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## SITE ENGINEERING REPORT

### Prepared For

THI, LLC & HB Capital LLC, (Contract Purchaser)  
131 & 139 Turn of River Road  
And 29 Intervale Road  
Stamford, CT 06905

### Prepared by

Redniss & Mead, Inc.  
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### Last Issued on

January 5, 2023  
October 28, 2022

*(Revisions are in bold italics)*



A handwritten signature in black ink, appearing to read "T Milone".

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Ted Milone, P.E., LEED AP BD+C  
CT Lic. No. 22563

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**REDNISS  
& MEAD**

LAND SURVEYING  
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PERMITTING

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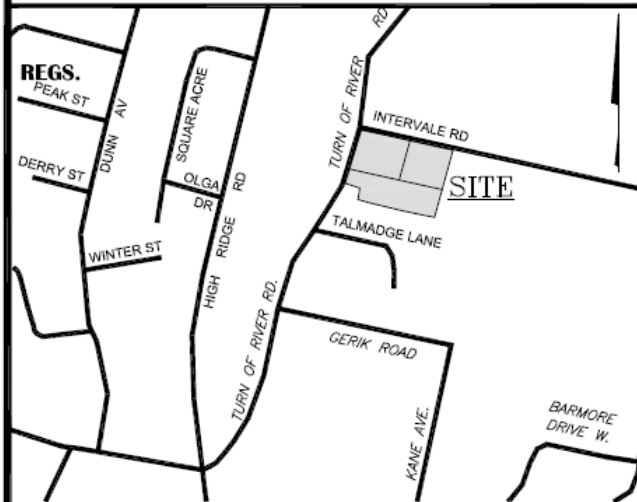
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**BLOCKS: 379 ZONE:R-10**



STAMFORD, CT

1" = 800'

**ORIENTATION**

## Narrative

### **Project Description:**

THI, LLC & HB Capital LLC, (contract purchaser), is seeking Planning Board approval to subdivide three parcels into a total of eleven parcels located at 131 & 139 Turn of River Road and 29 Intervale Road, Stamford, CT. The 3.963± acre properties are located on the southeast side of the intersection of Turn of River Road and Intervale Road within the R-10 Zoning District. This Site Engineering Report reflects the Site Civil Plan set (***SE-1 dated October 28, 2022; SE-2, SE-3, SE-4A, SE-4B, SE-5, SE-6, SE-7, SE-8, SE-9, and PP-1 last dated January 5, 2023***), prepared by Redniss & Mead, Inc.

### **Existing Conditions:**

The properties are currently developed with residential structures, garages, driveways, walkways, patios, landscaping along with other incidentals. The dwellings are served by public water and sewers. Inland wetlands were identified along the southern portion of the properties by William Kenny Associates. Elevations on the properties range from elevation 176± at the northeast to elevation 159± at the southwestern portion of the wetland area. The properties are not located within a flood hazard area as depicted on FEMA Map #09001C0506F effective date June 18, 2010.

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

Stormwater runoff currently sheet flows either towards Turn of River Road or within the inland wetlands found along the southern portion of the property. All flow is ultimately tributary to the City of Stamford drainage system located within Turn of River Road.

### **Soils**

Soil testing, consisting of a series of deep test pits, were performed on-site to identify any sub-grade restrictive soil conditions (ledge, groundwater, etc.) and to confirm the hydrologic soil classification. A total of nineteen deep test pits were performed. Ledge was encountered in five of the test pits at depths ranging between 52" to 90". Groundwater or high-seasonal was encountered in four of the test pits at depths ranging between 24" – 72". The USDA Web Soil Survey classifies most of the on-site soils as hydraulic soil group class A, with a portion of the western property classified as hydraulic soil group B, and a portion of the southern property classified as hydraulic soil group C. The results of our soil testing confirm this soil classification. Test pit results and locations can be reviewed on site plan sheet SE-9.

***At the request of the Engineering Bureau a saturated hydraulic conductivity test was completed using a Turf-Tec Infiltrometer on Lot 6 within B type soils to verify that the in-situ soils given the proximity to C type soils. Field infiltration rate was 5in/hr with an applicable rate of 2.5in/hr used for design purposes. Since the application rate of 2.5in/hr is greater than the default rates found within Table 5-1 of the Stormwater Drainage Manual to be conservative the Manual***

*application rate was maintained. The 72-hour draw down calculation for 19S-House Infiltration System #6 includes the draw down time based on field measurements.*

## **Proposed Conditions:**

### **General Design Criteria & Project Classification**

The redevelopment into eleven lots will disturb approximately 136,866 sf of the properties and is anticipated to increase impervious coverage by 31,282 sf when compared to existing site conditions. As a redevelopment project with more than ½ an acre of disturbance and directly connected impervious area being increased more than 400 sf, the stormwater design shall comply with Standards 1 through 5 of the Stamford Drainage Manual.

### **Proposed LID Techniques**

To comply with Standard 1, this project must at a minimum provide the full Water Quality Volume (WQV) required via non-structural practices or by infiltration best management practices (BMP's). Low impact development and site planning techniques were used to the maximum extent practicable given it is located within an urban area. LID techniques include development within areas already developed, maintaining a 25-foot buffer from the inland wetlands and minimizing impervious surfaces where possible. The limit of disturbance for the proposed development allows for the proposed development, while aiming to minimize impacts.

### **Proposed Stormwater Treatment Systems**

The design approach chosen to satisfy Standard 1 and 2 of the Stamford Drainage Manual is to provide the required water quality volume via infiltration BMP's. This has been accomplished by collecting and infiltrating most of the impervious coverage. Each system is described in detail below.

- **House Infiltration Systems** for Lots 2 through 10 are located on their respective properties consisting of Cultec Recharger units (model R-360HD) to treat roof runoff and driveways. System varies in length between 28 to 34 LF. Each system has been designed to provide more than the required water quality volume. The systems are designed to fill up and overflow via area drains.
- **Road Infiltration Systems** are located on Lot 1 and 2 consisting of Cultec Recharger units (model R-902HD) to treat roof runoff from Lot 1 and 2 along with the proposed road. Systems varies in length between 163 and 208 LF. Each system has been designed to provide more than the required water quality volume. This system has also been designed to detain runoff which will allow runoff to overflow via a meter manhole. All water quality volume is provided below the lower orifice.

A summary of the required and provided Water Quality Volume provided below:

**Table 1. Required and Provided Water Quality Volume**

<b>Standard I (Retention and Treatment) Calculations</b>					
Drainage Area ID	Description	Total Area (SF)	Impervious Area (SF)	WQV Required (CF)	Retention Volume Provided (CF)
Road Infil Basin (I3S)	Roadway, cul-de-sac, portions of driveways, lot #1 & #11 roof areas	32,023	26,534	2,123	4,669 CF
House Basin #1 (H1)	North ½ roof & portion of Driveway	1,330	1,330	105	505 CF
House Basin #2 (H2)	Roof Runoff & portion of Driveway	3,202	3,202	253	540 CF
House Basin #3 (H3)	North ½ roof & portion of Driveway	1,286	1,286	102	594 CF
House Basin #4 (H4)	Roof Runoff & portion of Driveway	3,202	3,202	253	575 CF
House Basin #5 (H5)	North ½ roof & portion of Driveway	1,286	1,286	102	594 CF
House Basin #6 (H6)	Roof Runoff & portion of Driveway	3,184	3,184	252	575 CF
House Basin #7 (H7)	North ½ roof & portion of Driveway	1,816	1,816	144	594 CF
House Basin #8 (H8)	Roof Runoff & portion of Driveway	2,689	2,689	213	565 CF
House Basin #9 (H9)	Roof Runoff & portion of Driveway	2,837	2,837	225	549 CF
Bypass (26S)	Bypass	106,621	4,960	<b>1073</b>	0 CF
<b>TOTAL</b>		<b>47,233</b>	<b>47,233</b>	<b>4,845</b>	<b>9,760 CF</b>

### Hydraulic Analysis of Peak Rates of Runoff

Hydrologic modeling has 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 each contributing watershed. The pre-development drainage basin boundaries and the post-development 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 F](#). A comparison of the pre- and post-development peak discharge rates is provided in the tables on next page.

**Table 2. Existing (21L) V.S. Proposed (25L) Peak Flows to Existing Stream**

Return Period (years)	Existing Peak Flow Rate (cfs)	Proposed Peak Flow Rate (cfs)	Change (cfs)	Percent Change (%)
1	0.50	0.21	-0.21	-42.0%
2	1.09	0.54	-0.55	-50.4%
5	2.33	1.53	-0.80	-34.3%
10	3.54	2.56	-0.98	-27.6%
25	5.39	4.22	-1.17	-21.7%
50	6.84	5.57	-1.27	-18.5%

**Table 3. Existing (10L) V.S. Proposed (23L) Peak Flows to Existing Road**

Return Period (years)	Existing Peak Flow Rate (cfs)	Proposed Peak Flow Rate (cfs)	Change (cfs)	Percent Change (%)
1	0.11	0.04	-0.07	-63.6%
2	0.28	0.16	-0.12	-42.8%
5	0.63	0.57	-0.06	-9.5%
10	1.05	0.98	-0.07	-6.6%
25	1.98	1.92	-0.06	-3.0%
50	2.79	2.71	-0.08	-2.8%

**Table 4. Existing (12L) V.S. Proposed (11L) Peak Flows**

Return Period (years)	Existing Peak Flow Rate (cfs)	Proposed Peak Flow Rate (cfs)	Change (cfs)	Percent Change (%)
1	0.59	0.21	-0.38	-64.4%
2	1.28	0.54	-0.74	-57.8%
5	2.77	1.67	-1.10	-39.7%
10	4.37	3.26	-1.11	-25.4%
25	6.98	5.50	-1.48	-21.2%
50	9.10	7.96	-1.14	-12.5%

Comparison of the peak discharge rates for pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the proposed development will be decreased from or maintained at pre-development conditions for all storm events up to and including the 50-year storm for all points of concern.

### **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 1. Runoff and Pollutant Reduction

- A. The runoff and pollutant reduction requirements for this project are to retain 100% of the WQV on-site using Non-Structural Practices or Infiltration BMP's. The proposed Stormwater Treatment Practice (subsurface infiltration) stores more than the required WQV. See "Proposed Conditions" for a detailed description of the system, its required WQV and provided storage volume.
- B. Not Applicable. Stormwater systems retain 100% of WQV.
- C. The proposed development has been designed to redevelop upland areas while not encroaching into areas regulated by EPB while minimize site disturbance to the extent possible. Proper installation of sediment and erosion controls will protect inland wetlands, surrounding neighbors and city owned infrastructure within Turn of River Road. All disturbed areas will be permanently stabilized.
- D. Noted
- E. Not applicable.
- F. The development project will preserve inland wetlands, development will occur with upland areas, trees along Intervale Road will be protect along with others to the extent practical. Reducing impervious coverage was incorporated with not maximizing the number of potential lots allowed in the zone.

## Standard 2. Peak Flow Control

- A. Stream channel protection to the inland wetlands has been provided. The 2-year, 24-hour post-development peak flow rate is less than or equal to 50 percent of the 2-year. Pre-development vs. post-development peak flow rates for the areas tributary to the existing inland wetlands are tabulated below:

**Table 5. Existing (21L) V.S. Proposed (25L) Peak Flows to Existing Stream**

Return Period (years)	Existing Peak Flow Rate (cfs)	Proposed Peak Flow Rate (cfs)	Change (cfs)	Percent Change (%)
2	1.09	0.54	-0.55	-50.4%

- B. Conveyance Protection is designed to adequately pass flows leading to, from and through it up to and including the 25-year design storm event as required in Section 3.2 of the Drainage Manual. Refer to pipe conveyance calculations in Appendix D.
- 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 Pre-development vs. post-development peak flow Table 2, 3 and 4 along with the HydroCAD report found in Appendix F.
- D. Emergency outlet devices are capable & sized to safely pass the 100-year storm event.
- E. A downstream hydrologic analysis is not required as there is no detention proposed.



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

- A. Site plan sheet SE-4 depicts erosion control measures to be implemented to control construction related impacts. Sediment and erosion controls such as silt fencing, stone tracking pads at construction zone entrance/exit points, catch basin insert protection, and tree protection are proposed.

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

- A. A Standard City of Stamford Drainage Maintenance Agreement will be executed with the Environmental Protection Board. A draft maintenance agreement has been prepared and is included in Appendix E.
- B. The construction plans will include notes describing the long-term maintenance requirements for the site-specific drainage system(s) including routine and non-routine inspection and maintenance tasks to be undertaken after construction is completed as well as the schedule for implementing these tasks. This information will be added to the plan set prior to filing for a building permit.

### **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.

### **Conclusion:**

As noted above, 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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## Sanitary Sewer Summary

Existing City owned sanitary sewer infrastructure exists within Intervale Road and Turn of River Road in Stamford, CT. There is a 12" sanitary main within Interval Road flowing west connected to a 12" sanitary main on Turn of River Road flowing south. Refer to Sanitary Sewer Infrastructure Exhibit in Appendix E for a plan view of the surrounding sanitary sewer system along with the proposed developments connection points.

Based on the Tax Cards on file with the City Tax Assessors, 131 Turn of River dwelling is 3 bedrooms, 139 Turn of River dwelling is 4 bedrooms and 29 Interval Road dwelling is 2 bedrooms. Using CT Health Code design flow guidelines, the existing use results in a total average daily sewage design flow of 1,350 GPD (0.013 cfs). Using a peaking factor of x4, the peak sewage design flow at any one time is 5,400 GPD (0.052 cfs). Refer to Appendix E for existing sanitary flow calculations.

Under proposed conditions the developer is seeking permission to eleven four (5) bedroom single family dwellings. Using CT Health Code design flow guidelines, the existing use results in a total average daily sewage design flow of 8,250 GPD (0.013 cfs). Using a peaking factor of x4, the peak sewage design flow at any one time is 33,000 GPD (0.052 cfs). Refer to Appendix E for calculations.

On October 25, 2022, monitoring of the sewer flow was observed within a sanitary manhole downgradient of proposed sanitary manhole no 100 as depicted on the Sanitary Sewer Infrastructure Exhibit. The highest flow of 3.89cfs was observed at 7:15am. The observed flow followed a three day rain event and most likely accounts for groundwater/stormwater infiltration. The total flow within the 12" pipe including the peak development flow is 3.94 cfs. This flow includes the sewer flow from the 3 existing houses to be demolished. The studied 12" main will be at 80.3% of its capacity of 4.91 cfs.

Based on the above information, the sanitary sewer system has sufficient capacity to accommodate the proposed development, and with proper implementation of the design drawings, the proposed development will not adversely impact the existing sanitary sewer system.

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## **Appendix A**

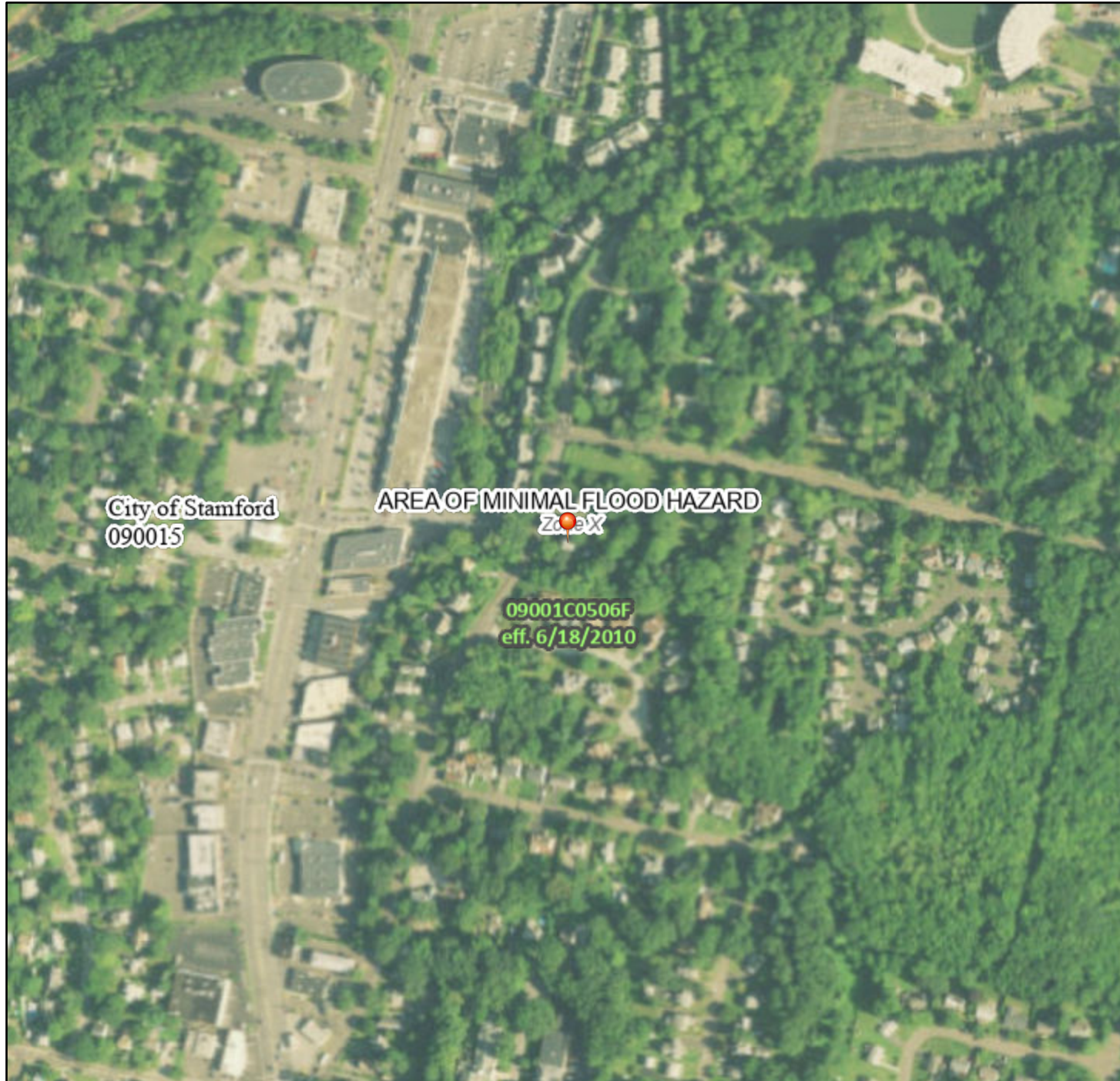
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FEMA Flood Insurance Map  
USGS Quadrangle Map – Site Vicinity Map  
City of Stamford Rainfall Intensity – Duration Curves  
NOAA-Atlas 14 Volume 10 – Precipitation Frequency  
NRCS Websoil Survey

# National Flood Hazard Layer FIRMMette



73°33'3"W 41°6'39"N



73°32'25"W 41°6'12"N

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

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

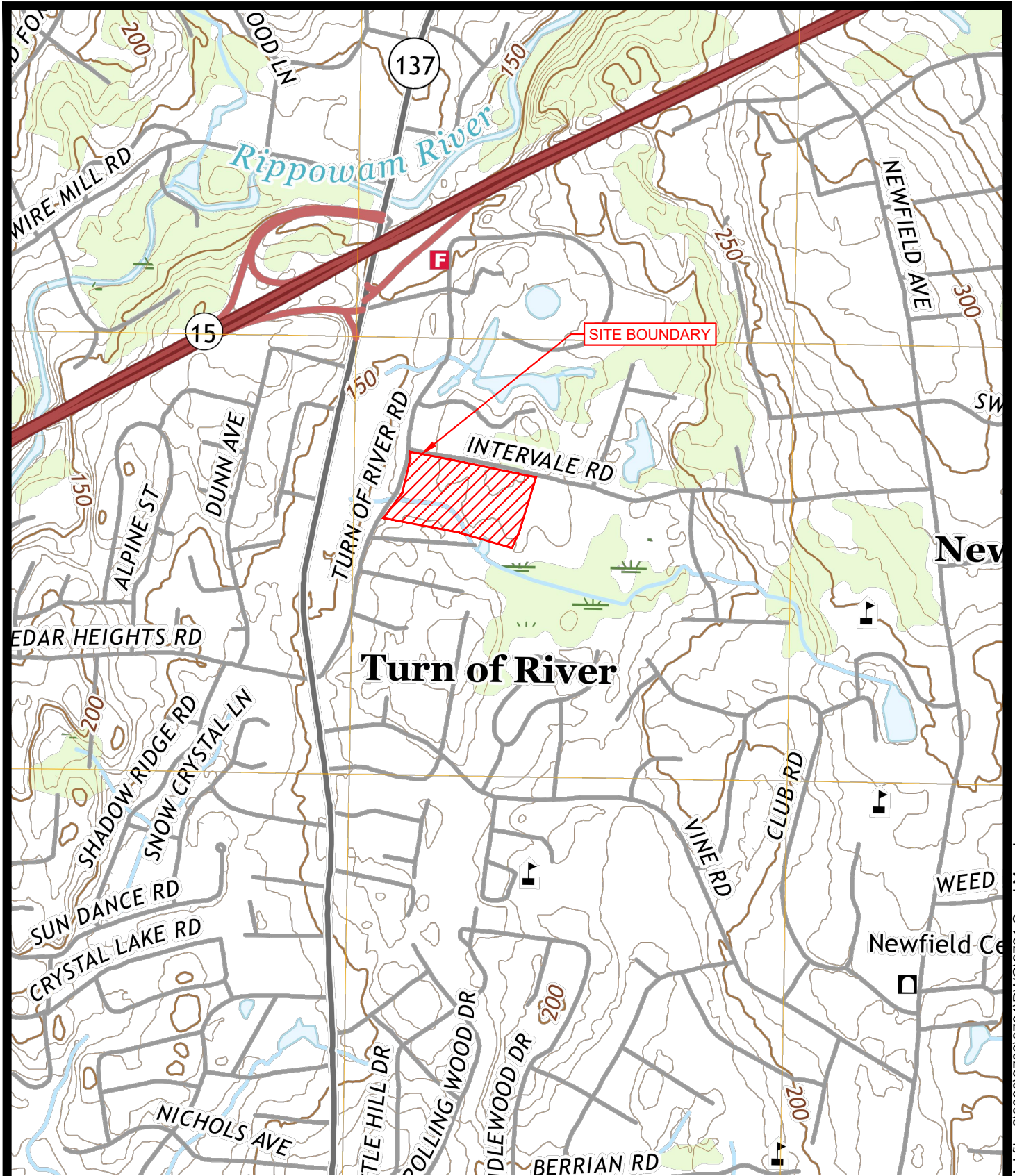
SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard <i>Zone D</i>
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		8 Coastal Transect
		5.13 Base Flood Elevation Line (BFE)
		Limit of Study
MAP PANELS		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **9/7/2022 at 6:11 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



**USGS QUADRANGLE MAP**

**NAME: STAMFOR NO.:113**

**131 & 129 TURN OF RIVER ROAD & 29 INTERVALE ROAD,  
STAMFORD, CT**

**REDNISS  
& MEAD**

COMM. NO.: 9734

DATE: 10/28/2022

SCALE: 1"=1,000'

10/24/2022 5:18 PM H:\Jobfiles\21900019700\9734\DWG\9734 Quad Map.dwg



**NOAA Atlas 14, Volume 10, Version 3**  
**Location name: Stamford, Connecticut, USA\***  
**Latitude: 41.107°, Longitude: -73.5455°**  
**Elevation: 163.81 ft\*\***  
\* source: ESRI Maps  
\*\* source: USGS



**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

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

**PF tabular**

<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
<b>5-min</b>	<b>0.368</b> (0.280-0.468)	<b>0.426</b> (0.324-0.543)	<b>0.522</b> (0.396-0.667)	<b>0.601</b> (0.453-0.771)	<b>0.711</b> (0.521-0.943)	<b>0.794</b> (0.571-1.07)	<b>0.880</b> (0.616-1.22)	<b>0.973</b> (0.652-1.38)	<b>1.10</b> (0.713-1.61)	<b>1.21</b> (0.763-1.79)
<b>10-min</b>	<b>0.521</b> (0.396-0.663)	<b>0.604</b> (0.459-0.770)	<b>0.740</b> (0.561-0.945)	<b>0.852</b> (0.643-1.09)	<b>1.01</b> (0.738-1.34)	<b>1.13</b> (0.809-1.52)	<b>1.25</b> (0.872-1.73)	<b>1.38</b> (0.923-1.95)	<b>1.56</b> (1.01-2.27)	<b>1.71</b> (1.08-2.53)
<b>15-min</b>	<b>0.613</b> (0.466-0.780)	<b>0.710</b> (0.540-0.906)	<b>0.870</b> (0.660-1.11)	<b>1.00</b> (0.755-1.29)	<b>1.19</b> (0.869-1.57)	<b>1.32</b> (0.951-1.78)	<b>1.47</b> (1.03-2.03)	<b>1.62</b> (1.09-2.29)	<b>1.84</b> (1.19-2.67)	<b>2.01</b> (1.27-2.97)
<b>30-min</b>	<b>0.858</b> (0.654-1.09)	<b>0.996</b> (0.757-1.27)	<b>1.22</b> (0.926-1.56)	<b>1.41</b> (1.06-1.81)	<b>1.66</b> (1.22-2.20)	<b>1.86</b> (1.34-2.50)	<b>2.06</b> (1.44-2.85)	<b>2.27</b> (1.52-3.22)	<b>2.57</b> (1.66-3.74)	<b>2.80</b> (1.77-4.15)
<b>60-min</b>	<b>1.10</b> (0.841-1.41)	<b>1.28</b> (0.974-1.63)	<b>1.57</b> (1.19-2.01)	<b>1.81</b> (1.37-2.32)	<b>2.14</b> (1.57-2.84)	<b>2.39</b> (1.72-3.22)	<b>2.65</b> (1.85-3.67)	<b>2.92</b> (1.96-4.14)	<b>3.30</b> (2.13-4.80)	<b>3.60</b> (2.28-5.32)
<b>2-hr</b>	<b>1.42</b> (1.09-1.80)	<b>1.67</b> (1.28-2.11)	<b>2.07</b> (1.58-2.63)	<b>2.41</b> (1.83-3.08)	<b>2.88</b> (2.12-3.79)	<b>3.23</b> (2.34-4.33)	<b>3.59</b> (2.53-4.96)	<b>3.99</b> (2.69-5.62)	<b>4.56</b> (2.96-6.60)	<b>5.02</b> (3.19-7.39)
<b>3-hr</b>	<b>1.64</b> (1.26-2.06)	<b>1.93</b> (1.49-2.44)	<b>2.42</b> (1.86-3.06)	<b>2.83</b> (2.16-3.59)	<b>3.38</b> (2.51-4.45)	<b>3.80</b> (2.76-5.09)	<b>4.24</b> (3.00-5.85)	<b>4.73</b> (3.19-6.63)	<b>5.43</b> (3.53-7.83)	<b>6.01</b> (3.82-8.81)
<b>6-hr</b>	<b>2.07</b> (1.61-2.59)	<b>2.46</b> (1.91-3.09)	<b>3.10</b> (2.40-3.90)	<b>3.64</b> (2.80-4.59)	<b>4.37</b> (3.26-5.71)	<b>4.92</b> (3.60-6.55)	<b>5.50</b> (3.92-7.55)	<b>6.16</b> (4.16-8.57)	<b>7.11</b> (4.64-10.2)	<b>7.90</b> (5.04-11.5)
<b>12-hr</b>	<b>2.58</b> (2.02-3.20)	<b>3.07</b> (2.40-3.83)	<b>3.89</b> (3.03-4.85)	<b>4.56</b> (3.53-5.72)	<b>5.49</b> (4.13-7.14)	<b>6.19</b> (4.56-8.19)	<b>6.92</b> (4.97-9.46)	<b>7.77</b> (5.28-10.7)	<b>9.01</b> (5.90-12.8)	<b>10.0</b> (6.42-14.5)
<b>24-hr</b>	<b>3.04</b> (2.40-3.76)	<b>3.66</b> (2.89-4.53)	<b>4.68</b> (3.68-5.80)	<b>5.52</b> (4.31-6.88)	<b>6.69</b> (5.07-8.65)	<b>7.55</b> (5.61-9.95)	<b>8.48</b> (6.14-11.5)	<b>9.56</b> (6.52-13.1)	<b>11.2</b> (7.34-15.8)	<b>12.5</b> (8.05-18.0)
<b>2-day</b>	<b>3.42</b> (2.72-4.19)	<b>4.18</b> (3.32-5.13)	<b>5.43</b> (4.30-6.69)	<b>6.47</b> (5.09-8.00)	<b>7.89</b> (6.03-10.2)	<b>8.95</b> (6.71-11.8)	<b>10.1</b> (7.38-13.7)	<b>11.5</b> (7.86-15.7)	<b>13.6</b> (8.94-19.1)	<b>15.4</b> (9.90-21.9)
<b>3-day</b>	<b>3.70</b> (2.95-4.52)	<b>4.53</b> (3.62-5.55)	<b>5.91</b> (4.70-7.24)	<b>7.05</b> (5.57-8.68)	<b>8.61</b> (6.61-11.1)	<b>9.77</b> (7.36-12.8)	<b>11.0</b> (8.09-15.0)	<b>12.6</b> (8.62-17.1)	<b>14.9</b> (9.82-20.8)	<b>16.9</b> (10.9-24.0)
<b>4-day</b>	<b>3.96</b> (3.18-4.83)	<b>4.85</b> (3.88-5.92)	<b>6.30</b> (5.02-7.71)	<b>7.50</b> (5.95-9.22)	<b>9.16</b> (7.04-11.7)	<b>10.4</b> (7.83-13.5)	<b>11.7</b> (8.61-15.8)	<b>13.3</b> (9.16-18.1)	<b>15.7</b> (10.4-22.0)	<b>17.8</b> (11.5-25.3)
<b>7-day</b>	<b>4.74</b> (3.83-5.75)	<b>5.71</b> (4.60-6.93)	<b>7.30</b> (5.86-8.88)	<b>8.62</b> (6.88-10.5)	<b>10.4</b> (8.06-13.2)	<b>11.8</b> (8.91-15.2)	<b>13.2</b> (9.73-17.7)	<b>14.9</b> (10.3-20.1)	<b>17.5</b> (11.6-24.2)	<b>19.6</b> (12.7-27.6)
<b>10-day</b>	<b>5.50</b> (4.46-6.65)	<b>6.53</b> (5.28-7.89)	<b>8.21</b> (6.62-9.95)	<b>9.60</b> (7.69-11.7)	<b>11.5</b> (8.92-14.5)	<b>13.0</b> (9.82-16.6)	<b>14.5</b> (10.6-19.2)	<b>16.2</b> (11.2-21.8)	<b>18.8</b> (12.5-25.9)	<b>20.9</b> (13.6-29.3)
<b>20-day</b>	<b>7.76</b> (6.34-9.31)	<b>8.92</b> (7.28-10.7)	<b>10.8</b> (8.79-13.0)	<b>12.4</b> (10.0-15.0)	<b>14.6</b> (11.3-18.2)	<b>16.2</b> (12.3-20.6)	<b>17.9</b> (13.1-23.3)	<b>19.7</b> (13.8-26.3)	<b>22.2</b> (14.9-30.5)	<b>24.2</b> (15.7-33.7)
<b>30-day</b>	<b>9.61</b> (7.88-11.5)	<b>10.9</b> (8.90-13.0)	<b>12.9</b> (10.6-15.5)	<b>14.6</b> (11.9-17.6)	<b>17.0</b> (13.3-21.1)	<b>18.8</b> (14.3-23.6)	<b>20.6</b> (15.1-26.6)	<b>22.5</b> (15.7-29.8)	<b>24.9</b> (16.7-34.0)	<b>26.8</b> (17.4-37.2)
<b>45-day</b>	<b>11.9</b> (9.78-14.1)	<b>13.2</b> (10.9-15.8)	<b>15.5</b> (12.7-18.5)	<b>17.3</b> (14.1-20.8)	<b>19.9</b> (15.6-24.5)	<b>21.9</b> (16.7-27.3)	<b>23.8</b> (17.5-30.5)	<b>25.7</b> (18.1-33.9)	<b>28.1</b> (18.9-38.2)	<b>29.9</b> (19.5-41.4)
<b>60-day</b>	<b>13.7</b> (11.4-16.3)	<b>15.2</b> (12.6-18.0)	<b>17.6</b> (14.5-20.9)	<b>19.5</b> (16.0-23.4)	<b>22.2</b> (17.5-27.3)	<b>24.4</b> (18.6-30.3)	<b>26.4</b> (19.4-33.6)	<b>28.4</b> (20.0-37.3)	<b>30.8</b> (20.7-41.7)	<b>32.5</b> (21.3-44.8)

