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# SITE ENGINEERING REPORT

## Stamford Hospital Proposed Parking Lot Expansion 1 Hospital Plaza & 31 Wright Street Stamford, CT

### Prepared For

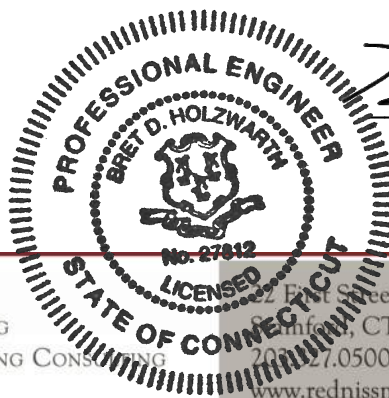
Stamford Hospital

### Prepared by

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**REDNISS  
& MEAD**

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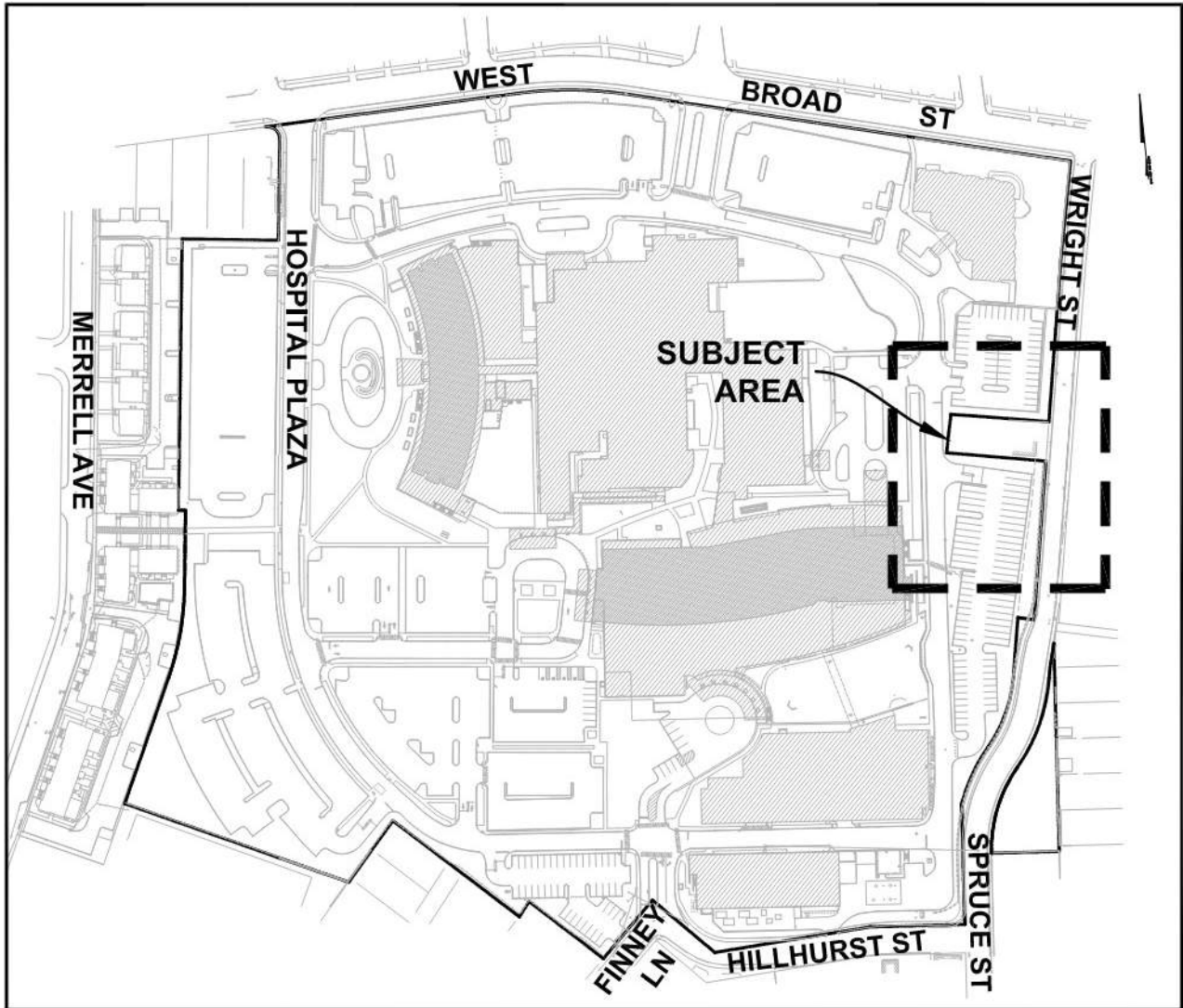
Existing Drainage Basin Exhibit  
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Level Spreader Sizing  
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DCIA Tracking Spreadsheet  
Checklist for Stormwater Management Report



## ORIENTATION MAP

SCALE: 1"=200'

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## Narrative

### **Project Description:**

Stamford Hospital is proposing to expand their parking lots along the east side of campus along Wright Street. The hospital purchased the property at 31 Wright Street and is proposing to consolidate the lot into the campus. The former dwelling and detached garage were recently demolished. The scope of this narrative is focused on the stormwater impacts of this parking lot expansion.

### **Existing Conditions:**

The hospital property (1 Hospital Plaza) is currently developed with a hospital campus which includes multiple hospital buildings, a loop road, several parking lots, walkways, landscaping and other improvements. 31 Wright Street was recently developed with a dwelling, detached garage, walkways and parking area. Once consolidated the total site area is 29.89 acres, and the onsite impervious coverage is 986,602 square feet (75.5%).

The property is mildly sloped with site elevations range from elevation 100± on the north side of the property to elevation 60± at the southeast of property. The property does not lie within the Coastal Boundaries or the drinking water supply watershed. The property lies within Zone X of the regulatory 100-year floodplain as established by the Federal Emergency Management Agency (FEMA) on "Flood Insurance Rate Maps" (FIRM) for Fairfield County, Community No. 09001C0516G, effective date June 8, 2013.

### **Drainage Patterns & Conveyance Systems**

Runoff from the site generally flows in three directions: west to Merrell Avenue, southeast to Spruce Street and east to Wright Street. Stormwater tributary to the Merrell Avenue drainage basin travels through an 18" storm drain through Lione Park and is eventually tributary to the 3'x7' box culvert near the Westover School. The storm water within the Spruce Street drainage basin is collected into a 36" storm drain and is eventually discharged into the Rippowam River via a 42" pipe just north of the Main Street pedestrian bridge. The area tributary to Wright Street is collected in catch basins in the road, then flows via a 12" storm drain down West Broad and discharges into the Rippowam River at Mill River Park. A portion of offsite area from Stillwater Place in the southwest corner of the property flows onto the hospital campus. The existing drainage system on site consists of standard manholes, catch basins oil/grit separators and pipe throughout the property. There are several parking lots along the east side of the campus that are constructed with porous unit pavers with crushed stone reservoirs below. These parking lots are modeled in the existing conditions HydroCAD model as volume storage reservoirs with a 40% void ratio for crushed stone. The outlets are at grade catch basins that act as overflow outlets. There are no low flow outlets as they are intended to infiltrate into the ground. One parking lot flows to the Spruce Street bypass outlet and two flow toward the detention basin.

The majority of the site runoff is directed to a large detention basin which collects and meters stormwater before leaving the site. The detention basin is vegetated with river rock channels that lead from two inlet headwalls to the outlet pipe. It is metered through a large vault with multiple outlets set at

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varying elevations. There is a high overflow double catch basin for emergency overflow. Please refer to the drainage basin maps in Appendix B for more detailed information.

## **Soils**

The USDA Natural Resources Conservation Service's Websoil Survey indicates the soils on the subject parcel is Urban land within Hydrologic Soils Group D. Furthermore, since the site has been significantly disturbed from prior construction, the underlying soils are not virgin soils and cannot be accurately categorized. Typically, infiltration is not recommended in D type soils due to its very slow infiltration rate when thoroughly wet.

## **Proposed Conditions:**

The project includes the construction an asphalt parking lot expansion along Wright Street. The proposed disturbance area of the site is approximately 12,000sf (0.28 acres). The proposed improvements shall increase impervious coverage onsite by approximately 2,472± sf. This increase in impervious coverage is incorporated into the drainage model and is shown on the proposed drainage basin map.

## **Methodology & General Design Criteria**

The drainage system has been designed for Type III, 24-hour storm events. The project site is south of the Merritt Parkway and therefore has been designed to adequately accommodate peak runoff for all storms up to and including the 50-year design storm. The 24-hour design storm rainfall amounts, and distributions were obtained from the latest NOAA Atlas 14 Point Precipitation Frequency Estimates and storm distributions ([Appendix A](#)). Since the proposed improvements will connect into existing onsite drainage facilities, outlet protection calculations are not provided.

## **Project Classification**

The proposed development is classified as a redevelopment project with less than ½ an acre of disturbance and greater than 400 square feet of new impervious coverage, therefore must comply with Standards 2 through 5 of the Stamford Drainage Manual utilizing the "Lite" checklist.

## **Hydrologic Analysis of Peak Rates of Runoff**

Hydrologic models have been prepared utilizing the SCS Runoff Curve Number Method from NRCS TR-55 to analyze the pre- and post-development rainfall runoff rates and volumes. Watershed areas, curve numbers (CN), and times of concentration (TC) were calculated for the onsite area. The as-built drainage basin boundaries and the proposed drainage basin boundaries are shown in [Appendix B](#). The results of the HydroCad model used to analyze the pre- and post-development watershed conditions are presented in [Appendix C](#).

## Stormwater Management System

The proposed parking impacts four drainage basins: the detention basin, Wright Street, Permeable Pavers #1 and Permeable Pavers #2A. All of which are eventually tributary to the Rippowam River. The northern portion of the proposed parking lot is tributary to Permeable Pavers #1. Due to the increase in coverage, it is proposed to expand the crushed stone reservoir under the new parking lot for additional storage volume. It will be connected to the existing stone reservoir under Permeable Pavers #1 and outlet through the same existing catch basin. The southern portion of the new parking lot will remain tributary to Wright Street. Runoff will be collected in a catch basin and discharged through a level spreader uphill of an existing catch basin in the road. Flow will be dissipated across the 10' level spreader and sheet flow across lawn before entering the city storm system. The impervious coverage of this basin is decreased. A small portion of lawn area is tributary to the detention basin. The tributary area of that basin is decreased. A small portion of the new parking lot is tributary to Permeable Paver #2A. This area flows into the stone reservoir below the pavers and has a negligible impact on the system.

A comparison of the pre- and post-development peak discharge rates at Spruce Street and Wright Street are provided in Tables 1 & 2 below.

**Table 1. As-Built V.S. Proposed Spruce Street Peak Flows**

Return Period (years)	As-Built Peak Flow Rate (cfs)	Proposed Peak Flow Rate (cfs)	Change (cfs)	Percent Change (%)	Detention Basin Water Surface Elevation
1	33.26	33.26	0	0.0%	65.19
2	44.75	44.52	-0.23	-0.5%	65.58
5	63.14	63.03	-0.11	-0.2%	66.07
10	75.55	75.59	0.04	0.1%	66.51
25	91.19	91.30	0.11	0.1%	67.15
50	101.30	101.45	0.15	0.1%	67.64
100	145.82	143.77	-2.05	-1.4%	70.53

**Table 2. As-Built V.S. Proposed Wright Street Peak Flows**

Return Period (years)	As-Built Peak Flow Rate (cfs)	Proposed Peak Flow Rate (cfs)	Change (cfs)	Percent Change (%)
1	1.43	1.42	-0.01	-0.7%
2	1.96	1.94	-0.02	-1.0%
5	2.83	2.82	-0.01	-0.4%
10	3.58	3.56	-0.02	-0.6%
25	4.62	4.59	-0.03	-0.6%
50	5.38	5.35	-0.03	-0.6%
100	6.21	6.17	-0.04	-0.6%

Comparison of the peak discharge rates for pre- and post-development watershed conditions demonstrates that in Spruce Street, there are slight decreases in the smaller storms but slight increases in peaks during the larger storms. When considering this large watershed, the percentage change from the

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proposed improvements is negligible. Therefore, the proposed development will not adversely impact the downstream or adjacent properties or receiving watercourse. Peaks in the Wright Street basin decrease slightly in all design storms.

## **Water Quality**

Standard I of the Stormwater Manual is not required to be met for this project. However, provisions have been installed to improve the quality of the stormwater runoff flowing from the site prior to being conveyed off-site and discharging into the Rippowam River. There are 6 existing hydrodynamic separators installed throughout the hospital campus. These were installed as part of the large Specialty Building construction project and were sized to handle the peak capacity flow rate and treat the drainage area at a net annual sediment load reduction of 80% or greater. The project area is tributary to OGS#2 installed in the loop road, south of the parking lot expansion. The unit is a Vortechs VX-5000.

In addition to the oil grit separators, the permeable pavers reduce runoff and infiltrate for groundwater recharge. The detention basin stores a large amount of volume and settles sediment. The western parking lots flow through vegetated swales prior to discharging into the storm system, allowing for infiltration and treatment. Additional water quality benefits are provided in the existing catch basins throughout the site. They have deep sumps and bell traps which help remove sediment and floatables.

## **Compliance with Stormwater Management Standards**

The project site will be designed to meet the Stamford Stormwater Management Standards to the maximum extent practicable as summarized below:

### **Standard 2. Peak Flow Control**

- A. Stream channel protection is not required for this project.
- B. The existing stormwater system can adequately pass flows leading to, from and through it up to and including the 50-year design storm event as required in Section 3 of the drainage manual. Refer to the HydroCAD model found in [Appendix C](#).
- C. The post-development peak flow rates from the 1-year, 2-year, 5-year, 10-year, 25-year and 50-year, 24-hour storms are controlled to the corresponding pre-development peak discharge rates. Reference is made to the HydroCAD report found in [Appendix C](#).
- D. The Wright Street level spreader has been designed to adequately dissipate the receiving runoff to avoid erosive velocities. Refer to Level Spreader sizing in [Appendix D](#).
- E. The proposed improvements flow to an onsite detention basin prior to discharging offsite. The peak flow rates are only negligibly impacted by the proposed development. As such, a downstream hydraulic analysis is not warranted.

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### **Standard 3: Construction Erosion and Sediment Control**

- A. Site plan sheet SE-2 depicts erosion control measures to be implemented to control construction related impacts. Sediment and erosion controls such as silt fencing, filter fabric catch basin inlet protection, tree protection and tracking pads are proposed.

### **Standard 4: Operation and Maintenance**

- A. A City of Stamford Drainage Maintenance Agreement was executed in 2018 when the construction of the Specialty Building and other various projects were concluded. It was filed on the land records under Volume 11884, Page 146 on 1/26/2018. A copy of that maintenance agreement has is included in Appendix D.
- B. Refer to plans and notes from prior projects describing the long-term maintenance requirements for the site-specific drainage systems including routine and non-routine inspection and maintenance tasks to be undertaken.

### **Standard 5: Stormwater Management Report**

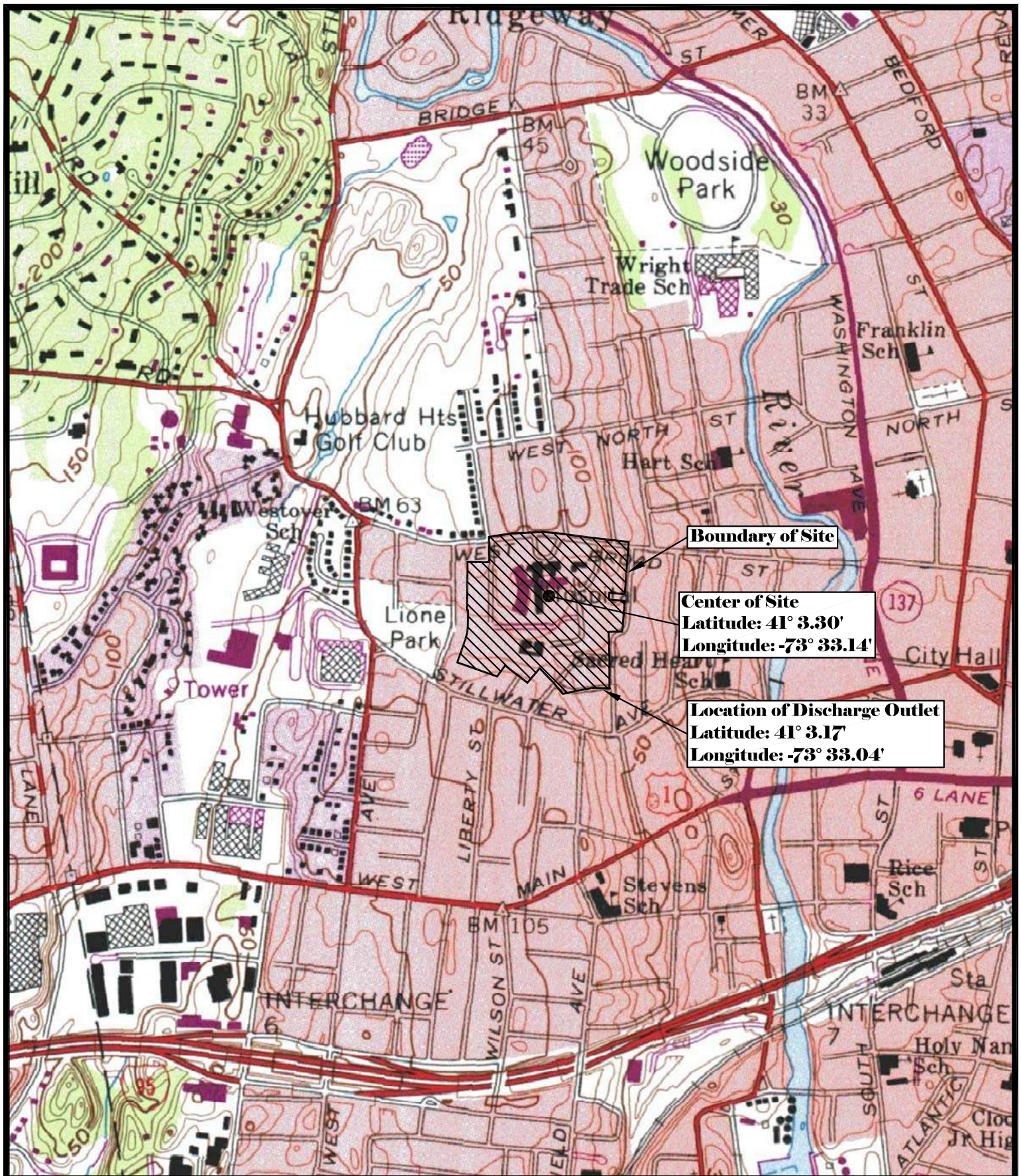
- A. This document and its associated appendices serve as the required Stormwater Management Report.
- B. Based on the above information, the proposed improvements are designed in accordance with the City of Stamford Stormwater Drainage Manual and will not adversely impact adjacent or downstream properties or City-owned drainage facilities.

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## **Appendix A**

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USGS QUAD Map  
NRCS Websoil Survey  
NOAA Atlas 14 Volume 10 – Precipitation Frequency  
FEMA Flood Insurance Map



**Boundary of Site**

**Center of Site**  
**Latitude: 41° 3.30'**  
**Longitude: -73° 33.14'**

**Location of Discharge Outlet**  
**Latitude: 41° 3.17'**  
**Longitude: -73° 33.04'**

## THE STAMFORD HOSPITAL

USGS MAP - STAMFORD, CONN. DMA 6266 II SE-SERIES V816



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COMM. NO.:

4620

DATE:

1/2/14

SCALE:

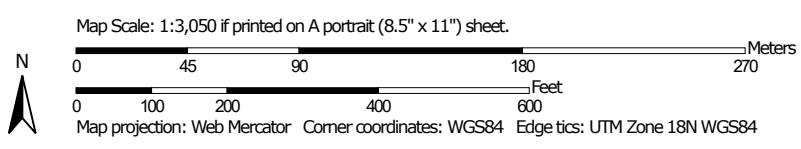
1"=1000'



Hydrologic Soil Group—State of Connecticut  
(Stamford Hospital)




Soil Map may not be valid at this scale.



## 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: Oct 4, 2020—Oct 31, 2020

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
245B	Woodbridge-Urban land complex, 0 to 8 percent slopes	C/D	0.2	0.6%
284C	Paxton-Urban land complex, 8 to 15 percent slopes	C	0.3	0.7%
307	Urban land	D	38.0	98.7%
<b>Totals for Area of Interest</b>			<b>38.5</b>	<b>100.0%</b>

### 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*



**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.365 (0.281-0.466)	0.425 (0.326-0.543)	0.523 (0.400-0.670)	0.604 (0.459-0.777)	0.716 (0.529-0.953)	0.801 (0.580-1.08)	0.889 (0.625-1.24)	0.984 (0.661-1.40)	1.12 (0.723-1.63)	1.22 (0.775-1.82)
10-min	0.518 (0.398-0.660)	0.602 (0.462-0.769)	0.741 (0.567-0.948)	0.856 (0.652-1.10)	1.01 (0.749-1.35)	1.14 (0.822-1.53)	1.26 (0.886-1.75)	1.39 (0.936-1.98)	1.58 (1.02-2.31)	1.73 (1.10-2.58)
15-min	0.609 (0.468-0.777)	0.709 (0.544-0.905)	0.872 (0.667-1.12)	1.01 (0.767-1.30)	1.19 (0.881-1.59)	1.34 (0.966-1.81)	1.48 (1.04-2.06)	1.64 (1.10-2.33)	1.86 (1.21-2.72)	2.04 (1.29-3.03)
30-min	0.851 (0.654-1.09)	0.992 (0.761-1.27)	1.22 (0.935-1.57)	1.41 (1.08-1.82)	1.68 (1.24-2.23)	1.88 (1.36-2.53)	2.08 (1.46-2.89)	2.30 (1.54-3.26)	2.60 (1.68-3.80)	2.84 (1.79-4.21)
60-min	1.09 (0.840-1.40)	1.28 (0.979-1.63)	1.57 (1.20-2.01)	1.82 (1.38-2.34)	2.16 (1.59-2.87)	2.42 (1.75-3.26)	2.68 (1.88-3.72)	2.96 (1.99-4.20)	3.34 (2.16-4.87)	3.63 (2.30-5.39)
2-hr	1.42 (1.10-1.80)	1.67 (1.29-2.11)	2.07 (1.60-2.64)	2.41 (1.85-3.08)	2.88 (2.13-3.80)	3.23 (2.35-4.34)	3.59 (2.54-4.96)	3.99 (2.69-5.62)	4.54 (2.95-6.58)	4.97 (3.16-7.34)
3-hr	1.63 (1.27-2.06)	1.93 (1.50-2.44)	2.41 (1.87-3.06)	2.82 (2.16-3.59)	3.37 (2.51-4.44)	3.79 (2.76-5.07)	4.22 (2.99-5.82)	4.70 (3.17-6.60)	5.37 (3.50-7.77)	5.92 (3.76-8.70)
6-hr	2.06 (1.61-2.59)	2.45 (1.91-3.07)	3.08 (2.40-3.88)	3.61 (2.79-4.56)	4.33 (3.25-5.68)	4.88 (3.59-6.51)	5.45 (3.90-7.50)	6.10 (4.13-8.52)	7.02 (4.58-10.1)	7.78 (4.96-11.4)
12-hr	2.54 (2.00-3.16)	3.04 (2.38-3.79)	3.85 (3.01-4.81)	4.52 (3.52-5.68)	5.44 (4.11-7.10)	6.14 (4.54-8.14)	6.87 (4.94-9.41)	7.71 (5.24-10.7)	8.93 (5.85-12.8)	9.95 (6.36-14.4)
24-hr	2.97 (2.35-3.68)	3.60 (2.84-4.46)	4.61 (3.63-5.73)	5.46 (4.27-6.81)	6.62 (5.03-8.59)	7.48 (5.57-9.89)	8.41 (6.10-11.5)	9.49 (6.48-13.1)	11.1 (7.30-15.8)	12.5 (8.00-18.0)
2-day	3.33 (2.65-4.09)	4.09 (3.25-5.03)	5.33 (4.23-6.58)	6.36 (5.02-7.89)	7.79 (5.96-10.1)	8.84 (6.63-11.6)	9.98 (7.30-13.6)	11.4 (7.78-15.6)	13.4 (8.86-18.9)	15.2 (9.80-21.8)
3-day	3.60 (2.87-4.40)	4.43 (3.54-5.43)	5.79 (4.61-7.12)	6.92 (5.47-8.55)	8.48 (6.51-10.9)	9.63 (7.25-12.6)	10.9 (7.98-14.8)	12.4 (8.50-16.9)	14.7 (9.70-20.6)	16.7 (10.7-23.8)
4-day	3.85 (3.09-4.71)	4.73 (3.79-5.78)	6.16 (4.92-7.56)	7.35 (5.83-9.06)	8.99 (6.92-11.5)	10.2 (7.70-13.4)	11.5 (8.47-15.6)	13.1 (9.01-17.8)	15.5 (10.3-21.7)	17.6 (11.4-25.0)
7-day	4.59 (3.70-5.58)	5.55 (4.46-6.75)	7.10 (5.70-8.66)	8.40 (6.69-10.3)	10.2 (7.86-13.0)	11.5 (8.70-14.9)	12.9 (9.51-17.3)	14.6 (10.1-19.8)	17.1 (11.4-23.8)	19.2 (12.5-27.2)
10-day	5.32 (4.30-6.44)	6.32 (5.11-7.66)	7.96 (6.41-9.68)	9.32 (7.46-11.4)	11.2 (8.66-14.2)	12.6 (9.54-16.2)	14.1 (10.4-18.8)	15.8 (10.9-21.3)	18.3 (12.2-25.4)	20.4 (13.2-28.8)
20-day	7.50 (6.10-9.02)	8.63 (7.01-10.4)	10.5 (8.48-12.6)	12.0 (9.66-14.5)	14.1 (11.0-17.7)	15.7 (11.9-20.0)	17.4 (12.7-22.7)	19.1 (13.3-25.6)	21.5 (14.4-29.6)	23.5 (15.3-32.9)
30-day	9.30 (7.60-11.1)	10.5 (8.58-12.6)	12.5 (10.2-15.0)	14.2 (11.4-17.1)	16.4 (12.8-20.4)	18.2 (13.8-23.0)	19.9 (14.6-25.8)	21.7 (15.2-28.9)	24.1 (16.2-33.0)	25.9 (16.9-36.1)
45-day	11.5 (9.45-13.7)	12.8 (10.5-15.3)	15.0 (12.3-18.0)	16.8 (13.6-20.2)	19.3 (15.0-23.8)	21.2 (16.1-26.6)	23.1 (16.9-29.6)	24.9 (17.5-33.0)	27.3 (18.3-37.2)	29.0 (18.9-40.2)
60-day	13.4 (11.0-15.9)	14.8 (12.1-17.6)	17.1 (14.0-20.4)	19.0 (15.4-22.8)	21.6 (16.9-26.6)	23.7 (18.0-29.6)	25.7 (18.8-32.8)	27.5 (19.4-36.4)	29.9 (20.1-40.6)	31.5 (20.6-43.7)

