STORMWATER MANAGEMENT ANALYSIS

FOR

86-88 PROSPECT STREET, NEWBURYPORT, MA

Prepared for:
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Prepared by:
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Project No. 2021-035
June, 2021

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APPENDICES

1.0 INTRODUCTION

The Joppa Design Group, LLC is proposing to redevelop the existing 5-unit residential building with a rear 2-story addition, a new 3-car garage and approximately 10 parking spaces. The following report addresses the hydrologic calculations and stormwater management design proposed at the site.

2.0 EXISTING CONDITION

The limit of work for the project is the parcels of land shown in the Town of Newburyport's Assessor's Database as Map 21, Parcel 45 at 86-88 Prospect Street. The parcel is approximately 11,223 SF (0.26 acres). This parcel is bound by Prospect Street to the north, Parsons Street to the east and residential dwellings to the south and west. The existing site consists of a 2-story, 5-unit residential dwelling surrounded by two paved driveways, grass/landscaping and two brick walkways around the site. The existing site is 47% impervious.

2.1 Existing Hydrology

For the design purposes of this study, due to limits of established survey information, the drainage area boundaries have been defined by the edges of the parcel. The topography at the site is very flat, with slight depressions in a couple locations, particularly one located in the center of the back yard. Within the parcel boundaries, there are two design discharge points located at the site.

The first design discharge point is located at a catch basin at the corner of Prospect Street and Parsons Street, at the northeast corner of the site. The northern, northeastern, and eastern portions of the site, including grass/landscaping, pavement, brick, and portions or the roof surface, drain off the site and towards the gutter lines at Parsons Street or Prospect Street where they flow to design point 1. The roof surface runoff also drains via gutters and downspouts off the roofs. At the gutter lines at the curb, the runoff flows to the catch basin where it enters the storm sewer at the corner of Parsons St and Prospect St.

The second design discharge point is located at the rear, western property line. The rear yard is very flat and there appears to be a depression in the center of the backyard. The runoff from the southeastern portion of the site, including roof surface and grass/landscaping likely pools a small amount in the rear yard area and eventually drains across a low point along the west property line to the abutters at 81-83 Lime Street at the design point 2.

2.2 FEMA Flood Insurance Rate Map

According to the FEMA Flood Insurance Rate Map Number 25009C0136G, with an effective date of July 16, 2014, the site is located within a Zone X, which is "areas determined to be outside the 0.2% annual chance floodplain." (*See Appendix C: FEMA Flood Insurance Rate Map*)

2.3 Soils

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, the soils across the entire site is classified as Merrimac Fine Sandy Loam, 0 to 3 percent slopes. This soil classification is recognized as part of Hydrologic Soil Group A, which was used for the purposes of hydrologic calculations across the entire site. Therefore, an exfiltration rate of 8.2 in/hr was also used in the hydrologic calculations for the dry well.

3.0 PROPOSED CONDITION

The project proposes the redevelopment of the site at 86-88 Prospect Street. The proposed redevelopment includes a 2-story addition, with no changes to the existing dwelling, as well as a 3 car garage and new parking at the existing driveways, which will be converted to permeable pavers and permeable bituminous pavement, shown on the plan.

3.1 Proposed Hydrology

In the proposed design, there will still be two design discharge points:

The first design discharge point will be the same as in the existing conditions, at the catch basin located at the corner of Prospect Street and Parsons Street that drains to the storm sewer. The area that drains to this Design Point 1 within the parcel will also have largely the same boundary. This area will include the northwest roof area as well as the surrounding lawn. The paved parking areas that drained to this Design Point in the existing conditions will be converted to permeable pavers or permeable bituminous pavement in the proposed conditions. The permeable pavers and pavement in the proposed conditions will result in a decrease in impervious area. The front section of the proposed garage will drain off the roof toward Parsons Street.

The location of design point 2 will also remain the same as in the existing conditions, and the drainage boundary will also be largely similar, with the inclusion of the new addition. The runoff from the roof of the new addition will be directed via gutters and downspouts to two 300 gallon drywells (surrounded by 1 FT of 3/4" crushed stone on the bottom and around the sides) set in the backyard. The runoff from the rear section of the garage roof will also be directed via gutters and downspouts to the drywell system in the backyard. The drywell system will have a rim with an overflow grate that will allow any overflow from the system to flow across the backyard to the second design point with the rest of the runoff from the yard. The proposed drywell will mitigate the impact of any additional runoff to the neighbors to the rear as a result of the roof of the new addition.

4.0 HYDROLOGIC MODEL

The hydrologic model was developed in HydroCAD. Both existing and proposed conditions are modeled for the 2-year, 10-year, 25-year, and 100-year 24-hour storm events. HydroCAD allows for variable rainfall intensity throughout the storm duration, peaking near the middle of the Type III, 24-hour storm. The drainage areas' time of concentration (t_c) has been calculated for each catchment area and the T_C paths are shown on the Drainage Areas Plan. Complete calculations, performed using the HydroCAD software, are included in the appendix.

Calculations show that he designated on-site stormwater management system reduces overall off-site flows for all storm events. See Table 4.1 below for the hydrologic calculation summary.

Table 4.1: Hydrological Calculation Summary

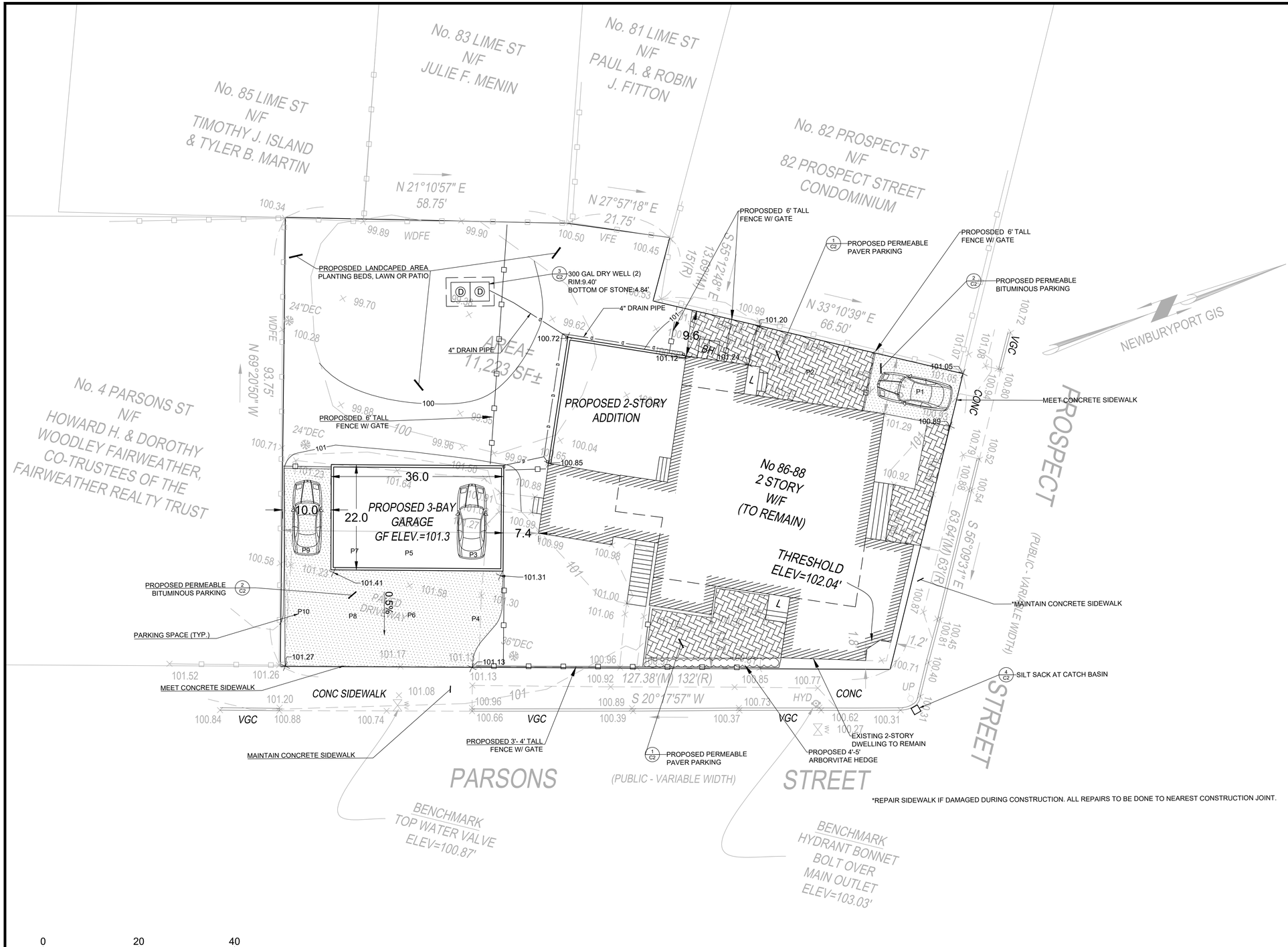
		Design Point 1		Design Point 2		Total	
Rainfall Event		*Existing*	**Proposed**	*Existing*	**Proposed**	*Existing*	**Proposed**
2 Yr	Rate (cfs)	*0.31*	0.14	*0.00*	0.00	*0.31*	0.14
	Volume (cf)	*792*	414	*35*	46	*828*	460
10 Yr	Rate (cfs)	*0.60*	0.38	*0.04*	0.05	*0.61*	0.42
	Volume (cf)	*1,526*	991	*226*	223	*1,752*	1,214
25 Yr	Rate (cfs)	*0.83*	0.59	*0.13*	0.13	*0.93*	0.71
	Volume (cf)	*2,142*	1,521	*463*	429	*2,605*	1,949
100 Yr	Rate (cfs)	*1.31*	1.07	*0.39*	0.35	*1.65*	1.38
	Volume (cf)	*3,475*	2,739	*1,122*	1,058	*4,597*	3,796

5.0 CONCLUSION

Based on DCI's analysis of the existing and proposed conditions, the proposed site conditions meet the stormwater management criteria set. Design point runoff volumes have been decreased for the 2-year, 10-year, 25-year and 100-year storm events. Peak flow rates are decreased for the 2-year and 10-year, 25-year and 100-year storm event. DCI concludes that the proposed redevelopment at 86-88 Prospect Street, Newburyport, MA adheres to all applicable stormwater management policies.

Appendix A

SITE PLANS



*REPAIR SIDEWALK IF DAMAGED DURING CONSTRUCTION. ALL REPAIRS TO BE DONE TO NEAREST CONSTRUCTION JOINT.

NORTH

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GMK REALTY TRUST
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LA JOLLA, CA 92037

PROJECT TEAM

86-88 PROSPECT ST
5-UNIT 2-STORY
RESIDENTIAL ADDITION
NEWBURYPORT, MA

PROJECT INFO

REV	DESCRIPTION	DATE

STAMP:

COMMONWEALTH OF MASSACHUSETTS
STEPHEN B. SAWYER
CIVIL
No. 52662
REGISTERED PROFESSIONAL ENGINEER

CIVIL
SITE
PLAN

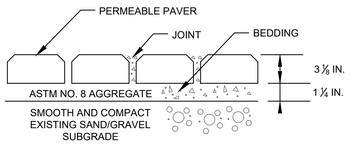
SHEET NAME:

C1

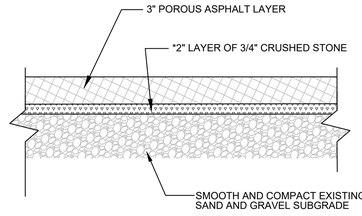
SHT NO:

DR BY: MCH
CHK BY: SBS
PROJ NO: 21-035
DATE: 6-9-21
SCALE: 1"=10'

P:\2021 Projects\2021-035 86-88 Prospect St Newburyport\Dwg_ENGINEERING\21-035_LAYT_MATL.dwg

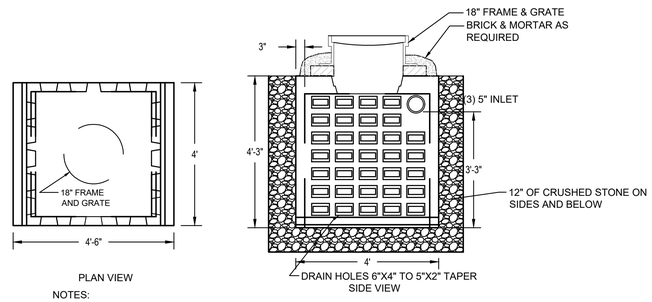


1 PERMEABLE PAVERS
NOT TO SCALE



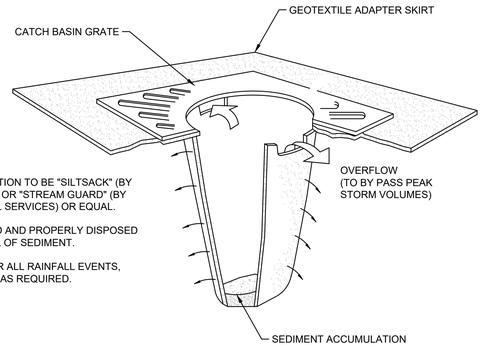
NOTES:
1. * IF DETEMINED BY ENGINEER PAVMENT MAY BE SET ON CLEAN SAND/GRAVEL SUBGRADE
2. SEE OPERATION AND MAINTENANCE PLAN FOR MAINTENANCE REQUIREMENTS OF POROUS PAVEMENT AREAS.

2 PERMEABLE BITUMINOUS PAVEMENT
NOT TO SCALE



NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGNED FOR AASHTO HS-20 LOADING, 1 TO 3 FT COVER.

3 300 GALLON DRY WELL (2)
NOT TO SCALE



NOTES:

1. CATCH BASIN PROTECTION TO BE "SILTSACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES) OR EQUAL.
2. INSERT TO BE EMPTIED AND PROPERLY DISPOSED OF WHEN IT IS 1/2 FULL OF SEDIMENT.
3. INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN AS REQUIRED.

4 SILT SACK AT CATCH BASIN
NOT TO SCALE

EROSION AND SEDIMENT CONTROL NOTES

1. ALL WORK PERFORMED AS PART OF THIS PROJECT SHALL CONFORM TO THE STANDARDS OF THE TOWN OF NEWBURYRPORT, DEPT. OF PUBLIC WORKS AND ANY OTHER AGENCY WITH AUTHORITY IN THIS AREA.
2. CONTRACTOR TO MAINTAIN WORK AREA IN A CLEAN CONDITION. NO CONSTRUCTION DEBRIS SHALL BE ALLOWED TO ACCUMULATE WITHIN THE WORKSITE AND NO DIRT, GRAVEL, ETC. SHALL BE ALLOWED TO ACCUMULATE ON THE PUBLIC RIGHT-OF-WAY.
3. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
4. CONTRACTOR SHALL INSTALL SILT SACKS IN ALL CATCH BASINS DOWNGRADE OF SITE PRIOR TO COMMENCEMENT OF WORK
5. MINIMIZE TOTAL AREA OF DISTURBANCE AND PROTECT NATURAL FEATURES AND SOIL.
6. THE CONTRACTOR SHALL SEQUENCE ALL ACTIVITIES TO MINIMIZE SIMULTANEOUS AREAS OF DISTURBANCE. MASS CLEARINGS AND GRADING OF THE ENTIRE SITE SHALL BE AVOIDED.
7. MINIMIZE SOIL EROSION AND CONTROL SEDIMENTATION DURING CONSTRUCTION.
8. DIVERT UNCONTAMINATED WATER AROUND DISTURBED AREAS.
9. INSTALL AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES OR THE 2008 EPA'S CONSTRUCTION GENERAL PERMIT.
10. PROTECT AND MANAGE ON AND OFF-SITE MATERIAL STORAGE AREAS (OVERBURDEN AND STOCKPILES OF DIRT, BORROW AREAS, OR OTHER AREAS USED SOLELY BY THE PERMITTED PROJECT ARE CONSIDERED A PART OF THE PROJECT).
11. COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS INCLUDING WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS, AND AIR QUALITY REQUIREMENTS, INCLUDING DUST CONTROL.
12. SEDIMENT SHALL BE REMOVED ONCE THE VOLUME REACHES ¼ TO ½ THE HEIGHT OF THE EROSION CONTROL DEVICE. SEDIMENT SHALL BE REMOVED FROM SILT FENCE PRIOR TO REACHING THE LOAD-BEARING CAPACITY OF THE SILT FENCE WHICH MAY BE LOWER THAN ¼ TO ½ THE HEIGHT.
13. SEDIMENT FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS SHALL BE REMOVED WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT.
14. BMPS TO BE USED FOR INFILTRATION AFTER CONSTRUCTION SHALL NOT BE USED AS BMPS DURING CONSTRUCTION UNLESS OTHERWISE APPROVED BY THE BOARD. MANY INFILTRATION TECHNOLOGIES ARE NOT DESIGNED TO HANDLE THE HIGH CONCENTRATIONS OF SEDIMENTS TYPICALLY FOUND IN CONSTRUCTION RUNOFF, AND THUS MUST BE PROTECTED FROM CONSTRUCTION RELATED SEDIMENT LOADINGS.
15. SOIL STOCKPILES MUST BE STABILIZED OR COVERED AT THE END OF EACH WORKDAY. STOCKPILE SIDE SLOPES SHALL NOT BE GREATER THAN 2:1. ALL STOCKPILES SHALL BE SURROUNDED BY SEDIMENT CONTROLS.
16. FOR ACTIVE CONSTRUCTION AREAS SUCH AS BORROW OR STOCKPILE AREAS, ROADWAY IMPROVEMENTS AND AREAS WITHIN 50 FEET OF A BUILDING UNDER CONSTRUCTION, A PERIMETER SEDIMENT CONTROL SYSTEM SHALL BE INSTALLED AND MAINTAINED TO CONTAIN SOIL.
17. A TRACKING PAD OR OTHER APPROVED STABILIZATION METHOD SHALL BE CONSTRUCTED AT ALL ENTRANCE/EXIST POINTS OF THE SITE TO REDUCE THE AMOUNT OF SOIL CARRIED ONTO ROADWAYS AND OFF THE SITE.
18. ON THE CUT SIDE OF ROADS, DITCHES SHALL BE STABILIZED IMMEDIATELY WITH ROCK RIP-RAP OR OTHER NON-ERODIBLE LINERS, OR WHERE APPROPRIATE, VEGETATIVE MEASURES SUCH AS HYDROSEEDING OR JUTE MATTING.
19. PERMANENT SEEDING SHALL BE UNDERTAKEN IN THE SPRING FROM MARCH THROUGH MAY, AND IN LATE SUMMER AND EARLY FALL FROM AUGUST TO OCTOBER 15. DURING THE PEAK SUMMER MONTHS AND IN THE FALL AFTER OCTOBER 15, WHEN SEEDING IS FOUND TO BE IMPRACTICAL, APPROPRIATE TEMPORARY STABILIZATION SHALL BE APPLIED. PERMANENT SEEDING MAY BE UNDERTAKEN DURING THE SUMMER IF PLANS PROVIDE FOR ADEQUATE MULCHING AND WATERING.
20. ALL SLOPES STEEPER THAN 3:1 (H:V, 33.3%), AS WELL AS PERIMETER DIKES, SEDIMENT BASINS OR TRAPS, AND EMBANKMENTS MUST, UPON COMPLETION, BE IMMEDIATELY STABILIZED WITH SOD, SEED AND ANCHORED STRAW MULCH, OR OTHER APPROVED STABILIZATION MEASURES. AREAS OUTSIDE OF THE PERIMETER SEDIMENT CONTROL SYSTEM MUST NOT BE DISTURBED.
21. TEMPORARY SEDIMENT TRAPPING DEVICES MUST NOT BE REMOVED UNTIL PERMANENT STABILIZATION IS ESTABLISHED IN ALL CONTRIBUTORY DRAINAGE AREAS.
22. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED AFTER FINAL SITE STABILIZATION. DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED WITHIN 30 DAYS OF REMOVAL.
23. PREVENT OFF-SITE VEHICLE TRACKING OF SEDIMENTS.
24. DUST SHALL BE CONTROLLED AT THE SITE.
25. ALL PREVIOUSLY DISTURBED LAND SHALL BE STABILIZED BY APPROVED METHODS AFTER 14 DAYS IF LEFT UNDISTURBED. THIS INCLUDES STOCKPILES, CONSTRUCTION ENTRANCES, GRADED AREAS AND OTHER CONSTRUCTION ACTIVITY RELATED CLEARING.
26. IF WORK IS HALTED OVER WINTER MONTHS THE CONTRACTOR SHALL BE RESPONSIBLE FOR STABILIZING THE AREA THROUGH GROUNDCOVER PRACTICES.

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LA JOLLA, CA 92037

PROJECT TEAM

86-88 PROSPECT ST
5-UNIT 2-STORY
RESIDENTIAL ADDITION
NEWBURYPORT, MA

PROJECT INFO

REV	DESCRIPTION	DATE

STAMP:
COMMONWEALTH OF MASSACHUSETTS
STEPHEN B. SAWYER
No. 52644
REGISTERED PROFESSIONAL ENGINEER

CIVIL DETAILS

SHEET NAME:

C2

SHT NO:

DR BY: MCH
CHK BY: SBS
PROJ NO: 21-035
DATE: 6-9-21
SCALE: NOT TO SCALE

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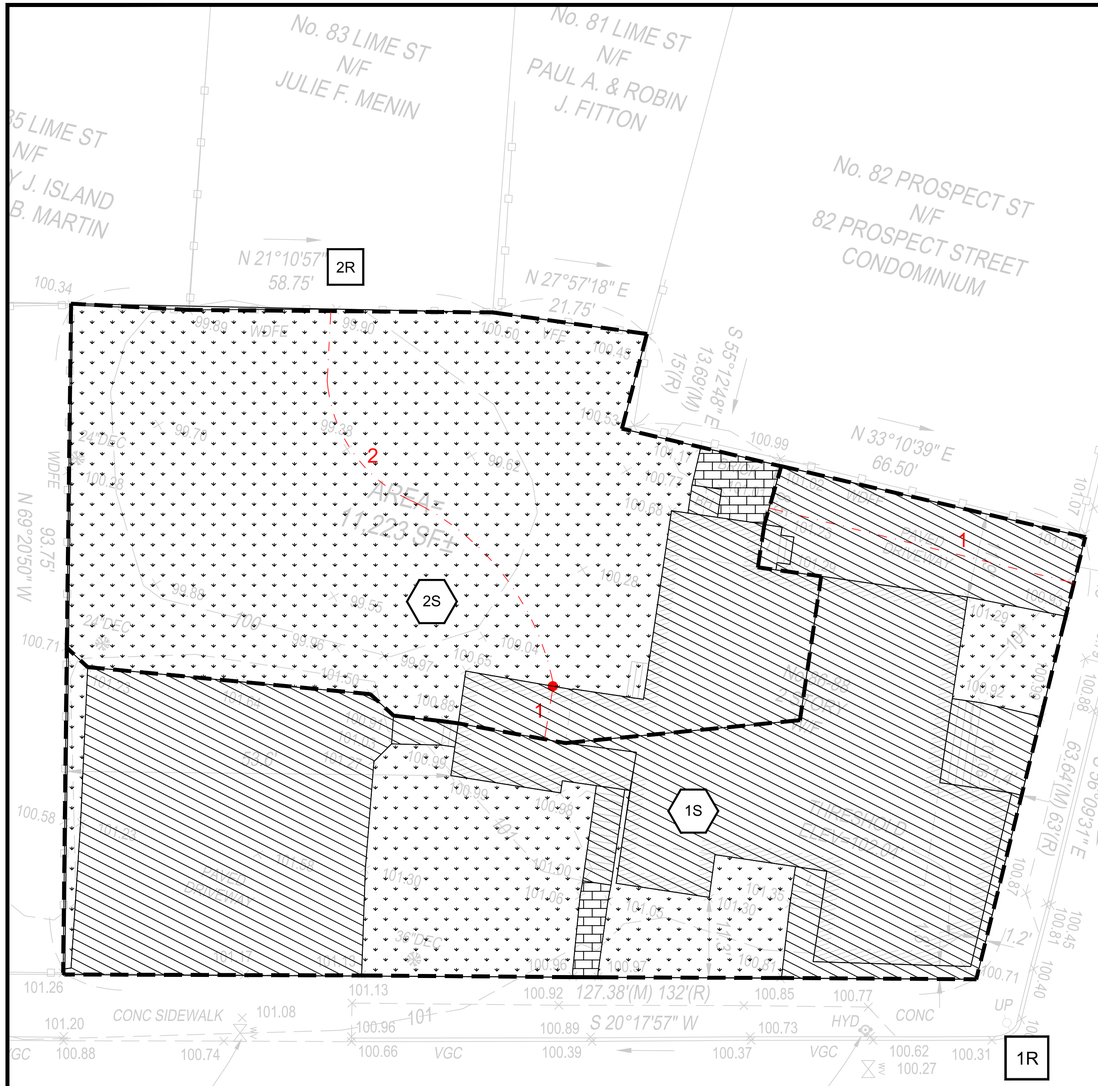
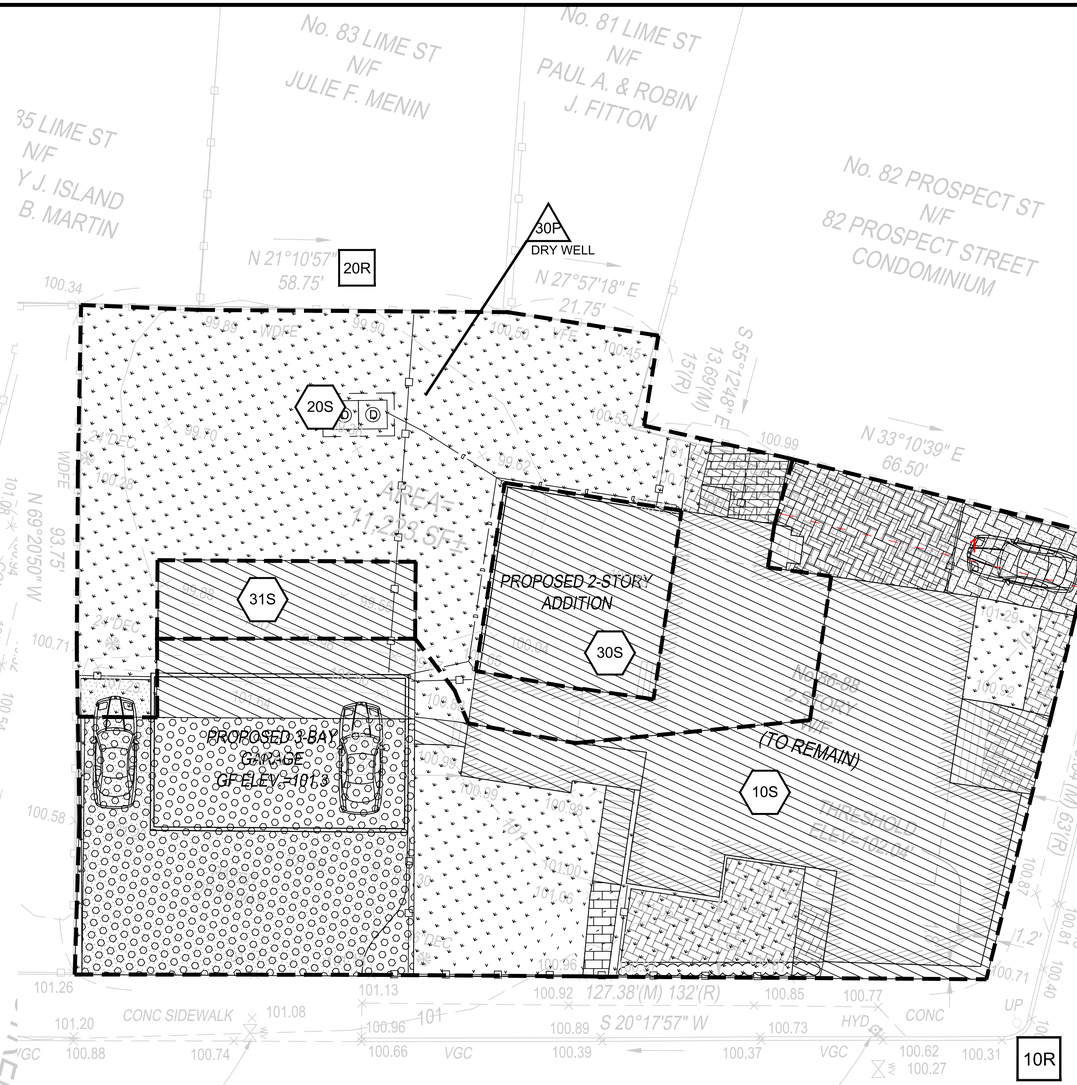
Appendix B

EXISTING & PROPOSED DRAINAGE AREAS





EXISTING

PROPOSED

LEGEND

- IMPERVIOUS AREA
- GRASS/LANDSCAPE
- BRICK SURFACE
- PERM. PAVERS
- PERM. BIT. PAVEMENT
- 1S — SUBCATCHMENT
- 1P — POND
- 1R — DESIGN POINT
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION PATH

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LA JOLLA, CA 92037

PROJECT TEAM

86-88 PROSPECT ST
5-UNIT 2-STORY
RESIDENTIAL ADDITION
NEWBURYPORT, MA

PROJECT INFO

REV	DESCRIPTION	DATE

STAMP:

DRAINAGE AREAS PLAN

SHEET NAME:

D1

SHT NO:

DR BY: MCH
CHK BY: SBS
PROJ NO: 20-035
DATE: 5-19-20
SCALE: 1"=10'