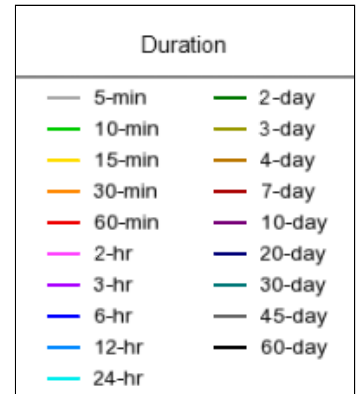
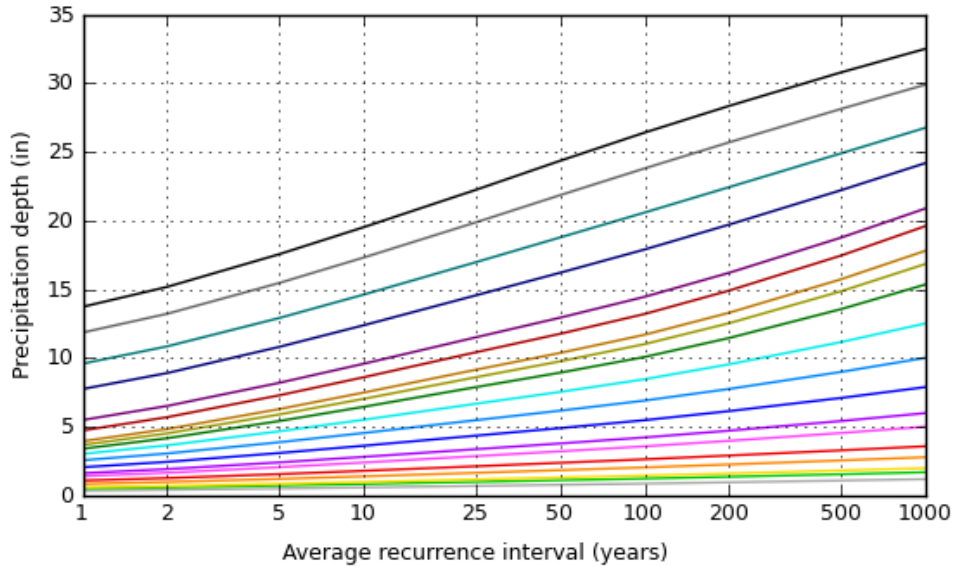
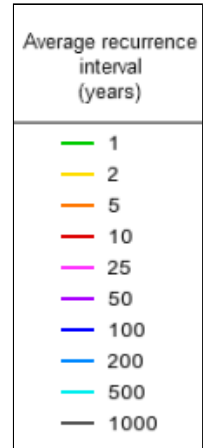
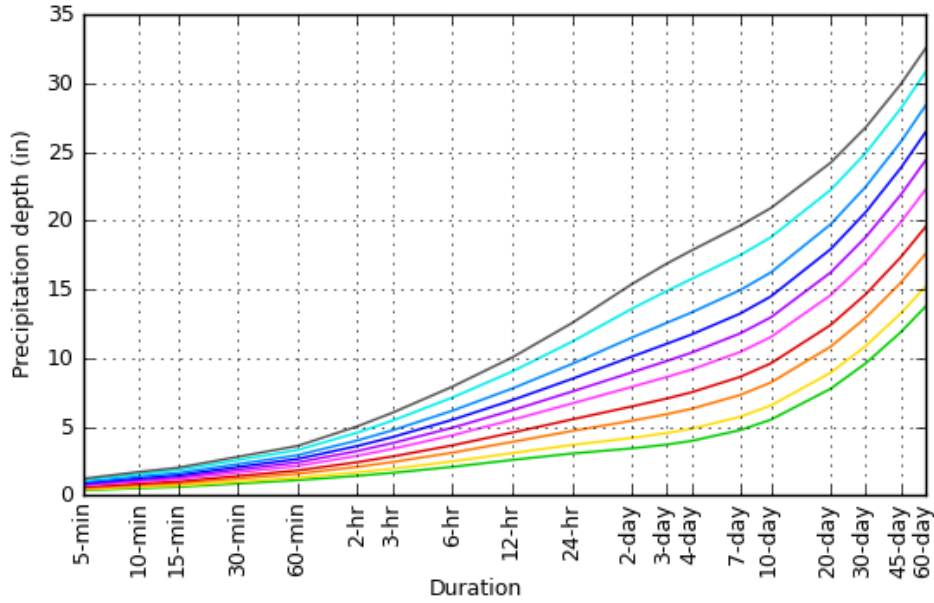
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration 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

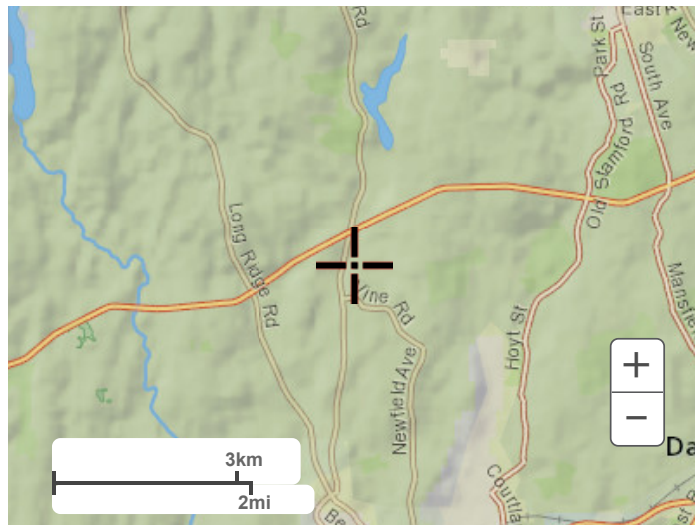
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### Maps & aerials

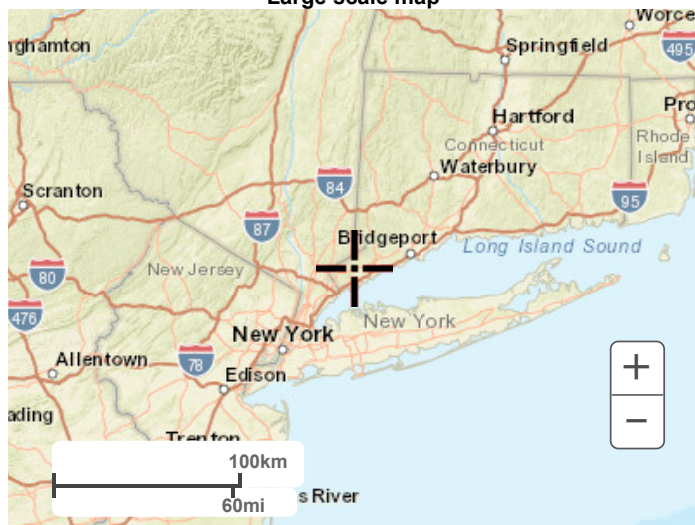
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial





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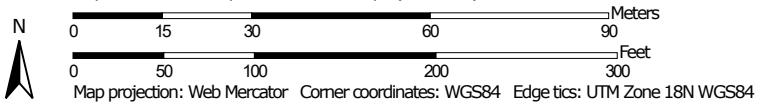
[US Department of Commerce](#)  
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1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

[Disclaimer](#)

Hydrologic Soil Group—State of Connecticut




Map Scale: 1:1,270 if printed on A landscape (11" x 8.5") sheet.



## 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
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	0.2	3.8%
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	3.0	73.0%
260B	Charlton-Urban land complex, 3 to 8 percent slopes	B	0.1	2.0%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	0.9	21.2%
<b>Totals for Area of Interest</b>			<b>4.0</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

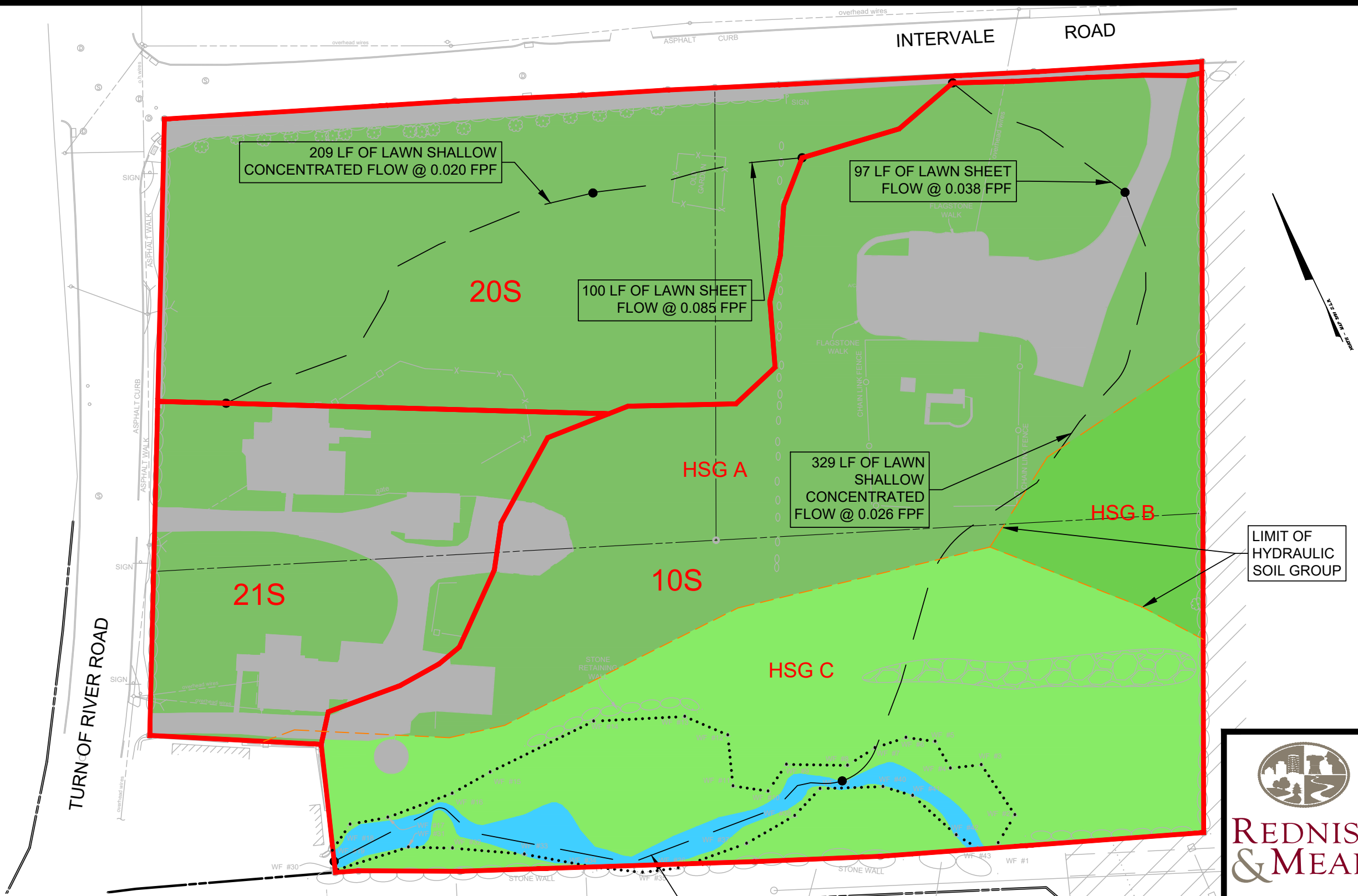
*Tie-break Rule:* Higher

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## **Appendix B**

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Existing On-Site Drainage Basin Map  
Proposed On-Site Drainage Basin Map



**DRAINAGE BASIN SUMMARY TABLE**

BASIN	CN	SIZE (SF.)	TC (HR.)	50YR RUNOFF VOLUME (CF)
20S	43.77	44,082	0.155	5,095
21S	59.82	23,558	0.0833 (ASSUMED)	5,095
10S	61.10	105,002	0.222	27,178

**EXISTING CONDITIONS DRAINAGE BASIN MAP**  
**131 & 139 TURN OF RIVER ROAD & 29 INTERVALE ROAD**  
**STAMFORD, CT**



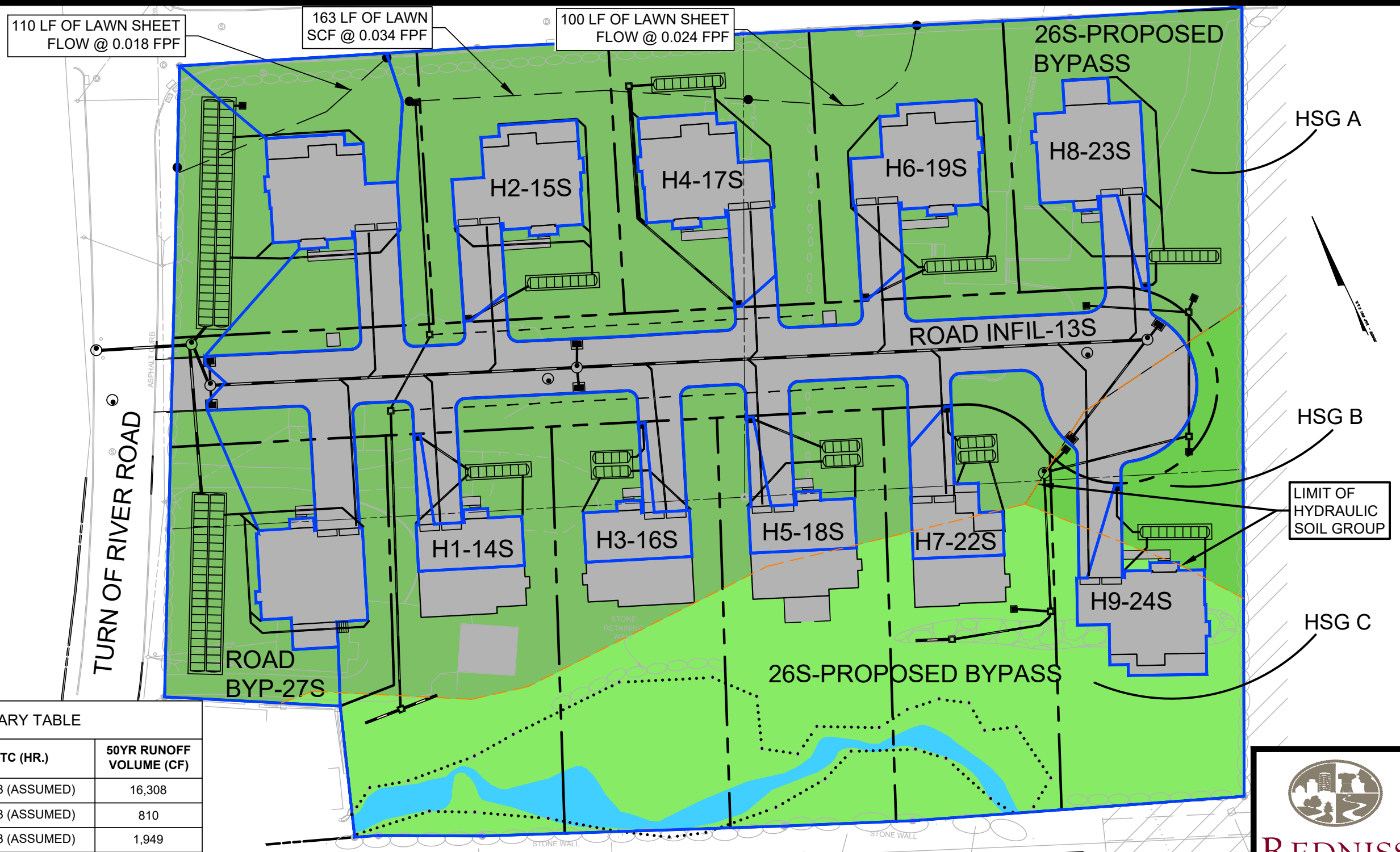
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DRAINAGE BASIN SUMMARY TABLE				
BASIN	CN	SIZE (SF.)	TC (HR.)	50YR RUNOFF VOLUME (CF)
ROAD-INFIL-13S	87.89	32,023	0.833 (ASSUMED)	16,308
H1-14S	98	1,330	0.833 (ASSUMED)	810
H2-15S	98	3,202	0.833 (ASSUMED)	1,949
H3-16S	98	1,286	0.833 (ASSUMED)	783
H4-17S	98	3,202	0.833 (ASSUMED)	1,949
H5-18S	98	1,371	0.833 (ASSUMED)	835
H6-19S	98	3,184	0.833 (ASSUMED)	1,938
H7-22S	98	1,816	0.833 (ASSUMED)	1,106
H8-23S	98	2,690	0.833 (ASSUMED)	1,638
H9-24S	98	2,837	0.833 (ASSUMED)	1,727
PR BYPASS-26S	55.83	106,620	0.218	22,720
ROAD BYP-27S	41.64	13,081	0.258	1,302

**PROPOSED CONDITIONS DRAINAGE BASIN MAP**  
**131 & 139 TURN OF RIVER ROAD & 29 INTERVALE ROAD**  
**STAMFORD, CT**

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
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# Appendix C

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LID Review Map

**LEGEND:**

-  BUILDINGS
-  ASPHALT PARKING, DRIVES & HARDSCAPE
-  PERVIOUS
-  STORMWATER BMP

**HOUSE INFILTRATION #2**  
 236 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=3,202 SQ.FT.  
 IMPERVIOUS AREA=3,202 SQ.FT.  
 REQ. WQV=253 CU.FT.  
 WQV. PROVIDED=540 CU.FT.

**ROAD INFILTRATION #1 & 2**  
 2,986 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=32,023 SQ.FT.  
 IMPERVIOUS AREA=26,534 SQ.FT.  
 REQ. WQV=2,123 CU.FT.  
 WQV. PROVIDED=4,669 CU.FT.

**HOUSE INFILTRATION #1**  
 211 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=1,330 SQ.FT.  
 IMPERVIOUS AREA=1,330 SQ.FT.  
 REQ. WQV=105 CU.FT.  
 WQV. PROVIDED=505 CU.FT.

**HOUSE INFILTRATION #4**  
 236 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=3,202 SQ.FT.  
 IMPERVIOUS AREA=3,202 SQ.FT.  
 REQ. WQV=253 CU.FT.  
 WQV. PROVIDED=575 CU.FT.

**HOUSE INFILTRATION #6**  
 236 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=3,184 SQ.FT.  
 IMPERVIOUS AREA=3,184 SQ.FT.  
 REQ. WQV=252 CU.FT.  
 WQV. PROVIDED=575 CU.FT.

**HOUSE INFILTRATION #8**  
 236 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=2,689 SQ.FT.  
 IMPERVIOUS AREA=2,689 SQ.FT.  
 REQ. WQV=213 CU.FT.  
 WQV. PROVIDED=565 CU.FT.

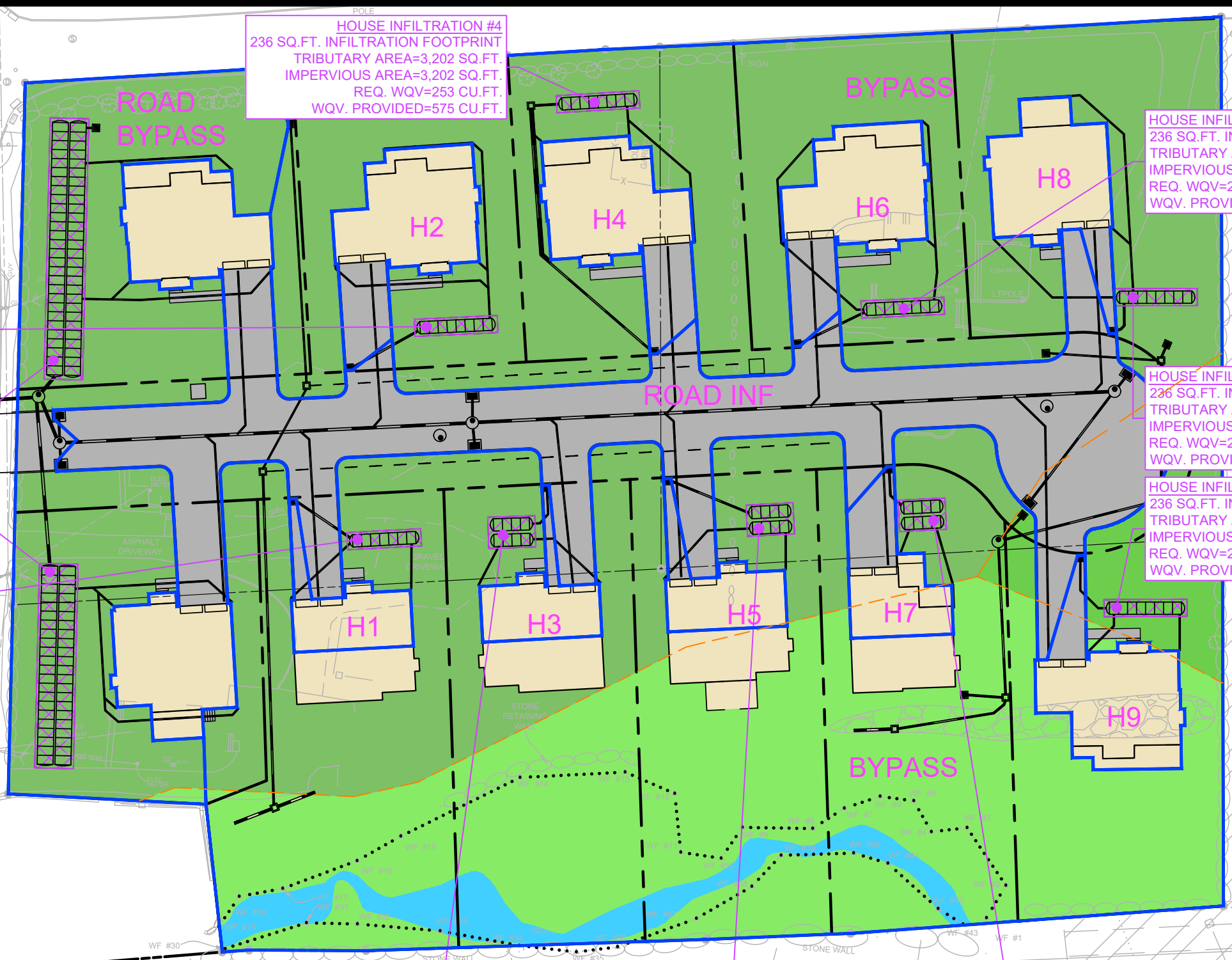
**HOUSE INFILTRATION #9**  
 236 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=2,837 SQ.FT.  
 IMPERVIOUS AREA=2,837 SQ.FT.  
 REQ. WQV=225 CU.FT.  
 WQV. PROVIDED=549 CU.FT.

**HOUSE INFILTRATION #3**  
 244 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=1,286 SQ.FT.  
 IMPERVIOUS AREA=1,286 SQ.FT.  
 REQ. WQV=102 CU.FT.  
 WQV. PROVIDED=594 CU.FT.


**HOUSE INFILTRATION #5**  
 244 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=1,286 SQ.FT.  
 IMPERVIOUS AREA=1,286 SQ.FT.  
 REQ. WQV=102 CU.FT.  
 WQV. PROVIDED=594 CU.FT.

**HOUSE INFILTRATION #7**  
 244 SQ.FT. INFILTRATION FOOTPRINT  
 TRIBUTARY AREA=1,816 SQ.FT.  
 IMPERVIOUS AREA=1,816 SQ.FT.  
 REQ. WQV=144 CU.FT.  
 WQV. PROVIDED=594 CU.FT.

LID SUMMARY TABLE					
Drainage Area ID	Total Area (SF)	Impervious Area (SF)	% Impervious	WQV (CF)	Retention Volume Provided (CF)
Road Infil	32,023	26,534	83%	2,123	4,669
H-Infil #1	1,330	1,330	100%	105	505
H-Infil #2	3,202	3,202	100%	253	540
H-Infil #3	1,286	1,286	100%	102	594
H-Infil #4	3,202	3,202	100%	253	575
H-Infil #5	1,286	1,286	100%	102	594
H-Infil #6	3,184	3,184	100%	252	575
H-Infil #7	1,816	1,816	100%	144	594
H-Infil #8	2,689	2,689	100%	225	565
H-Infil #9	2,837	2,837	100%	225	549
<b>TOTAL</b>	<b>52,855</b>	<b>47,366</b>	<b>90%</b>	<b>3,784</b>	<b>9,760</b>



**LID REVIEW MAP**  
**131 & 139 TURN OF RIVER ROAD & 29 INTERVALE ROAD**  
**STAMFORD, CT**



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## **Appendix D**

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Water Quality Volume Calculations  
BMP Volume Calculations  
72 Hour Drawdown Calculations  
Conveyance Calculations  
Level Spreader Sizing

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** 131, 139 Turn of River Road, 29 Intervale Road

**By:** *JWB*    **Checked:** *TM*

### Proposed

Area=	3.963 acres
Proposed Impervious Area=	1.215 acres
Proposed Imperviousness=	30.7%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.33 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>4689 cf <sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>9760 cf <sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** 131, 139 Turn of River Road, 29 Intervale Road

**By:** *JWB*    **Checked:** *TM*

### 13S-Road Infiltration Systems

Area=	0.735 acres
Proposed Impervious Area=	0.609 acres
Proposed Imperviousness=	82.9%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.80 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>2123 cf <sup>b</sup></b>
<b>Water Quality Volume Provided=</b>	<b>4669 cf <sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** *131, 139 Turn of River Road, 29 Intervale Road*

**By:** *JWB*    **Checked:** *TM*

### 14S-House Infiltration System #1

Area=	0.031 acres
Proposed Impervious Area=	0.031 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>105 cf<sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>505 cf<sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(I \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** *1/5/2023*

**Location:** *131, 139 Turn of River Road, 29 Intervale Road*

**By:** *JWB*    **Checked:** *TM*

### 15S-House Infiltration System #2

Area=	0.074 acres
Proposed Impervious Area=	0.074 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>253 cf <sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>540 cf <sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** 131, 139 Turn of River Road, 29 Intervale Road

**By:** *JWB*    **Checked:** *TM*

### 16S-House Infiltration System #3

Area=	0.030 acres
Proposed Impervious Area=	0.030 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>102 cf<sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>594 cf<sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1



## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** *131, 139 Turn of River Road, 29 Intervale Road*

**By:** *JWB*    **Checked:** *TM*

### 17S-House Infiltration System #4

Area=	0.074 acres
Proposed Impervious Area=	0.074 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>253 cf<sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>575 cf<sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** *1/5/2023*

**Location:** *131, 139 Turn of River Road, 29 Intervale Road*

**By:** *JWB*    **Checked:** *TM*

### 18S-House Infiltration System #5

Area=	0.030 acres
Proposed Impervious Area=	0.030 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>102 cf<sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>594 cf<sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** *131, 139 Turn of River Road, 29 Intervale Road*

**By:** *JWB*    **Checked:** *TM*

### 19S-House Infiltration System #6

Area=	0.073 acres
Proposed Impervious Area=	0.073 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>252 cf<sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>575 cf<sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** 131, 139 Turn of River Road, 29 Intervale Road

**By:** *JWB*    **Checked:** *TM*

### 22S-House Infiltration System #7

Area=	0.042 acres
Proposed Impervious Area=	0.042 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>144 cf<sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>594 cf<sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** *1/5/2023*

**Location:** *131, 139 Turn of River Road, 29 Intervale Road*

**By:** *JWB*    **Checked:** *TM*

### 23S-House Infiltration System #8

Area=	0.062 acres
Proposed Impervious Area=	0.062 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>213 cf <sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>565 cf <sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** 131, 139 Turn of River Road, 29 Intervale Road

**By:** *JWB*    **Checked:** *TM*

### 24S-House Infiltration System #9

Area=	0.065 acres
Proposed Impervious Area=	0.065 acres
Proposed Imperviousness=	100.0%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.95 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>225 cf <sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>549 cf <sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1" \times R \times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## Water Quality Volume Calculation

**Project:** *Turn of River Road Subdivision*

**Project #:** 9734    **Date:** 1/5/2023

**Location:** 131, 139 Turn of River Road, 29 Intervale Road

**By:** *JWB*    **Checked:** *TM*

### 26S-Bypass

Area=	2.448 acres
Proposed Impervious Area=	<b>0.192</b> acres
Proposed Imperviousness=	7.9%
Design Rainfall (P)=	1.0 inches
Volumetric Runoff Coefficient (R)=	0.12 <sup>a</sup>
<b>Water Quality Volume (WQV)=</b>	<b>1073 cf <sup>b</sup></b>
<b>Water Quality Volume Provided =</b>	<b>0 cf <sup>b</sup></b>

<sup>a</sup>  $R=0.05+0.009(I)$ ; Volumetric runoff Coefficient, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

<sup>b</sup>  $WQV=(1''\times R\times A)/12$ ; Water Quality Volume, Equation taken from 2004 Connecticut Stormwater Quality Manual section 7.4.1

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 13S-Road Infiltration Systems

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	1,311	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	3,780	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	34.60	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>14.36</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1



## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022

**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 14S-House Infiltration System #1

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	211	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	505	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	28.72	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>11.92</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 15S-House Infiltration System #2

<u>Infiltration System</u>	
Surface Area of Infiltration System (SA)	236 ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	540 ft <sup>3</sup>
Infiltration Rate (IR)	2.41 in/hr <sup>c</sup>
Theoretical Water Column Height	27.46 in <sup>a</sup>
<b>Time of Draw Down</b>	<b>11.39 hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 16S-House Infiltration System #3

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	244	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	594	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	29.21	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>12.12</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 17S-House Infiltration System #4

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	236	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	575	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	29.24	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>12.13</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 18S-House Infiltration System #5

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	244	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	594	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	29.21	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>12.12</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

## 72-Hour Draw Down Calculations

<b>Project:</b> 131 & 139 Turn of River & 29 Intervale Road	<b>Project #:</b> 9734	<b>Date:</b> 1/5/2023
<b>Location:</b> Stamford, CT	<b>By:</b> JWB	<b>Checked:</b> TM

### 19S-House Infiltration System #6

<u><b>Infiltration System</b></u>	
Surface Area of Infiltration System (SA)	236 ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	575 ft <sup>3</sup>
Infiltration Rate (IR)	2.41 in/hr <sup>c,d</sup>
Theoretical Water Column Height	29.24 in <sup>a</sup>
<b>Time of Draw Down</b>	<b>12.13 hr<sup>b,d</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

<sup>d</sup> *Field Application Rate Conducted 12/27/2022 is 2.5in/hr resulting in a drawdown of 11.7hr*

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 22S-House Infiltration System #7

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	244	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	594	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	29.21	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>12.12</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 23S-House Infiltration System #8

<u>Infiltration System</u>		
Surface Area of Infiltration System (SA)	236	ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	565	ft <sup>3</sup>
Infiltration Rate (IR)	2.41	in/hr <sup>c</sup>
Theoretical Water Column Height	28.73	in <sup>a</sup>
<b>Time of Draw Down</b>	<b>11.92</b>	<b>hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1



## 72-Hour Draw Down Calculations

**Project:** 131 & 139 Turn of River & 29 Intervale Road      **Project #:** 9734      **Date:** 10/28/2022  
**Location:** Stamford, CT      **By:** JWB      **Checked:** TM

### 24S-House Infiltration System #9

<u>Infiltration System</u>	
Surface Area of Infiltration System (SA)	236 ft <sup>2</sup>
Volume of Storage of Infiltration System (VS)	594 ft <sup>3</sup>
Infiltration Rate (IR)	0.52 in/hr <sup>c</sup>
Theoretical Water Column Height	30.20 in <sup>a</sup>
<b>Time of Draw Down</b>	<b>58.08 hr<sup>b</sup></b>

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA\*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Infiltration Rate (IR) Taken From Stamford Stormwater Drainage Manual, Table 5-1

HYDRAULIC DATA FOR RATIONAL METHOD								
<b>Project:</b> 131 & 139 Turn of River Road & 29 Intervale Road					<b>Project #:</b> 9734		<b>Date:</b> 10/28/2022	
<b>Location:</b> Stamford, CT					<b>By:</b> JWB		<b>Checked:</b> TM	
25-Year Storm Conveyance Calculations								
Pipe Section	Q in system (cfs)*	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q <sub>full</sub> (cfs)	Q <sub>system</sub> / Q <sub>full</sub> (%)
MMH#1 to DMH#1 (26P)	1.79	12	41	0.011	PVC	0.068	11.01	16.3%
MH#1 to MMH#1 (26P)	6.89 **	15	14	0.011	PVC	0.015	9.38	73.5%
JB#2 to JB#1 (11S)	0.28	8	135	0.011	PVC	0.010	1.43	19.6%
JB#5 to JB#4 (12S)	0.45	8	48	0.011	PVC	0.010	1.43	31.4%

\*25-Year flow rates obtained from HydroCAD Report

\*\*Conservative Flow as Lot #1 & 11 roofs bypass system

## Level Spreader Calculations

<b>Project:</b> <i>Turn of River Road Subdivision</i>	<b>Project #:</b> 9734	<b>Date:</b> 10/28/2022
<b>Location:</b> <i>131 &amp; 139 Turn of River Road and 29 Intervale Road, Stamford, CT</i>	<b>By:</b> <i>JWB</i>	<b>Checked:</b> <i>TM</i>

### Level Spreader Calculations - 100 yr Storm

Level Spreader LS#1	
<b>Q =</b>	<b>0.94 cfs</b>

Assumed $V_{MAX}$ =	2.0 ft/sec
y =	0.124 ft
H =	0.186 ft
L =	4.023 Q

<b>Length Required</b>	<b>3.78 ft</b>
------------------------	----------------

<b>Length Provided</b>	<b>30.00 ft</b>
------------------------	-----------------

<sup>a</sup> Flow derived from Subcatchment #11S

<sup>b</sup>  $V_{MAX}$  = 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:  $Q = 3.09LH^{3/2}$

y = Depth of water over weir (ft)

H = Head (ft)

## Level Spreader Calculations

<b>Project:</b> <i>Turn of River Road Subdivision</i>	<b>Project #:</b> 9734	<b>Date:</b> 10/28/2022
<b>Location:</b> <i>131 &amp; 139 Turn of River Road and 29 Intervale Road, Stamford, CT</i>	<b>By:</b> <i>JWB</i>	<b>Checked:</b> <i>TM</i>

### Level Spreader Calculations - 100 yr Storm

Level Spreader LS#2	
<b>Q =</b>	<b>1.06 cfs</b>

Assumed $V_{MAX} =$	2.0 ft/sec
y =	0.124 ft
H =	0.186 ft
L =	4.023 Q

<b>Length Required</b>	<b>4.26 ft</b>
------------------------	----------------

<b>Length Provided</b>	<b>15.00 ft</b>
------------------------	-----------------

<sup>a</sup> Flow derived from Subcatchment #12S

<sup>b</sup>  $V_{MAX}$  = 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:  $Q = 3.09LH^{3/2}$

y = Depth of water over weir (ft)

H = Head (ft)

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## **Appendix E**

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Sanitary Infrastructure Exhibit  
Sanitary Sewer Flow Exhibit

GR=164.44  
 OUT=160.1 (WL)  
 SUMP=160.1 (SILTED)

STORM MH  
 RIM=165.05  
 INV=162.80 (S)  
 INV=160.95 (E)  
 OUT=160.74 (W)

CB  
 GR=164.64  
 OUT=161.36  
 SUMP=161.0 (SILTED)

DOGHOUSE SANITARY  
 MANHOLE #100  
 RIM=163.30±  
 INV IN=148.27± (EX-N)  
 INV IN=152.45 (SMH#101)  
 INV IN=148.40 (SMH#101)(DROP)  
 INV OUT=148.27 (EX SMH)