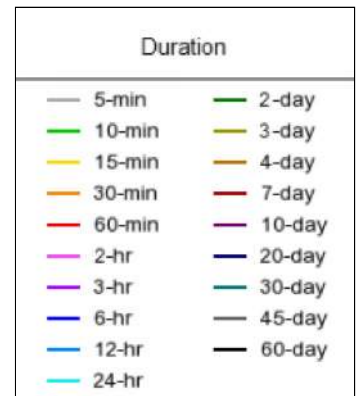
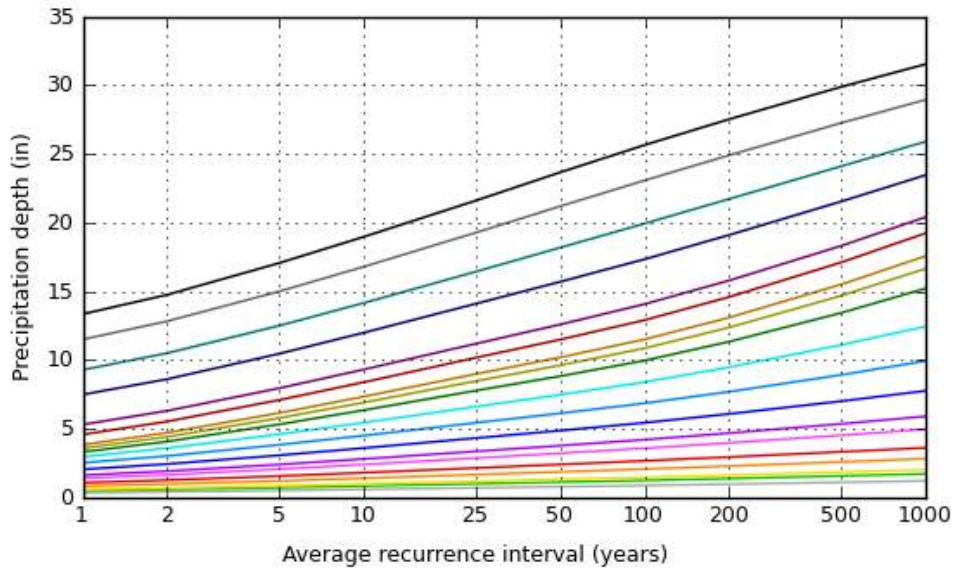
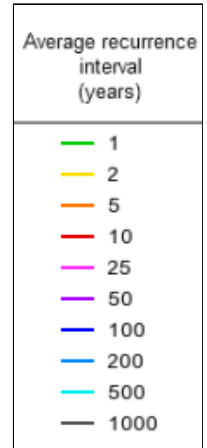
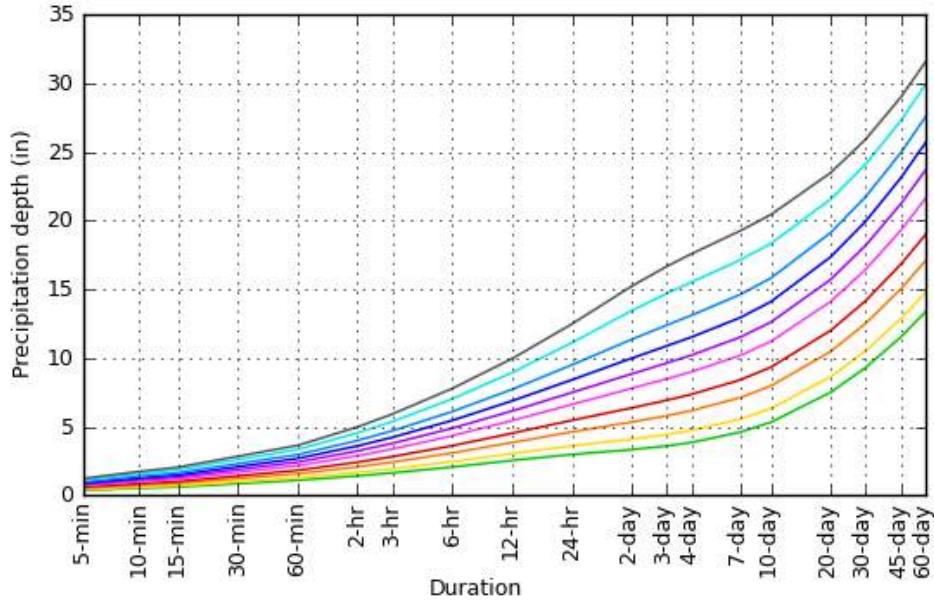
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**

PDS-based depth-duration-frequency (DDF) curves

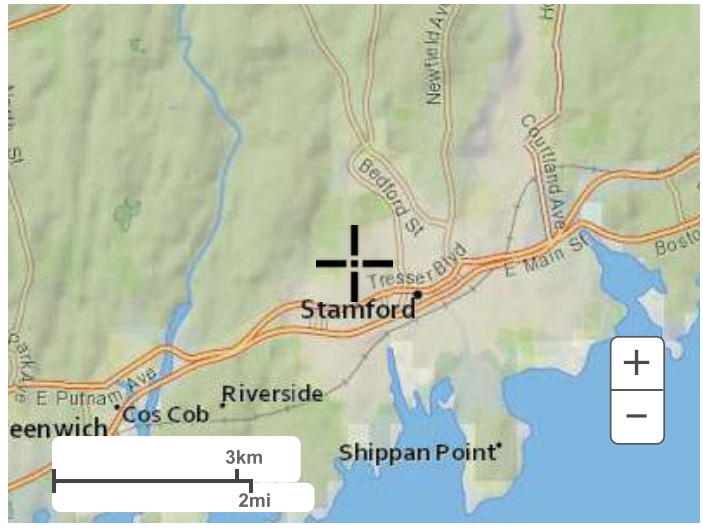
Latitude: 41.0550°, Longitude: -73.5523°



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**Maps & aerials**

**Small scale terrain**



Large scale terrain



Large scale map



Large scale aerial



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[US Department of Commerce](#)  
[National Oceanic and Atmospheric Administration](#)  
[National Weather Service](#)  
[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

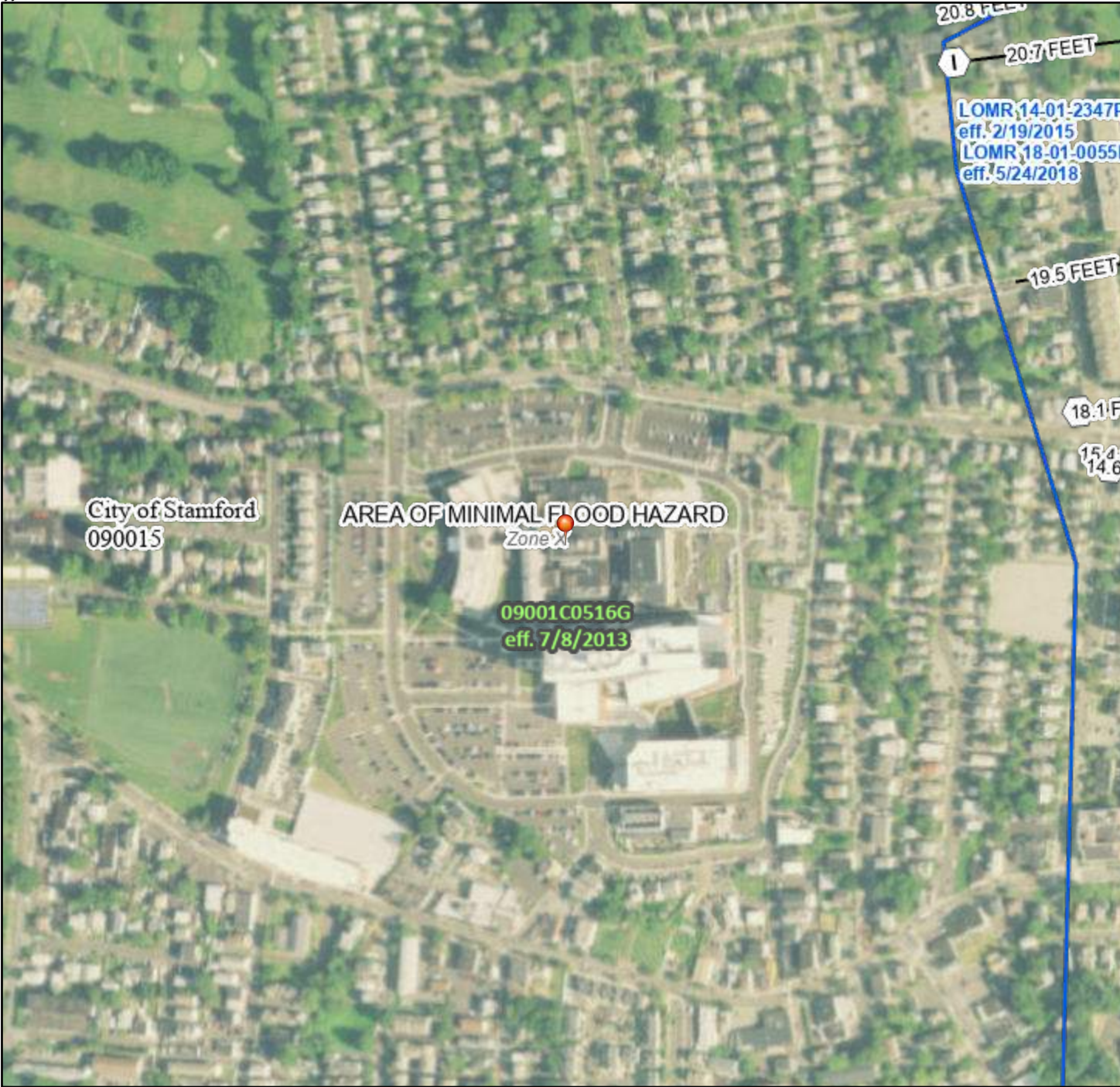
[Disclaimer](#)

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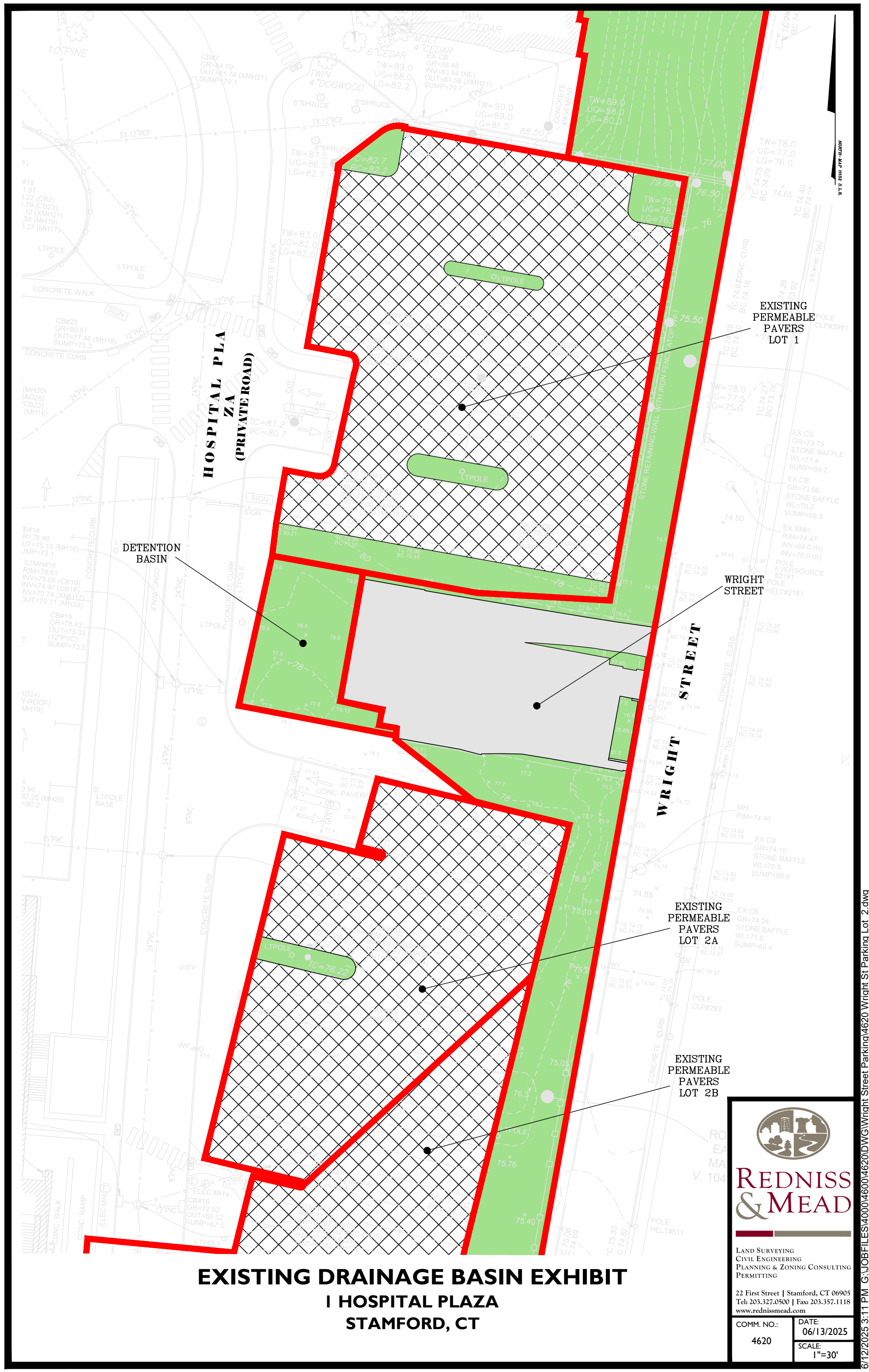
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) S S Q C H Q H U D O G S H I F W L Y H G D W H D S L B H V I R U  
X C E S S G D O G X C R G U Q J G D U H V F D O Q R W E H X H G I R U  
U H K O D W R U S U S R H V

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## **Appendix B**

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Existing Drainage Basin Exhibit  
Proposed Drainage Basin Exhibit  
Proposed Full Site Drainage Basin Exhibit



**EXISTING DRAINAGE BASIN EXHIBIT  
I HOSPITAL PLAZA  
STAMFORD, CT**

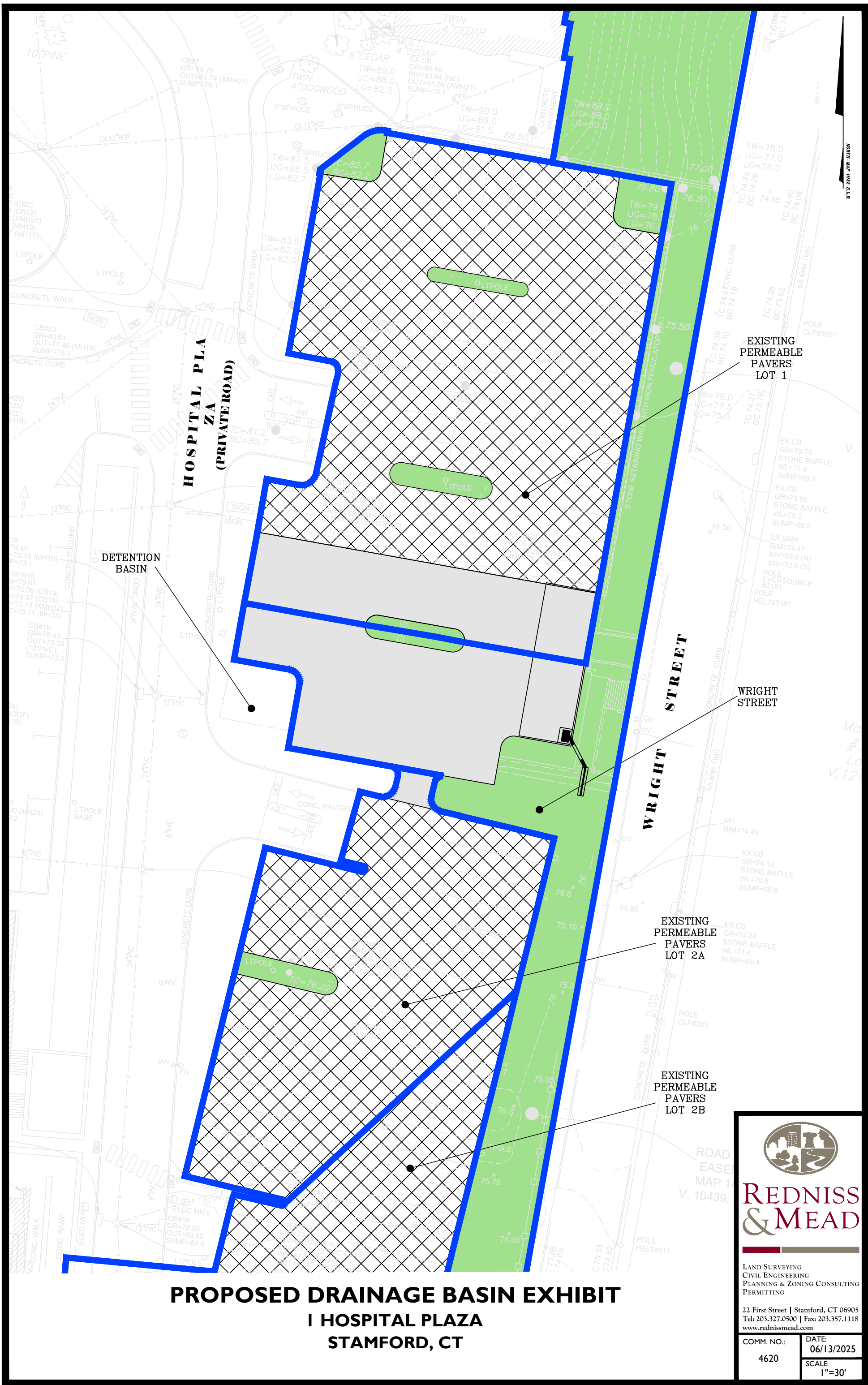


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PERMITTING

22 First Street | Stamford, CT 06905  
Tel: 203.327.0500 | Fax: 203.357.1118  
www.rednissmead.com

COMM. NO.: 4620	DATE: 06/13/2025
	SCALE: 1"=30'



**PROPOSED DRAINAGE BASIN EXHIBIT  
I HOSPITAL PLAZA  
STAMFORD, CT**



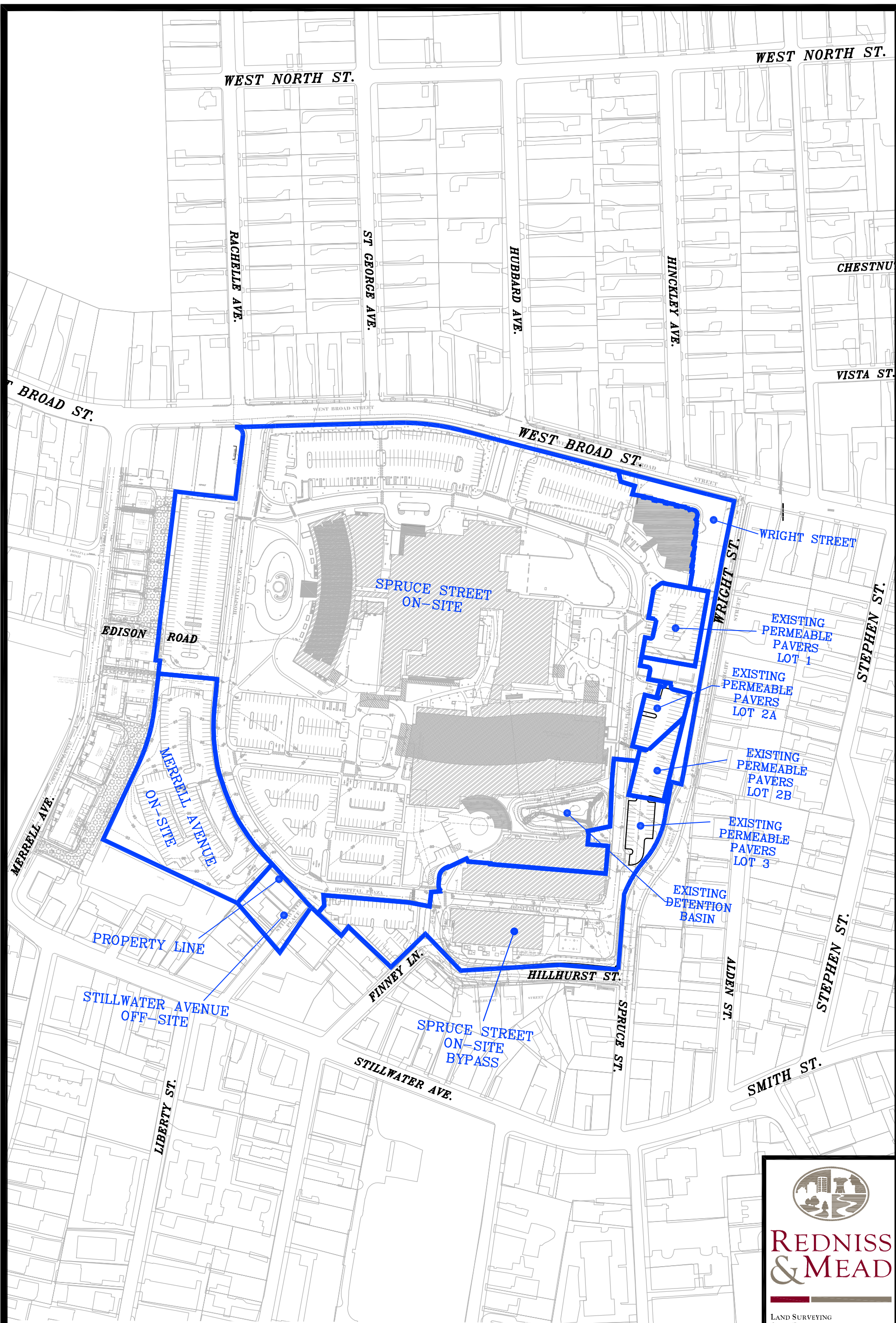
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www.rednissmead.com

COMM. NO.: 4620	DATE: 06/13/2025
	SCALE: 1"=30'



**PROPOSED FULL SITE DRAINAGE BASIN EXHIBIT  
I HOSPITAL PLAZA  
STAMFORD, CT**



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22 First Street | Stamford, CT 06905  
Tel: 203.327.0500 | Fax: 203.357.1118  
www.rednissmead.com

COMM. NO.:	DATE:
4620	06/13/2025
	SCALE:
	1"=200'

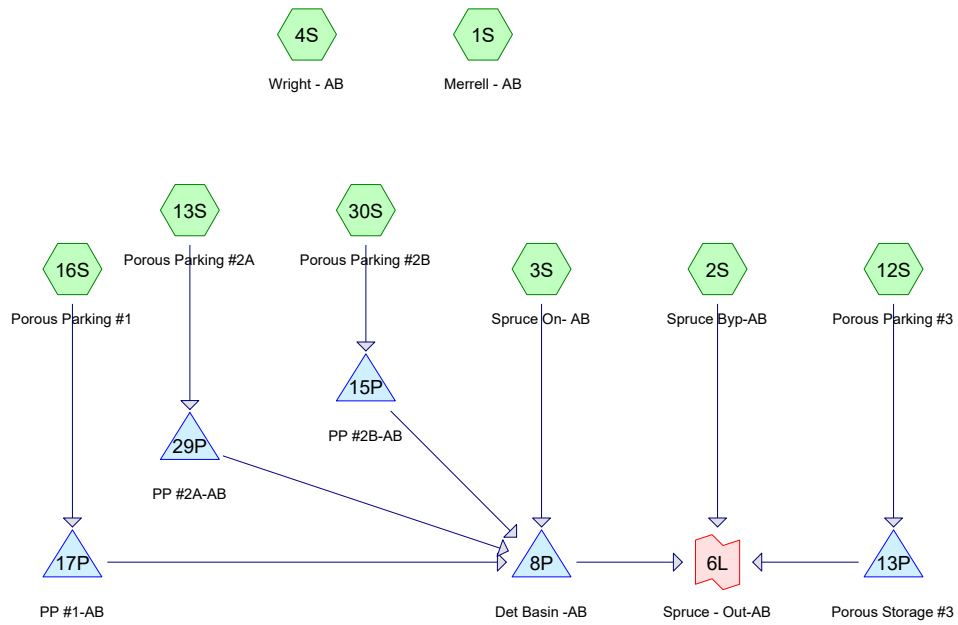
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# Appendix C

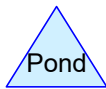
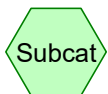
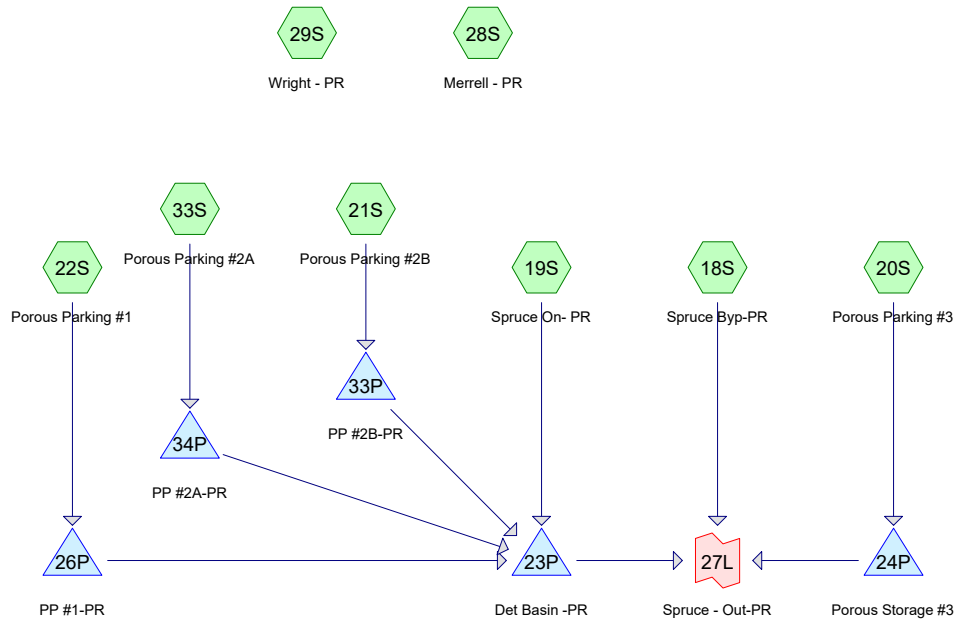
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HydroCAD Report

As-Built



Proposed



**Routing Diagram for 4620 HydroCAD Wright Parking**  
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# 4620 HydroCAD Wright Parking

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## Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 Year	Type III 24-hr		Default	24.00	1	2.97	2
2	2 Year	Type III 24-hr		Default	24.00	1	3.60	2
3	5 Year	Type III 24-hr		Default	24.00	1	4.61	2
4	10 Year	Type III 24-hr		Default	24.00	1	5.46	2
5	25 Year	Type III 24-hr		Default	24.00	1	6.62	2
6	50 Year	Type III 24-hr		Default	24.00	1	7.48	2
7	100 Year	Type III 24-hr		Default	24.00	1	8.41	2

**4620 HydroCAD Wright Parking**

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Type III 24-hr 1 Year Rainfall=2.97"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Merrell - AB</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>2.13" Tc=5.0 min CN=92 Runoff=5.59 cfs 0.396 af
<b>Subcatchment2S: Spruce Byp-AB</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>2.32" Tc=5.0 min CN=94 Runoff=8.16 cfs 0.590 af
<b>Subcatchment3S: Spruce On- AB</b>	Runoff Area=994,039 sf 76.89% Impervious Runoff Depth>2.31" Tc=20.0 min CN=94 Runoff=40.51 cfs 4.400 af
<b>Subcatchment4S: Wright - AB</b>	Runoff Area=36,516 sf 16.64% Impervious Runoff Depth>1.42" Tc=5.0 min CN=83 Runoff=1.43 cfs 0.099 af
<b>Subcatchment12S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>1.56" Tc=5.0 min CN=85 Runoff=0.30 cfs 0.021 af
<b>Subcatchment13S: Porous Parking #2A</b>	Runoff Area=10,601 sf 0.00% Impervious Runoff Depth>1.56" Tc=5.0 min CN=85 Runoff=0.46 cfs 0.032 af
<b>Subcatchment16S: Porous Parking #1</b>	Runoff Area=17,980 sf 0.00% Impervious Runoff Depth>1.49" Tc=5.0 min CN=84 Runoff=0.74 cfs 0.051 af
<b>Subcatchment18S: Spruce Byp-PR</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>2.32" Tc=5.0 min CN=94 Runoff=8.16 cfs 0.590 af
<b>Subcatchment19S: Spruce On- PR</b>	Runoff Area=994,039 sf 77.52% Impervious Runoff Depth>2.31" Tc=20.0 min CN=94 Runoff=40.51 cfs 4.400 af
<b>Subcatchment20S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>1.56" Tc=5.0 min CN=85 Runoff=0.30 cfs 0.021 af
<b>Subcatchment21S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>1.56" Tc=5.0 min CN=85 Runoff=0.47 cfs 0.033 af
<b>Subcatchment22S: Porous Parking #1</b>	Runoff Area=19,710 sf 14.69% Impervious Runoff Depth>1.71" Tc=5.0 min CN=87 Runoff=0.93 cfs 0.065 af
<b>Subcatchment28S: Merrell - PR</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>2.13" Tc=5.0 min CN=92 Runoff=5.59 cfs 0.396 af
<b>Subcatchment29S: Wright - PR</b>	Runoff Area=36,287 sf 15.13% Impervious Runoff Depth>1.42" Tc=5.0 min CN=83 Runoff=1.42 cfs 0.099 af
<b>Subcatchment30S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>1.56" Tc=5.0 min CN=85 Runoff=0.47 cfs 0.033 af
<b>Subcatchment33S: Porous Parking #2A</b>	Runoff Area=10,874 sf 1.51% Impervious Runoff Depth>1.56" Tc=5.0 min CN=85 Runoff=0.47 cfs 0.032 af