P:\2021 Projects\2021-035 86-88 Prospect St Newburyport_Drainage\21-035 DR.dwg

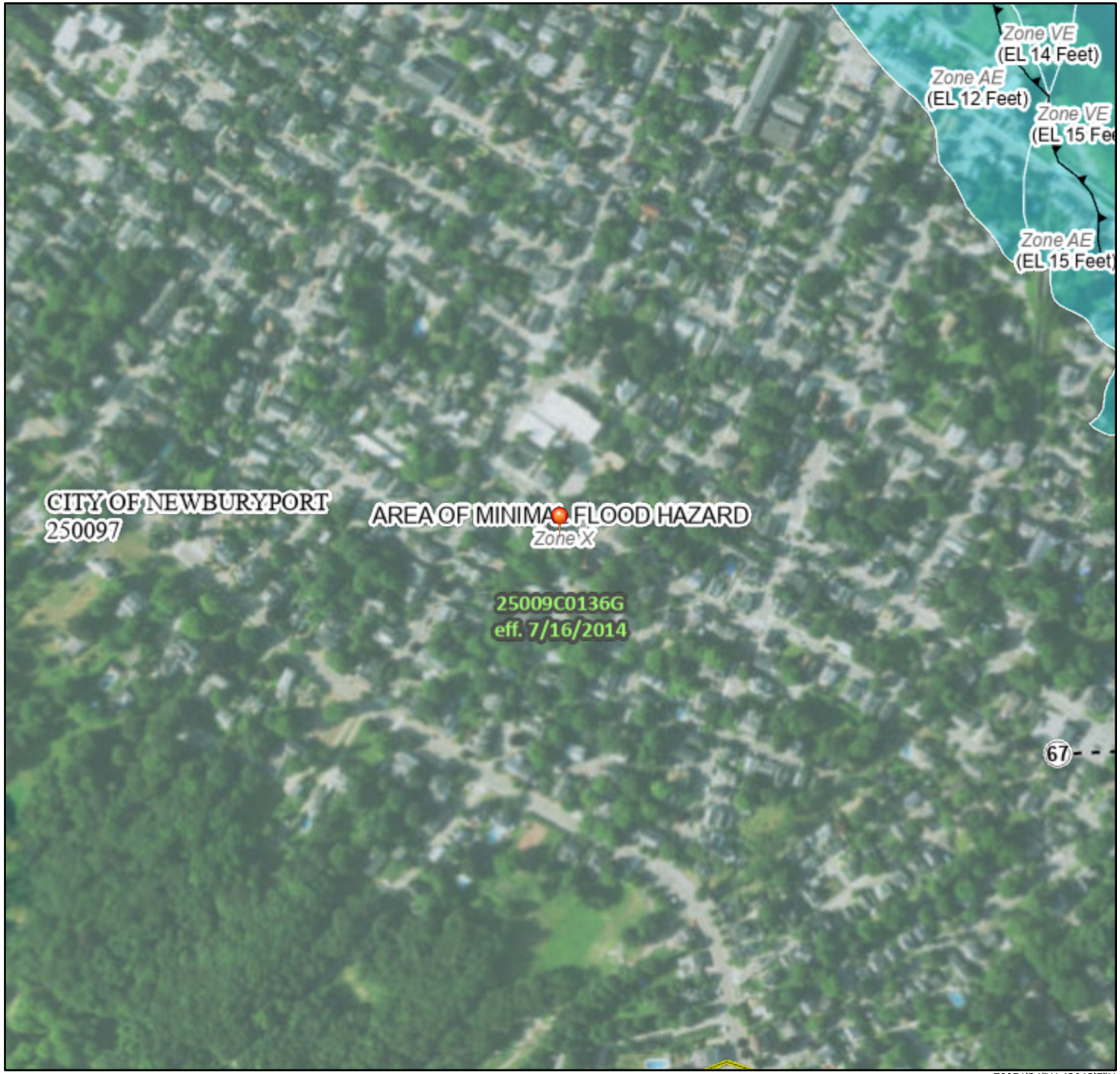
Appendix C

FEMA FLOOD INSURANCE RATE MAP

National Flood Hazard Layer FIRMette

FEMA

70°52'12"W 42°48'32"N



70°51'34"W 42°48'5"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 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

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

N

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

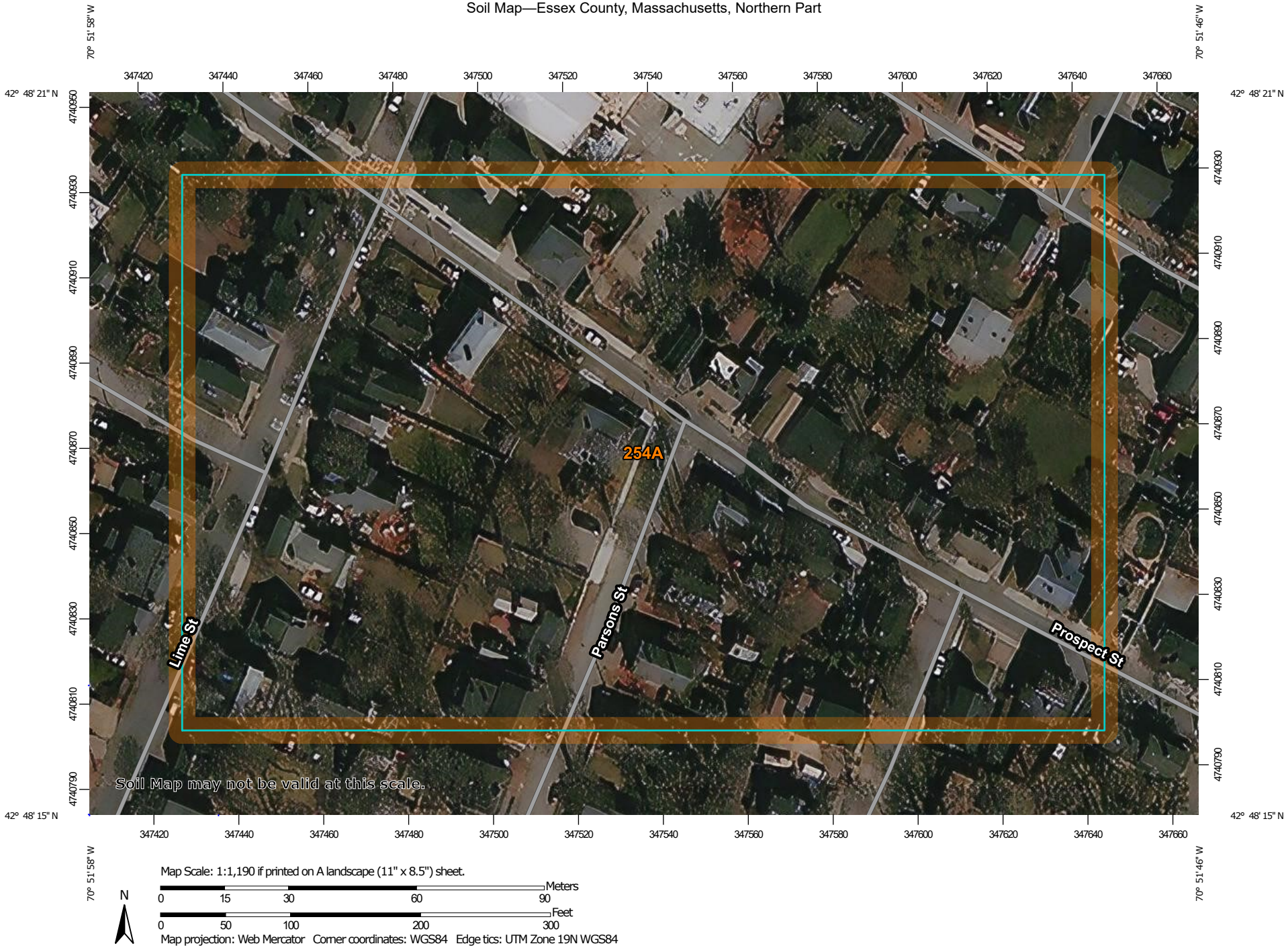
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/23/2021 at 2:51 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 D

SOILS INFORMATION



Map Scale: 1:1,190 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 16, Jun 9, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 12, 2016

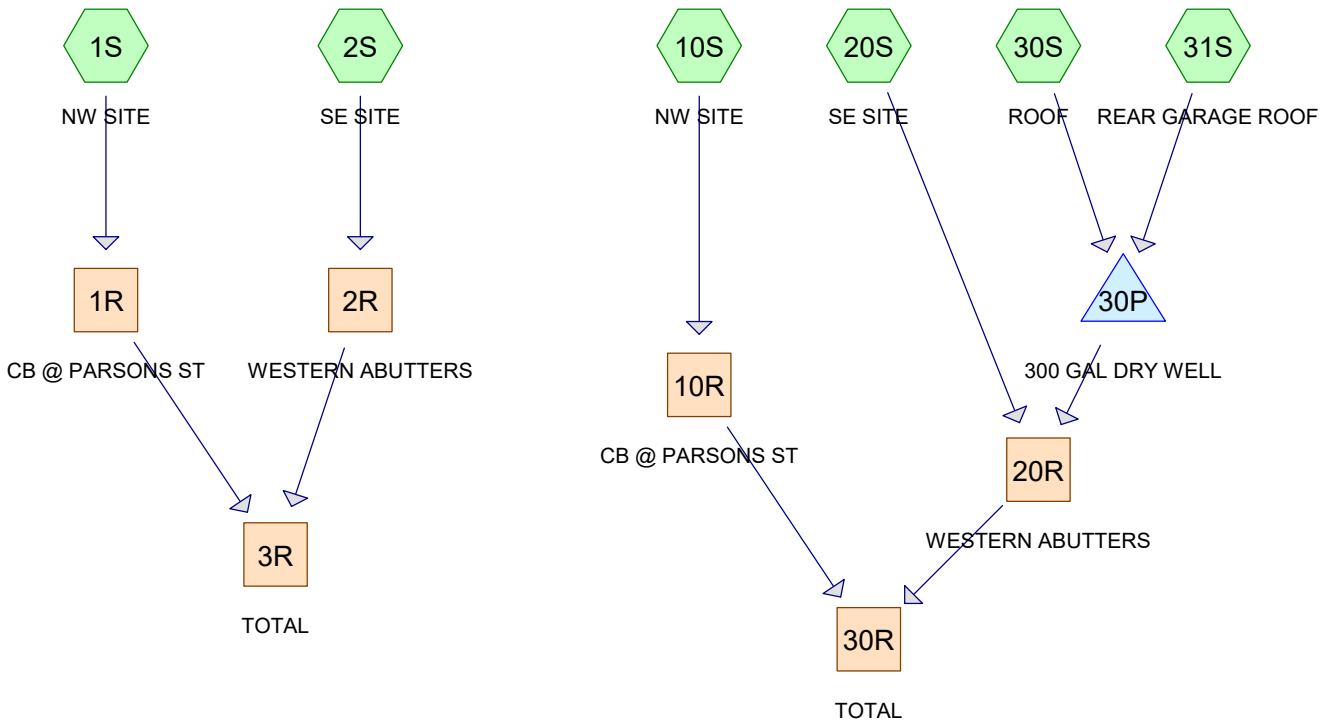
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	7.0	100.0%
Totals for Area of Interest		**7.0**	**100.0%**

Appendix E

EXISTING AND PROPOSED HYDROLOGY



Subcat Reach Pond Link

Routing Diagram for 21-035 DR
Prepared by Design Consultants, Inc., Printed 6/17/2021

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
10,223	39	>75% Grass cover, Good, HSG A (1S, 2S, 10S, 20S)
276	76	Brick (1S, 2S, 10S, 20S)
2,609	98	Paved parking, HSG A (1S)
2,218	55	Perm Pavers/ Perm Bit. (10S)
6,757	98	Roofs, HSG A (1S, 2S, 10S, 20S, 30S, 31S)
404	98	Unconnected pavement, HSG A (2S, 10S)

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
19,993	HSG A	1S, 2S, 10S, 20S, 30S, 31S
0	HSG B	
0	HSG C	
0	HSG D	
2,494	Other	1S, 2S, 10S, 20S

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
10,223	0	0	0	0	10,223	>75% Grass cover, Good	
0	0	0	0	276	276	Brick	
2,609	0	0	0	0	2,609	Paved parking	
0	0	0	0	2,218	2,218	Perm Pavers/ Perm Bit.	
6,757	0	0	0	0	6,757	Roofs	
404	0	0	0	0	404	Unconnected pavement	

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: NW SITE Runoff Area=6,063 sf 73.94% Impervious Runoff Depth>1.57"
Flow Length=44' Slope=0.0050 '/' Tc=0.5 min CN=83 Runoff=0.31 cfs 792 cf

Subcatchment 2S: SE SITE Runoff Area=5,168 sf 15.11% Impervious Runoff Depth>0.08"
Flow Length=78' Tc=2.0 min UI Adjusted CN=48 Runoff=0.00 cfs 35 cf

Subcatchment 10S: NW SITE Runoff Area=6,222 sf 42.74% Impervious Runoff Depth>0.80"
Flow Length=44' Slope=0.0050 '/' Tc=0.6 min CN=70 Runoff=0.14 cfs 414 cf

Subcatchment 20S: SE SITE Runoff Area=3,968 sf 19.68% Impervious Runoff Depth>0.14"
Flow Length=78' Tc=2.0 min CN=51 Runoff=0.00 cfs 46 cf

Subcatchment 30S: ROOF Runoff Area=670 sf 100.00% Impervious Runoff Depth>2.92"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.06 cfs 163 cf

Subcatchment 31S: REAR GARAGE ROOF Runoff Area=396 sf 100.00% Impervious Runoff Depth>2.92"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.03 cfs 96 cf

Reach 1R: CB @ PARSONS ST Inflow=0.31 cfs 792 cf
Outflow=0.31 cfs 792 cf

Reach 2R: WESTERN ABUTTERS Inflow=0.00 cfs 35 cf
Outflow=0.00 cfs 35 cf

Reach 3R: TOTAL Inflow=0.31 cfs 828 cf
Outflow=0.31 cfs 828 cf

Reach 10R: CB @ PARSONS ST Inflow=0.14 cfs 414 cf
Outflow=0.14 cfs 414 cf

Reach 20R: WESTERN ABUTTERS Inflow=0.00 cfs 46 cf
Outflow=0.00 cfs 46 cf

Reach 30R: TOTAL Inflow=0.14 cfs 460 cf
Outflow=0.14 cfs 460 cf

Pond 30P: 300 GAL DRY WELL Peak Elev=1.35' Storage=55 cf Inflow=0.09 cfs 259 cf
Discarded=0.02 cfs 259 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 259 cf

Summary for Subcatchment 1S: NW SITE

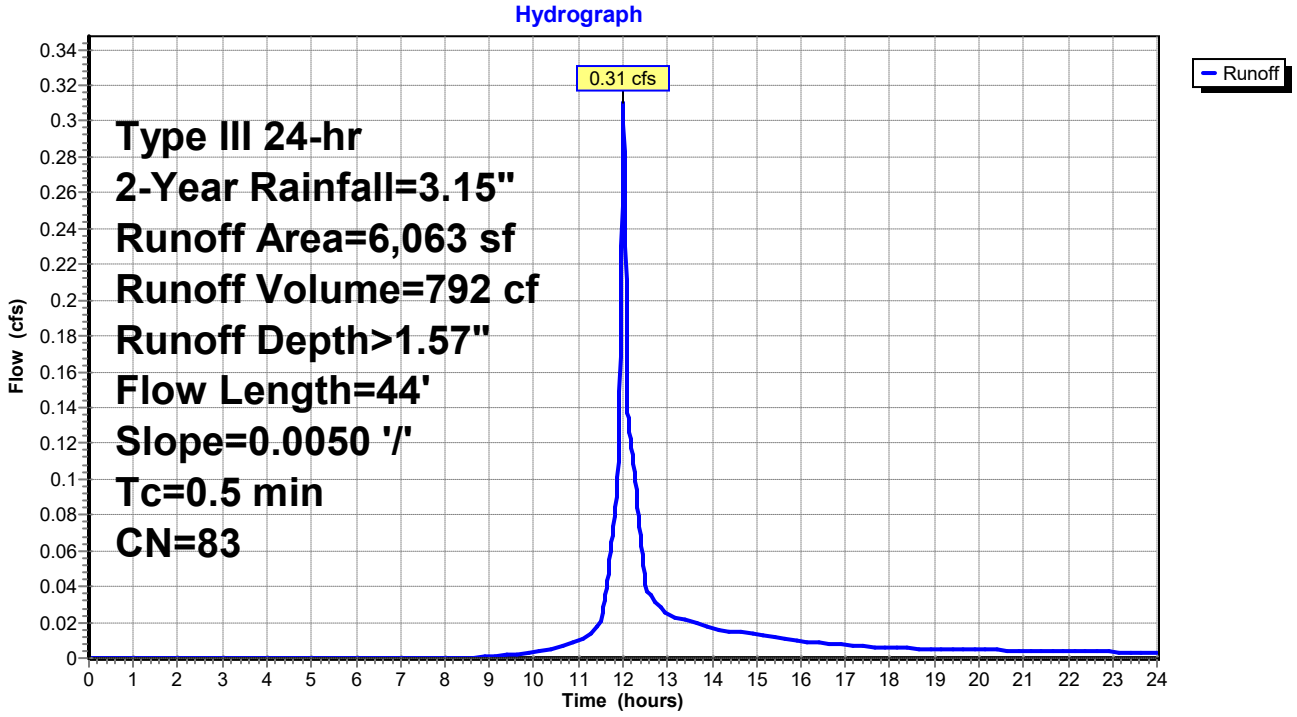
Runoff = 0.31 cfs @ 12.01 hrs, Volume= 792 cf, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
	1,530	39	>75% Grass cover, Good, HSG A
	1,874	98	Roofs, HSG A
	2,609	98	Paved parking, HSG A
*	50	76	Brick
	6,063	83	Weighted Average
	1,580		26.06% Pervious Area
	4,483		73.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	44	0.0050	1.44		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps

Subcatchment 1S: NW SITE



Summary for Subcatchment 2S: SE SITE

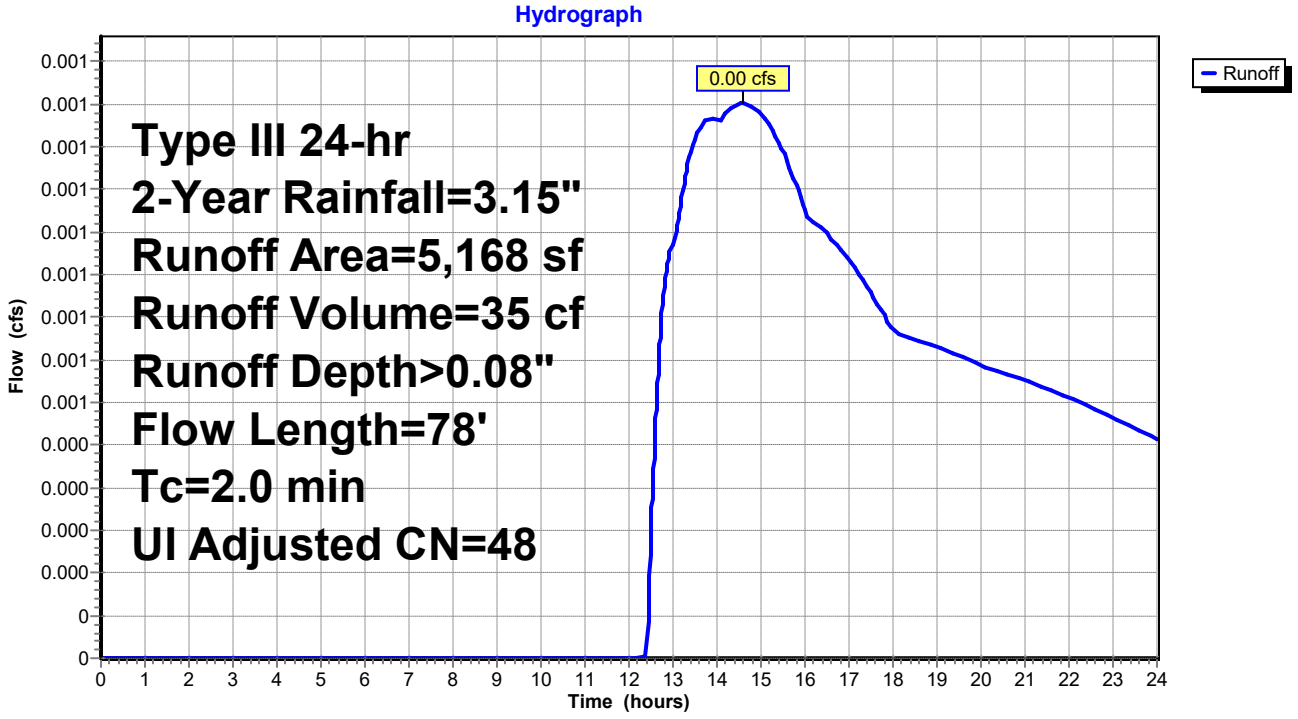
Runoff = 0.00 cfs @ 14.58 hrs, Volume= 35 cf, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Adj	Description
	4,303	39		>75% Grass cover, Good, HSG A
	765	98		Roofs, HSG A
	16	98		Unconnected pavement, HSG A
*	84	76		Brick
	5,168	49	48	Weighted Average, UI Adjusted
	4,387			84.89% Pervious Area
	781			15.11% Impervious Area
	16			2.05% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 2S: SE SITE



Summary for Subcatchment 10S: NW SITE

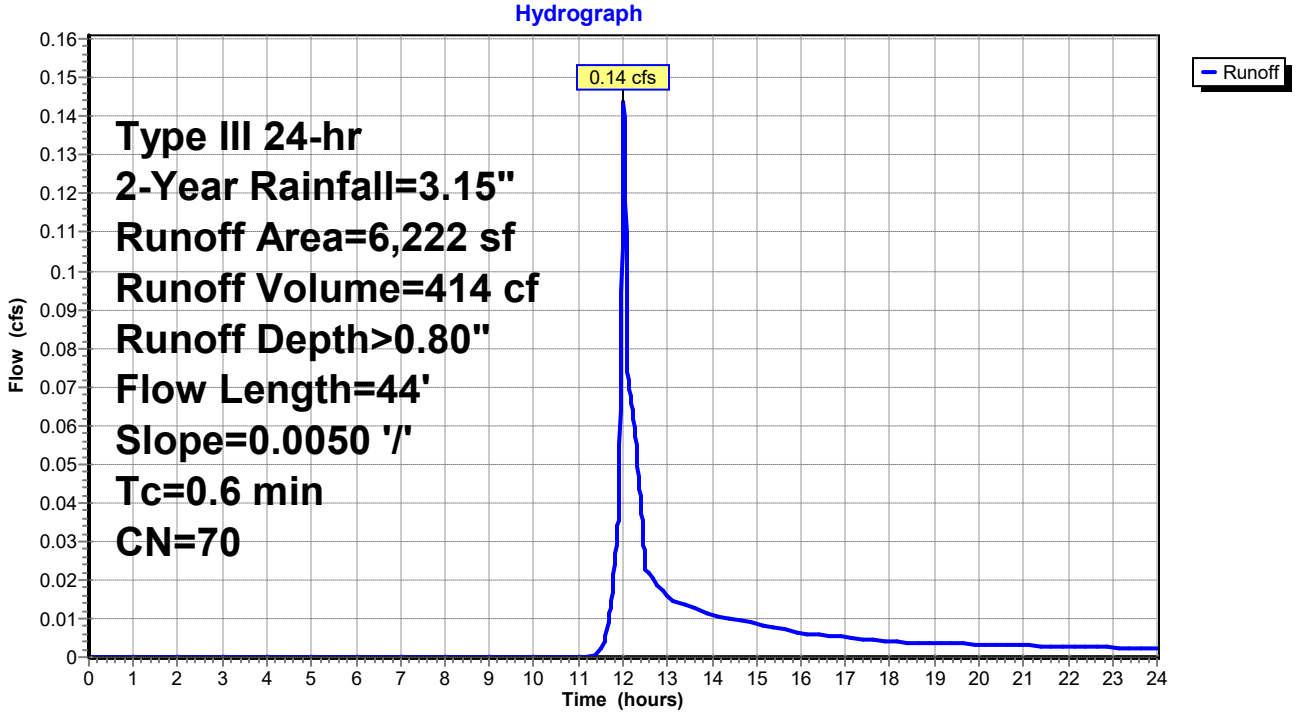
Runoff = 0.14 cfs @ 12.01 hrs, Volume= 414 cf, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
	1,295	39	>75% Grass cover, Good, HSG A
*	2,218	55	Perm Pavers/ Perm Bit.
	2,271	98	Roofs, HSG A
	388	98	Unconnected pavement, HSG A
*	50	76	Brick
	6,222	70	Weighted Average
	3,563		57.26% Pervious Area
	2,659		42.74% Impervious Area
	388		14.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	44	0.0050	1.14		**Shallow Concentrated Flow, Permeable Pavement** Unpaved Kv= 16.1 fps

Subcatchment 10S: NW SITE



Summary for Subcatchment 20S: SE SITE

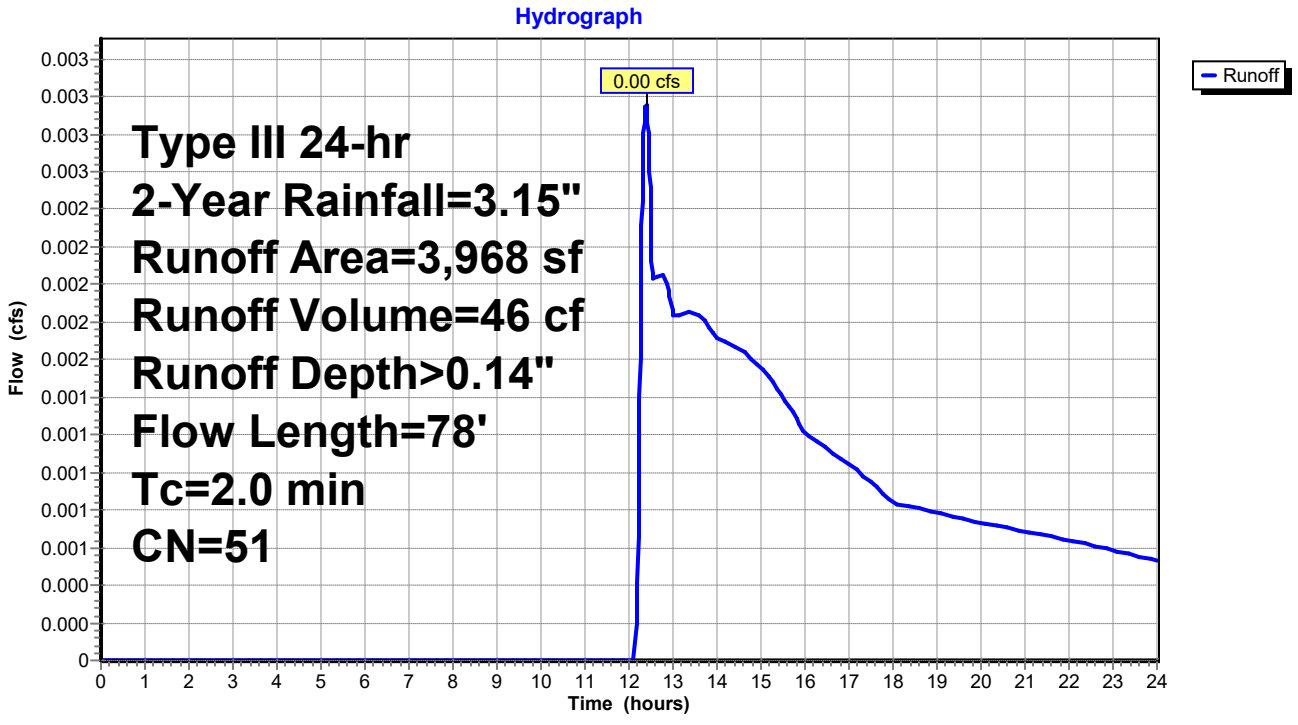
Runoff = 0.00 cfs @ 12.39 hrs, Volume= 46 cf, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
	3,095	39	>75% Grass cover, Good, HSG A
*	92	76	Brick
	781	98	Roofs, HSG A
	3,968	51	Weighted Average
	3,187		80.32% Pervious Area
	781		19.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 20S: SE SITE