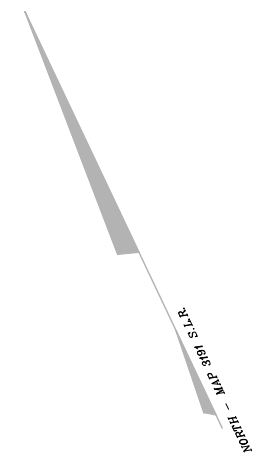
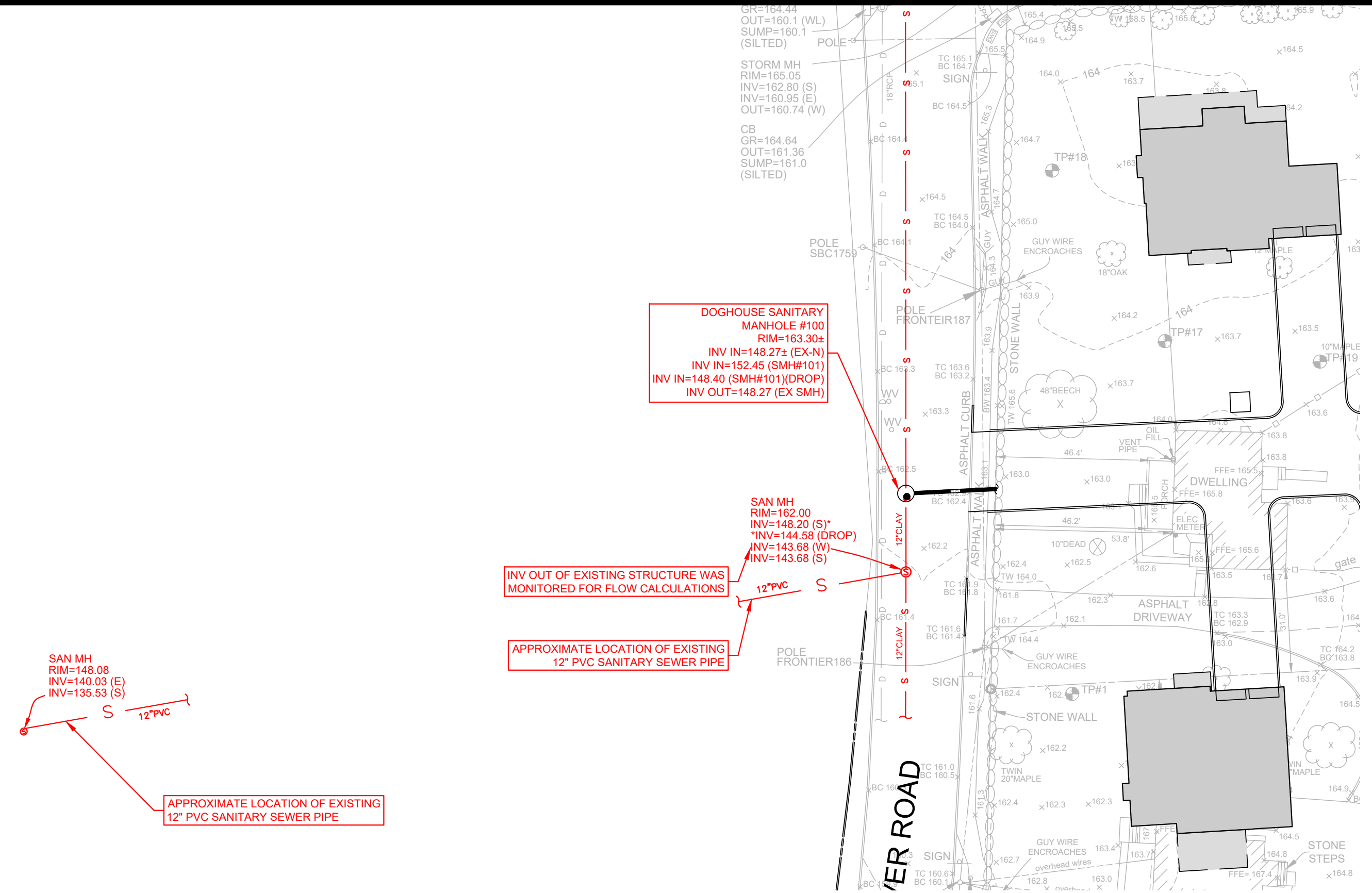
SAN MH  
 RIM=162.00  
 INV=148.20 (S)\*  
 \*INV=144.58 (DROP)  
 INV=143.68 (W)  
 INV=143.68 (S)

INV OUT OF EXISTING STRUCTURE WAS  
 MONITORED FOR FLOW CALCULATIONS

APPROXIMATE LOCATION OF EXISTING  
 12" PVC SANITARY SEWER PIPE

SAN MH  
 RIM=148.08  
 INV=140.03 (E)  
 INV=135.53 (S)

APPROXIMATE LOCATION OF EXISTING  
 12" PVC SANITARY SEWER PIPE



# SANITARY SEWER INFRASTRUCTURE EXHIBIT

## 131 & 139 TURN OF RIVER ROAD AND 29 INTERVALE ROAD

### STAMFORD, CT

**REDNISS & MEAD**

LAND SURVEYING  
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 www.rednissmead.com

COMM. NO.:	DATE:
9734	10/28/2022
	SCALE:
	XX

10/27/2022 4:47 PM H:\jobfiles\219000\19700\19734\DWG\19734\Master7(Sanitary EX).dwg



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## Sanitary Sewer Flow Monitoring

<b>Project:</b>	<i>Turn of River Road Subdivision</i>	<b>Project #:</b>	9734
<b>Location:</b>	<i>131 &amp; 139 Turn of River Road and 29 Intervale Road</i>	<b>By:</b>	<i>JWB</i>
<b>Description:</b>	<i>Ex. 12" Sanitary Sewer Main in Turn of River Road</i>	<b>Checked:</b>	<i>TM</i>
		<b>Date:</b>	10/28/22

		EX. SAN. MH#1		
DATE	TIME	Depth of Ex. San. MH#1 (in)	Depth to San. Flow (in)	Depth of Flow in 12" Sewer Main (in)
10/26/22	7:15 AM	219.84	220.34	0.50
10/26/22	7:30 AM	219.84	220.27	0.43
10/26/22	7:45 AM	219.84	220.17	0.33
10/26/22	8:00 AM	219.84	220.01	0.17
10/26/22	8:15 AM	219.84	220.01	0.17
10/26/22	8:30 AM	219.84	220.01	0.17
10/26/22	8:45 AM	219.84	220.09	0.25
10/26/22	9:00 AM	219.84	220.01	0.17
10/26/22	9:15 AM	219.84	220.09	0.25
10/26/22	9:30 AM	219.84	220.09	0.25
10/26/22	11:30 AM	219.84	220.09	0.25
10/26/22	11:45 AM	219.84	220.09	0.25
10/26/22	12:00 PM	219.84	220.09	0.25
10/26/22	12:15 PM	219.84	220.09	0.25
10/26/22	12:30 PM	219.84	220.09	0.25
10/26/22	12:45 PM	219.84	220.09	0.25
10/26/22	1:00 PM	219.84	220.17	0.33
10/26/22	1:15 PM	219.84	220.09	0.25
10/26/22	1:30 PM	219.84	220.09	0.25
10/26/22	4:30 PM	219.84	220.09	0.25
10/26/22	4:45 PM	219.84	220.09	0.25
10/26/22	5:00 PM	219.84	220.09	0.25
10/26/22	5:15 PM	219.84	220.17	0.33
10/26/22	5:30 PM	219.84	220.17	0.33
10/26/22	5:45 PM	219.84	220.17	0.33
10/26/22	6:00 PM	219.84	220.17	0.33
10/26/22	6:15 PM	219.84	220.09	0.25
10/28/22	6:30 PM	219.84	220.09	0.25

**Notes:**

- 1) Site visits made during peak hours to measure depths of sanitary flow.
- 2) Existing sanitary manhole #1 is located in the ROW in front of #139 Turn of River Road
- 3) Monitoring was conducted following rainfall events.

HYDRAULIC DATA FOR RATIONAL METHOD								
<b>Project:</b> 131 & 139 Turn of River Road & 29 Intervale Road						<b>Project #:</b> 9734		<b>Date:</b> 10/28/2022
<b>Location:</b> Stamford, CT						<b>By:</b> JWB		<b>Checked:</b> TM
Existing Sanitary Sewer Conveyance Calculations								
Pipe Section	Q in system (cfs)*	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q <sub>full</sub> (cfs)	Q <sub>system</sub> / Q <sub>full</sub> (%)
EX SMH-N to EX SMH-S	3.89	12	270	0.011	PVC	0.0135	4.91	79.3%
Proposed Sanitary Sewer Conveyance Calculations								
Pipe Section	Q in system (cfs)**	Pipe Size (in)	Pipe Length (ft)	Roughness coefficient	Material	Slope (ft/ft)	Q <sub>full</sub> (cfs)	Q <sub>system</sub> / Q <sub>full</sub> (%)
EX SMH-N to EX SMH-S	3.94	12	270	0.011	PVC	0.0135	4.91	80.3%

\*Existing flow rates were computed using Manning's equation for Flow in an Open Channel and obtained from Sanitary Sewer Monitoring. See Sanitary Sewer Flow Monitoring Sheet for more information.

Manning's Equation:

$$Q = VA = \left( \frac{1.49}{n} \right) AR^{\frac{2}{3}} \sqrt{S} \quad [\text{U.S.}]$$

$$Q = VA = \left( \frac{1.00}{n} \right) AR^{\frac{2}{3}} \sqrt{S} \quad [\text{SI}]$$

Where:

Q = Flow Rate, (ft<sup>3</sup>/s)  
v = Velocity, (ft/s)  
A = Flow Area, (ft<sup>2</sup>)  
n = Manning's Roughness Coefficient  
R = Hydraulic Radius, (ft)  
S = Channel Slope, (ft/ft)

\*\*Proposed Flow was computed by adding the peak sewer flow from the development of 33,000 Gallons per Day or 0.05118 cfs. This flow includes the three existing houses on site to be demolished were included in this flow.



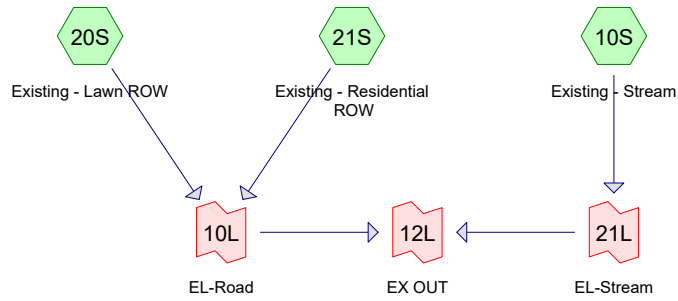
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# Appendix F

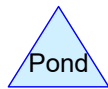
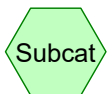
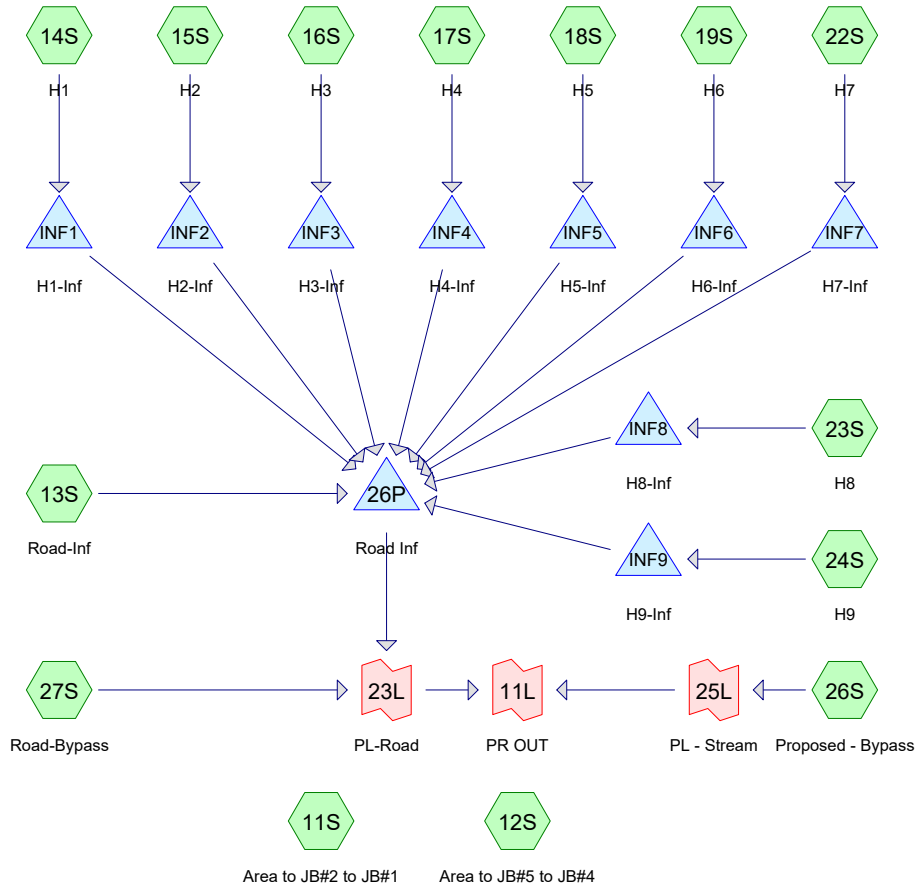
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HydroCAD Report

**EXISTING CONDITIONS**



**PROPOSED CONDITIONS**



**9734 HydroCAD2**

Type III 24-hr 1-Year Rainfall=3.04"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 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>Subcatchment 10S: Existing - Stream</b>	Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>0.38" Flow Length=686' Tc=13.3 min CN=61.10 Runoff=0.50 cfs 3,340 cf
<b>Subcatchment 11S: Area to JB#2 to JB#1</b>	Runoff Area=32,077 sf 1.03% Impervious Runoff Depth=0.00" Tc=5.0 min CN=39.61 Runoff=0.00 cfs 0 cf
<b>Subcatchment 12S: Area to JB#5 to JB#4</b>	Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>0.01" Tc=5.0 min CN=43.57 Runoff=0.00 cfs 31 cf
<b>Subcatchment 13S: Road-Inf</b>	Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>1.84" Tc=5.0 min CN=87.89 Runoff=1.65 cfs 4,919 cf
<b>Subcatchment 14S: H1</b>	Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.09 cfs 311 cf
<b>Subcatchment 15S: H2</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.22 cfs 749 cf
<b>Subcatchment 16S: H3</b>	Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.09 cfs 301 cf
<b>Subcatchment 17S: H4</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.22 cfs 749 cf
<b>Subcatchment 18S: H5</b>	Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.10 cfs 321 cf
<b>Subcatchment 19S: H6</b>	Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.22 cfs 745 cf
<b>Subcatchment 20S: Existing - Lawn ROW</b>	Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>0.02" Flow Length=309' Tc=9.3 min CN=43.77 Runoff=0.00 cfs 60 cf
<b>Subcatchment 21S: Existing - Residential</b>	Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>0.34" Tc=5.0 min CN=59.82 Runoff=0.11 cfs 670 cf
<b>Subcatchment 22S: H7</b>	Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.13 cfs 425 cf
<b>Subcatchment 23S: H8</b>	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.19 cfs 629 cf
<b>Subcatchment 24S: H9</b>	Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>2.81" Tc=5.0 min CN=98.00 Runoff=0.20 cfs 663 cf
<b>Subcatchment 26S: Proposed - Bypass</b>	Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>0.23" Flow Length=263' Tc=13.1 min CN=55.83 Runoff=0.21 cfs 2,002 cf

**9734 HydroCAD2**

Type III 24-hr 1-Year Rainfall=3.04"

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf	3.92% Impervious	Runoff Depth>0.00"
Flow Length=110'	Slope=0.0180 '/'	Tc=15.5 min	CN=41.64
			Runoff=0.00 cfs
			4 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=159.36'	Storage=4,927 cf	Inflow=1.65 cfs
			5,649 cf
			Outflow=0.04 cfs
			755 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=164.26'	Storage=311 cf	Inflow=0.09 cfs
			311 cf
			Outflow=0.00 cfs
			0 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.16'	Storage=541 cf	Inflow=0.22 cfs
			749 cf
			Outflow=0.02 cfs
			209 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=166.40'	Storage=301 cf	Inflow=0.09 cfs
			301 cf
			Outflow=0.00 cfs
			0 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.81'	Storage=575 cf	Inflow=0.22 cfs
			749 cf
			Outflow=0.01 cfs
			174 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=167.52'	Storage=321 cf	Inflow=0.10 cfs
			321 cf
			Outflow=0.00 cfs
			0 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.51'	Storage=575 cf	Inflow=0.22 cfs
			745 cf
			Outflow=0.01 cfs
			170 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=169.17'	Storage=425 cf	Inflow=0.13 cfs
			425 cf
			Outflow=0.00 cfs
			0 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=169.90'	Storage=565 cf	Inflow=0.19 cfs
			629 cf
			Outflow=0.00 cfs
			64 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.76'	Storage=550 cf	Inflow=0.20 cfs
			663 cf
			Outflow=0.01 cfs
			114 cf
<b>Link 10L: EL-Road</b>			Inflow=0.11 cfs
			730 cf
			Primary=0.11 cfs
			730 cf
<b>Link 11L: PR OUT</b>			Inflow=0.21 cfs
			2,760 cf
			Primary=0.21 cfs
			2,760 cf
<b>Link 12L: EX OUT</b>			Inflow=0.59 cfs
			4,070 cf
			Primary=0.59 cfs
			4,070 cf
<b>Link 21L: EL-Stream</b>			Inflow=0.50 cfs
			3,340 cf
			Primary=0.50 cfs
			3,340 cf
<b>Link 23L: PL-Road</b>			Inflow=0.04 cfs
			759 cf
			Primary=0.04 cfs
			759 cf
<b>Link 25L: PL - Stream</b>			Inflow=0.21 cfs
			2,002 cf
			Primary=0.21 cfs
			2,002 cf

**Total Runoff Area = 401,928 sf    Runoff Volume = 15,916 cf    Average Runoff Depth = 0.48"**  
**79.63% Pervious = 320,053 sf    20.37% Impervious = 81,875 sf**

**9734 HydroCAD2**

Type III 24-hr 2-Year Rainfall=3.66"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 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>Subcatchment 10S: Existing - Stream</b>	Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>0.65" Flow Length=686' Tc=13.3 min CN=61.10 Runoff=1.09 cfs 5,667 cf
<b>Subcatchment 11S: Area to JB#2 to JB#1</b>	Runoff Area=32,077 sf 1.03% Impervious Runoff Depth>0.02" Tc=5.0 min CN=39.61 Runoff=0.00 cfs 62 cf
<b>Subcatchment 12S: Area to JB#5 to JB#4</b>	Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>0.08" Tc=5.0 min CN=43.57 Runoff=0.01 cfs 166 cf
<b>Subcatchment 13S: Road-Inf</b>	Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>2.40" Tc=5.0 min CN=87.89 Runoff=2.14 cfs 6,413 cf
<b>Subcatchment 14S: H1</b>	Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.11 cfs 379 cf
<b>Subcatchment 15S: H2</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.27 cfs 914 cf
<b>Subcatchment 16S: H3</b>	Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.11 cfs 367 cf
<b>Subcatchment 17S: H4</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.27 cfs 914 cf
<b>Subcatchment 18S: H5</b>	Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.12 cfs 391 cf
<b>Subcatchment 19S: H6</b>	Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.27 cfs 908 cf
<b>Subcatchment 20S: Existing - Lawn ROW</b>	Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>0.08" Flow Length=309' Tc=9.3 min CN=43.77 Runoff=0.01 cfs 311 cf
<b>Subcatchment 21S: Existing - Residential</b>	Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>0.59" Tc=5.0 min CN=59.82 Runoff=0.28 cfs 1,164 cf
<b>Subcatchment 22S: H7</b>	Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.15 cfs 518 cf
<b>Subcatchment 23S: H8</b>	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.23 cfs 767 cf
<b>Subcatchment 24S: H9</b>	Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>3.42" Tc=5.0 min CN=98.00 Runoff=0.24 cfs 809 cf
<b>Subcatchment 26S: Proposed - Bypass</b>	Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>0.43" Flow Length=263' Tc=13.1 min CN=55.83 Runoff=0.54 cfs 3,819 cf

**9734 HydroCAD2**

Type III 24-hr 2-Year Rainfall=3.66"

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf 3.92% Impervious Runoff Depth>0.05" Flow Length=110' Slope=0.0180 '/' Tc=15.5 min CN=41.64 Runoff=0.00 cfs 53 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=159.49' Storage=5,226 cf Inflow=2.14 cfs 7,921 cf Outflow=0.15 cfs 3,002 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=164.76' Storage=379 cf Inflow=0.11 cfs 379 cf Outflow=0.00 cfs 0 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.19' Storage=544 cf Inflow=0.27 cfs 914 cf Outflow=0.10 cfs 374 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=166.80' Storage=367 cf Inflow=0.11 cfs 367 cf Outflow=0.00 cfs 0 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.84' Storage=575 cf Inflow=0.27 cfs 914 cf Outflow=0.09 cfs 339 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=167.95' Storage=391 cf Inflow=0.12 cfs 391 cf Outflow=0.00 cfs 0 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.53' Storage=575 cf Inflow=0.27 cfs 908 cf Outflow=0.08 cfs 334 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=169.84' Storage=518 cf Inflow=0.15 cfs 518 cf Outflow=0.00 cfs 0 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=169.91' Storage=566 cf Inflow=0.23 cfs 767 cf Outflow=0.02 cfs 202 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.76' Storage=551 cf Inflow=0.24 cfs 809 cf Outflow=0.03 cfs 260 cf
<b>Link 10L: EL-Road</b>	Inflow=0.28 cfs 1,475 cf Primary=0.28 cfs 1,475 cf
<b>Link 11L: PR OUT</b>	Inflow=0.54 cfs 6,874 cf Primary=0.54 cfs 6,874 cf
<b>Link 12L: EX OUT</b>	Inflow=1.28 cfs 7,143 cf Primary=1.28 cfs 7,143 cf
<b>Link 21L: EL-Stream</b>	Inflow=1.09 cfs 5,667 cf Primary=1.09 cfs 5,667 cf
<b>Link 23L: PL-Road</b>	Inflow=0.16 cfs 3,055 cf Primary=0.16 cfs 3,055 cf
<b>Link 25L: PL - Stream</b>	Inflow=0.54 cfs 3,819 cf Primary=0.54 cfs 3,819 cf

**Total Runoff Area = 401,928 sf Runoff Volume = 23,623 cf Average Runoff Depth = 0.71"**  
**79.63% Pervious = 320,053 sf 20.37% Impervious = 81,875 sf**

**9734 HydroCAD2**

Type III 24-hr 5-Year Rainfall=4.68"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 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>Subcatchment 10S: Existing - Stream</b>	Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>1.18" Flow Length=686' Tc=13.3 min CN=61.10 Runoff=2.33 cfs 10,349 cf
<b>Subcatchment 11S: Area to JB#2 to JB#1</b>	Runoff Area=32,077 sf 1.03% Impervious Runoff Depth>0.16" Tc=5.0 min CN=39.61 Runoff=0.02 cfs 420 cf
<b>Subcatchment 12S: Area to JB#5 to JB#4</b>	Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>0.29" Tc=5.0 min CN=43.57 Runoff=0.06 cfs 593 cf
<b>Subcatchment 13S: Road-Inf</b>	Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>3.35" Tc=5.0 min CN=87.89 Runoff=2.95 cfs 8,945 cf
<b>Subcatchment 14S: H1</b>	Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.14 cfs 492 cf
<b>Subcatchment 15S: H2</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.35 cfs 1,185 cf
<b>Subcatchment 16S: H3</b>	Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.14 cfs 476 cf
<b>Subcatchment 17S: H4</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.35 cfs 1,185 cf
<b>Subcatchment 18S: H5</b>	Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.15 cfs 507 cf
<b>Subcatchment 19S: H6</b>	Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.35 cfs 1,178 cf
<b>Subcatchment 20S: Existing - Lawn ROW</b>	Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>0.30" Flow Length=309' Tc=9.3 min CN=43.77 Runoff=0.10 cfs 1,089 cf
<b>Subcatchment 21S: Existing - Residential</b>	Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>1.11" Tc=5.0 min CN=59.82 Runoff=0.63 cfs 2,171 cf
<b>Subcatchment 22S: H7</b>	Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.20 cfs 672 cf
<b>Subcatchment 23S: H8</b>	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.29 cfs 995 cf
<b>Subcatchment 24S: H9</b>	Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>4.44" Tc=5.0 min CN=98.00 Runoff=0.31 cfs 1,050 cf
<b>Subcatchment 26S: Proposed - Bypass</b>	Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>0.87" Flow Length=263' Tc=13.1 min CN=55.83 Runoff=1.53 cfs 7,709 cf

**9734 HydroCAD2**

Type III 24-hr 5-Year Rainfall=4.68"

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf 3.92% Impervious Runoff Depth>0.22" Flow Length=110' Slope=0.0180 '/' Tc=15.5 min CN=41.64 Runoff=0.01 cfs 239 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=159.85' Storage=6,051 cf Inflow=3.89 cfs 11,812 cf Outflow=0.56 cfs 6,848 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=165.85' Storage=492 cf Inflow=0.14 cfs 492 cf Outflow=0.00 cfs 0 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.25' Storage=549 cf Inflow=0.35 cfs 1,185 cf Outflow=0.34 cfs 645 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=167.52' Storage=476 cf Inflow=0.14 cfs 476 cf Outflow=0.00 cfs 0 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.89' Storage=575 cf Inflow=0.35 cfs 1,185 cf Outflow=0.34 cfs 610 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=168.75' Storage=507 cf Inflow=0.15 cfs 507 cf Outflow=0.00 cfs 0 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.59' Storage=575 cf Inflow=0.35 cfs 1,178 cf Outflow=0.34 cfs 604 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=172.40' Storage=594 cf Inflow=0.20 cfs 672 cf Outflow=0.00 cfs 78 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=169.95' Storage=570 cf Inflow=0.29 cfs 995 cf Outflow=0.13 cfs 430 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.82' Storage=556 cf Inflow=0.31 cfs 1,050 cf Outflow=0.21 cfs 500 cf
<b>Link 10L: EL-Road</b>	Inflow=0.63 cfs 3,259 cf Primary=0.63 cfs 3,259 cf
<b>Link 11L: PR OUT</b>	Inflow=1.67 cfs 14,796 cf Primary=1.67 cfs 14,796 cf
<b>Link 12L: EX OUT</b>	Inflow=2.77 cfs 13,608 cf Primary=2.77 cfs 13,608 cf
<b>Link 21L: EL-Stream</b>	Inflow=2.33 cfs 10,349 cf Primary=2.33 cfs 10,349 cf
<b>Link 23L: PL-Road</b>	Inflow=0.57 cfs 7,087 cf Primary=0.57 cfs 7,087 cf
<b>Link 25L: PL - Stream</b>	Inflow=1.53 cfs 7,709 cf Primary=1.53 cfs 7,709 cf

**Total Runoff Area = 401,928 sf Runoff Volume = 39,255 cf Average Runoff Depth = 1.17"**  
**79.63% Pervious = 320,053 sf 20.37% Impervious = 81,875 sf**



**9734 HydroCAD2**

Type III 24-hr 10-Year Rainfall=5.52"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 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>Subcatchment 10S: Existing - Stream</b>	Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>1.69" Flow Length=686' Tc=13.3 min CN=61.10 Runoff=3.54 cfs 14,814 cf
<b>Subcatchment 11S: Area to JB#2 to JB#1</b>	Runoff Area=32,077 sf 1.03% Impervious Runoff Depth>0.34" Tc=5.0 min CN=39.61 Runoff=0.09 cfs 919 cf
<b>Subcatchment 12S: Area to JB#5 to JB#4</b>	Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>0.54" Tc=5.0 min CN=43.57 Runoff=0.15 cfs 1,104 cf
<b>Subcatchment 13S: Road-Inf</b>	Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>4.15" Tc=5.0 min CN=87.89 Runoff=3.61 cfs 11,074 cf
<b>Subcatchment 14S: H1</b>	Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.17 cfs 585 cf
<b>Subcatchment 15S: H2</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.41 cfs 1,409 cf
<b>Subcatchment 16S: H3</b>	Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.17 cfs 566 cf
<b>Subcatchment 17S: H4</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.41 cfs 1,409 cf
<b>Subcatchment 18S: H5</b>	Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.18 cfs 603 cf
<b>Subcatchment 19S: H6</b>	Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.41 cfs 1,401 cf
<b>Subcatchment 20S: Existing - Lawn ROW</b>	Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>0.55" Flow Length=309' Tc=9.3 min CN=43.77 Runoff=0.26 cfs 2,016 cf
<b>Subcatchment 21S: Existing - Residential</b>	Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>1.60" Tc=5.0 min CN=59.82 Runoff=0.98 cfs 3,139 cf
<b>Subcatchment 22S: H7</b>	Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.23 cfs 799 cf
<b>Subcatchment 23S: H8</b>	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.35 cfs 1,183 cf
<b>Subcatchment 24S: H9</b>	Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>5.28" Tc=5.0 min CN=98.00 Runoff=0.37 cfs 1,248 cf
<b>Subcatchment 26S: Proposed - Bypass</b>	Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>1.30" Flow Length=263' Tc=13.1 min CN=55.83 Runoff=2.56 cfs 11,579 cf

**9734 HydroCAD2**

Type III 24-hr 10-Year Rainfall=5.52"

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf 3.92% Impervious Runoff Depth>0.44" Flow Length=110' Slope=0.0180 '/' Tc=15.5 min CN=41.64 Runoff=0.05 cfs 477 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=160.47' Storage=7,409 cf Inflow=5.39 cfs 15,212 cf Outflow=0.93 cfs 10,206 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=166.00' Storage=505 cf Inflow=0.17 cfs 585 cf Outflow=0.01 cfs 80 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.26' Storage=550 cf Inflow=0.41 cfs 1,409 cf Outflow=0.41 cfs 869 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=168.30' Storage=566 cf Inflow=0.17 cfs 566 cf Outflow=0.00 cfs 0 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.91' Storage=575 cf Inflow=0.41 cfs 1,409 cf Outflow=0.41 cfs 834 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=171.40' Storage=594 cf Inflow=0.18 cfs 603 cf Outflow=0.00 cfs 9 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.61' Storage=575 cf Inflow=0.41 cfs 1,401 cf Outflow=0.41 cfs 826 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=172.41' Storage=594 cf Inflow=0.23 cfs 799 cf Outflow=0.02 cfs 204 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=169.99' Storage=574 cf Inflow=0.35 cfs 1,183 cf Outflow=0.32 cfs 618 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.85' Storage=560 cf Inflow=0.37 cfs 1,248 cf Outflow=0.36 cfs 698 cf
<b>Link 10L: EL-Road</b>	Inflow=1.05 cfs 5,155 cf Primary=1.05 cfs 5,155 cf
<b>Link 11L: PR OUT</b>	Inflow=3.26 cfs 22,262 cf Primary=3.26 cfs 22,262 cf
<b>Link 12L: EX OUT</b>	Inflow=4.37 cfs 19,969 cf Primary=4.37 cfs 19,969 cf
<b>Link 21L: EL-Stream</b>	Inflow=3.54 cfs 14,814 cf Primary=3.54 cfs 14,814 cf
<b>Link 23L: PL-Road</b>	Inflow=0.98 cfs 10,683 cf Primary=0.98 cfs 10,683 cf
<b>Link 25L: PL - Stream</b>	Inflow=2.56 cfs 11,579 cf Primary=2.56 cfs 11,579 cf

**Total Runoff Area = 401,928 sf Runoff Volume = 54,324 cf Average Runoff Depth = 1.62"**  
**79.63% Pervious = 320,053 sf 20.37% Impervious = 81,875 sf**

**9734 HydroCAD2**

Type III 24-hr 25-Year Rainfall=6.69"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 10S: Existing - Stream** Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>2.48"  
 Flow Length=686' Tc=13.3 min CN=61.10 Runoff=5.39 cfs 21,715 cf

**Subcatchment 11S: Area to JB#2 to JB#1** Runoff Area=32,077 sf 1.03% Impervious Runoff Depth>0.70"  
 Tc=5.0 min CN=39.61 Runoff=0.28 cfs 1,872 cf

**Subcatchment 12S: Area to JB#5 to JB#4** Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>0.98"  
 Tc=5.0 min CN=43.57 Runoff=0.45 cfs 2,014 cf

**Subcatchment 13S: Road-Inf** Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>5.28"  
 Tc=5.0 min CN=87.89 Runoff=4.53 cfs 14,079 cf

**Subcatchment 14S: H1** Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.21 cfs 715 cf

**Subcatchment 15S: H2** Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.50 cfs 1,720 cf

**Subcatchment 16S: H3** Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.20 cfs 691 cf

**Subcatchment 17S: H4** Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.50 cfs 1,720 cf

**Subcatchment 18S: H5** Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.21 cfs 737 cf

**Subcatchment 19S: H6** Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.50 cfs 1,711 cf

**Subcatchment 20S: Existing - Lawn ROW** Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>1.00"  
 Flow Length=309' Tc=9.3 min CN=43.77 Runoff=0.70 cfs 3,663 cf

**Subcatchment 21S: Existing - Residential** Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>2.37"  
 Tc=5.0 min CN=59.82 Runoff=1.50 cfs 4,646 cf

**Subcatchment 22S: H7** Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.28 cfs 976 cf

**Subcatchment 23S: H8** Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.42 cfs 1,445 cf

**Subcatchment 24S: H9** Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>6.45"  
 Tc=5.0 min CN=98.00 Runoff=0.44 cfs 1,524 cf

**Subcatchment 26S: Proposed - Bypass** Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>2.00"  
 Flow Length=263' Tc=13.1 min CN=55.83 Runoff=4.22 cfs 17,739 cf

**9734 HydroCAD2**

Type III 24-hr 25-Year Rainfall=6.69"