**4620 HydroCAD Wright Parking**

Type III 24-hr 1 Year Rainfall=2.97"

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<b>Pond 8P: Det Basin -AB</b>	Peak Elev=65.19' Storage=0.562 af Inflow=40.51 cfs 4.423 af Outflow=31.06 cfs 4.377 af
<b>Pond 13P: Porous Storage #3</b>	Peak Elev=66.97' Storage=919 cf Inflow=0.30 cfs 0.021 af Outflow=0.00 cfs 0.000 af
<b>Pond 15P: PP #2B-AB</b>	Peak Elev=70.34' Storage=1,363 cf Inflow=0.47 cfs 0.033 af Outflow=0.01 cfs 0.002 af
<b>Pond 17P: PP #1-AB</b>	Peak Elev=76.21' Storage=1,309 cf Inflow=0.74 cfs 0.051 af Outflow=0.07 cfs 0.022 af
<b>Pond 23P: Det Basin -PR</b>	Peak Elev=65.19' Storage=0.562 af Inflow=40.51 cfs 4.415 af Outflow=31.06 cfs 4.368 af
<b>Pond 24P: Porous Storage #3</b>	Peak Elev=66.97' Storage=919 cf Inflow=0.30 cfs 0.021 af Outflow=0.00 cfs 0.000 af
<b>Pond 26P: PP #1-PR</b>	Peak Elev=76.21' Storage=2,273 cf Inflow=0.93 cfs 0.065 af Outflow=0.03 cfs 0.013 af
<b>Pond 29P: PP #2A-AB</b>	Peak Elev=73.47' Storage=1,379 cf Inflow=0.46 cfs 0.032 af Outflow=0.00 cfs 0.000 af
<b>Pond 33P: PP #2B-PR</b>	Peak Elev=70.34' Storage=1,363 cf Inflow=0.47 cfs 0.033 af Outflow=0.01 cfs 0.002 af
<b>Pond 34P: PP #2A-PR</b>	Peak Elev=73.47' Storage=1,384 cf Inflow=0.47 cfs 0.032 af Outflow=0.01 cfs 0.001 af
<b>Link 6L: Spruce - Out-AB</b>	Inflow=33.26 cfs 4.966 af Primary=33.26 cfs 4.966 af
<b>Link 27L: Spruce - Out-PR</b>	Inflow=33.26 cfs 4.958 af Primary=33.26 cfs 4.958 af

**Total Runoff Area = 60.060 ac Runoff Volume = 11.258 af Average Runoff Depth = 2.25"**  
**27.83% Pervious = 16.713 ac 72.17% Impervious = 43.347 ac**

**4620 HydroCAD Wright Parking**

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Type III 24-hr 5 Year Rainfall=4.61"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Merrell - AB</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>3.71" Tc=5.0 min CN=92 Runoff=9.45 cfs 0.689 af
<b>Subcatchment2S: Spruce Byp-AB</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>3.92" Tc=5.0 min CN=94 Runoff=13.39 cfs 0.997 af
<b>Subcatchment3S: Spruce On- AB</b>	Runoff Area=994,039 sf 76.89% Impervious Runoff Depth>3.91" Tc=20.0 min CN=94 Runoff=66.65 cfs 7.440 af
<b>Subcatchment4S: Wright - AB</b>	Runoff Area=36,516 sf 16.64% Impervious Runoff Depth>2.82" Tc=5.0 min CN=83 Runoff=2.83 cfs 0.197 af
<b>Subcatchment12S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>3.01" Tc=5.0 min CN=85 Runoff=0.58 cfs 0.041 af
<b>Subcatchment13S: Porous Parking #2A</b>	Runoff Area=10,601 sf 0.00% Impervious Runoff Depth>3.01" Tc=5.0 min CN=85 Runoff=0.87 cfs 0.061 af
<b>Subcatchment16S: Porous Parking #1</b>	Runoff Area=17,980 sf 0.00% Impervious Runoff Depth>2.91" Tc=5.0 min CN=84 Runoff=1.44 cfs 0.100 af
<b>Subcatchment18S: Spruce Byp-PR</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>3.92" Tc=5.0 min CN=94 Runoff=13.39 cfs 0.997 af
<b>Subcatchment19S: Spruce On- PR</b>	Runoff Area=994,039 sf 77.52% Impervious Runoff Depth>3.91" Tc=20.0 min CN=94 Runoff=66.65 cfs 7.440 af
<b>Subcatchment20S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>3.01" Tc=5.0 min CN=85 Runoff=0.58 cfs 0.041 af
<b>Subcatchment21S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>3.01" Tc=5.0 min CN=85 Runoff=0.91 cfs 0.063 af
<b>Subcatchment22S: Porous Parking #1</b>	Runoff Area=19,710 sf 14.69% Impervious Runoff Depth>3.20" Tc=5.0 min CN=87 Runoff=1.71 cfs 0.121 af
<b>Subcatchment28S: Merrell - PR</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>3.71" Tc=5.0 min CN=92 Runoff=9.45 cfs 0.689 af
<b>Subcatchment29S: Wright - PR</b>	Runoff Area=36,287 sf 15.13% Impervious Runoff Depth>2.82" Tc=5.0 min CN=83 Runoff=2.82 cfs 0.196 af
<b>Subcatchment30S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>3.01" Tc=5.0 min CN=85 Runoff=0.91 cfs 0.063 af
<b>Subcatchment33S: Porous Parking #2A</b>	Runoff Area=10,874 sf 1.51% Impervious Runoff Depth>3.01" Tc=5.0 min CN=85 Runoff=0.89 cfs 0.063 af

**4620 HydroCAD Wright Parking**

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Type III 24-hr 5 Year Rainfall=4.61"

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<b>Pond 8P: Det Basin -AB</b>	Peak Elev=66.07' Storage=0.821 af Inflow=67.39 cfs 7.571 af Outflow=58.98 cfs 7.518 af
<b>Pond 13P: Porous Storage #3</b>	Peak Elev=67.49' Storage=1,588 cf Inflow=0.58 cfs 0.041 af Outflow=0.01 cfs 0.004 af
<b>Pond 15P: PP #2B-AB</b>	Peak Elev=70.40' Storage=1,450 cf Inflow=0.91 cfs 0.063 af Outflow=0.24 cfs 0.032 af
<b>Pond 17P: PP #1-AB</b>	Peak Elev=76.36' Storage=1,515 cf Inflow=1.44 cfs 0.100 af Outflow=1.07 cfs 0.071 af
<b>Pond 23P: Det Basin -PR</b>	Peak Elev=66.07' Storage=0.821 af Inflow=67.35 cfs 7.571 af Outflow=58.89 cfs 7.517 af
<b>Pond 24P: Porous Storage #3</b>	Peak Elev=67.49' Storage=1,588 cf Inflow=0.58 cfs 0.041 af Outflow=0.01 cfs 0.004 af
<b>Pond 26P: PP #1-PR</b>	Peak Elev=76.32' Storage=2,454 cf Inflow=1.71 cfs 0.121 af Outflow=0.71 cfs 0.069 af
<b>Pond 29P: PP #2A-AB</b>	Peak Elev=73.53' Storage=1,454 cf Inflow=0.87 cfs 0.061 af Outflow=0.19 cfs 0.029 af
<b>Pond 33P: PP #2B-PR</b>	Peak Elev=70.40' Storage=1,450 cf Inflow=0.91 cfs 0.063 af Outflow=0.24 cfs 0.032 af
<b>Pond 34P: PP #2A-PR</b>	Peak Elev=73.53' Storage=1,462 cf Inflow=0.89 cfs 0.063 af Outflow=0.22 cfs 0.031 af
<b>Link 6L: Spruce - Out-AB</b>	Inflow=63.14 cfs 8.519 af Primary=63.14 cfs 8.519 af
<b>Link 27L: Spruce - Out-PR</b>	Inflow=63.03 cfs 8.518 af Primary=63.03 cfs 8.518 af

**Total Runoff Area = 60.060 ac Runoff Volume = 19.196 af Average Runoff Depth = 3.84"**  
**27.83% Pervious = 16.713 ac 72.17% Impervious = 43.347 ac**

**4620 HydroCAD Wright Parking**

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Type III 24-hr 10 Year Rainfall=5.46"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Merrell - AB</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>4.54" Tc=5.0 min CN=92 Runoff=11.44 cfs 0.843 af
<b>Subcatchment2S: Spruce Byp-AB</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>4.76" Tc=5.0 min CN=94 Runoff=16.07 cfs 1.210 af
<b>Subcatchment3S: Spruce On- AB</b>	Runoff Area=994,039 sf 76.89% Impervious Runoff Depth>4.75" Tc=20.0 min CN=94 Runoff=80.06 cfs 9.030 af
<b>Subcatchment4S: Wright - AB</b>	Runoff Area=36,516 sf 16.64% Impervious Runoff Depth>3.59" Tc=5.0 min CN=83 Runoff=3.58 cfs 0.251 af
<b>Subcatchment12S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>3.79" Tc=5.0 min CN=85 Runoff=0.73 cfs 0.051 af
<b>Subcatchment13S: Porous Parking #2A</b>	Runoff Area=10,601 sf 0.00% Impervious Runoff Depth>3.79" Tc=5.0 min CN=85 Runoff=1.09 cfs 0.077 af
<b>Subcatchment16S: Porous Parking #1</b>	Runoff Area=17,980 sf 0.00% Impervious Runoff Depth>3.69" Tc=5.0 min CN=84 Runoff=1.81 cfs 0.127 af
<b>Subcatchment18S: Spruce Byp-PR</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>4.76" Tc=5.0 min CN=94 Runoff=16.07 cfs 1.210 af
<b>Subcatchment19S: Spruce On- PR</b>	Runoff Area=994,039 sf 77.52% Impervious Runoff Depth>4.75" Tc=20.0 min CN=94 Runoff=80.06 cfs 9.030 af
<b>Subcatchment20S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>3.79" Tc=5.0 min CN=85 Runoff=0.73 cfs 0.051 af
<b>Subcatchment21S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>3.79" Tc=5.0 min CN=85 Runoff=1.13 cfs 0.080 af
<b>Subcatchment22S: Porous Parking #1</b>	Runoff Area=19,710 sf 14.69% Impervious Runoff Depth>4.00" Tc=5.0 min CN=87 Runoff=2.12 cfs 0.151 af
<b>Subcatchment28S: Merrell - PR</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>4.54" Tc=5.0 min CN=92 Runoff=11.44 cfs 0.843 af
<b>Subcatchment29S: Wright - PR</b>	Runoff Area=36,287 sf 15.13% Impervious Runoff Depth>3.59" Tc=5.0 min CN=83 Runoff=3.56 cfs 0.249 af
<b>Subcatchment30S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>3.79" Tc=5.0 min CN=85 Runoff=1.13 cfs 0.080 af
<b>Subcatchment33S: Porous Parking #2A</b>	Runoff Area=10,874 sf 1.51% Impervious Runoff Depth>3.79" Tc=5.0 min CN=85 Runoff=1.12 cfs 0.079 af

**4620 HydroCAD Wright Parking**

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Type III 24-hr 10 Year Rainfall=5.46"

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<b>Pond 8P: Det Basin -AB</b>	Peak Elev=66.51' Storage=0.959 af Inflow=81.97 cfs 9.221 af Outflow=70.60 cfs 9.165 af
<b>Pond 13P: Porous Storage #3</b>	Peak Elev=67.50' Storage=1,609 cf Inflow=0.73 cfs 0.051 af Outflow=0.04 cfs 0.015 af
<b>Pond 15P: PP #2B-AB</b>	Peak Elev=70.46' Storage=1,527 cf Inflow=1.13 cfs 0.080 af Outflow=0.54 cfs 0.048 af
<b>Pond 17P: PP #1-AB</b>	Peak Elev=76.41' Storage=1,589 cf Inflow=1.81 cfs 0.127 af Outflow=1.64 cfs 0.097 af
<b>Pond 23P: Det Basin -PR</b>	Peak Elev=66.51' Storage=0.959 af Inflow=82.15 cfs 9.225 af Outflow=70.65 cfs 9.169 af
<b>Pond 24P: Porous Storage #3</b>	Peak Elev=67.50' Storage=1,609 cf Inflow=0.73 cfs 0.051 af Outflow=0.04 cfs 0.015 af
<b>Pond 26P: PP #1-PR</b>	Peak Elev=76.40' Storage=2,594 cf Inflow=2.12 cfs 0.151 af Outflow=1.55 cfs 0.099 af
<b>Pond 29P: PP #2A-AB</b>	Peak Elev=73.59' Storage=1,531 cf Inflow=1.09 cfs 0.077 af Outflow=0.47 cfs 0.045 af
<b>Pond 33P: PP #2B-PR</b>	Peak Elev=70.46' Storage=1,527 cf Inflow=1.13 cfs 0.080 af Outflow=0.54 cfs 0.048 af
<b>Pond 34P: PP #2A-PR</b>	Peak Elev=73.60' Storage=1,541 cf Inflow=1.12 cfs 0.079 af Outflow=0.51 cfs 0.047 af
<b>Link 6L: Spruce - Out-AB</b>	Inflow=75.55 cfs 10.390 af Primary=75.55 cfs 10.390 af
<b>Link 27L: Spruce - Out-PR</b>	Inflow=75.59 cfs 10.393 af Primary=75.59 cfs 10.393 af

**Total Runoff Area = 60.060 ac Runoff Volume = 23.363 af Average Runoff Depth = 4.67"**  
**27.83% Pervious = 16.713 ac 72.17% Impervious = 43.347 ac**

**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Merrell - AB</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>5.68" Tc=5.0 min CN=92 Runoff=14.12 cfs 1.055 af
<b>Subcatchment2S: Spruce Byp-AB</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>5.91" Tc=5.0 min CN=94 Runoff=19.71 cfs 1.502 af
<b>Subcatchment3S: Spruce On- AB</b>	Runoff Area=994,039 sf 76.89% Impervious Runoff Depth>5.89" Tc=20.0 min CN=94 Runoff=98.24 cfs 11.210 af
<b>Subcatchment4S: Wright - AB</b>	Runoff Area=36,516 sf 16.64% Impervious Runoff Depth>4.67" Tc=5.0 min CN=83 Runoff=4.62 cfs 0.326 af
<b>Subcatchment12S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>4.89" Tc=5.0 min CN=85 Runoff=0.93 cfs 0.066 af
<b>Subcatchment13S: Porous Parking #2A</b>	Runoff Area=10,601 sf 0.00% Impervious Runoff Depth>4.89" Tc=5.0 min CN=85 Runoff=1.39 cfs 0.099 af
<b>Subcatchment16S: Porous Parking #1</b>	Runoff Area=17,980 sf 0.00% Impervious Runoff Depth>4.78" Tc=5.0 min CN=84 Runoff=2.32 cfs 0.164 af
<b>Subcatchment18S: Spruce Byp-PR</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>5.91" Tc=5.0 min CN=94 Runoff=19.71 cfs 1.502 af
<b>Subcatchment19S: Spruce On- PR</b>	Runoff Area=994,039 sf 77.52% Impervious Runoff Depth>5.89" Tc=20.0 min CN=94 Runoff=98.24 cfs 11.210 af
<b>Subcatchment20S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>4.89" Tc=5.0 min CN=85 Runoff=0.93 cfs 0.066 af
<b>Subcatchment21S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>4.89" Tc=5.0 min CN=85 Runoff=1.44 cfs 0.103 af
<b>Subcatchment22S: Porous Parking #1</b>	Runoff Area=19,710 sf 14.69% Impervious Runoff Depth>5.11" Tc=5.0 min CN=87 Runoff=2.68 cfs 0.193 af
<b>Subcatchment28S: Merrell - PR</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>5.68" Tc=5.0 min CN=92 Runoff=14.12 cfs 1.055 af
<b>Subcatchment29S: Wright - PR</b>	Runoff Area=36,287 sf 15.13% Impervious Runoff Depth>4.67" Tc=5.0 min CN=83 Runoff=4.59 cfs 0.324 af
<b>Subcatchment30S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>4.89" Tc=5.0 min CN=85 Runoff=1.44 cfs 0.103 af
<b>Subcatchment33S: Porous Parking #2A</b>	Runoff Area=10,874 sf 1.51% Impervious Runoff Depth>4.89" Tc=5.0 min CN=85 Runoff=1.43 cfs 0.102 af

**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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<b>Pond 8P: Det Basin -AB</b>	Peak Elev=67.14' Storage=1.166 af Inflow=100.97 cfs 11.483 af Outflow=85.12 cfs 11.424 af
<b>Pond 13P: Porous Storage #3</b>	Peak Elev=67.55' Storage=1,664 cf Inflow=0.93 cfs 0.066 af Outflow=0.19 cfs 0.030 af
<b>Pond 15P: PP #2B-AB</b>	Peak Elev=70.55' Storage=1,650 cf Inflow=1.44 cfs 0.103 af Outflow=1.17 cfs 0.071 af
<b>Pond 17P: PP #1-AB</b>	Peak Elev=76.45' Storage=1,653 cf Inflow=2.32 cfs 0.164 af Outflow=2.14 cfs 0.135 af
<b>Pond 23P: Det Basin -PR</b>	Peak Elev=67.15' Storage=1.168 af Inflow=101.17 cfs 11.491 af Outflow=85.24 cfs 11.432 af
<b>Pond 24P: Porous Storage #3</b>	Peak Elev=67.55' Storage=1,664 cf Inflow=0.93 cfs 0.066 af Outflow=0.19 cfs 0.030 af
<b>Pond 26P: PP #1-PR</b>	Peak Elev=76.47' Storage=2,719 cf Inflow=2.68 cfs 0.193 af Outflow=2.43 cfs 0.141 af
<b>Pond 29P: PP #2A-AB</b>	Peak Elev=73.67' Storage=1,644 cf Inflow=1.39 cfs 0.099 af Outflow=1.05 cfs 0.067 af
<b>Pond 33P: PP #2B-PR</b>	Peak Elev=70.55' Storage=1,650 cf Inflow=1.44 cfs 0.103 af Outflow=1.17 cfs 0.071 af
<b>Pond 34P: PP #2A-PR</b>	Peak Elev=73.69' Storage=1,659 cf Inflow=1.43 cfs 0.102 af Outflow=1.14 cfs 0.070 af
<b>Link 6L: Spruce - Out-AB</b>	Inflow=91.19 cfs 12.955 af Primary=91.19 cfs 12.955 af
<b>Link 27L: Spruce - Out-PR</b>	Inflow=91.30 cfs 12.964 af Primary=91.30 cfs 12.964 af

**Total Runoff Area = 60.060 ac Runoff Volume = 29.078 af Average Runoff Depth = 5.81"**  
**27.83% Pervious = 16.713 ac 72.17% Impervious = 43.347 ac**

**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 1S: Merrell - AB**

Runoff = 14.12 cfs @ 12.07 hrs, Volume= 1.055 af, Depth> 5.68"

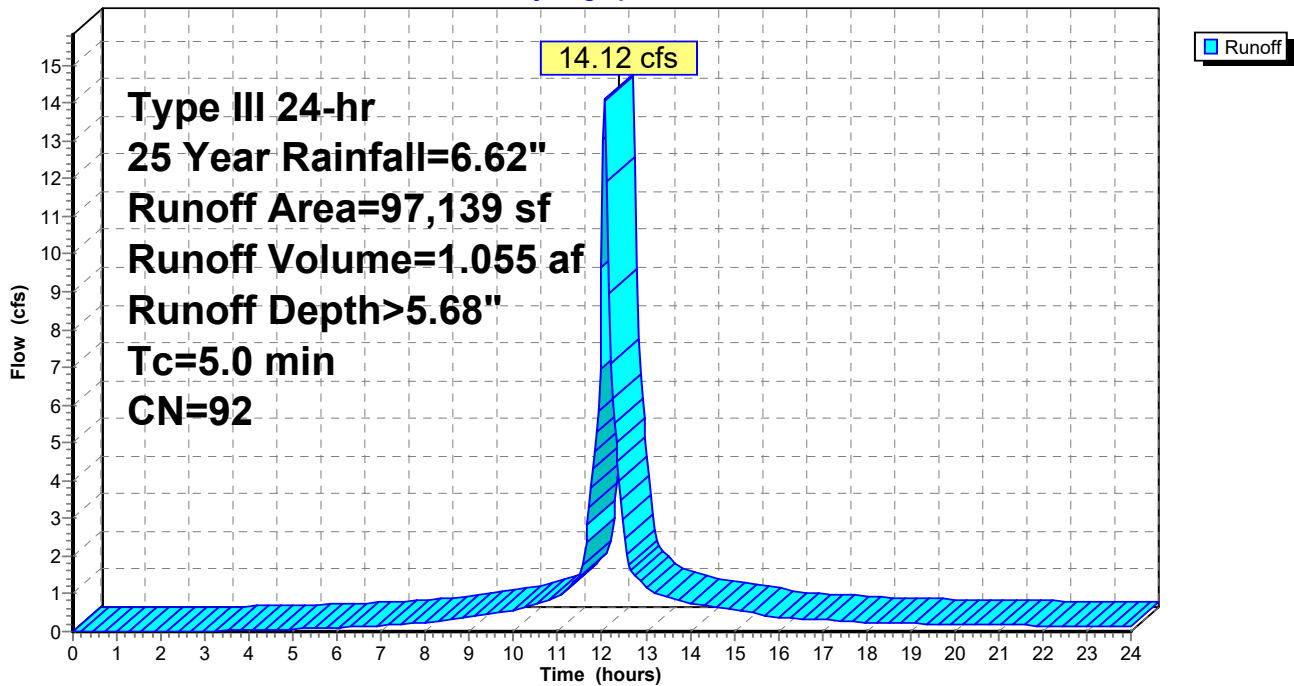
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
55,757	98	Paved parking, HSG D
33,106	80	>75% Grass cover, Good, HSG D
8,276	98	Unconnected pavement, HSG D
97,139	92	Weighted Average
33,106		34.08% Pervious Area
64,033		65.92% Impervious Area
8,276		12.92% Unconnected

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

**Subcatchment 1S: Merrell - AB**

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 2S: Spruce Byp-AB

Runoff = 19.71 cfs @ 12.07 hrs, Volume= 1.502 af, Depth> 5.91"

Routed to Link 6L : Spruce - Out-AB

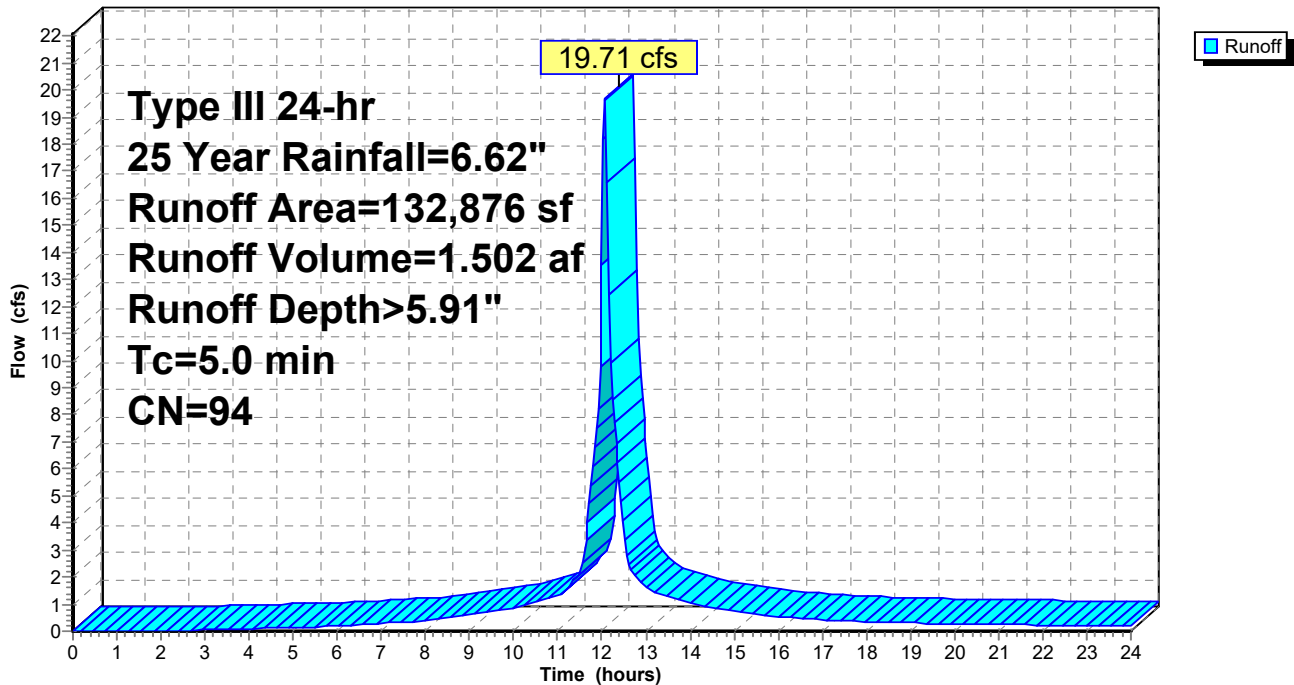
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
27,545	80	>75% Grass cover, Good, HSG D
105,331	98	Paved parking, HSG D
132,876	94	Weighted Average
27,545		20.73% Pervious Area
105,331		79.27% Impervious Area

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

## Subcatchment 2S: Spruce Byp-AB

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 3S: Spruce On- AB**

Runoff = 98.24 cfs @ 12.26 hrs, Volume= 11.210 af, Depth> 5.89"  
 Routed to Pond 8P : Det Basin -AB

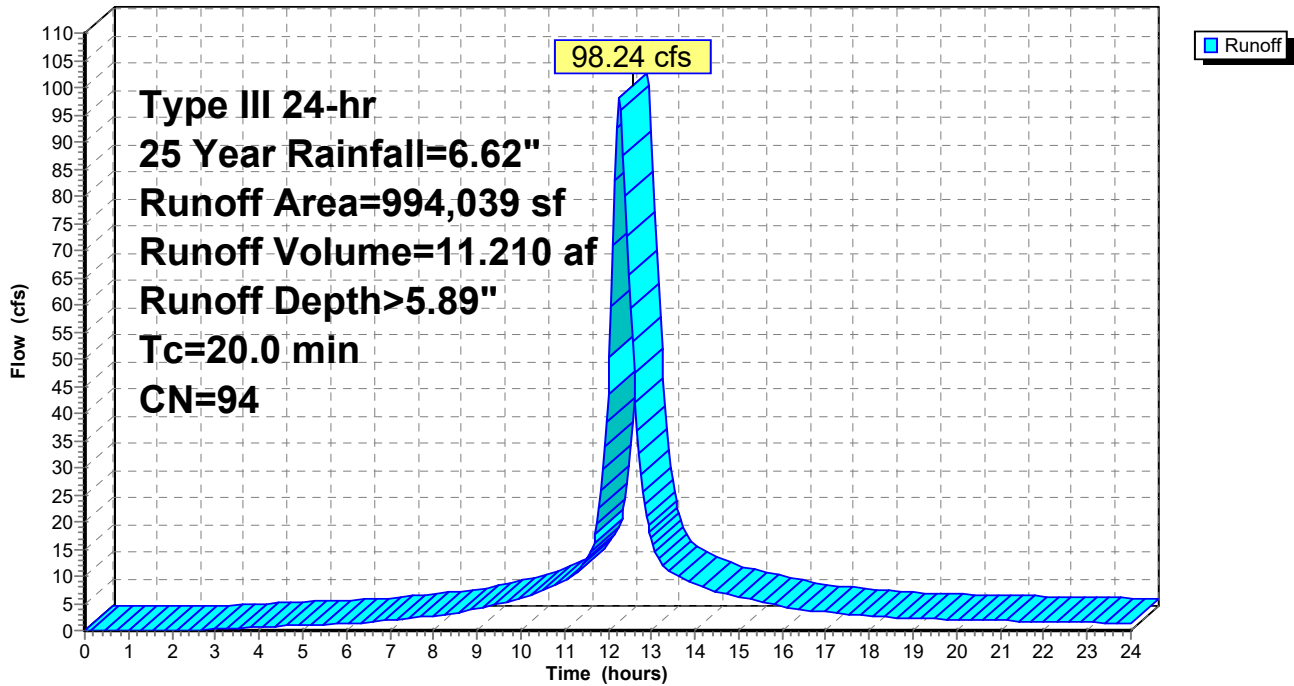
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
713,165	98	Paved parking, HSG D
229,745	80	>75% Grass cover, Good, HSG D
* 35,719	98	Unconnected roofs
* 15,410	98	Offsite - Paved parking, HSG D
994,039	94	Weighted Average
229,745		23.11% Pervious Area
764,294		76.89% Impervious Area
35,719		4.67% Unconnected