Summary for Subcatchment 30S: ROOF

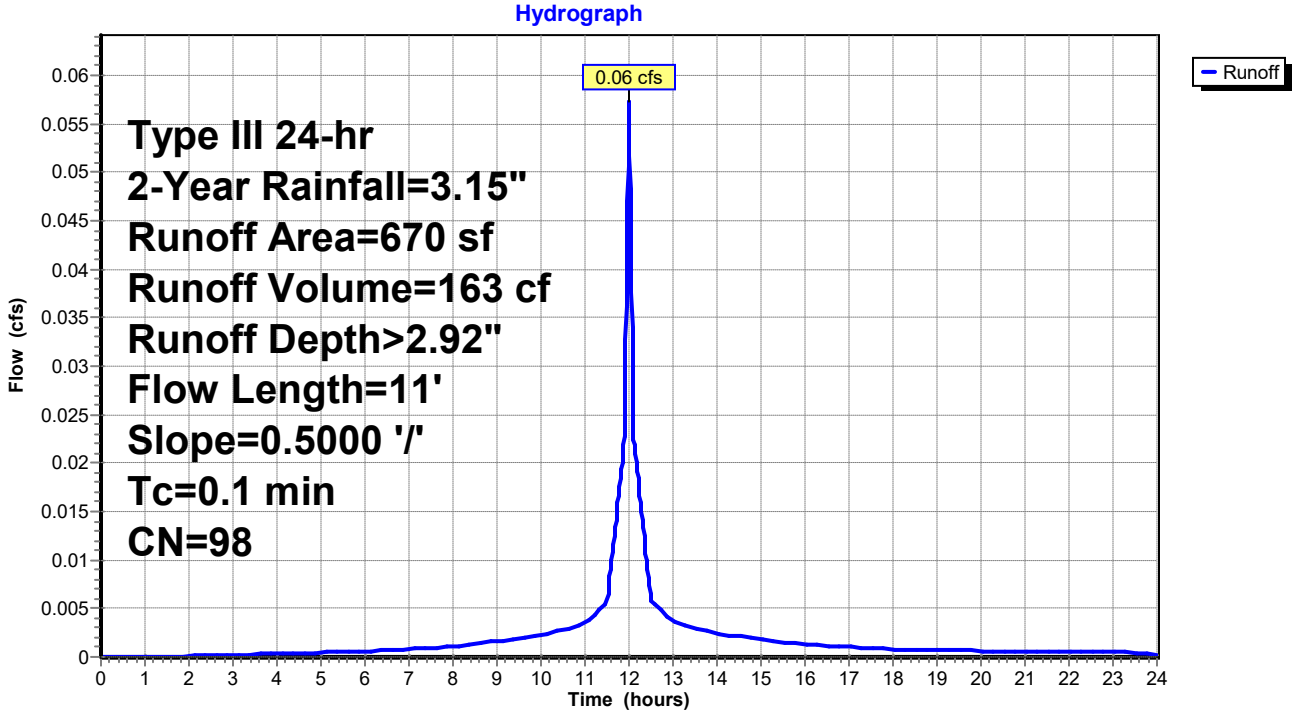
Runoff = 0.06 cfs @ 12.00 hrs, Volume= 163 cf, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (sf)	CN	Description
670	98	Roofs, HSG A
670		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 30S: ROOF



Summary for Subcatchment 31S: REAR GARAGE ROOF

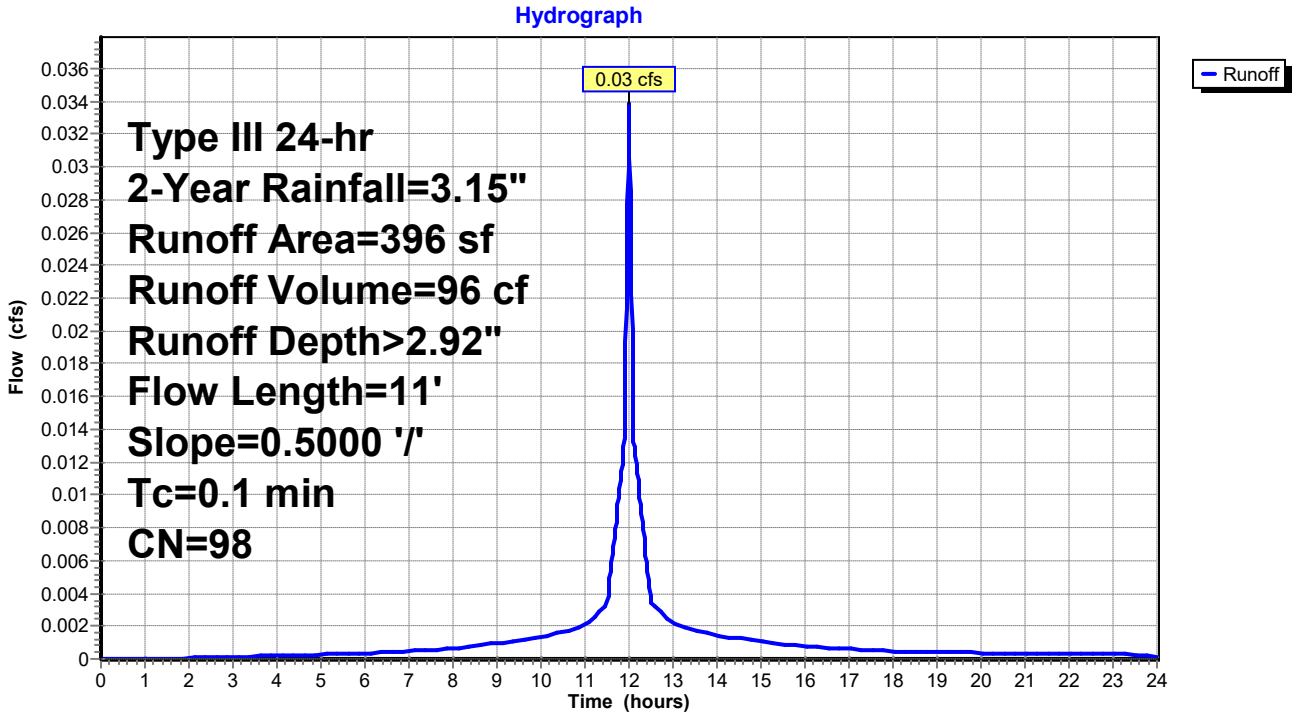
Runoff = 0.03 cfs @ 12.00 hrs, Volume= 96 cf, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (sf)	CN	Description
396	98	Roofs, HSG A
396		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 31S: REAR GARAGE ROOF

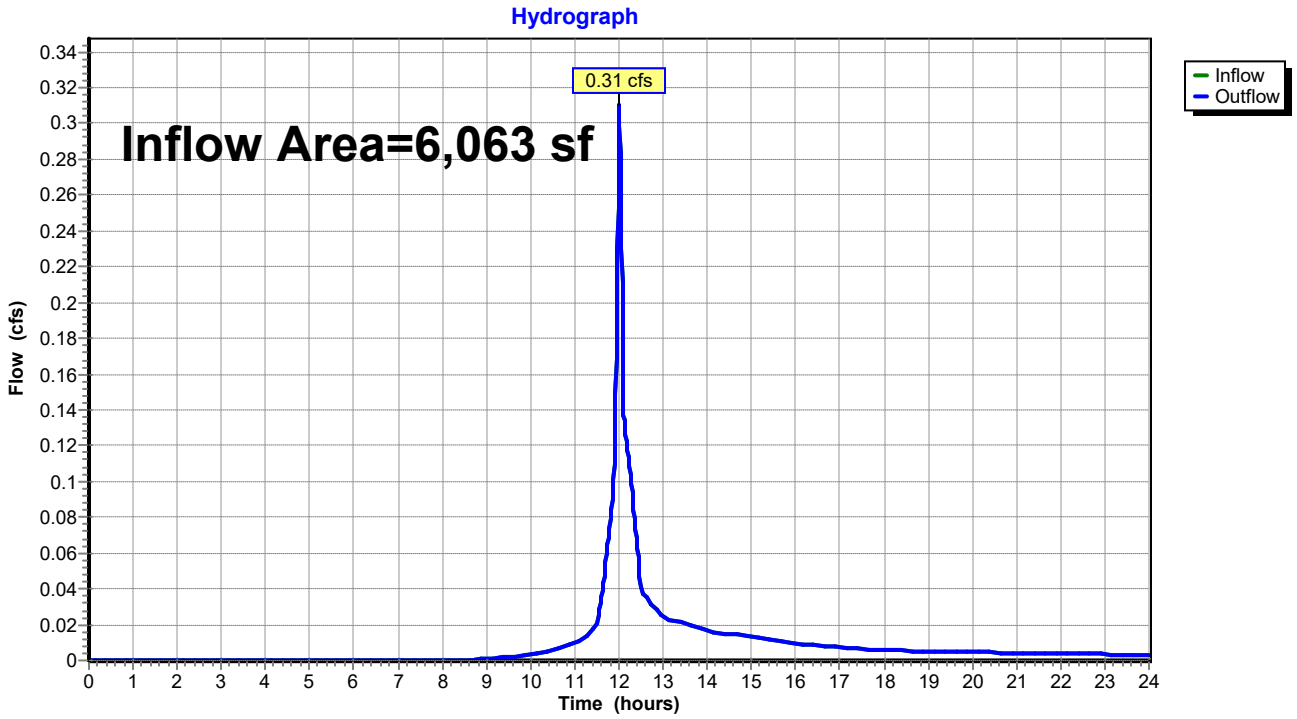


Summary for Reach 1R: CB @ PARSONS ST

Inflow Area = 6,063 sf, 73.94% Impervious, Inflow Depth > 1.57" for 2-Year event
Inflow = 0.31 cfs @ 12.01 hrs, Volume= 792 cf
Outflow = 0.31 cfs @ 12.01 hrs, Volume= 792 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: CB @ PARSONS ST

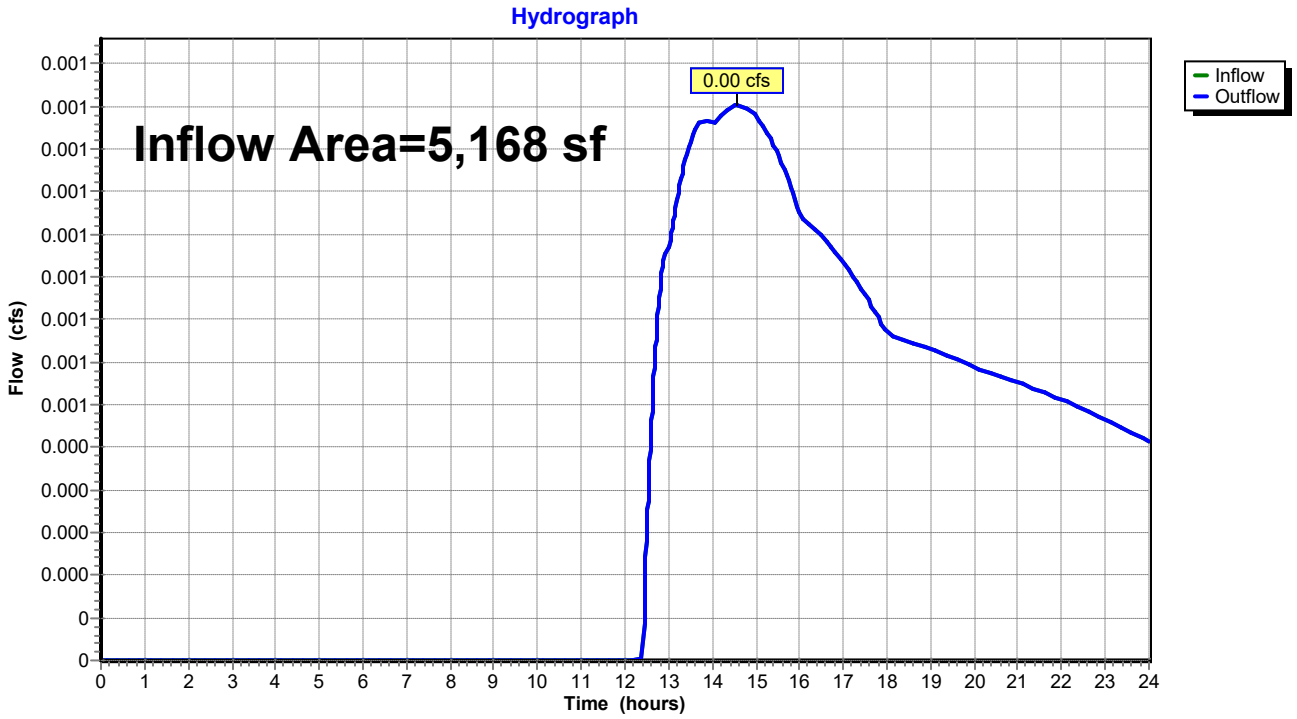


Summary for Reach 2R: WESTERN ABUTTERS

Inflow Area = 5,168 sf, 15.11% Impervious, Inflow Depth > 0.08" for 2-Year event
Inflow = 0.00 cfs @ 14.58 hrs, Volume= 35 cf
Outflow = 0.00 cfs @ 14.58 hrs, Volume= 35 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: WESTERN ABUTTERS

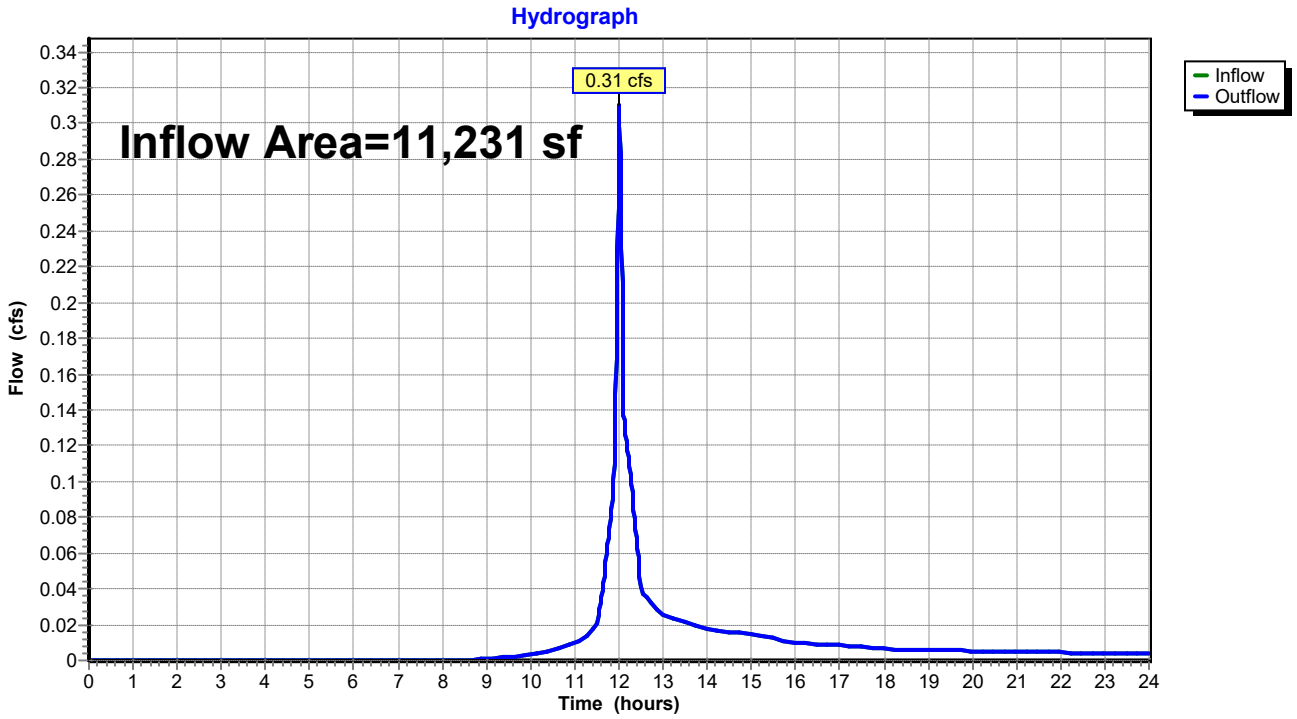


Summary for Reach 3R: TOTAL

Inflow Area = 11,231 sf, 46.87% Impervious, Inflow Depth > 0.88" for 2-Year event
Inflow = 0.31 cfs @ 12.01 hrs, Volume= 828 cf
Outflow = 0.31 cfs @ 12.01 hrs, Volume= 828 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 3R: TOTAL

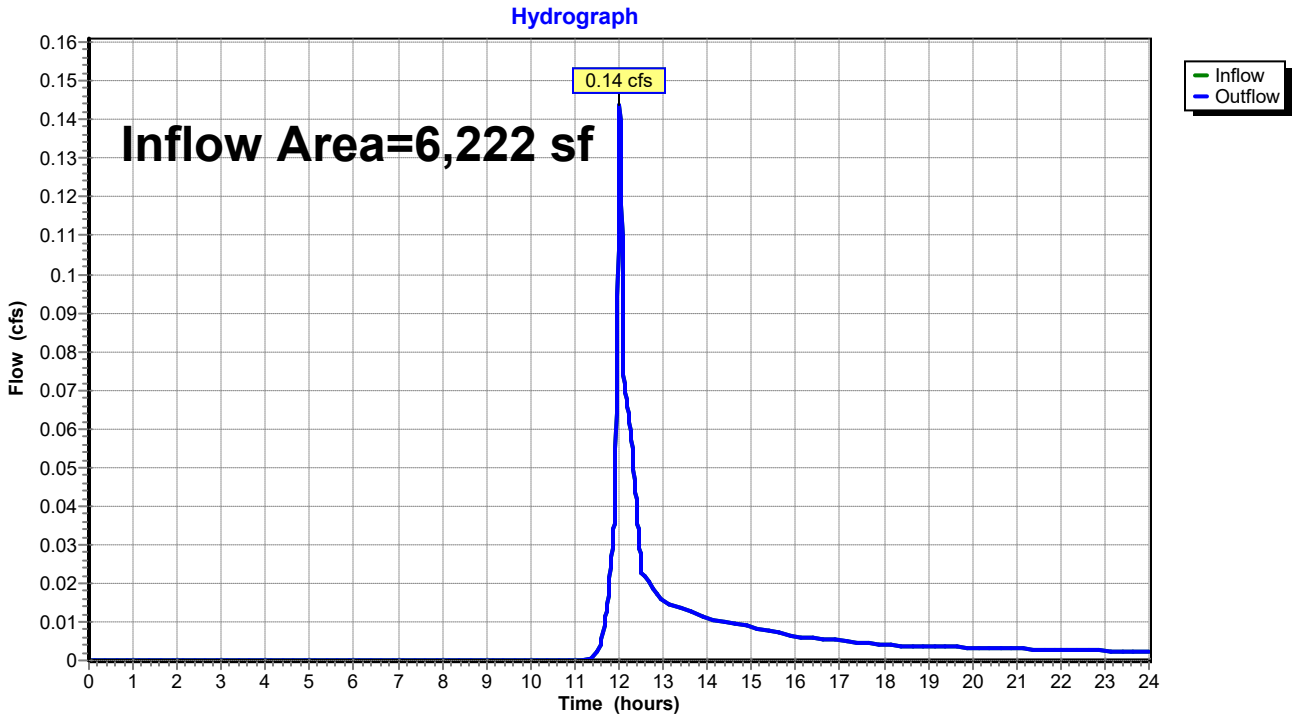


Summary for Reach 10R: CB @ PARSONS ST

Inflow Area = 6,222 sf, 42.74% Impervious, Inflow Depth > 0.80" for 2-Year event
Inflow = 0.14 cfs @ 12.01 hrs, Volume= 414 cf
Outflow = 0.14 cfs @ 12.01 hrs, Volume= 414 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 10R: CB @ PARSONS ST

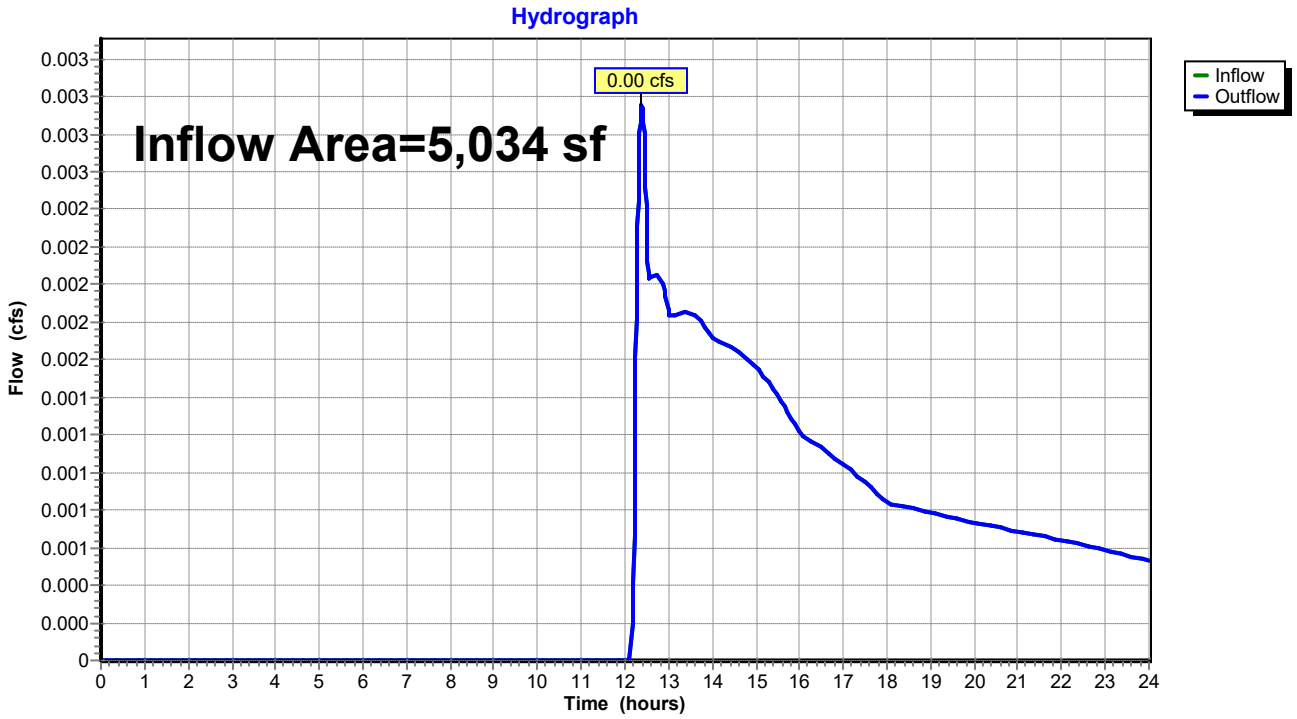


Summary for Reach 20R: WESTERN ABUTTERS

Inflow Area = 5,034 sf, 36.69% Impervious, Inflow Depth > 0.11" for 2-Year event
Inflow = 0.00 cfs @ 12.39 hrs, Volume= 46 cf
Outflow = 0.00 cfs @ 12.39 hrs, Volume= 46 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 20R: WESTERN ABUTTERS

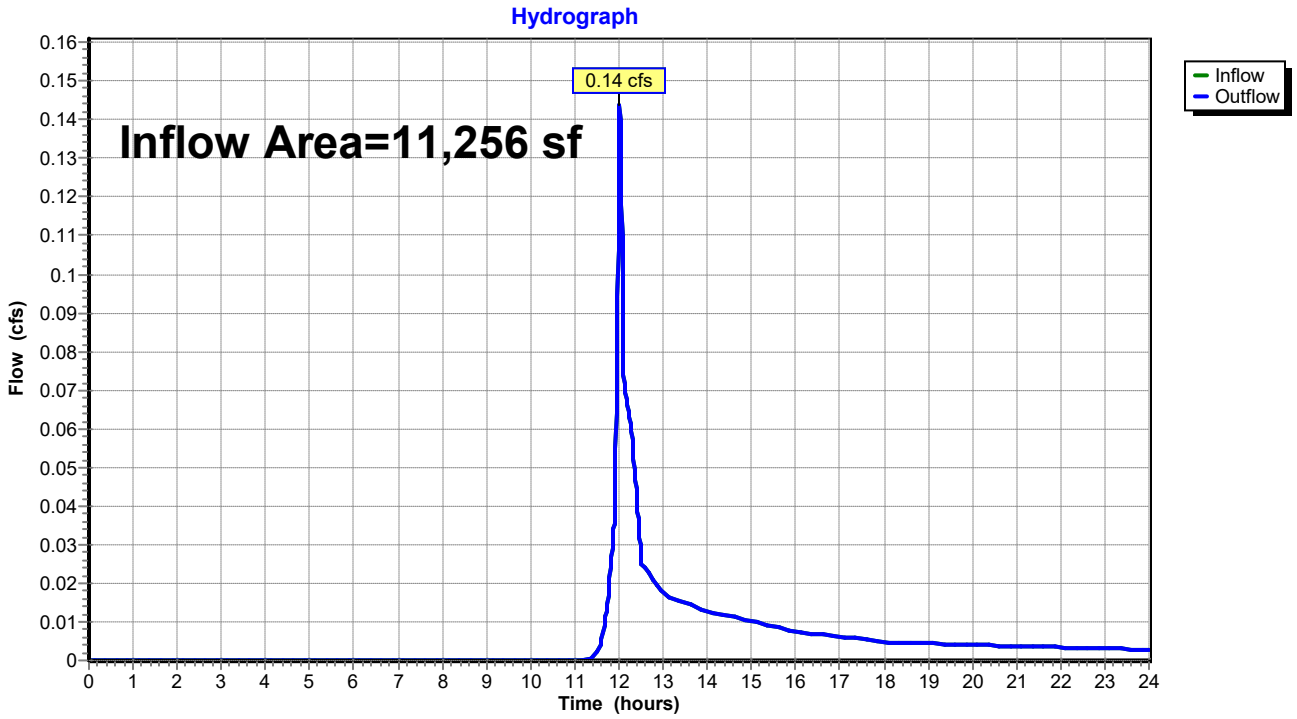


Summary for Reach 30R: TOTAL

Inflow Area = 11,256 sf, 40.03% Impervious, Inflow Depth > 0.49" for 2-Year event
Inflow = 0.14 cfs @ 12.01 hrs, Volume= 460 cf
Outflow = 0.14 cfs @ 12.01 hrs, Volume= 460 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 30R: TOTAL



Summary for Pond 30P: 300 GAL DRY WELL

Inflow Area = 1,066 sf,100.00% Impervious, Inflow Depth > 2.92" for 2-Year event
Inflow = 0.09 cfs @ 12.00 hrs, Volume= 259 cf
Outflow = 0.02 cfs @ 11.66 hrs, Volume= 259 cf, Atten= 81%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.66 hrs, Volume= 259 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 1.35' @ 12.38 hrs Surf.Area= 90 sf Storage= 55 cf

Plug-Flow detention time= 15.9 min calculated for 259 cf (100% of inflow)
Center-of-Mass det. time= 15.7 min (767.0 - 751.3)

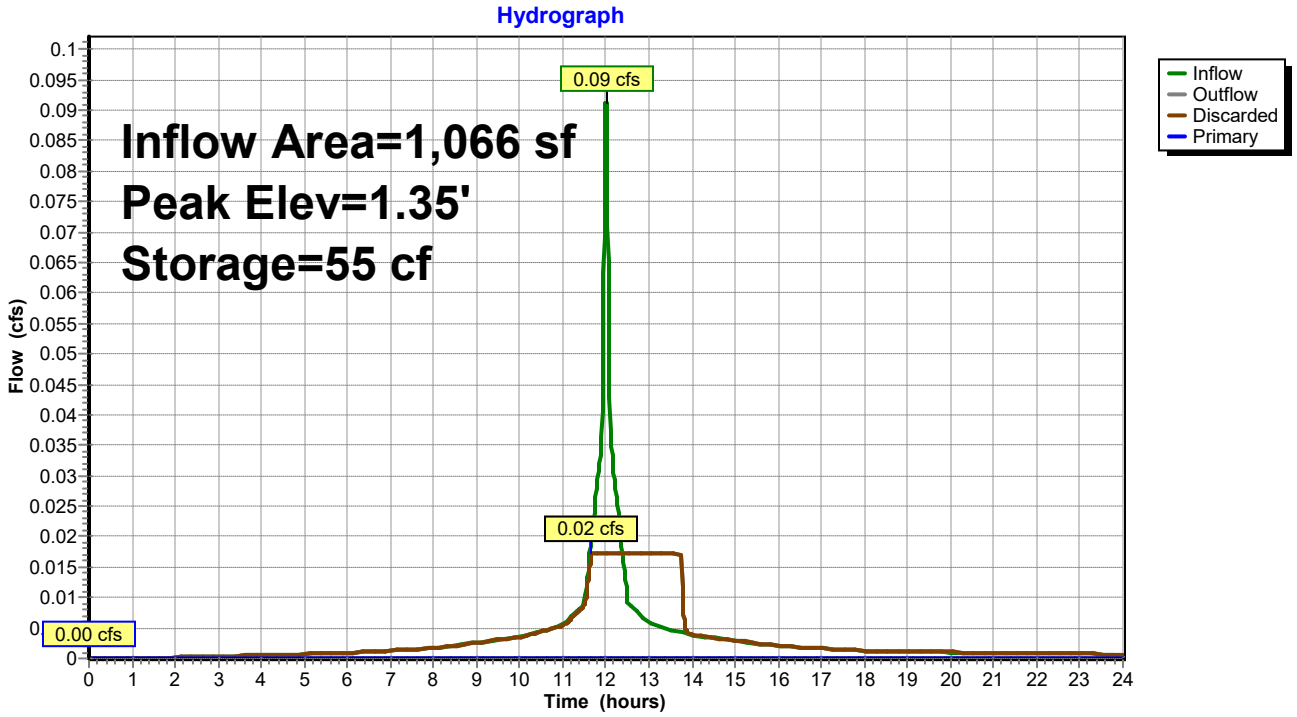
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	67 cf	**5.67'W x 8.00'L x 3.67'H Field A** 166 cf Overall x 40.0% Voids
#2	1.00'	105 cf	**3.50'W x 4.00'L x 3.75'H Prismatoid** x 2 Inside #3 110 cf Overall - 0.5" Wall Thickness = 105 cf
#3	0.00'	51 cf	**4.50'W x 5.00'L x 5.25'H Prismatoid** x 2 236 cf Overall - 110 cf Embedded = 127 cf x 40.0% Voids
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	4.25'	**5.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	0.00'	**8.210 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.66 hrs HW=0.05' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 30P: 300 GAL DRY WELL