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf 3.92% Impervious Runoff Depth>0.84" Flow Length=110' Slope=0.0180 '/' Tc=15.5 min CN=41.64 Runoff=0.13 cfs 914 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=161.48' Storage=9,299 cf Inflow=6.89 cfs 20,224 cf Outflow=1.79 cfs 15,176 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=166.01' Storage=505 cf Inflow=0.21 cfs 715 cf Outflow=0.02 cfs 209 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.28' Storage=552 cf Inflow=0.50 cfs 1,720 cf Outflow=0.50 cfs 1,180 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=170.50' Storage=594 cf Inflow=0.20 cfs 691 cf Outflow=0.01 cfs 96 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.92' Storage=575 cf Inflow=0.50 cfs 1,720 cf Outflow=0.50 cfs 1,146 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=171.40' Storage=594 cf Inflow=0.21 cfs 737 cf Outflow=0.01 cfs 142 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.62' Storage=575 cf Inflow=0.50 cfs 1,711 cf Outflow=0.50 cfs 1,136 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=172.44' Storage=595 cf Inflow=0.28 cfs 976 cf Outflow=0.11 cfs 381 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=170.01' Storage=575 cf Inflow=0.42 cfs 1,445 cf Outflow=0.42 cfs 880 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.86' Storage=561 cf Inflow=0.44 cfs 1,524 cf Outflow=0.44 cfs 974 cf
<b>Link 10L: EL-Road</b>	Inflow=1.98 cfs 8,309 cf Primary=1.98 cfs 8,309 cf
<b>Link 11L: PR OUT</b>	Inflow=5.50 cfs 33,829 cf Primary=5.50 cfs 33,829 cf
<b>Link 12L: EX OUT</b>	Inflow=6.98 cfs 30,024 cf Primary=6.98 cfs 30,024 cf
<b>Link 21L: EL-Stream</b>	Inflow=5.39 cfs 21,715 cf Primary=5.39 cfs 21,715 cf
<b>Link 23L: PL-Road</b>	Inflow=1.92 cfs 16,091 cf Primary=1.92 cfs 16,091 cf
<b>Link 25L: PL - Stream</b>	Inflow=4.22 cfs 17,739 cf Primary=4.22 cfs 17,739 cf

**Total Runoff Area = 401,928 sf Runoff Volume = 77,880 cf Average Runoff Depth = 2.33"**  
**79.63% Pervious = 320,053 sf 20.37% Impervious = 81,875 sf**

**9734 HydroCAD2**

Type III 24-hr 50-Year Rainfall=7.55"

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 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>Subcatchment 10S: Existing - Stream</b>	Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>3.11" Flow Length=686' Tc=13.3 min CN=61.10 Runoff=6.84 cfs 27,178 cf
<b>Subcatchment 11S: Area to JB#2 to JB#1</b>	Runoff Area=32,077 sf 1.03% Impervious Runoff Depth>1.02" Tc=5.0 min CN=39.61 Runoff=0.57 cfs 2,737 cf
<b>Subcatchment 12S: Area to JB#5 to JB#4</b>	Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>1.37" Tc=5.0 min CN=43.57 Runoff=0.73 cfs 2,807 cf
<b>Subcatchment 13S: Road-Inf</b>	Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>6.11" Tc=5.0 min CN=87.89 Runoff=5.21 cfs 16,308 cf
<b>Subcatchment 14S: H1</b>	Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.23 cfs 810 cf
<b>Subcatchment 15S: H2</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.57 cfs 1,949 cf
<b>Subcatchment 16S: H3</b>	Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.23 cfs 783 cf
<b>Subcatchment 17S: H4</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.57 cfs 1,949 cf
<b>Subcatchment 18S: H5</b>	Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.24 cfs 835 cf
<b>Subcatchment 19S: H6</b>	Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.56 cfs 1,938 cf
<b>Subcatchment 20S: Existing - Lawn ROW</b>	Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>1.39" Flow Length=309' Tc=9.3 min CN=43.77 Runoff=1.13 cfs 5,095 cf
<b>Subcatchment 21S: Existing - Residential</b>	Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>2.98" Tc=5.0 min CN=59.82 Runoff=1.92 cfs 5,845 cf
<b>Subcatchment 22S: H7</b>	Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.32 cfs 1,106 cf
<b>Subcatchment 23S: H8</b>	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.47 cfs 1,638 cf
<b>Subcatchment 24S: H9</b>	Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>7.31" Tc=5.0 min CN=98.00 Runoff=0.50 cfs 1,727 cf
<b>Subcatchment 26S: Proposed - Bypass</b>	Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>2.56" Flow Length=263' Tc=13.1 min CN=55.83 Runoff=5.57 cfs 22,720 cf

**9734 HydroCAD2**

Type III 24-hr 50-Year Rainfall=7.55"

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf 3.92% Impervious Runoff Depth>1.19" Flow Length=110' Slope=0.0180 '/' Tc=15.5 min CN=41.64 Runoff=0.22 cfs 1,302 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=162.24' Storage=10,375 cf Inflow=7.87 cfs 23,950 cf Outflow=2.50 cfs 18,878 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=166.03' Storage=505 cf Inflow=0.23 cfs 810 cf Outflow=0.08 cfs 304 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.29' Storage=553 cf Inflow=0.57 cfs 1,949 cf Outflow=0.56 cfs 1,409 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=170.51' Storage=594 cf Inflow=0.23 cfs 783 cf Outflow=0.02 cfs 189 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.93' Storage=575 cf Inflow=0.57 cfs 1,949 cf Outflow=0.57 cfs 1,375 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=171.41' Storage=594 cf Inflow=0.24 cfs 835 cf Outflow=0.02 cfs 240 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.63' Storage=575 cf Inflow=0.56 cfs 1,938 cf Outflow=0.56 cfs 1,364 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=172.47' Storage=595 cf Inflow=0.32 cfs 1,106 cf Outflow=0.24 cfs 511 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=170.02' Storage=575 cf Inflow=0.47 cfs 1,638 cf Outflow=0.47 cfs 1,072 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.87' Storage=562 cf Inflow=0.50 cfs 1,727 cf Outflow=0.50 cfs 1,177 cf
<b>Link 10L: EL-Road</b>	Inflow=2.79 cfs 10,940 cf Primary=2.79 cfs 10,940 cf
<b>Link 11L: PR OUT</b>	Inflow=7.96 cfs 42,900 cf Primary=7.96 cfs 42,900 cf
<b>Link 12L: EX OUT</b>	Inflow=9.10 cfs 38,118 cf Primary=9.10 cfs 38,118 cf
<b>Link 21L: EL-Stream</b>	Inflow=6.84 cfs 27,178 cf Primary=6.84 cfs 27,178 cf
<b>Link 23L: PL-Road</b>	Inflow=2.71 cfs 20,180 cf Primary=2.71 cfs 20,180 cf
<b>Link 25L: PL - Stream</b>	Inflow=5.57 cfs 22,720 cf Primary=5.57 cfs 22,720 cf

**Total Runoff Area = 401,928 sf Runoff Volume = 96,726 cf Average Runoff Depth = 2.89"**  
**79.63% Pervious = 320,053 sf 20.37% Impervious = 81,875 sf**

**Summary for Subcatchment 10S: Existing - Stream**

Runoff = 6.84 cfs @ 12.19 hrs, Volume= 27,178 cf, Depth> 3.11"  
 Routed to Link 21L : EL-Stream

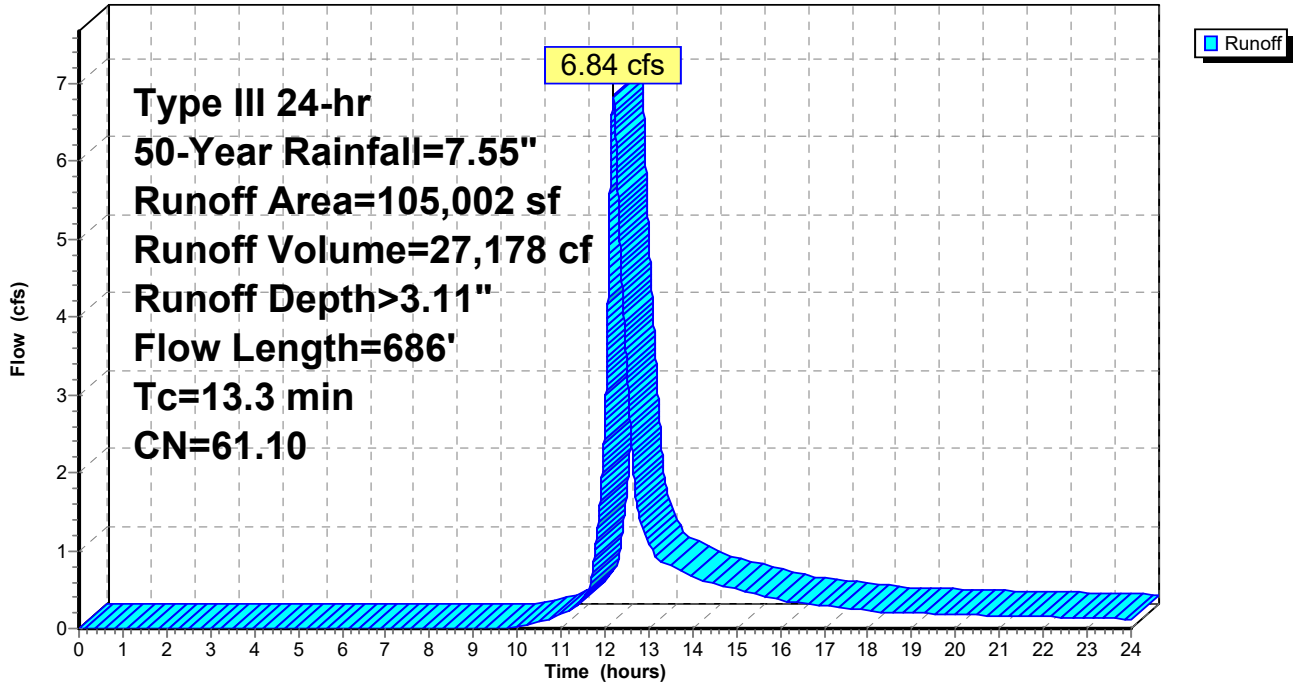
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
45,180	39.00	>75% Grass cover, Good, HSG A
7,459	61.00	>75% Grass cover, Good, HSG B
39,178	74.00	>75% Grass cover, Good, HSG C
* 9,768	98.00	Impervious
* 3,417	100.00	Water
105,002	61.10	Weighted Average
91,817		87.44% Pervious Area
13,185		12.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	97	0.0380	0.16		<b>Sheet Flow, 97 LF of Lawn Sheet Flow</b> Grass: Dense n= 0.240 P2= 3.45"
2.3	329	0.0260	2.42		<b>Shallow Concentrated Flow, 329 LF of Lawn SCF</b> Grassed Waterway Kv= 15.0 fps
0.6	260	0.0110	7.72	216.29	<b>Channel Flow, 260 LF of Stream Flow</b> Area= 28.0 sf Perim= 20.3' r= 1.38' n= 0.025 Earth, clean & winding
13.3	686	Total			

### Subcatchment 10S: Existing - Stream

Hydrograph





**Summary for Subcatchment 11S: Area to JB#2 to JB#1**

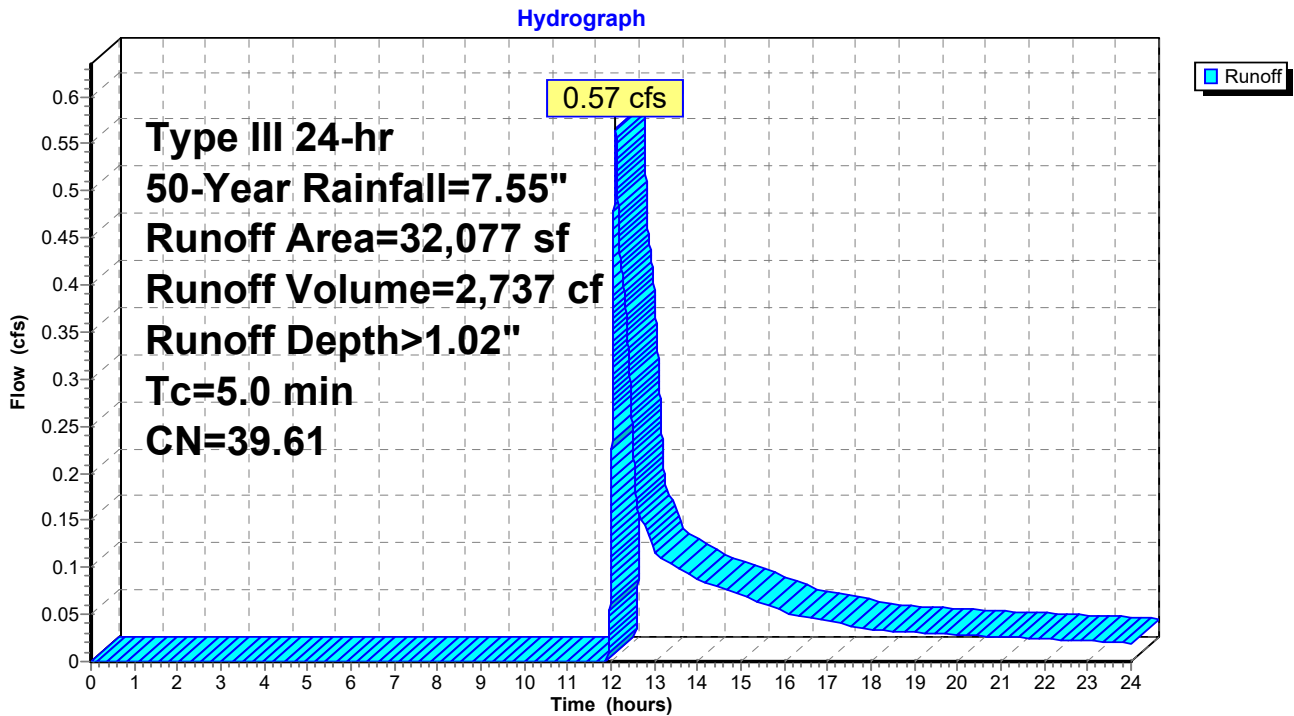
Runoff = 0.57 cfs @ 12.11 hrs, Volume= 2,737 cf, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
31,747	39.00	>75% Grass cover, Good, HSG A
* 330	98.00	Impervious
32,077	39.61	Weighted Average
31,747		98.97% Pervious Area
330		1.03% Impervious Area

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

**Subcatchment 11S: Area to JB#2 to JB#1**



**Summary for Subcatchment 12S: Area to JB#5 to JB#4**

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 2,807 cf, Depth> 1.37"

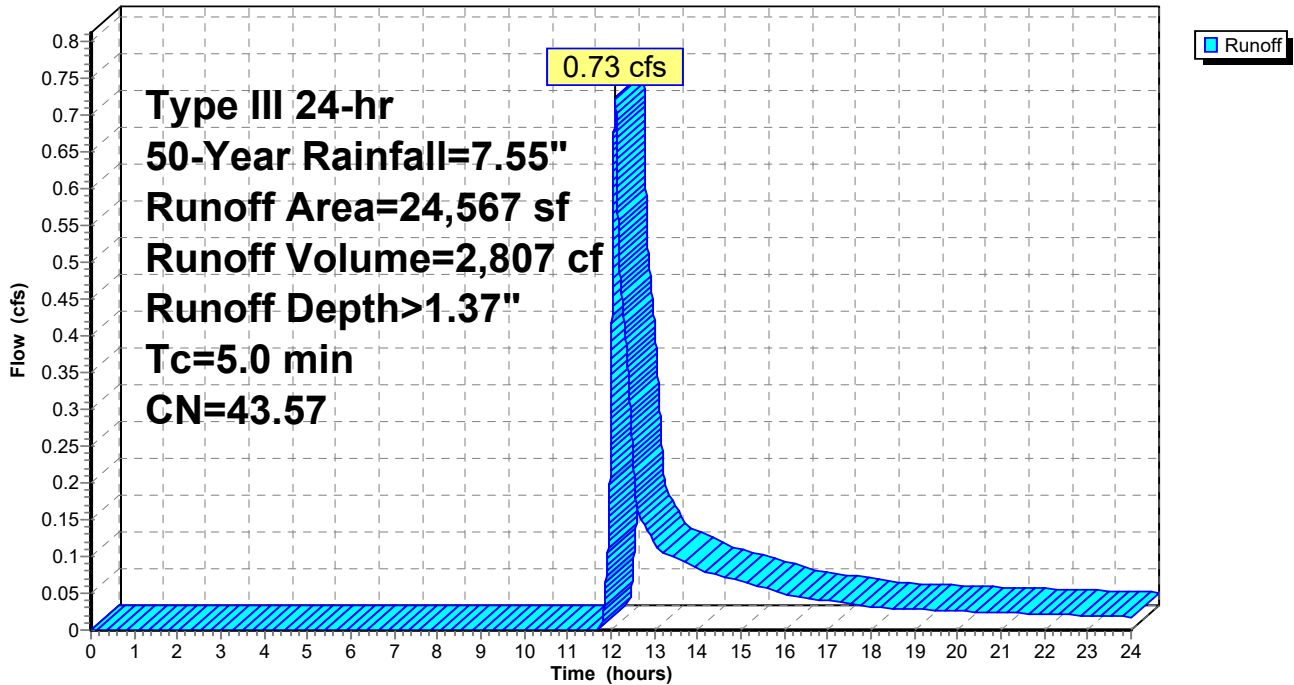
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
19,699	39.00	>75% Grass cover, Good, HSG A
4,725	61.00	>75% Grass cover, Good, HSG B
* 143	98.00	Impervious
24,567	43.57	Weighted Average
24,424		99.42% Pervious Area
143		0.58% Impervious Area

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

**Subcatchment 12S: Area to JB#5 to JB#4**

Hydrograph



**Summary for Subcatchment 13S: Road-Inf**

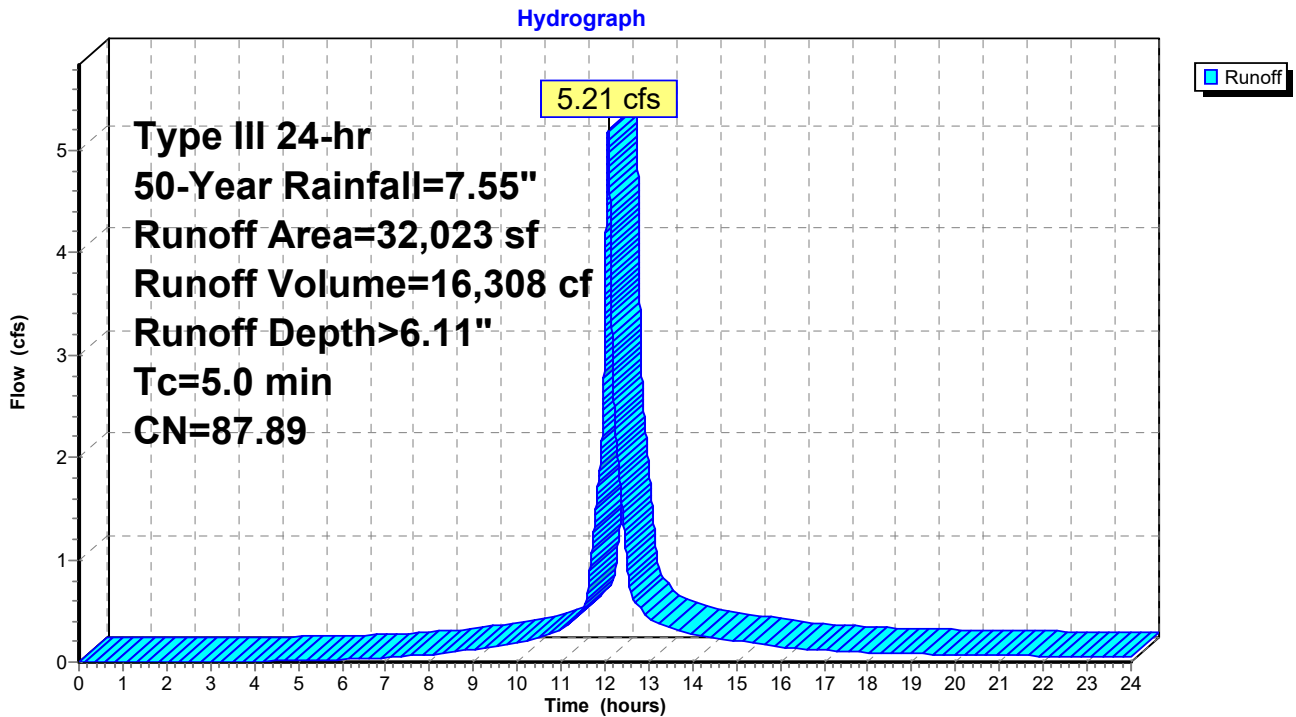
Runoff = 5.21 cfs @ 12.07 hrs, Volume= 16,308 cf, Depth> 6.11"  
 Routed to Pond 26P : Road Inf

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
5,489	39.00	>75% Grass cover, Good, HSG A
* 26,534	98.00	Impervious
32,023	87.89	Weighted Average
5,489		17.14% Pervious Area
26,534		82.86% Impervious Area

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

**Subcatchment 13S: Road-Inf**



**Summary for Subcatchment 14S: H1**

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 810 cf, Depth> 7.31"  
 Routed to Pond INF1 : H1-Inf

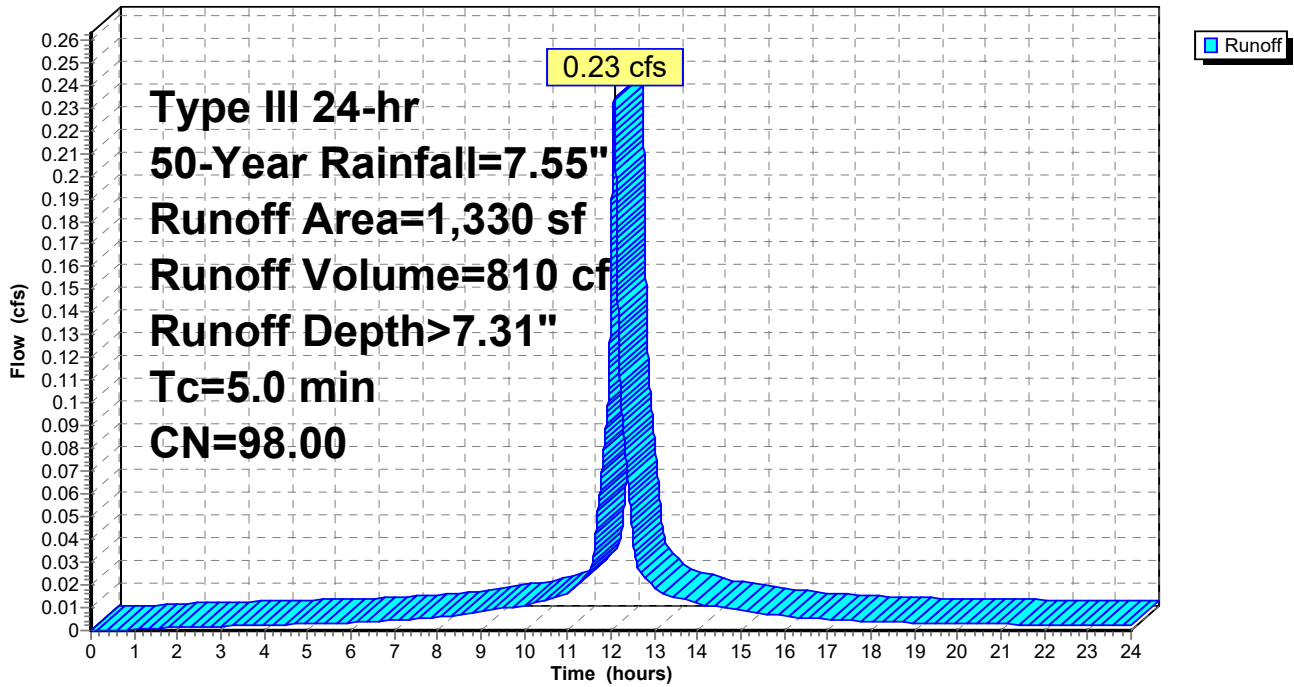
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 1,330	98.00	Impervious
1,330		100.00% Impervious Area

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

**Subcatchment 14S: H1**

Hydrograph



**Summary for Subcatchment 15S: H2**

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,949 cf, Depth> 7.31"  
 Routed to Pond INF2 : H2-Inf

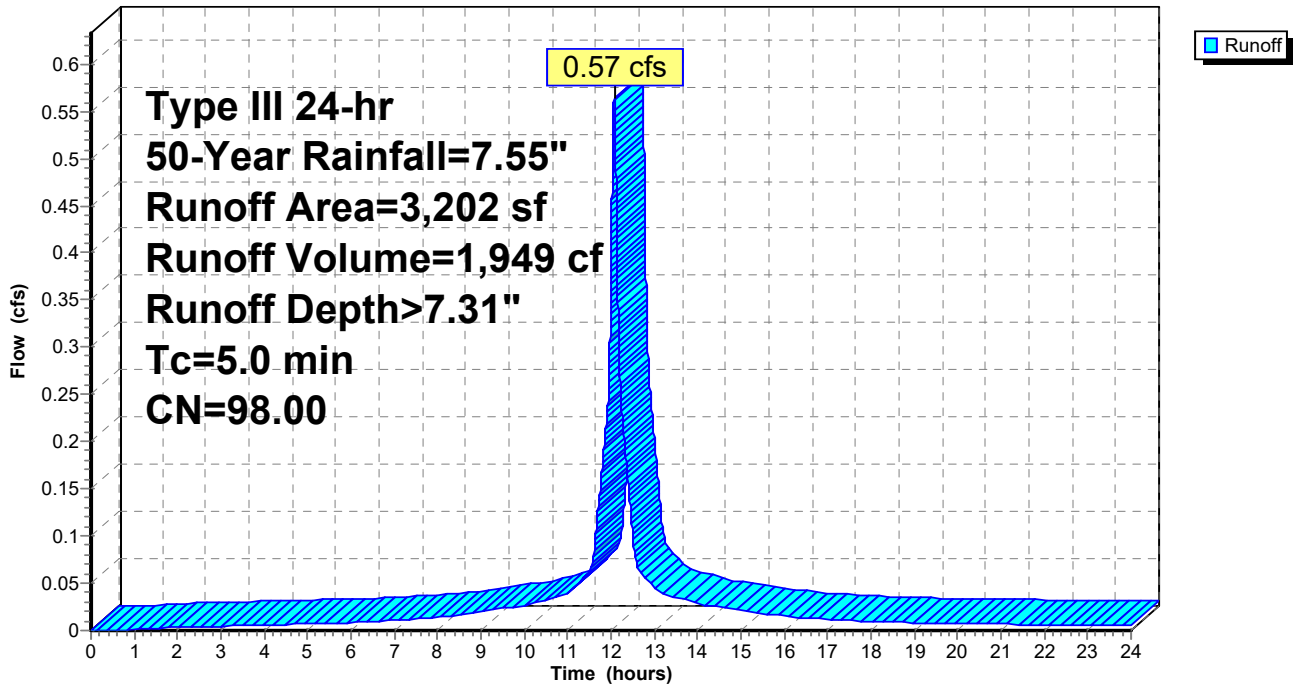
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 3,202	98.00	Impervious
3,202		100.00% Impervious Area

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

**Subcatchment 15S: H2**

Hydrograph



**Summary for Subcatchment 16S: H3**

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 783 cf, Depth> 7.31"  
 Routed to Pond INF3 : H3-Inf

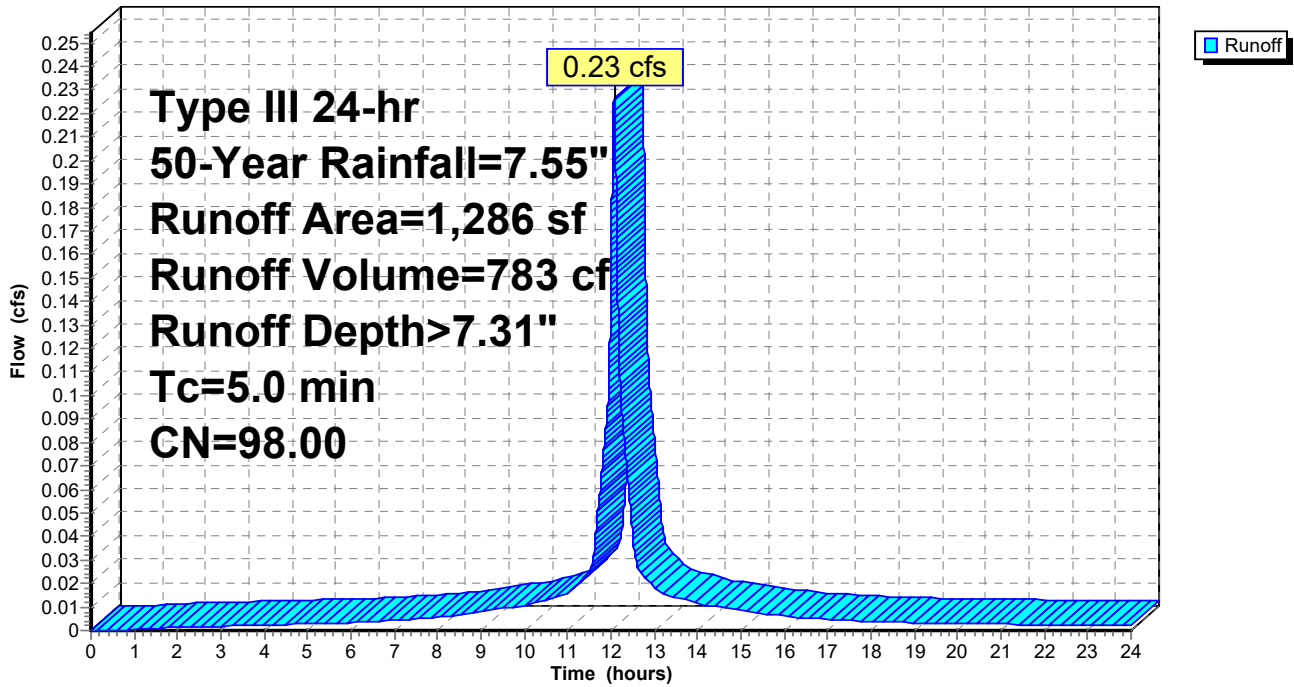
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 1,286	98.00	Impervious
1,286		100.00% Impervious Area

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

**Subcatchment 16S: H3**

Hydrograph



**Summary for Subcatchment 17S: H4**

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,949 cf, Depth> 7.31"  
 Routed to Pond INF4 : H4-Inf

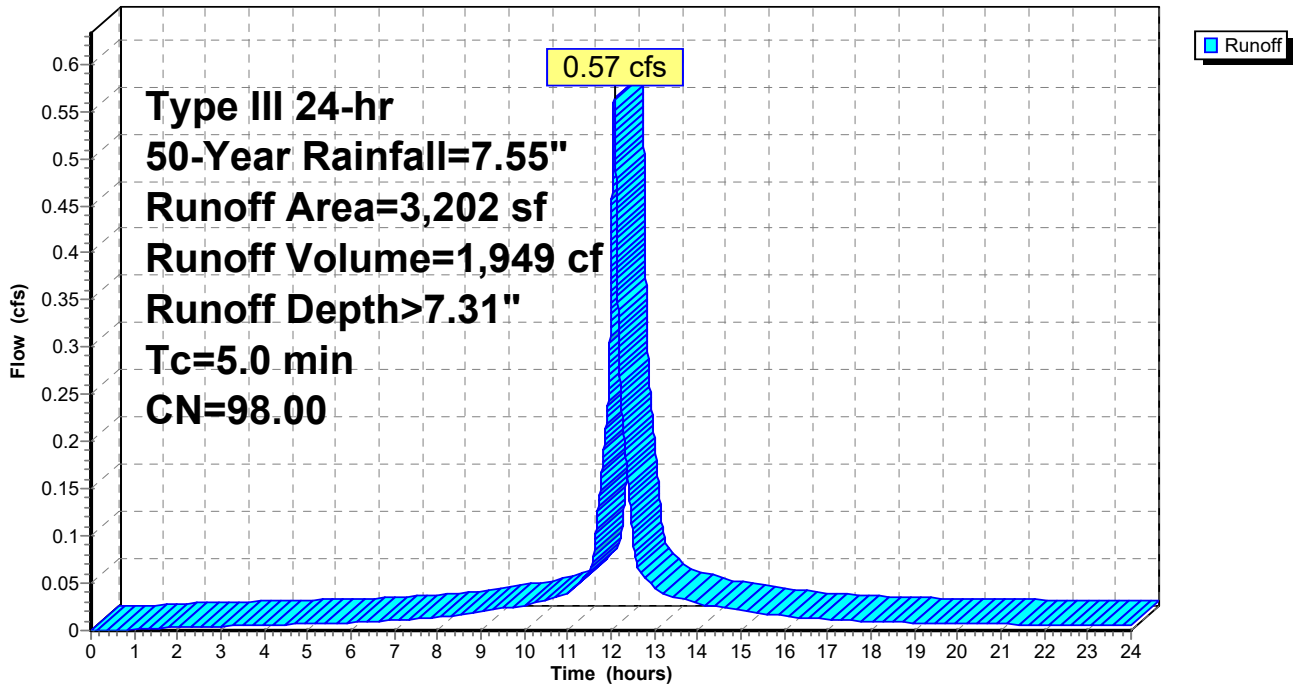
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 3,202	98.00	Impervious
3,202		100.00% Impervious Area

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

**Subcatchment 17S: H4**

Hydrograph



**Summary for Subcatchment 18S: H5**

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 835 cf, Depth> 7.31"  
 Routed to Pond INF5 : H5-Inf