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

**Subcatchment 3S: Spruce On- AB**

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 4S: Wright - AB

Runoff = 4.62 cfs @ 12.08 hrs, Volume= 0.326 af, Depth> 4.67"

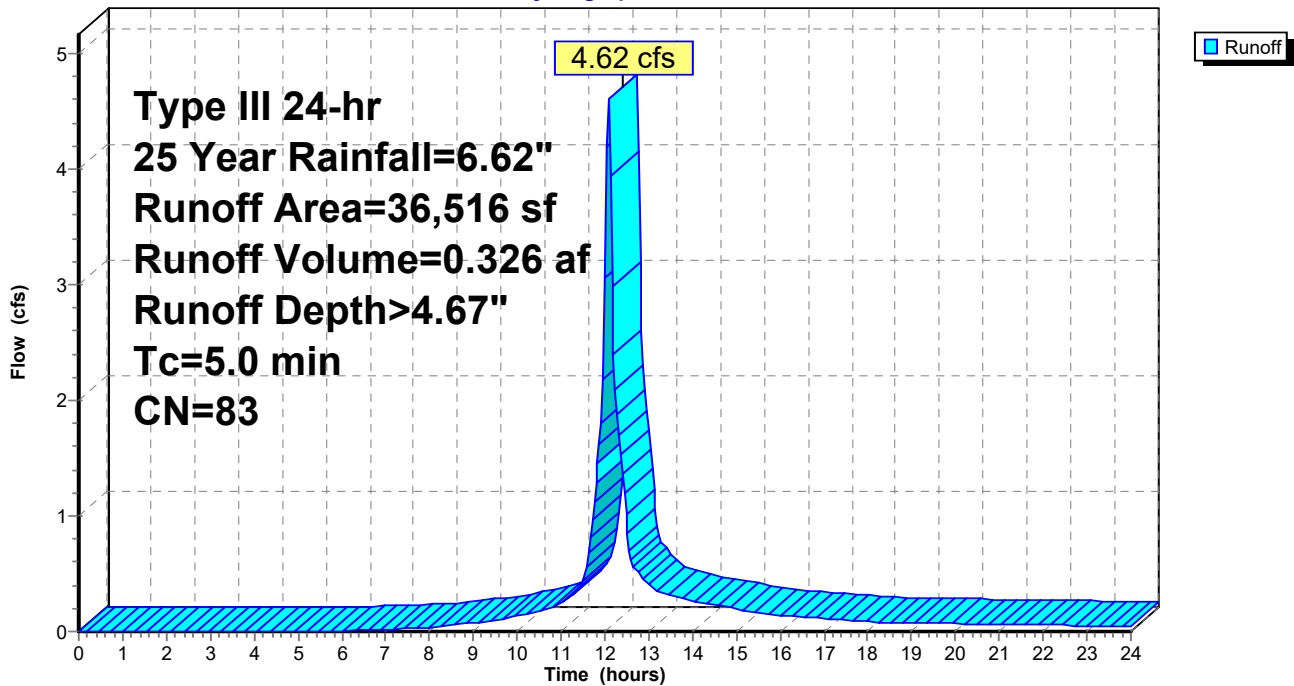
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
30,441	80	>75% Grass cover, Good, HSG D
6,075	98	Paved parking, HSG D
36,516	83	Weighted Average
30,441		83.36% Pervious Area
6,075		16.64% Impervious Area

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

## Subcatchment 4S: Wright - AB

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 12S: Porous Parking #3

Runoff = 0.93 cfs @ 12.07 hrs, Volume= 0.066 af, Depth> 4.89"

Routed to Pond 13P : Porous Storage #3

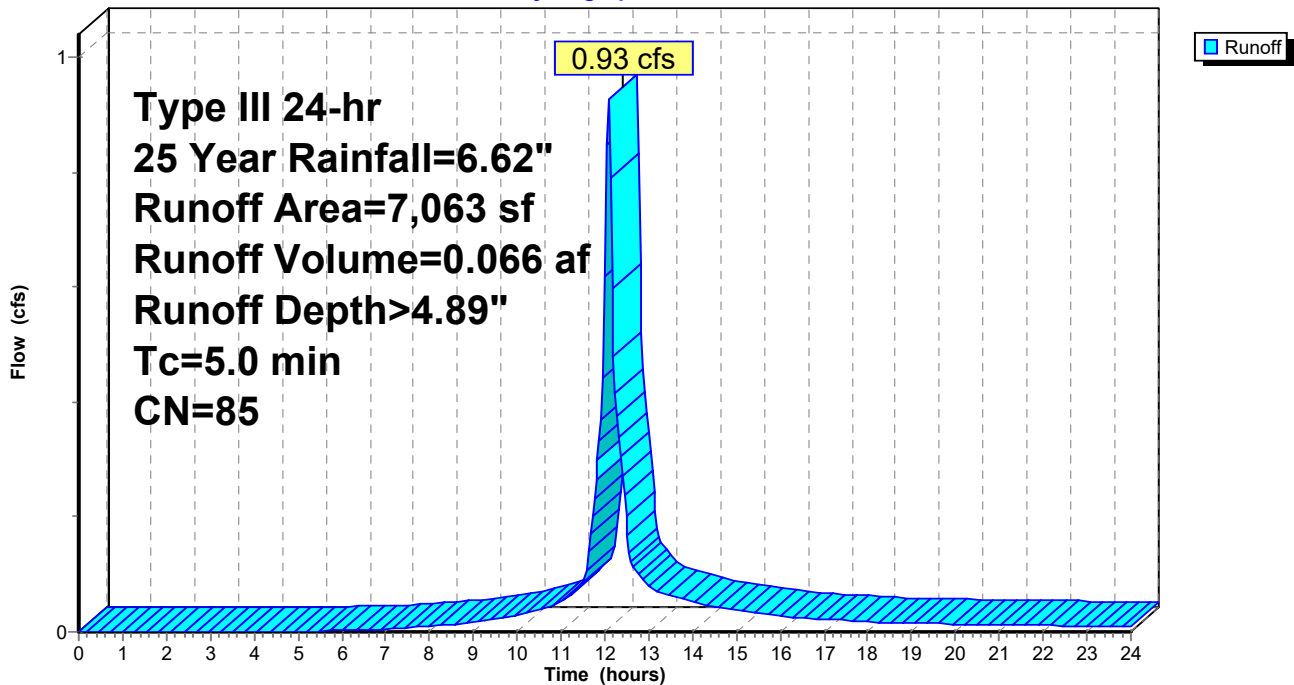
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
* 7,063	85	Porous Pavers
7,063		100.00% Pervious Area

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

## Subcatchment 12S: Porous Parking #3

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 13S: Porous Parking #2A

Runoff = 1.39 cfs @ 12.07 hrs, Volume= 0.099 af, Depth> 4.89"  
Routed to Pond 29P : PP #2A-AB

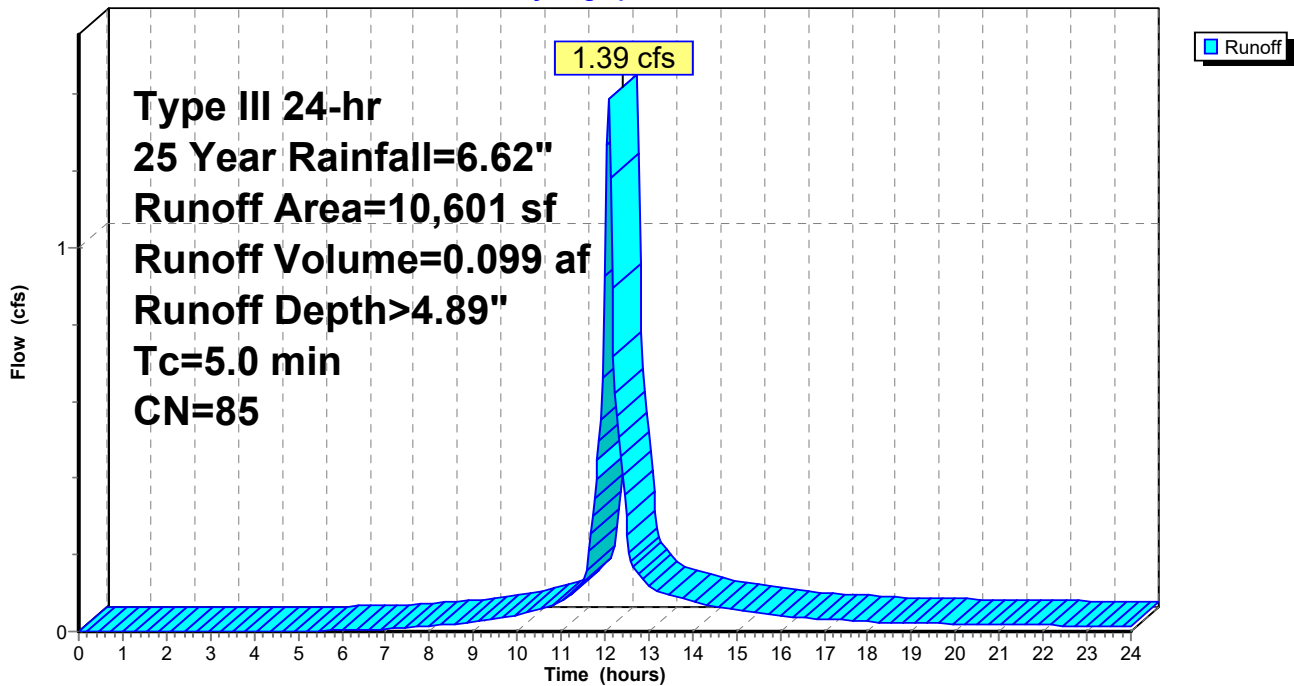
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
283	80	>75% Grass cover, Good, HSG D
* 10,318	85	Porous Pavement
10,601	85	Weighted Average
10,601		100.00% Pervious Area

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

## Subcatchment 13S: Porous Parking #2A

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 16S: Porous Parking #1

Runoff = 2.32 cfs @ 12.07 hrs, Volume= 0.164 af, Depth> 4.78"  
Routed to Pond 17P : PP #1-AB

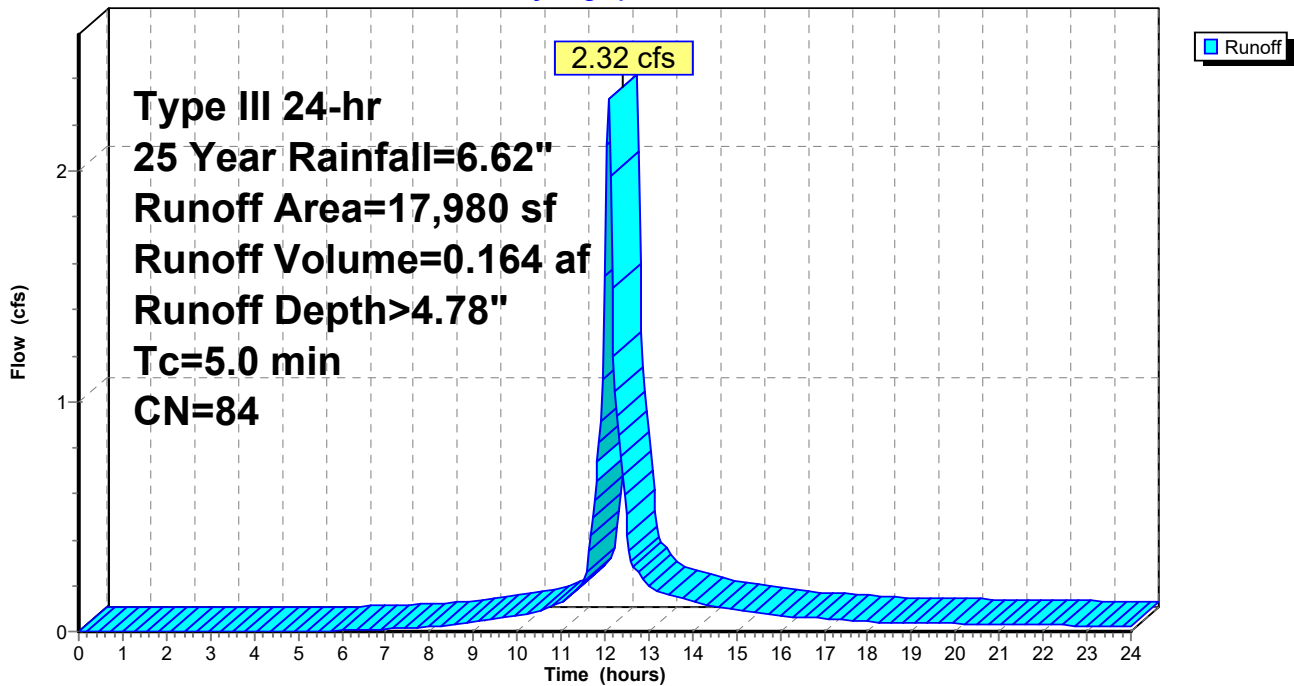
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
2,311	80	>75% Grass cover, Good, HSG D
* 15,669	85	Porous Pavement
17,980	84	Weighted Average
17,980		100.00% Pervious Area

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

## Subcatchment 16S: Porous Parking #1

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 18S: Spruce Byp-PR**

Runoff = 19.71 cfs @ 12.07 hrs, Volume= 1.502 af, Depth> 5.91"

Routed to Link 27L : Spruce - Out-PR

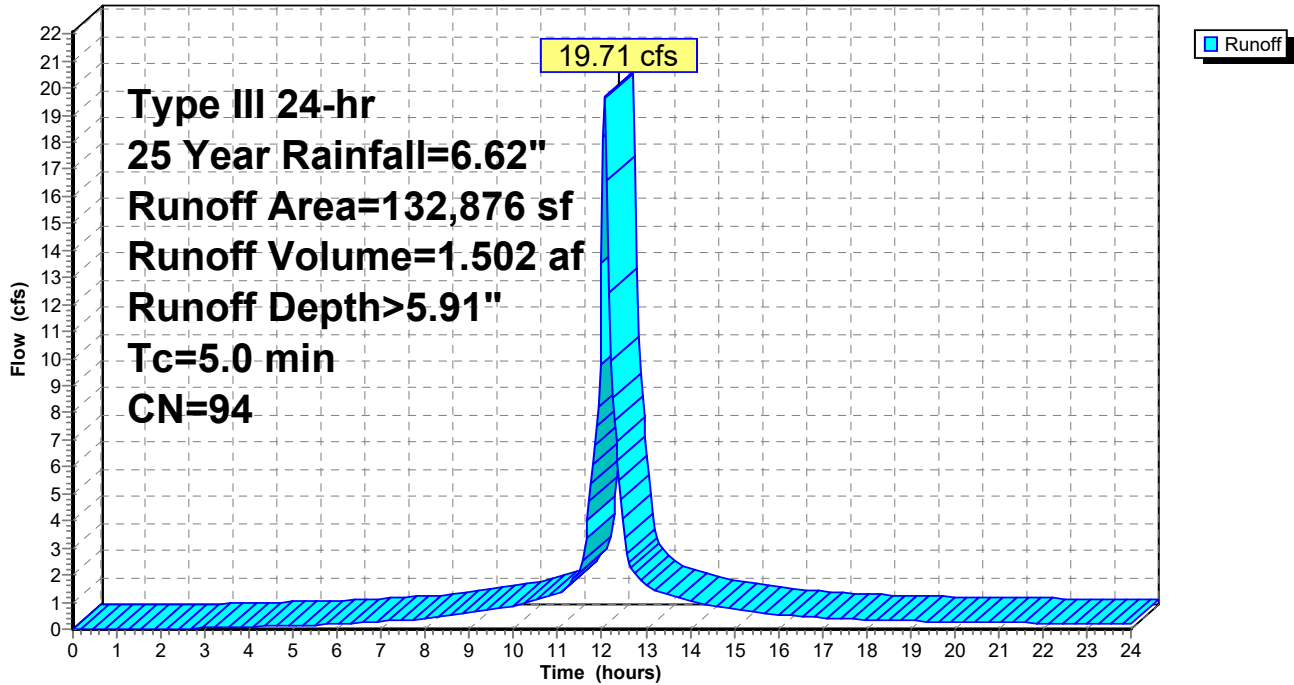
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
105,331	98	Paved parking, HSG D
27,545	80	>75% Grass cover, Good, HSG D
132,876	94	Weighted Average
27,545		20.73% Pervious Area
105,331		79.27% Impervious Area

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

**Subcatchment 18S: Spruce Byp-PR**

Hydrograph



# 4620 HydroCAD Wright Parking

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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 19S: Spruce On- PR

Runoff = 98.24 cfs @ 12.26 hrs, Volume= 11.210 af, Depth> 5.89"  
 Routed to Pond 23P : Det Basin -PR

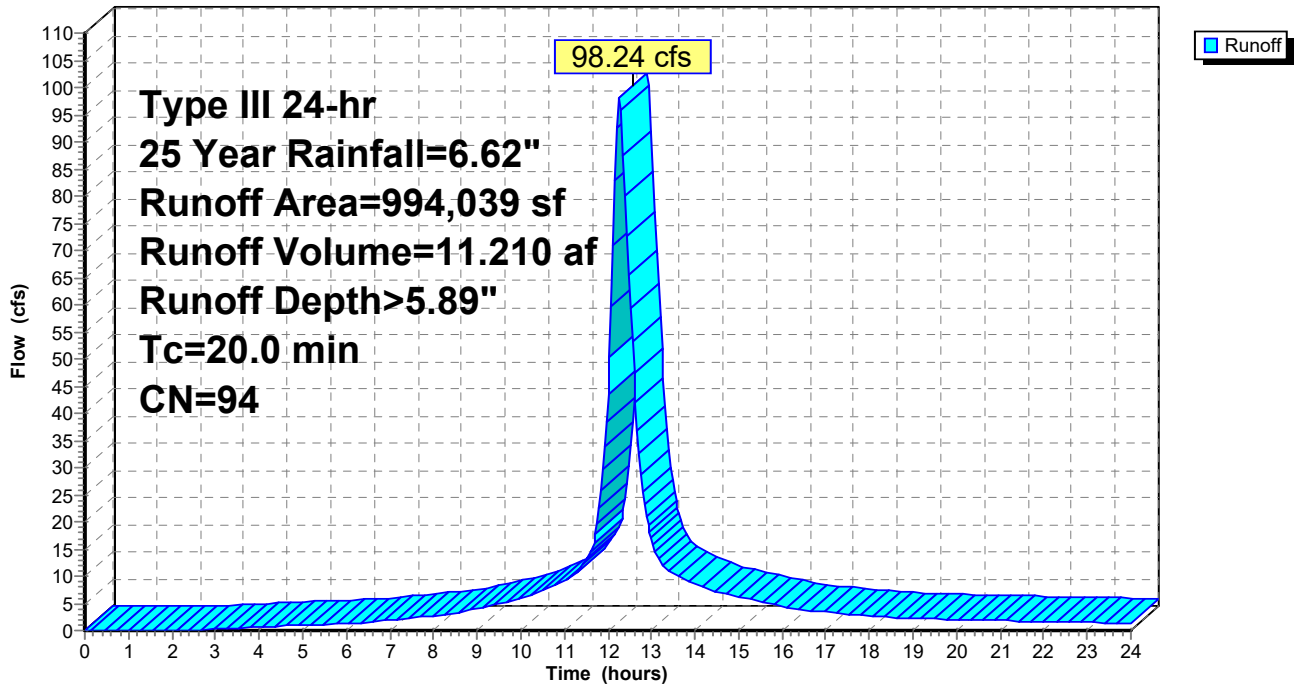
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
719,415	98	Paved parking, HSG D
223,495	80	>75% Grass cover, Good, HSG D
* 35,719	98	Unconnected roofs
* 15,410	98	Offsite - Paved parking, HSG D
994,039	94	Weighted Average
223,495		22.48% Pervious Area
770,544		77.52% Impervious Area
35,719		4.64% Unconnected

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

## Subcatchment 19S: Spruce On- PR

Hydrograph



# 4620 HydroCAD Wright Parking

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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 20S: Porous Parking #3

Runoff = 0.93 cfs @ 12.07 hrs, Volume= 0.066 af, Depth> 4.89"

Routed to Pond 24P : Porous Storage #3

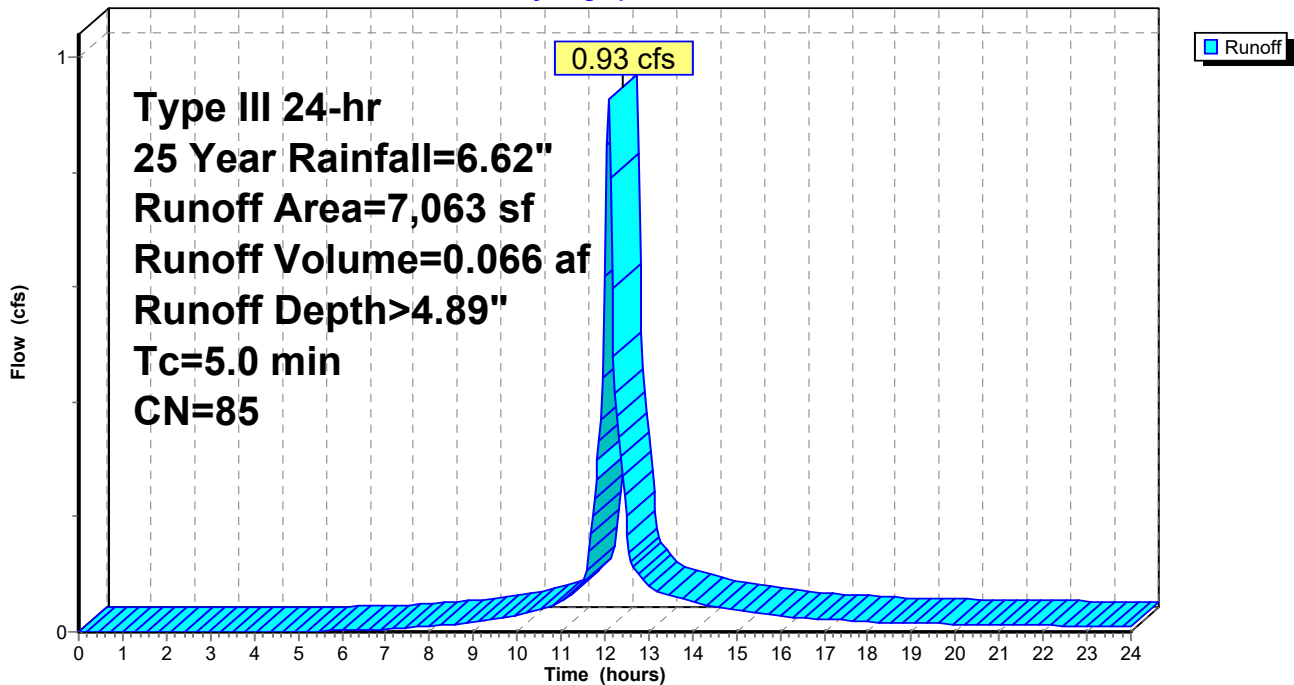
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
* 7,063	85	Porous Pavers
7,063		100.00% Pervious Area

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

## Subcatchment 20S: Porous Parking #3

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 21S: Porous Parking #2B**

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 0.103 af, Depth> 4.89"

Routed to Pond 33P : PP #2B-PR

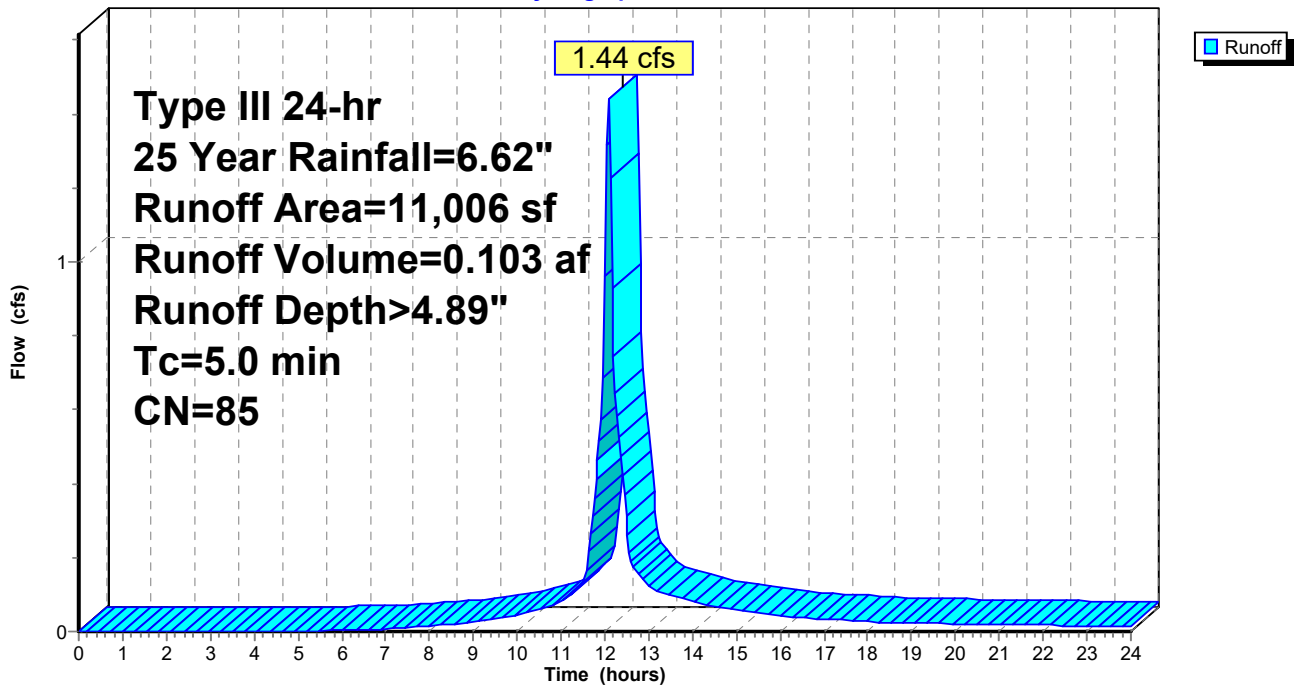
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Type III 24-hr 25 Year Rainfall=6.62"

	Area (sf)	CN	Description
*	10,819	85	Porous Pavement
	187	80	>75% Grass cover, Good, HSG D
	11,006	85	Weighted Average
	11,006		100.00% Pervious Area

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

**Subcatchment 21S: Porous Parking #2B**

Hydrograph



**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 22S: Porous Parking #1**

Runoff = 2.68 cfs @ 12.07 hrs, Volume= 0.193 af, Depth> 5.11"  
 Routed to Pond 26P : PP #1-PR