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: NW SITE Runoff Area=6,063 sf 73.94% Impervious Runoff Depth>3.02"
Flow Length=44' Slope=0.0050 '/' Tc=0.5 min CN=83 Runoff=0.60 cfs 1,526 cf

Subcatchment 2S: SE SITE Runoff Area=5,168 sf 15.11% Impervious Runoff Depth>0.53"
Flow Length=78' Tc=2.0 min UI Adjusted CN=48 Runoff=0.04 cfs 226 cf

Subcatchment 10S: NW SITE Runoff Area=6,222 sf 42.74% Impervious Runoff Depth>1.91"
Flow Length=44' Slope=0.0050 '/' Tc=0.6 min CN=70 Runoff=0.38 cfs 991 cf

Subcatchment 20S: SE SITE Runoff Area=3,968 sf 19.68% Impervious Runoff Depth>0.68"
Flow Length=78' Tc=2.0 min CN=51 Runoff=0.05 cfs 223 cf

Subcatchment 30S: ROOF Runoff Area=670 sf 100.00% Impervious Runoff Depth>4.59"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.09 cfs 256 cf

Subcatchment 31S: REAR GARAGE ROOF Runoff Area=396 sf 100.00% Impervious Runoff Depth>4.59"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.05 cfs 152 cf

Reach 1R: CB @ PARSONS ST Inflow=0.60 cfs 1,526 cf
Outflow=0.60 cfs 1,526 cf

Reach 2R: WESTERN ABUTTERS Inflow=0.04 cfs 226 cf
Outflow=0.04 cfs 226 cf

Reach 3R: TOTAL Inflow=0.61 cfs 1,752 cf
Outflow=0.61 cfs 1,752 cf

Reach 10R: CB @ PARSONS ST Inflow=0.38 cfs 991 cf
Outflow=0.38 cfs 991 cf

Reach 20R: WESTERN ABUTTERS Inflow=0.05 cfs 223 cf
Outflow=0.05 cfs 223 cf

Reach 30R: TOTAL Inflow=0.42 cfs 1,214 cf
Outflow=0.42 cfs 1,214 cf

Pond 30P: 300 GAL DRY WELL Peak Elev=2.45' Storage=112 cf Inflow=0.14 cfs 408 cf
Discarded=0.02 cfs 408 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 408 cf

Summary for Subcatchment 1S: NW SITE

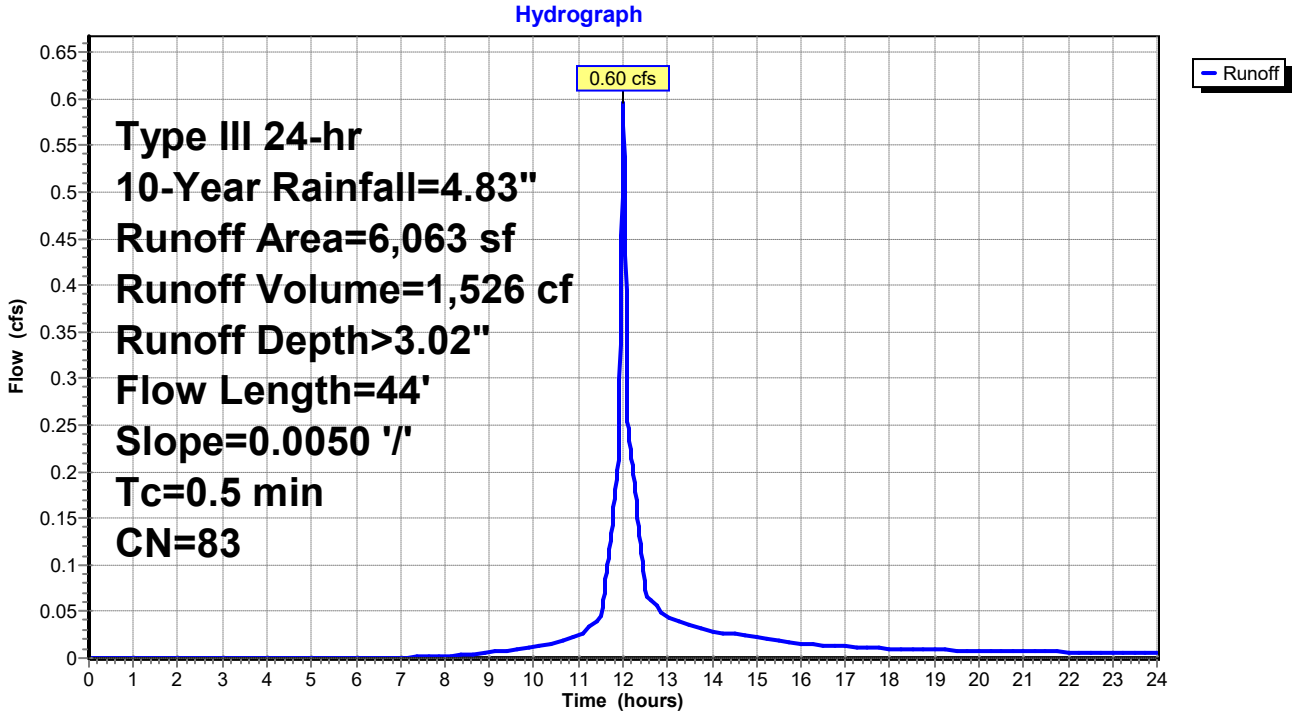
Runoff = 0.60 cfs @ 12.01 hrs, Volume= 1,526 cf, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

	Area (sf)	CN	Description
	1,530	39	>75% Grass cover, Good, HSG A
	1,874	98	Roofs, HSG A
	2,609	98	Paved parking, HSG A
*	50	76	Brick
	6,063	83	Weighted Average
	1,580		26.06% Pervious Area
	4,483		73.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	44	0.0050	1.44		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps

Subcatchment 1S: NW SITE



Summary for Subcatchment 2S: SE SITE

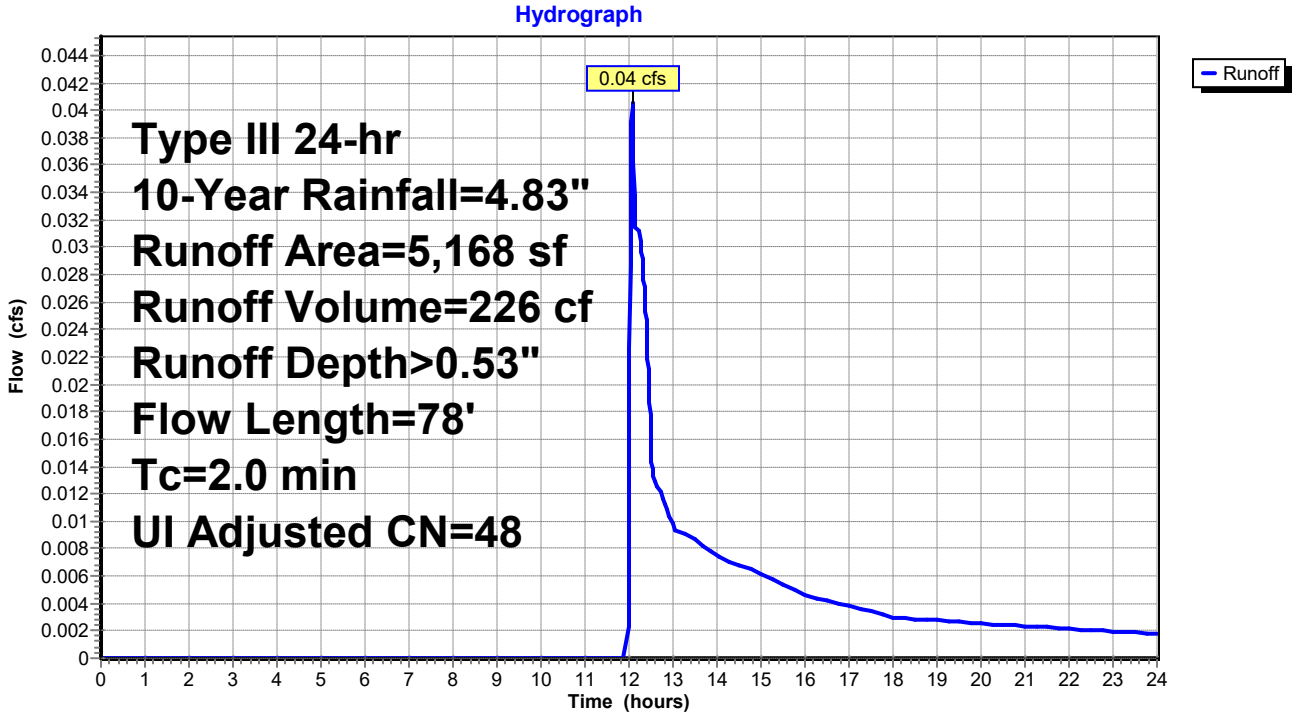
Runoff = 0.04 cfs @ 12.08 hrs, Volume= 226 cf, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

	Area (sf)	CN	Adj	Description
	4,303	39		>75% Grass cover, Good, HSG A
	765	98		Roofs, HSG A
	16	98		Unconnected pavement, HSG A
*	84	76		Brick
	5,168	49	48	Weighted Average, UI Adjusted
	4,387			84.89% Pervious Area
	781			15.11% Impervious Area
	16			2.05% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 2S: SE SITE



Summary for Subcatchment 10S: NW SITE

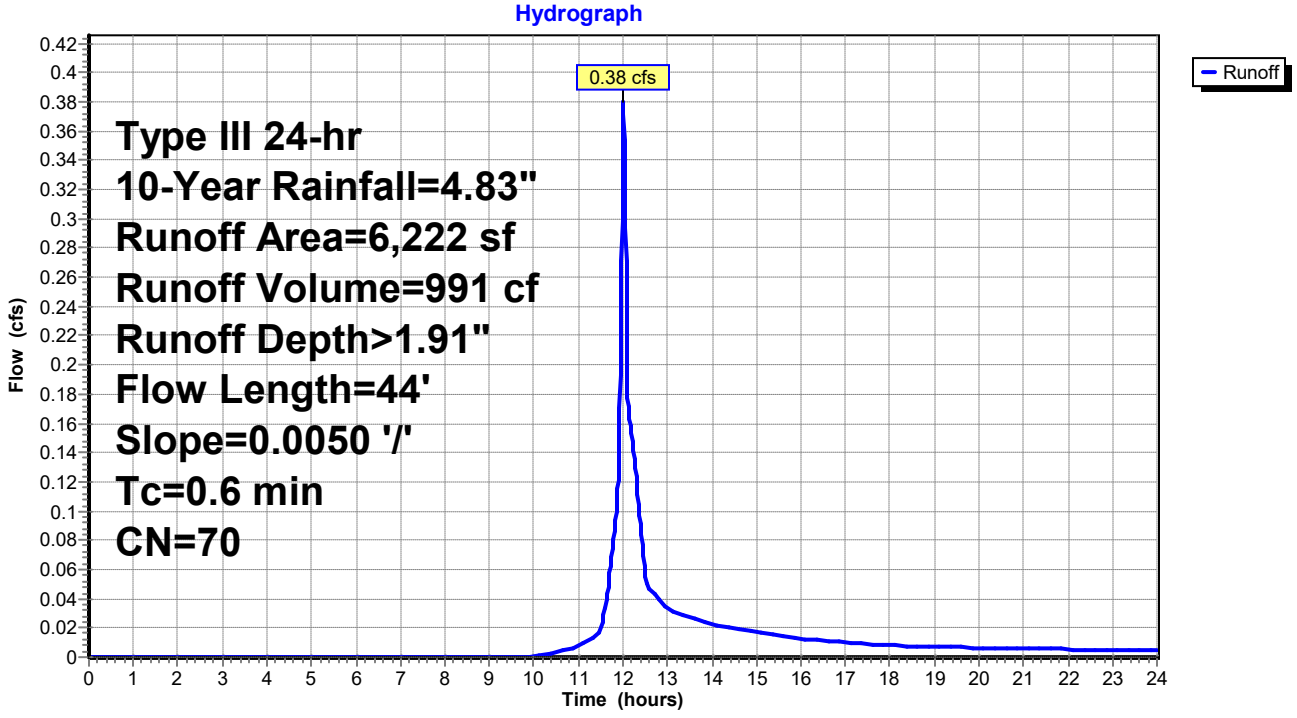
Runoff = 0.38 cfs @ 12.01 hrs, Volume= 991 cf, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

	Area (sf)	CN	Description
	1,295	39	>75% Grass cover, Good, HSG A
*	2,218	55	Perm Pavers/ Perm Bit.
	2,271	98	Roofs, HSG A
	388	98	Unconnected pavement, HSG A
*	50	76	Brick
	6,222	70	Weighted Average
	3,563		57.26% Pervious Area
	2,659		42.74% Impervious Area
	388		14.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	44	0.0050	1.14		**Shallow Concentrated Flow, Permeable Pavement** Unpaved Kv= 16.1 fps

Subcatchment 10S: NW SITE



Summary for Subcatchment 20S: SE SITE

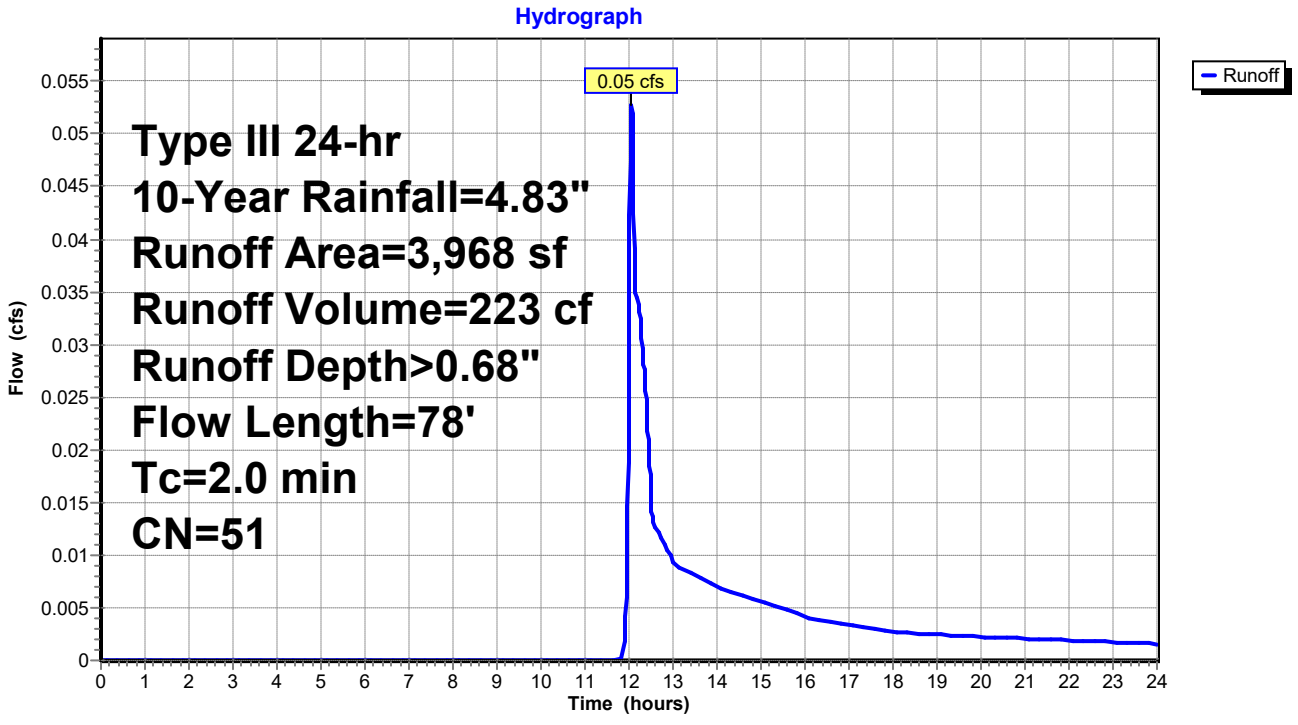
Runoff = 0.05 cfs @ 12.06 hrs, Volume= 223 cf, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

	Area (sf)	CN	Description
	3,095	39	>75% Grass cover, Good, HSG A
*	92	76	Brick
	781	98	Roofs, HSG A
	3,968	51	Weighted Average
	3,187		80.32% Pervious Area
	781		19.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 20S: SE SITE



Summary for Subcatchment 30S: ROOF

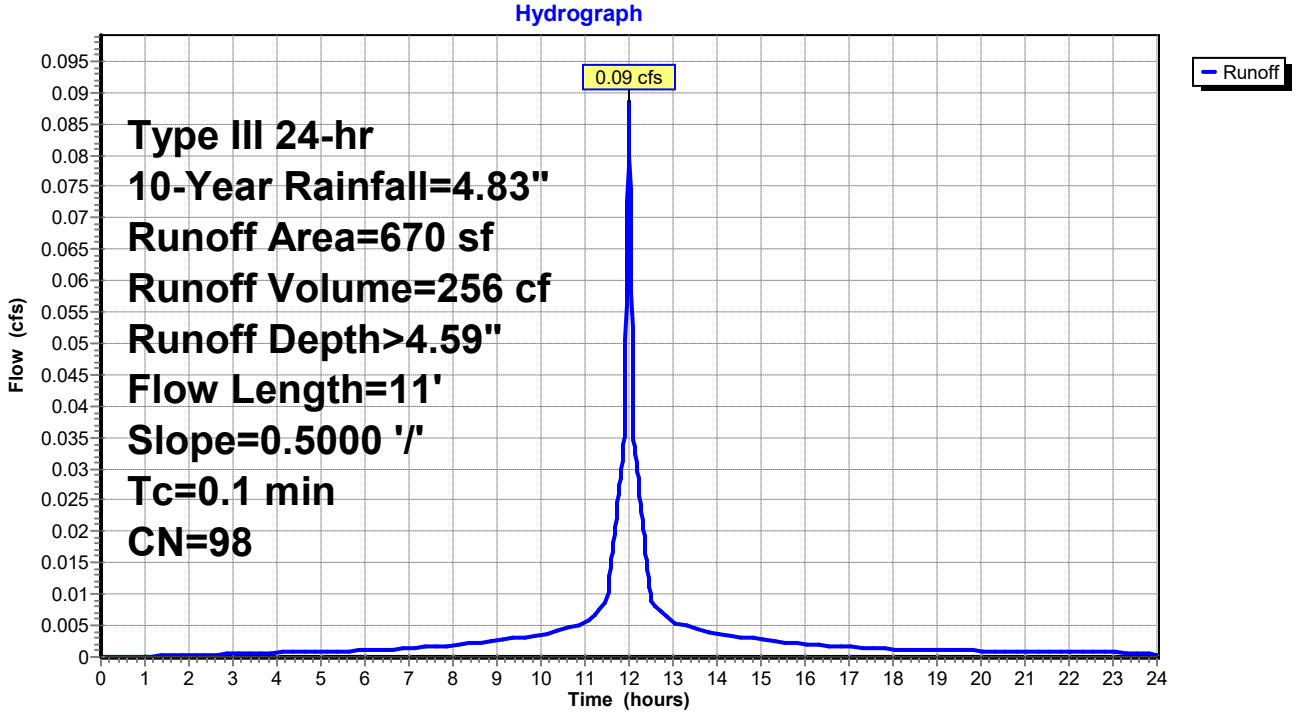
Runoff = 0.09 cfs @ 12.00 hrs, Volume= 256 cf, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
670	98	Roofs, HSG A
670		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 30S: ROOF



Summary for Subcatchment 31S: REAR GARAGE ROOF

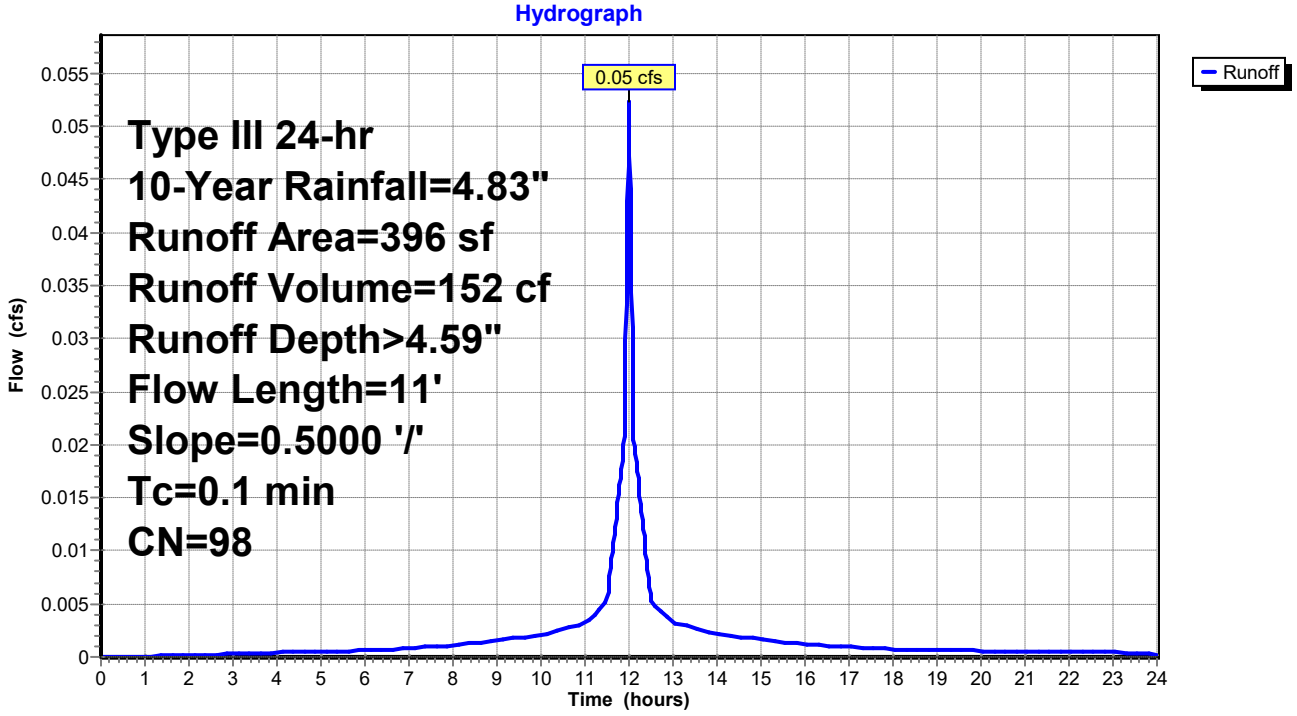
Runoff = 0.05 cfs @ 12.00 hrs, Volume= 152 cf, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (sf)	CN	Description
396	98	Roofs, HSG A
396		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 31S: REAR GARAGE ROOF

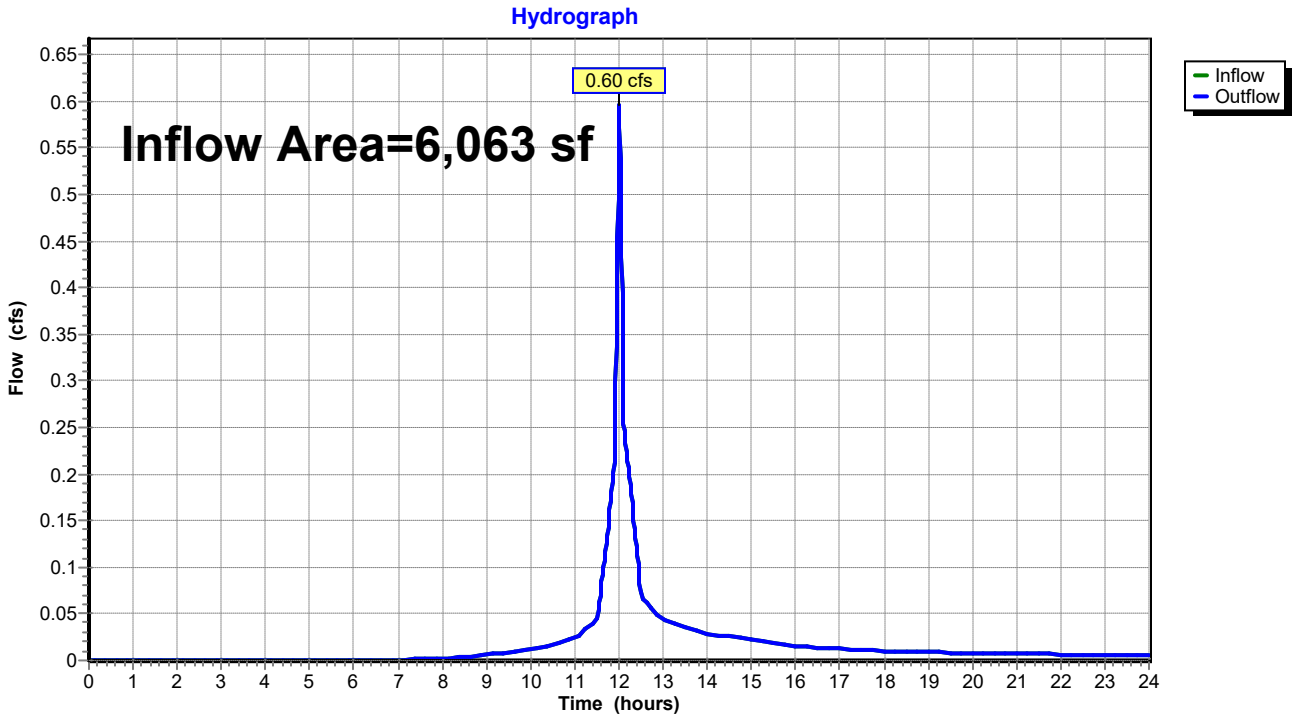


Summary for Reach 1R: CB @ PARSONS ST

Inflow Area = 6,063 sf, 73.94% Impervious, Inflow Depth > 3.02" for 10-Year event
Inflow = 0.60 cfs @ 12.01 hrs, Volume= 1,526 cf
Outflow = 0.60 cfs @ 12.01 hrs, Volume= 1,526 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: CB @ PARSONS ST

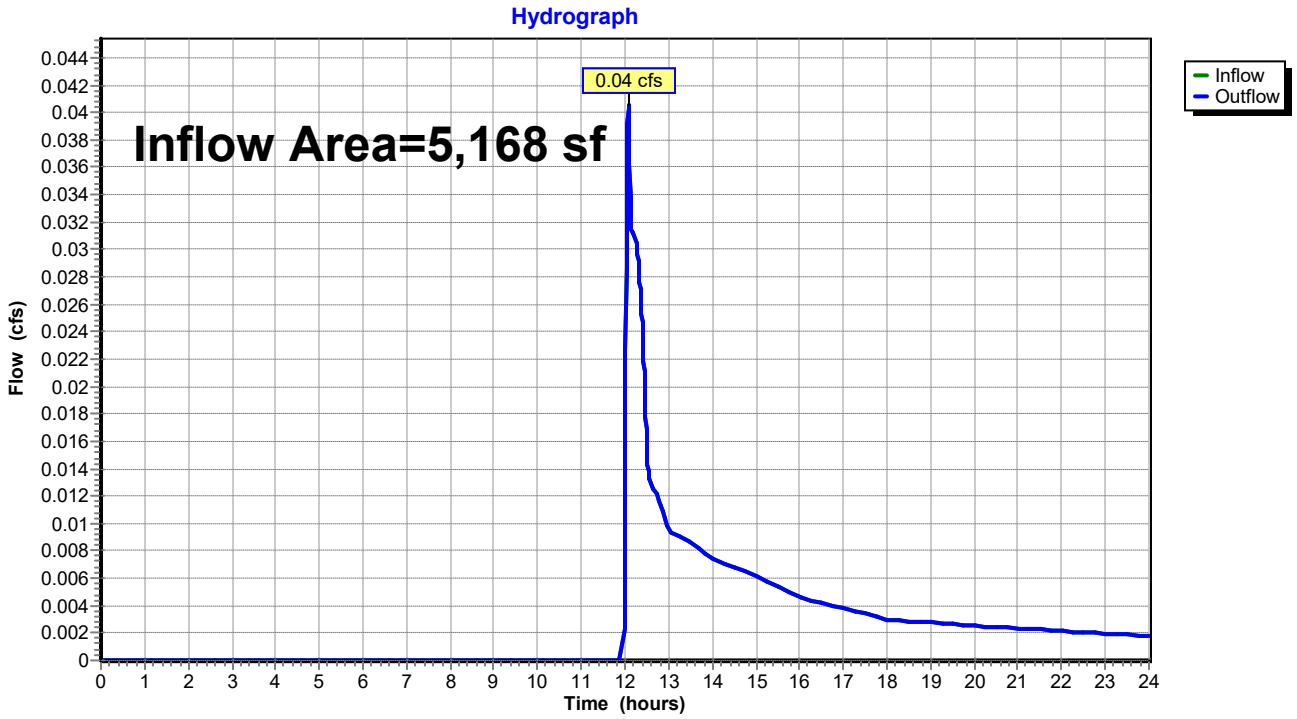


Summary for Reach 2R: WESTERN ABUTTERS

Inflow Area = 5,168 sf, 15.11% Impervious, Inflow Depth > 0.53" for 10-Year event
Inflow = 0.04 cfs @ 12.08 hrs, Volume= 226 cf
Outflow = 0.04 cfs @ 12.08 hrs, Volume= 226 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: WESTERN ABUTTERS