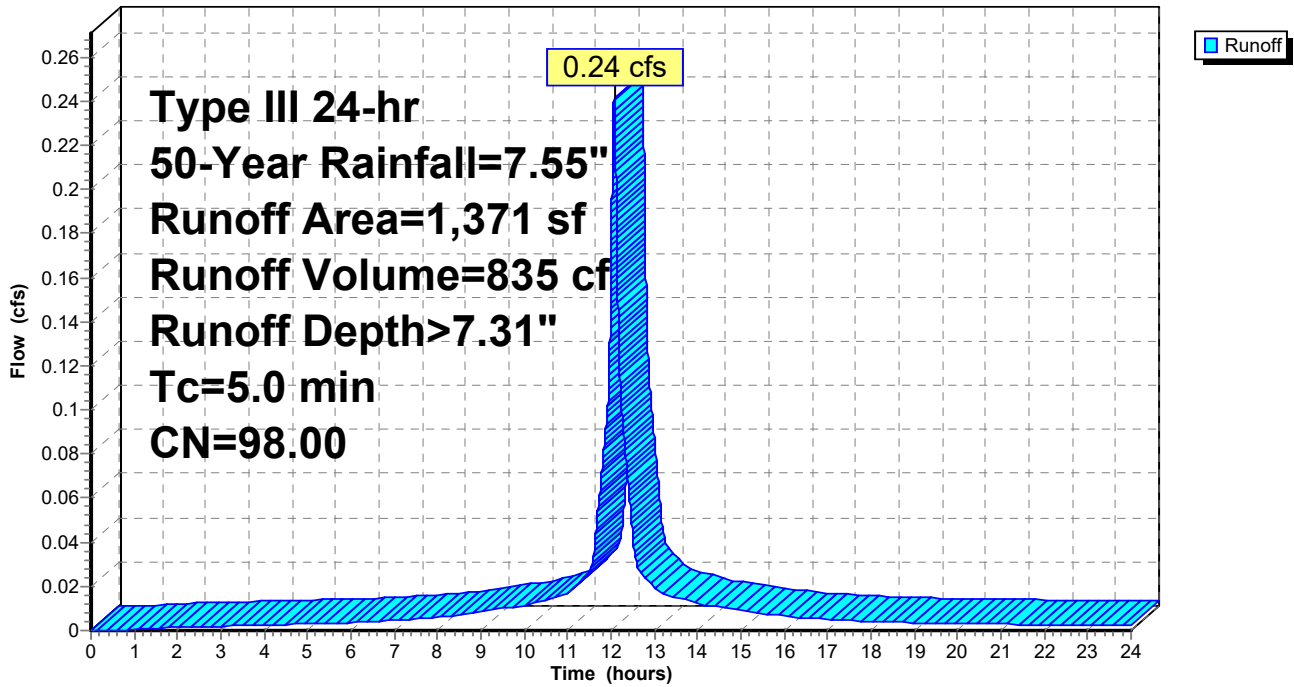
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 1,371	98.00	Impervious
1,371		100.00% Impervious Area

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

**Subcatchment 18S: H5**

Hydrograph





**Summary for Subcatchment 19S: H6**

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,938 cf, Depth> 7.31"  
 Routed to Pond INF6 : H6-Inf

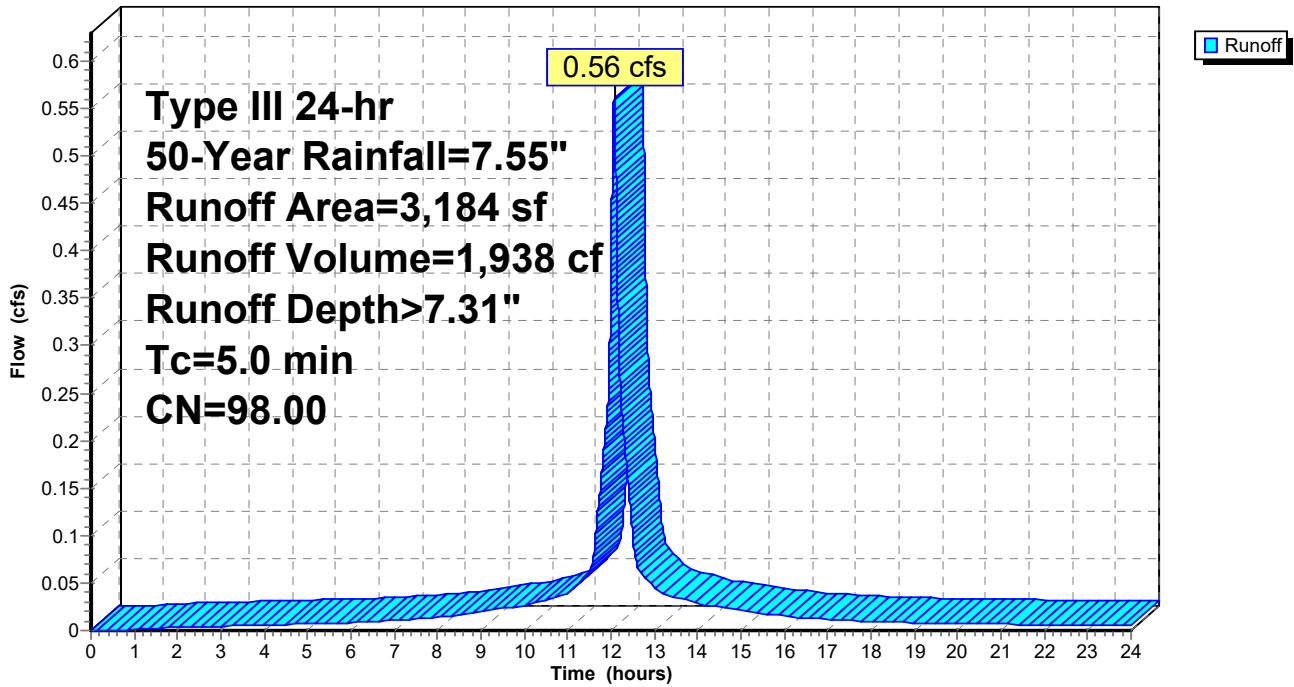
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 3,184	98.00	Impervious
3,184		100.00% Impervious Area

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

**Subcatchment 19S: H6**

Hydrograph



**Summary for Subcatchment 20S: Existing - Lawn ROW**

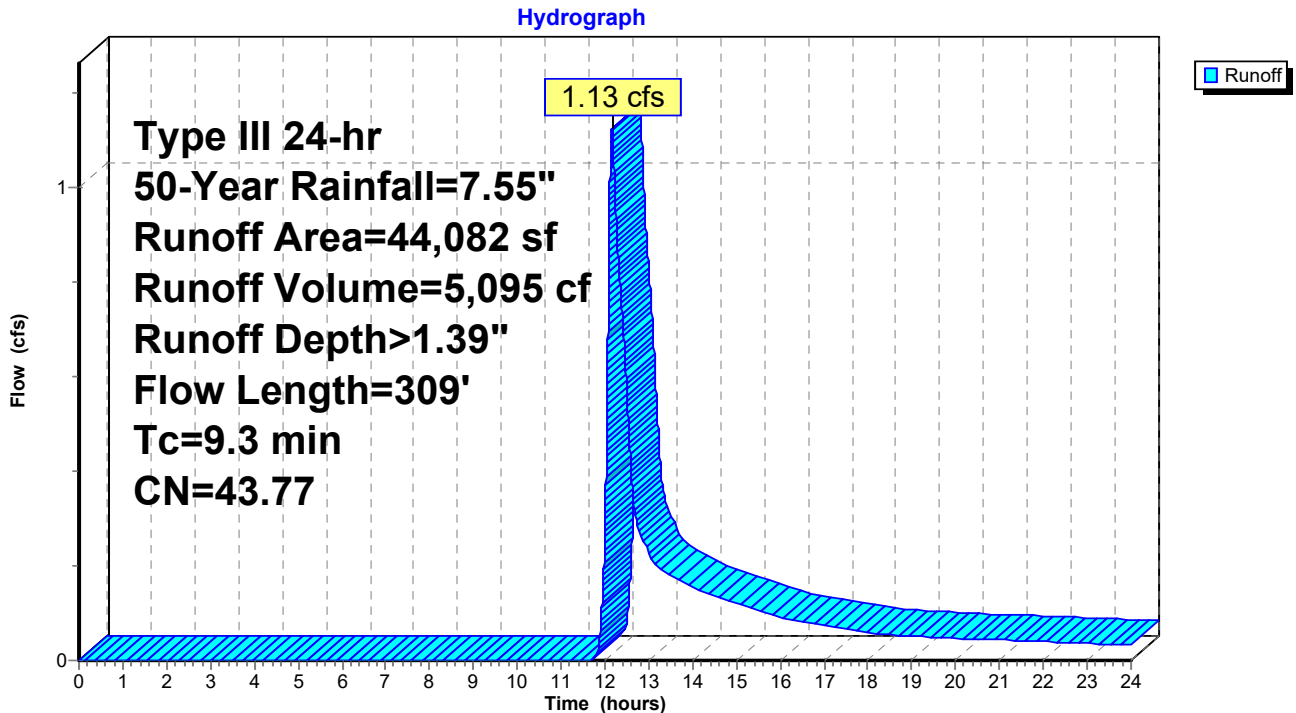
Runoff = 1.13 cfs @ 12.16 hrs, Volume= 5,095 cf, Depth> 1.39"  
 Routed to Link 10L : EL-Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
40,519	39.00	>75% Grass cover, Good, HSG A
* 3,563	98.00	Impervious
44,082	43.77	Weighted Average
40,519		91.92% Pervious Area
3,563		8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0850	0.22		<b>Sheet Flow, 100 LF of Lawn Sheet Flow</b> Grass: Dense n= 0.240 P2= 3.45"
1.6	209	0.0200	2.12		<b>Shallow Concentrated Flow, 209 LF of Lawn SCF</b> Grassed Waterway Kv= 15.0 fps
9.3	309	Total			

**Subcatchment 20S: Existing - Lawn ROW**



**9734 HydroCAD2**

Type III 24-hr 50-Year Rainfall=7.55"

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**Summary for Subcatchment 21S: Existing - Residential ROW**

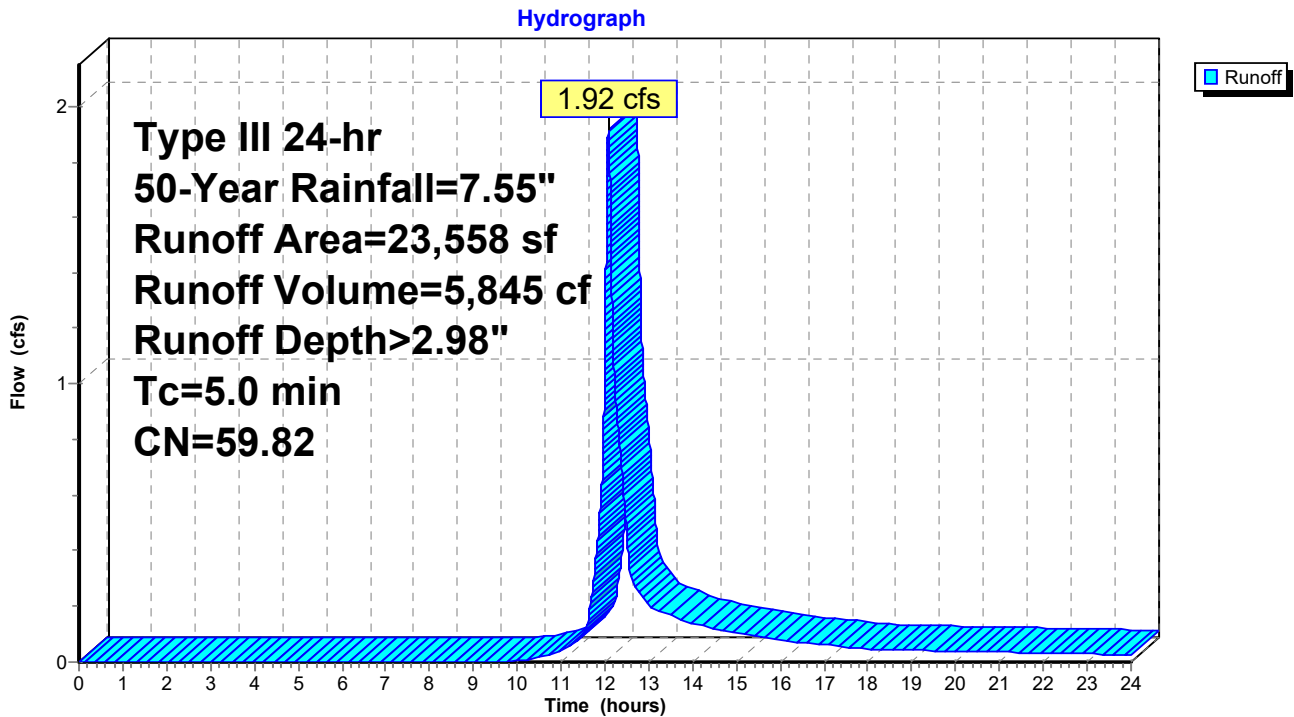
Runoff = 1.92 cfs @ 12.08 hrs, Volume= 5,845 cf, Depth> 2.98"  
 Routed to Link 10L : EL-Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
15,246	39.00	>75% Grass cover, Good, HSG A
* 8,312	98.00	Impervious
23,558	59.82	Weighted Average
15,246		64.72% Pervious Area
8,312		35.28% Impervious Area

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

**Subcatchment 21S: Existing - Residential ROW**



**Summary for Subcatchment 22S: H7**

Runoff = 0.32 cfs @ 12.07 hrs, Volume= 1,106 cf, Depth> 7.31"  
 Routed to Pond INF7 : H7-Inf

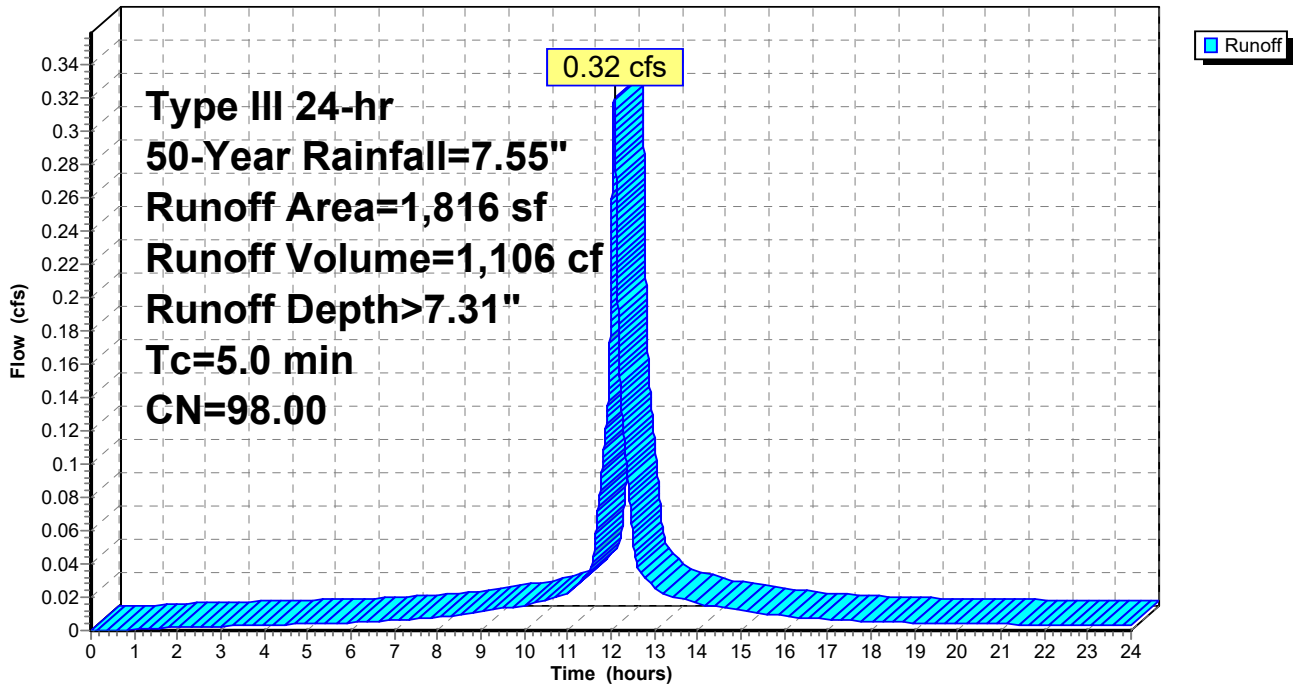
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 1,816	98.00	Impervious
1,816		100.00% Impervious Area

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

**Subcatchment 22S: H7**

Hydrograph



**Summary for Subcatchment 23S: H8**

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 1,638 cf, Depth> 7.31"  
 Routed to Pond INF8 : H8-Inf

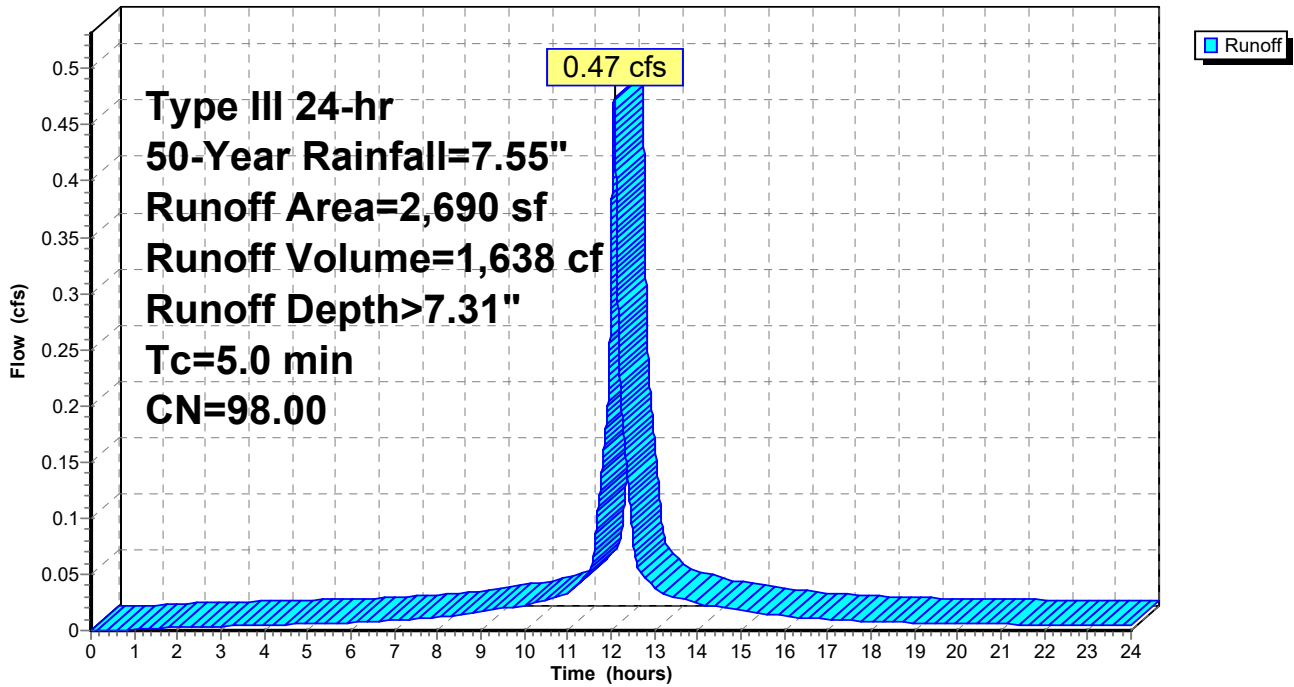
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 2,690	98.00	Impervious
2,690		100.00% Impervious Area

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

**Subcatchment 23S: H8**

Hydrograph



**Summary for Subcatchment 24S: H9**

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 1,727 cf, Depth> 7.31"  
 Routed to Pond INF9 : H9-Inf

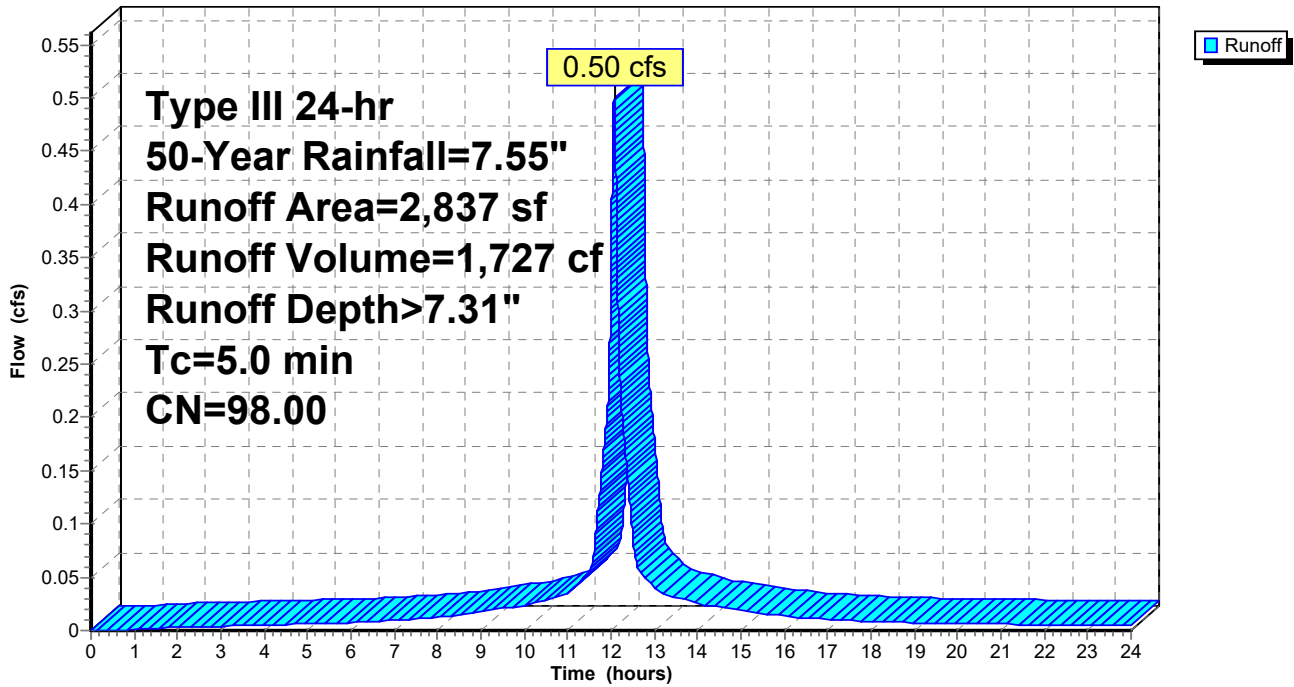
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
* 2,837	98.00	Impervious
2,837		100.00% Impervious Area

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

**Subcatchment 24S: H9**

Hydrograph



**9734 HydroCAD2**

Type III 24-hr 50-Year Rainfall=7.55"

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**Summary for Subcatchment 26S: Proposed - Bypass**

Runoff = 5.57 cfs @ 12.18 hrs, Volume= 22,720 cf, Depth> 2.56"  
 Routed to Link 25L : PL - Stream

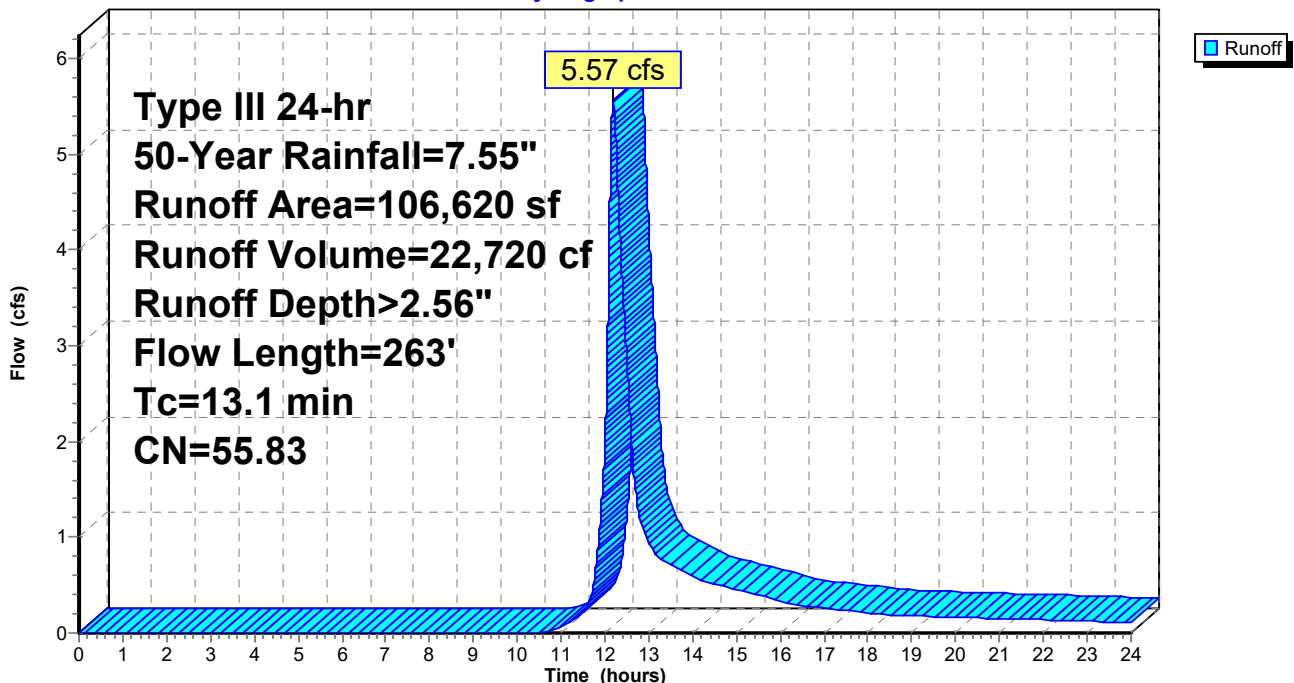
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
59,480	39.00	>75% Grass cover, Good, HSG A
4,876	61.00	>75% Grass cover, Good, HSG B
33,887	74.00	>75% Grass cover, Good, HSG C
* 4,960	98.00	Impervious
* 3,417	100.00	Water
106,620	55.83	Weighted Average
98,243		92.14% Pervious Area
8,377		7.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0240	0.13		<b>Sheet Flow,</b> Grass: Dense n= 0.240 P2= 3.45"
0.3	163	0.3400	8.75		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
13.1	263	Total			

**Subcatchment 26S: Proposed - Bypass**

Hydrograph



### Summary for Subcatchment 27S: Road-Bypass

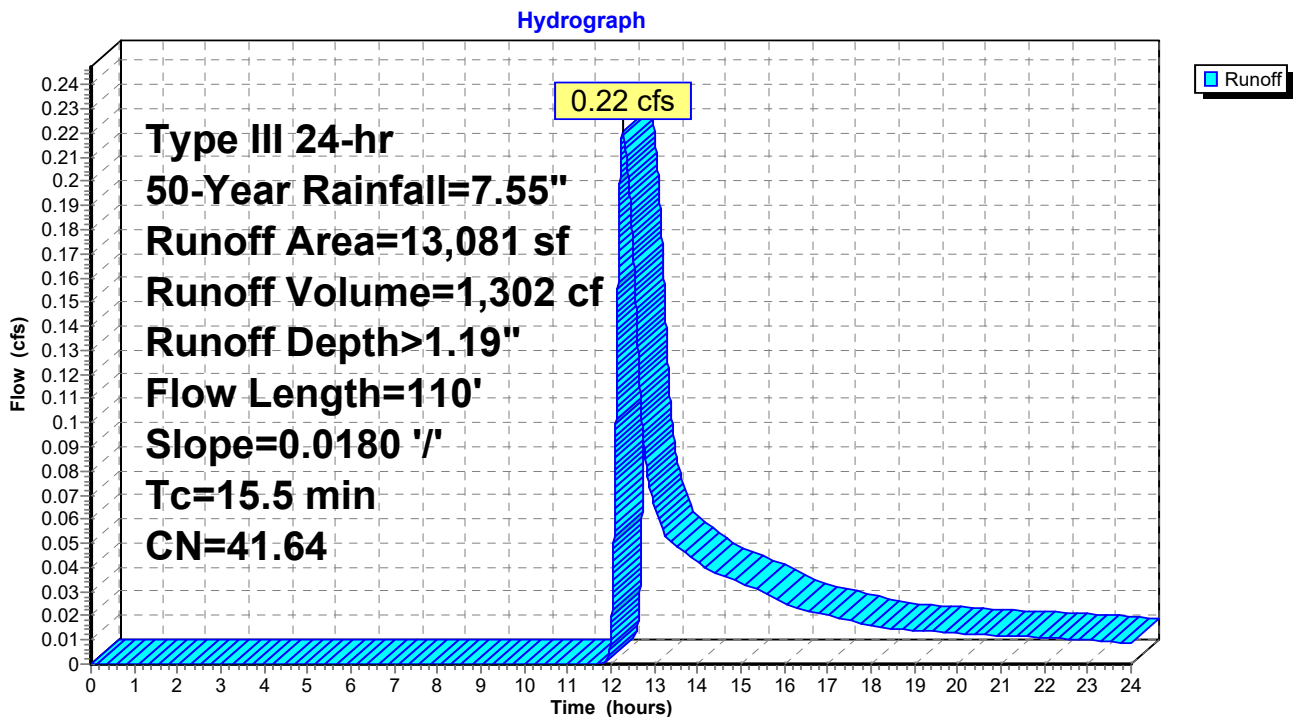
Runoff = 0.22 cfs @ 12.28 hrs, Volume= 1,302 cf, Depth> 1.19"  
 Routed to Link 23L : PL-Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Type III 24-hr 50-Year Rainfall=7.55"

Area (sf)	CN	Description
12,447	39.00	>75% Grass cover, Good, HSG A
121	74.00	>75% Grass cover, Good, HSG C
* 513	98.00	Impervious
13,081	41.64	Weighted Average
12,568		96.08% Pervious Area
513		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	110	0.0180	0.12		Sheet Flow, Grass: Dense n= 0.240 P2= 3.45"

### Subcatchment 27S: Road-Bypass





**Summary for Pond 26P: Road Inf**

Inflow Area = 52,941 sf, 89.63% Impervious, Inflow Depth > 5.43" for 50-Year event  
 Inflow = 7.87 cfs @ 12.07 hrs, Volume= 23,950 cf  
 Outflow = 2.50 cfs @ 12.38 hrs, Volume= 18,878 cf, Atten= 68%, Lag= 18.4 min  
 Primary = 2.50 cfs @ 12.38 hrs, Volume= 18,878 cf  
 Routed to Link 23L : PL-Road

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Peak Elev= 162.24' @ 12.38 hrs Surf.Area= 2,983 sf Storage= 10,375 cf

Plug-Flow detention time= 157.3 min calculated for 18,878 cf (79% of inflow)  
 Center-of-Mass det. time= 78.1 min ( 881.1 - 803.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	157.25'	2,541 cf	<b>15.75'W x 105.70'L x 6.00'H Field A</b> 9,989 cf Overall - 3,636 cf Embedded = 6,352 cf x 40.0% Voids
#2A	158.25'	3,636 cf	<b>Cultec R-902HD</b> x 56 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 56 Chambers in 2 Rows Cap Storage= 2.8 cf x 2 x 2 rows = 11.0 cf
#3B	156.25'	2,020 cf	<b>15.75'W x 83.70'L x 6.00'H Field B</b> 7,910 cf Overall - 2,859 cf Embedded = 5,050 cf x 40.0% Voids
#4B	157.25'	2,859 cf	<b>Cultec R-902HD</b> x 44 Inside #3 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 44 Chambers in 2 Rows Cap Storage= 2.8 cf x 2 x 2 rows = 11.0 cf
		11,057 cf	Total Available Storage

Storage Group A created with Chamber Wizard  
 Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	162.25'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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
#2	Primary	159.25'	<b>6.0" Vert. Orifice/Gate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	161.00'	<b>6.0" Vert. Orifice/Gate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=2.50 cfs @ 12.38 hrs HW=162.24' (Free Discharge)

- 1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)
- 2=Orifice/Gate (Orifice Controls 1.56 cfs @ 7.97 fps)
- 3=Orifice/Gate (Orifice Controls 0.94 cfs @ 4.78 fps)

**Pond 26P: Road Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-902HD (Cultec Recharger®902HD)**

Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf

Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap

Cap Storage= 2.8 cf x 2 x 2 rows = 11.0 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

28 Chambers/Row x 3.67' Long +0.52' Cap Length x 2 = 103.70' Row Length +12.0" End Stone x 2 = 105.70' Base Length

2 Rows x 78.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.75' Base Width

12.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 6.00' Field Height

56 Chambers x 64.7 cf + 2.8 cf Cap Volume x 2 x 2 Rows = 3,636.2 cf Chamber Storage

9,988.7 cf Field - 3,636.2 cf Chambers = 6,352.4 cf Stone x 40.0% Voids = 2,541.0 cf Stone Storage

Chamber Storage + Stone Storage = 6,177.2 cf = 0.142 af

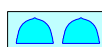
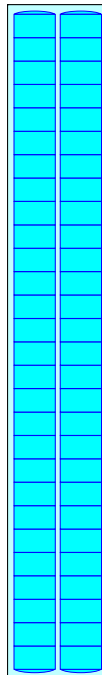
Overall Storage Efficiency = 61.8%

Overall System Size = 105.70' x 15.75' x 6.00'

56 Chambers

370.0 cy Field

235.3 cy Stone



**Pond 26P: Road Inf - Chamber Wizard Field B**

**Chamber Model = Cultec R-902HD (Cultec Recharger®902HD)**

Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf

Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap

Cap Storage= 2.8 cf x 2 x 2 rows = 11.0 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

22 Chambers/Row x 3.67' Long +0.52' Cap Length x 2 = 81.70' Row Length +12.0" End Stone x 2 = 83.70' Base Length

2 Rows x 78.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.75' Base Width

12.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 6.00' Field Height

44 Chambers x 64.7 cf + 2.8 cf Cap Volume x 2 x 2 Rows = 2,859.4 cf Chamber Storage

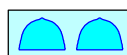
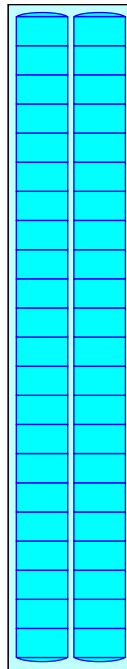
7,909.7 cf Field - 2,859.4 cf Chambers = 5,050.3 cf Stone x 40.0% Voids = 2,020.1 cf Stone Storage