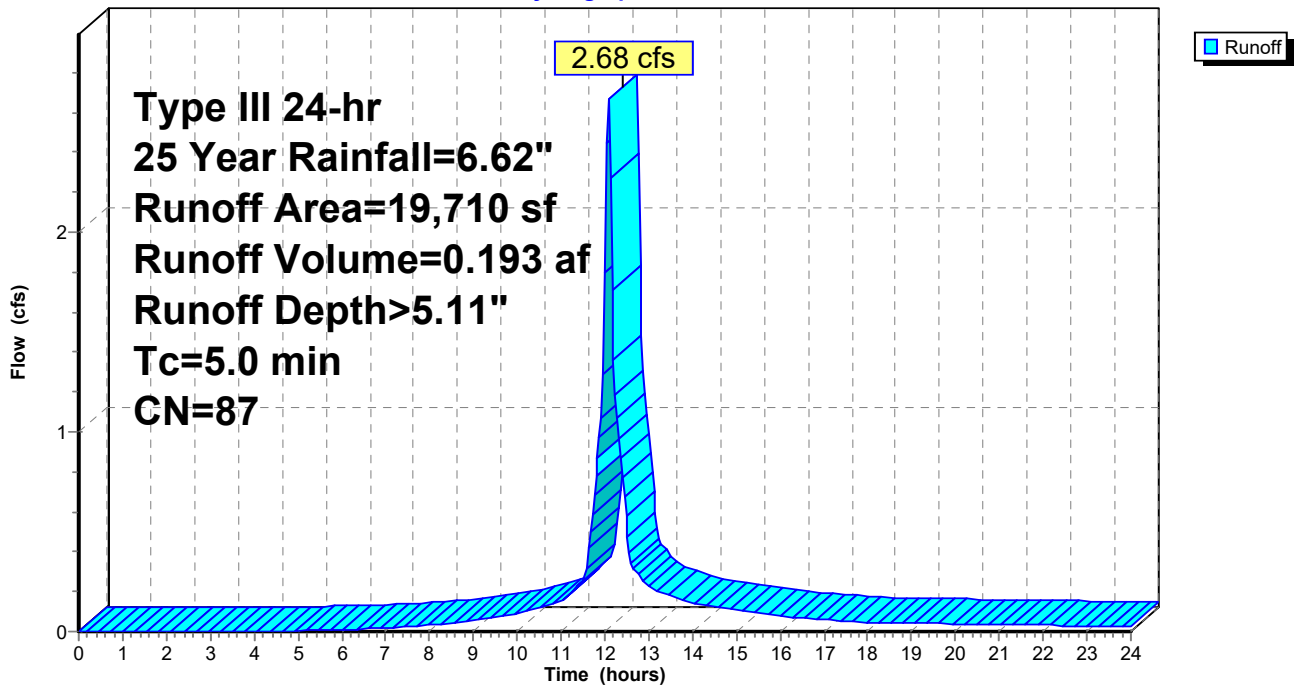
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Type III 24-hr 25 Year Rainfall=6.62"

	Area (sf)	CN	Description
*	15,669	85	Porous Pavement
	1,146	80	>75% Grass cover, Good, HSG D
	2,895	98	Paved parking, HSG D
	19,710	87	Weighted Average
	16,815		85.31% Pervious Area
	2,895		14.69% Impervious Area

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

**Subcatchment 22S: Porous Parking #1**

Hydrograph



**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 28S: Merrell - PR**

Runoff = 14.12 cfs @ 12.07 hrs, Volume= 1.055 af, Depth> 5.68"

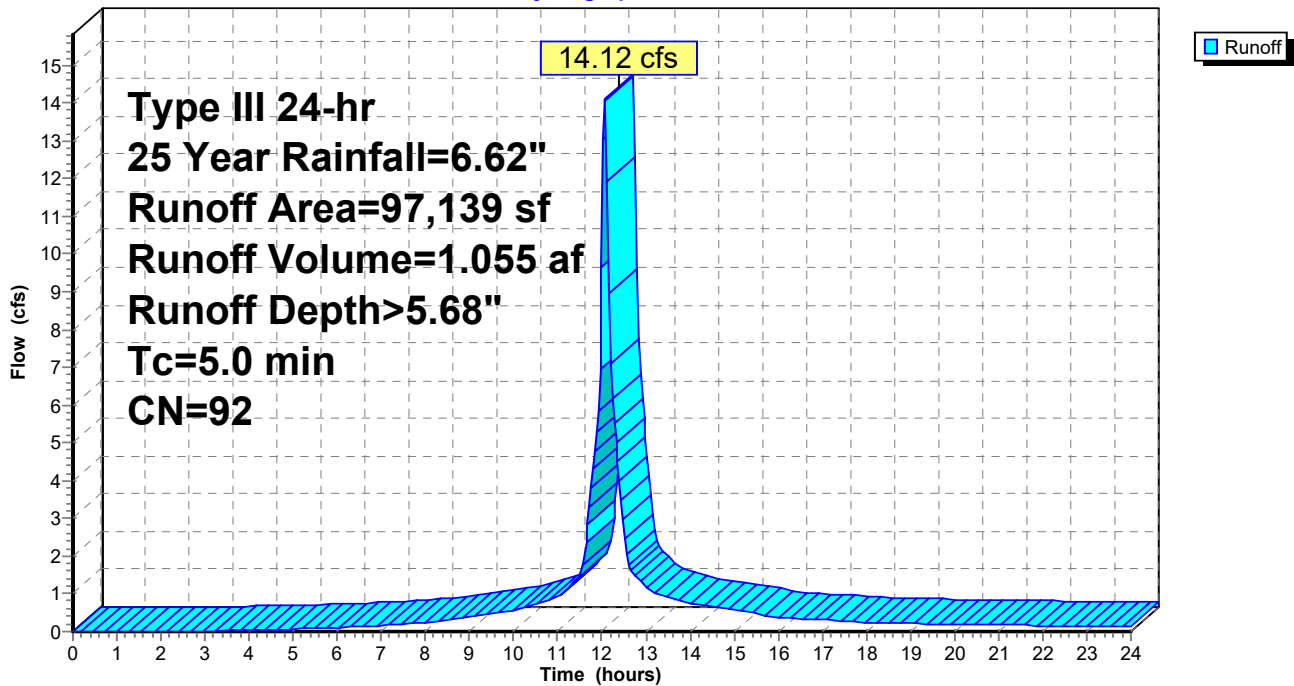
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
55,757	98	Paved parking, HSG D
33,106	80	>75% Grass cover, Good, HSG D
8,276	98	Unconnected pavement, HSG D
97,139	92	Weighted Average
33,106		34.08% Pervious Area
64,033		65.92% Impervious Area
8,276		12.92% Unconnected

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

**Subcatchment 28S: Merrell - PR**

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 29S: Wright - PR

Runoff = 4.59 cfs @ 12.08 hrs, Volume= 0.324 af, Depth> 4.67"  
 Routed to nonexistent node 35L

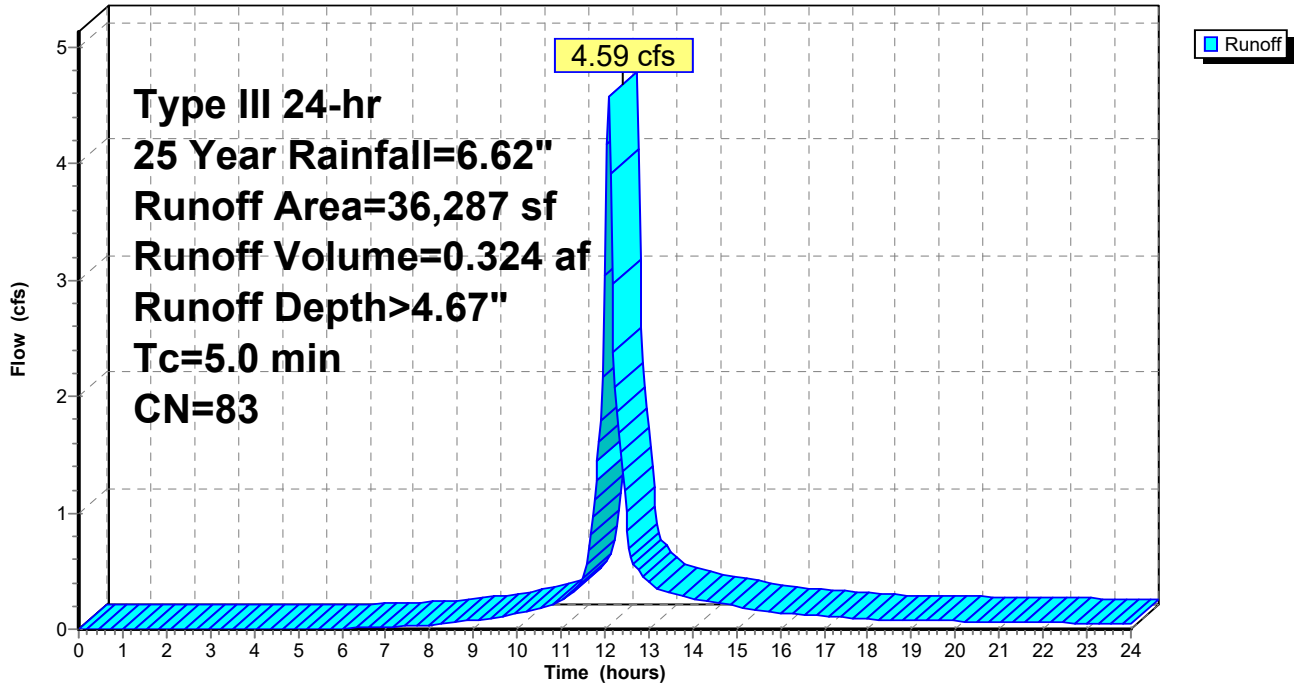
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
30,797	80	>75% Grass cover, Good, HSG D
5,490	98	Paved parking, HSG D
36,287	83	Weighted Average
30,797		84.87% Pervious Area
5,490		15.13% Impervious Area

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

## Subcatchment 29S: Wright - PR

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Subcatchment 30S: Porous Parking #2B

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 0.103 af, Depth> 4.89"  
Routed to Pond 15P : PP #2B-AB

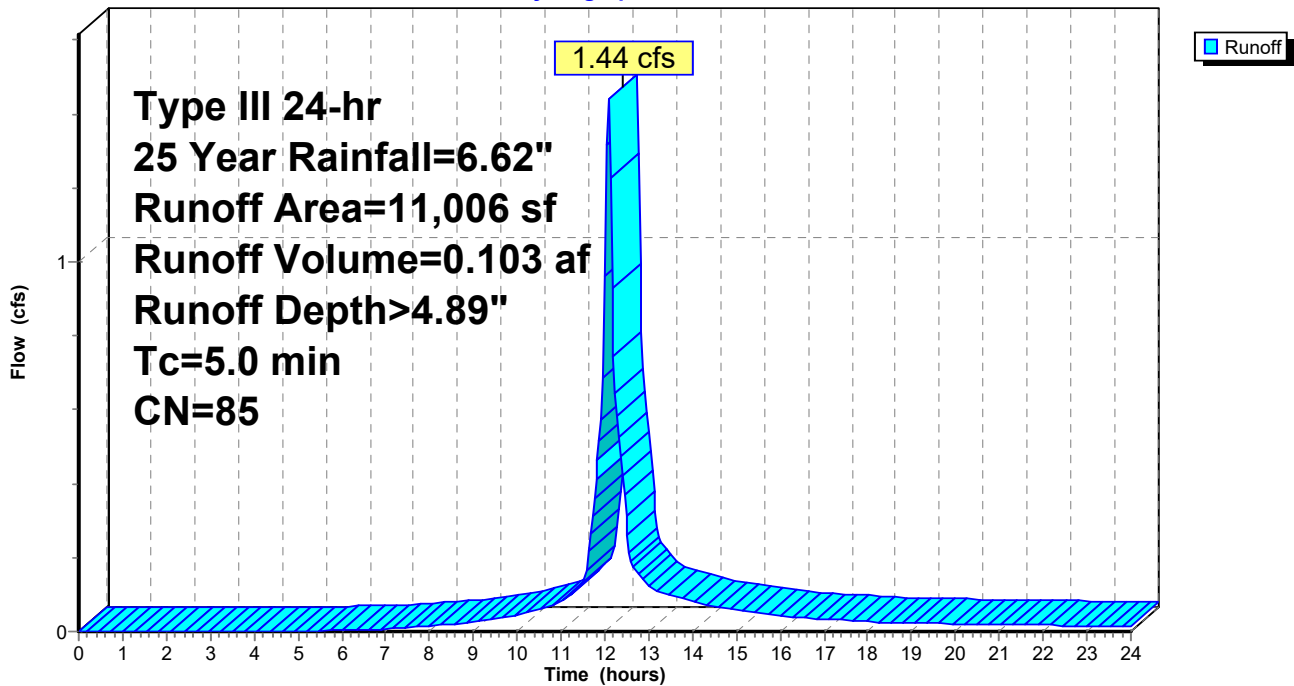
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
Type III 24-hr 25 Year Rainfall=6.62"

Area (sf)	CN	Description
187	80	>75% Grass cover, Good, HSG D
* 10,819	85	Porous Pavement
11,006	85	Weighted Average
11,006		100.00% Pervious Area

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

## Subcatchment 30S: Porous Parking #2B

Hydrograph



**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Subcatchment 33S: Porous Parking #2A**

Runoff = 1.43 cfs @ 12.07 hrs, Volume= 0.102 af, Depth> 4.89"  
 Routed to Pond 34P : PP #2A-PR

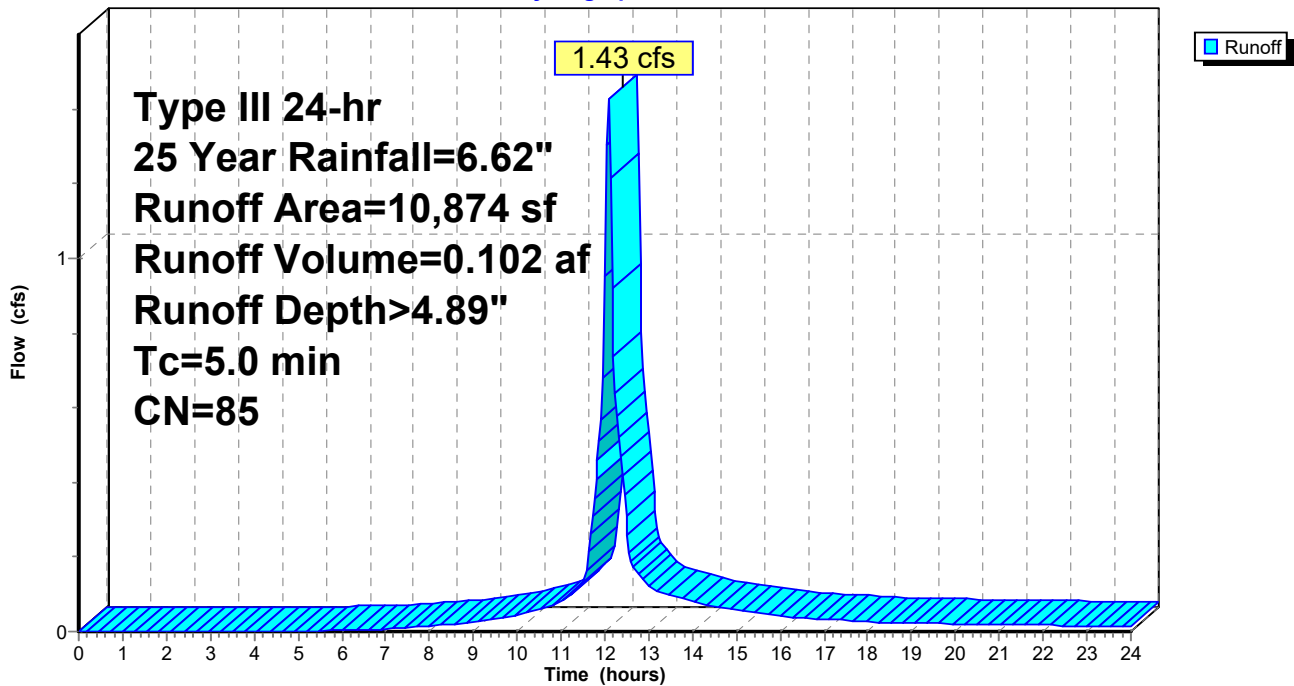
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Type III 24-hr 25 Year Rainfall=6.62"

	Area (sf)	CN	Description
*	10,318	85	Porous Pavement
	164	98	Paved parking, HSG D
	392	80	>75% Grass cover, Good, HSG D
	10,874	85	Weighted Average
	10,710		98.49% Pervious Area
	164		1.51% Impervious Area

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

**Subcatchment 33S: Porous Parking #2A**

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 8P: Det Basin -AB

Inflow Area = 23.729 ac, 73.94% Impervious, Inflow Depth > 5.81" for 25 Year event  
 Inflow = 100.97 cfs @ 12.26 hrs, Volume= 11.483 af  
 Outflow = 85.12 cfs @ 12.38 hrs, Volume= 11.424 af, Atten= 16%, Lag= 7.5 min  
 Primary = 85.12 cfs @ 12.38 hrs, Volume= 11.424 af  
 Routed to Link 6L : Spruce - Out-AB

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 67.14' @ 12.38 hrs Storage= 1.166 af

Plug-Flow detention time= 14.8 min calculated for 11.424 af (99% of inflow)  
 Center-of-Mass det. time= 11.4 min ( 790.3 - 778.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	1.475 af	<b>Det Basin</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
59.00	0.000
60.00	0.001
61.00	0.007
62.00	0.013
62.50	0.027
63.00	0.062
64.00	0.242
65.00	0.507
66.00	0.799
67.00	1.114
68.00	1.475

Device	Routing	Invert	Outlet Devices
#1	Primary	65.02'	<b>78.0" W x 12.0" H Vert. Vault Weir</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	63.42'	<b>15.0" Vert. 15" Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	62.66'	<b>18.0" Vert. 18" Orifices x2 X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	66.66'	<b>Double CB Grate X 2.00</b> Head (feet) 0.00 0.08 0.17 0.25 0.33 0.42 0.50 Disch. (cfs) 0.000 3.400 4.500 6.200 7.700 9.400 11.000
#5	Primary	59.00'	<b>3.0" Vert. 3" Orifice in cap</b> C= 0.600 Limited to weir flow at low heads
#6	Device 4	63.56'	<b>10.0" Round Double CB Culvert</b> L= 34.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.56' / 62.40' S= 0.0341 1/1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

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Type III 24-hr 25 Year Rainfall=6.62"

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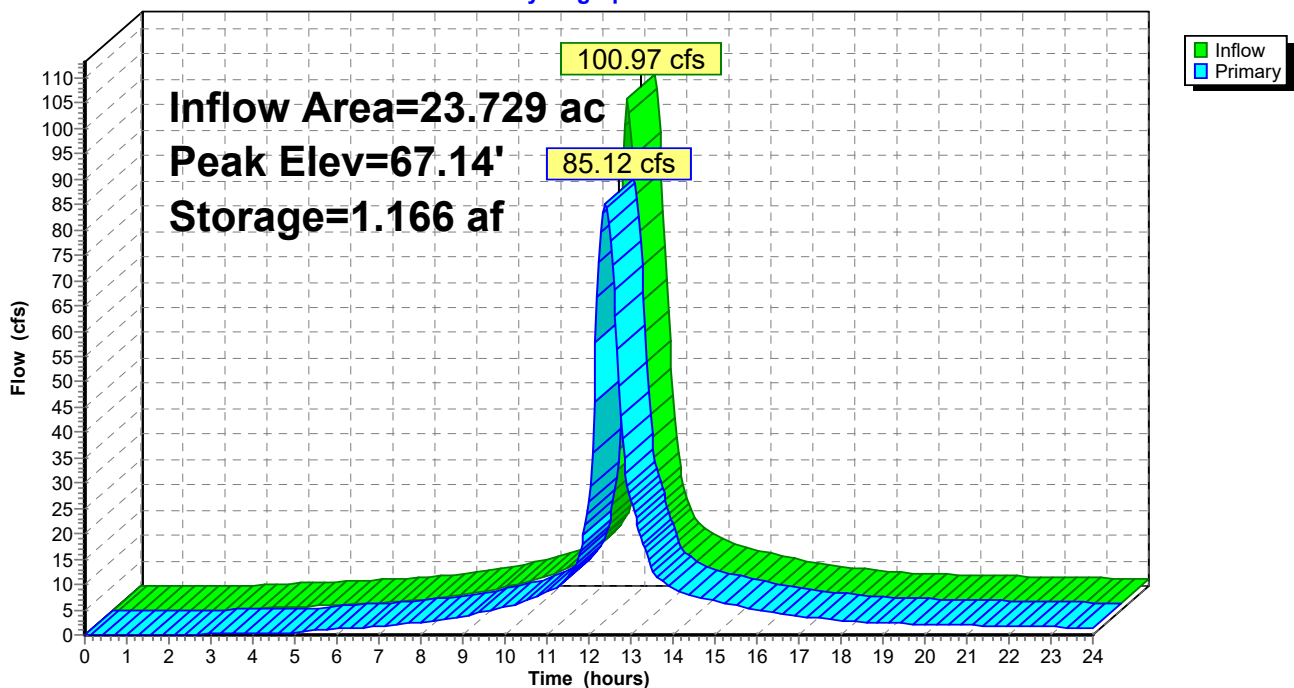
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**Primary OutFlow** Max=84.96 cfs @ 12.38 hrs HW=67.14' (Free Discharge)

- 1=Vault Weir (Orifice Controls 39.62 cfs @ 6.10 fps)
- 2=15" Orifice (Orifice Controls 10.39 cfs @ 8.47 fps)
- 3=18" Orifices x2 (Orifice Controls 32.85 cfs @ 9.29 fps)
- 4=Double CB Grate (Passes 1.43 cfs of 21.04 cfs potential flow)
- 5=3" Orifice in cap (Orifice Controls 0.67 cfs @ 13.63 fps)
- 6=Double CB Culvert (Inlet Controls 1.43 cfs @ 2.62 fps)

## Pond 8P: Det Basin -AB

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 13P: Porous Storage #3

Inflow Area = 0.162 ac, 0.00% Impervious, Inflow Depth > 4.89" for 25 Year event  
 Inflow = 0.93 cfs @ 12.07 hrs, Volume= 0.066 af  
 Outflow = 0.19 cfs @ 12.50 hrs, Volume= 0.030 af, Atten= 79%, Lag= 25.2 min  
 Primary = 0.19 cfs @ 12.50 hrs, Volume= 0.030 af  
 Routed to Link 6L : Spruce - Out-AB

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 67.55' @ 12.50 hrs Surf.Area= 3,216 sf Storage= 1,664 cf

Plug-Flow detention time= 256.8 min calculated for 0.030 af (45% of inflow)  
 Center-of-Mass det. time= 139.3 min ( 935.0 - 795.7 )

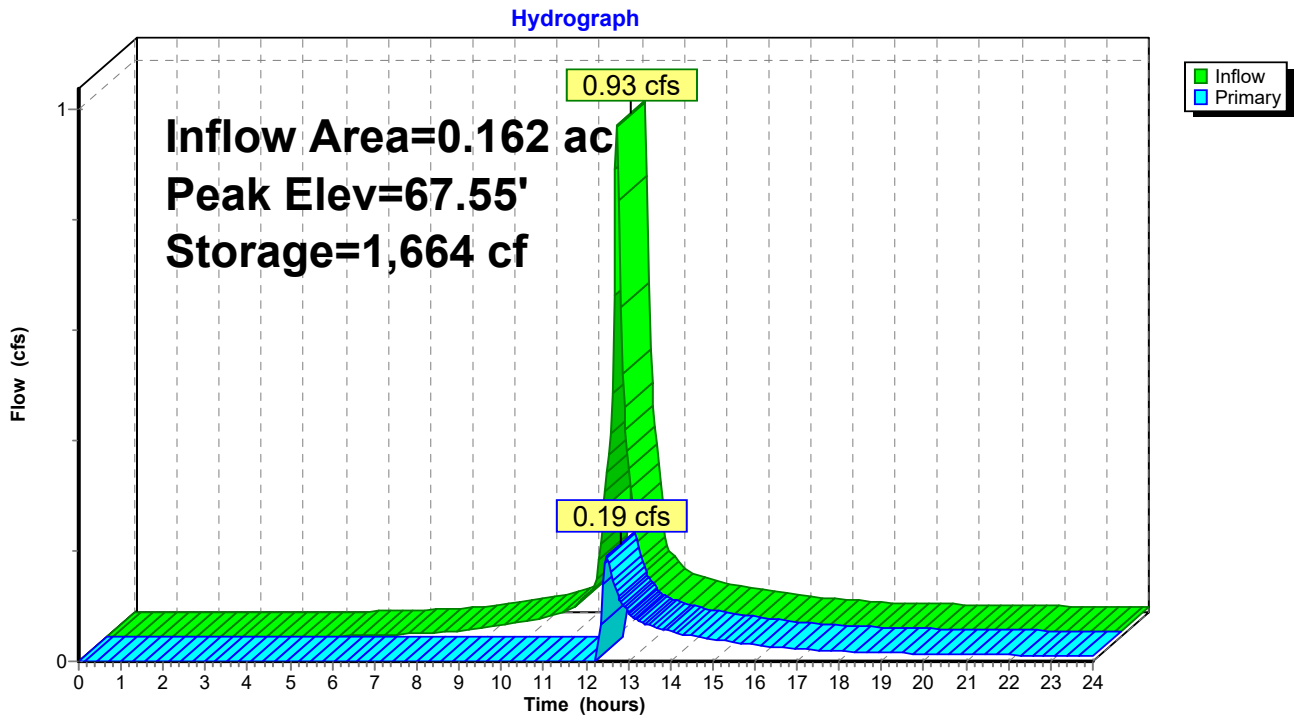
Volume	Invert	Avail.Storage	Storage Description
#1	65.50'	4,113 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 10,283 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.50	0	0	0
67.00	3,210	2,408	2,408
68.50	3,227	4,828	7,235
70.00	627	2,891	10,126
70.50	0	157	10,283

Device	Routing	Invert	Outlet Devices
#1	Primary	67.48'	<b>4.0' long CB#20</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=0.19 cfs @ 12.50 hrs HW=67.55' (Free Discharge)  
 ↑1=CB#20 (Weir Controls 0.19 cfs @ 0.71 fps)

### Pond 13P: Porous Storage #3



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 15P: PP #2B-AB

Inflow Area = 0.253 ac, 0.00% Impervious, Inflow Depth > 4.89" for 25 Year event  
 Inflow = 1.44 cfs @ 12.07 hrs, Volume= 0.103 af  
 Outflow = 1.17 cfs @ 12.13 hrs, Volume= 0.071 af, Atten= 19%, Lag= 3.6 min  
 Primary = 1.17 cfs @ 12.13 hrs, Volume= 0.071 af  
 Routed to Pond 8P : Det Basin -AB

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 70.55' @ 12.13 hrs Surf.Area= 3,432 sf Storage= 1,650 cf

Plug-Flow detention time= 157.5 min calculated for 0.071 af (69% of inflow)  
 Center-of-Mass det. time= 65.8 min ( 861.5 - 795.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	68.50'	6,937 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 17,342 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.50	0	0	0
70.00	3,106	2,330	2,330
71.70	4,116	6,139	8,468
73.40	2,594	5,704	14,172
74.90	790	2,538	16,710
76.50	0	632	17,342