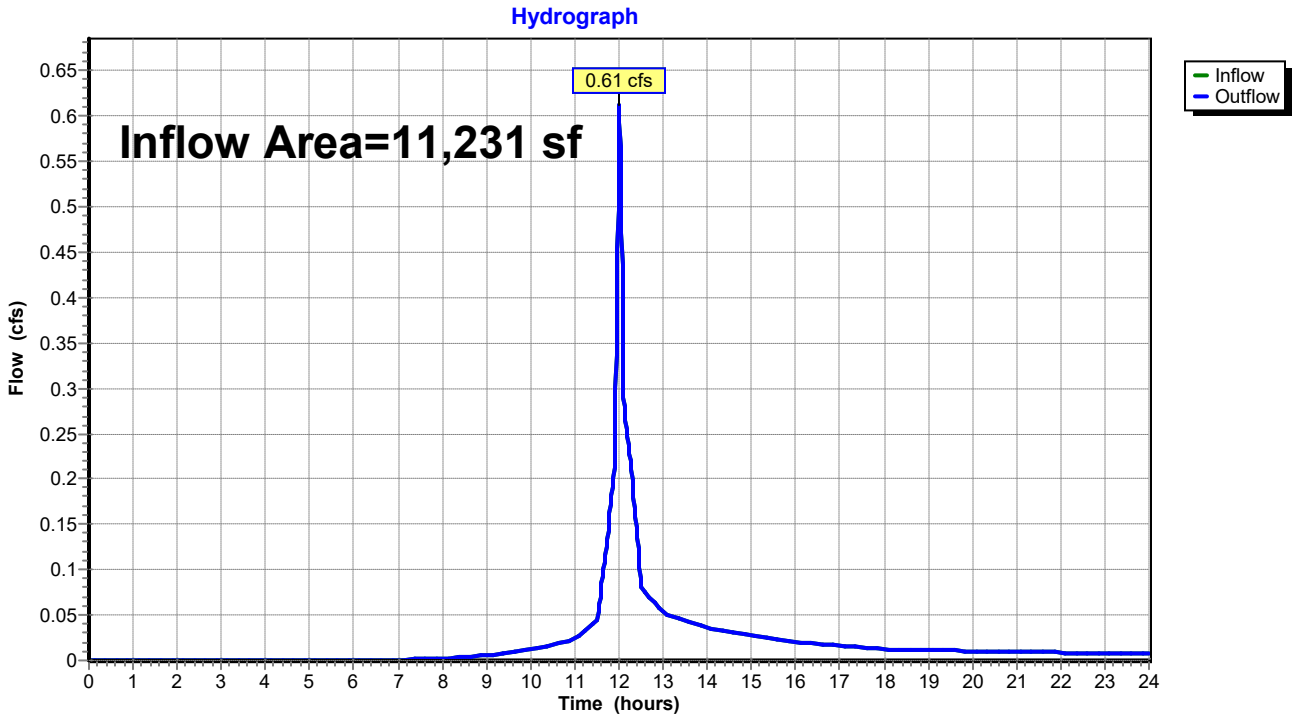


Summary for Reach 3R: TOTAL

Inflow Area = 11,231 sf, 46.87% Impervious, Inflow Depth > 1.87" for 10-Year event
Inflow = 0.61 cfs @ 12.01 hrs, Volume= 1,752 cf
Outflow = 0.61 cfs @ 12.01 hrs, Volume= 1,752 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 3R: TOTAL

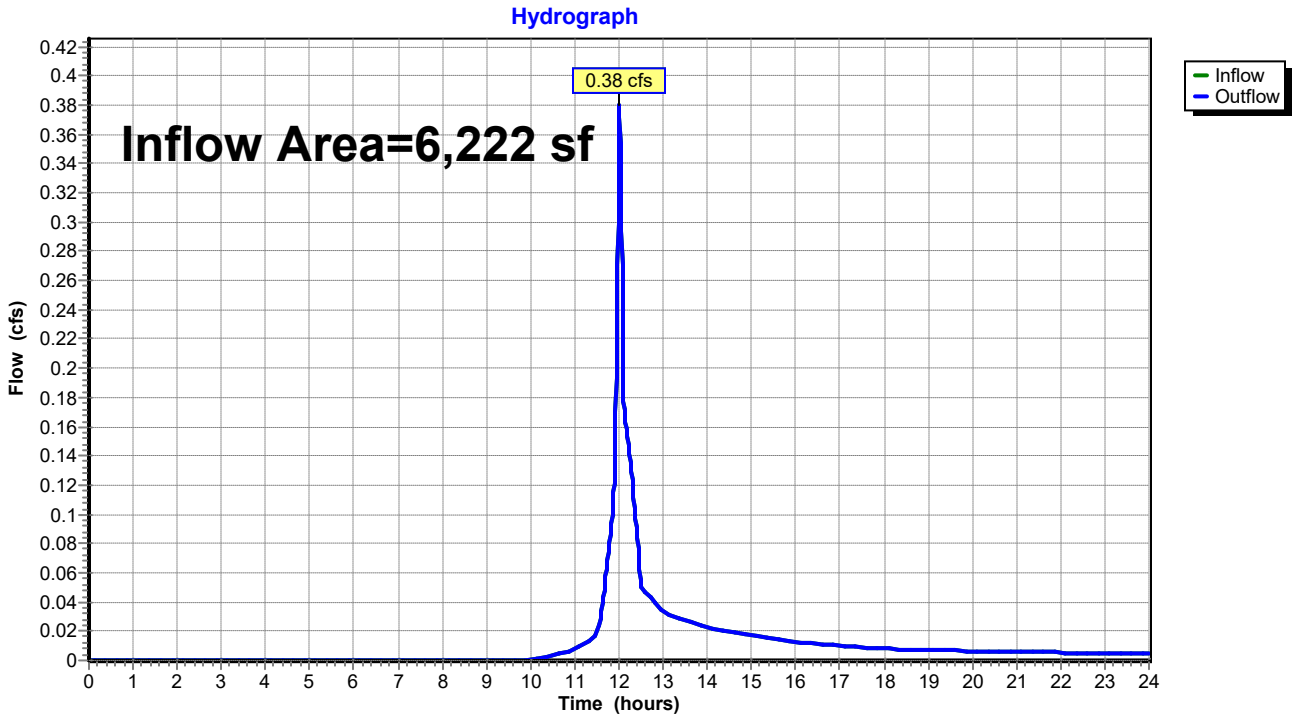


Summary for Reach 10R: CB @ PARSONS ST

Inflow Area = 6,222 sf, 42.74% Impervious, Inflow Depth > 1.91" for 10-Year event
Inflow = 0.38 cfs @ 12.01 hrs, Volume= 991 cf
Outflow = 0.38 cfs @ 12.01 hrs, Volume= 991 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 10R: CB @ PARSONS ST

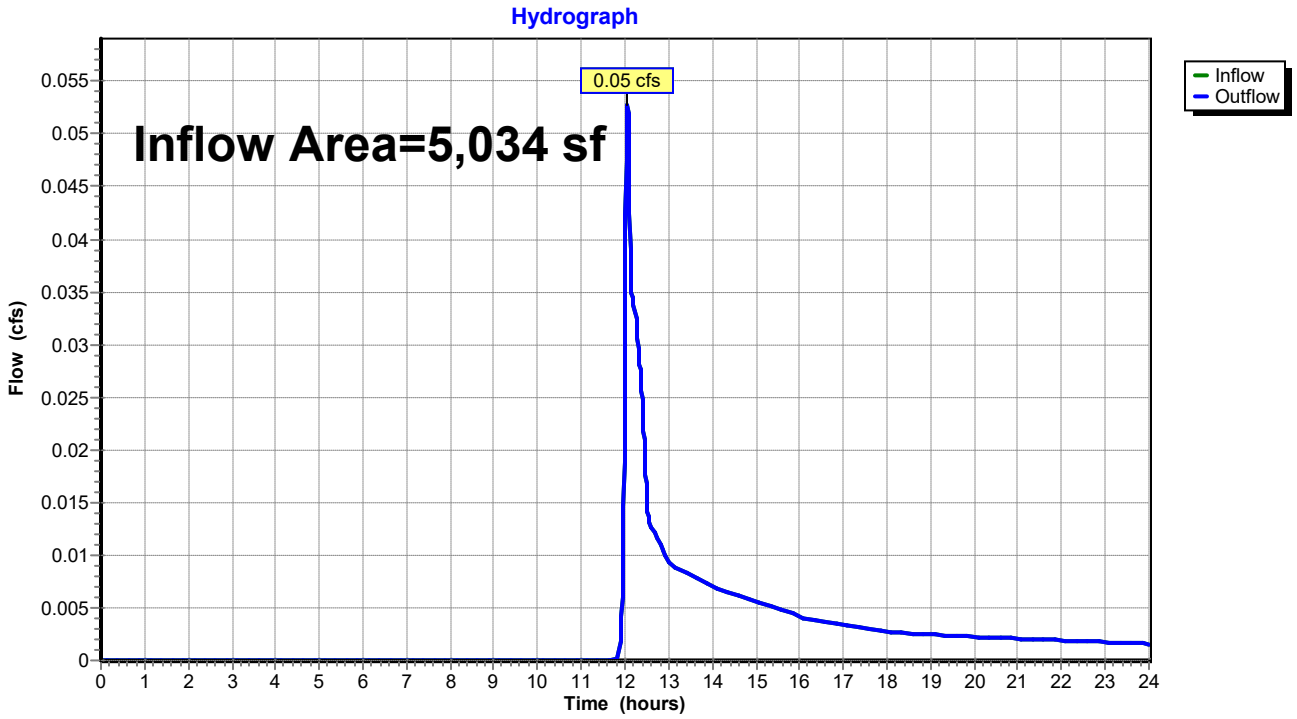


Summary for Reach 20R: WESTERN ABUTTERS

Inflow Area = 5,034 sf, 36.69% Impervious, Inflow Depth > 0.53" for 10-Year event
Inflow = 0.05 cfs @ 12.06 hrs, Volume= 223 cf
Outflow = 0.05 cfs @ 12.06 hrs, Volume= 223 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 20R: WESTERN ABUTTERS

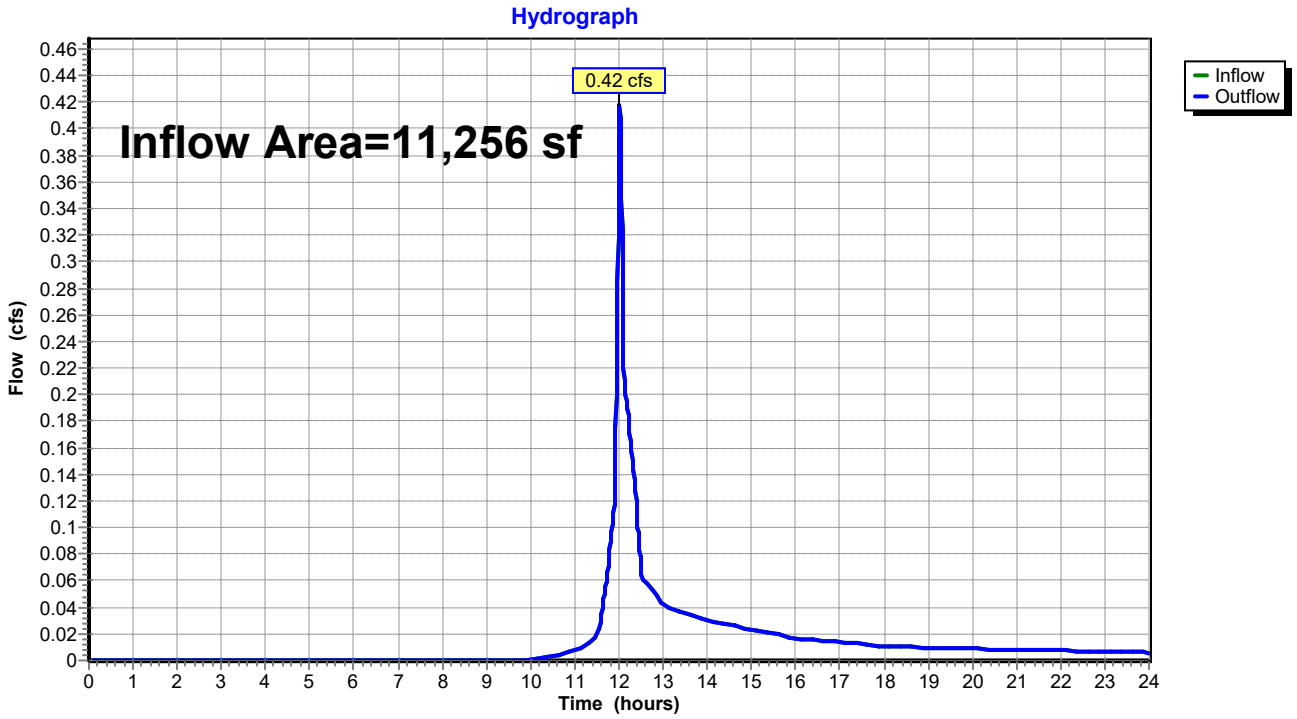


Summary for Reach 30R: TOTAL

Inflow Area = 11,256 sf, 40.03% Impervious, Inflow Depth > 1.29" for 10-Year event
Inflow = 0.42 cfs @ 12.01 hrs, Volume= 1,214 cf
Outflow = 0.42 cfs @ 12.01 hrs, Volume= 1,214 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 30R: TOTAL



Summary for Pond 30P: 300 GAL DRY WELL

Inflow Area = 1,066 sf,100.00% Impervious, Inflow Depth > 4.59" for 10-Year event
Inflow = 0.14 cfs @ 12.00 hrs, Volume= 408 cf
Outflow = 0.02 cfs @ 11.56 hrs, Volume= 408 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.56 hrs, Volume= 408 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 2.45' @ 12.47 hrs Surf.Area= 90 sf Storage= 112 cf

Plug-Flow detention time= 36.9 min calculated for 408 cf (100% of inflow)
Center-of-Mass det. time= 36.8 min (779.9 - 743.1)

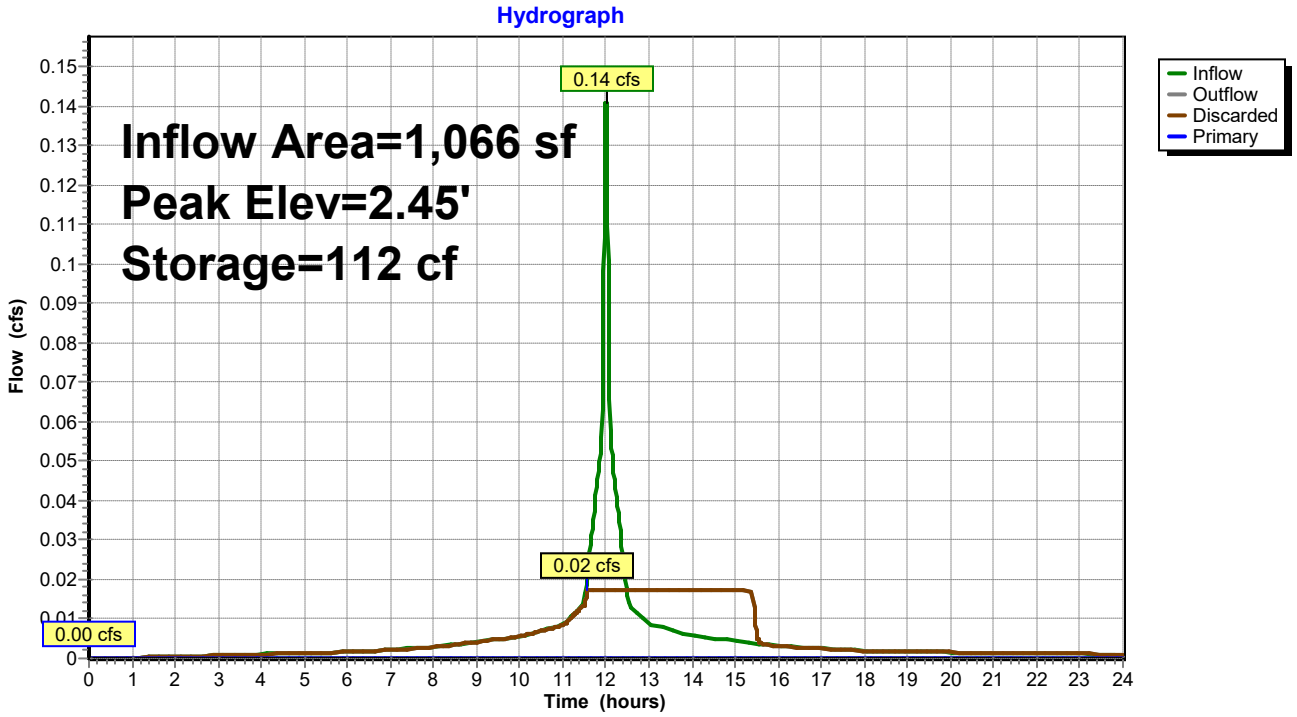
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	67 cf	**5.67'W x 8.00'L x 3.67'H Field A** 166 cf Overall x 40.0% Voids
#2	1.00'	105 cf	**3.50'W x 4.00'L x 3.75'H Prismatoid** x 2 Inside #3 110 cf Overall - 0.5" Wall Thickness = 105 cf
#3	0.00'	51 cf	**4.50'W x 5.00'L x 5.25'H Prismatoid** x 2 236 cf Overall - 110 cf Embedded = 127 cf x 40.0% Voids
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	4.25'	**5.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	0.00'	**8.210 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.56 hrs HW=0.05' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 30P: 300 GAL DRY WELL



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: NW SITE Runoff Area=6,063 sf 73.94% Impervious Runoff Depth>4.24"
Flow Length=44' Slope=0.0050 '/' Tc=0.5 min CN=83 Runoff=0.83 cfs 2,142 cf

Subcatchment 2S: SE SITE Runoff Area=5,168 sf 15.11% Impervious Runoff Depth>1.07"
Flow Length=78' Tc=2.0 min UI Adjusted CN=48 Runoff=0.13 cfs 463 cf

Subcatchment 10S: NW SITE Runoff Area=6,222 sf 42.74% Impervious Runoff Depth>2.93"
Flow Length=44' Slope=0.0050 '/' Tc=0.6 min CN=70 Runoff=0.59 cfs 1,521 cf

Subcatchment 20S: SE SITE Runoff Area=3,968 sf 19.68% Impervious Runoff Depth>1.30"
Flow Length=78' Tc=2.0 min CN=51 Runoff=0.13 cfs 429 cf

Subcatchment 30S: ROOF Runoff Area=670 sf 100.00% Impervious Runoff Depth>5.92"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.11 cfs 331 cf

Subcatchment 31S: REAR GARAGE ROOF Runoff Area=396 sf 100.00% Impervious Runoff Depth>5.92"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.07 cfs 195 cf

Reach 1R: CB @ PARSONS ST Inflow=0.83 cfs 2,142 cf
Outflow=0.83 cfs 2,142 cf

Reach 2R: WESTERN ABUTTERS Inflow=0.13 cfs 463 cf
Outflow=0.13 cfs 463 cf

Reach 3R: TOTAL Inflow=0.93 cfs 2,605 cf
Outflow=0.93 cfs 2,605 cf

Reach 10R: CB @ PARSONS ST Inflow=0.59 cfs 1,521 cf
Outflow=0.59 cfs 1,521 cf

Reach 20R: WESTERN ABUTTERS Inflow=0.13 cfs 429 cf
Outflow=0.13 cfs 429 cf

Reach 30R: TOTAL Inflow=0.71 cfs 1,949 cf
Outflow=0.71 cfs 1,949 cf

Pond 30P: 300 GAL DRY WELL Peak Elev=3.37' Storage=160 cf Inflow=0.18 cfs 526 cf
Discarded=0.02 cfs 526 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 526 cf

Summary for Subcatchment 1S: NW SITE

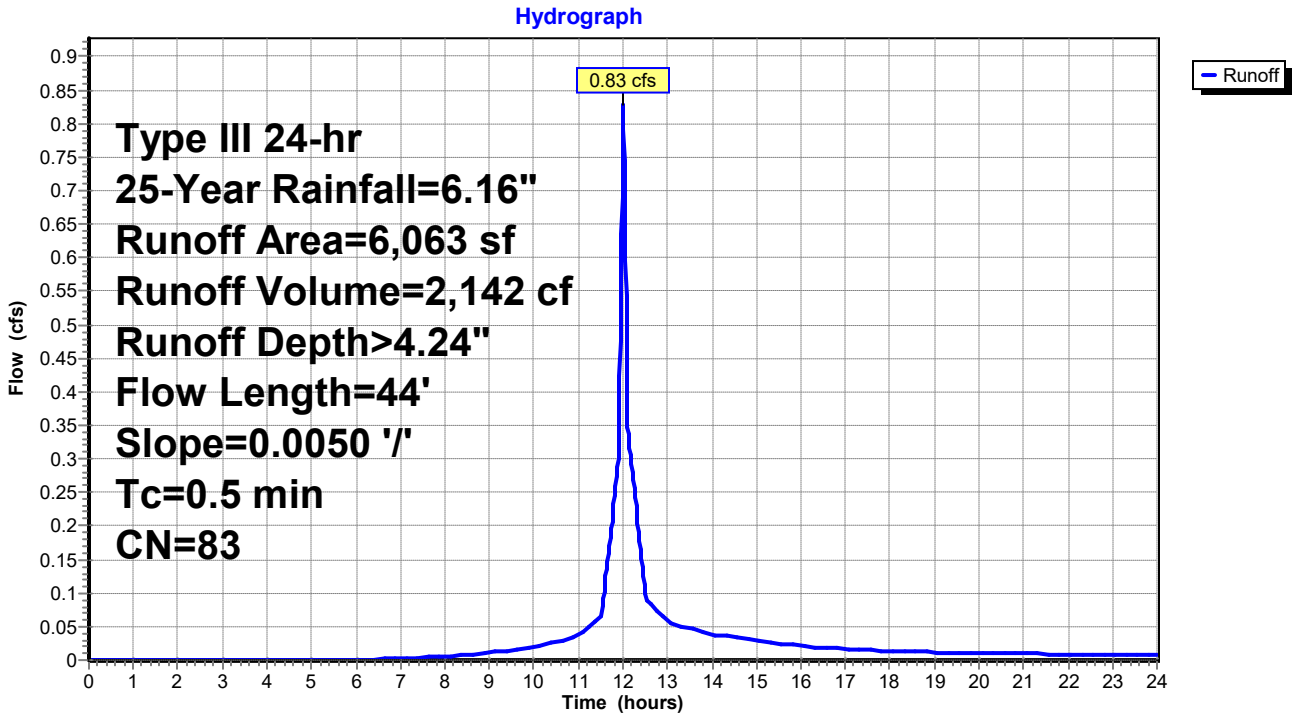
Runoff = 0.83 cfs @ 12.01 hrs, Volume= 2,142 cf, Depth> 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.16"

	Area (sf)	CN	Description
	1,530	39	>75% Grass cover, Good, HSG A
	1,874	98	Roofs, HSG A
	2,609	98	Paved parking, HSG A
*	50	76	Brick
	6,063	83	Weighted Average
	1,580		26.06% Pervious Area
	4,483		73.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	44	0.0050	1.44		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps

Subcatchment 1S: NW SITE



Summary for Subcatchment 2S: SE SITE

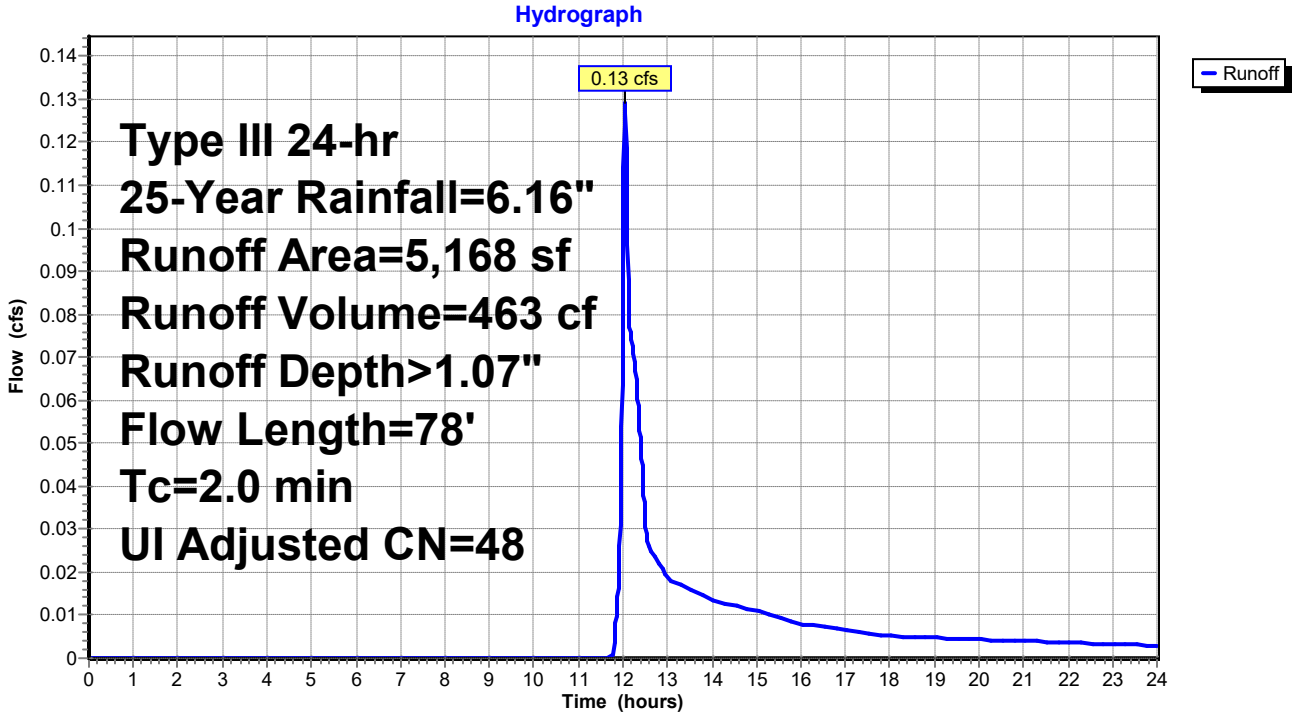
Runoff = 0.13 cfs @ 12.05 hrs, Volume= 463 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.16"

	Area (sf)	CN	Adj	Description
	4,303	39		>75% Grass cover, Good, HSG A
	765	98		Roofs, HSG A
	16	98		Unconnected pavement, HSG A
*	84	76		Brick
	5,168	49	48	Weighted Average, UI Adjusted
	4,387			84.89% Pervious Area
	781			15.11% Impervious Area
	16			2.05% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 2S: SE SITE



Summary for Subcatchment 10S: NW SITE

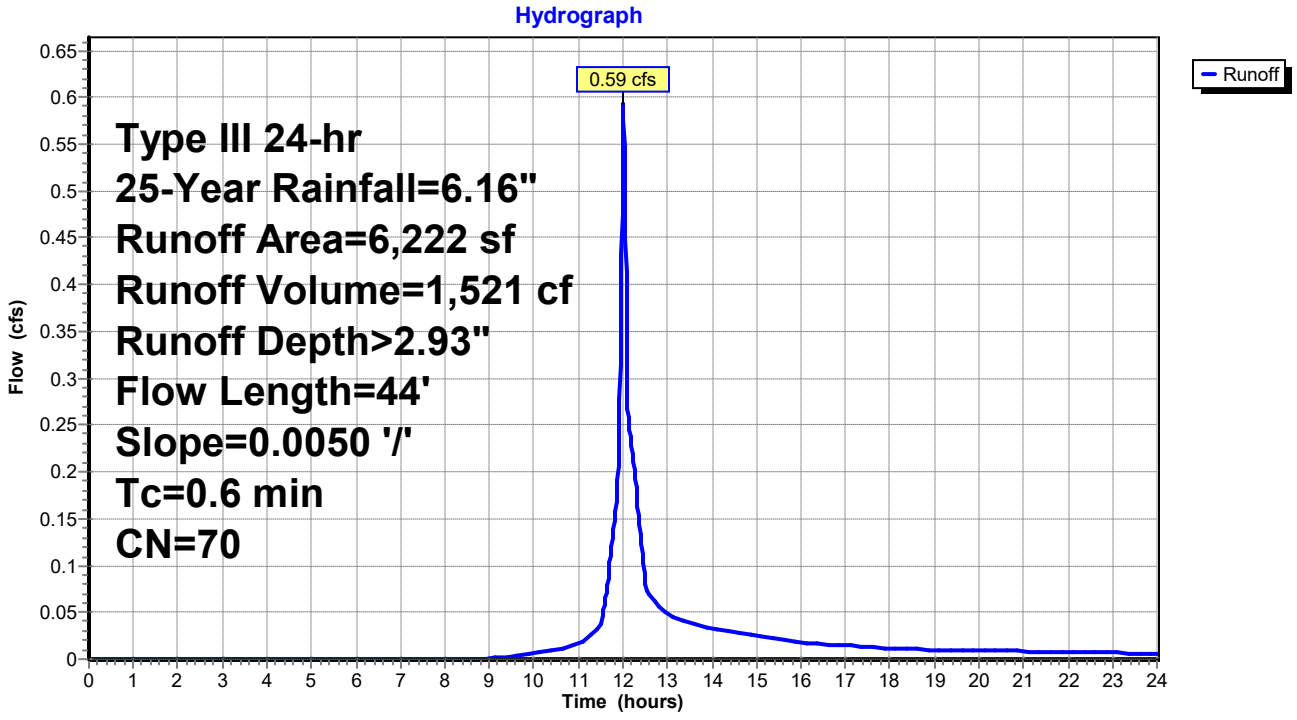
Runoff = 0.59 cfs @ 12.01 hrs, Volume= 1,521 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.16"