Chamber Storage + Stone Storage = 4,879.5 cf = 0.112 af

Overall Storage Efficiency = 61.7%

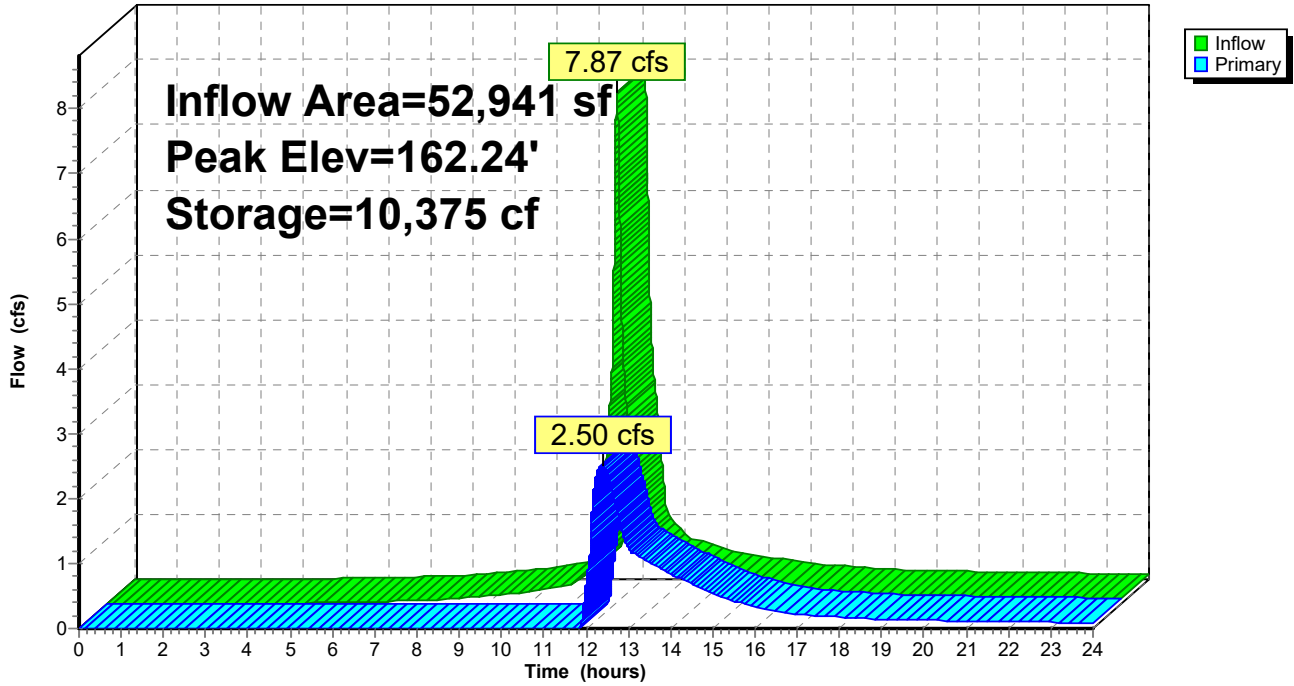
Overall System Size = 83.70' x 15.75' x 6.00'

- 44 Chambers
- 293.0 cy Field
- 187.0 cy Stone



### Pond 26P: Road Inf

Hydrograph



**Stage-Area-Storage for Pond 26P: Road Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
156.25	0	158.90	3,840	161.55	9,403
156.30	26	158.95	3,960	161.60	9,482
156.35	53	159.00	4,079	161.65	9,560
156.40	79	159.05	4,197	161.70	9,637
156.45	105	159.10	4,316	161.75	9,714
156.50	132	159.15	4,434	161.80	9,789
156.55	158	159.20	4,552	161.85	9,863
156.60	185	159.25	4,669	161.90	9,935
156.65	211	159.30	4,787	161.95	10,006
156.70	237	159.35	4,904	162.00	10,074
156.75	264	159.40	5,021	162.05	10,141
156.80	290	159.45	5,137	162.10	10,205
156.85	316	159.50	5,253	162.15	10,268
156.90	343	159.55	5,369	162.20	10,330
156.95	369	159.60	5,484	162.25	10,391
157.00	395	159.65	5,599	162.30	10,424
157.05	422	159.70	5,714	162.35	10,457
157.10	448	159.75	5,828	162.40	10,491
157.15	475	159.80	5,942	162.45	10,524
157.20	501	159.85	6,055	162.50	10,557
157.25	527	159.90	6,168	162.55	10,591
157.30	615	159.95	6,280	162.60	10,624
157.35	703	160.00	6,392	162.65	10,657
157.40	790	160.05	6,504	162.70	10,690
157.45	878	160.10	6,615	162.75	10,724
157.50	966	160.15	6,725	162.80	10,757
157.55	1,054	160.20	6,835	162.85	10,790
157.60	1,141	160.25	6,944	162.90	10,824
157.65	1,228	160.30	7,053	162.95	10,857
157.70	1,316	160.35	7,161	163.00	10,890
157.75	1,403	160.40	7,268	163.05	10,923
157.80	1,490	160.45	7,374	163.10	10,957
157.85	1,577	160.50	7,480	163.15	10,990
157.90	1,664	160.55	7,585	163.20	11,023
157.95	1,751	160.60	7,689	163.25	<b>11,057</b>
158.00	1,838	160.65	7,791		
158.05	1,925	160.70	7,894		
158.10	2,011	160.75	7,995		
158.15	2,097	160.80	8,095		
158.20	2,184	160.85	8,193		
158.25	2,270	160.90	8,290		
158.30	2,392	160.95	8,384		
158.35	2,513	161.00	8,477		
158.40	2,635	161.05	8,568		
158.45	2,757	161.10	8,657		
158.50	2,878	161.15	8,744		
158.55	2,999	161.20	8,830		
158.60	3,120	161.25	8,915		
158.65	3,241	161.30	8,998		
158.70	3,361	161.35	9,080		
158.75	3,481	161.40	9,162		
158.80	3,601	161.45	9,243		
158.85	3,720	161.50	9,323		

WQV PROVIDED

**Summary for Pond INF1: H1-Inf**

Inflow Area = 1,330 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.23 cfs @ 12.07 hrs, Volume= 810 cf  
 Outflow = 0.08 cfs @ 12.30 hrs, Volume= 304 cf, Atten= 64%, Lag= 13.9 min  
 Primary = 0.08 cfs @ 12.30 hrs, Volume= 304 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 166.03' @ 12.30 hrs Surf.Area= 213 sf Storage= 505 cf

Plug-Flow detention time= 350.7 min calculated for 304 cf (38% of inflow)  
 Center-of-Mass det. time= 180.2 min ( 920.7 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	162.00'	230 cf	<b>7.00'W x 30.17'L x 4.00'H Field A</b> 845 cf Overall - 269 cf Embedded = 575 cf x 40.0% Voids
#2A	162.50'	269 cf	<b>Cultec R-360HD</b> x 7 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf
#3	163.10'	8 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		507 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
163.10	2	0	0
167.00	2	8	8

Device	Routing	Invert	Outlet Devices
#1	Primary	166.00'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.07 cfs @ 12.30 hrs HW=166.03' (Free Discharge)  
 ←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.51 fps)

**Pond INF1: H1-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf

7 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 28.17' Row Length +12.0" End Stone x 2 = 30.17' Base Length

1 Rows x 60.0" Wide + 12.0" Side Stone x 2 = 7.00' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

7 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 1 Rows = 269.4 cf Chamber Storage

844.7 cf Field - 269.4 cf Chambers = 575.2 cf Stone x 40.0% Voids = 230.1 cf Stone Storage

Chamber Storage + Stone Storage = 499.5 cf = 0.011 af

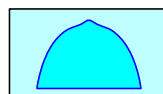
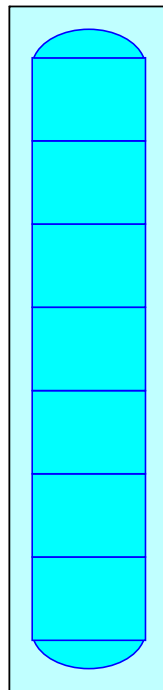
Overall Storage Efficiency = 59.1%

Overall System Size = 30.17' x 7.00' x 4.00'

7 Chambers

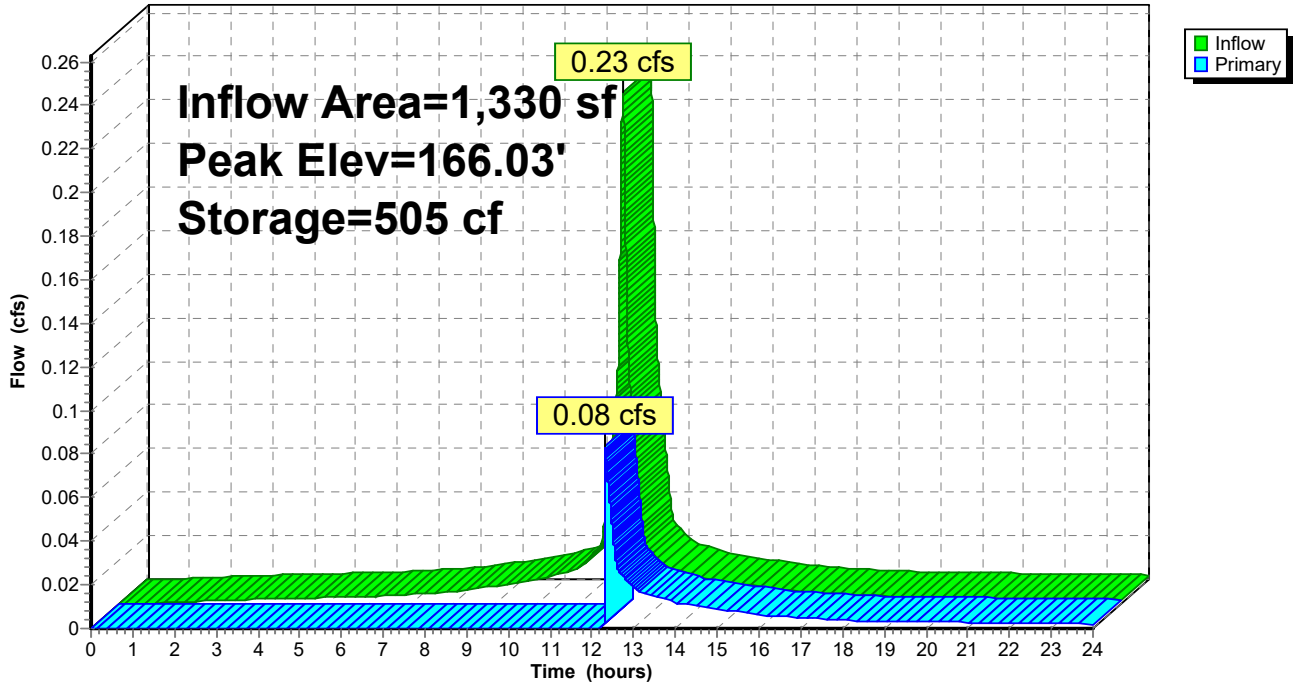
31.3 cy Field

21.3 cy Stone



### Pond INF1: H1-Inf

#### Hydrograph





**Stage-Area-Storage for Pond INF1: H1-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
162.00	0	164.65	365
162.05	4	164.70	371
162.10	8	164.75	378
162.15	13	164.80	385
162.20	17	164.85	391
162.25	21	164.90	397
162.30	25	164.95	403
162.35	30	165.00	410
162.40	34	165.05	416
162.45	38	165.10	422
162.50	42	165.15	427
162.55	50	165.20	433
162.60	58	165.25	438
162.65	66	165.30	443
162.70	74	165.35	448
162.75	82	165.40	453
162.80	90	165.45	458
162.85	97	165.50	462
162.90	105	165.55	466
162.95	113	165.60	471
163.00	121	165.65	475
163.05	129	165.70	479
163.10	136	165.75	484
163.15	144	165.80	488
163.20	152	165.85	492
163.25	160	165.90	497
163.30	168	165.95	501
163.35	175	166.00	505
163.40	183	166.05	505
163.45	191	166.10	506
163.50	198	166.15	506
163.55	206	166.20	506
163.60	214	166.25	506
163.65	221	166.30	506
163.70	229	166.35	506
163.75	236	166.40	506
163.80	244	166.45	506
163.85	251	166.50	506
163.90	259	166.55	506
163.95	266	166.60	507
164.00	273	166.65	507
164.05	281	166.70	507
164.10	288	166.75	507
164.15	295	166.80	507
164.20	302	166.85	507
164.25	310	166.90	507
164.30	317	166.95	507
164.35	324	167.00	<b>507</b>
164.40	331		
164.45	338		
164.50	345		
164.55	351		
164.60	358		

WQV PROVIDED



**Summary for Pond INF2: H2-Inf**

Inflow Area = 3,202 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,949 cf  
 Outflow = 0.56 cfs @ 12.07 hrs, Volume= 1,409 cf, Atten= 0%, Lag= 0.1 min  
 Primary = 0.56 cfs @ 12.07 hrs, Volume= 1,409 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs  
 Peak Elev= 166.29' @ 12.07 hrs Surf.Area= 241 sf Storage= 553 cf

Plug-Flow detention time= 176.9 min calculated for 1,409 cf (72% of inflow)  
 Center-of-Mass det. time= 84.6 min ( 825.2 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	162.50'	257 cf	<b>7.00'W x 33.83'L x 4.00'H Field A</b> 947 cf Overall - 306 cf Embedded = 641 cf x 40.0% Voids
#2A	163.00'	306 cf	<b>Cultec R-360HD</b> x 8 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf
#3	163.60'	14 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		577 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
163.60	4	0	0
167.15	4	14	14

Device	Routing	Invert	Outlet Devices
#1	Primary	166.15'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.56 cfs @ 12.07 hrs HW=166.29' (Free Discharge)  
 ←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.56 cfs @ 1.03 fps)

**Pond INF2: H2-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf

8 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 31.83' Row Length +12.0" End Stone x 2 = 33.83' Base Length

1 Rows x 60.0" Wide + 12.0" Side Stone x 2 = 7.00' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 1 Rows = 306.1 cf Chamber Storage

947.3 cf Field - 306.1 cf Chambers = 641.3 cf Stone x 40.0% Voids = 256.5 cf Stone Storage

Chamber Storage + Stone Storage = 562.6 cf = 0.013 af

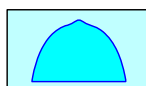
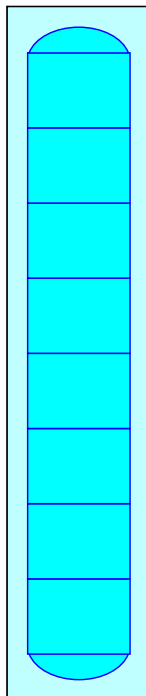
Overall Storage Efficiency = 59.4%

Overall System Size = 33.83' x 7.00' x 4.00'

8 Chambers

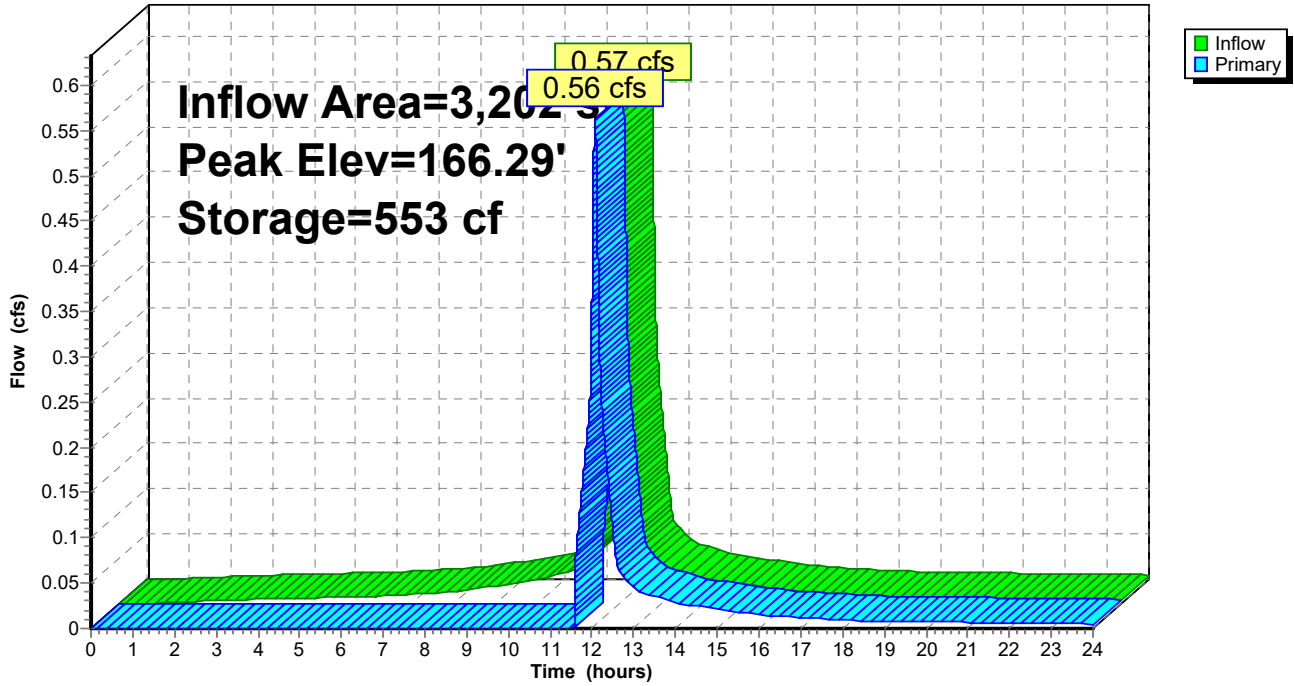
35.1 cy Field

23.8 cy Stone



Pond INF2: H2-Inf

Hydrograph



**Stage-Area-Storage for Pond INF2: H2-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
162.50	0	165.15	414
162.55	5	165.20	421
162.60	9	165.25	429
162.65	14	165.30	436
162.70	19	165.35	444
162.75	24	165.40	451
162.80	28	165.45	458
162.85	33	165.50	465
162.90	38	165.55	472
162.95	43	165.60	479
163.00	47	165.65	485
163.05	56	165.70	491
163.10	65	165.75	498
163.15	74	165.80	503
163.20	83	165.85	509
163.25	92	165.90	514
163.30	101	165.95	520
163.35	110	166.00	525
163.40	118	166.05	530
163.45	127	166.10	535
163.50	136	166.15	540
163.55	145	166.20	545
163.60	154	166.25	549
163.65	162	166.30	554
163.70	171	166.35	559
163.75	180	166.40	564
163.80	189	166.45	569
163.85	198	166.50	574
163.90	207	166.55	574
163.95	215	166.60	575
164.00	224	166.65	575
164.05	233	166.70	575
164.10	242	166.75	575
164.15	250	166.80	575
164.20	259	166.85	576
164.25	267	166.90	576
164.30	276	166.95	576
164.35	284	167.00	576
164.40	293	167.05	576
164.45	301	167.10	577
164.50	310	167.15	577
164.55	318		
164.60	326		
164.65	335		
164.70	343		
164.75	351		
164.80	359		
164.85	367		
164.90	375		
164.95	383		
165.00	391		
165.05	399		
165.10	406		

WQV PROVIDED



**Summary for Pond INF3: H3-Inf**

Inflow Area = 1,286 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.23 cfs @ 12.07 hrs, Volume= 783 cf  
 Outflow = 0.02 cfs @ 13.31 hrs, Volume= 189 cf, Atten= 93%, Lag= 74.6 min  
 Primary = 0.02 cfs @ 13.31 hrs, Volume= 189 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 170.51' @ 13.31 hrs Surf.Area= 248 sf Storage= 594 cf

Plug-Flow detention time= 514.8 min calculated for 189 cf (24% of inflow)  
 Center-of-Mass det. time= 270.7 min ( 1,011.2 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	164.50'	263 cf	<b>12.75'W x 19.17'L x 4.00'H Field A</b> 977 cf Overall - 319 cf Embedded = 659 cf x 40.0% Voids
#2A	165.00'	319 cf	<b>Cultec R-360HD</b> x 8 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 8 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
#3	167.50'	16 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		598 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.50	4	0	0
171.50	4	16	16

Device	Routing	Invert	Outlet Devices
#1	Primary	170.50'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.01 cfs @ 13.31 hrs HW=170.51' (Free Discharge)  
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 0.01 cfs @ 0.27 fps)

**Pond INF3: H3-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

4 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 17.17' Row Length +12.0" End Stone x 2 = 19.17' Base Length

2 Rows x 60.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 12.75' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 2 Rows = 319.0 cf Chamber Storage

977.5 cf Field - 319.0 cf Chambers = 658.5 cf Stone x 40.0% Voids = 263.4 cf Stone Storage

Chamber Storage + Stone Storage = 582.4 cf = 0.013 af

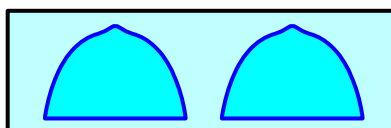
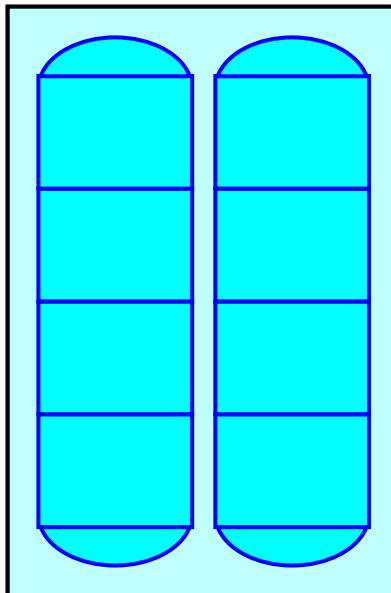
Overall Storage Efficiency = 59.6%

Overall System Size = 19.17' x 12.75' x 4.00'

8 Chambers

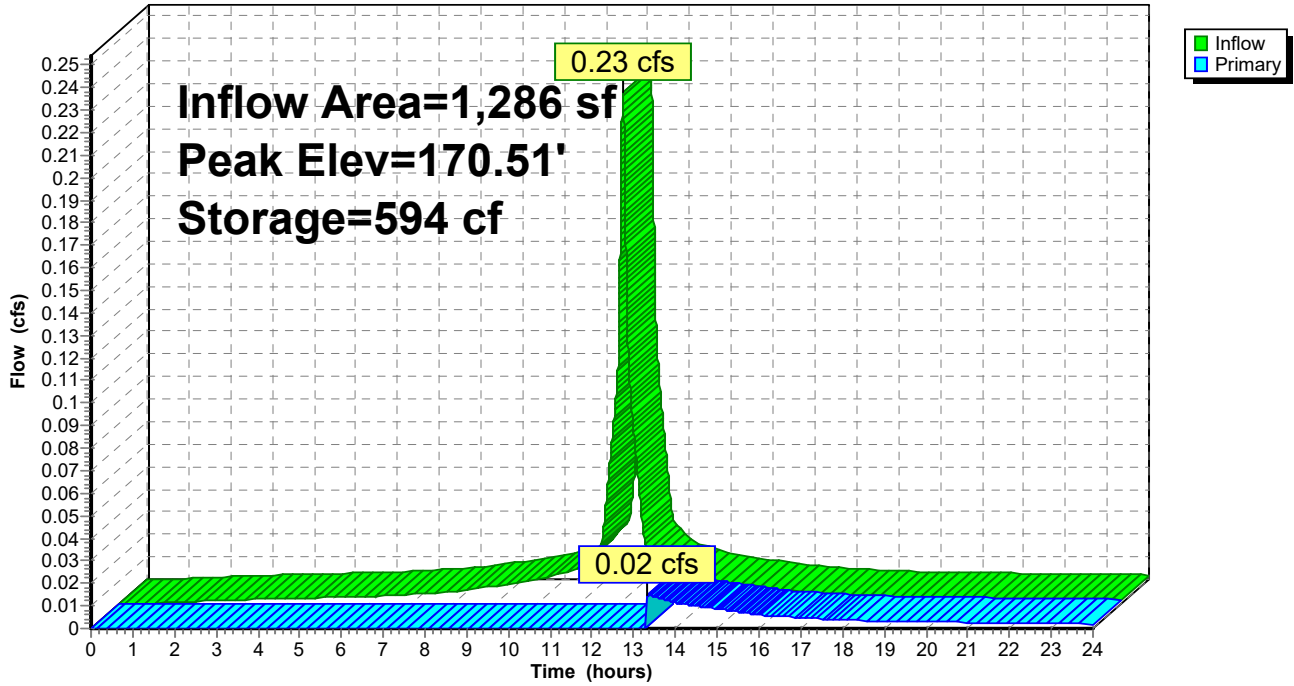
36.2 cy Field

24.4 cy Stone



### Pond INF3: H3-Inf

#### Hydrograph





**Stage-Area-Storage for Pond INF3: H3-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
164.50	0	167.15	422	169.80	592
164.55	5	167.20	430	169.85	592
164.60	10	167.25	437	169.90	592
164.65	15	167.30	445	169.95	592
164.70	20	167.35	452	170.00	592
164.75	24	167.40	460	170.05	593
164.80	29	167.45	467	170.10	593
164.85	34	167.50	474	170.15	593
164.90	39	167.55	481	170.20	593
164.95	44	167.60	488	170.25	593
165.00	49	167.65	494	170.30	594
165.05	58	167.70	501	170.35	594
165.10	67	167.75	507	170.40	594
165.15	77	167.80	513	170.45	594
165.20	86	167.85	519	170.50	594
165.25	95	167.90	525	170.55	595
165.30	104	167.95	530	170.60	595
165.35	113	168.00	536	170.65	595
165.40	123	168.05	541	170.70	595
165.45	132	168.10	546	170.75	595
165.50	141	168.15	551	170.80	596
165.55	150	168.20	556	170.85	596
165.60	159	168.25	561	170.90	596
165.65	168	168.30	566	170.95	596
165.70	177	168.35	571	171.00	596
165.75	186	168.40	576	171.05	597
165.80	195	168.45	581	171.10	597
165.85	204	168.50	586	171.15	597
165.90	213	168.55	587	171.20	597
165.95	222	168.60	587	171.25	597
166.00	231	168.65	587	171.30	598
166.05	239	168.70	587	171.35	598
166.10	248	168.75	587	171.40	598
166.15	257	168.80	588	171.45	598
166.20	266	168.85	588	171.50	<b>598</b>
166.25	274	168.90	588		
166.30	283	168.95	588		
166.35	291	169.00	588		
166.40	300	169.05	589		
166.45	309	169.10	589		
166.50	317	169.15	589		
166.55	325	169.20	589		
166.60	334	169.25	589		
166.65	342	169.30	590		
166.70	350	169.35	590		
166.75	359	169.40	590		
166.80	367	169.45	590		
166.85	375	169.50	590		
166.90	383	169.55	591		
166.95	391	169.60	591		
167.00	399	169.65	591		
167.05	407	169.70	591		
167.10	415	169.75	591		

WQV PROVIDED



170.50 594

**Summary for Pond INF4: H4-Inf**

Inflow Area = 3,202 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,949 cf  
 Outflow = 0.57 cfs @ 12.07 hrs, Volume= 1,375 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.57 cfs @ 12.07 hrs, Volume= 1,375 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 3  
 Peak Elev= 170.93' @ 12.07 hrs Surf.Area= 241 sf Storage= 575 cf

Plug-Flow detention time= 182.6 min calculated for 1,375 cf (71% of inflow)  
 Center-of-Mass det. time= 87.3 min ( 827.8 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	165.00'	257 cf	<b>7.00'W x 33.83'L x 4.00'H Field A</b> 947 cf Overall - 306 cf Embedded = 641 cf x 40.0% Voids
#2A	165.50'	306 cf	<b>Cultec R-360HD</b> x 8 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf
#3	167.80'	16 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		579 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.80	4	0	0
171.80	4	16	16

Device	Routing	Invert	Outlet Devices
#1	Primary	170.80'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.55 cfs @ 12.07 hrs HW=170.93' (Free Discharge)  
 ←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.55 cfs @ 1.03 fps)

**Pond INF4: H4-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf

8 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 31.83' Row Length +12.0" End Stone x 2 = 33.83' Base Length

1 Rows x 60.0" Wide + 12.0" Side Stone x 2 = 7.00' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 1 Rows = 306.1 cf Chamber Storage

947.3 cf Field - 306.1 cf Chambers = 641.3 cf Stone x 40.0% Voids = 256.5 cf Stone Storage

Chamber Storage + Stone Storage = 562.6 cf = 0.013 af

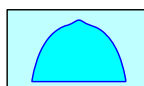
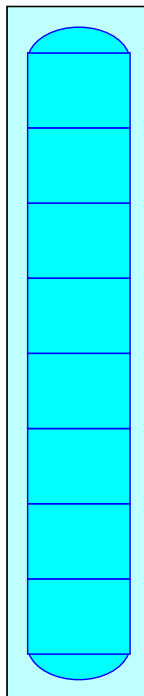
Overall Storage Efficiency = 59.4%

Overall System Size = 33.83' x 7.00' x 4.00'

8 Chambers

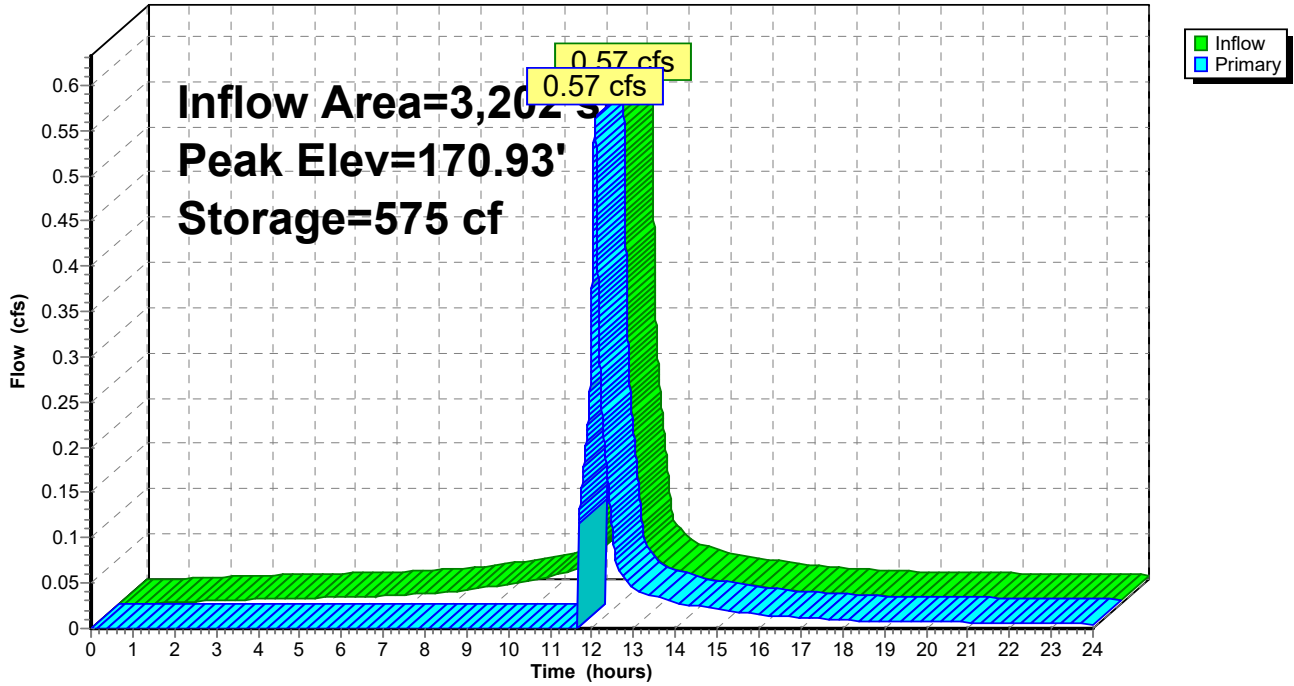
35.1 cy Field

23.8 cy Stone



Pond INF4: H4-Inf

Hydrograph



**Stage-Area-Storage for Pond INF4: H4-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
165.00	0	167.65	408	170.30	573
165.05	5	167.70	415	170.35	573
165.10	9	167.75	422	170.40	573
165.15	14	167.80	430	170.45	573
165.20	19	167.85	437	170.50	573
165.25	24	167.90	444	170.55	574
165.30	28	167.95	451	170.60	574
165.35	33	168.00	458	170.65	574
165.40	38	168.05	465	170.70	574
165.45	43	168.10	472	170.75	574
165.50	47	168.15	478	170.80	575
165.55	56	168.20	485	170.85	575
165.60	65	168.25	491	170.90	575
165.65	74	168.30	497	170.95	575
165.70	83	168.35	502	171.00	575
165.75	92	168.40	508	171.05	576
165.80	101	168.45	513	171.10	576
165.85	110	168.50	518	171.15	576
165.90	118	168.55	523	171.20	576
165.95	127	168.60	528	171.25	576
166.00	136	168.65	533	171.30	577
166.05	145	168.70	538	171.35	577
166.10	154	168.75	543	171.40	577
166.15	162	168.80	548	171.45	577
166.20	171	168.85	553	171.50	577
166.25	180	168.90	558	171.55	578
166.30	188	168.95	562	171.60	578
166.35	197	169.00	567	171.65	578
166.40	206	169.05	568	171.70	578
166.45	214	169.10	568	171.75	578
166.50	223	169.15	568	171.80	578
166.55	231	169.20	568		<b>579</b>
166.60	240	169.25	568		
166.65	248	169.30	569		
166.70	256	169.35	569		
166.75	265	169.40	569		
166.80	273	169.45	569		
166.85	281	169.50	569		
166.90	290	169.55	570		
166.95	298	169.60	570		
167.00	306	169.65	570		
167.05	314	169.70	570		
167.10	322	169.75	570		
167.15	330	169.80	571		
167.20	338	169.85	571		
167.25	346	169.90	571		
167.30	354	169.95	571		
167.35	362	170.00	571		
167.40	370	170.05	572		
167.45	377	170.10	572		
167.50	385	170.15	572		
167.55	393	170.20	572		
167.60	400	170.25	572		