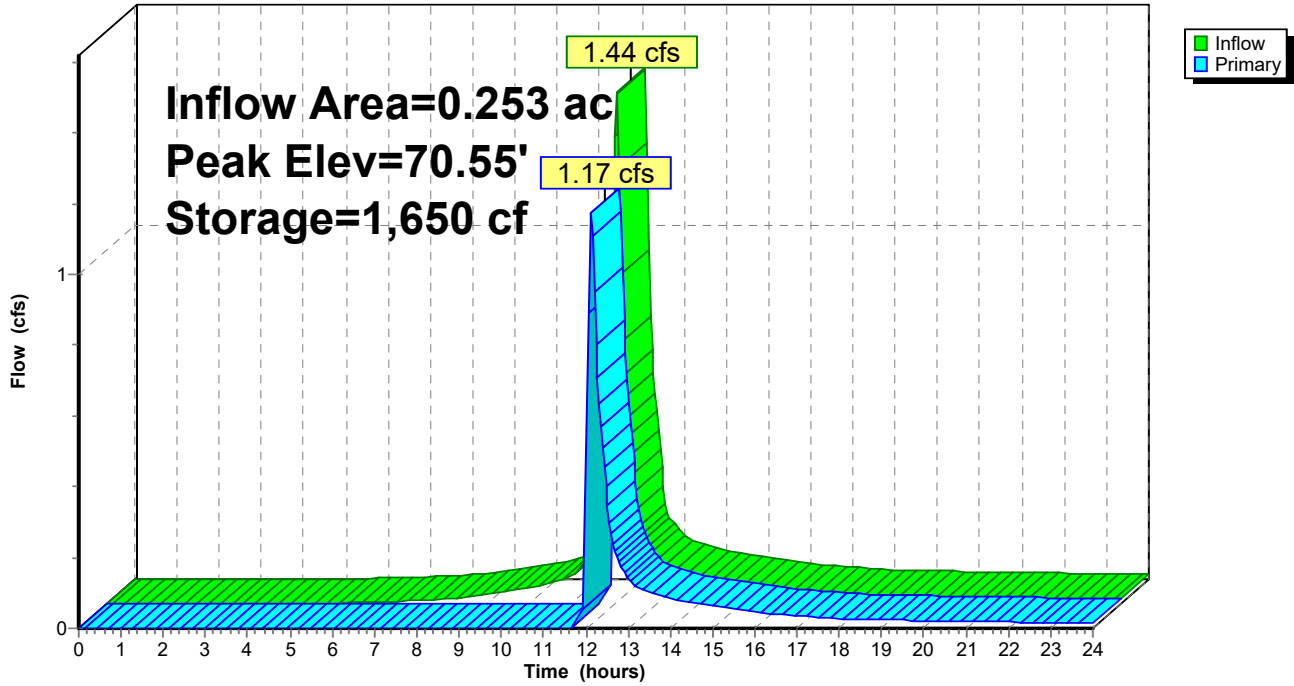
Device	Routing	Invert	Outlet Devices
#1	Primary	70.33'	<b>4.0' long CB#17B</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=1.12 cfs @ 12.13 hrs HW=70.54' (Free Discharge)

↑1=CB#17B (Weir Controls 1.12 cfs @ 1.30 fps)

Pond 15P: PP #2B-AB

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 17P: PP #1-AB

Inflow Area = 0.413 ac, 0.00% Impervious, Inflow Depth > 4.78" for 25 Year event  
 Inflow = 2.32 cfs @ 12.07 hrs, Volume= 0.164 af  
 Outflow = 2.14 cfs @ 12.11 hrs, Volume= 0.135 af, Atten= 8%, Lag= 2.0 min  
 Primary = 2.14 cfs @ 12.11 hrs, Volume= 0.135 af  
 Routed to Pond 8P : Det Basin -AB

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 76.45' @ 12.11 hrs Surf.Area= 3,877 sf Storage= 1,653 cf

Plug-Flow detention time= 112.2 min calculated for 0.134 af (82% of inflow)  
 Center-of-Mass det. time= 41.9 min ( 840.4 - 798.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	74.20'	9,814 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 24,536 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.20	0	0	0
75.70	2,378	1,784	1,784
77.00	4,974	4,779	6,562
78.50	5,720	8,021	14,583
80.20	2,752	7,201	21,784
82.20	0	2,752	24,536

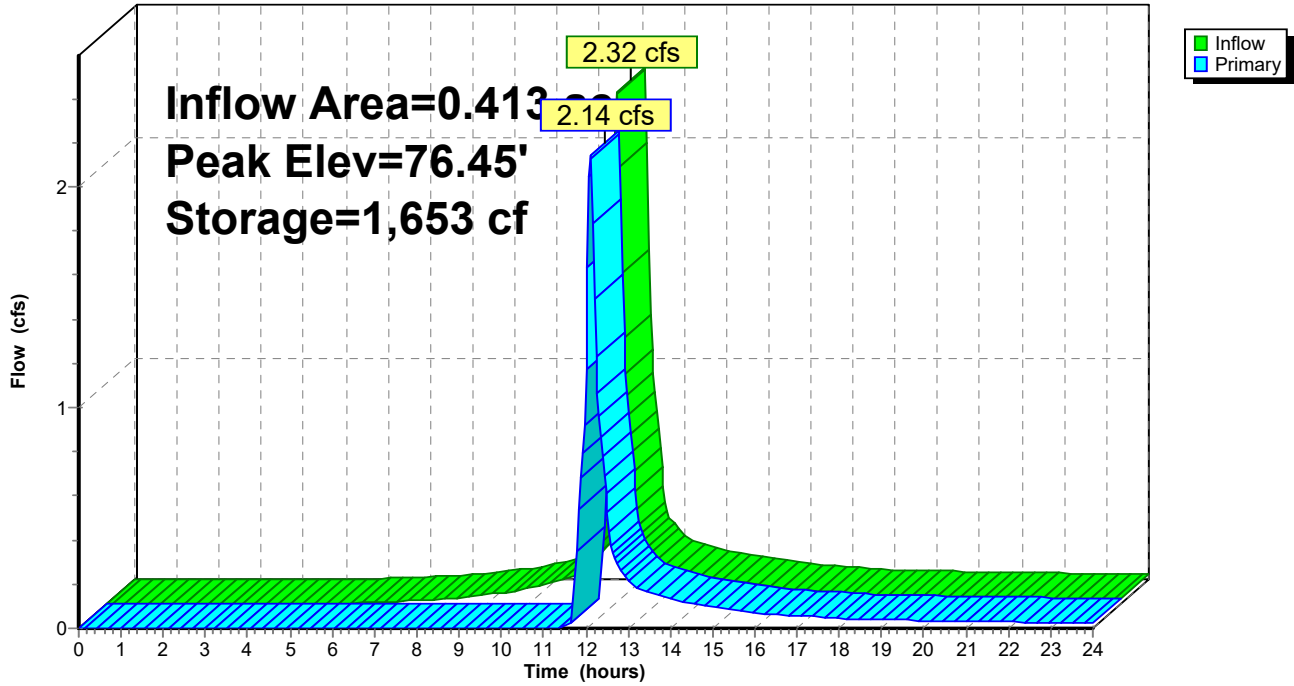
Device	Routing	Invert	Outlet Devices
#1	Primary	76.20'	<b>6.0' long ExCB#20</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=2.09 cfs @ 12.11 hrs HW=76.45' (Free Discharge)

↑**1=ExCB#20** (Weir Controls 2.09 cfs @ 1.41 fps)

Pond 17P: PP #1-AB

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 23P: Det Basin -PR

Inflow Area = 23.775 ac, 74.70% Impervious, Inflow Depth > 5.80" for 25 Year event  
 Inflow = 101.17 cfs @ 12.26 hrs, Volume= 11.491 af  
 Outflow = 85.24 cfs @ 12.38 hrs, Volume= 11.432 af, Atten= 16%, Lag= 7.5 min  
 Primary = 85.24 cfs @ 12.38 hrs, Volume= 11.432 af  
 Routed to Link 27L : Spruce - Out-PR

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 67.15' @ 12.38 hrs Storage= 1.168 af

Plug-Flow detention time= 14.8 min calculated for 11.413 af (99% of inflow)  
 Center-of-Mass det. time= 11.4 min ( 790.5 - 779.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	1.475 af	<b>Det Basin</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
59.00	0.000
60.00	0.001
61.00	0.007
62.00	0.013
62.50	0.027
63.00	0.062
64.00	0.242
65.00	0.507
66.00	0.799
67.00	1.114
68.00	1.475

Device	Routing	Invert	Outlet Devices
#1	Primary	65.02'	<b>78.0" W x 12.0" H Vert. Vault Weir</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	63.42'	<b>15.0" Vert. 15" Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	62.66'	<b>18.0" Vert. 18" Orifices x2 X 2.00</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	66.66'	<b>Double CB Grate X 2.00</b> Head (feet) 0.00 0.08 0.17 0.25 0.33 0.42 0.50 Disch. (cfs) 0.000 3.400 4.500 6.200 7.700 9.400 11.000
#5	Primary	59.00'	<b>3.0" Vert. 3" Orifice in cap</b> C= 0.600 Limited to weir flow at low heads
#6	Device 4	63.56'	<b>10.0" Round Double CB Culvert</b> L= 34.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.56' / 62.40' S= 0.0341 1/1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

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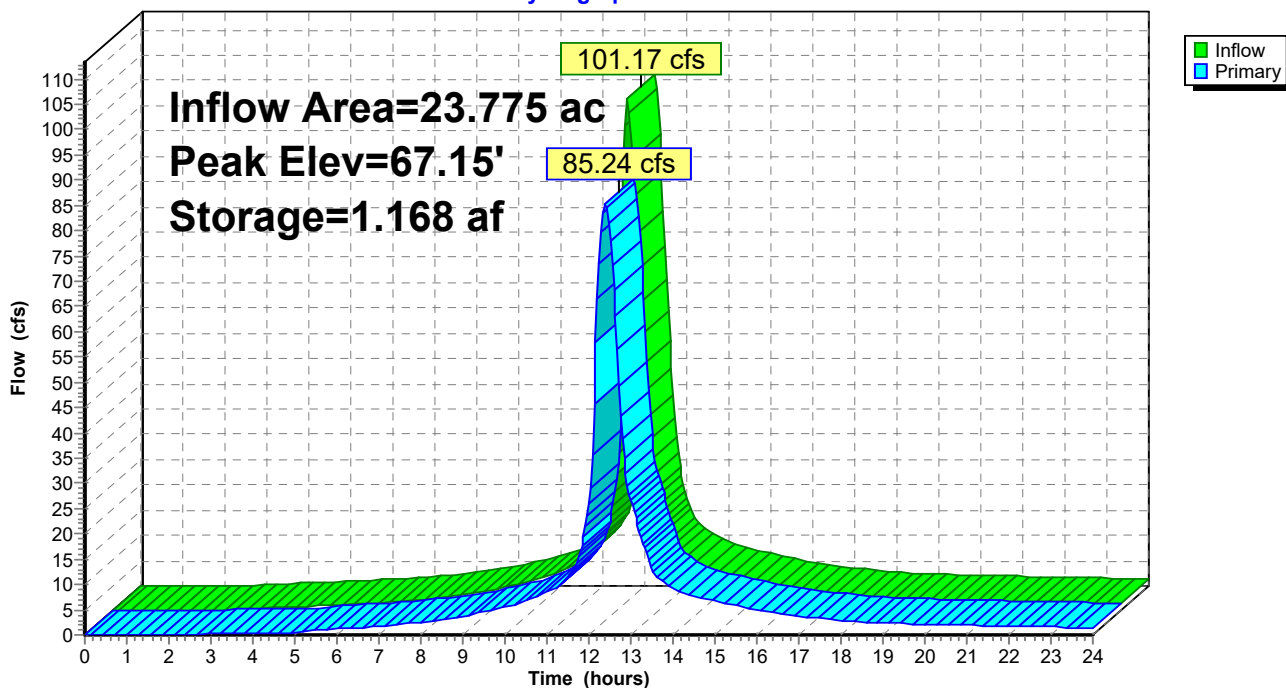
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**Primary OutFlow** Max=85.08 cfs @ 12.38 hrs HW=67.14' (Free Discharge)

- 1=Vault Weir (Orifice Controls 39.70 cfs @ 6.11 fps)
- 2=15" Orifice (Orifice Controls 10.40 cfs @ 8.47 fps)
- 3=18" Orifices x2 (Orifice Controls 32.87 cfs @ 9.30 fps)
- 4=Double CB Grate (Passes 1.44 cfs of 21.27 cfs potential flow)
- 5=3" Orifice in cap (Orifice Controls 0.67 cfs @ 13.63 fps)
- 6=Double CB Culvert (Inlet Controls 1.44 cfs @ 2.64 fps)

## Pond 23P: Det Basin -PR

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 24P: Porous Storage #3

Inflow Area = 0.162 ac, 0.00% Impervious, Inflow Depth > 4.89" for 25 Year event  
 Inflow = 0.93 cfs @ 12.07 hrs, Volume= 0.066 af  
 Outflow = 0.19 cfs @ 12.50 hrs, Volume= 0.030 af, Atten= 79%, Lag= 25.2 min  
 Primary = 0.19 cfs @ 12.50 hrs, Volume= 0.030 af  
 Routed to Link 27L : Spruce - Out-PR

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 67.55' @ 12.50 hrs Surf.Area= 3,216 sf Storage= 1,664 cf

Plug-Flow detention time= 256.8 min calculated for 0.030 af (45% of inflow)  
 Center-of-Mass det. time= 139.3 min ( 935.0 - 795.7 )

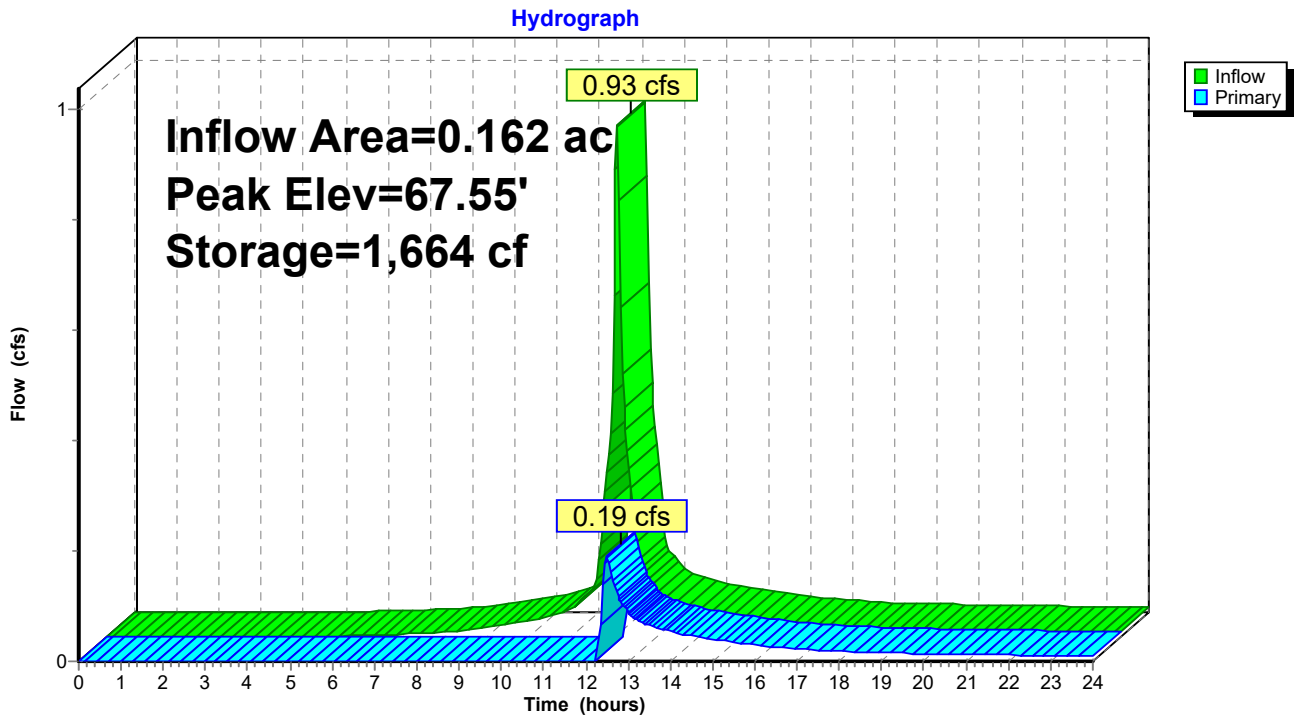
Volume	Invert	Avail.Storage	Storage Description
#1	65.50'	4,113 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 10,283 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.50	0	0	0
67.00	3,210	2,408	2,408
68.50	3,227	4,828	7,235
70.00	627	2,891	10,126
70.50	0	157	10,283

Device	Routing	Invert	Outlet Devices
#1	Primary	67.48'	<b>4.0' long CB#20</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=0.19 cfs @ 12.50 hrs HW=67.55' (Free Discharge)  
 ↑**1=CB#20** (Weir Controls 0.19 cfs @ 0.71 fps)

### Pond 24P: Porous Storage #3



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 26P: PP #1-PR

Inflow Area = 0.452 ac, 14.69% Impervious, Inflow Depth > 5.11" for 25 Year event  
 Inflow = 2.68 cfs @ 12.07 hrs, Volume= 0.193 af  
 Outflow = 2.43 cfs @ 12.11 hrs, Volume= 0.141 af, Atten= 9%, Lag= 2.3 min  
 Primary = 2.43 cfs @ 12.11 hrs, Volume= 0.141 af  
 Routed to Pond 23P : Det Basin -PR

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 76.47' @ 12.11 hrs Surf.Area= 4,416 sf Storage= 2,719 cf

Plug-Flow detention time= 147.7 min calculated for 0.141 af (73% of inflow)  
 Center-of-Mass det. time= 60.4 min ( 850.3 - 789.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	74.20'	9,814 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 24,536 cf Overall x 40.0% Voids
#2	73.50'	1,038 cf	<b>Added Stone Storage (Prismatic)</b> Listed below (Recalc) 2,595 cf Overall x 40.0% Voids
		10,852 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.20	0	0	0
75.70	2,378	1,784	1,784
77.00	4,974	4,779	6,562
78.50	5,720	8,021	14,583
80.20	2,752	7,201	21,784
82.20	0	2,752	24,536

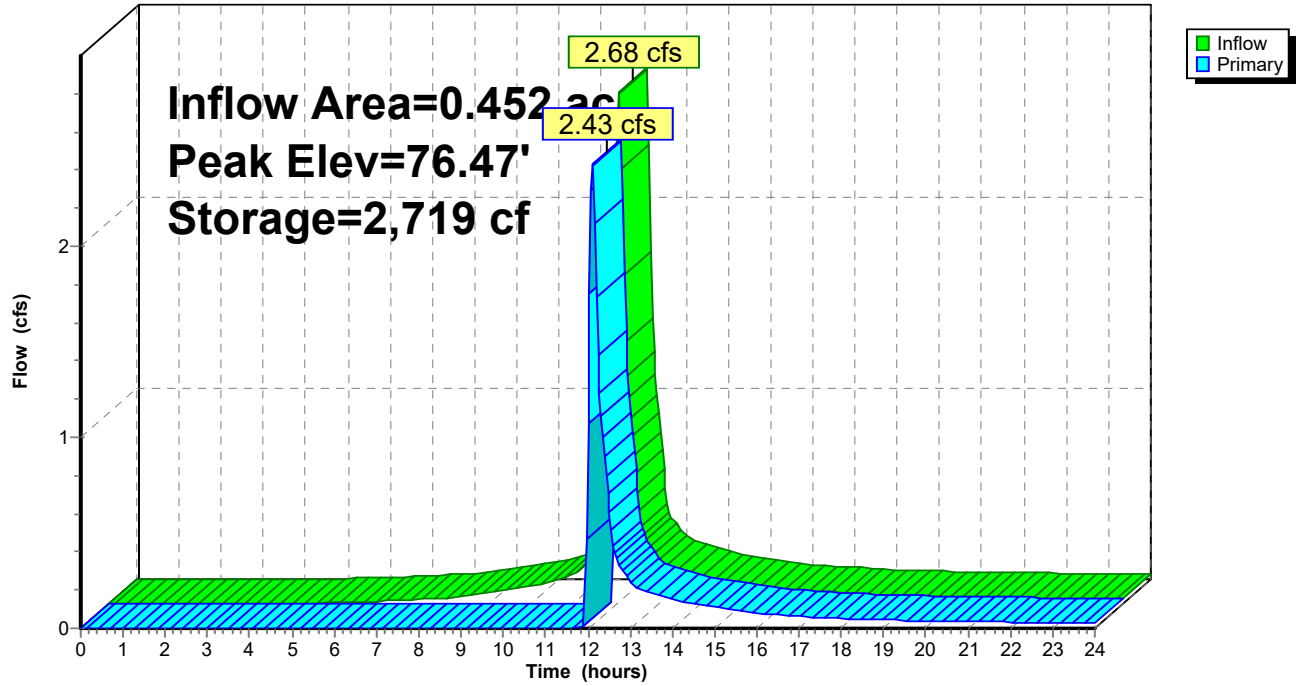
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.50	970	0	0
75.20	970	1,649	1,649
76.50	485	946	2,595

Device	Routing	Invert	Outlet Devices
#1	Primary	76.20'	<b>6.0' long ExCB#20</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=2.39 cfs @ 12.11 hrs HW=76.47' (Free Discharge)  
 ↑1=ExCB#20 (Weir Controls 2.39 cfs @ 1.48 fps)

Pond 26P: PP #1-PR

Hydrograph



# 4620 HydroCAD Wright Parking

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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 29P: PP #2A-AB

Inflow Area = 0.243 ac, 0.00% Impervious, Inflow Depth > 4.89" for 25 Year event  
 Inflow = 1.39 cfs @ 12.07 hrs, Volume= 0.099 af  
 Outflow = 1.05 cfs @ 12.14 hrs, Volume= 0.067 af, Atten= 25%, Lag= 4.0 min  
 Primary = 1.05 cfs @ 12.14 hrs, Volume= 0.067 af  
 Routed to Pond 8P : Det Basin -AB

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 73.67' @ 12.14 hrs Surf.Area= 3,295 sf Storage= 1,644 cf

Plug-Flow detention time= 164.3 min calculated for 0.067 af (68% of inflow)  
 Center-of-Mass det. time= 69.7 min ( 865.4 - 795.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	6,500 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 16,251 cf Overall x 40.0% Voids

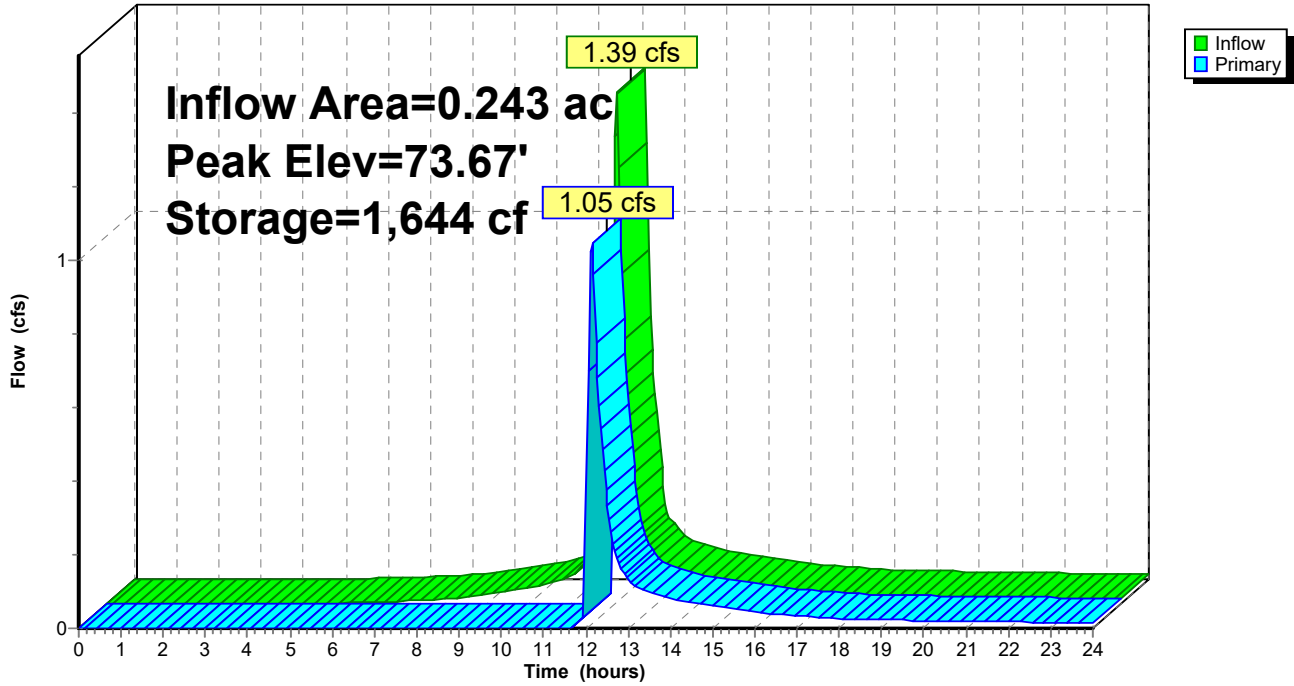
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.00	0	0	0
71.70	291	247	247
73.40	3,206	2,972	3,220
74.90	3,695	5,176	8,396
76.50	2,722	5,134	13,529
78.50	0	2,722	16,251

Device	Routing	Invert	Outlet Devices
#1	Primary	73.47'	<b>4.0' long CB#17</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=1.02 cfs @ 12.14 hrs HW=73.67' (Free Discharge)  
 ↑1=CB#17 (Weir Controls 1.02 cfs @ 1.26 fps)

Pond 29P: PP #2A-AB

Hydrograph



**4620 HydroCAD Wright Parking**

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Type III 24-hr 25 Year Rainfall=6.62"

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**Summary for Pond 33P: PP #2B-PR**

Inflow Area = 0.253 ac, 0.00% Impervious, Inflow Depth > 4.89" for 25 Year event  
 Inflow = 1.44 cfs @ 12.07 hrs, Volume= 0.103 af  
 Outflow = 1.17 cfs @ 12.13 hrs, Volume= 0.071 af, Atten= 19%, Lag= 3.6 min  
 Primary = 1.17 cfs @ 12.13 hrs, Volume= 0.071 af  
 Routed to Pond 23P : Det Basin -PR

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 70.55' @ 12.13 hrs Surf.Area= 3,432 sf Storage= 1,650 cf

Plug-Flow detention time= 157.5 min calculated for 0.071 af (69% of inflow)  
 Center-of-Mass det. time= 65.8 min ( 861.5 - 795.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	68.50'	6,937 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 17,342 cf Overall x 40.0% Voids

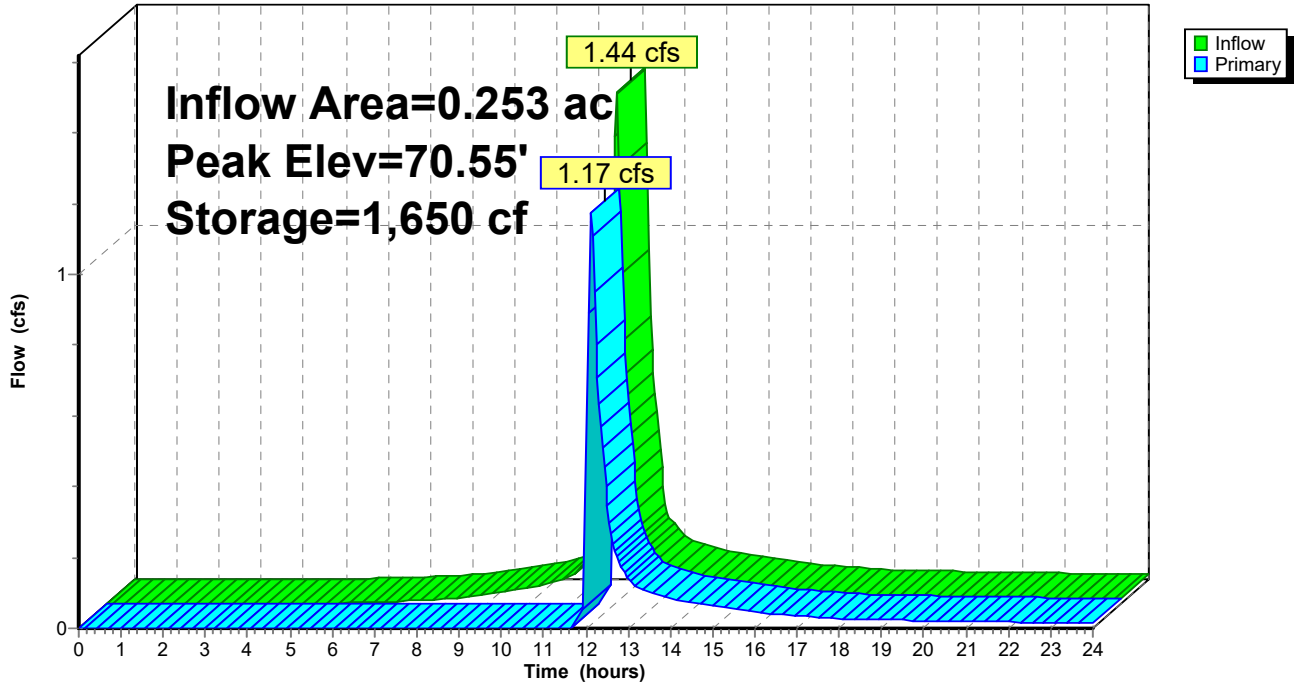
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.50	0	0	0
70.00	3,106	2,330	2,330
71.70	4,116	6,139	8,468
73.40	2,594	5,704	14,172
74.90	790	2,538	16,710
76.50	0	632	17,342