	Area (sf)	CN	Description
	1,295	39	>75% Grass cover, Good, HSG A
*	2,218	55	Perm Pavers/ Perm Bit.
	2,271	98	Roofs, HSG A
	388	98	Unconnected pavement, HSG A
*	50	76	Brick
	6,222	70	Weighted Average
	3,563		57.26% Pervious Area
	2,659		42.74% Impervious Area
	388		14.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	44	0.0050	1.14		**Shallow Concentrated Flow, Permeable Pavement** Unpaved Kv= 16.1 fps

Subcatchment 10S: NW SITE



Summary for Subcatchment 20S: SE SITE

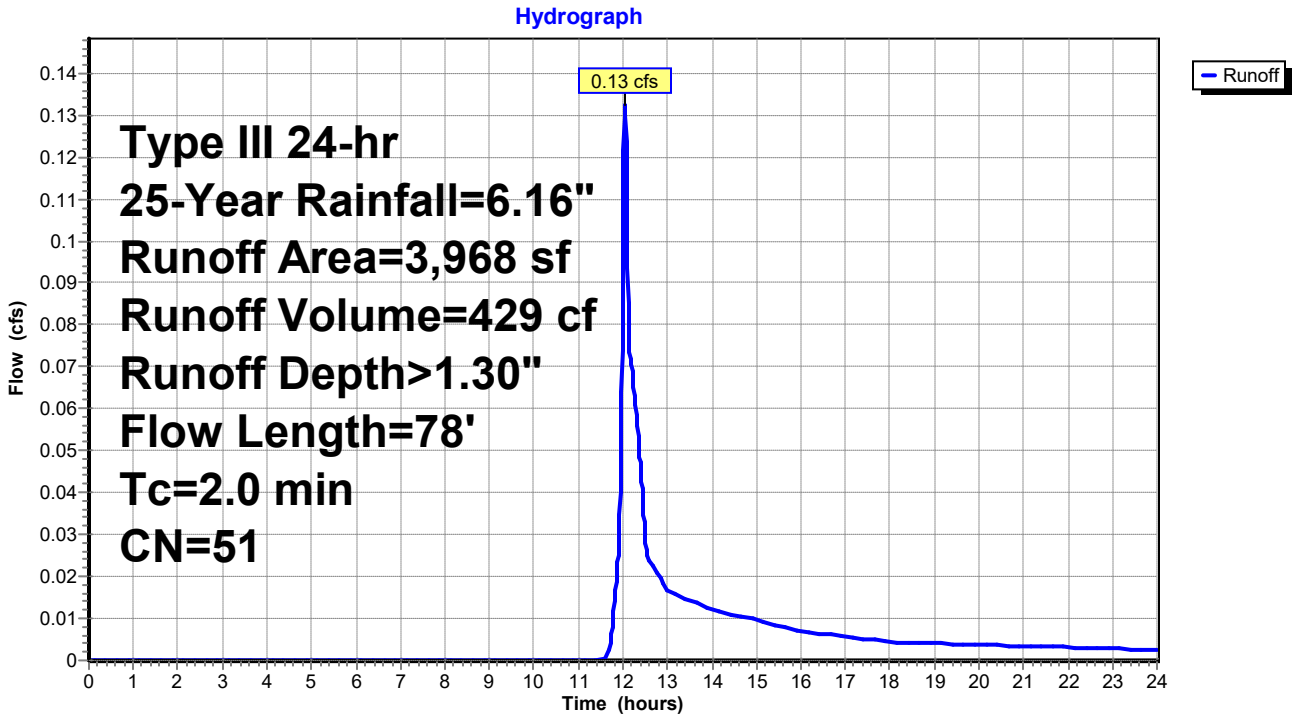
Runoff = 0.13 cfs @ 12.04 hrs, Volume= 429 cf, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.16"

	Area (sf)	CN	Description
	3,095	39	>75% Grass cover, Good, HSG A
*	92	76	Brick
	781	98	Roofs, HSG A
	3,968	51	Weighted Average
	3,187		80.32% Pervious Area
	781		19.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 20S: SE SITE



Summary for Subcatchment 30S: ROOF

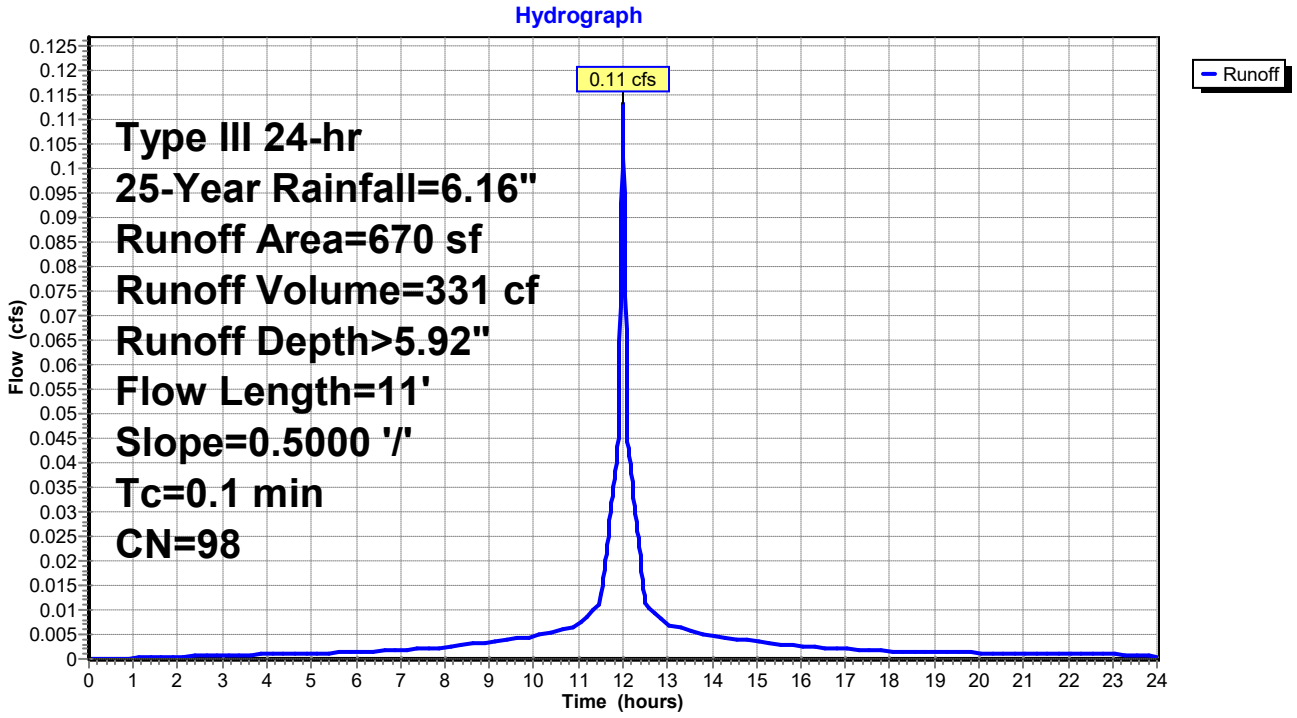
Runoff = 0.11 cfs @ 12.00 hrs, Volume= 331 cf, Depth> 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.16"

Area (sf)	CN	Description
670	98	Roofs, HSG A
670		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 30S: ROOF



Summary for Subcatchment 31S: REAR GARAGE ROOF

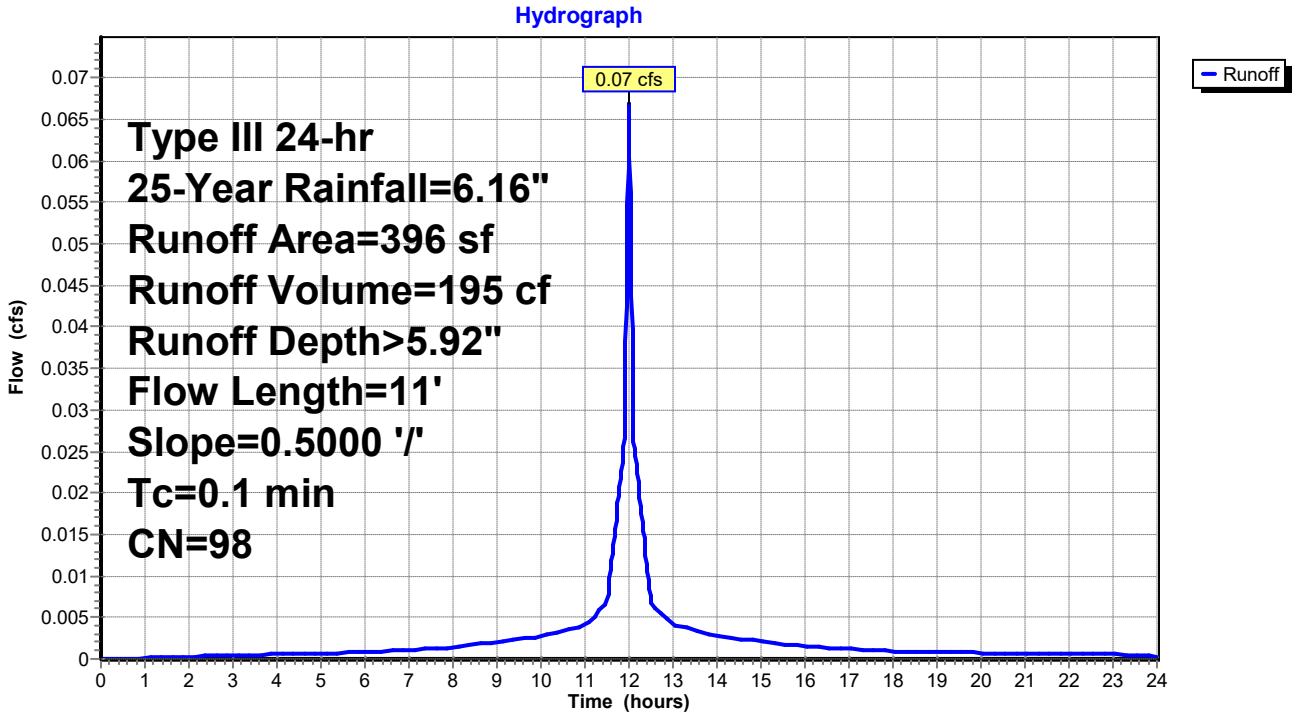
Runoff = 0.07 cfs @ 12.00 hrs, Volume= 195 cf, Depth> 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.16"

Area (sf)	CN	Description
396	98	Roofs, HSG A
396		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 31S: REAR GARAGE ROOF

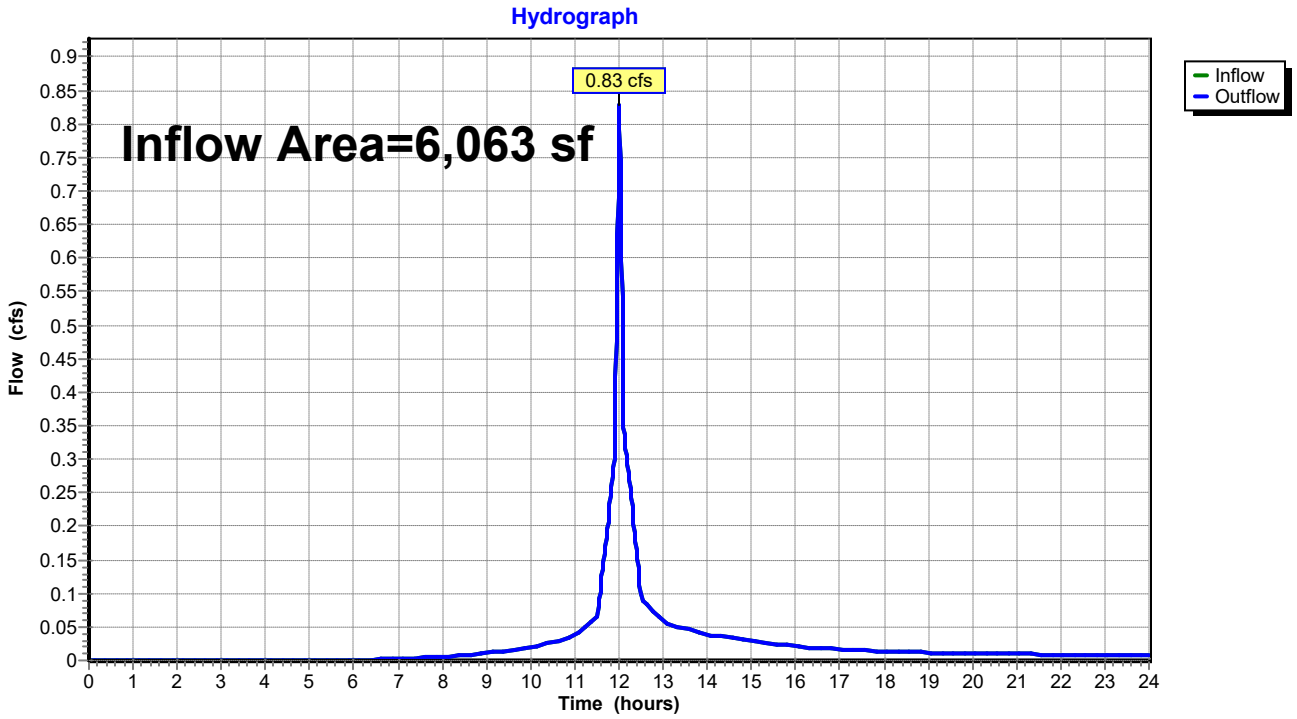


Summary for Reach 1R: CB @ PARSONS ST

Inflow Area = 6,063 sf, 73.94% Impervious, Inflow Depth > 4.24" for 25-Year event
Inflow = 0.83 cfs @ 12.01 hrs, Volume= 2,142 cf
Outflow = 0.83 cfs @ 12.01 hrs, Volume= 2,142 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: CB @ PARSONS ST

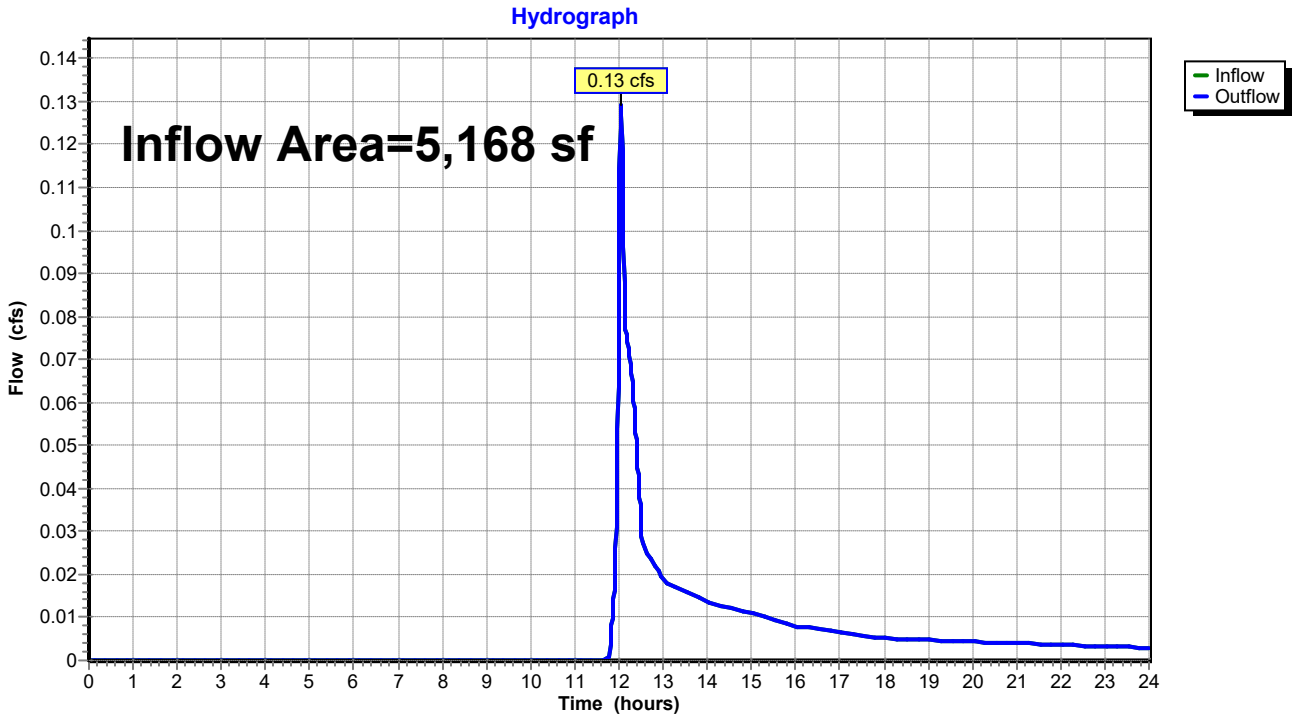


Summary for Reach 2R: WESTERN ABUTTERS

Inflow Area = 5,168 sf, 15.11% Impervious, Inflow Depth > 1.07" for 25-Year event
Inflow = 0.13 cfs @ 12.05 hrs, Volume= 463 cf
Outflow = 0.13 cfs @ 12.05 hrs, Volume= 463 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: WESTERN ABUTTERS

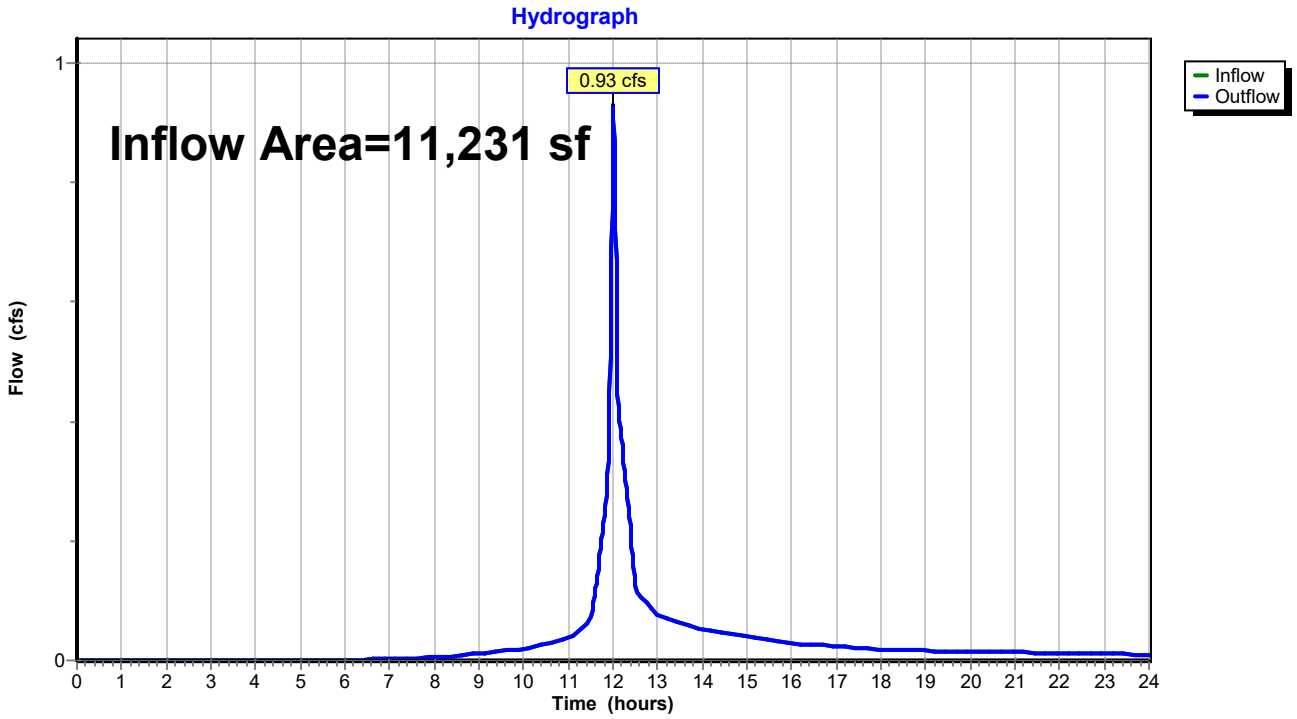


Summary for Reach 3R: TOTAL

Inflow Area = 11,231 sf, 46.87% Impervious, Inflow Depth > 2.78" for 25-Year event
Inflow = 0.93 cfs @ 12.01 hrs, Volume= 2,605 cf
Outflow = 0.93 cfs @ 12.01 hrs, Volume= 2,605 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 3R: TOTAL

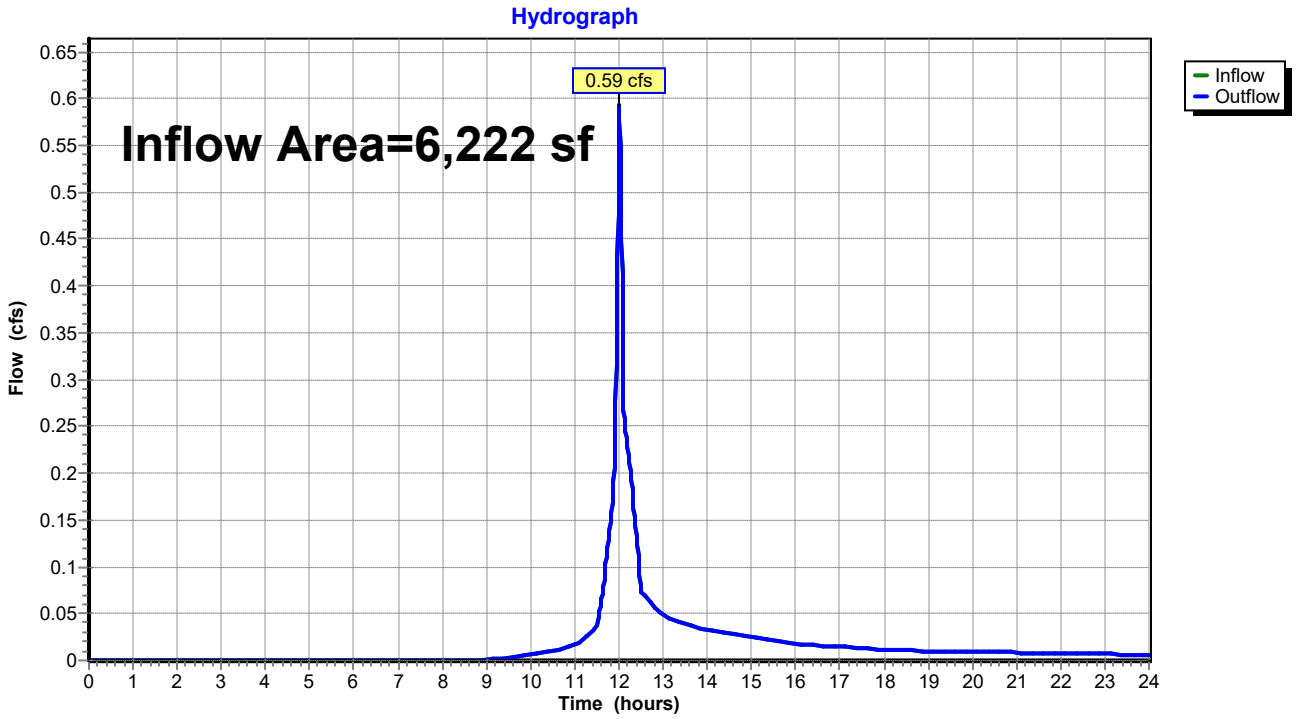


Summary for Reach 10R: CB @ PARSONS ST

Inflow Area = 6,222 sf, 42.74% Impervious, Inflow Depth > 2.93" for 25-Year event
Inflow = 0.59 cfs @ 12.01 hrs, Volume= 1,521 cf
Outflow = 0.59 cfs @ 12.01 hrs, Volume= 1,521 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 10R: CB @ PARSONS ST

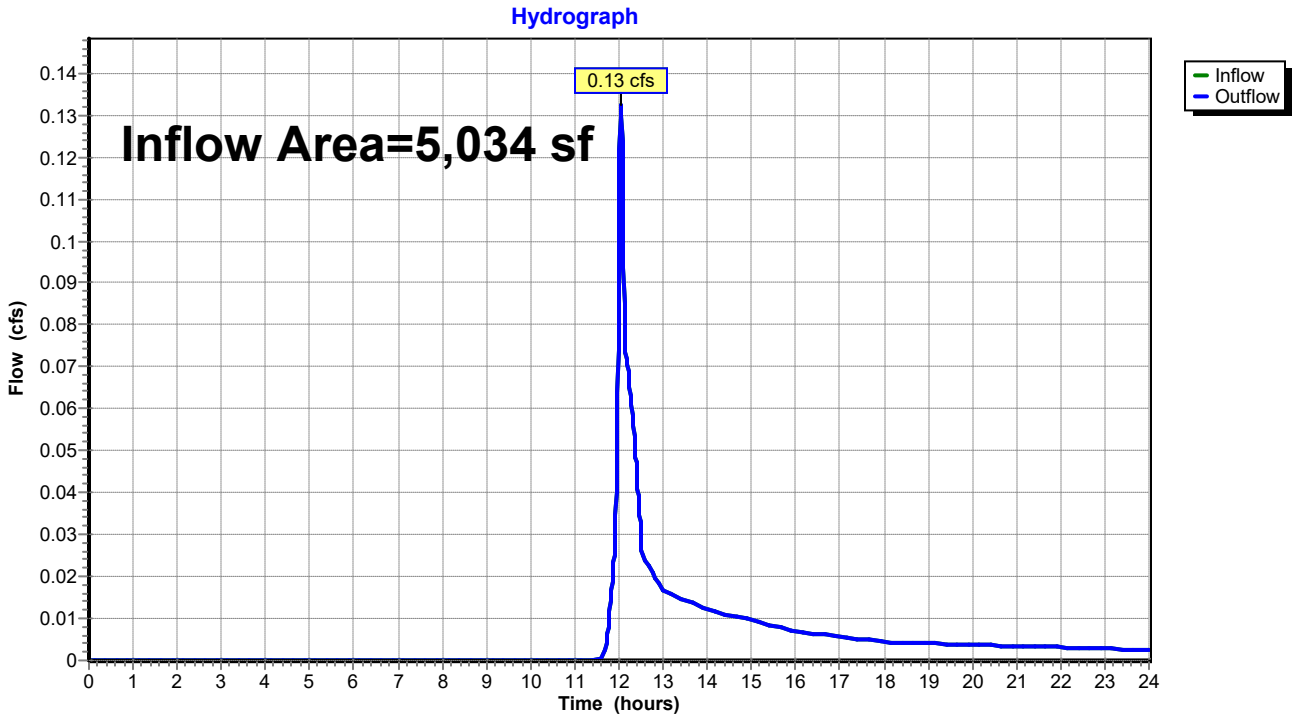


Summary for Reach 20R: WESTERN ABUTTERS

Inflow Area = 5,034 sf, 36.69% Impervious, Inflow Depth > 1.02" for 25-Year event
Inflow = 0.13 cfs @ 12.04 hrs, Volume= 429 cf
Outflow = 0.13 cfs @ 12.04 hrs, Volume= 429 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 20R: WESTERN ABUTTERS

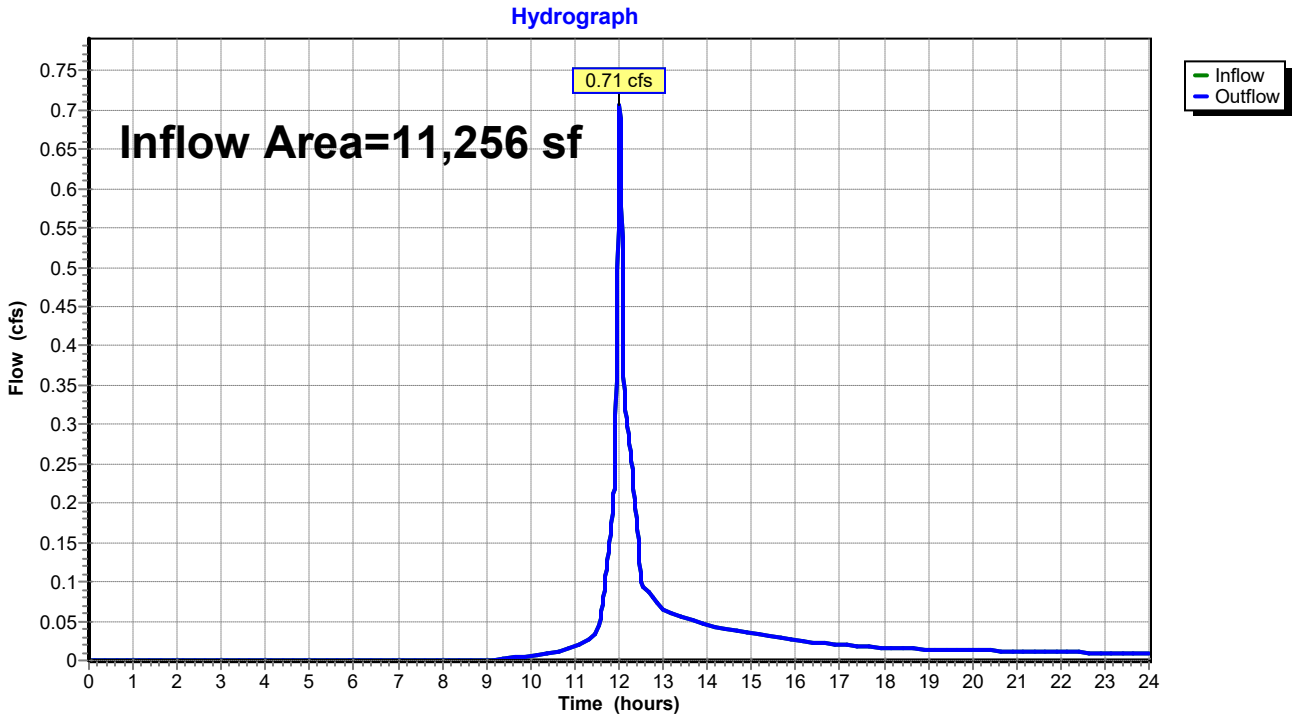


Summary for Reach 30R: TOTAL

Inflow Area = 11,256 sf, 40.03% Impervious, Inflow Depth > 2.08" for 25-Year event
Inflow = 0.71 cfs @ 12.01 hrs, Volume= 1,949 cf
Outflow = 0.71 cfs @ 12.01 hrs, Volume= 1,949 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 30R: TOTAL