WQV PROVIDED

**Summary for Pond INF5: H5-Inf**

Inflow Area = 1,371 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.24 cfs @ 12.07 hrs, Volume= 835 cf  
 Outflow = 0.02 cfs @ 12.75 hrs, Volume= 240 cf, Atten= 90%, Lag= 40.6 min  
 Primary = 0.02 cfs @ 12.75 hrs, Volume= 240 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 171.41' @ 12.75 hrs Surf.Area= 248 sf Storage= 594 cf

Plug-Flow detention time= 445.7 min calculated for 240 cf (29% of inflow)  
 Center-of-Mass det. time= 232.9 min ( 973.5 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	165.50'	263 cf	<b>12.75'W x 19.17'L x 4.00'H Field A</b> 977 cf Overall - 319 cf Embedded = 659 cf x 40.0% Voids
#2A	166.00'	319 cf	<b>Cultec R-360HD x 8 Inside #1</b> Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 8 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
#3	168.40'	16 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		598 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
168.40	4	0	0
172.40	4	16	16

Device	Routing	Invert	Outlet Devices
#1	Primary	171.40'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.01 cfs @ 12.75 hrs HW=171.41' (Free Discharge)  
 ←1=Broad-Crested Rectangular Weir (Weir Controls 0.01 cfs @ 0.31 fps)

**Pond INF5: H5-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

4 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 17.17' Row Length +12.0" End Stone x 2 = 19.17' Base Length

2 Rows x 60.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 12.75' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 2 Rows = 319.0 cf Chamber Storage

977.5 cf Field - 319.0 cf Chambers = 658.5 cf Stone x 40.0% Voids = 263.4 cf Stone Storage

Chamber Storage + Stone Storage = 582.4 cf = 0.013 af

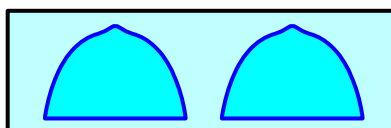
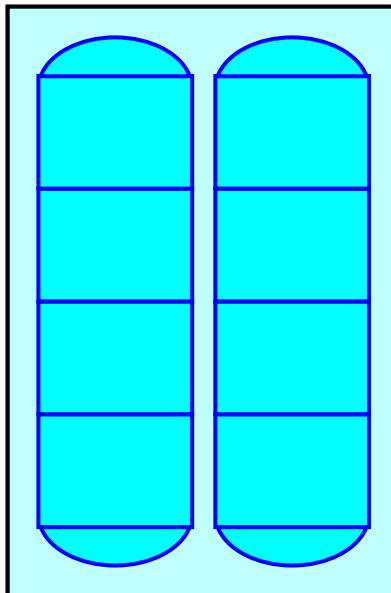
Overall Storage Efficiency = 59.6%

Overall System Size = 19.17' x 12.75' x 4.00'

8 Chambers

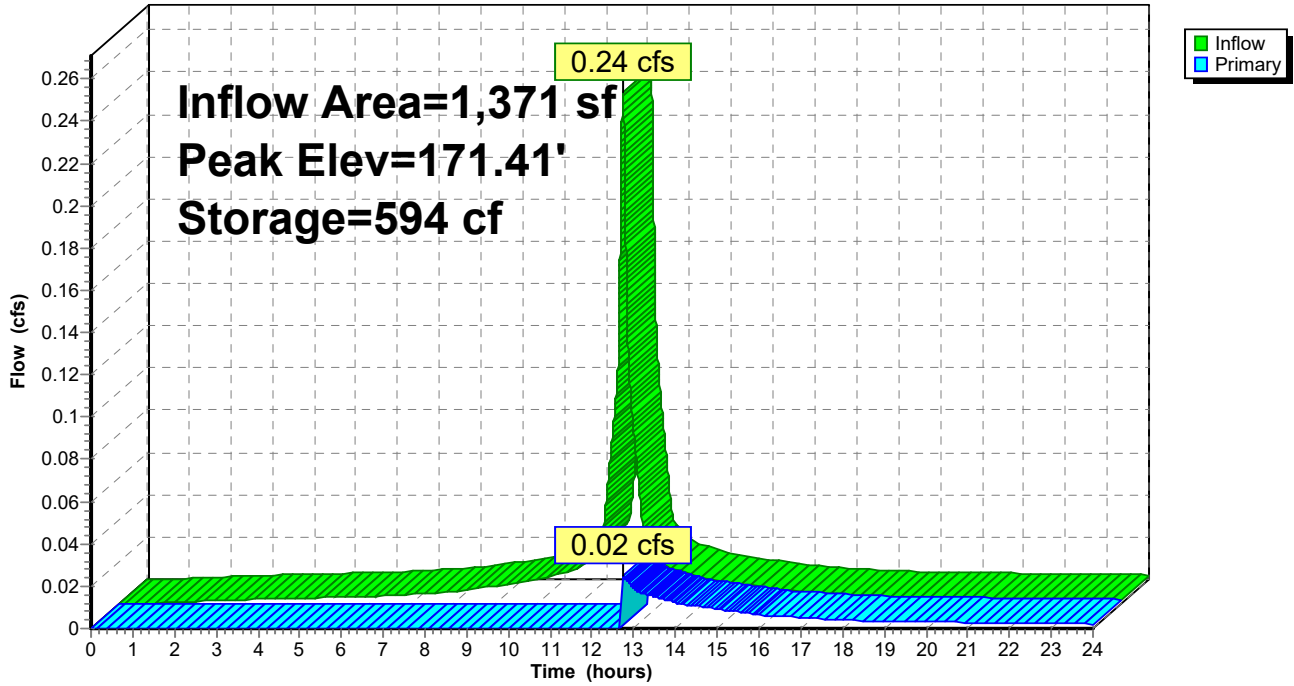
36.2 cy Field

24.4 cy Stone



### Pond INF5: H5-Inf

#### Hydrograph





**Stage-Area-Storage for Pond INF5: H5-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
165.50	0	168.15	422	170.80	592
165.55	5	168.20	430	170.85	592
165.60	10	168.25	437	170.90	592
165.65	15	168.30	445	170.95	593
165.70	20	168.35	452	171.00	593
165.75	24	168.40	460	171.05	593
165.80	29	168.45	467	171.10	593
165.85	34	168.50	474	171.15	593
165.90	39	168.55	481	171.20	594
165.95	44	168.60	488	171.25	594
166.00	49	168.65	495	171.30	594
166.05	58	168.70	501	171.35	594
166.10	67	168.75	508	171.40	594
166.15	77	168.80	514	171.45	595
166.20	86	168.85	520	171.50	595
166.25	95	168.90	525	171.55	595
166.30	104	168.95	531	171.60	595
166.35	113	169.00	536	171.65	595
166.40	123	169.05	541	171.70	596
166.45	132	169.10	546	171.75	596
166.50	141	169.15	551	171.80	596
166.55	150	169.20	556	171.85	596
166.60	159	169.25	561	171.90	596
166.65	168	169.30	566	171.95	597
166.70	177	169.35	572	172.00	597
166.75	186	169.40	577	172.05	597
166.80	195	169.45	582	172.10	597
166.85	204	169.50	587	172.15	597
166.90	213	169.55	587	172.20	598
166.95	222	169.60	587	172.25	598
167.00	231	169.65	587	172.30	598
167.05	239	169.70	588	172.35	598
167.10	248	169.75	588	172.40	<b>598</b>
167.15	257	169.80	588		
167.20	266	169.85	588		
167.25	274	169.90	588		
167.30	283	169.95	589		
167.35	291	170.00	589		
167.40	300	170.05	589		
167.45	309	170.10	589		
167.50	317	170.15	589		
167.55	325	170.20	590		
167.60	334	170.25	590		
167.65	342	170.30	590		
167.70	350	170.35	590		
167.75	359	170.40	590		
167.80	367	170.45	591		
167.85	375	170.50	591		
167.90	383	170.55	591		
167.95	391	170.60	591		
168.00	399	170.65	591		
168.05	407	170.70	592		
168.10	415	170.75	592		

WQV PROVIDED

**Summary for Pond INF6: H6-Inf**

Inflow Area = 3,184 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,938 cf  
 Outflow = 0.56 cfs @ 12.07 hrs, Volume= 1,364 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.56 cfs @ 12.07 hrs, Volume= 1,364 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 171.63' @ 12.07 hrs Surf.Area= 241 sf Storage= 575 cf

Plug-Flow detention time= 183.1 min calculated for 1,364 cf (70% of inflow)  
 Center-of-Mass det. time= 87.6 min ( 828.1 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	167.00'	257 cf	<b>7.00'W x 33.83'L x 4.00'H Field A</b> 947 cf Overall - 306 cf Embedded = 641 cf x 40.0% Voids
#2A	167.50'	306 cf	<b>Cultec R-360HD</b> x 8 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf
#3	168.50'	16 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		579 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
168.50	4	0	0
172.50	4	16	16

Device	Routing	Invert	Outlet Devices
#1	Primary	171.50'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.56 cfs @ 12.07 hrs HW=171.63' (Free Discharge)  
 ←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.56 cfs @ 1.03 fps)

**Pond INF6: H6-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf

8 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 31.83' Row Length +12.0" End Stone x 2 = 33.83' Base Length

1 Rows x 60.0" Wide + 12.0" Side Stone x 2 = 7.00' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 1 Rows = 306.1 cf Chamber Storage

947.3 cf Field - 306.1 cf Chambers = 641.3 cf Stone x 40.0% Voids = 256.5 cf Stone Storage

Chamber Storage + Stone Storage = 562.6 cf = 0.013 af

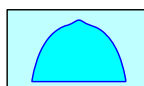
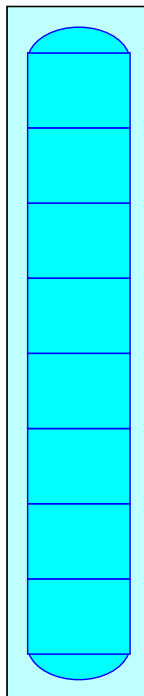
Overall Storage Efficiency = 59.4%

Overall System Size = 33.83' x 7.00' x 4.00'

8 Chambers

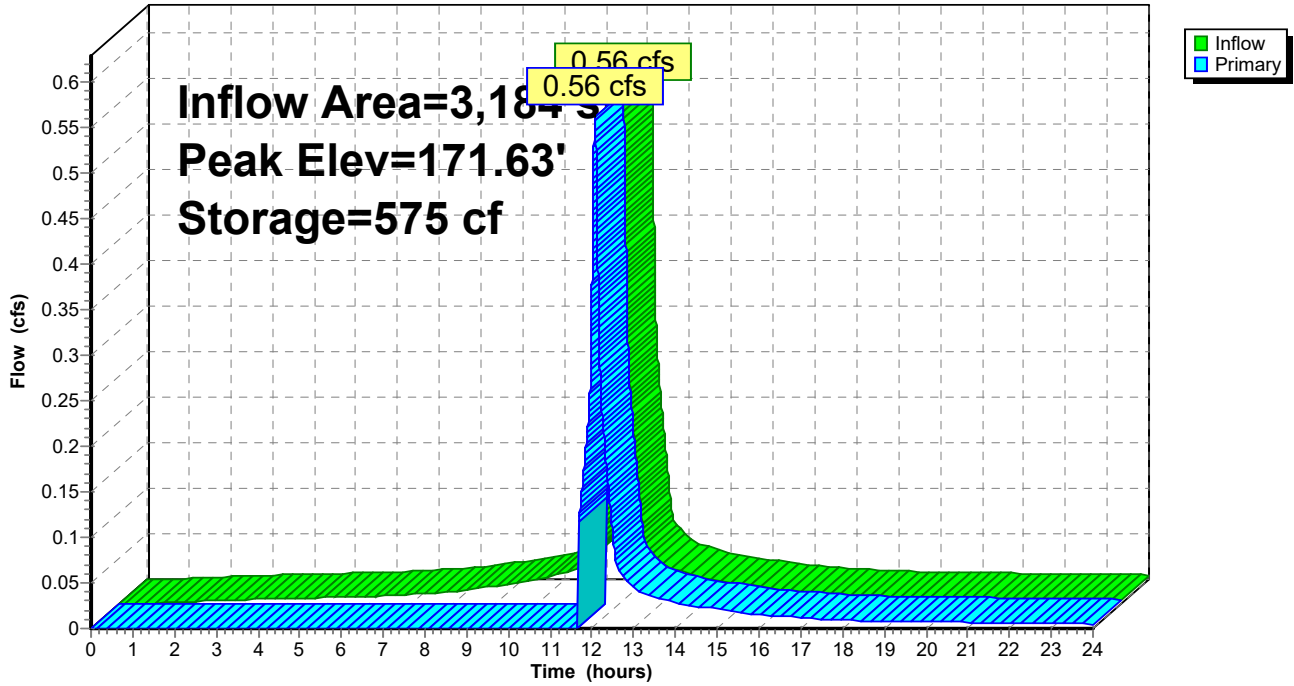
35.1 cy Field

23.8 cy Stone



### Pond INF6: H6-Inf

Hydrograph



**Stage-Area-Storage for Pond INF6: H6-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
167.00	0	169.65	412	172.30	578
167.05	5	169.70	420	172.35	578
167.10	9	169.75	427	172.40	578
167.15	14	169.80	435	172.45	578
167.20	19	169.85	442	172.50	<b>579</b>
167.25	24	169.90	449		
167.30	28	169.95	456		
167.35	33	170.00	463		
167.40	38	170.05	470		
167.45	43	170.10	477		
167.50	47	170.15	483		
167.55	56	170.20	490		
167.60	65	170.25	496		
167.65	74	170.30	502		
167.70	83	170.35	507		
167.75	92	170.40	513		
167.80	101	170.45	518		
167.85	110	170.50	523		
167.90	118	170.55	528		
167.95	127	170.60	533		
168.00	136	170.65	538		
168.05	145	170.70	543		
168.10	154	170.75	548		
168.15	162	170.80	553		
168.20	171	170.85	558		
168.25	180	170.90	563		
168.30	188	170.95	568		
168.35	197	171.00	573		
168.40	206	171.05	573		
168.45	214	171.10	573		
168.50	223	171.15	573		
168.55	231	171.20	573		
168.60	240	171.25	574		
168.65	249	171.30	574		
168.70	257	171.35	574		
168.75	266	171.40	574		
168.80	274	171.45	574		
168.85	283	171.50	575		
168.90	291	171.55	575		
168.95	300	171.60	575		
169.00	308	171.65	575		
169.05	316	171.70	575		
169.10	325	171.75	576		
169.15	333	171.80	576		
169.20	341	171.85	576		
169.25	349	171.90	576		
169.30	357	171.95	576		
169.35	365	172.00	577		
169.40	373	172.05	577		
169.45	381	172.10	577		
169.50	389	172.15	577		
169.55	397	172.20	577		
169.60	405	172.25	578		

WQV PROVIDED



171.50 575

**Summary for Pond INF7: H7-Inf**

Inflow Area = 1,816 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.32 cfs @ 12.07 hrs, Volume= 1,106 cf  
 Outflow = 0.24 cfs @ 12.13 hrs, Volume= 511 cf, Atten= 25%, Lag= 3.7 min  
 Primary = 0.24 cfs @ 12.13 hrs, Volume= 511 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 172.47' @ 12.13 hrs Surf.Area= 248 sf Storage= 595 cf

Plug-Flow detention time= 287.4 min calculated for 511 cf (46% of inflow)  
 Center-of-Mass det. time= 144.9 min ( 885.5 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	166.50'	263 cf	<b>12.75'W x 19.17'L x 4.00'H Field A</b> 977 cf Overall - 319 cf Embedded = 659 cf x 40.0% Voids
#2A	167.00'	319 cf	<b>Cultec R-360HD x 8 Inside #1</b> Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 8 Chambers in 2 Rows Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf
#3	169.40'	16 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		598 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
169.40	4	0	0
173.40	4	16	16

Device	Routing	Invert	Outlet Devices
#1	Primary	172.40'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.22 cfs @ 12.13 hrs HW=172.47' (Free Discharge)  
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 0.22 cfs @ 0.76 fps)

**Pond INF7: H7-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 2 rows = 25.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

4 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 17.17' Row Length +12.0" End Stone x 2 = 19.17' Base Length

2 Rows x 60.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 12.75' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 2 Rows = 319.0 cf Chamber Storage

977.5 cf Field - 319.0 cf Chambers = 658.5 cf Stone x 40.0% Voids = 263.4 cf Stone Storage

Chamber Storage + Stone Storage = 582.4 cf = 0.013 af

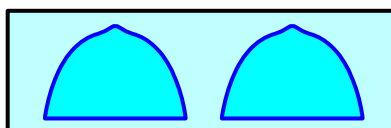
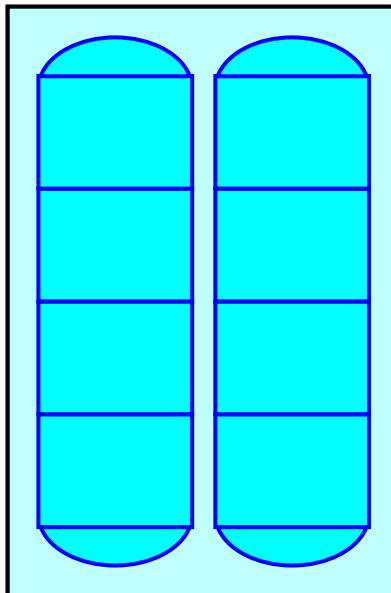
Overall Storage Efficiency = 59.6%

Overall System Size = 19.17' x 12.75' x 4.00'

8 Chambers

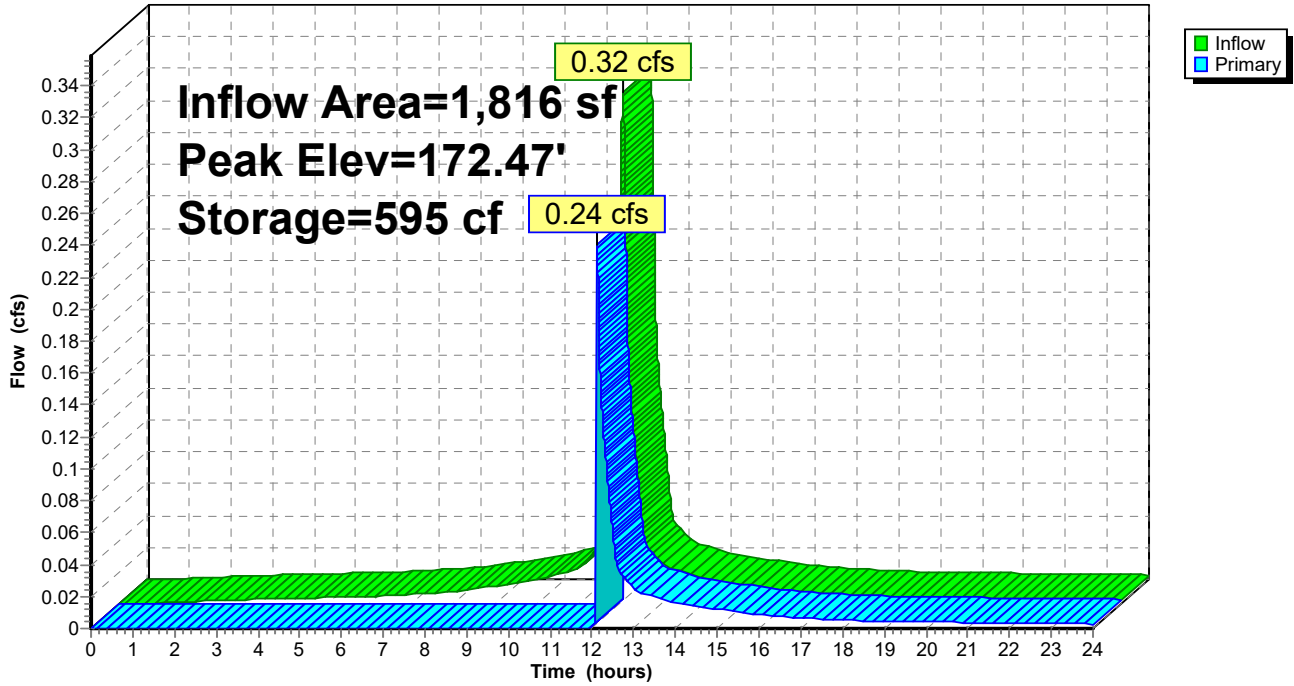
36.2 cy Field

24.4 cy Stone



### Pond INF7: H7-Inf

#### Hydrograph





**Stage-Area-Storage for Pond INF7: H7-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
166.50	0	169.15	422	171.80	592
166.55	5	169.20	430	171.85	592
166.60	10	169.25	437	171.90	592
166.65	15	169.30	445	171.95	593
166.70	20	169.35	452	172.00	593
166.75	24	169.40	460	172.05	593
166.80	29	169.45	467	172.10	593
166.85	34	169.50	474	172.15	593
166.90	39	169.55	481	172.20	594
166.95	44	169.60	488	172.25	594
167.00	49	169.65	495	172.30	594
167.05	58	169.70	501	172.35	594
167.10	67	169.75	508	172.40	594
167.15	77	169.80	514	172.45	595
167.20	86	169.85	520	172.50	595
167.25	95	169.90	525	172.55	595
167.30	104	169.95	531	172.60	595
167.35	113	170.00	536	172.65	595
167.40	123	170.05	541	172.70	596
167.45	132	170.10	546	172.75	596
167.50	141	170.15	551	172.80	596
167.55	150	170.20	556	172.85	596
167.60	159	170.25	561	172.90	596
167.65	168	170.30	566	172.95	597
167.70	177	170.35	572	173.00	597
167.75	186	170.40	577	173.05	597
167.80	195	170.45	582	173.10	597
167.85	204	170.50	587	173.15	597
167.90	213	170.55	587	173.20	598
167.95	222	170.60	587	173.25	598
168.00	231	170.65	587	173.30	598
168.05	239	170.70	588	173.35	598
168.10	248	170.75	588	173.40	<b>598</b>
168.15	257	170.80	588		
168.20	266	170.85	588		
168.25	274	170.90	588		
168.30	283	170.95	589		
168.35	291	171.00	589		
168.40	300	171.05	589		
168.45	309	171.10	589		
168.50	317	171.15	589		
168.55	325	171.20	590		
168.60	334	171.25	590		
168.65	342	171.30	590		
168.70	350	171.35	590		
168.75	359	171.40	590		
168.80	367	171.45	591		
168.85	375	171.50	591		
168.90	383	171.55	591		
168.95	391	171.60	591		
169.00	399	171.65	591		
169.05	407	171.70	592		
169.10	415	171.75	592		

WQV PROVIDED

172.40 594

**Summary for Pond INF8: H8-Inf**

Inflow Area = 2,690 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.47 cfs @ 12.07 hrs, Volume= 1,638 cf  
 Outflow = 0.47 cfs @ 12.07 hrs, Volume= 1,072 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.47 cfs @ 12.07 hrs, Volume= 1,072 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 170.02' @ 12.07 hrs Surf.Area= 241 sf Storage= 575 cf

Plug-Flow detention time= 200.6 min calculated for 1,072 cf (65% of inflow)  
 Center-of-Mass det. time= 97.2 min ( 837.8 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	166.00'	257 cf	<b>7.00'W x 33.83'L x 4.00'H Field A</b> 947 cf Overall - 306 cf Embedded = 641 cf x 40.0% Voids
#2A	166.50'	306 cf	<b>Cultec R-360HD</b> x 8 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf
#3	166.90'	16 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		579 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
166.90	4	0	0
170.90	4	16	16

Device	Routing	Invert	Outlet Devices
#1	Primary	169.90'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.47 cfs @ 12.07 hrs HW=170.02' (Free Discharge)  
 ←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.47 cfs @ 0.98 fps)

**Pond INF8: H8-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf

8 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 31.83' Row Length +12.0" End Stone x 2 = 33.83' Base Length

1 Rows x 60.0" Wide + 12.0" Side Stone x 2 = 7.00' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 1 Rows = 306.1 cf Chamber Storage

947.3 cf Field - 306.1 cf Chambers = 641.3 cf Stone x 40.0% Voids = 256.5 cf Stone Storage

Chamber Storage + Stone Storage = 562.6 cf = 0.013 af

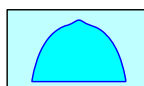
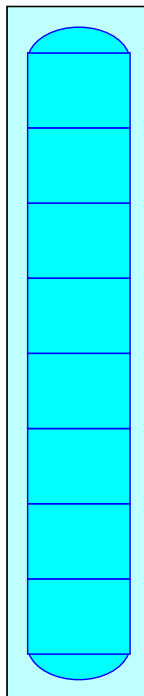
Overall Storage Efficiency = 59.4%

Overall System Size = 33.83' x 7.00' x 4.00'

8 Chambers

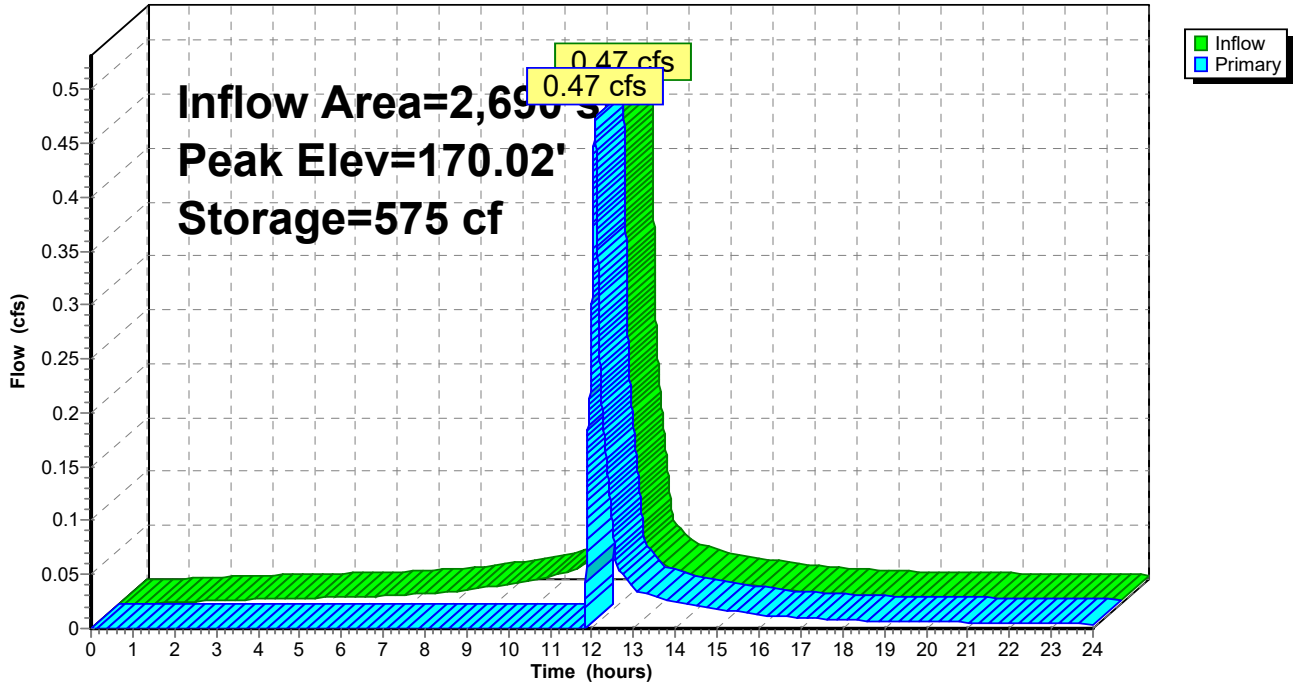
35.1 cy Field

23.8 cy Stone



### Pond INF8: H8-Inf

#### Hydrograph



**Stage-Area-Storage for Pond INF8: H8-Inf**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
166.00	0	168.65	415
166.05	5	168.70	422
166.10	9	168.75	430
166.15	14	168.80	437
166.20	19	168.85	444
166.25	24	168.90	452
166.30	28	168.95	459
166.35	33	169.00	466
166.40	38	169.05	473
166.45	43	169.10	479
166.50	47	169.15	486
166.55	56	169.20	492
166.60	65	169.25	498
166.65	74	169.30	504
166.70	83	169.35	510
166.75	92	169.40	515
166.80	101	169.45	520
166.85	110	169.50	526
166.90	118	169.55	531
166.95	127	169.60	535
167.00	136	169.65	540
167.05	145	169.70	545
167.10	154	169.75	550
167.15	163	169.80	555
167.20	172	169.85	560
167.25	181	169.90	565
167.30	190	169.95	570
167.35	199	170.00	575
167.40	208	170.05	575
167.45	216	170.10	575
167.50	225	170.15	576
167.55	234	170.20	576
167.60	242	170.25	576
167.65	251	170.30	576
167.70	260	170.35	576
167.75	268	170.40	577
167.80	277	170.45	577
167.85	285	170.50	577
167.90	294	170.55	577
167.95	302	170.60	577
168.00	310	170.65	578
168.05	319	170.70	578
168.10	327	170.75	578
168.15	335	170.80	578
168.20	344	170.85	578
168.25	352	170.90	579
168.30	360		
168.35	368		
168.40	376		
168.45	384		
168.50	392		
168.55	399		
168.60	407		

WQV PROVIDED



**Summary for Pond INF9: H9-Inf**

Inflow Area = 2,837 sf, 100.00% Impervious, Inflow Depth > 7.31" for 50-Year event  
 Inflow = 0.50 cfs @ 12.07 hrs, Volume= 1,727 cf  
 Outflow = 0.50 cfs @ 12.07 hrs, Volume= 1,177 cf, Atten= 0%, Lag= 0.2 min  
 Primary = 0.50 cfs @ 12.07 hrs, Volume= 1,177 cf  
 Routed to Pond 26P : Road Inf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs / 2  
 Peak Elev= 169.87' @ 12.07 hrs Surf.Area= 241 sf Storage= 562 cf

Plug-Flow detention time= 191.1 min calculated for 1,177 cf (68% of inflow)  
 Center-of-Mass det. time= 92.0 min ( 832.6 - 740.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	166.00'	257 cf	<b>7.00'W x 33.83'L x 4.00'H Field A</b> 947 cf Overall - 306 cf Embedded = 641 cf x 40.0% Voids
#2A	166.50'	306 cf	<b>Cultec R-360HD</b> x 8 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf
#3	167.10'	15 cf	<b>Area Drain Storage (Prismatic)</b> Listed below (Recalc)
		577 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.10	4	0	0
170.75	4	15	15

Device	Routing	Invert	Outlet Devices
#1	Primary	169.75'	<b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</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=0.49 cfs @ 12.07 hrs HW=169.87' (Free Discharge)  
 ←1=**Broad-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 0.99 fps)

**Pond INF9: H9-Inf - Chamber Wizard Field A**

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= 6.5 cf x 2 x 1 rows = 12.9 cf

8 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 31.83' Row Length +12.0" End Stone x 2 = 33.83' Base Length

1 Rows x 60.0" Wide + 12.0" Side Stone x 2 = 7.00' Base Width

6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

8 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 1 Rows = 306.1 cf Chamber Storage

947.3 cf Field - 306.1 cf Chambers = 641.3 cf Stone x 40.0% Voids = 256.5 cf Stone Storage

Chamber Storage + Stone Storage = 562.6 cf = 0.013 af

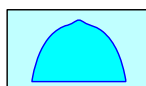
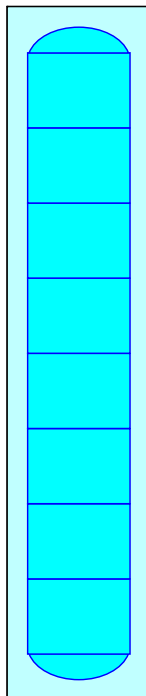
Overall Storage Efficiency = 59.4%

Overall System Size = 33.83' x 7.00' x 4.00'