Device	Routing	Invert	Outlet Devices
#1	Primary	70.33'	<b>4.0' long CB#17B</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=1.12 cfs @ 12.13 hrs HW=70.54' (Free Discharge)  
 ↑1=CB#17B (Weir Controls 1.12 cfs @ 1.30 fps)

Pond 33P: PP #2B-PR

Hydrograph



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Type III 24-hr 25 Year Rainfall=6.62"

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## Summary for Pond 34P: PP #2A-PR

Inflow Area = 0.250 ac, 1.51% Impervious, Inflow Depth > 4.89" for 25 Year event  
 Inflow = 1.43 cfs @ 12.07 hrs, Volume= 0.102 af  
 Outflow = 1.14 cfs @ 12.14 hrs, Volume= 0.070 af, Atten= 20%, Lag= 3.7 min  
 Primary = 1.14 cfs @ 12.14 hrs, Volume= 0.070 af  
 Routed to Pond 23P : Det Basin -PR

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs  
 Peak Elev= 73.69' @ 12.14 hrs Surf.Area= 3,299 sf Storage= 1,659 cf

Plug-Flow detention time= 161.6 min calculated for 0.070 af (69% of inflow)  
 Center-of-Mass det. time= 68.0 min ( 863.7 - 795.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	6,500 cf	<b>Stone Storage (Prismatic)</b> Listed below (Recalc) 16,251 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.00	0	0	0
71.70	291	247	247
73.40	3,206	2,972	3,220
74.90	3,695	5,176	8,396
76.50	2,722	5,134	13,529
78.50	0	2,722	16,251

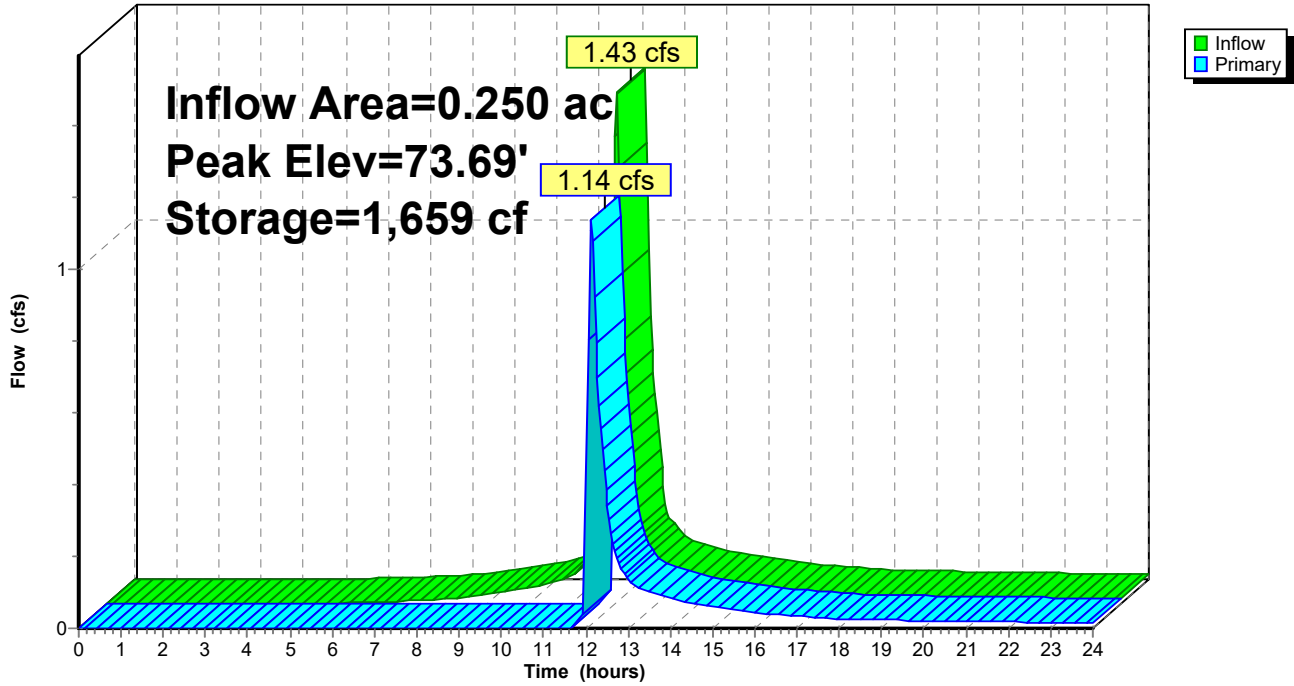
Device	Routing	Invert	Outlet Devices
#1	Primary	73.47'	<b>4.0' long CB#17</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

**Primary OutFlow** Max=1.08 cfs @ 12.14 hrs HW=73.68' (Free Discharge)

↑1=CB#17 (Weir Controls 1.08 cfs @ 1.29 fps)

Pond 34P: PP #2A-PR

Hydrograph



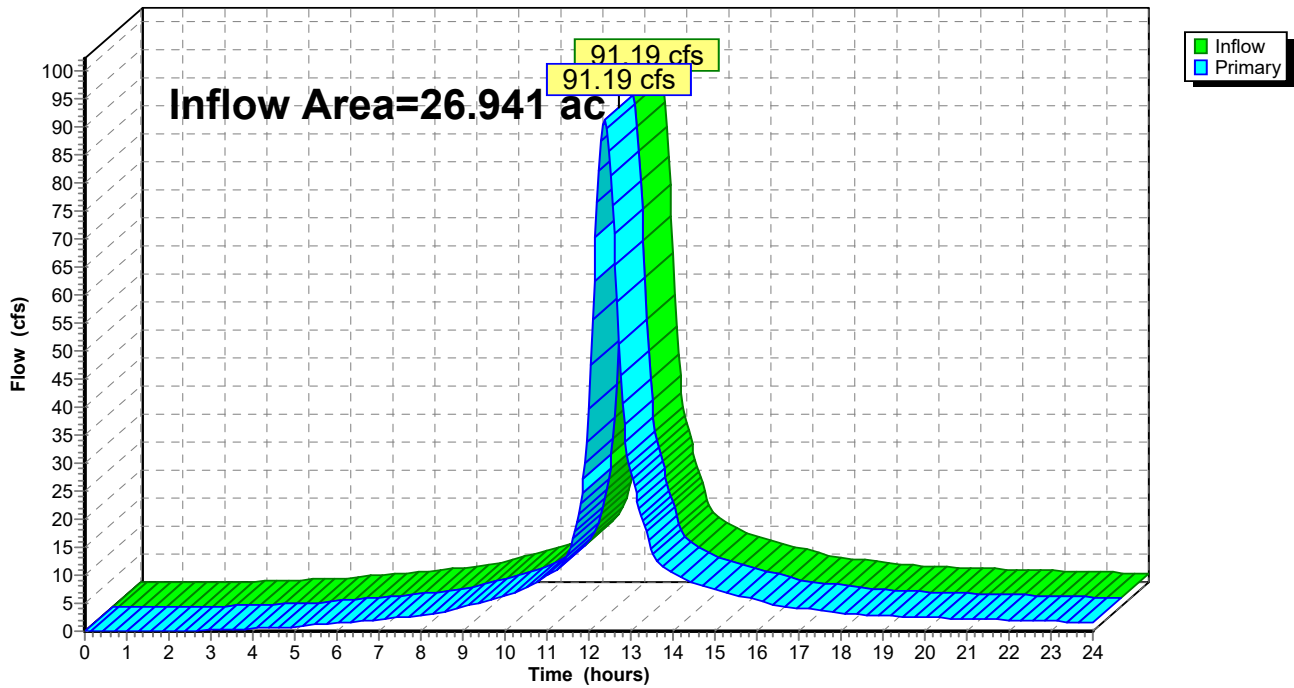
### Summary for Link 6L: Spruce - Out-AB

Inflow Area = 26.941 ac, 74.10% Impervious, Inflow Depth > 5.77" for 25 Year event  
Inflow = 91.19 cfs @ 12.37 hrs, Volume= 12.955 af  
Primary = 91.19 cfs @ 12.37 hrs, Volume= 12.955 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

### Link 6L: Spruce - Out-AB

Hydrograph



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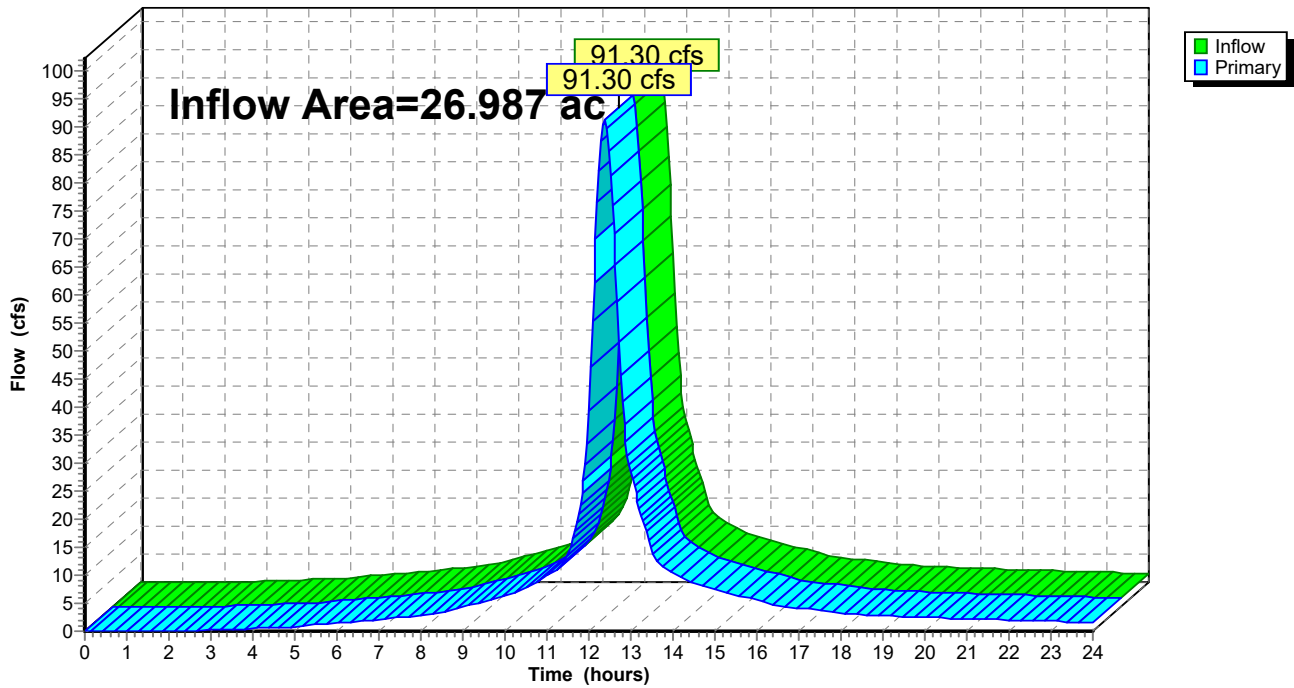
## Summary for Link 27L: Spruce - Out-PR

Inflow Area = 26.987 ac, 74.77% Impervious, Inflow Depth > 5.76" for 25 Year event  
Inflow = 91.30 cfs @ 12.37 hrs, Volume= 12.964 af  
Primary = 91.30 cfs @ 12.37 hrs, Volume= 12.964 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

## Link 27L: Spruce - Out-PR

Hydrograph



**4620 HydroCAD Wright Parking**

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Type III 24-hr 50 Year Rainfall=7.48"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Merrell - AB</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>6.53" Tc=5.0 min CN=92 Runoff=16.10 cfs 1.213 af
<b>Subcatchment2S: Spruce Byp-AB</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>6.76" Tc=5.0 min CN=94 Runoff=22.39 cfs 1.719 af
<b>Subcatchment3S: Spruce On- AB</b>	Runoff Area=994,039 sf 76.89% Impervious Runoff Depth>6.75" Tc=20.0 min CN=94 Runoff=111.67 cfs 12.829 af
<b>Subcatchment4S: Wright - AB</b>	Runoff Area=36,516 sf 16.64% Impervious Runoff Depth>5.48" Tc=5.0 min CN=83 Runoff=5.38 cfs 0.383 af
<b>Subcatchment12S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>5.71" Tc=5.0 min CN=85 Runoff=1.07 cfs 0.077 af
<b>Subcatchment13S: Porous Parking #2A</b>	Runoff Area=10,601 sf 0.00% Impervious Runoff Depth>5.71" Tc=5.0 min CN=85 Runoff=1.61 cfs 0.116 af
<b>Subcatchment16S: Porous Parking #1</b>	Runoff Area=17,980 sf 0.00% Impervious Runoff Depth>5.59" Tc=5.0 min CN=84 Runoff=2.69 cfs 0.192 af
<b>Subcatchment18S: Spruce Byp-PR</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>6.76" Tc=5.0 min CN=94 Runoff=22.39 cfs 1.719 af
<b>Subcatchment19S: Spruce On- PR</b>	Runoff Area=994,039 sf 77.52% Impervious Runoff Depth>6.75" Tc=20.0 min CN=94 Runoff=111.67 cfs 12.829 af
<b>Subcatchment20S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>5.71" Tc=5.0 min CN=85 Runoff=1.07 cfs 0.077 af
<b>Subcatchment21S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>5.71" Tc=5.0 min CN=85 Runoff=1.67 cfs 0.120 af
<b>Subcatchment22S: Porous Parking #1</b>	Runoff Area=19,710 sf 14.69% Impervious Runoff Depth>5.94" Tc=5.0 min CN=87 Runoff=3.09 cfs 0.224 af
<b>Subcatchment28S: Merrell - PR</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>6.53" Tc=5.0 min CN=92 Runoff=16.10 cfs 1.213 af
<b>Subcatchment29S: Wright - PR</b>	Runoff Area=36,287 sf 15.13% Impervious Runoff Depth>5.48" Tc=5.0 min CN=83 Runoff=5.35 cfs 0.380 af
<b>Subcatchment30S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>5.71" Tc=5.0 min CN=85 Runoff=1.67 cfs 0.120 af
<b>Subcatchment33S: Porous Parking #2A</b>	Runoff Area=10,874 sf 1.51% Impervious Runoff Depth>5.71" Tc=5.0 min CN=85 Runoff=1.65 cfs 0.119 af

**4620 HydroCAD Wright Parking**

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*Type III 24-hr 50 Year Rainfall=7.48"*

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<b>Pond 8P: Det Basin -AB</b>	Peak Elev=67.64' Storage=1.343 af Inflow=114.80 cfs 13.164 af Outflow=94.33 cfs 13.103 af
<b>Pond 13P: Porous Storage #3</b>	Peak Elev=67.59' Storage=1,716 cf Inflow=1.07 cfs 0.077 af Outflow=0.39 cfs 0.041 af
<b>Pond 15P: PP #2B-AB</b>	Peak Elev=70.59' Storage=1,701 cf Inflow=1.67 cfs 0.120 af Outflow=1.47 cfs 0.089 af
<b>Pond 17P: PP #1-AB</b>	Peak Elev=76.48' Storage=1,693 cf Inflow=2.69 cfs 0.192 af Outflow=2.51 cfs 0.163 af
<b>Pond 23P: Det Basin -PR</b>	Peak Elev=67.64' Storage=1.346 af Inflow=115.02 cfs 13.177 af Outflow=94.48 cfs 13.115 af
<b>Pond 24P: Porous Storage #3</b>	Peak Elev=67.59' Storage=1,716 cf Inflow=1.07 cfs 0.077 af Outflow=0.39 cfs 0.041 af
<b>Pond 26P: PP #1-PR</b>	Peak Elev=76.50' Storage=2,770 cf Inflow=3.09 cfs 0.224 af Outflow=2.84 cfs 0.172 af
<b>Pond 29P: PP #2A-AB</b>	Peak Elev=73.72' Storage=1,703 cf Inflow=1.61 cfs 0.116 af Outflow=1.41 cfs 0.084 af
<b>Pond 33P: PP #2B-PR</b>	Peak Elev=70.59' Storage=1,701 cf Inflow=1.67 cfs 0.120 af Outflow=1.47 cfs 0.089 af
<b>Pond 34P: PP #2A-PR</b>	Peak Elev=73.72' Storage=1,710 cf Inflow=1.65 cfs 0.119 af Outflow=1.46 cfs 0.087 af
<b>Link 6L: Spruce - Out-AB</b>	Inflow=101.30 cfs 14.863 af Primary=101.30 cfs 14.863 af
<b>Link 27L: Spruce - Out-PR</b>	Inflow=101.45 cfs 14.875 af Primary=101.45 cfs 14.875 af

**Total Runoff Area = 60.060 ac Runoff Volume = 33.330 af Average Runoff Depth = 6.66"**  
**27.83% Pervious = 16.713 ac 72.17% Impervious = 43.347 ac**

**4620 HydroCAD Wright Parking**

Type III 24-hr 100 Year Rainfall=8.41"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Merrell - AB</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>7.45" Tc=5.0 min CN=92 Runoff=18.24 cfs 1.384 af
<b>Subcatchment2S: Spruce Byp-AB</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>7.69" Tc=5.0 min CN=94 Runoff=25.29 cfs 1.954 af
<b>Subcatchment3S: Spruce On- AB</b>	Runoff Area=994,039 sf 76.89% Impervious Runoff Depth>7.67" Tc=20.0 min CN=94 Runoff=126.14 cfs 14.583 af
<b>Subcatchment4S: Wright - AB</b>	Runoff Area=36,516 sf 16.64% Impervious Runoff Depth>6.37" Tc=5.0 min CN=83 Runoff=6.21 cfs 0.445 af
<b>Subcatchment12S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>6.61" Tc=5.0 min CN=85 Runoff=1.23 cfs 0.089 af
<b>Subcatchment13S: Porous Parking #2A</b>	Runoff Area=10,601 sf 0.00% Impervious Runoff Depth>6.61" Tc=5.0 min CN=85 Runoff=1.85 cfs 0.134 af
<b>Subcatchment16S: Porous Parking #1</b>	Runoff Area=17,980 sf 0.00% Impervious Runoff Depth>6.49" Tc=5.0 min CN=84 Runoff=3.10 cfs 0.223 af
<b>Subcatchment18S: Spruce Byp-PR</b>	Runoff Area=132,876 sf 79.27% Impervious Runoff Depth>7.69" Tc=5.0 min CN=94 Runoff=25.29 cfs 1.954 af
<b>Subcatchment19S: Spruce On- PR</b>	Runoff Area=994,039 sf 77.52% Impervious Runoff Depth>7.67" Tc=20.0 min CN=94 Runoff=126.14 cfs 14.583 af
<b>Subcatchment20S: Porous Parking #3</b>	Runoff Area=7,063 sf 0.00% Impervious Runoff Depth>6.61" Tc=5.0 min CN=85 Runoff=1.23 cfs 0.089 af
<b>Subcatchment21S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>6.61" Tc=5.0 min CN=85 Runoff=1.92 cfs 0.139 af
<b>Subcatchment22S: Porous Parking #1</b>	Runoff Area=19,710 sf 14.69% Impervious Runoff Depth>6.85" Tc=5.0 min CN=87 Runoff=3.53 cfs 0.258 af
<b>Subcatchment28S: Merrell - PR</b>	Runoff Area=97,139 sf 65.92% Impervious Runoff Depth>7.45" Tc=5.0 min CN=92 Runoff=18.24 cfs 1.384 af
<b>Subcatchment29S: Wright - PR</b>	Runoff Area=36,287 sf 15.13% Impervious Runoff Depth>6.37" Tc=5.0 min CN=83 Runoff=6.17 cfs 0.442 af
<b>Subcatchment30S: Porous Parking #2B</b>	Runoff Area=11,006 sf 0.00% Impervious Runoff Depth>6.61" Tc=5.0 min CN=85 Runoff=1.92 cfs 0.139 af
<b>Subcatchment33S: Porous Parking #2A</b>	Runoff Area=10,874 sf 1.51% Impervious Runoff Depth>6.61" Tc=5.0 min CN=85 Runoff=1.90 cfs 0.137 af

**4620 HydroCAD Wright Parking**

Type III 24-hr 100 Year Rainfall=8.41"

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<b>Pond 8P: Det Basin -AB</b>	Peak Elev=70.70' Storage=1.475 af Inflow=129.70 cfs 14.986 af Outflow=137.40 cfs 14.920 af
<b>Pond 13P: Porous Storage #3</b>	Peak Elev=67.63' Storage=1,777 cf Inflow=1.23 cfs 0.089 af Outflow=0.68 cfs 0.053 af
<b>Pond 15P: PP #2B-AB</b>	Peak Elev=70.61' Storage=1,738 cf Inflow=1.92 cfs 0.139 af Outflow=1.73 cfs 0.108 af
<b>Pond 17P: PP #1-AB</b>	Peak Elev=76.50' Storage=1,736 cf Inflow=3.10 cfs 0.223 af Outflow=2.89 cfs 0.193 af
<b>Pond 23P: Det Basin -PR</b>	Peak Elev=70.53' Storage=1.475 af Inflow=129.95 cfs 15.002 af Outflow=135.34 cfs 14.936 af
<b>Pond 24P: Porous Storage #3</b>	Peak Elev=67.63' Storage=1,777 cf Inflow=1.23 cfs 0.089 af Outflow=0.68 cfs 0.053 af
<b>Pond 26P: PP #1-PR</b>	Peak Elev=76.53' Storage=2,816 cf Inflow=3.53 cfs 0.258 af Outflow=3.28 cfs 0.206 af
<b>Pond 29P: PP #2A-AB</b>	Peak Elev=73.75' Storage=1,741 cf Inflow=1.85 cfs 0.134 af Outflow=1.67 cfs 0.102 af
<b>Pond 33P: PP #2B-PR</b>	Peak Elev=70.61' Storage=1,738 cf Inflow=1.92 cfs 0.139 af Outflow=1.73 cfs 0.108 af
<b>Pond 34P: PP #2A-PR</b>	Peak Elev=73.75' Storage=1,748 cf Inflow=1.90 cfs 0.137 af Outflow=1.72 cfs 0.105 af
<b>Link 6L: Spruce - Out-AB</b>	Inflow=145.82 cfs 16.926 af Primary=145.82 cfs 16.926 af
<b>Link 27L: Spruce - Out-PR</b>	Inflow=143.77 cfs 16.942 af Primary=143.77 cfs 16.942 af

**Total Runoff Area = 60.060 ac Runoff Volume = 37.937 af Average Runoff Depth = 7.58"**  
**27.83% Pervious = 16.713 ac 72.17% Impervious = 43.347 ac**

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## **Appendix D**

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Level Spreader Sizing  
Drainage Maintenance Agreement  
DCIA Tracking Spreadsheet  
Checklist for Stormwater Management Report

## LEVEL SPREADER SIZING CALCULATIONS

**Project:** *Stamford Hospital - Wright Street parking*      **Project #:** 4620      **Date:** 6/13/2025

**Location:** *Stamford, CT*      **By:** BDH      **Checked:** BDH

### Level Spreader LS#1

<b>Q =</b>	<b>0.70 cfs</b>	<sup>a</sup>
Assumed V <sub>MAX</sub> =	2.0 ft/sec	<sup>b</sup>
y =	0.124 ft	<sup>c</sup>
H =	0.186 ft	<sup>d</sup>
L =	4.023 Q	<sup>e</sup>
Length Required	2.82 ft	
<b>Length Provided</b>	<b>10.00 ft</b>	

<sup>a</sup> Flow derived from 25-Year Storm event of the portion of Wright Street parking tributary to LS#1, obtained from HydroCAD

<sup>b</sup> V<sub>MAX</sub> = Maximum velocity of water over weir (ft/sec)

<sup>c</sup>  $y = V^2/g$

<sup>d</sup>  $H = 3/2y$

<sup>e</sup> Derived from Broadcrested Weir Equation:  $Q = 3.09I$

y = Depth of water over weir (ft)

H = Head (ft)



INSTR # 2018001189  
 VOL 11884 PG 146  
 RECORDED 01/26/2018 12:30:59 PM  
 LYDA RUIJTER  
 CITY & TOWN CLERK STAMFORD CT  
 BLOCK 274 275

Blocks 274 and 275.

Return original to:  
 Carmody Torrance Sandak & Hennessey LLP  
 Attn: Lisa L. Feinberg  
 707 Summer Street, 3<sup>rd</sup> floor  
 Stamford, CT 06901

**MODIFICATION OF AGREEMENT COVENANT**

**AGREEMENT** made this 25<sup>th</sup> day of January 2018 ~~July, 2017~~ by and between **The Stamford Hospital**, a Connecticut non-stock corporation with an address of 1 Hospital Plaza, f/k/a 30 Shelburne Road City of Stamford, County of Fairfield and State of Connecticut and Miller Hall Medical Suites, LLC, a Connecticut limited liability company having a business address of C/O Stamford Health, Inc., 1 Hospital Plaza f/k/a 30 Shelburne Road, Stamford (hereinafter collectively referred to as "Owner"); and the **CITY OF STAMFORD**, a municipal corporation existing under the laws of the State of Connecticut, having an address of 888 Washington Boulevard, and lying within the County of Fairfield and State of Connecticut, acting herein by its duly authorized Mayor, David R. Martin (hereinafter referred to as the "CITY"), the **ENVIRONMENTAL PROTECTION BOARD OF THE CITY OF STAMFORD**, having an address of 888 Washington Boulevard, acting herein by its duly authorized Chairman, Gary H. Stone (hereinafter referred to as the "EPB").

WITNESSETH

WHEREAS, OWNER has commenced the planning and expansion of the existing hospital campus to approximately 30 acres and reconfiguration and modification of the existing facilities. Principal new improvements include a main specialty building, a replacement central utility plant, and a medical office building above a 4-story garage as well as associated parking, landscaping, and site improvements. Construction is on land owned by it and as more particularly described on Schedule "A" annexed hereto and

{W2704068;4}

(1)

made of part hereof (hereinafter referred to as the "Property"); and

WHEREAS, the Property is currently subject to a drainage maintenance Agreement Covenant recorded in the Stamford Land Records in Volume 11576 at Page 15; and

WHEREAS, certain drainage facilities ("Drainage Facilities"), including but not limited to catch basins, area drains, manholes, pipes, oil-grit separators, and other related features as more particularly described on Schedule "B" attached (the "Construction Plans") shall be installed in connection with the aforesaid construction and in accordance with the General Development Plan, Final Plan and Special Exception approvals from the Zoning Board of the City of Stamford (1 Hospital Plaza f.k.a. 30 Shelburne Road, Application Nos. 210-06, 212-14, 212-15 and 214-01, as modified, The Stamford Hospital, recorded in Volume 9928 at Page 264 on July 30, 2010; Volume 10492 at Page 346 on August 2, 2012 and Volume 10968 at Page 191 on March 18, 2014, respectively) as well as the Construction Plans and Approval for the Discharge of Stormwater and Construction Activities (Stormwater and Dewatering Wastewaters from Construction Activities) Permit No. GSN002448 issued by the Connecticut Department of Energy and Environmental Protection, Water Permitting and Enforcement Division of the Bureau of Materials Management and Compliance Assurance (located at 79 Elm Street, Hartford, CT 06106) issued therefore, (collectively the "Permit") and;

WHEREAS, OWNER, the CITY and EPB share a joint concern that the Drainage Facilities be maintained in a functioning condition so as to avoid pollution

of surface and groundwaters, flooding and/or improper drainage.

NOW, THEREFORE, in consideration of ten dollars (\$10.00) and other good and valuable consideration receipt of which is hereby acknowledged by the OWNER, it is hereby agreed as follows:

- (1) OWNER shall clean the Drainage Facilities or cause such facilities to be cleaned by periodic removal of accumulated sediment and debris in a good and workman-like manner, at least two (2) times during every twelve (12) month period, which times shall be in the period between April and June and between October and December and more often as the City may determine to be necessary, as requested upon reasonable and adequate notice to Owner.
- (2) OWNER shall sweep, or cause to be swept, garage facilities, driveways and roadway surfaces located on the Property at least once per calendar quarter.
- (3) OWNER shall utilize only sand or calcium chloride in connection with the de-icing of areas within the Property meaning and intending that road salt (Sodium Chloride) shall not be used for said purpose.
- (4) OWNER shall repair or replace any defects or defective Drainage Facilities so as to maintain the Drainage Facilities, at all times, in a fully functional capacity.

- (5) OWNER shall file as-built drainage plans with the EPB immediately upon the completion of work. Said plans shall be prepared by a professional engineer/surveyor registered in the State of Connecticut.
- (6) OWNER grants the CITY and/or EPB, its agents, and employees, the right to enter the Property at all reasonable times upon twenty-four (24) hours notice to the OWNER for the purpose of inspecting the Property to determine if OWNER is complying with the requirements of Paragraphs 1 through 4 above. A representative of the Owner shall have the right to accompany the City and/or EPB on any such inspection of the Property.
- (7) If, after an inspection is made pursuant to Paragraph Six (6) hereof, the CITY and/or EPB determines that the owner has failed to comply with the aforesaid undertakings discussed in Paragraphs 1 through 4 above, then the CITY and/or EPB shall give written notice of said determination to the then OWNER of the Property ("Notice") which Notice shall also specify the said failure. Said Notice shall be sent by registered or certified mail to the last known address of said Owner. If the Owner disputes the claim, Owner shall give written notice thereof to City and/or EPB within ten (10) days of receipt of said Notice, and the EPB shall hold a hearing as promptly as possible to decide the merits of the disputed claim. If the claim is not disputed within said ten (10) days, the OWNER shall

have thirty (30) days from the receipt of said Notice to correct said failure, unless it is impossible to cure said defect within said time, in which case, the necessary repairs shall be immediately commenced and diligently pursued to completion within a reasonable time.

- (8) If the said failure is not remedied within the time frame stated in Paragraph 7, the CITY and/or EPB may proceed to cure the same and charge the actual cost thereof to the OWNER of the Property.
- (9) OWNER agrees to reimburse the CITY and/or EPB for reasonable legal fees and court costs if it becomes necessary for the CITY and/or EPB to sue for reimbursement of sums expended by the CITY and/or EPB in performance of OWNER'S obligations under this Agreement.
- (10) OWNER agrees and covenants to indemnify and save harmless the CITY and the EPB against any and all claims, suits, actions or judgments arising out of the delay in the performance of any of their obligations pursuant to this Agreement, except to the extent and comparative degree that such claims arise out of conduct not protected by Connecticut General Statutes §52-557(n).
- (11) OWNER agrees that this covenant and restriction shall apply to and run with the land. It shall be binding on all future owners, successors and assigns.

- (12) The OWNER hereby represents to the CITY and EPB that it is the owner, in fee simple, of all of the property described in "Schedule A" attached hereto and made a part hereof.
- (13) OWNER agrees that this Agreement and restrictive covenant upon execution of the same, shall be recorded on the land records at the OWNER'S expense at the time that a final Certificate of Occupancy is issued for the Property herein and while the OWNER is in title.
- (14) OWNER agrees not to assert the invalidity of this document.
- (15) OWNER agrees that nothing herein shall be construed to be a limitation upon the right of the EPB to assert and enforce any rights it may have under federal, state or City statute, ordinance or regulation.
- (16) This agreement shall be governed by the laws of the State of Connecticut.





Terence Brady Terence Brady

OWNER: THE STAMFORD HOSPITAL

Jacquelin Cameron

BY: Brian Grissler

Brian Grissler  
Its President and Chief Executive Officer, duly  
authorized

STATE OF CONNECTICUT }  
COUNTY OF FAIRFIELD }

ss: STAMFORD

Date: July 27, 2016

Personally appeared Brian Grissler, President and Chief Executive Officer of The Stamford Hospital, signer and sealer of the foregoing instrument, and acknowledged the same to be his free act and the free act and deed of The Stamford Hospital, before me.

Lynne MacGregor  
Commissioner of the Superior  
Court or Notary Public

**LYNNE MACGREGOR**  
**NOTARY PUBLIC**  
**CONNECTICUT**  
My Commission Expires July 31, 2020



**SCHEDULE "A"**

***General Boundary Description***

Parcel 1

Block #: 275

Area 1: 29.409± Acres (1,281,056± SF)

Point of Beginning: Intersection of the southerly side of West Broad Street with the westerly side of former Shelburne Road.

Description:

Northerly: 1,138.0'± by the southerly side of West Broad Street;  
Easterly: 366.4'± by the westerly side of Wright Street;  
Southerly: 137.6'± by land n/f of Mary Boccuzzi, et al;  
Easterly: 54.3'± by said land of Mary Boccuzzi, et al;  
Northerly: 139.8'± by said land of Mary Boccuzzi;  
Easterly: 222.5'± by said westerly side of Wright Street  
Southerly: 23.0'± by the northerly side of Spruce/Wright Street;  
Southeasterly: 277.2'± by the westerly side of the approved Spruce Street realignment;  
Easterly: 168.8'± by the westerly side of existing Spruce Street;  
Southerly: 467.1'± by the northerly side of Hillhurst Street;  
Southeasterly: 106.9'± by the northwesterly side of Finney Lane;  
Southwesterly: 131.0'± by land n/f of Marie M. Laguardia;  
Southeasterly: 25.3'± by said land of Marie M. Laguardia;  
Southerwesterly: 222.3'± by land n/f of Miguel A. Juarez, Stillwater Place, and land n/f of Rodolfo Duque & Elsa Duque, each in part;  
Southeasterly: 106.0'± by said land of Rodolfo Duque & Elsa Duque, land n/f of Estate of Assunto Mollo, and land n/f of Colonial Land Limited Partnership, each in part;  
Southerly: 332.3'± by land n/f of Housing Authority of City of Stamford;  
Westerly: 813.6'± by said lands of Housing Authority of City of Stamford;  
Northerly: 135.0'± by lands n/f of Rippowam Corporation; and  
Westerly: 171.2'± by land n/f of said Rippowam Corporation

Parcel 2

Block #: 274

Area: 0.302± acres 13,170± SF

Point of Beginning: Intersection of the easterly side of Spruce Street and the northerly property line of land now or formerly of John F. Steinneger (#151 Spruce Street).

Description:

Northwesterly: 310.5'± by the easterly side of the Approved Spruce Street realignment;  
Easterly: 291.6'± by land now or formerly of Victor H. Lolanne, land now or formerly of Antonio & Cluny Huyhua, land now or formerly of Duffy & Vera Sasser; land now or formerly of Zaferino & Eleazar Jimenez, land now or formerly of Ricardo Cotuc, land now or formerly of Peter & Pierre Medoit, and land now or formerly of Olympia Rosa Iorfino, Tr., each in part; and  
Southerly: 95.0'± by the aforesaid land now or formerly of John F. Steinneger

**Total area of the General Development Area = 29.711± Acres (1,294,225± SF)**

{W2704068;4}

(11)

**SCHEDULE "B"**

Development & Renovation, SE-1, "Site Plan" prepared for The Stamford Hospital, revised 12/3/2015

Development & Renovation, SE-2A, "Site Grading Plan (Sheet 1 of 4)" prepared for The Stamford Hospital, revised 12/3/2015

Development & Renovation, SE-2B, "Site Grading Plan (Sheet 2 of 4)" prepared for The Stamford Hospital, revised 8/27/2013

Development & Renovation, SE-2C, "Site Grading Plan (Sheet 3 of 4)" prepared for The Stamford Hospital, revised 12/3/2015

Development & Renovation, SE-2D, "Site Grading Plan (Sheet 4 of 4)" prepared for The Stamford Hospital, revised 12/11/2013

Development & Renovation, SE-3, "Site Utility Plan" prepared for The Stamford Hospital, revised 3/28/2014

Development & Renovation, SE-4A, "Site Storm & Sanitary Plan (Sheet 1 of 4)" prepared for The Stamford Hospital, revised 12/3/2015

Development & Renovation, SE-4B, "Site Storm & Sanitary Plan (Sheet 2 of 4)" prepared for The Stamford Hospital, revised 3/28/2014

Development & Renovation, SE-4C, "Site Storm & Sanitary Plan (Sheet 3 of 4)" prepared for The Stamford Hospital, revised 12/3/2015

Development & Renovation, SE-4D, "Site Storm & Sanitary Plan (Sheet 4 of 4)" prepared for The Stamford Hospital, revised 3/28/2014

Development & Renovation, SE-5, "Sediment & Erosion Control Plan" prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-6, "Pavement Markings & Signage Plan" prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-7, "Site Removals Plan" prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-8, "Invert Charts" prepared for The Stamford Hospital, revised 3/28/2014

Development & Renovation, SE-9, "Site Details (Sheet 1 of 4)" prepared for The Stamford Hospital, revised 3/28/2014

Development & Renovation, SE-10, "Site Details (Sheet 2 of 4)" prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-11, "Site Details (Sheet 3 of 4)"  
(W2704068;4) (12)

prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-12, "Site Details (Sheet 4 of 4)"  
prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-13, "Site Notes" prepared for The  
Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-14, "Site Dimensional Layout Plan"  
prepared for The Stamford Hospital, revised 8/6/2013

Development & Renovation, SE-15, "Retaining Wall Plan" prepared  
for The Stamford Hospital, revised 12/11/2013

Development & Renovation, SE-16, "Spruce Street Plan & Profile"  
prepared for The Stamford Hospital, revised 12/3/2012

Development & Renovation, SE-17, "Site Paving Details" prepared  
for The Stamford Hospital, revised 8/6/201

"Site Development Plan Depicting Detention Basin Mitigation,"  
Stamford, CT, Prepared for Stamford Hospital, SE-1, dated May 5,  
2017

"Notes & Details Depicting Detention Basin Mitigation," Stamford,  
CT, Prepared for Stamford Hospital, SE-2, dated May 5, 2017



Note to user: complete all cells of this color *only*



Part 1: General Information	
Project Name	Stamford Hospital Wright Street Parking
Project Address	1 Hospital Plaza
Project Applicant	Stamford Hospital
Date of Submittal	6/13/2025
Tax Account Number	002-6574

Part 2: Project Details	
1. What type of development is this? (choose from dropdown)	Redevelopment
2. What is the total area of the project site?	1,301,838 ft <sup>2</sup>
3. What is the total area of land disturbance for this project?	12,000 ft <sup>2</sup>
4. Does project site drain to High Quality Waters, a Direct Waterfront, or within 500 ft. of Tidal Wetlands? (Yes/No)	No
5. What is the <u>current DCIA</u> for the site?	175,439 ft <sup>2</sup>
6. Will the proposed development increase <b>DCIA</b> (without consideration of proposed stormwater management)? (Yes/No)	Yes
7. What is the <u>proposed-development total impervious area</u> for the site?	986,074 ft <sup>2</sup>

Part 3: Water Quality Target Total	
Does Standard 1 apply based on information above?	No, Skip to Part 4
Water Quality Volume (WQV)	N/A ft <sup>3</sup>
Standard 1 requirement	N/A
Required treatment/retention volume	N/A ft <sup>3</sup>
Provided treatment/retention volume for proposed development	ft <sup>3</sup>

Part 4: Proposed DCIA Tracking	
Pre-development <u>total impervious area</u>	983,602 ft <sup>2</sup>
Current <b>DCIA</b>	175,439 ft <sup>2</sup>
Proposed-development <u>total impervious area</u>	986,074 ft <sup>2</sup>
Proposed-development <b>DCIA</b> (after stormwater management)	174,854 ft <sup>2</sup>
Net change in <b>DCIA</b> from pre-development to proposed-development	-585 ft <sup>2</sup>

Part 5: Post-Development (As-Built Certified) DCIA Tracking	
Post-development (per as-built) <u>total impervious area</u>	ft <sup>2</sup>
Post-development (per as-built) <b>DCIA</b> (after stormwater management)	ft <sup>2</sup>
Net change in <b>DCIA</b> from pre-development to post-development	ft <sup>2</sup>

Certification Statement	
I hereby certify that the information contained in this worksheet is true and correct.	
 Engineer's Signature	Date 6/13/2025
 Engineer's Seal	



City of Stamford  
 Engineering Bureau  
 888 Washington Boulevard, 7th Floor Stamford, CT 06901  
 Phone 203-977-4189

### CHECKLISTS

Project Name: Stamford Hospital Wright Street Parking

Project Address 1 Hospital Plaza

Property Owner(s) Stamford Hospital

Tax Account Number(s) 002-6574

Engineer's Signature *Bob Howard* Date: 06/13/2025

**All checklists must be completed and submitted. Provide a brief explanation for any items not provided. Check boxes as completed or N/A as not applicable.**

<input checked="" type="checkbox"/>	<b>Existing Conditions Plan</b>
<input checked="" type="checkbox"/>	<b>Stormwater Management Report</b>
<input checked="" type="checkbox"/>	<b>Stormwater Management Plan / Construction Plan</b>
<input type="checkbox"/>	<b>Certificate of Occupancy</b>

### Checklist for Existing Conditions Plan

**I. General Information**

<input checked="" type="checkbox"/>	Site address
<input checked="" type="checkbox"/>	Orientation, block, zone, City, street name
<input checked="" type="checkbox"/>	Applicant name and legal address
<input checked="" type="checkbox"/>	Surveyor name, address, contact information
<input checked="" type="checkbox"/>	North arrow, bar scale, horizontal and vertical datum
<input checked="" type="checkbox"/>	24" x 36" sheet size unless otherwise approved
<input checked="" type="checkbox"/>	Existing conditions survey shall be prepared in accordance with the Minimum Standards for Surveys and Maps in the State of Connecticut. The class of survey shall be A-2 and T-2 and shall be represented as such on the map. The base map shall be sealed and signed by a Professional Land Surveyor licensed in the State of Connecticut.
<input type="checkbox"/>	Drawing scale shall be set at 1" = 20' or 1" = 40' when possible



**II. Existing Conditions Plan Elements**

✓	Show and label all property boundaries with linear bearing / distances and curve information
✓	Required zoning setbacks
✓	Show and label monument information
✓	Show and label at least one permanent benchmark on the parcel with northing, easting and elevation
✓	Label adjacent property ownership information
	Existing contours based on NAVD 88 (no exceptions) at 2 foot contour interval or 1 foot contour interval when slope is flatter than 2 percent at a minimum of 20 ft. beyond the property boundaries of the subject parcel
	Show spot elevations at low points, high points, and where topography is flatter than 2 percent
✓	All buildings and structures (label current use and finished floor elevations)
✓	All pavement, parking, driveways, property access points
✓	All roadways, streets, and rights-of-way. Label streets as public or private with street name
✓	All patios, decks, walkways, sidewalks, curb ramps (both adjacent to and opposite and existing roadways or intersections)
✓	Show and label (size, material, inverts) all existing utilities (overhead and underground) within the right-of-way and the project site (label ownership) including but not limited to water, gas and electrical services, wells, storm sewers, sanitary sewers and subsurface sewerage disposal systems.
✓	Show and label existing conveyance systems (swales, ditches, storm drains) including dimensions, elevations, sizes, slopes, and direction of flow
✓	Show and label boundaries of all easements, both public and private, with type, owner, and width
✓	Show and label all other existing features and improvements (e.g. light poles, mature trees of 8" (dbh) diameter or greater, vegetation, walls with top and bottom elevations, fences, pavement markings)

**III. Resource Areas**

N/A	Show and label limits of inland wetlands, tidal wetlands and any associated setbacks.
N/A	Show and label existing natural site features including tree canopy, outcroppings, permanent and intermittent watercourses, waterbodies, streams
N/A	Show and label limits of floodplain and floodway along with FIRM references (Community Number, Panel, Suffix, and Date) including any effective Letters of Map Revision/Amendment, zone designation and elevation.
N/A	Show and label any Conservation Easement Areas
N/A	Show and label Connecticut Coastal Jurisdiction Line (CJL)
N/A	Show and label existing steep slopes (25% and greater)



## Checklist for Stormwater Management Report

### I. Project Report

#### A. Applicant / Site Information

✓	Applicant name, legal address, contact information (email & phone)
✓	Engineers name, legal address, contact information (email & phone)
✓	Site address and legal description
✓	Current / proposed zoning and land use
✓	Site vicinity map (8.5" x 11")

#### B. Project Description and Purpose

✓	Project description including proposed project elements and anticipated construction schedule
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#### C. Existing Conditions Description

✓	Site area, ground cover, vegetation, features (roads, buildings, utilities, etc.)
✓	Site topography, slopes, drainage patterns, conveyances systems (swales, storm drains, etc.), stormwater discharge locations
✓	Receiving waterbody information including stormwater impairments and TMDL information (See the most recent <a href="#">State of Connecticut Integrated Water Quality Report</a> )
✓	Site soils information including soil types, hydrologic soil group, bedrock / outcroppings, groundwater elevation, significant geologic features
✓	Provide NRCS Soils Mapping
N/A	Resource protection areas (wetlands, streams, lakes, etc.), buffers, floodplains, floodways

#### D. Summary of Applicable General Design Criteria

✓	Methodology, design storm frequency
✓	Hydrologic design criteria
✓	Hydraulic design criteria
✓	Flood hazard areas

✓	<b>Applying under "Lite" Stormwater Management: Skip to Section I</b> (Refer to Flow Chart on page vii of the City of Stamford Stormwater Drainage Manual)
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#### E. Project Type in Accordance with Standard 1 Definitions

	Area of disturbance, receiving waterbody classification (High Quality, Tidal Wetlands, Direct Waterfront)
	Project type (development, redevelopment, linear development)
	Pollutant reduction standard per flowchart Section 2.4



F. Summary of LID Site Constraints

	Description of sensitive areas for protection
	Mature tree inventory, which shall include 8-inch (dbh) diameter trees or greater
	Steep slopes
	Ledge and bedrock depth
	Seasonal high groundwater elevation
	Pollutant hotspots
	Summary of infiltration rates

G. Summary of Proposed Stormwater Treatment Practices

	Proposed LID controls (i.e. minimize impervious, minimize DCIA, minimize disturbance, increase time of concentrations, other LID controls and strategies)
	Location, size, types
	Design criteria and references
	Stormwater treatment practice, drainage area characteristics / details

H. Summary of Compliance with Standards 1

	Required pollutant reduction criteria
	Provided pollutant reduction (WQV) by stormwater treatment practice
	Summary of compliance with Standard 1

I. Summary of Compliance with Standards 2, 3, and 4

	✓	Description of proposed stormwater management system
	✓	Pre-development site hydrology with delineation of each watershed area and sub-basin
	✓	Post-development site hydrology with delineation of each watershed area and sub-basin
	✓	Comparison table of pre- and post-development hydrology, peak flow, volume, and percent difference
	✓	Summary table of watershed areas and sub-basin areas, time of concentration and runoff coefficients
N/A		Summary table demonstrating the 2-year, 24-hour post development peak flow rate is less than or equal to the lowest of either: - The pre-development 1-year, 24-hour storm peak flow rate - 50 percent of the pre-development 2-year, 24-hour storm peak flow rate
N/A		Conveyance protection, emergency outlet sizing
N/A		Hydraulic grade line summary and tail water elevation used in analysis
	✓	Construction erosion and sediment control description, Standard 3
	✓	Operation and Maintenance, maintenance tasks and schedule on construction plans per Standard 4



J. Summary of Compliance with Applicable Drainage Facility Design Requirements

✓	Description of applicable design requirements and compliance
✓	Description of proposed drainage facilities and compliance

K. Stormwater Management Report

✓	Signed and stamped by professional engineer licensed in the State of Connecticut
✓	Drainage impact statement in accordance with Standard 5B.

II. **Supporting Calculations** (as appendix to Project Report)

✓	<b><u>Applying under "Lite" Stormwater Management: Skip to Section N</u></b>
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L. Water Quality Volume / Water Quality Flow Calculations

	Calculations demonstrating the total Water Quality Volume generated by the post-development site and the required retention/treatment volume per Standard 1 in cubic feet.
	Calculations demonstrating the total Water Quality Volume retained/treated by each stormwater treatment practice and the total Water Quality Volume generated by the post-development contributing drainage area to each stormwater treatment practice

M. Stormwater Treatment Practice Sizing Calculations

	Calculations demonstrating how each stormwater treatment practice has been designed and sized in accordance with the Structural Stormwater BMP Design references in Appendix B. Calculations will vary by stormwater treatment practice, but a minimum, applicants shall provide calculations in accordance with design criteria from the Connecticut Stormwater Quality Manual.
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N. Hydrologic and Hydraulic Design Calculations

N/A	Stream channel protection, Standard 2A
	✓ Conveyance protection, Standard 2B
	✓ Peak flow control (1-year, 2-year, 5-year, 10-year, 25-year, and 50-year storms), Standard 2C
N/A	Inlet analysis
N/A	Gutter flow (Site by site basis as requested by Engineering Bureau)
N/A	Storm sewers and culverts (velocities, capacity, hydraulics)
N/A	Hydraulic grade line required when pipe is flowing at full capacity <ul style="list-style-type: none"> <li>o Provide existing and proposed summary table</li> <li>o Provide existing and proposed mapping, label structures</li> </ul>
	✓ Detention facilities (outlet structure, stage/storage, freeboard)
N/A	Emergency outlet sizing, safely pass the 100 year storm, Standard 2D
N/A	Outlet protection calculations, based on conveyance protection (i.e. riprap, energy dissipater)



O. Hydrologic and Hydraulic Model, Existing and Proposed

✓	Drainage routing diagram
✓	Summary
✓	Storage pond input

P. Downstream analysis (Site by site basis as required by the Engineering Bureau)

N/A	Downstream analysis, Standard 2E
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**III. Supporting Mapping** (as appendix to Project Report)

O. Pre-Development Drainage Basin Area Mapping

✓	11" x 17" or 8.5" x 11" sheet size
✓	Topography, drainage patterns, drainage area boundaries and sub basins, flow paths, times of concentration
✓	Locations of existing stormwater discharges
N/A	Perennial and intermittent streams, wetlands, and floodplain / floodways
✓	NRCS soil types, locations, boring locations, infiltration testing locations
✓	Vegetation and groundcover
✓	Existing roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, decks and other structures
✓	Location, size, type of existing structural stormwater controls, facilities and conveyance systems

R. Post-Development Drainage Basin Area Mapping

✓	11" x 17" or 8.5" x 11" sheet size
✓	Topography, drainage patterns, drainage area boundaries and sub basins, flow paths, times of concentration
✓	Locations of proposed stormwater discharges
N/A	Perennial and intermittent streams, wetlands, and floodplain / floodways
✓	NRCS soil types, locations, boring locations, infiltration testing locations
✓	Vegetation, ground cover and proposed limits of clearing/disturbance
✓	Proposed, roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, decks and other structures
✓	Location, size, type of proposed structural stormwater controls, facilities and conveyance systems

**IV. DCIA Tracking Worksheet** (as appendix to Project Report)

✓	DCIA Tracking Worksheet (Use form found in Appendix E)
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City of Stamford  
 Engineering Bureau  
 888 Washington Boulevard, 7th Floor Stamford, CT 06901  
 Phone 203-977-4189

**V. Proposed LID Review Map**

✓	<b>Applying under "Lite" Stormwater Management - Proposed LID Review Map <u>NOT</u> required.</b>
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**A. General**

	Site address
	Applicant name, legal address, contact information
	Engineers name, address, contact information
	North arrow, bar scale, horizontal and vertical datum
	Drawing scale shall be set at 1"=20' or 1"=40' when possible
	Signed and stamped by a Licensed Professional Engineer in the State of Connecticut
	11" x 17" or 24" x 36" sheet size unless otherwise approved
	Existing and proposed contours based on NAVD 88 at 2 foot contour interval or 1 foot contour interval when slope is flatter than 2 percent
	Locations of existing stormwater discharges
	Roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, and decks and other structures
	Location, size, ownership of stormwater conveyance systems (swales, pipes, etc.)

**B. LID Constraints:**

	Boring / test pit locations
	Infiltration testing locations and results
	Vegetation and proposed limits of clearing / disturbance
	NRCS soils mapping
	Steep slopes
	Surface waters / Perennial and intermittent streams
	Resource protection areas and buffers, wetlands, floodplain / floodways
	Existing vegetation and mature trees, which shall include 8-inch (dbh) diameter trees or greater
	Poor soils (HSG C & D)
	Shallow bedrock / ledge
	Seasonal high groundwater elevation
	Other site constraints (e.g. brownfield caps)

**C. Proposed Stormwater Treatment Measures:**

	Location, size, type, limits, and WQV provided by each proposed stormwater treatment practices
	Drainage area to each proposed stormwater treatment practice (total area, impervious area, WQV)

**D. Site Summary Table:**

	Total site area, disturbed area, pre- and post-development impervious areas
	Required pollutant reduction volume (retention or detention)
	Provided pollutant reduction volume (retention or detention)



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## **Checklist for Stormwater Management Plan / Construction Plans**

### A. General

✓	Site orientation, address and legal description
✓	Applicant name, legal address, contact information
✓	Engineers name, address, contact information
✓	North arrow, bar scale, horizontal and vertical datum
✓	Drawing scale shall be set at 1"=20' or 1"=40' when possible
✓	Stamped by a Licensed Professional Engineer in the State of Connecticut
✓	24" x 36" sheet size unless otherwise approved

### B. Site Development Plans

✓	City of Stamford Standard Notes
✓	As required by the Drainage Maintenance Agreement, provide a written narrative describing the nature of the proposed development activity and the program for operation and maintenance of drainage facilities and control measures throughout the life of the project.
✓	Existing and proposed contours based on NAVD 88 at 2 foot contour interval or 1 foot contour interval when slope is flatter than 2 percent
✓	All required spot elevations to clearly depict positive pitch
✓	Top and bottom elevation of all walls
✓	Roads, buildings, driveways, parking areas, walks, patios, pools and other impervious surfaces, and decks and other structures
✓	All utilities and easements
✓	Location, size, maintenance access, type of proposed structural stormwater controls and facilities with elevations and inverts
✓	Location, size, maintenance access, type of proposed non-structural stormwater controls and facilities with elevations and inverts
✓	Location, size, type of proposed stormwater infrastructure, inlets, manholes, infiltration and detentions systems, control structures with elevations and inverts
✓	Location, size, ownership of stormwater conveyance systems (swales, pipes, etc.) with elevations and inverts
✓	Identify roof leaders, curtain drains and foundation drains with elevations and inverts
✓	Proposed water quality treatment systems, size and model type
✓	Final stabilization measures which may include slope stabilization

### C. Erosion and Sedimentation Control Plan

✓	Phasing and schedule
✓	Construction access and staging and stock pile areas
✓	Operation and maintenance of erosion and sedimentation controls
✓	Tree protection
✓	Downstream protection such as location of silt fencing
✓	Limit of disturbance
✓	Construction fencing



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D. Construction Details

✓	Standard City of Stamford details
	Infiltration system details
	Control structure details
	Water quality treatment details
	Infiltration testing results

**Checklist for Certificate of Occupancy**

	Final Improvement Location Survey
	Stormwater Management Certification Form
	Final DCIA Tracking Worksheet
	Standard City of Stamford Drainage Maintenance Agreement (Agreement Covenant)

Other Certifications at the discretion of the Engineering Bureau and/or EPB

	Wall Certification
	Landscape Certification
	Landscape Maintenance Agreement
	Waiver Covering Storm Sewer Connection
	Waiver Covering Granite Block, Depressed Curb, and Driveway Aprons
	Flood Certification