Summary for Pond 30P: 300 GAL DRY WELL

Inflow Area = 1,066 sf,100.00% Impervious, Inflow Depth > 5.92" for 25-Year event
Inflow = 0.18 cfs @ 12.00 hrs, Volume= 526 cf
Outflow = 0.02 cfs @ 11.49 hrs, Volume= 526 cf, Atten= 90%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.49 hrs, Volume= 526 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.37' @ 12.56 hrs Surf.Area= 90 sf Storage= 160 cf

Plug-Flow detention time= 57.5 min calculated for 526 cf (100% of inflow)
Center-of-Mass det. time= 57.4 min (796.7 - 739.3)

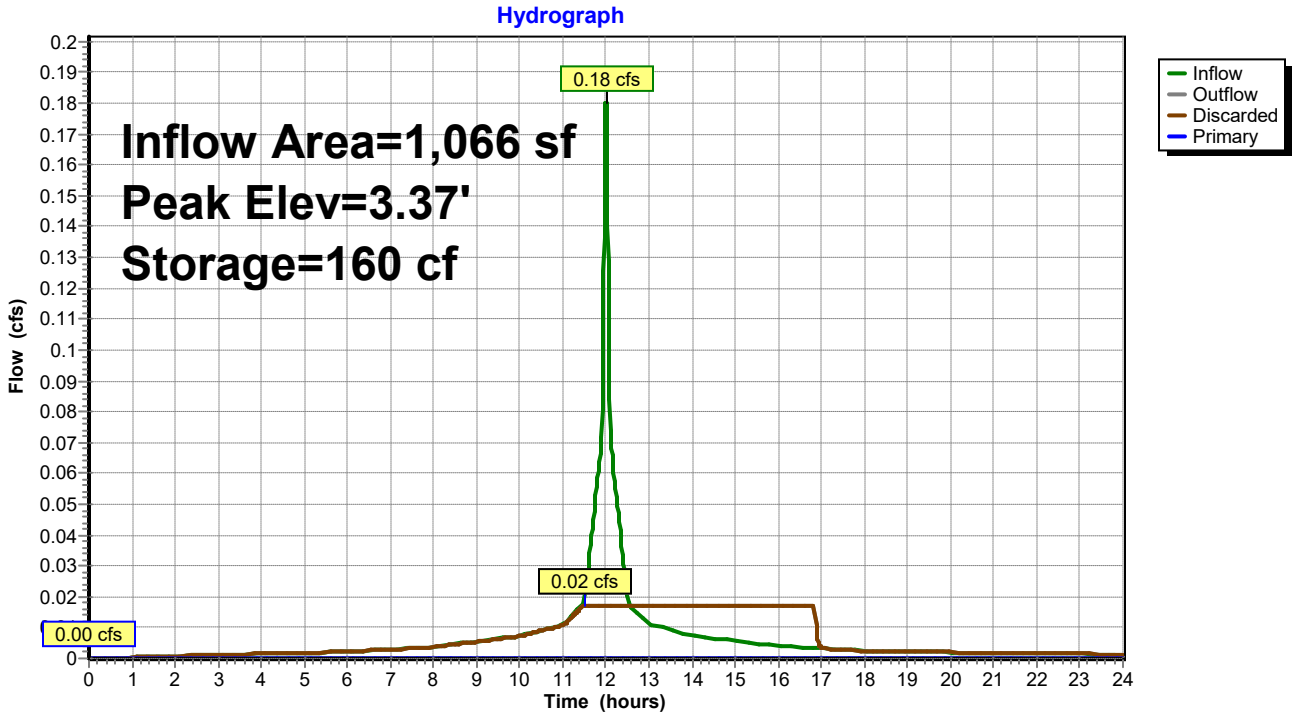
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	67 cf	**5.67'W x 8.00'L x 3.67'H Field A** 166 cf Overall x 40.0% Voids
#2	1.00'	105 cf	**3.50'W x 4.00'L x 3.75'H Prismatoid** x 2 Inside #3 110 cf Overall - 0.5" Wall Thickness = 105 cf
#3	0.00'	51 cf	**4.50'W x 5.00'L x 5.25'H Prismatoid** x 2 236 cf Overall - 110 cf Embedded = 127 cf x 40.0% Voids
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	4.25'	**5.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	0.00'	**8.210 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.49 hrs HW=0.05' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 30P: 300 GAL DRY WELL



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: NW SITE Runoff Area=6,063 sf 73.94% Impervious Runoff Depth>6.88"
Flow Length=44' Slope=0.0050 '/' Tc=0.5 min CN=83 Runoff=1.31 cfs 3,475 cf

Subcatchment 2S: SE SITE Runoff Area=5,168 sf 15.11% Impervious Runoff Depth>2.60"
Flow Length=78' Tc=2.0 min UI Adjusted CN=48 Runoff=0.39 cfs 1,122 cf

Subcatchment 10S: NW SITE Runoff Area=6,222 sf 42.74% Impervious Runoff Depth>5.28"
Flow Length=44' Slope=0.0050 '/' Tc=0.6 min CN=70 Runoff=1.07 cfs 2,739 cf

Subcatchment 20S: SE SITE Runoff Area=3,968 sf 19.68% Impervious Runoff Depth>2.96"
Flow Length=78' Tc=2.0 min CN=51 Runoff=0.35 cfs 979 cf

Subcatchment 30S: ROOF Runoff Area=670 sf 100.00% Impervious Runoff Depth>8.70"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.16 cfs 486 cf

Subcatchment 31S: REAR GARAGE ROOF Runoff Area=396 sf 100.00% Impervious Runoff Depth>8.70"
Flow Length=11' Slope=0.5000 '/' Tc=0.1 min CN=98 Runoff=0.10 cfs 287 cf

Reach 1R: CB @ PARSONS ST Inflow=1.31 cfs 3,475 cf
Outflow=1.31 cfs 3,475 cf

Reach 2R: WESTERN ABUTTERS Inflow=0.39 cfs 1,122 cf
Outflow=0.39 cfs 1,122 cf

Reach 3R: TOTAL Inflow=1.65 cfs 4,597 cf
Outflow=1.65 cfs 4,597 cf

Reach 10R: CB @ PARSONS ST Inflow=1.07 cfs 2,739 cf
Outflow=1.07 cfs 2,739 cf

Reach 20R: WESTERN ABUTTERS Inflow=0.35 cfs 1,058 cf
Outflow=0.35 cfs 1,058 cf

Reach 30R: TOTAL Inflow=1.38 cfs 3,796 cf
Outflow=1.38 cfs 3,796 cf

Pond 30P: 300 GAL DRY WELL Peak Elev=4.42' Storage=202 cf Inflow=0.26 cfs 773 cf
Discarded=0.02 cfs 694 cf Primary=0.08 cfs 78 cf Outflow=0.10 cfs 773 cf

Summary for Subcatchment 1S: NW SITE

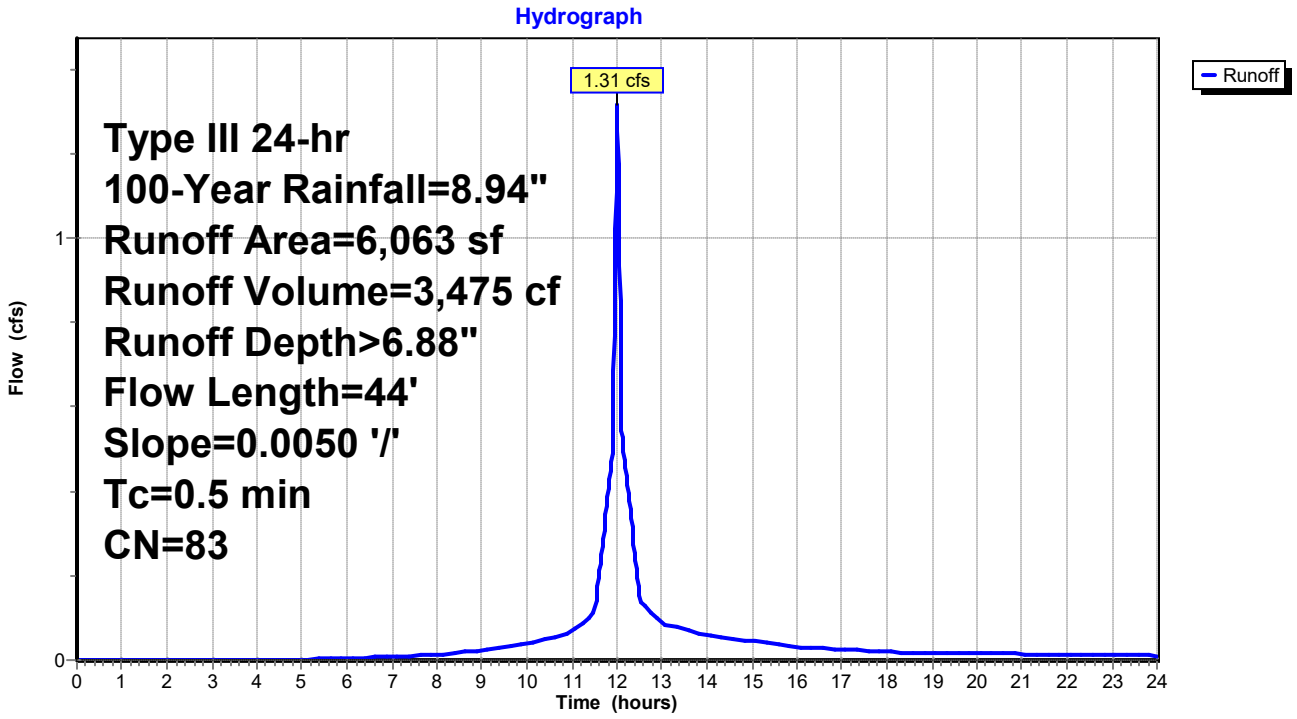
Runoff = 1.31 cfs @ 12.01 hrs, Volume= 3,475 cf, Depth> 6.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.94"

	Area (sf)	CN	Description
	1,530	39	>75% Grass cover, Good, HSG A
	1,874	98	Roofs, HSG A
	2,609	98	Paved parking, HSG A
*	50	76	Brick
	6,063	83	Weighted Average
	1,580		26.06% Pervious Area
	4,483		73.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	44	0.0050	1.44		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps

Subcatchment 1S: NW SITE



Summary for Subcatchment 2S: SE SITE

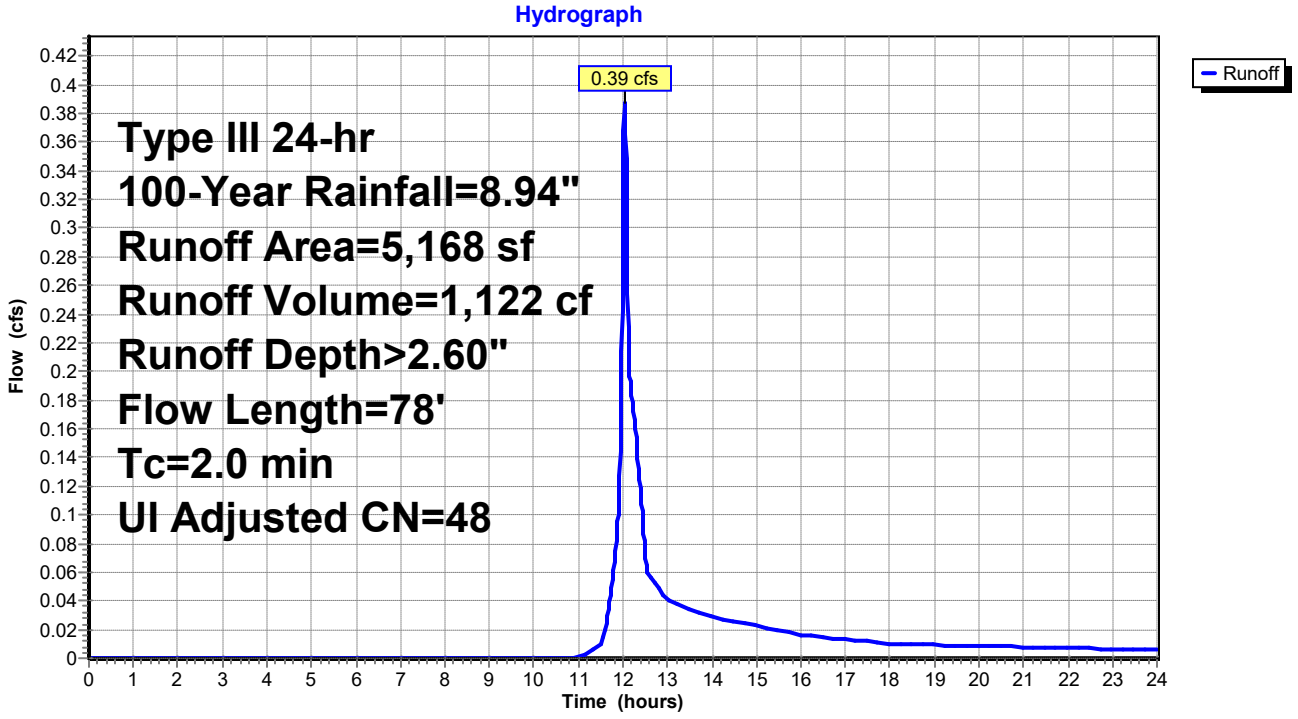
Runoff = 0.39 cfs @ 12.04 hrs, Volume= 1,122 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.94"

	Area (sf)	CN	Adj	Description
	4,303	39		>75% Grass cover, Good, HSG A
	765	98		Roofs, HSG A
	16	98		Unconnected pavement, HSG A
*	84	76		Brick
	5,168	49	48	Weighted Average, UI Adjusted
	4,387			84.89% Pervious Area
	781			15.11% Impervious Area
	16			2.05% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 2S: SE SITE



Summary for Subcatchment 10S: NW SITE

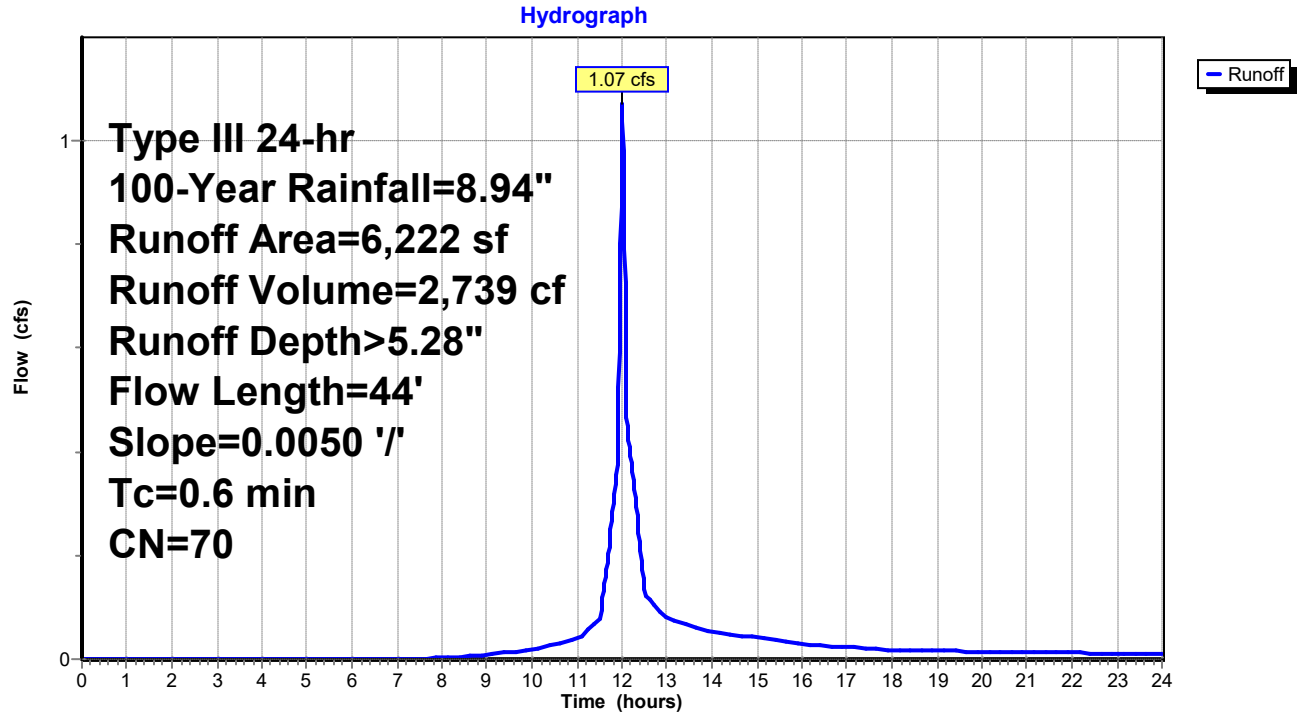
Runoff = 1.07 cfs @ 12.01 hrs, Volume= 2,739 cf, Depth> 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.94"

	Area (sf)	CN	Description
	1,295	39	>75% Grass cover, Good, HSG A
*	2,218	55	Perm Pavers/ Perm Bit.
	2,271	98	Roofs, HSG A
	388	98	Unconnected pavement, HSG A
*	50	76	Brick
	6,222	70	Weighted Average
	3,563		57.26% Pervious Area
	2,659		42.74% Impervious Area
	388		14.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	44	0.0050	1.14		**Shallow Concentrated Flow, Permeable Pavement** Unpaved Kv= 16.1 fps

Subcatchment 10S: NW SITE



Summary for Subcatchment 20S: SE SITE

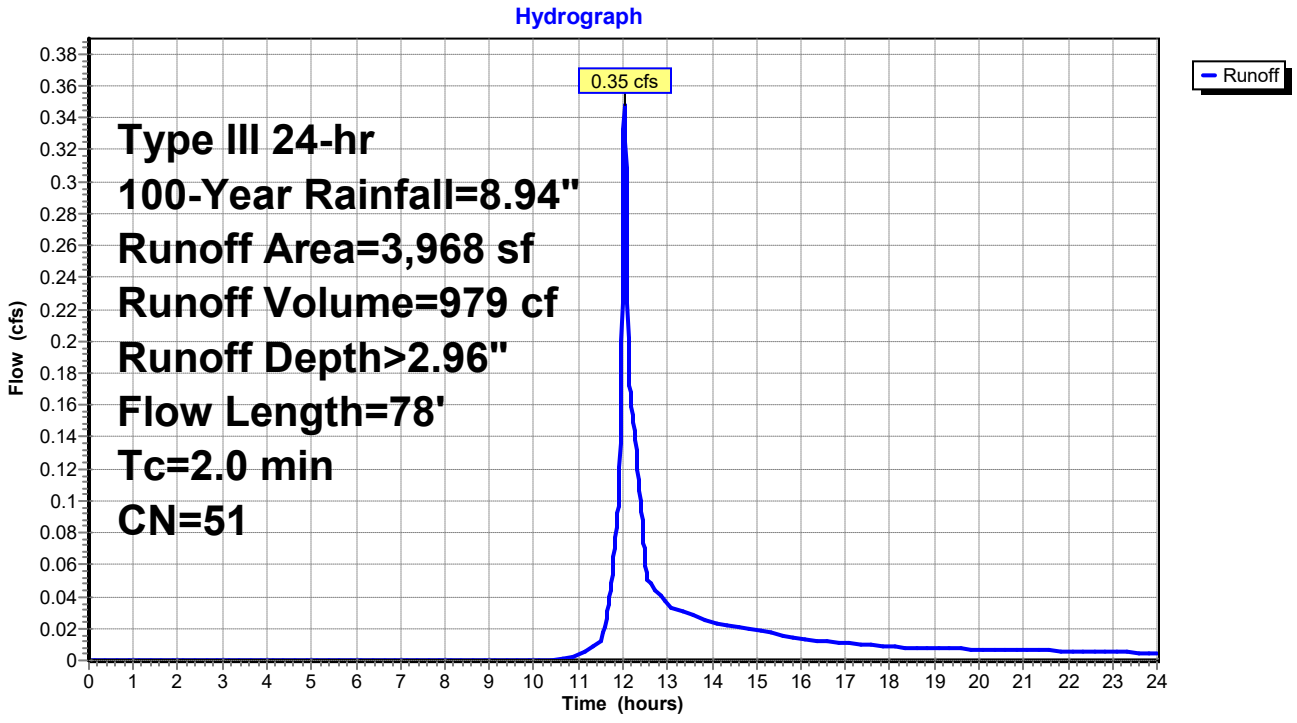
Runoff = 0.35 cfs @ 12.04 hrs, Volume= 979 cf, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.94"

	Area (sf)	CN	Description
	3,095	39	>75% Grass cover, Good, HSG A
*	92	76	Brick
	781	98	Roofs, HSG A
	3,968	51	Weighted Average
	3,187		80.32% Pervious Area
	781		19.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	71	0.0070	0.59		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
0.0	7	1.0000	3.83		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"
2.0	78	Total			

Subcatchment 20S: SE SITE



Summary for Subcatchment 30S: ROOF

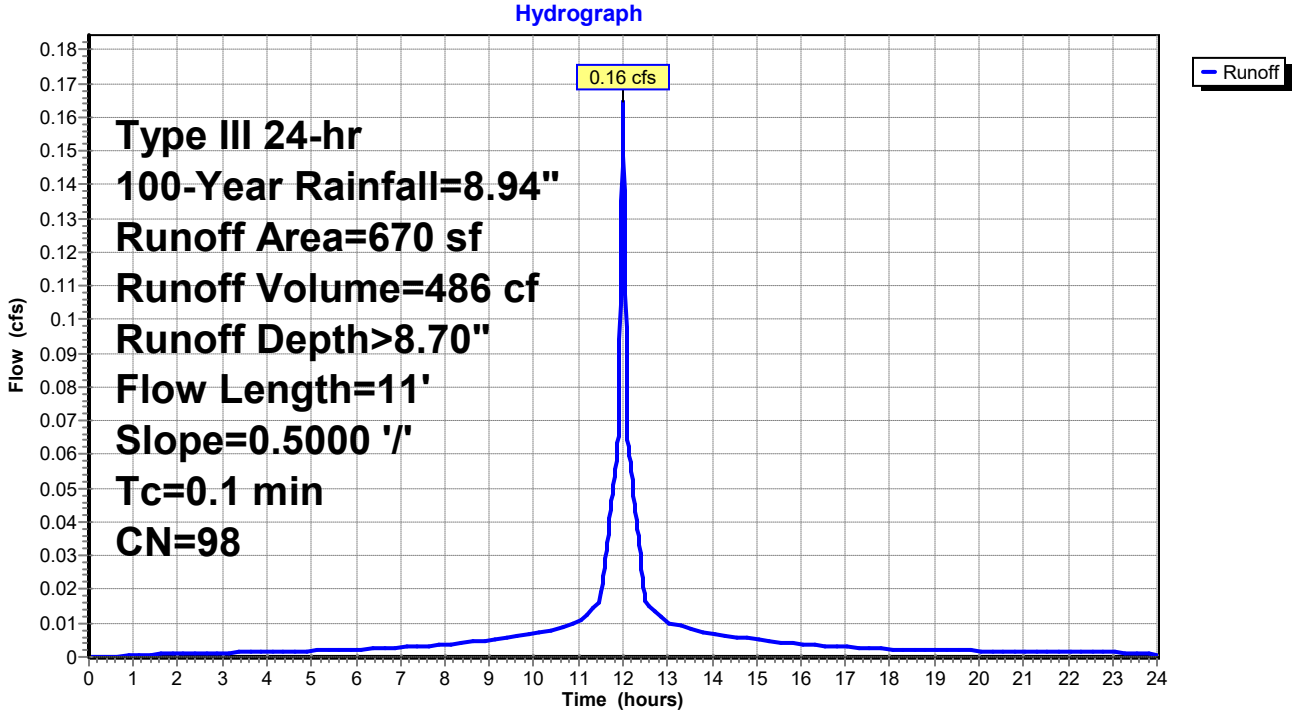
Runoff = 0.16 cfs @ 12.00 hrs, Volume= 486 cf, Depth> 8.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (sf)	CN	Description
670	98	Roofs, HSG A
670		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 30S: ROOF



Summary for Subcatchment 31S: REAR GARAGE ROOF

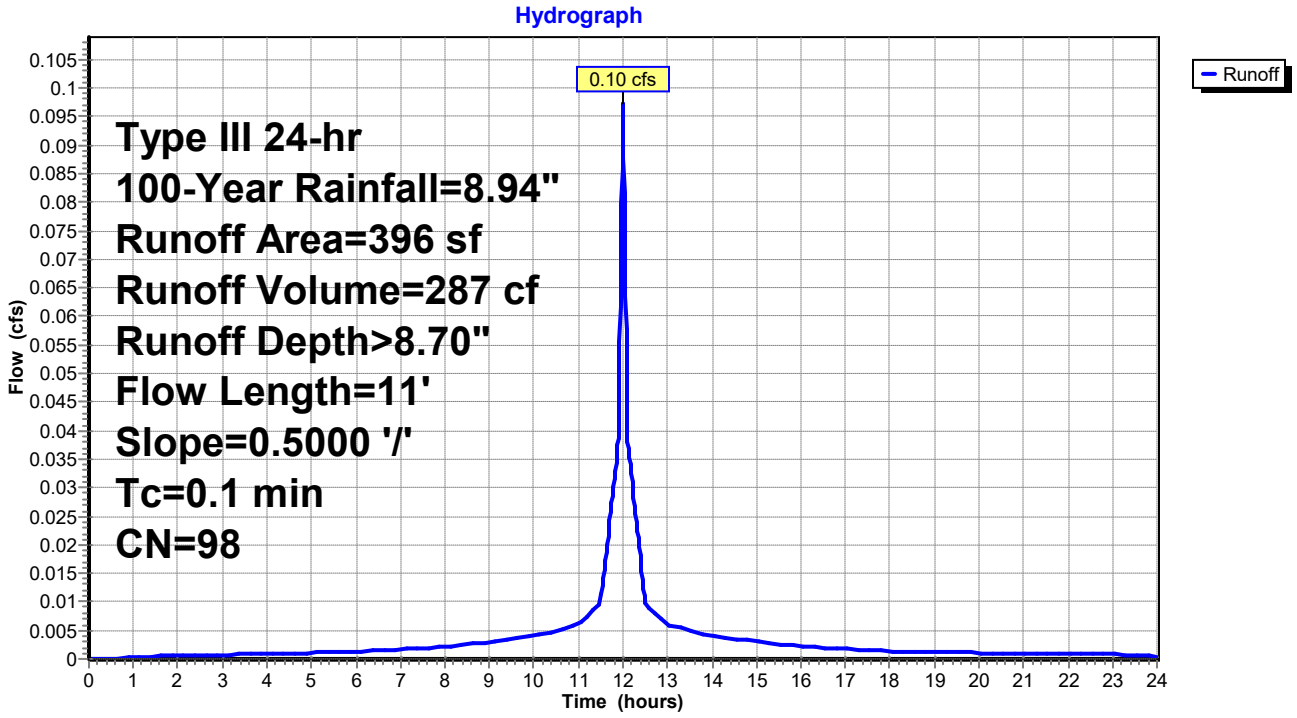
Runoff = 0.10 cfs @ 12.00 hrs, Volume= 287 cf, Depth> 8.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (sf)	CN	Description
396	98	Roofs, HSG A
396		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	11	0.5000	3.18		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 3.15"