8 Chambers

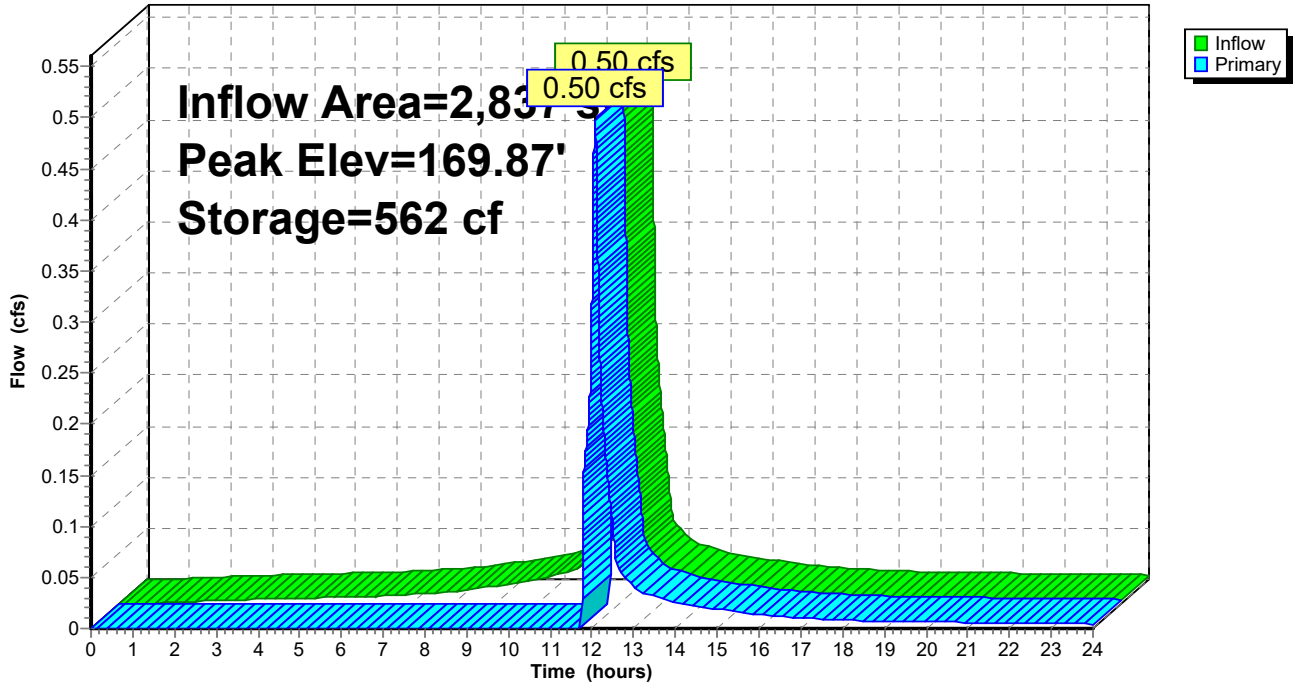
35.1 cy Field

23.8 cy Stone



Pond INF9: H9-Inf

Hydrograph





**Stage-Area-Storage for Pond INF9: H9-Inf**

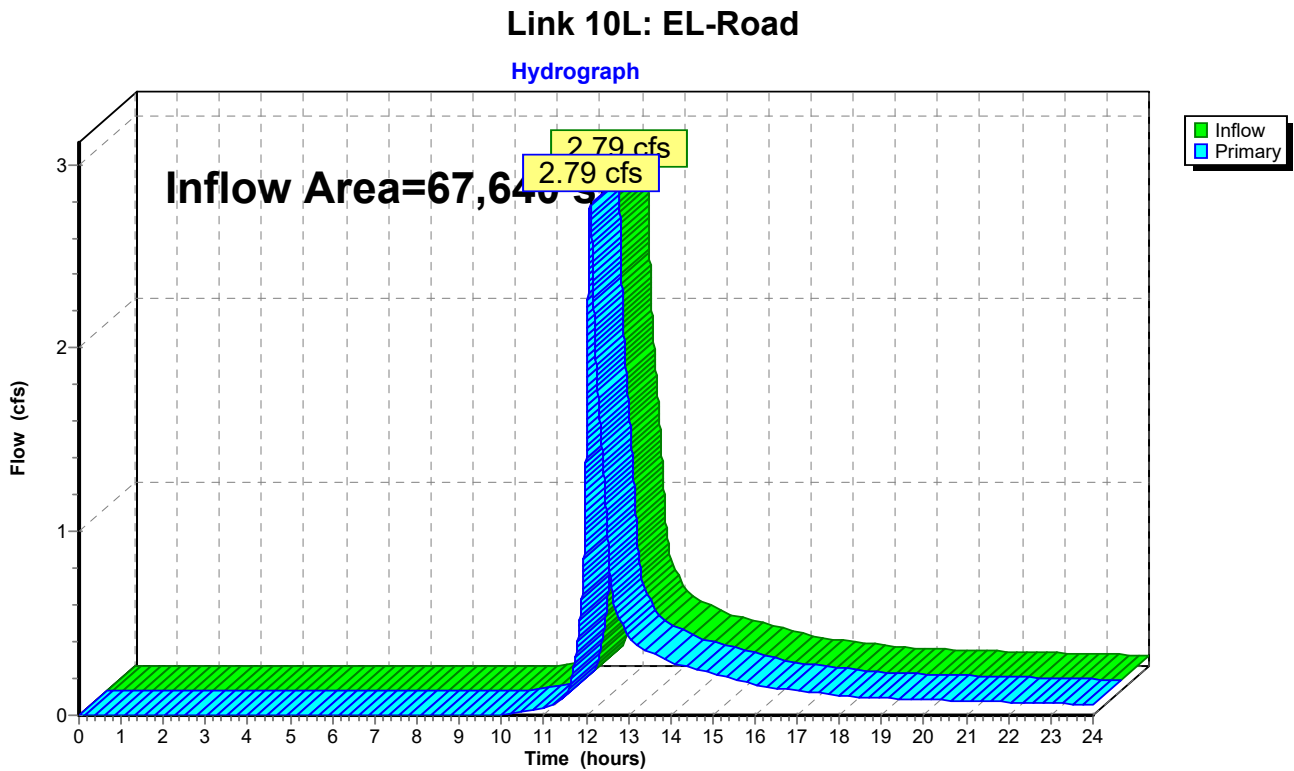
Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
166.00	0	168.65	414
166.05	5	168.70	421
166.10	9	168.75	429
166.15	14	168.80	436
166.20	19	168.85	444
166.25	24	168.90	451
166.30	28	168.95	458
166.35	33	169.00	465
166.40	38	169.05	472
166.45	43	169.10	479
166.50	47	169.15	485
166.55	56	169.20	491
166.60	65	169.25	498
166.65	74	169.30	503
166.70	83	169.35	509
166.75	92	169.40	514
166.80	101	169.45	520
166.85	110	169.50	525
166.90	118	169.55	530
166.95	127	169.60	535
167.00	136	169.65	540
167.05	145	169.70	545
167.10	154	169.75	549
167.15	162	169.80	554
167.20	171	169.85	559
167.25	180	169.90	564
167.30	189	169.95	569
167.35	198	170.00	574
167.40	207	170.05	574
167.45	215	170.10	575
167.50	224	170.15	575
167.55	233	170.20	575
167.60	242	170.25	575
167.65	250	170.30	575
167.70	259	170.35	576
167.75	267	170.40	576
167.80	276	170.45	576
167.85	284	170.50	576
167.90	293	170.55	576
167.95	301	170.60	577
168.00	310	170.65	577
168.05	318	170.70	577
168.10	326	170.75	<b>577</b>
168.15	335		
168.20	343		
168.25	351		
168.30	359		
168.35	367		
168.40	375		
168.45	383		
168.50	391		
168.55	399		
168.60	406		

WQV PROVIDED

### Summary for Link 10L: EL-Road

Inflow Area = 67,640 sf, 17.56% Impervious, Inflow Depth > 1.94" for 50-Year event  
Inflow = 2.79 cfs @ 12.10 hrs, Volume= 10,940 cf  
Primary = 2.79 cfs @ 12.10 hrs, Volume= 10,940 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 12L : EX OUT

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs



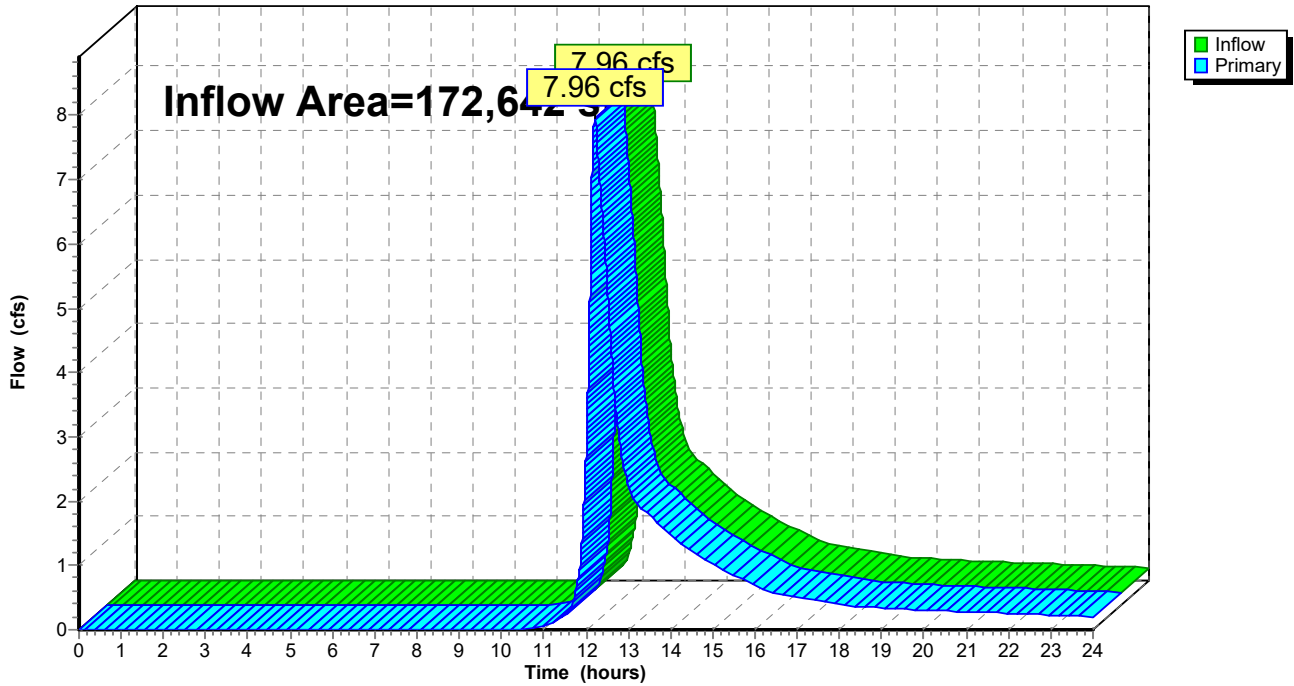
### Summary for Link 11L: PR OUT

Inflow Area = 172,642 sf, 32.64% Impervious, Inflow Depth > 2.98" for 50-Year event  
Inflow = 7.96 cfs @ 12.21 hrs, Volume= 42,900 cf  
Primary = 7.96 cfs @ 12.21 hrs, Volume= 42,900 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

### Link 11L: PR OUT

Hydrograph



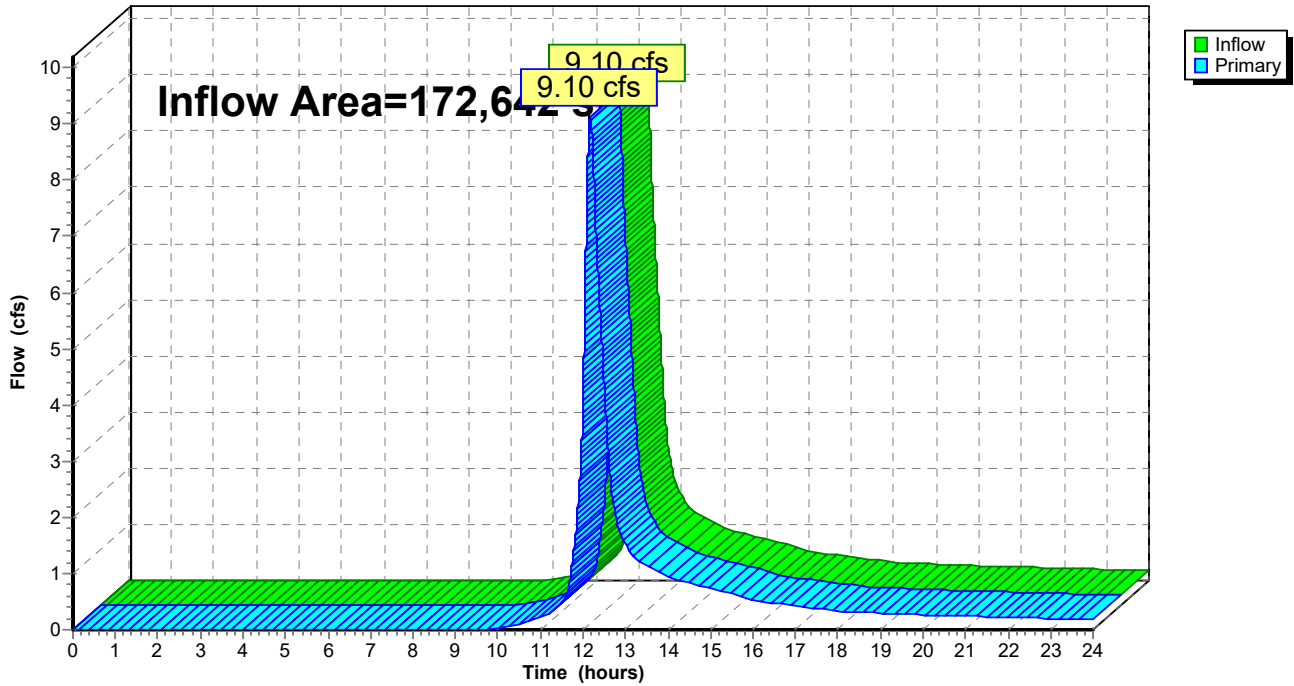
### Summary for Link 12L: EX OUT

Inflow Area = 172,642 sf, 14.52% Impervious, Inflow Depth > 2.65" for 50-Year event  
Inflow = 9.10 cfs @ 12.16 hrs, Volume= 38,118 cf  
Primary = 9.10 cfs @ 12.16 hrs, Volume= 38,118 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

### Link 12L: EX OUT

Hydrograph



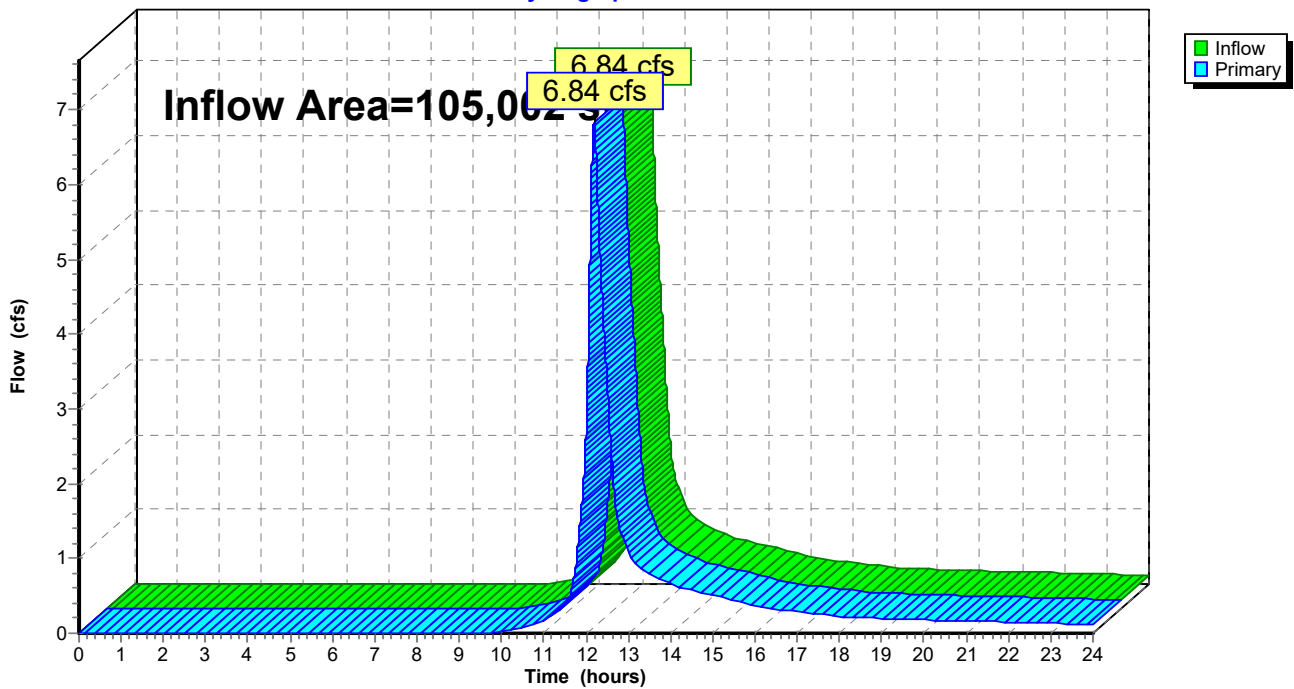
### Summary for Link 21L: EL-Stream

Inflow Area = 105,002 sf, 12.56% Impervious, Inflow Depth > 3.11" for 50-Year event  
Inflow = 6.84 cfs @ 12.19 hrs, Volume= 27,178 cf  
Primary = 6.84 cfs @ 12.19 hrs, Volume= 27,178 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 12L : EX OUT

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

### Link 21L: EL-Stream

Hydrograph



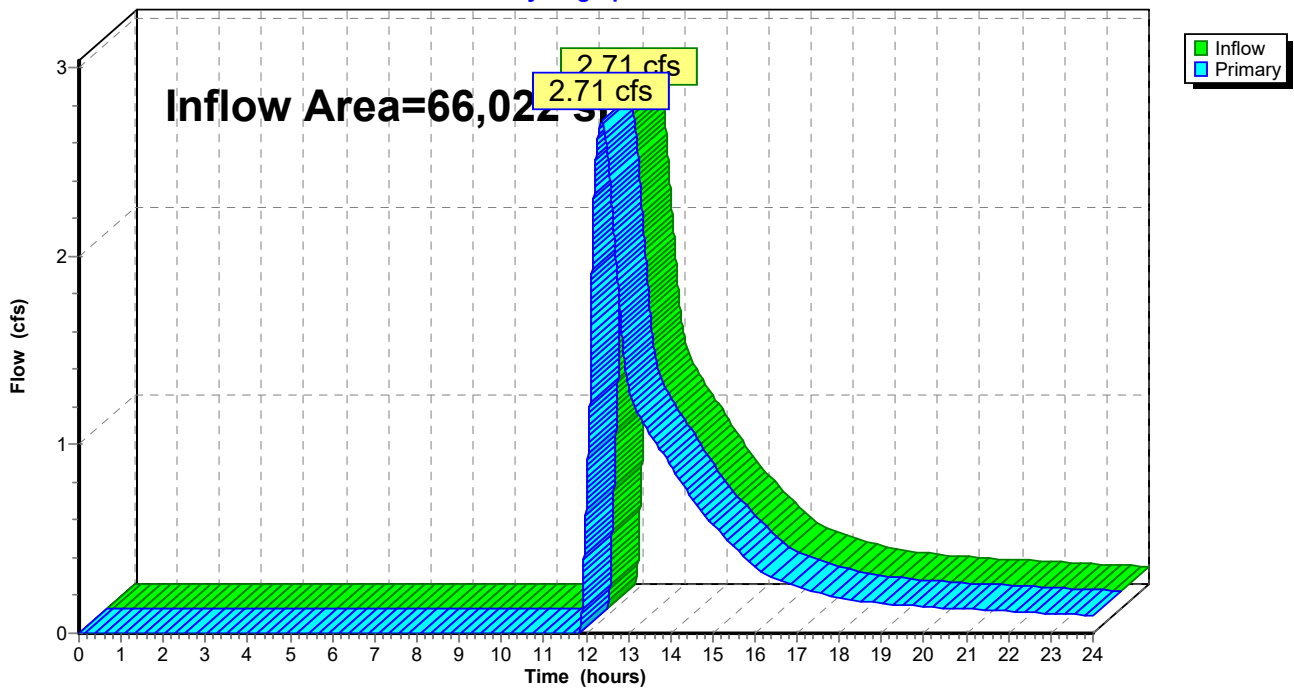
### Summary for Link 23L: PL-Road

Inflow Area = 66,022 sf, 72.65% Impervious, Inflow Depth > 3.67" for 50-Year event  
Inflow = 2.71 cfs @ 12.37 hrs, Volume= 20,180 cf  
Primary = 2.71 cfs @ 12.37 hrs, Volume= 20,180 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 11L : PR OUT

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

### Link 23L: PL-Road

Hydrograph



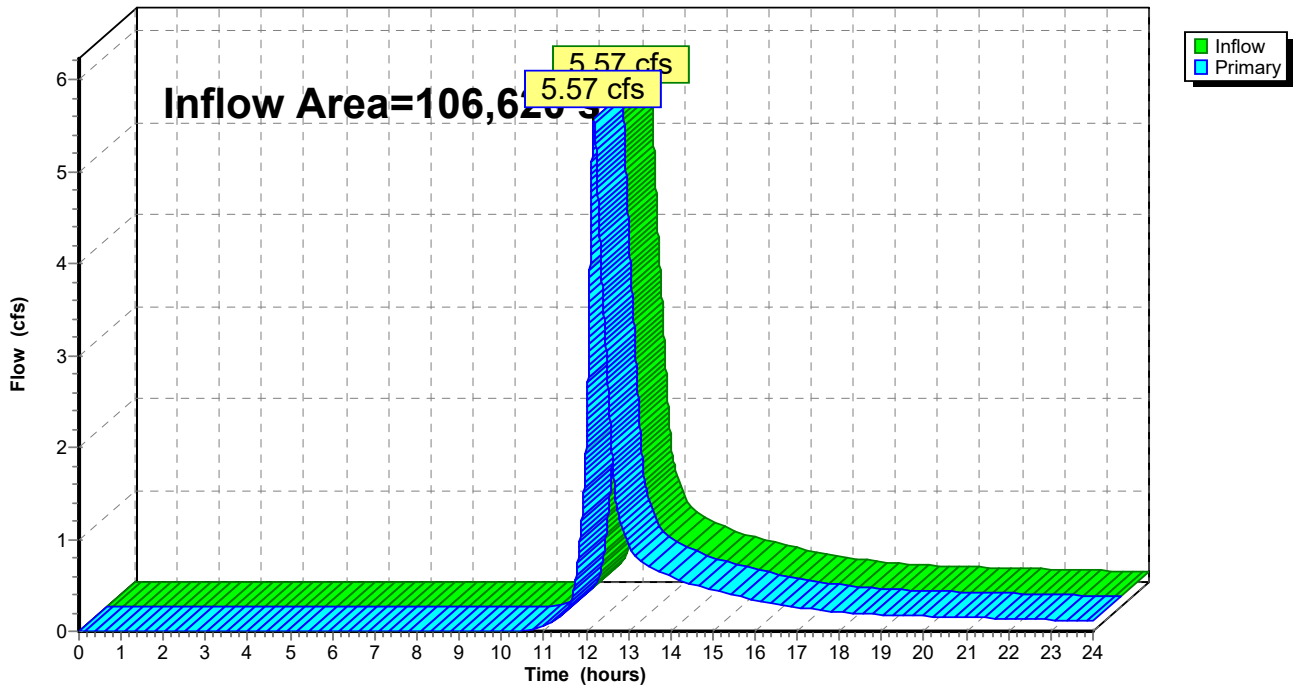
### Summary for Link 25L: PL - Stream

Inflow Area = 106,620 sf, 7.86% Impervious, Inflow Depth > 2.56" for 50-Year event  
Inflow = 5.57 cfs @ 12.18 hrs, Volume= 22,720 cf  
Primary = 5.57 cfs @ 12.18 hrs, Volume= 22,720 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 11L : PR OUT

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.001 hrs

### Link 25L: PL - Stream

Hydrograph



**9734 HydroCAD2**

Type III 24-hr 100-Year Rainfall=8.48"

Prepared by {enter your company name here}

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Time span=0.00-24.00 hrs, dt=0.001 hrs, 24001 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>Subcatchment 10S: Existing - Stream</b>	Runoff Area=105,002 sf 12.56% Impervious Runoff Depth>3.81" Flow Length=686' Tc=13.3 min CN=61.10 Runoff=8.48 cfs 33,379 cf
<b>Subcatchment 11S: Area to JB#2 to JB#1</b>	Runoff Area=32,077 sf 1.03% Impervious Runoff Depth>1.42" Tc=5.0 min CN=39.61 Runoff=0.94 cfs 3,806 cf
<b>Subcatchment 12S: Area to JB#5 to JB#4</b>	Runoff Area=24,567 sf 0.58% Impervious Runoff Depth>1.84" Tc=5.0 min CN=43.57 Runoff=1.06 cfs 3,763 cf
<b>Subcatchment 13S: Road-Inf</b>	Runoff Area=32,023 sf 82.86% Impervious Runoff Depth>7.02" Tc=5.0 min CN=87.89 Runoff=5.94 cfs 18,731 cf
<b>Subcatchment 14S: H1</b>	Runoff Area=1,330 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.26 cfs 913 cf
<b>Subcatchment 15S: H2</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.64 cfs 2,197 cf
<b>Subcatchment 16S: H3</b>	Runoff Area=1,286 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.26 cfs 882 cf
<b>Subcatchment 17S: H4</b>	Runoff Area=3,202 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.64 cfs 2,197 cf
<b>Subcatchment 18S: H5</b>	Runoff Area=1,371 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.27 cfs 941 cf
<b>Subcatchment 19S: H6</b>	Runoff Area=3,184 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.63 cfs 2,185 cf
<b>Subcatchment 20S: Existing - Lawn ROW</b>	Runoff Area=44,082 sf 8.08% Impervious Runoff Depth>1.86" Flow Length=309' Tc=9.3 min CN=43.77 Runoff=1.65 cfs 6,822 cf
<b>Subcatchment 21S: Existing - Residential</b>	Runoff Area=23,558 sf 35.28% Impervious Runoff Depth>3.67" Tc=5.0 min CN=59.82 Runoff=2.39 cfs 7,209 cf
<b>Subcatchment 22S: H7</b>	Runoff Area=1,816 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.36 cfs 1,246 cf
<b>Subcatchment 23S: H8</b>	Runoff Area=2,690 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.53 cfs 1,846 cf
<b>Subcatchment 24S: H9</b>	Runoff Area=2,837 sf 100.00% Impervious Runoff Depth>8.23" Tc=5.0 min CN=98.00 Runoff=0.56 cfs 1,947 cf
<b>Subcatchment 26S: Proposed - Bypass</b>	Runoff Area=106,620 sf 7.86% Impervious Runoff Depth>3.20" Flow Length=263' Tc=13.1 min CN=55.83 Runoff=7.11 cfs 28,451 cf



**9734 HydroCAD2**

Type III 24-hr 100-Year Rainfall=8.48"

Prepared by {enter your company name here}

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<b>Subcatchment27S: Road-Bypass</b>	Runoff Area=13,081 sf 3.92% Impervious Runoff Depth>1.63" Flow Length=110' Slope=0.0180 '/' Tc=15.5 min CN=41.64 Runoff=0.34 cfs 1,775 cf
<b>Pond 26P: Road Inf</b>	Peak Elev=162.61' Storage=10,634 cf Inflow=9.29 cfs 27,992 cf Outflow=5.97 cfs 22,896 cf
<b>Pond INF1: H1-Inf</b>	Peak Elev=166.06' Storage=505 cf Inflow=0.26 cfs 913 cf Outflow=0.20 cfs 407 cf
<b>Pond INF2: H2-Inf</b>	Peak Elev=166.30' Storage=554 cf Inflow=0.64 cfs 2,197 cf Outflow=0.63 cfs 1,657 cf
<b>Pond INF3: H3-Inf</b>	Peak Elev=170.53' Storage=595 cf Inflow=0.26 cfs 882 cf Outflow=0.05 cfs 288 cf
<b>Pond INF4: H4-Inf</b>	Peak Elev=170.95' Storage=575 cf Inflow=0.64 cfs 2,197 cf Outflow=0.63 cfs 1,623 cf
<b>Pond INF5: H5-Inf</b>	Peak Elev=171.44' Storage=595 cf Inflow=0.27 cfs 941 cf Outflow=0.09 cfs 346 cf
<b>Pond INF6: H6-Inf</b>	Peak Elev=171.65' Storage=575 cf Inflow=0.63 cfs 2,185 cf Outflow=0.63 cfs 1,610 cf
<b>Pond INF7: H7-Inf</b>	Peak Elev=172.50' Storage=595 cf Inflow=0.36 cfs 1,246 cf Outflow=0.36 cfs 652 cf
<b>Pond INF8: H8-Inf</b>	Peak Elev=170.03' Storage=575 cf Inflow=0.53 cfs 1,846 cf Outflow=0.53 cfs 1,280 cf
<b>Pond INF9: H9-Inf</b>	Peak Elev=169.89' Storage=563 cf Inflow=0.56 cfs 1,947 cf Outflow=0.56 cfs 1,397 cf
<b>Link 10L: EL-Road</b>	Inflow=3.73 cfs 14,031 cf Primary=3.73 cfs 14,031 cf
<b>Link 11L: PR OUT</b>	Inflow=13.17 cfs 53,121 cf Primary=13.17 cfs 53,121 cf
<b>Link 12L: EX OUT</b>	Inflow=11.54 cfs 47,409 cf Primary=11.54 cfs 47,409 cf
<b>Link 21L: EL-Stream</b>	Inflow=8.48 cfs 33,379 cf Primary=8.48 cfs 33,379 cf
<b>Link 23L: PL-Road</b>	Inflow=6.23 cfs 24,670 cf Primary=6.23 cfs 24,670 cf
<b>Link 25L: PL - Stream</b>	Inflow=7.11 cfs 28,451 cf Primary=7.11 cfs 28,451 cf

**Total Runoff Area = 401,928 sf Runoff Volume = 118,290 cf Average Runoff Depth = 3.53"**  
**79.63% Pervious = 320,053 sf 20.37% Impervious = 81,875 sf**

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## **Appendix G**

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Draft Operation and Maintenance Agreement

Block \_\_\_\_\_

**AGREEMENT COVENANT**

AGREEMENT made this \_\_\_\_\_ by and between \_\_\_\_\_ and the **CITY OF STAMFORD**, a municipal corporation lying within the County of Fairfield and State of Connecticut, acting herein by its duly authorized Mayor, Caroline Simmons (hereinafter referred to as the "City"), and the **ENVIRONMENTAL PROTECTION BOARD OF THE CITY OF STAMFORD**, acting herein by its duly authorized Chairman, Gary H. Stone (hereinafter referred to as the "EPB").

WITNESSETH:

WHEREAS, OWNER has commenced the planning and construction of \_\_\_\_\_ on a parcel of land owned by them and as more particularly described on Schedule "A", attached hereto and made a part hereof (the "Property").

WHEREAS, certain drainage facilities ("Drainage Facilities"), including but not limited to \_\_\_\_\_ 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 Construction Plans and \_\_\_\_\_ issued therefore, (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 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.
- 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 hereunder. A representative of the Owner shall have the right to accompany the City and/or EPB on their 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, then the CITY and/or EPB shall give written notice of said determination to the then OWNER of the Property 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, he 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 herein stated, 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 obligation.
- 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.
- 11) OWNER agrees that this covenant and restriction shall apply to and run with the land. It shall be binding on all future owners, administrators, executors, successors and assigns.
- 12) The OWNER hereby represents to the CITY and EPB that he/she 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 permit 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.

IN WITNESS WHEREOF, the said parties hereto have hereunto set their hands and seals, the day and year first above written.

WITNESSED:

\_\_\_\_\_  
\_\_\_\_\_  
**THE CITY OF STAMFORD**

BY: \_\_\_\_\_

Caroline Simmons  
Its duly authorized Mayor

\_\_\_\_\_  
\_\_\_\_\_  
**THE ENVIRONMENTAL PROTECTION BOARD**

BY: \_\_\_\_\_

Gary H. Stone  
Its duly authorized Chairman

\_\_\_\_\_  
\_\_\_\_\_  
**OWNER**

BY: \_\_\_\_\_

\_\_\_\_\_  
(Owner's Name)

(Acknowledgement on the Following Page)

STATE OF CONNECTICUT}
} ss: STAMFORD Date: \_\_\_\_\_
COUNTY OF FAIRFIELD }

Personally appeared Caroline Simmons, Mayor of the City of Stamford,
signer and sealer of the foregoing Instrument, and acknowledged the same to
be his free act and deed and the free act and deed of said City, before me.

\_\_\_\_\_  
Commissioner of the Superior
Court or Notary Public

STATE OF CONNECTICUT}
} ss: STAMFORD Date: \_\_\_\_\_
COUNTY OF FAIRFIELD }

Personally appeared Gary H. Stone, Chairman of the Environmental
Protection Board of the City of Stamford, signer and sealer of the foregoing
Instrument, and acknowledged the same to be his free act and deed and the
free act and deed of said Commission, before me.

\_\_\_\_\_  
Commissioner of the Superior Court
or Notary Public

STATE OF CONNECTICUT}
} ss: STAMFORD Date: \_\_\_\_\_
COUNTY OF FAIRFIELD }

Personally appeared \_\_\_\_\_ signer and sealer of the foregoing instrument,
and acknowledged the same to be \_\_\_\_\_ free act and deed, before me.

\_\_\_\_\_  
Commissioner of the Superior Court
or Notary Public



**SCHEDULE "A"**

**SCHEDULE "B"**

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## **Appendix G**

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DCIA Tracking Spreadsheets  
Checklist for Stormwater Management Report



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

Part 1: General Information	
Project Name	Turn of River Road Subdivision
Project Address	131 & 139 Turn of River Road and 29 Intervale Road, Stamford, CT, 06905
Project Applicant	Silver Heights Development, LLC
Date of Submittal	28-Oct-22
Tax Account Number	001-1626 / 001-1619 / 000-0598

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?	172,642 ft <sup>2</sup>
3. What is the total area of land disturbance for this project?	136,866 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?	21,643 ft <sup>2</sup>
6. Will the proposed development increase <u>DCIA</u> (without consideration of proposed stormwater management)? (Yes/No)	Yes
7. What is the <u>proposed-development total impervious area</u> for the site?	52,925 ft <sup>2</sup>

Part 3: Water Quality Target Total	
Does Standard 1 apply based on information above?	Yes
Water Quality Volume (WQV)	4688.7 ft <sup>3</sup>
Standard 1 requirement	Retain WQV on-site
Required retention volume	4688.7 ft <sup>3</sup>
Provided retention volume for proposed development	8,753.0 ft <sup>3</sup>

Part 4: Proposed DCIA Tracking	
Pre-development <u>total impervious area</u>	21,643 ft <sup>2</sup>
Current <u>DCIA</u>	21,643 ft <sup>2</sup>
Proposed-development <u>total impervious area</u>	52,925 ft <sup>2</sup>
Proposed-development <u>DCIA</u> (after stormwater management)	5,607 ft <sup>2</sup>
Net change in <u>DCIA</u> from pre-development to proposed-development	-16,036 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) <u>DCIA</u> (after stormwater management)	ft <sup>2</sup>
Net change in <u>DCIA</u> 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 Oct. 28, 2022 Engineer's Seal





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

**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**

	Show and label limits of inland wetlands, tidal wetlands and any associated setbacks.
	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.
	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
	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
N/A	Flood hazard areas

	<b><u>Applying under "Lite" Stormwater Management: Skip to Section I</u></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

N/A	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

N/A	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
	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
	Conveyance protection, emergency outlet sizing
	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

	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>
N/A	Detention facilities (outlet structure, stage/storage, freeboard)
	Emergency outlet sizing, safely pass the 100 year storm, Standard 2D
	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

N/A	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
	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

N/A	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
	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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 Engineering Bureau  
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 Phone 203-977-4189

**V. Proposed LID Review Map**

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

**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**

N/A

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