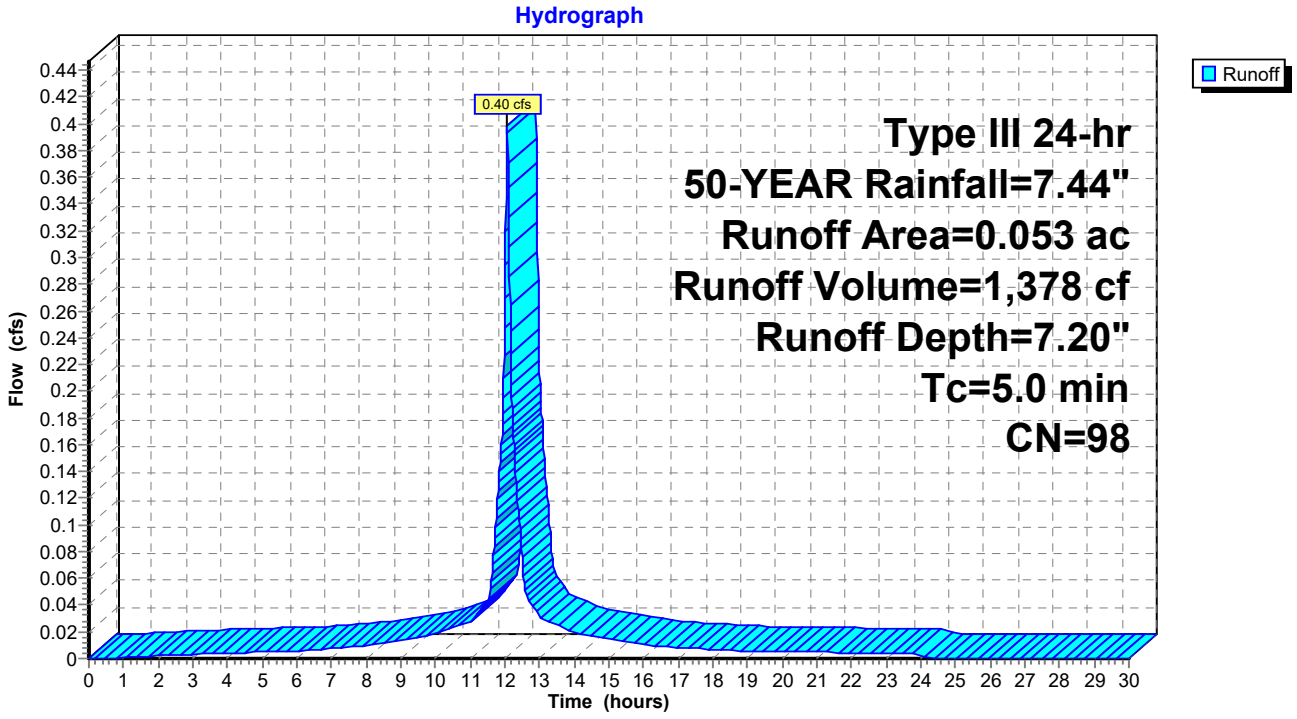
Runoff = 0.40 cfs @ 12.07 hrs, Volume= 1,378 cf, Depth= 7.20"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YEAR Rainfall=7.44"

Area (ac)	CN	Description
0.053	98	Unconnected pavement, HSG B
0.053		100.00% Impervious Area
0.053		100.00% Unconnected

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

Subcatchment 4: North Restaurant



Summary for Pond 1P: Infiltration Basin

Inflow Area = 22,128 sf, 19.69% Impervious, Inflow Depth = 3.85" for 50-YEAR event
Inflow = 2.23 cfs @ 12.08 hrs, Volume= 7,092 cf
Outflow = 1.25 cfs @ 12.19 hrs, Volume= 7,092 cf, Atten= 44%, Lag= 6.9 min
Discarded = 0.14 cfs @ 12.19 hrs, Volume= 5,462 cf
Primary = 1.10 cfs @ 12.19 hrs, Volume= 1,630 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 175.31' @ 12.19 hrs Surf.Area= 2,070 sf Storage= 1,823 cf

Plug-Flow detention time= 103.2 min calculated for 7,090 cf (100% of inflow)
Center-of-Mass det. time= 103.2 min (911.1 - 807.9)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	4,584 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

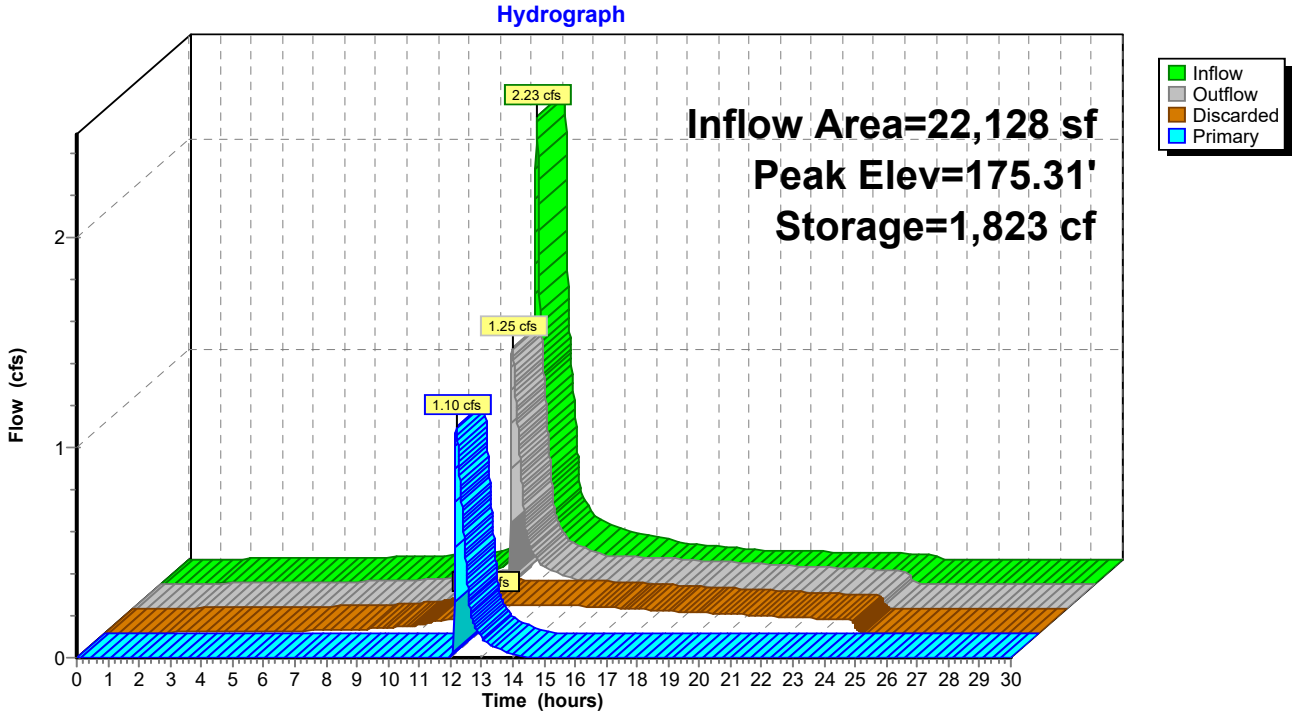
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	880	160.0	0	0	880
175.00	1,655	263.0	1,247	1,247	4,354
176.00	3,161	430.0	2,368	3,615	13,570
176.30	3,300	440.0	969	4,584	14,274

Device	Routing	Invert	Outlet Devices
#1	Device 3	175.20'	**19.4" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Primary	172.90'	**12.0" Round Culvert** L= 86.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 172.90' / 172.10' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.14 cfs @ 12.19 hrs HW=175.31' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.10 cfs @ 12.19 hrs HW=175.31' (Free Discharge)
└**3=Culvert** (Passes 1.10 cfs of 4.47 cfs potential flow)
└**1=Orifice/Grate** (Weir Controls 1.10 cfs @ 1.08 fps)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Detention

Inflow Area = 2,297 sf,100.00% Impervious, Inflow Depth = 7.20" for 50-YEAR event
Inflow = 0.40 cfs @ 12.07 hrs, Volume= 1,378 cf
Outflow = 0.40 cfs @ 12.07 hrs, Volume= 1,378 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 9.33 hrs, Volume= 920 cf
Primary = 0.38 cfs @ 12.07 hrs, Volume= 458 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 176.34' @ 12.07 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 73.7 min calculated for 1,378 cf (100% of inflow)
Center-of-Mass det. time= 73.6 min (814.9 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	174.40'	0.004 af	**4.83'W x 45.92'L x 2.33'H Field A** 0.012 af Overall - 0.002 af Embedded = 0.010 af x 40.0% Voids
#2A	174.90'	0.002 af	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		0.006 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	174.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	176.23'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 9.33 hrs HW=174.42' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.38 cfs @ 12.07 hrs HW=176.34' (Free Discharge)
└**1=Orifice/Grate** (Passes 0.38 cfs of 3.66 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.38 cfs @ 0.91 fps)

Pond 2P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-310 +Cap (ADS StormTech®SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

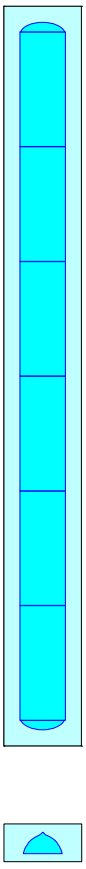
6 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 43.92' Row Length +12.0" End Stone x 2 = 45.92' Base Length
1 Rows x 34.0" Wide + 12.0" Side Stone x 2 = 4.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

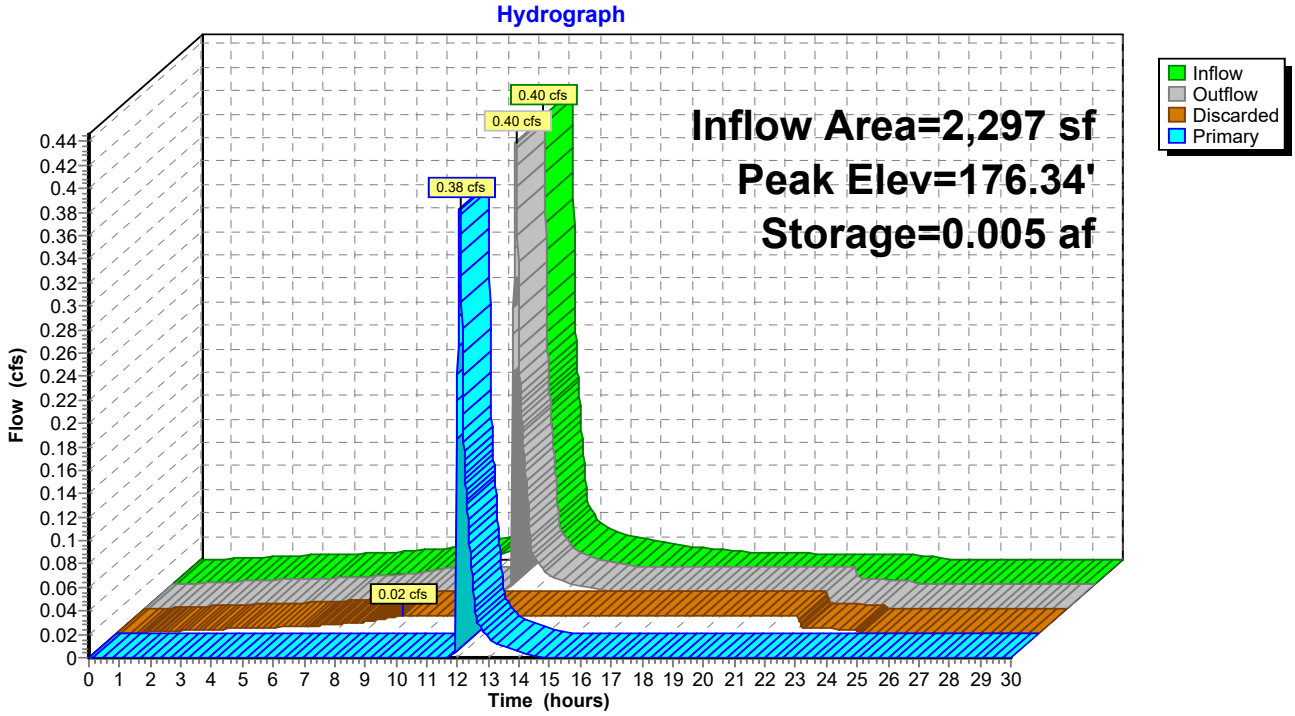
517.9 cf Field - 88.5 cf Chambers = 429.4 cf Stone x 40.0% Voids = 171.8 cf Stone Storage

Chamber Storage + Stone Storage = 260.2 cf = 0.006 af
Overall Storage Efficiency = 50.2%
Overall System Size = 45.92' x 4.83' x 2.33'

6 Chambers
19.2 cy Field
15.9 cy Stone



Pond 2P: Underground Detention



Summary for Pond 3P: Underground Detention

Inflow Area = 11,600 sf,100.00% Impervious, Inflow Depth = 7.20" for 50-YEAR event
Inflow = 2.01 cfs @ 12.07 hrs, Volume= 6,961 cf
Outflow = 2.00 cfs @ 12.08 hrs, Volume= 6,961 cf, Atten= 1%, Lag= 0.5 min
Discarded = 0.05 cfs @ 7.80 hrs, Volume= 3,998 cf
Primary = 1.96 cfs @ 12.08 hrs, Volume= 2,962 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 185.71' @ 12.08 hrs Surf.Area= 0.015 ac Storage= 0.030 af

Plug-Flow detention time= 140.6 min calculated for 6,958 cf (100% of inflow)
Center-of-Mass det. time= 140.7 min (881.9 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	182.40'	0.015 af	**11.00'W x 60.58'L x 3.50'H Field A** 0.054 af Overall - 0.017 af Embedded = 0.037 af x 40.0% Voids
#2A	182.90'	0.017 af	**ADS_StormTech SC-740 +Cap** x 16 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 16 Chambers in 2 Rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	182.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	182.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	185.40'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 7.80 hrs HW=182.44' (Free Discharge)
↑└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.95 cfs @ 12.08 hrs HW=185.71' (Free Discharge)
↑└**1=Orifice/Grate** (Passes 1.95 cfs of 5.74 cfs potential flow)
↑└**3=Broad-Crested Rectangular Weir** (Weir Controls 1.95 cfs @ 1.59 fps)

Pond 3P: Underground Detention - Chamber Wizard Field A

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

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

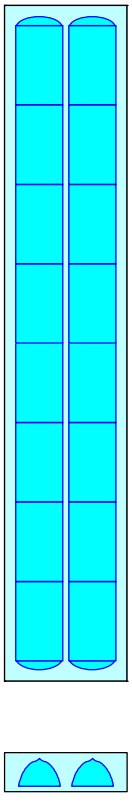
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

16 Chambers x 45.9 cf = 735.0 cf Chamber Storage

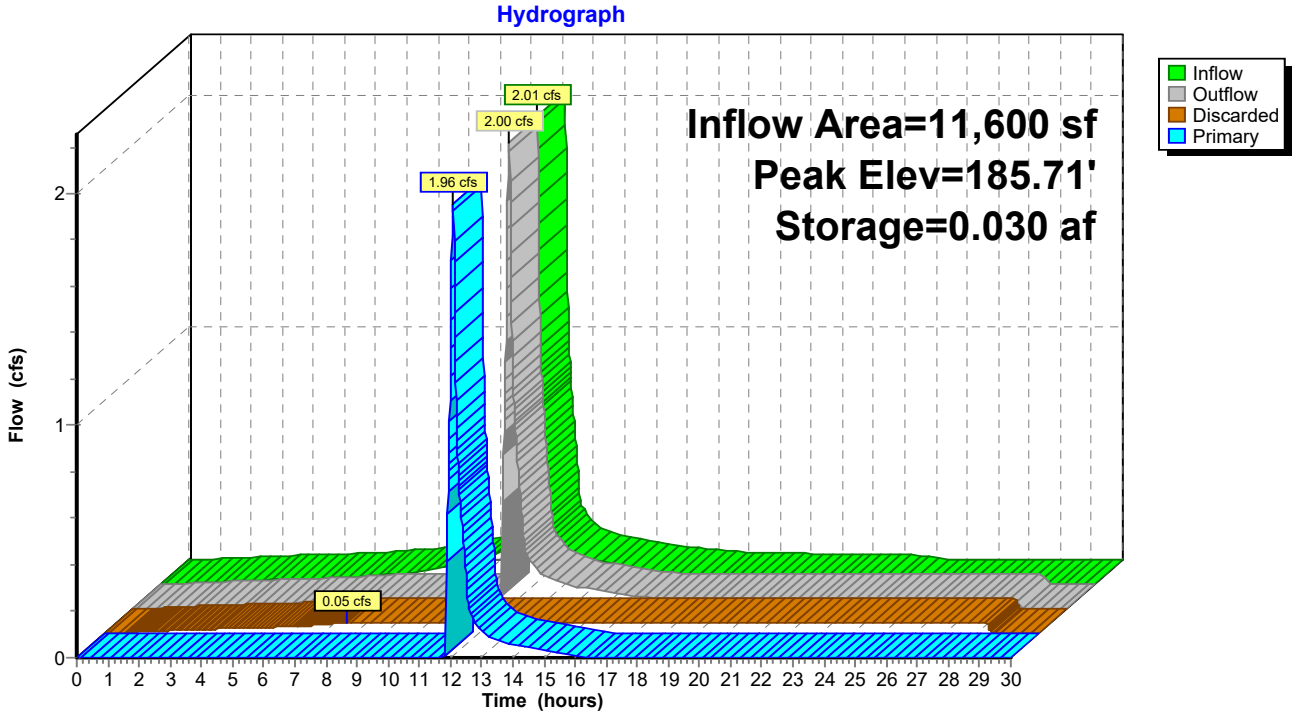
2,332.2 cf Field - 735.0 cf Chambers = 1,597.2 cf Stone x 40.0% Voids = 638.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,373.9 cf = 0.032 af
Overall Storage Efficiency = 58.9%
Overall System Size = 60.58' x 11.00' x 3.50'

16 Chambers
86.4 cy Field
59.2 cy Stone



Pond 3P: Underground Detention

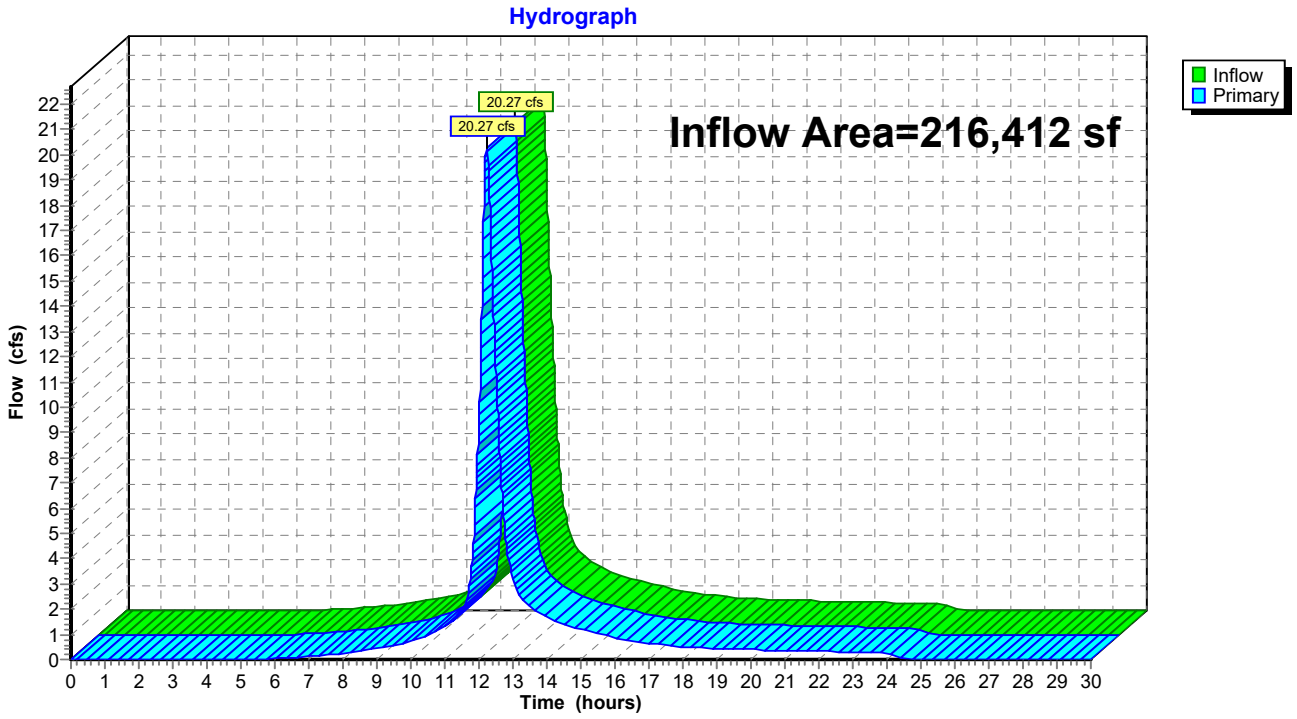


Summary for Link DP-1: Hopmeadow

Inflow Area = 216,412 sf, 58.05% Impervious, Inflow Depth = 4.82" for 50-YEAR event
Inflow = 20.27 cfs @ 12.23 hrs, Volume= 86,889 cf
Primary = 20.27 cfs @ 12.23 hrs, Volume= 86,889 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: Hopmeadow



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Site Runoff Area=4.141 ac 59.52% Impervious Runoff Depth=6.41"
Flow Length=774' Tc=18.1 min CN=83 Runoff=21.33 cfs 96,326 cf

Subcatchment2: South Pervious Runoff Area=0.408 ac 0.00% Impervious Runoff Depth=3.79"
Tc=5.0 min CN=61 Runoff=1.86 cfs 5,615 cf

Subcatchment2A: South Restaurant Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=8.21"
Tc=5.0 min CN=98 Runoff=0.86 cfs 2,980 cf

Subcatchment3: Retail Bldg Runoff Area=0.266 ac 100.00% Impervious Runoff Depth=8.21"
Tc=5.0 min CN=98 Runoff=2.29 cfs 7,936 cf

Subcatchment4: North Restaurant Runoff Area=0.053 ac 100.00% Impervious Runoff Depth=8.21"
Tc=5.0 min CN=98 Runoff=0.45 cfs 1,571 cf

Pond 1P: Infiltration Basin Peak Elev=175.36' Storage=1,935 cf Inflow=2.72 cfs 8,595 cf
Discarded=0.15 cfs 5,924 cf Primary=1.99 cfs 2,672 cf Outflow=2.14 cfs 8,595 cf

Pond 2P: Underground Detention Peak Elev=176.34' Storage=0.005 af Inflow=0.45 cfs 1,571 cf
Discarded=0.02 cfs 975 cf Primary=0.44 cfs 596 cf Outflow=0.45 cfs 1,571 cf

Pond 3P: Underground Detention Peak Elev=185.73' Storage=0.031 af Inflow=2.29 cfs 7,936 cf
Discarded=0.05 cfs 4,182 cf Primary=2.23 cfs 3,755 cf Outflow=2.28 cfs 7,936 cf

Link DP-1: Hopmeadow Inflow=23.82 cfs 103,348 cf
Primary=23.82 cfs 103,348 cf

Total Runoff Area = 216,412 sf Runoff Volume = 114,429 cf Average Runoff Depth = 6.35"
41.95% Pervious = 90,788 sf 58.05% Impervious = 125,624 sf

Summary for Subcatchment 1: Site

[47] Hint: Peak is 342% of capacity of segment #5
[47] Hint: Peak is 122% of capacity of segment #6

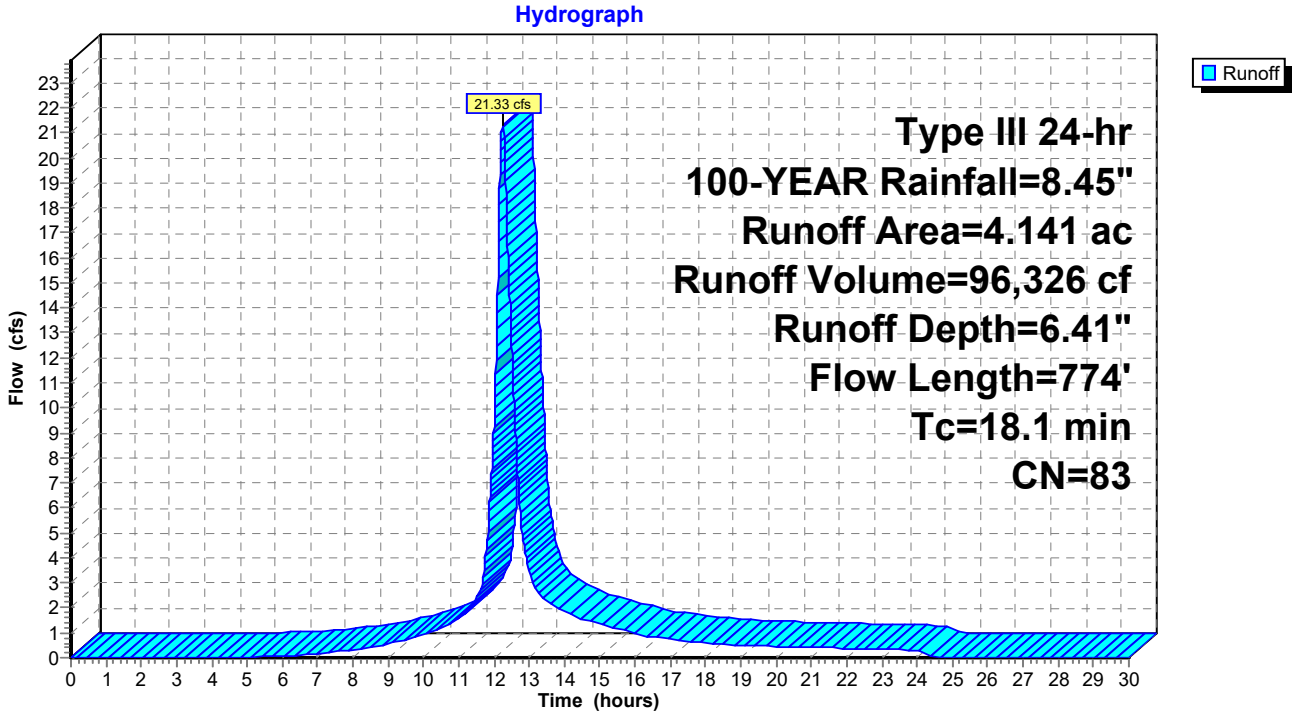
Runoff = 21.33 cfs @ 12.24 hrs, Volume= 96,326 cf, Depth= 6.41"
Routed to Link DP-1 : Hopmeadow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.45"

Area (ac)	CN	Description
1.676	61	>75% Grass cover, Good, HSG B
2.465	98	Unconnected pavement, HSG B
4.141	83	Weighted Average
1.676		40.48% Pervious Area
2.465		59.52% Impervious Area
2.465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	35	0.0200	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.28"
0.1	33	0.2000	7.20		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	110	0.0171	1.96		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	8	0.0625	5.08		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	430	0.0220	7.95	6.25	**Pipe Channel, RCP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.3	158	0.0200	9.93	17.56	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
18.1	774	Total			

Subcatchment 1: Site



Summary for Subcatchment 2: South Pervious

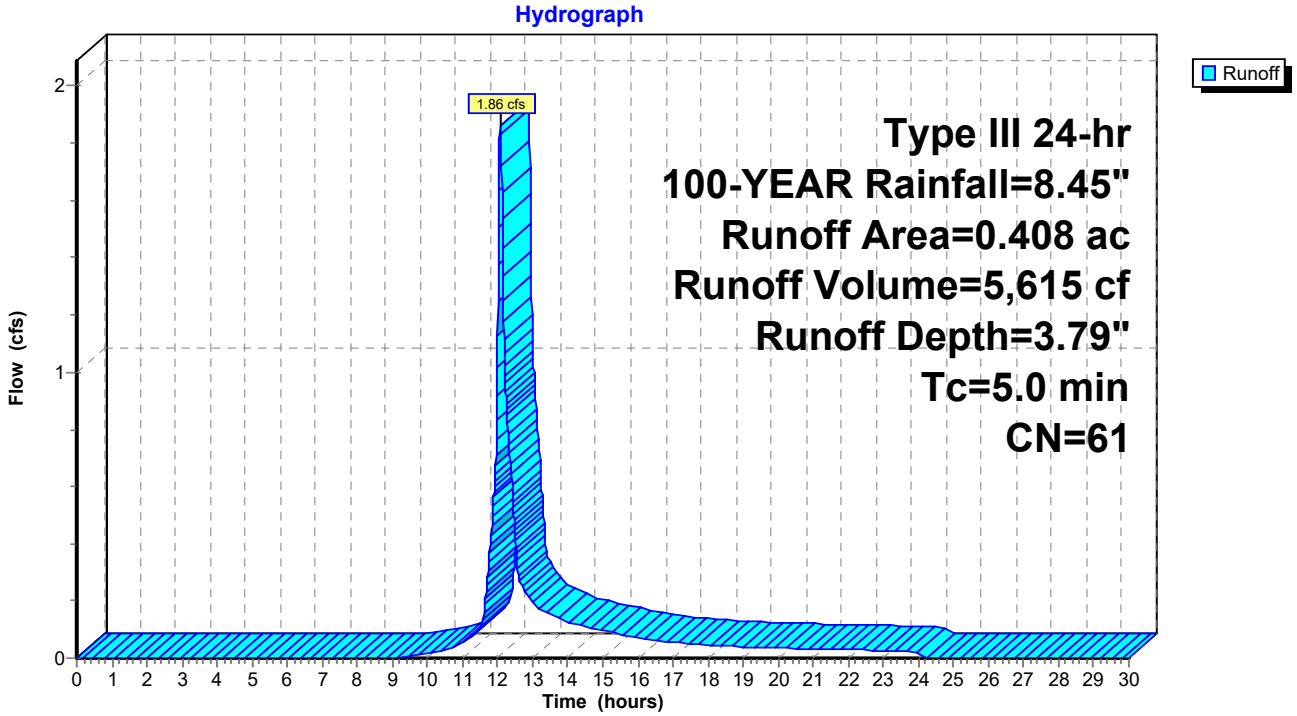
Runoff = 1.86 cfs @ 12.08 hrs, Volume= 5,615 cf, Depth= 3.79"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.45"

Area (ac)	CN	Description
0.408	61	>75% Grass cover, Good, HSG B
0.408		100.00% Pervious Area

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

Subcatchment 2: South Pervious



Summary for Subcatchment 2A: South Restaurant

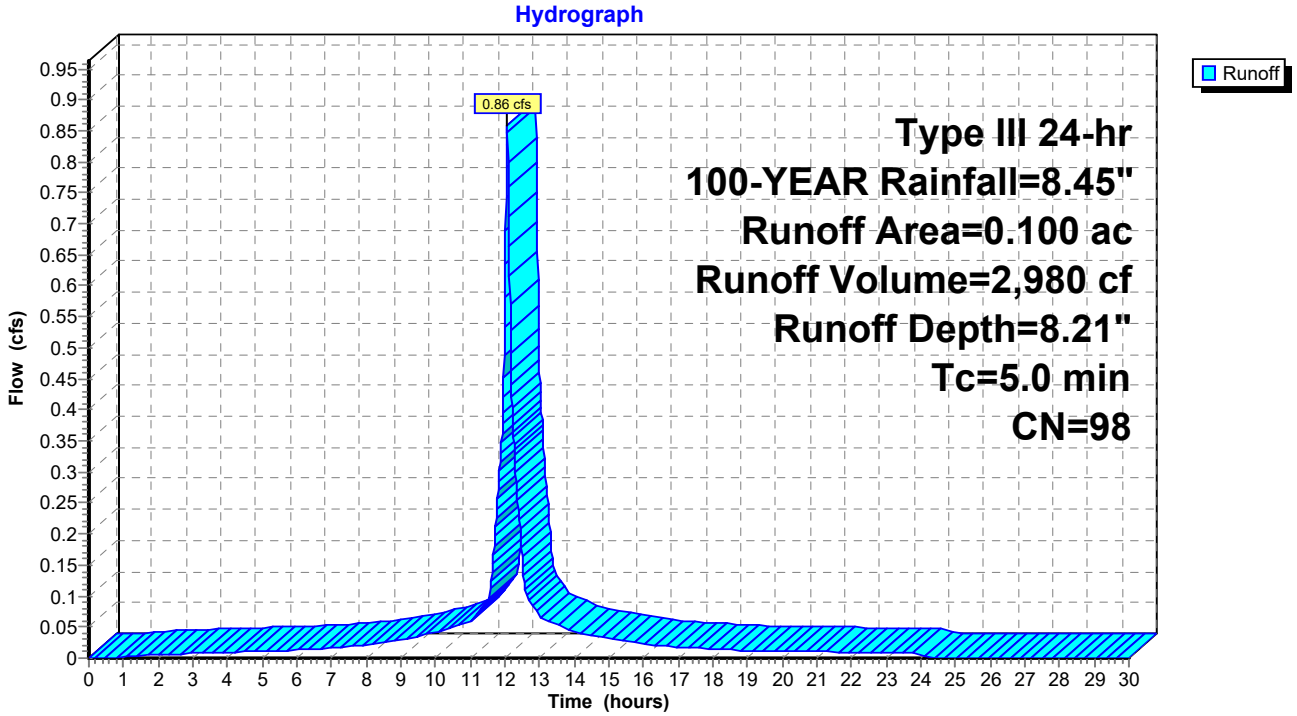
Runoff = 0.86 cfs @ 12.07 hrs, Volume= 2,980 cf, Depth= 8.21"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.45"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

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

Subcatchment 2A: South Restaurant



Summary for Subcatchment 3: Retail Bldg

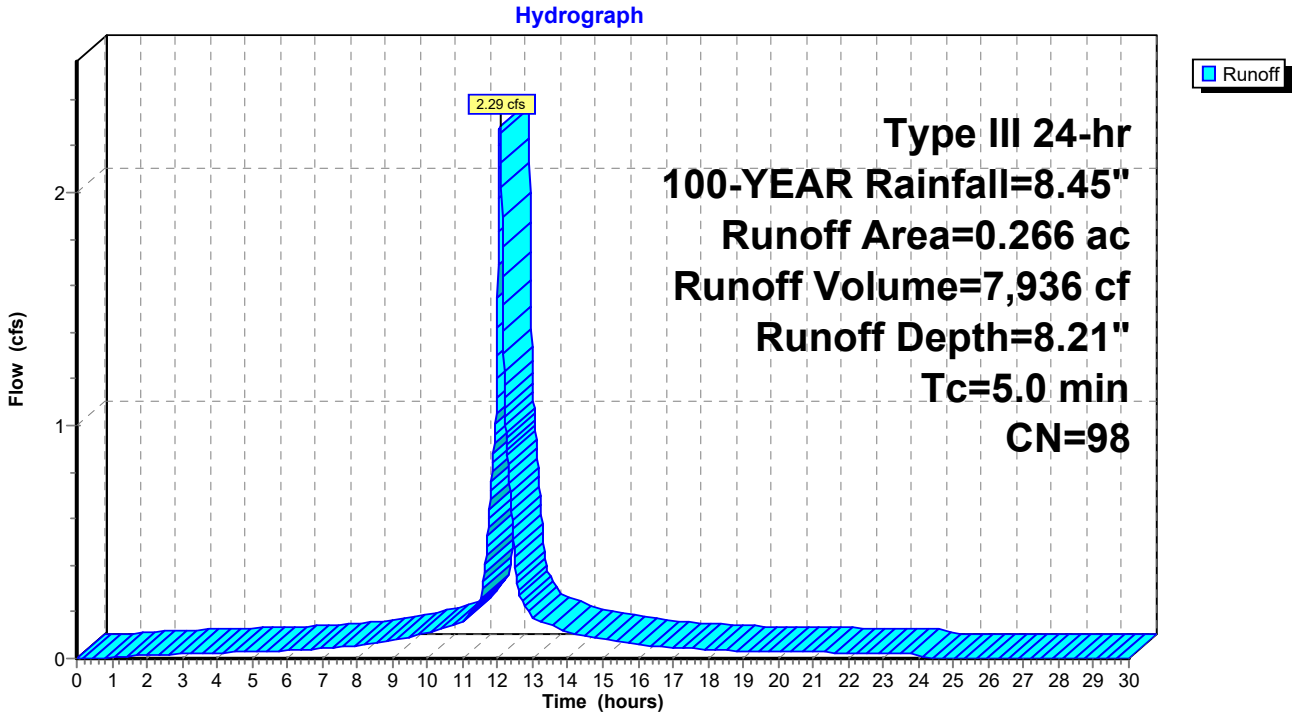
Runoff = 2.29 cfs @ 12.07 hrs, Volume= 7,936 cf, Depth= 8.21"
Routed to Pond 3P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.45"

Area (ac)	CN	Description
0.266	98	Unconnected pavement, HSG B
0.266		100.00% Impervious Area
0.266		100.00% Unconnected

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

Subcatchment 3: Retail Bldg



Summary for Subcatchment 4: North Restaurant

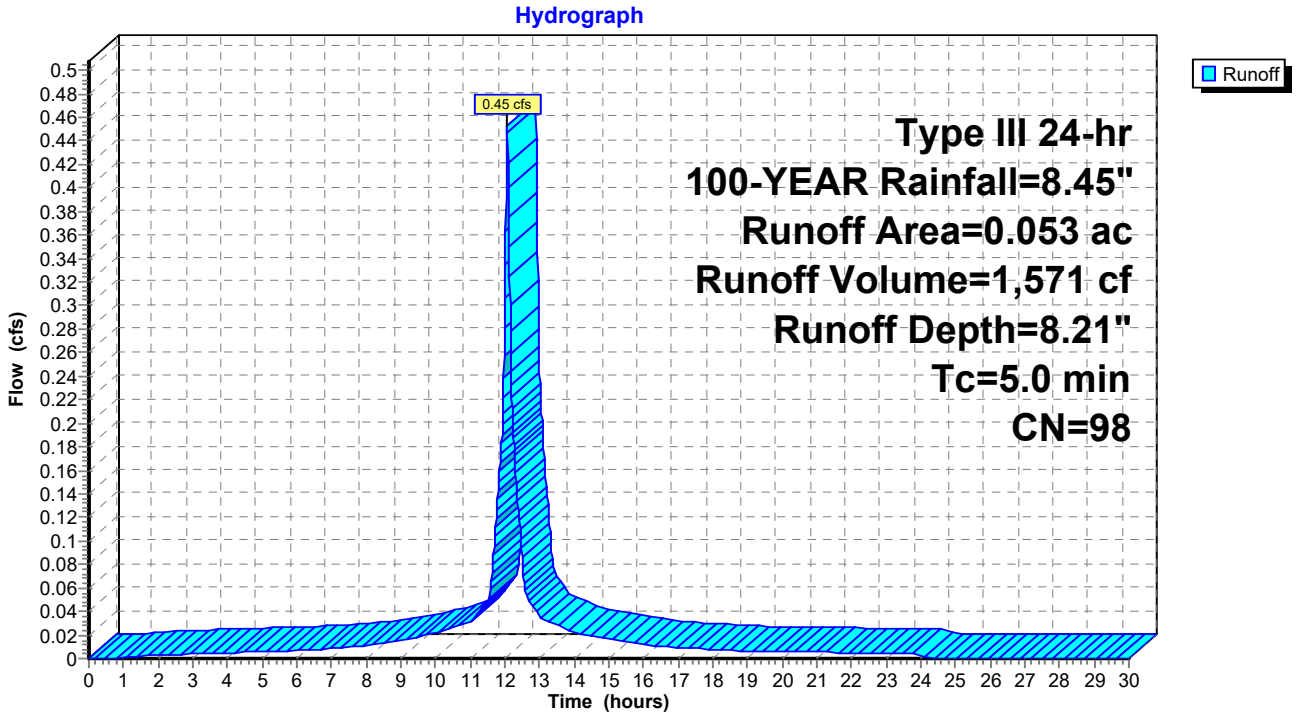
Runoff = 0.45 cfs @ 12.07 hrs, Volume= 1,571 cf, Depth= 8.21"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.45"

Area (ac)	CN	Description
0.053	98	Unconnected pavement, HSG B
0.053		100.00% Impervious Area
0.053		100.00% Unconnected

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

Subcatchment 4: North Restaurant



Summary for Pond 1P: Infiltration Basin

Inflow Area = 22,128 sf, 19.69% Impervious, Inflow Depth = 4.66" for 100-YEAR event
Inflow = 2.72 cfs @ 12.07 hrs, Volume= 8,595 cf
Outflow = 2.14 cfs @ 12.13 hrs, Volume= 8,595 cf, Atten= 21%, Lag= 3.6 min
Discarded = 0.15 cfs @ 12.13 hrs, Volume= 5,924 cf
Primary = 1.99 cfs @ 12.13 hrs, Volume= 2,672 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 175.36' @ 12.13 hrs Surf.Area= 2,146 sf Storage= 1,935 cf

Plug-Flow detention time= 95.2 min calculated for 8,592 cf (100% of inflow)
Center-of-Mass det. time= 95.1 min (900.5 - 805.3)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	4,584 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

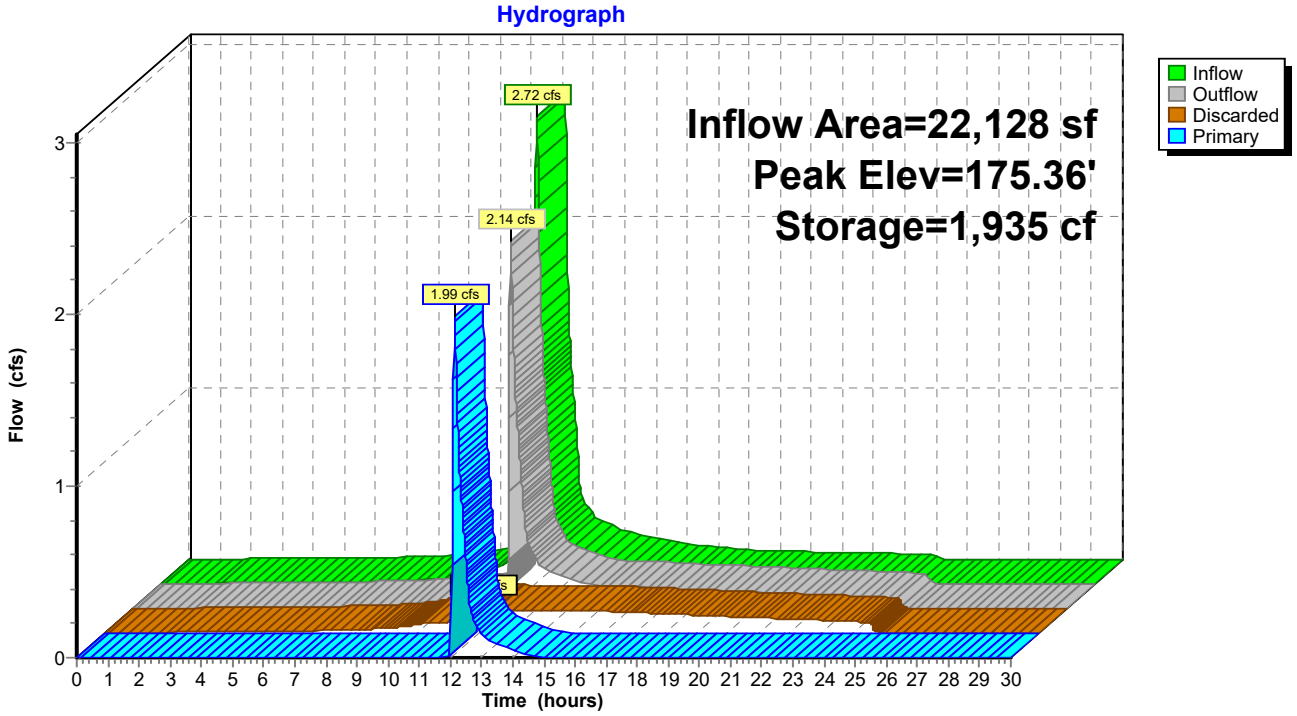
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	880	160.0	0	0	880
175.00	1,655	263.0	1,247	1,247	4,354
176.00	3,161	430.0	2,368	3,615	13,570
176.30	3,300	440.0	969	4,584	14,274

Device	Routing	Invert	Outlet Devices
#1	Device 3	175.20'	**19.4" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Primary	172.90'	**12.0" Round Culvert** L= 86.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 172.90' / 172.10' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.15 cfs @ 12.13 hrs HW=175.36' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=1.98 cfs @ 12.13 hrs HW=175.36' (Free Discharge)
└**3=Culvert** (Passes 1.98 cfs of 4.52 cfs potential flow)
└**1=Orifice/Grate** (Weir Controls 1.98 cfs @ 1.32 fps)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Detention

Inflow Area = 2,297 sf,100.00% Impervious, Inflow Depth = 8.21" for 100-YEAR event
Inflow = 0.45 cfs @ 12.07 hrs, Volume= 1,571 cf
Outflow = 0.45 cfs @ 12.07 hrs, Volume= 1,571 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 8.91 hrs, Volume= 975 cf
Primary = 0.44 cfs @ 12.07 hrs, Volume= 596 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 176.34' @ 12.07 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 70.6 min calculated for 1,571 cf (100% of inflow)
Center-of-Mass det. time= 70.6 min (810.2 - 739.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	174.40'	0.004 af	**4.83'W x 45.92'L x 2.33'H Field A** 0.012 af Overall - 0.002 af Embedded = 0.010 af x 40.0% Voids
#2A	174.90'	0.002 af	**ADS_StormTech SC-310 +Cap** x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
		0.006 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	174.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	174.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	176.23'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 8.91 hrs HW=174.42' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.43 cfs @ 12.07 hrs HW=176.34' (Free Discharge)
└**1=Orifice/Grate** (Passes 0.43 cfs of 3.68 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 0.95 fps)

Pond 2P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-310 +Cap (ADS StormTech®SC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

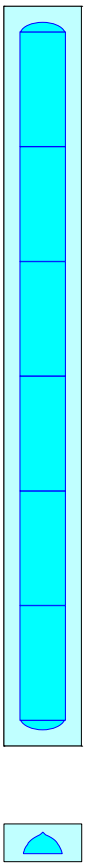
6 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 43.92' Row Length +12.0" End Stone x 2 = 45.92' Base Length
1 Rows x 34.0" Wide + 12.0" Side Stone x 2 = 4.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

6 Chambers x 14.7 cf = 88.5 cf Chamber Storage

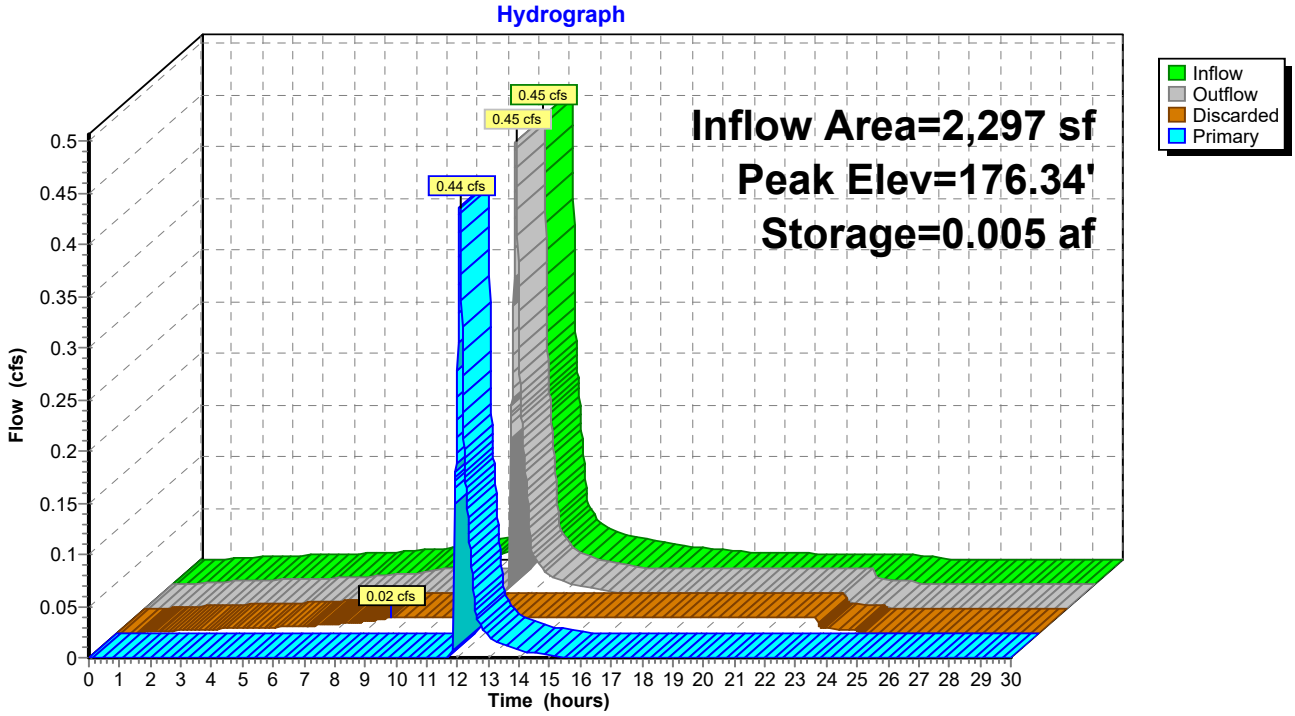
517.9 cf Field - 88.5 cf Chambers = 429.4 cf Stone x 40.0% Voids = 171.8 cf Stone Storage

Chamber Storage + Stone Storage = 260.2 cf = 0.006 af
Overall Storage Efficiency = 50.2%
Overall System Size = 45.92' x 4.83' x 2.33'

6 Chambers
19.2 cy Field
15.9 cy Stone



Pond 2P: Underground Detention



Summary for Pond 3P: Underground Detention

Inflow Area = 11,600 sf,100.00% Impervious, Inflow Depth = 8.21" for 100-YEAR event
Inflow = 2.29 cfs @ 12.07 hrs, Volume= 7,936 cf
Outflow = 2.28 cfs @ 12.08 hrs, Volume= 7,936 cf, Atten= 0%, Lag= 0.4 min
Discarded = 0.05 cfs @ 7.22 hrs, Volume= 4,182 cf
Primary = 2.23 cfs @ 12.08 hrs, Volume= 3,755 cf
Routed to Link DP-1 : Hopmeadow

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 185.73' @ 12.08 hrs Surf.Area= 0.015 ac Storage= 0.031 af

Plug-Flow detention time= 132.2 min calculated for 7,934 cf (100% of inflow)
Center-of-Mass det. time= 132.3 min (871.9 - 739.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	182.40'	0.015 af	**11.00'W x 60.58'L x 3.50'H Field A** 0.054 af Overall - 0.017 af Embedded = 0.037 af x 40.0% Voids
#2A	182.90'	0.017 af	**ADS_StormTech SC-740 +Cap** x 16 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 16 Chambers in 2 Rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	182.90'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	182.40'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Device 1	185.40'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 7.22 hrs HW=182.44' (Free Discharge)
↑└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=2.23 cfs @ 12.08 hrs HW=185.73' (Free Discharge)
↑└**1=Orifice/Grate** (Passes 2.23 cfs of 5.78 cfs potential flow)
↑└**3=Broad-Crested Rectangular Weir** (Weir Controls 2.23 cfs @ 1.67 fps)

Pond 3P: Underground Detention - Chamber Wizard Field A

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

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

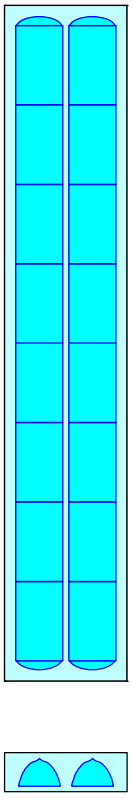
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

16 Chambers x 45.9 cf = 735.0 cf Chamber Storage

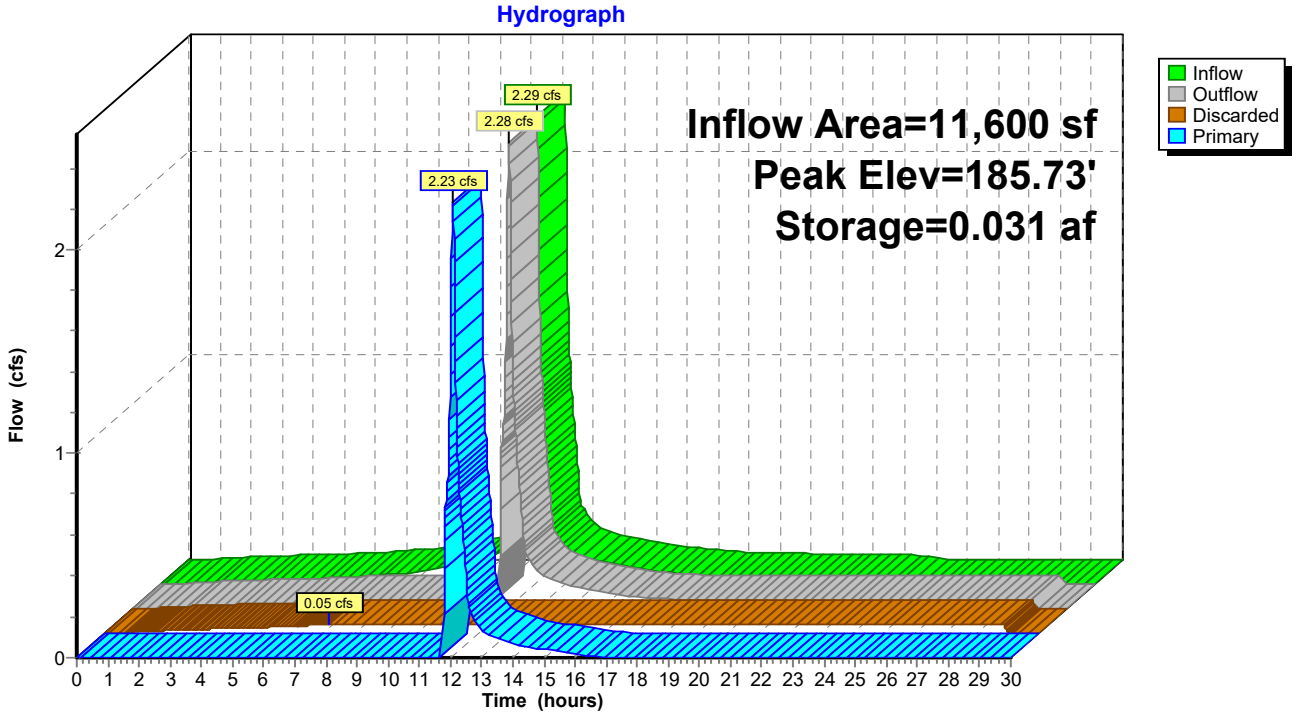
2,332.2 cf Field - 735.0 cf Chambers = 1,597.2 cf Stone x 40.0% Voids = 638.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,373.9 cf = 0.032 af
Overall Storage Efficiency = 58.9%
Overall System Size = 60.58' x 11.00' x 3.50'

16 Chambers
86.4 cy Field
59.2 cy Stone



Pond 3P: Underground Detention



Summary for Link DP-1: Hopmeadow

Inflow Area = 216,412 sf, 58.05% Impervious, Inflow Depth = 5.73" for 100-YEAR event
Inflow = 23.82 cfs @ 12.23 hrs, Volume= 103,348 cf
Primary = 23.82 cfs @ 12.23 hrs, Volume= 103,348 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: Hopmeadow