Subcatchment 31S: REAR GARAGE ROOF

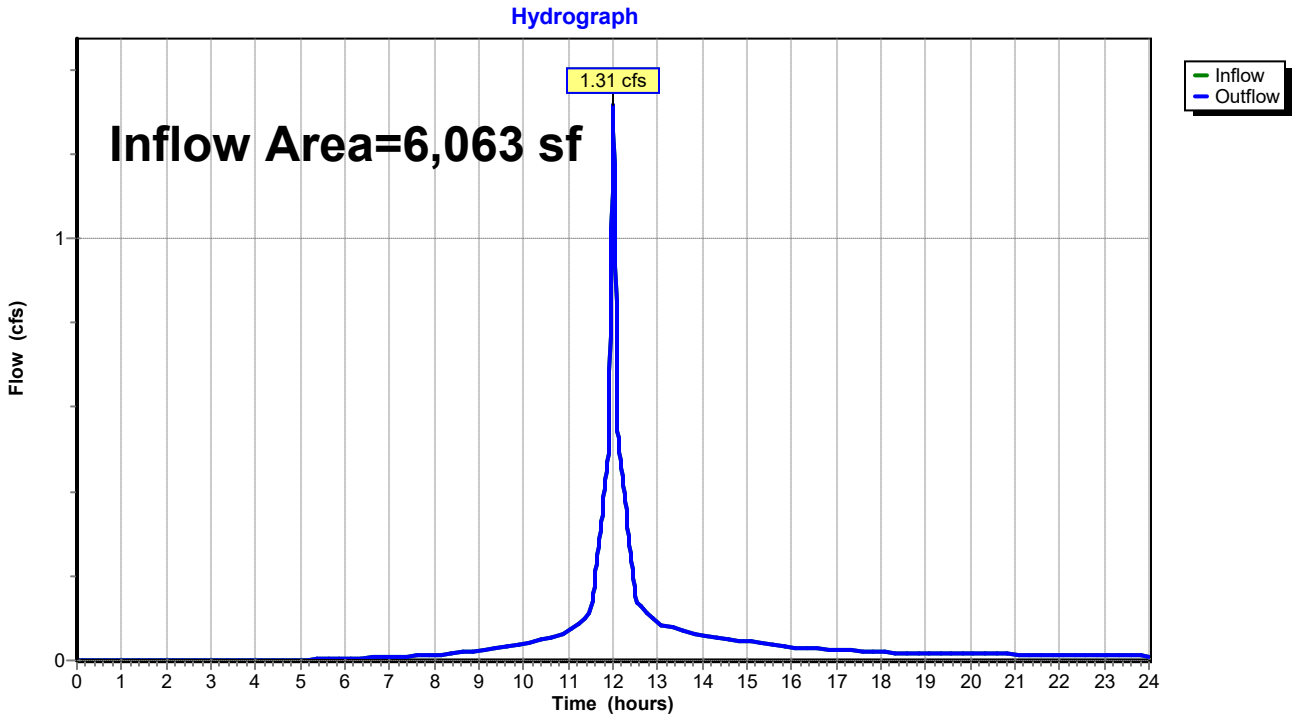


Summary for Reach 1R: CB @ PARSONS ST

Inflow Area = 6,063 sf, 73.94% Impervious, Inflow Depth > 6.88" for 100-Year event
Inflow = 1.31 cfs @ 12.01 hrs, Volume= 3,475 cf
Outflow = 1.31 cfs @ 12.01 hrs, Volume= 3,475 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: CB @ PARSONS ST

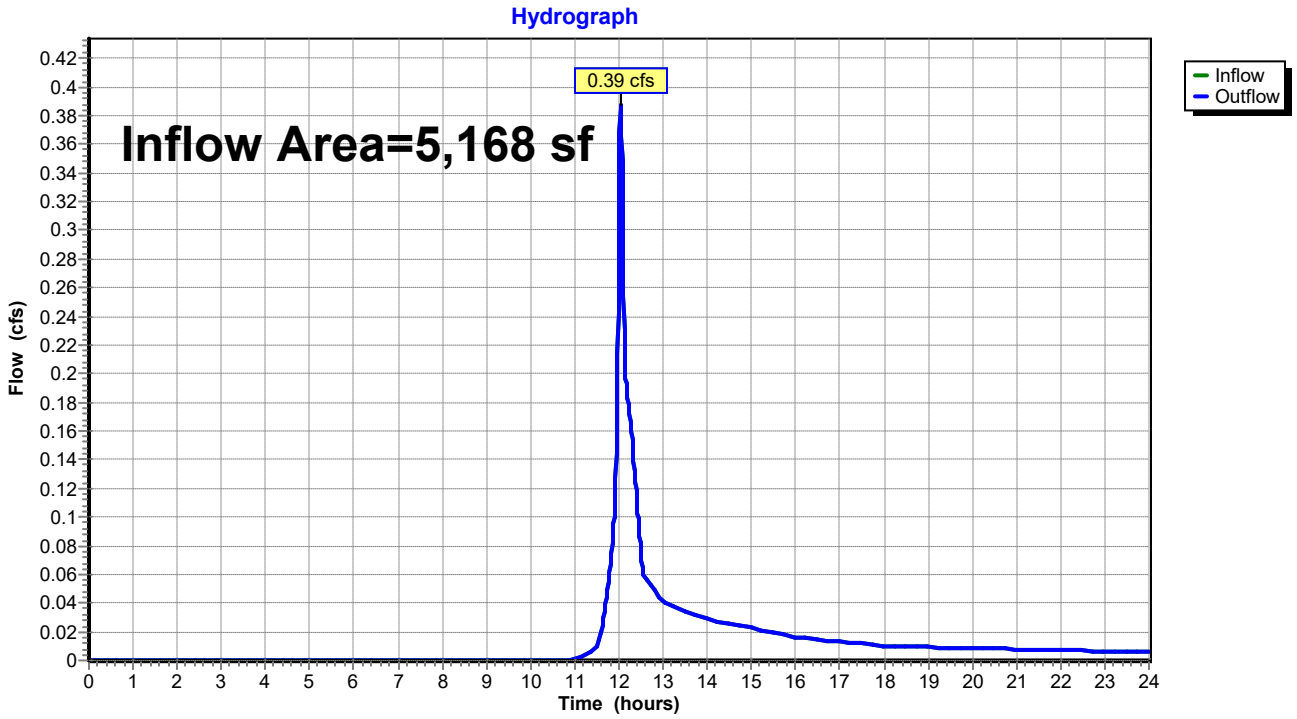


Summary for Reach 2R: WESTERN ABUTTERS

Inflow Area = 5,168 sf, 15.11% Impervious, Inflow Depth > 2.60" for 100-Year event
Inflow = 0.39 cfs @ 12.04 hrs, Volume= 1,122 cf
Outflow = 0.39 cfs @ 12.04 hrs, Volume= 1,122 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: WESTERN ABUTTERS

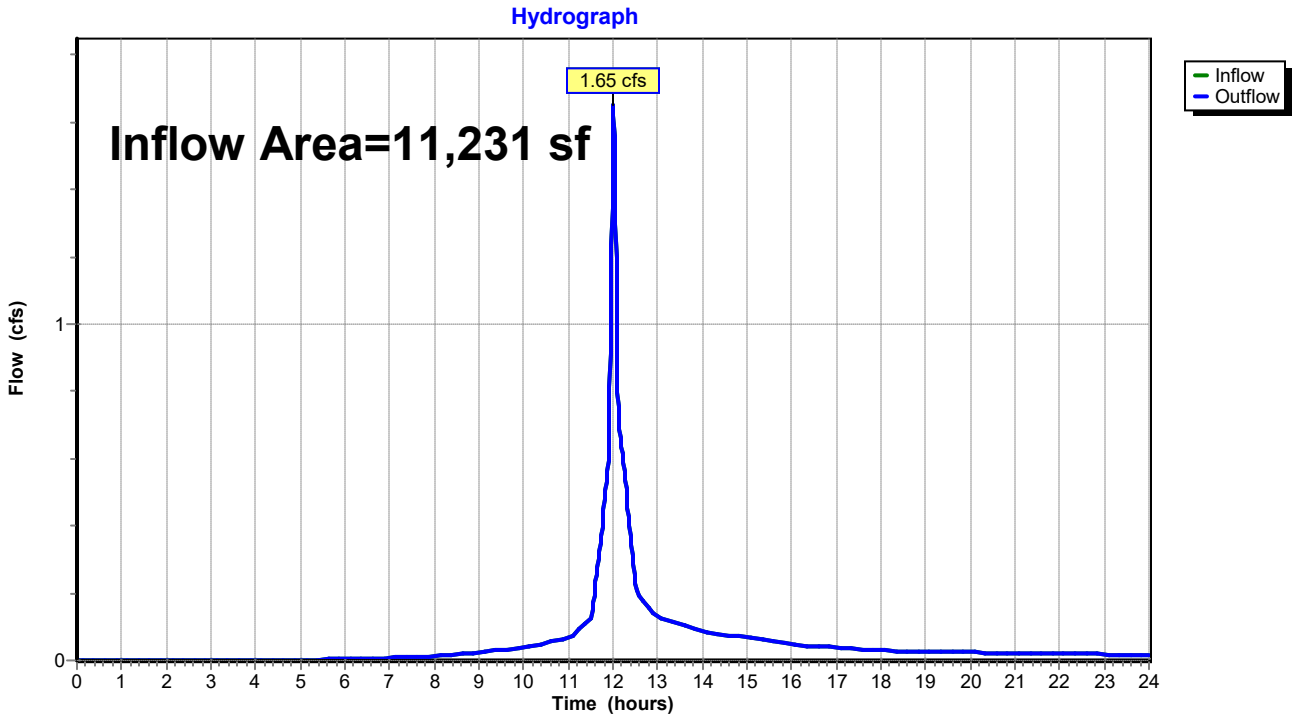


Summary for Reach 3R: TOTAL

Inflow Area = 11,231 sf, 46.87% Impervious, Inflow Depth > 4.91" for 100-Year event
Inflow = 1.65 cfs @ 12.01 hrs, Volume= 4,597 cf
Outflow = 1.65 cfs @ 12.01 hrs, Volume= 4,597 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 3R: TOTAL

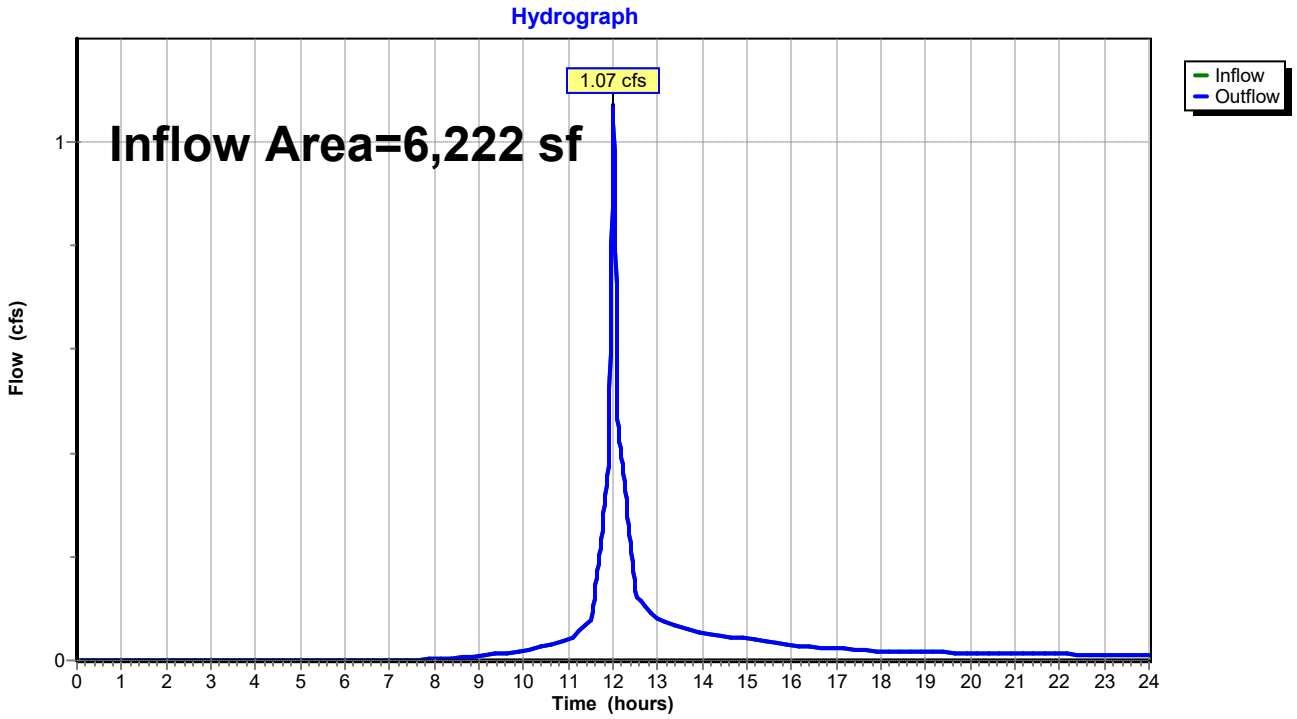


Summary for Reach 10R: CB @ PARSONS ST

Inflow Area = 6,222 sf, 42.74% Impervious, Inflow Depth > 5.28" for 100-Year event
Inflow = 1.07 cfs @ 12.01 hrs, Volume= 2,739 cf
Outflow = 1.07 cfs @ 12.01 hrs, Volume= 2,739 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 10R: CB @ PARSONS ST

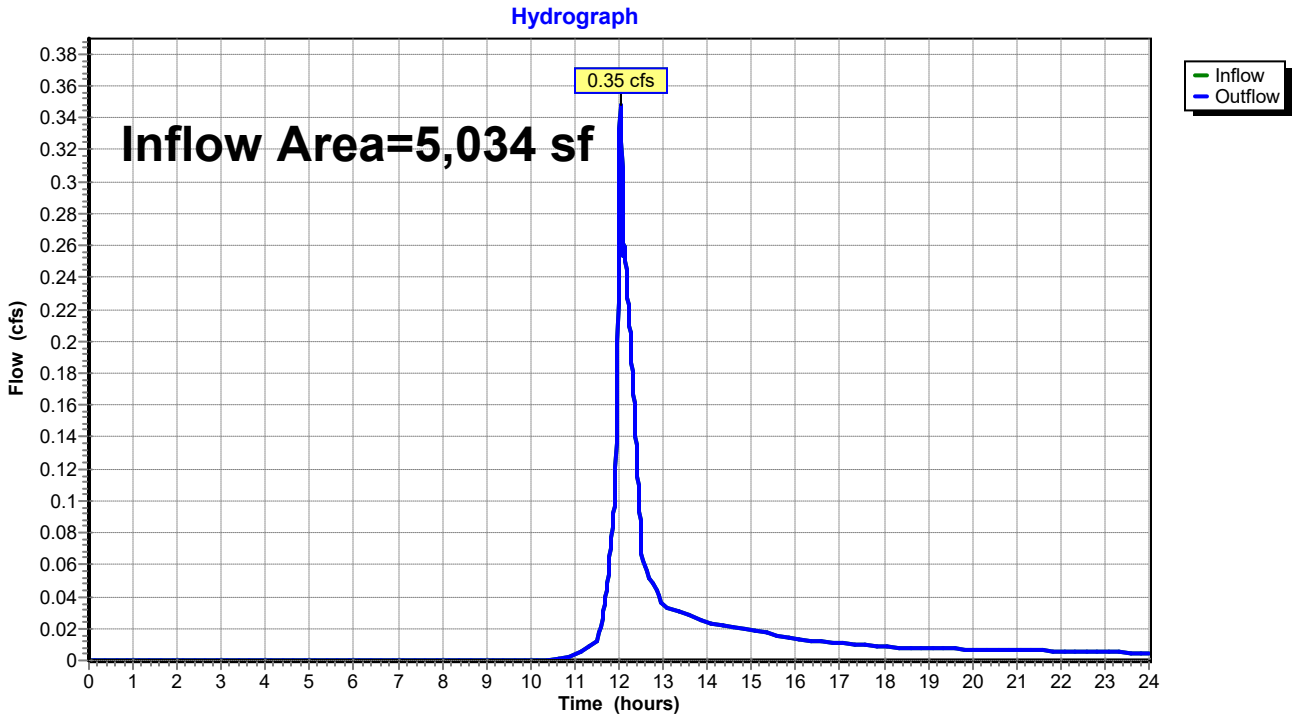


Summary for Reach 20R: WESTERN ABUTTERS

Inflow Area = 5,034 sf, 36.69% Impervious, Inflow Depth > 2.52" for 100-Year event
Inflow = 0.35 cfs @ 12.04 hrs, Volume= 1,058 cf
Outflow = 0.35 cfs @ 12.04 hrs, Volume= 1,058 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 20R: WESTERN ABUTTERS

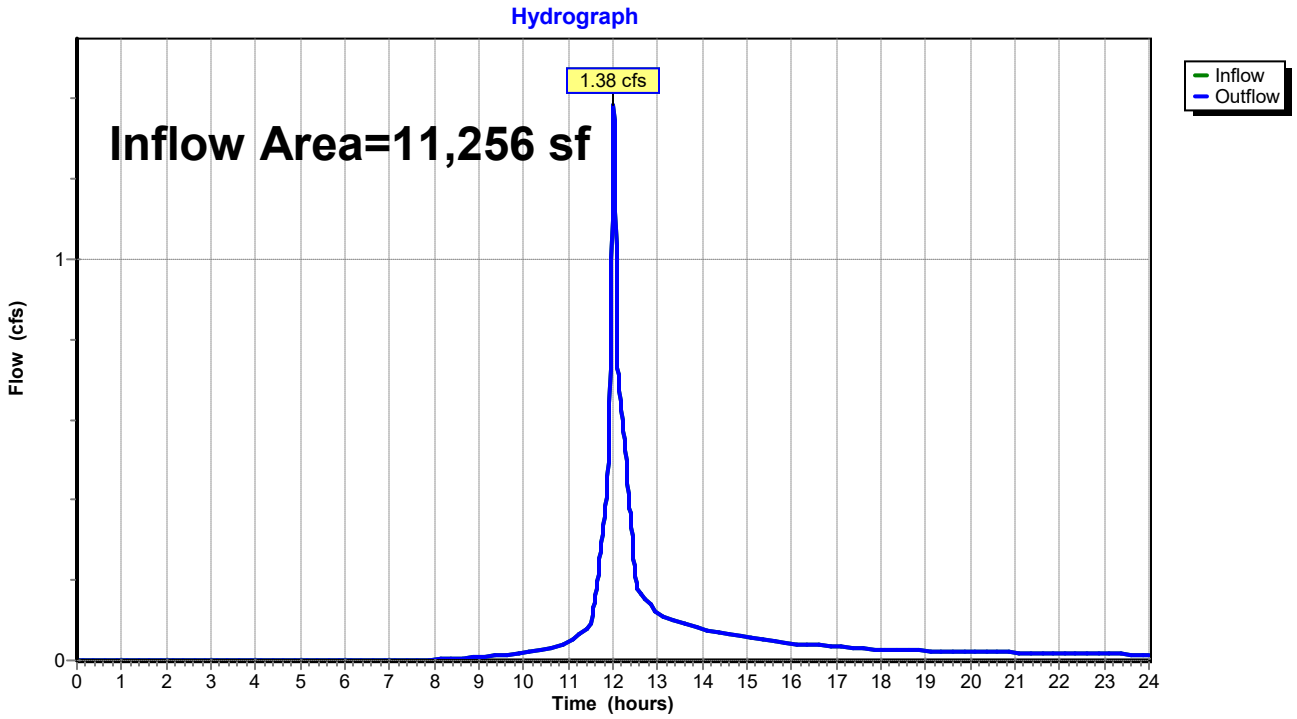


Summary for Reach 30R: TOTAL

Inflow Area = 11,256 sf, 40.03% Impervious, Inflow Depth > 4.05" for 100-Year event
Inflow = 1.38 cfs @ 12.01 hrs, Volume= 3,796 cf
Outflow = 1.38 cfs @ 12.01 hrs, Volume= 3,796 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 30R: TOTAL



Summary for Pond 30P: 300 GAL DRY WELL

Inflow Area = 1,066 sf,100.00% Impervious, Inflow Depth > 8.70" for 100-Year event
Inflow = 0.26 cfs @ 12.00 hrs, Volume= 773 cf
Outflow = 0.10 cfs @ 12.15 hrs, Volume= 773 cf, Atten= 64%, Lag= 8.8 min
Discarded = 0.02 cfs @ 11.09 hrs, Volume= 694 cf
Primary = 0.08 cfs @ 12.15 hrs, Volume= 78 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 4.42' @ 12.15 hrs Surf.Area= 90 sf Storage= 202 cf

Plug-Flow detention time= 68.8 min calculated for 772 cf (100% of inflow)
Center-of-Mass det. time= 68.6 min (803.0 - 734.4)

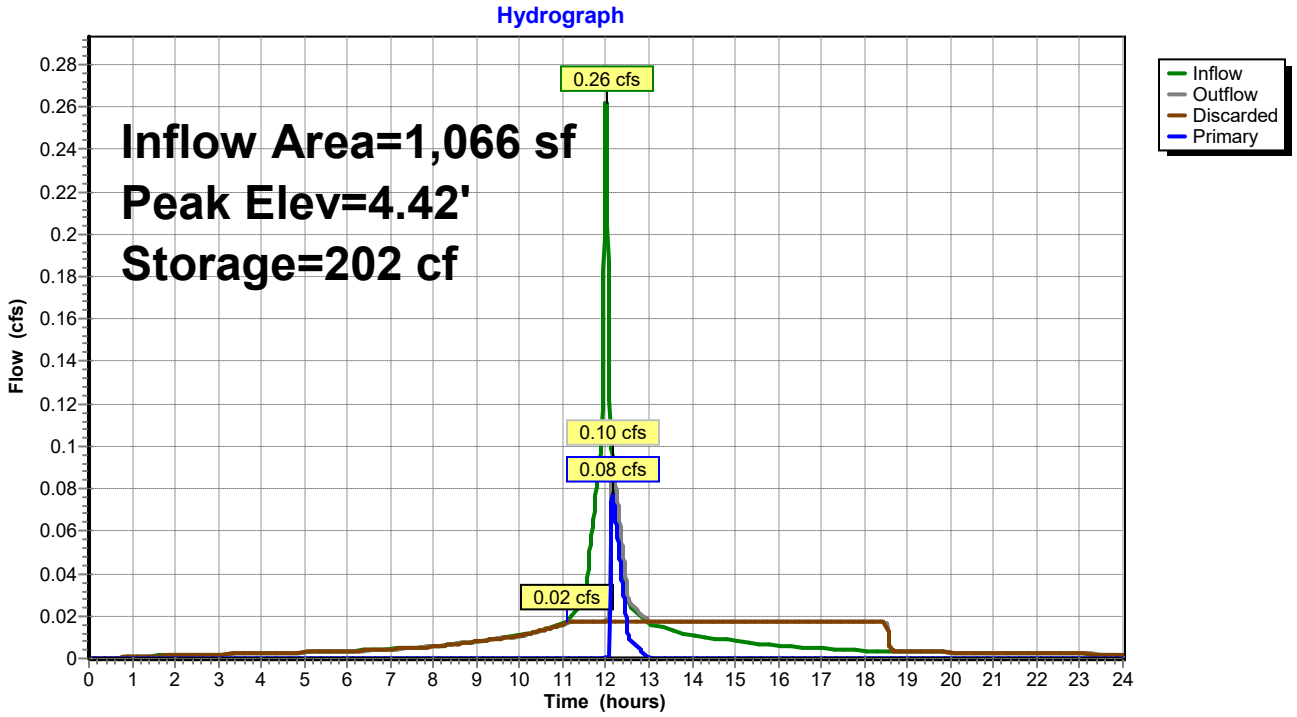
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	67 cf	**5.67'W x 8.00'L x 3.67'H Field A** 166 cf Overall x 40.0% Voids
#2	1.00'	105 cf	**3.50'W x 4.00'L x 3.75'H Prismatoid** x 2 Inside #3 110 cf Overall - 0.5" Wall Thickness = 105 cf
#3	0.00'	51 cf	**4.50'W x 5.00'L x 5.25'H Prismatoid** x 2 236 cf Overall - 110 cf Embedded = 127 cf x 40.0% Voids
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	4.25'	**5.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	0.00'	**8.210 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 11.09 hrs HW=0.05' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.08 cfs @ 12.15 hrs HW=4.42' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.42 fps)

Pond 30P: 300 GAL DRY WELL



Appendix F

OPERATION & MAINTENANCE PLAN

Operation & Maintenance Plan (Permanent BMPs)

FOR

86-88 Prospect St, Newburyport, MA

Date: June, 2021

Owner/Operator: Blake Wilcox
The Joppa Group LLC
10 Harrison Street
Newburyport, MA 01950

Inspection and Maintenance Schedule

Facility personnel will inspect the stormwater management system on a routine basis not less than once per month for the first six (6) months of operation and annually thereafter. The estimated cost for this inspection and maintenance schedule is $800/yr. Refer to project design and as-built plans for stormwater systems and landscaped area locations. Inspection and maintenance shall be performed as follows:

1. Landscaped Areas:

Landscaped areas shall be inspected and maintained on a regular basis. Areas that may be subject to erosion will be stabilized and reseeded immediately. Inspect soil and repair eroded areas monthly. Re-plant void areas as needed. Remove litter and debris monthly. Remove and replace dead vegetation twice per year in spring and fall. Replace soil media if ponding is witnessed more than 48 hours after rainfall event.

2. Roof Drains:

Inspections: The downspout inlets on the roof of the building will need periodic maintenance to ensure proper function. The required interval for this maintenance will vary by season; however, downspout inlets should be inspected for debris before the rainy season. When trees and other deciduous vegetation shed leaves that drop into the gutters, this will inhibit the flow of water and possibly clog downspouts. The leaves and/or debris must be removed in order for the system to work as designed.

Maintenance: Debris, such as leaves and trash, shall be removed by hand. Sediments shall be swept and collected or vacuumed.

3. Dry Well:

Inspections: During first year visually inspect after each major storm (>1.5") and again 72 hours later to verify exfiltration is occurring as designed. Note if water remains in basin after 72 hours. After first year visually inspect twice per year. Infiltration Systems shall be inspected for accumulation of silt, sediment, standing water, or debris on an annual basis. Debris and sediment shall be removed.

Inspection & Maintenance procedure is as follows:
The inspection port is a 24" by 24" grate and frame. When the grate is removed, this will provide access to the inside of the dry well below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment, if any, in this dry well. If the depth of sediment is in excess of 3 inches (76 mm), then this chamber should be cleaned with a vacuum truck, or by hand if possible.

4. Porous Pavement

See Inspection Checklist for Porous Pavement (attached).

Inspection:

- Inspect parking area after precipitation events at a minimum of four times per year to ensure proper drainage. Inspection should preferably occur during extended precipitation events, high-intensity rainfall, and/or rain-on-snow events. If standing water remains on surface of pavement more than 30 minutes after rainfall has ended, cleaning of porous pavement is recommended.
- Inspect for damaged areas.

Cleaning:

- Vacuum sweeping (regenerative air sweepers or vacuum-assisted dry sweepers) shall be performed at minimum four times per year. Recommended cleaning times include spring cleanup after snow melt, after spring seed drop, fall cleanup to remove dead leaves and organic materials, and once mid-winter during a dry period.
- Clogged areas shall be power washed with mid-pressure water (less than 500 psi) prior to vacuuming. Areas that do not allow infiltration after power washing and vacuum sweeping shall be replaced per the general measures listed above.
- The porous pavement parking area abuts a conventional asphalt pavement parking area. Run-on and sediment tracking may occur at the transition between conventional and porous asphalt pavements. Additional focus on inspection and cleaning may be needed in this area.

Winter Maintenance:

- No winter sanding shall be allowed on either the porous pavement parking area or the adjacent conventional asphalt pavement parking area, as sand will clog the porous pavement surface.
- To prevent aesthetic damage to the pavement surface (e.g. scaring), consider plowing with rubber skids or raised blades; however, aesthetic damage from plow blades does not affect the integrity of the pavement structure.
- Stockpiling of snow shall not be allowed on the porous pavement parking area as it will lead to premature clogging and additional maintenance and vacuuming of the stockpile areas.
- Liquid anti-icing (salt brine) can be applied before storms as determined necessary by the Owner. Unreduced deicing (salting) loading is 3 pounds per 1,000-square feet of parking area.

According to University of New Hampshire Stormwater Center research, this application may be reduced by up to 75% based upon sun exposure within the parking area. We recommend that the Owner balance the use of salt based on site-specific experience gathered over the winter season.

5. Permeable Pavers:

Inspection:

- Inspect parking area after precipitation events at a minimum of four times per year to ensure proper drainage. Inspection should preferably occur during extended precipitation events, high-intensity rainfall, and/or rain-on-snow events. If standing water remains on surface of pavers more than 30 minutes after rainfall has ended, cleaning of porous pavers is recommended.

Cleaning:

- In Clogged areas power wash aggregate between joints to a minimum of 1" below paver surface. Refill joints with clean ASTM NO. 8 aggregate material.

Winter Maintenance:

- Salting of the permeable paver driveway is permitted. **No winter sanding shall be allowed on either the porous pavement parking area or the adjacent conventional asphalt pavement parking area, as sand will clog the porous pavement surface.**
- To prevent aesthetic damage to the paver surface (e.g. scaring), consider plowing with rubber skids or raised blades; however, aesthetic damage from plow blades does not affect the integrity of the paver structure.

Stormwater System Inspection Report

General Information			
Location: 86-88 Prospect Street, Newburyport			
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Purpose of Inspection			
Weather Information			
Has it rained since the last inspection? ❑Yes ❑No			
Weather at time of this inspection?			

Site-Specific Stormwater Devices: (See above for inspection frequency)

	Description	Installed and Operating Properly?	Corrective Action Needed	Date for Corrective Action/Responsible Person
1		❑Yes ❑No		
2		❑Yes ❑No		
3		❑Yes ❑No		
4		❑Yes ❑No		
5		❑Yes ❑No		
6		❑Yes ❑No		
7		❑Yes ❑No		

	Description	Installed and Operating Properly?	Corrective Action Needed	Date for Corrective Action/Responsible Person
8		❑Yes ❑No		

Overall Site Issues

	Description		Corrective Action	Date for Corrective Action/Responsible Person
1	Are all slopes properly stabilized?	❑Yes ❑No		
2	Are natural resource areas (e.g., streams, wetlands, etc.) being subjected to erosion?	❑Yes ❑No		
3	Are discharge points free of sediment deposits?	❑Yes ❑No		

Certification Statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name:

Signature:

Date: