

**Stormwater Management Report  
Prime Material Recovery  
444 Nutmeg Road  
South Windsor, Connecticut**

Prepared by:

**Design Professionals, Inc.  
21 Jeffrey Drive  
South Windsor, CT 06074**

October 3, 2022



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## **Introduction**

Prime Materials Recovery is proposing site improvements to a tract of land comprised of two properties located at 410 Governor's Highway and 444 Nutmeg Road, South Windsor, CT 06074. The properties are referenced on the Town of South Windsor Tax Assessors map as GIS#: 36900410 and 65100444, respectively. The proposed site improvements will include the construction of a new 29,600 SF building addition to their existing facility. Associated site improvements will include but not be limited to: new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's.

The total combined tract area is 36.36 acres. 3.60± acres of this area are proposed to be disturbed during construction. For more information, please refer to the plans entitled "Prime Materials Recovery ~ Site Plan Modification ~ 410 Governor's Highway & 444 Nutmeg Road ~ South Windsor, CT ~ GIS#: 36900410 & 65100444" prepared by Design Professionals, Inc., and dated October 03, 2022, as amended.

## **Pre-Development Site Conditions**

Apart from the existing develop area to be modified for the building addition, the existing surficial characteristics of 444 Nutmeg Road to be improved can be primarily classified as paved area for the northern portion of the site with woods and grass covering the southern strip adjacent to Govenors Highway and abutting property 400 Nutmeg Road. For 410 Governor's Highway, the existing surficial characteristic is woodland. Review of the site topography indicated all stormwater runoff generated across the tract would flow to one of four design points. These four design points were identified as follows:

1. **Design Point #1 (DP#1):** Flow to wetlands via a 30" RCP
2. **Design Point #2 (DP#2):** Flow offsite to 400 Nutmeg Road
3. **Design Point #3 (DP#3):** Flow south to existing system of catchment system in Governor's Highway
4. **Design Point #4 (DP#4):** Flow north to an existing wetland pocket.

The wetland pocket via a 30" RCP, neighboring catch basins, flow to Governor's Highway, and the wetland pocket north of the site were selected as design points for our drainage analysis. Flow to Governor's Highway (DP#3) ultimately drains to The Newberry Brook and is a part of local basin ID 4000-21-1. All other design point ultimately drains to The Stoughton Brook and is a part of local basin ID 4000-18-1. Existing conditions watershed delineations are identified in the Existing Conditions Drainage Map located in **Appendix G**. Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, soil types A, B, C, & D are located on site. See **Appendix C** for The NRCS Soil Map & Data.

An evaluation was performed to quantify the peak rate of stormwater discharge offsite to the design points identified. The Natural Resources Conservation Service's TR-55 Manual was followed in predicting the peak rates of runoff and volumes. HydroCAD computer modeling software was utilized.

Peak rates of stormwater runoff were evaluated for the 2-, 10-, 25-, 50- and 100-year storm events. Rainfall data from NOAA Atlas 14 Point Frequency Estimates was used to generate storm conditions. NOAA Atlas 14 rainfall data is included in **Appendix D** for reference. For more information, please refer to the enclosed Pre-Development Drainage HydroCAD Report located in **Appendix A**.

## **Post-Development Site Conditions**

The proposed site improvements will include the construction of a new 29,600± SF building addition to their existing facility. Associated site improvements will include but not be limited to: new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's. A proposed detention basin, water quality basin, and concrete leakoffs were designed to attenuate stormwater discharge in the proposed site conditions and ensure that peak rates offsite are less than or equal to the existing site conditions.

See **Appendix B** for the Post Development Condition and Pond summary HydroCAD reports. The Proposed Conditions Drainage Map for the site can be found in **Appendix G**.

## **Analysis of Results**

The pre-development and post-development conditions were analyzed using HydroCAD consistent with National Resource Conservation Service (NRCS) hydrology methods. One discharge location (**Design Point #1**) was identified as a point of interest for assessing downstream effects. The following table contains the data generated from the HydroCAD software:

| Reach                                                  |      | 2 year | 10 year | 25 year | 50 year | 100 year |
|--------------------------------------------------------|------|--------|---------|---------|---------|----------|
| DP#1 – 30" RCP to Wetlands                             | Pre  | 3.92   | 4.67    | 5.02    | 5.26    | 5.5      |
|                                                        | Post | 3.87   | 4.61    | 4.95    | 5.18    | 5.41     |
|                                                        | Net  | -0.05  | -0.06   | -0.07   | -0.08   | -0.09    |
| DP#2 – Flow to Governor's Highway                      | Pre  | 0.81   | 4.46    | 6.82    | 8.56    | 10.54    |
|                                                        | Post | 0.45   | 3.51    | 5.43    | 6.81    | 8.34     |
|                                                        | Net  | -0.36  | -0.95   | -1.39   | -1.75   | -2.2     |
| DP#3 – Flow to 400 Governor's Highway Catchment System | Pre  | 0.56   | 1.57    | 2.3     | 2.85    | 3.48     |
|                                                        | Post | 0.60   | 1.66    | 2.43    | 3.01    | 3.68     |
|                                                        | Net  | 0.04   | 0.09    | 0.13    | 0.16    | 0.2      |
| DP#4 – Flow to Wetland Pocket                          | Pre  | 0.93   | 1.86    | 2.45    | 2.89    | 3.37     |
|                                                        | Post | 0.85   | 1.74    | 2.31    | 2.73    | 3.2      |
|                                                        | Net  | -0.08  | -0.12   | -0.14   | -0.16   | -0.17    |
| Overall Site                                           | Pre  | 6.22   | 12.56   | 16.59   | 19.56   | 22.89    |
|                                                        | Post | 5.81   | 11.58   | 15.18   | 17.8    | 20.7     |
|                                                        | Net  | -0.41  | -0.98   | -1.41   | -1.76   | -2.19    |

As seen in the table above, most of the storm events evaluated for the subject project will result in peak runoff rates in the proposed condition that are less than the peak runoff rates of the existing condition for 2-, 10-, 25-, 50- and 100-year design storms. There was an observed increase for all year storm events for DP#3. This increase to DP#3 is offset by reductions in the peak flow to DP#1, 2, & 4, providing a total net reduction in flow for the entire site. It is our opinion that these increases are negligible and will not cause detrimental impacts downstream.

### **Storm Sewer Collection System**

The proposed subsurface stormwater collection and conveyance system was designed to adequately convey proposed runoff under 10- year storm event conditions. The design of the storm sewers followed the guidelines set forth in the Connecticut Department of Transportation's Drainage Manual. It is estimated that during a 10-year storm event, all proposed subsurface culverts will convey storm runoff without resulting in any unacceptable flooding conditions. Storm Sewer calculation are included as **Appendix E** of this report.

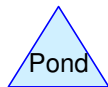
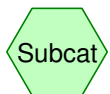
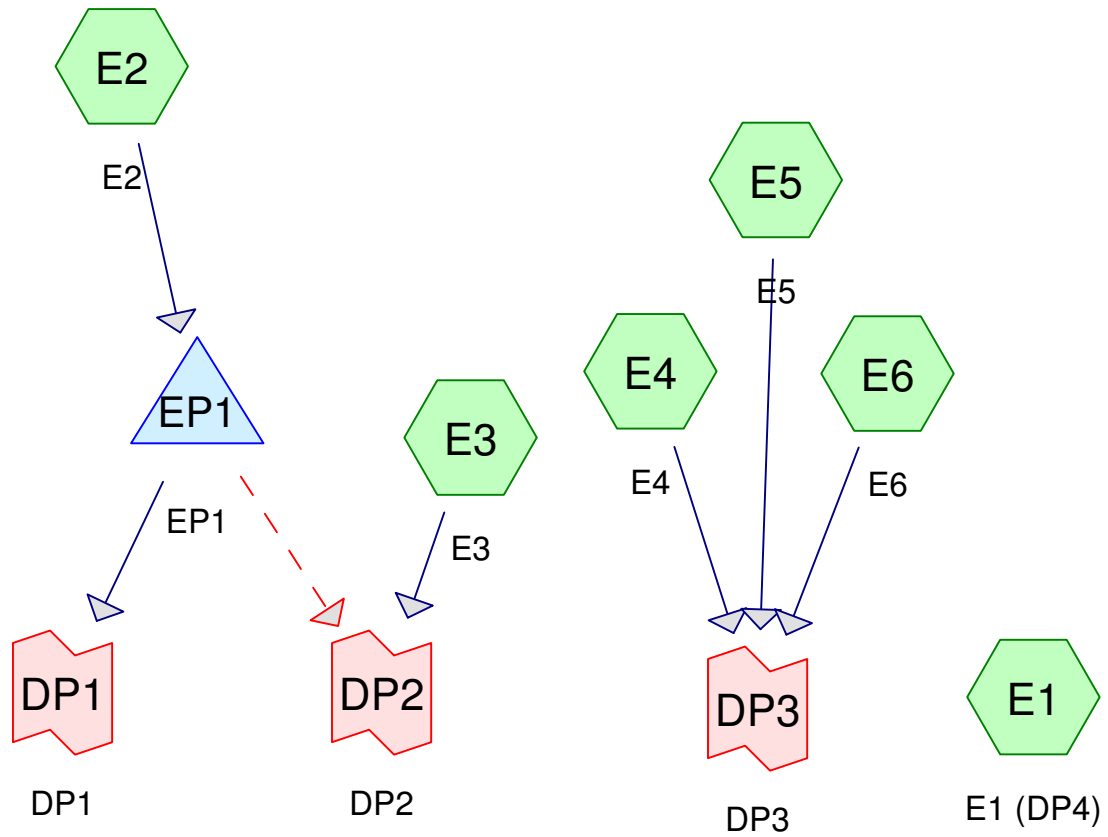
### **Water Quality**

The proposed water quality basin and forebays were sized to treat a 1" rain event as recommended in the 2004 Connecticut Stormwater Quality Manual. The proposed forebay was sized to store over 10% of this water quality volume as recommended by the 2004 Connecticut Stormwater Quality Manual. Water Quality Volume calculations and basin stage storage tables are included as **Appendix F** of this report.

### **Conclusion**

The proposed stormwater management system as discussed herein and shown on the referenced plans is appropriate for the proposed development on the subject site and should not pose any detrimental impacts to the environment.

**APPENDIX A**  
**Watershed Computations**  
**(Pre-Development Drainage HydroCAD Report)**



**2509.P HydroCAD**

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Existing Conditions  
Type III 24-hr 2-Year Rainfall=3.11"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: E1 (DP4)**

Runoff Area=56,484 sf 63.89% Impervious Runoff Depth=1.61"  
Flow Length=323' Tc=63.4 min CN=84 Runoff=0.93 cfs 0.174 af

**Subcatchment E2: E2**

Runoff Area=181,289 sf 68.30% Impervious Runoff Depth=2.00"  
Flow Length=795' Tc=42.3 min CN=89 Runoff=4.66 cfs 0.693 af

**Subcatchment E3: E3**

Runoff Area=32,192 sf 0.00% Impervious Runoff Depth=0.73"  
Flow Length=185' Tc=49.6 min CN=69 Runoff=0.24 cfs 0.045 af

**Subcatchment E4: E4**

Runoff Area=15,940 sf 32.15% Impervious Runoff Depth=0.87"  
Flow Length=204' Tc=19.3 min CN=72 Runoff=0.23 cfs 0.027 af

**Subcatchment E5: E5**

Runoff Area=18,292 sf 32.63% Impervious Runoff Depth=0.93"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=0.29 cfs 0.032 af

**Subcatchment E6: E6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=0.78"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=0.31 cfs 0.076 af

**Pond EP1: EP1**

Peak Elev=73.94' Storage=2,270 cf Inflow=4.66 cfs 0.693 af  
Primary=3.92 cfs 0.683 af Secondary=0.58 cfs 0.011 af Outflow=4.49 cfs 0.693 af

**Link DP1: DP1**

Inflow=3.92 cfs 0.683 af  
Primary=3.92 cfs 0.683 af

**Link DP2: DP2**

Inflow=0.81 cfs 0.056 af  
Primary=0.81 cfs 0.056 af

**Link DP3: DP3**

Inflow=0.56 cfs 0.135 af  
Primary=0.56 cfs 0.135 af

**Total Runoff Area = 8.159 ac Runoff Volume = 1.047 af Average Runoff Depth = 1.54"**  
**51.02% Pervious = 4.163 ac 48.98% Impervious = 3.996 ac**

**2509.P HydroCAD**

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Existing Conditions  
Type III 24-hr 10-Year Rainfall=4.94"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: E1 (DP4)**

Runoff Area=56,484 sf 63.89% Impervious Runoff Depth=3.22"  
Flow Length=323' Tc=63.4 min CN=84 Runoff=1.86 cfs 0.347 af

**Subcatchment E2: E2**

Runoff Area=181,289 sf 68.30% Impervious Runoff Depth=3.71"  
Flow Length=795' Tc=42.3 min CN=89 Runoff=8.51 cfs 1.288 af

**Subcatchment E3: E3**

Runoff Area=32,192 sf 0.00% Impervious Runoff Depth=1.91"  
Flow Length=185' Tc=49.6 min CN=69 Runoff=0.71 cfs 0.118 af

**Subcatchment E4: E4**

Runoff Area=15,940 sf 32.15% Impervious Runoff Depth=2.15"  
Flow Length=204' Tc=19.3 min CN=72 Runoff=0.62 cfs 0.066 af

**Subcatchment E5: E5**

Runoff Area=18,292 sf 32.63% Impervious Runoff Depth=2.23"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=0.76 cfs 0.078 af

**Subcatchment E6: E6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=1.99"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=0.87 cfs 0.195 af

**Pond EP1: EP1**

Peak Elev=74.04' Storage=2,824 cf Inflow=8.51 cfs 1.288 af  
Primary=4.67 cfs 1.122 af Secondary=3.78 cfs 0.166 af Outflow=8.45 cfs 1.288 af

**Link DP1: DP1**

Inflow=4.67 cfs 1.122 af  
Primary=4.67 cfs 1.122 af

**Link DP2: DP2**

Inflow=4.46 cfs 0.284 af  
Primary=4.46 cfs 0.284 af

**Link DP3: DP3**

Inflow=1.57 cfs 0.339 af  
Primary=1.57 cfs 0.339 af

**Total Runoff Area = 8.159 ac Runoff Volume = 2.092 af Average Runoff Depth = 3.08"**  
**51.02% Pervious = 4.163 ac 48.98% Impervious = 3.996 ac**

**2509.P HydroCAD**

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Existing Conditions  
Type III 24-hr 25-Year Rainfall=6.08"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: E1 (DP4)**

Runoff Area=56,484 sf 63.89% Impervious Runoff Depth=4.27"  
Flow Length=323' Tc=63.4 min CN=84 Runoff=2.45 cfs 0.462 af

**Subcatchment E2: E2**

Runoff Area=181,289 sf 68.30% Impervious Runoff Depth=4.81"  
Flow Length=795' Tc=42.3 min CN=89 Runoff=10.91 cfs 1.669 af

**Subcatchment E3: E3**

Runoff Area=32,192 sf 0.00% Impervious Runoff Depth=2.78"  
Flow Length=185' Tc=49.6 min CN=69 Runoff=1.04 cfs 0.171 af

**Subcatchment E4: E4**

Runoff Area=15,940 sf 32.15% Impervious Runoff Depth=3.06"  
Flow Length=204' Tc=19.3 min CN=72 Runoff=0.89 cfs 0.093 af

**Subcatchment E5: E5**

Runoff Area=18,292 sf 32.63% Impervious Runoff Depth=3.16"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=1.09 cfs 0.110 af

**Subcatchment E6: E6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=2.87"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=1.29 cfs 0.281 af

**Pond EP1: EP1**

Peak Elev=74.08' Storage=3,102 cf Inflow=10.91 cfs 1.669 af  
Primary=5.02 cfs 1.373 af Secondary=5.81 cfs 0.297 af Outflow=10.83 cfs 1.669 af

**Link DP1: DP1**

Inflow=5.02 cfs 1.373 af  
Primary=5.02 cfs 1.373 af

**Link DP2: DP2**

Inflow=6.82 cfs 0.467 af  
Primary=6.82 cfs 0.467 af

**Link DP3: DP3**

Inflow=2.30 cfs 0.485 af  
Primary=2.30 cfs 0.485 af

**Total Runoff Area = 8.159 ac Runoff Volume = 2.786 af Average Runoff Depth = 4.10"**  
**51.02% Pervious = 4.163 ac 48.98% Impervious = 3.996 ac**

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Existing Conditions  
Type III 24-hr 50-Year Rainfall=6.91"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: E1 (DP4)**

Runoff Area=56,484 sf 63.89% Impervious Runoff Depth=5.05"  
Flow Length=323' Tc=63.4 min CN=84 Runoff=2.89 cfs 0.546 af

**Subcatchment E2: E2**

Runoff Area=181,289 sf 68.30% Impervious Runoff Depth=5.62"  
Flow Length=795' Tc=42.3 min CN=89 Runoff=12.64 cfs 1.949 af

**Subcatchment E3: E3**

Runoff Area=32,192 sf 0.00% Impervious Runoff Depth=3.44"  
Flow Length=185' Tc=49.6 min CN=69 Runoff=1.30 cfs 0.212 af

**Subcatchment E4: E4**

Runoff Area=15,940 sf 32.15% Impervious Runoff Depth=3.75"  
Flow Length=204' Tc=19.3 min CN=72 Runoff=1.10 cfs 0.114 af

**Subcatchment E5: E5**

Runoff Area=18,292 sf 32.63% Impervious Runoff Depth=3.86"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=1.34 cfs 0.135 af

**Subcatchment E6: E6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=3.54"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=1.60 cfs 0.347 af

**Pond EP1: EP1**

Peak Elev=74.11' Storage=3,293 cf Inflow=12.64 cfs 1.949 af  
Primary=5.26 cfs 1.549 af Secondary=7.31 cfs 0.400 af Outflow=12.57 cfs 1.949 af

**Link DP1: DP1**

Inflow=5.26 cfs 1.549 af  
Primary=5.26 cfs 1.549 af

**Link DP2: DP2**

Inflow=8.56 cfs 0.612 af  
Primary=8.56 cfs 0.612 af

**Link DP3: DP3**

Inflow=2.85 cfs 0.596 af  
Primary=2.85 cfs 0.596 af

**Total Runoff Area = 8.159 ac Runoff Volume = 3.304 af Average Runoff Depth = 4.86"**  
**51.02% Pervious = 4.163 ac 48.98% Impervious = 3.996 ac**

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Existing Conditions  
Type III 24-hr 100-Year Rainfall=7.84"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E1: E1 (DP4)**

Runoff Area=56,484 sf 63.89% Impervious Runoff Depth=5.94"  
Flow Length=323' Tc=63.4 min CN=84 Runoff=3.37 cfs 0.642 af

**Subcatchment E2: E2**

Runoff Area=181,289 sf 68.30% Impervious Runoff Depth=6.53"  
Flow Length=795' Tc=42.3 min CN=89 Runoff=14.58 cfs 2.265 af

**Subcatchment E3: E3**

Runoff Area=32,192 sf 0.00% Impervious Runoff Depth=4.21"  
Flow Length=185' Tc=49.6 min CN=69 Runoff=1.60 cfs 0.260 af

**Subcatchment E4: E4**

Runoff Area=15,940 sf 32.15% Impervious Runoff Depth=4.55"  
Flow Length=204' Tc=19.3 min CN=72 Runoff=1.34 cfs 0.139 af

**Subcatchment E5: E5**

Runoff Area=18,292 sf 32.63% Impervious Runoff Depth=4.67"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=1.62 cfs 0.163 af

**Subcatchment E6: E6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=4.33"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=1.97 cfs 0.424 af

**Pond EP1: EP1**

Peak Elev=74.14' Storage=3,492 cf Inflow=14.58 cfs 2.265 af  
Primary=5.50 cfs 1.742 af Secondary=9.00 cfs 0.522 af Outflow=14.50 cfs 2.265 af

**Link DP1: DP1**

Inflow=5.50 cfs 1.742 af  
Primary=5.50 cfs 1.742 af

**Link DP2: DP2**

Inflow=10.54 cfs 0.782 af  
Primary=10.54 cfs 0.782 af

**Link DP3: DP3**

Inflow=3.48 cfs 0.726 af  
Primary=3.48 cfs 0.726 af

**Total Runoff Area = 8.159 ac Runoff Volume = 3.892 af Average Runoff Depth = 5.72"**  
**51.02% Pervious = 4.163 ac 48.98% Impervious = 3.996 ac**

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Existing Conditions

Type III 24-hr 2-Year Rainfall=3.11"

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**Summary for Subcatchment E1: E1 (DP4)**

Runoff = 0.93 cfs @ 12.89 hrs, Volume= 0.174 af, Depth= 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 2,051     | 74 | >75% Grass cover, Good, HSG C   |
| 24,104    | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 7,863   | 98 | Paved parking, HSG B/D          |
| 4,120     | 98 | Paved parking, HSG C            |
| 4,313     | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 12,549  | 66 | Woods, Good, HSG B/D            |
| 1,484     | 70 | Woods, Good, HSG C              |
| 56,484    | 84 | Weighted Average                |
| 20,397    |    | 36.11% Pervious Area            |
| 36,087    |    | 63.89% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                        |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------------------------------------|
| 25.8        | 100              | 0.0047           | 0.06                 |                   | <b>Sheet Flow, Grass Sheet Flow</b><br>Grass: Dense n= 0.240 P2= 3.11"             |
| 0.5         | 30               | 0.0184           | 0.95                 |                   | <b>Shallow Concentrated Flow, Grass Shallow</b><br>Short Grass Pasture Kv= 7.0 fps |
| 37.1        | 193              | 0.0003           | 0.09                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps       |
| 63.4        | 323              | Total            |                      |                   |                                                                                    |

## 2509.P HydroCAD

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Existing Conditions

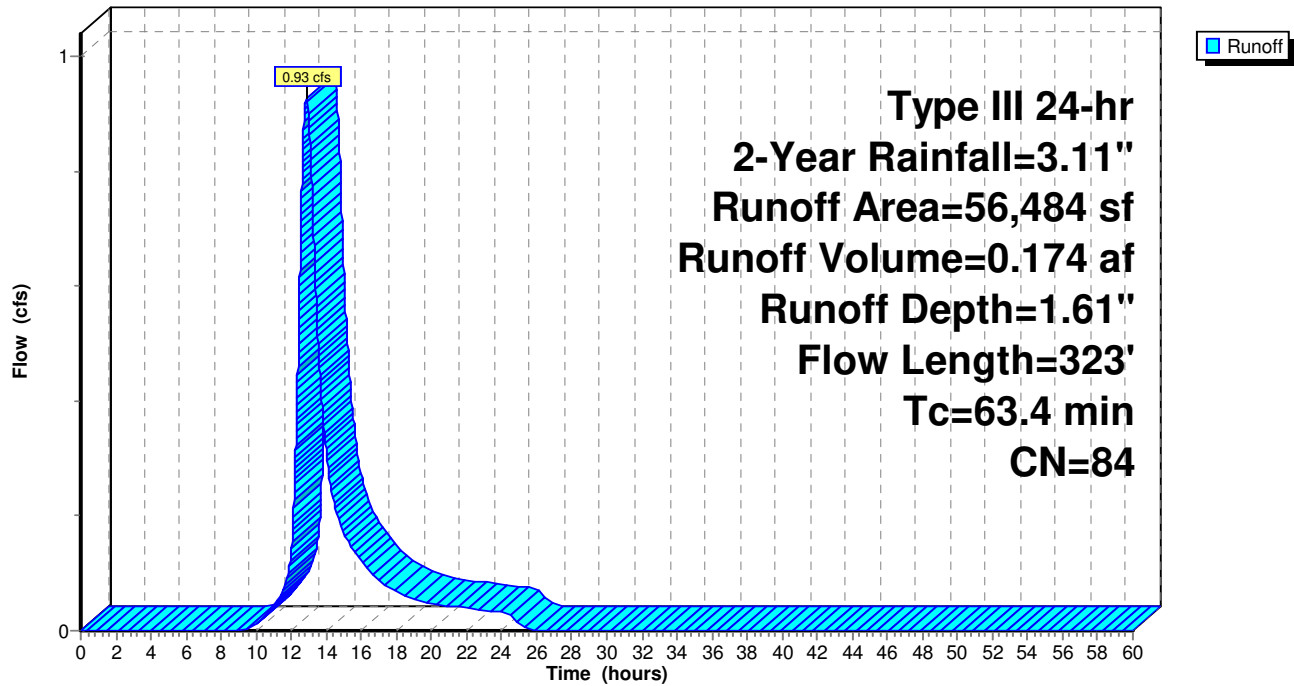
Type III 24-hr 2-Year Rainfall=3.11"

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### Subcatchment E1: E1 (DP4)

Hydrograph



**2509.P HydroCAD**

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Existing Conditions

Type III 24-hr 2-Year Rainfall=3.11"

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**Summary for Subcatchment E2: E2**

Runoff = 4.66 cfs @ 12.55 hrs, Volume= 0.693 af, Depth= 2.00"  
 Routed to Pond EP1 : EP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 14,877  | 71 | >75% Grass cover, Good, HSG B/D |
| 12,913    | 74 | >75% Grass cover, Good, HSG C   |
| 1,215     | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 12,802  | 98 | Paved parking, HSG B/D          |
| 109,808   | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 4,540   | 66 | Woods, Good, HSG B/D            |
| 25,134    | 70 | Woods, Good, HSG C              |
| 181,289   | 89 | Weighted Average                |
| 57,464    |    | 31.70% Pervious Area            |
| 123,825   |    | 68.30% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                               |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------|
| 29.4     | 100           | 0.0379        | 0.06              |                | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|          |               |               |                   |                | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 8.0      | 24            | 0.0001        | 0.05              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                                      |
| 3.1      | 85            | 0.0005        | 0.45              |                | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                        |
| 1.8      | 586           | 0.1303        | 5.41              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b>      |
|          |               |               |                   |                | Grassed Waterway Kv= 15.0 fps                             |
| 42.3     | 795           | Total         |                   |                |                                                           |

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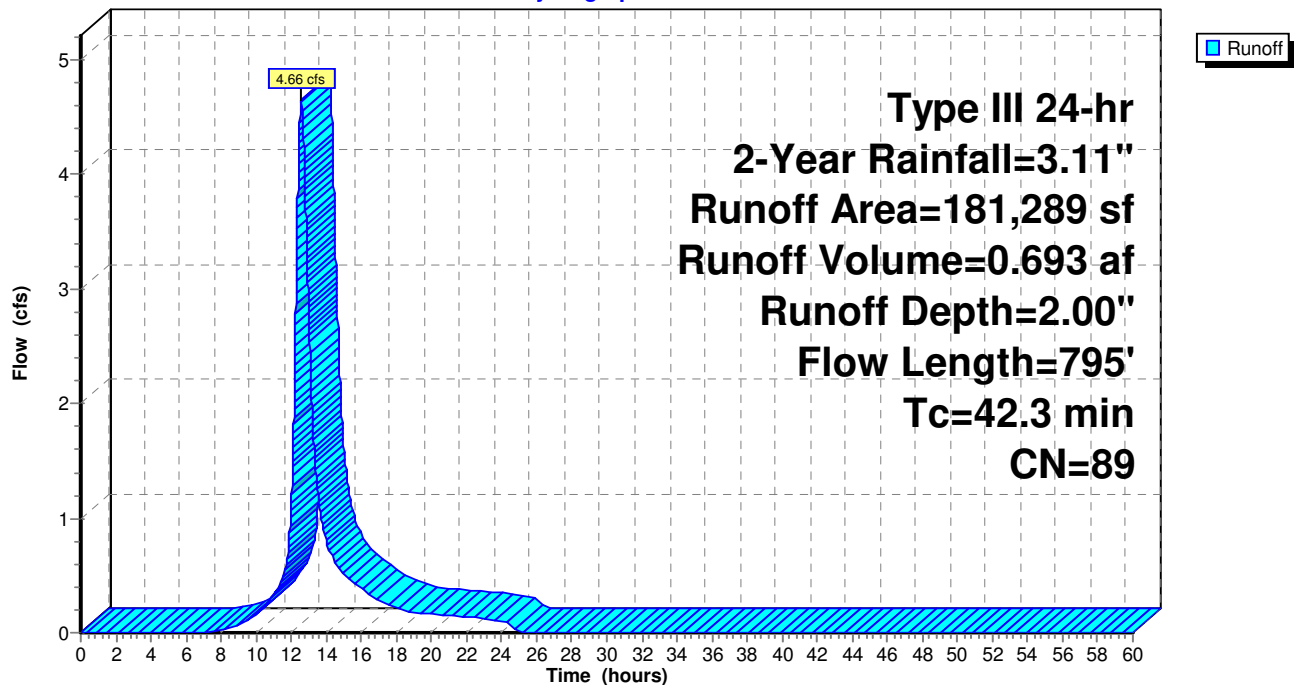
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### Subcatchment E2: E2

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**Summary for Subcatchment E3: E3**

Runoff = 0.24 cfs @ 12.78 hrs, Volume= 0.045 af, Depth= 0.73"  
 Routed to Link DP2 : DP2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 23        | 61 | >75% Grass cover, Good, HSG B   |
| * 203     | 71 | >75% Grass cover, Good, HSG B/D |
| 245       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 237       | 55 | Woods, Good, HSG B              |
| * 6,562   | 66 | Woods, Good, HSG B/D            |
| 24,922    | 70 | Woods, Good, HSG C              |
| 32,192    | 69 | Weighted Average                |
| 32,192    |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 43.7     | 100           | 0.0140        | 0.04              |                | <b>Sheet Flow, Woods Sheet Flow</b>                  |
|          |               |               |                   |                | Woods: Dense underbrush n= 0.800 P2= 3.11"           |
| 5.8      | 70            | 0.0016        | 0.20              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b> |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                                 |
| 0.1      | 15            | 0.0510        | 3.39              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b> |
|          |               |               |                   |                | Grassed Waterway Kv= 15.0 fps                        |
| 49.6     | 185           | Total         |                   |                |                                                      |

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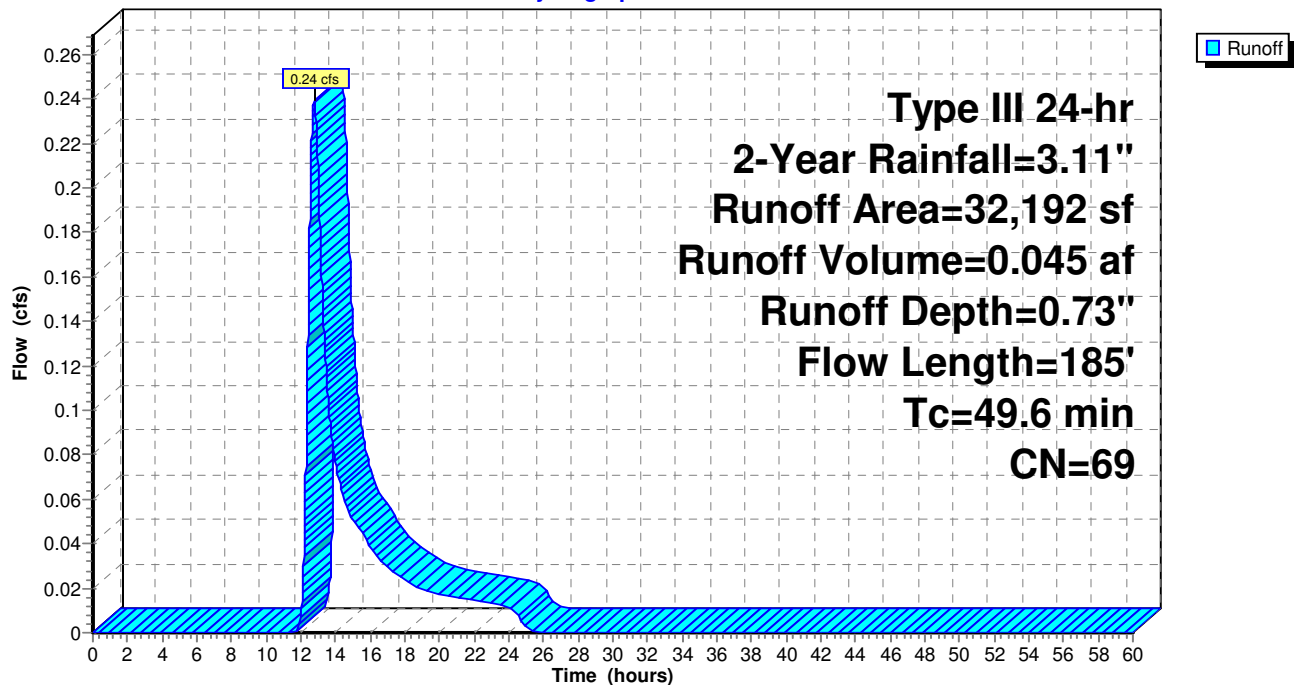
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### Subcatchment E3: E3

Hydrograph



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**Summary for Subcatchment E4: E4**

Runoff = 0.23 cfs @ 12.29 hrs, Volume= 0.027 af, Depth= 0.87"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 845       | 61 | >75% Grass cover, Good, HSG B   |
| * | 0         | 71 | >75% Grass cover, Good, HSG B/D |
|   | 104       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 5,124     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 0         | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 6,563     | 55 | Woods, Good, HSG B              |
| * | 0         | 66 | Woods, Good, HSG B/D            |
|   | 3,304     | 70 | Woods, Good, HSG C              |
|   | 15,940    | 72 | Weighted Average                |
|   | 10,816    |    | 67.85% Pervious Area            |
|   | 5,124     |    | 32.15% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 17.9        | 75               | 0.0739           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 0.4         | 15               | 0.0056           | 0.56                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Smooth surfaces n= 0.011 P2= 3.11"                        |
| 1.0         | 114              | 0.0080           | 1.82                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 19.3        | 204              | Total            |                      |                   |                                                           |

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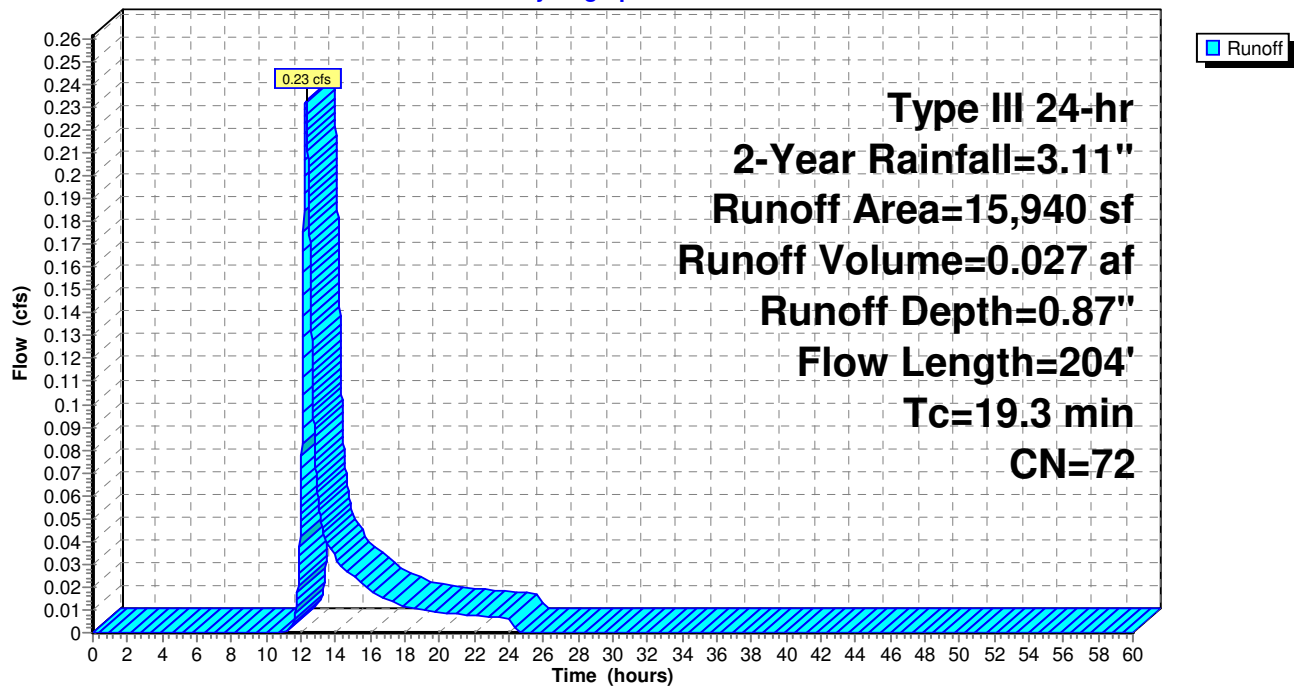
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### Subcatchment E4: E4

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**Summary for Subcatchment E5: E5**

Runoff = 0.29 cfs @ 12.27 hrs, Volume= 0.032 af, Depth= 0.93"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 3,677     | 61 | >75% Grass cover, Good, HSG B   |
| * | 0         | 71 | >75% Grass cover, Good, HSG B/D |
|   | 195       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 5,968     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 0         | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 4,836     | 55 | Woods, Good, HSG B              |
| * | 0         | 66 | Woods, Good, HSG B/D            |
|   | 3,616     | 70 | Woods, Good, HSG C              |
|   | 18,292    | 73 | Weighted Average                |
|   | 12,324    |    | 67.37% Pervious Area            |
|   | 5,968     |    | 32.63% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 14.9        | 65               | 0.0871           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 0.7         | 35               | 0.0113           | 0.87                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Smooth surfaces n= 0.011 P2= 3.11"                        |
| 2.5         | 224              | 0.0055           | 1.51                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 18.1        | 324              | Total            |                      |                   |                                                           |

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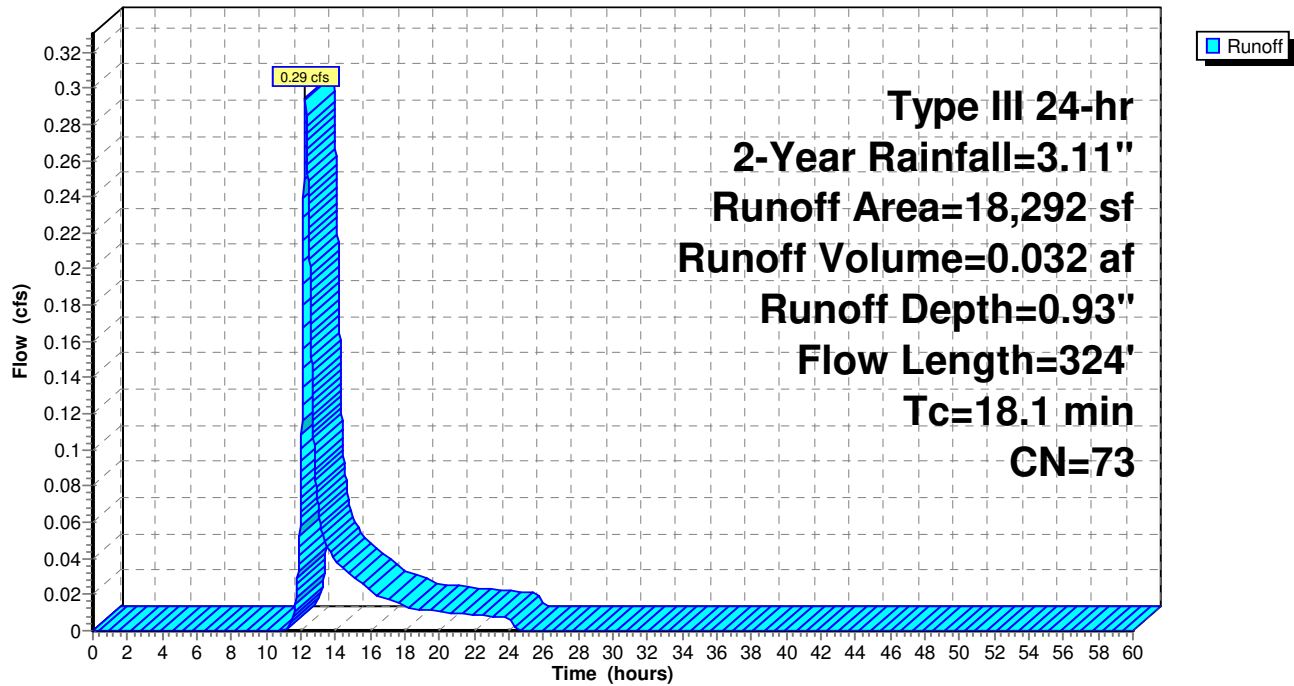
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### Subcatchment E5: E5

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**Summary for Subcatchment E6: E6**

Runoff = 0.31 cfs @ 13.22 hrs, Volume= 0.076 af, Depth= 0.78"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 1,285     | 61 | >75% Grass cover, Good, HSG B   |
| * | 20        | 71 | >75% Grass cover, Good, HSG B/D |
|   | 3,754     | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 2,999     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 55        | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 5,069     | 55 | Woods, Good, HSG B              |
| * | 9,032     | 66 | Woods, Good, HSG B/D            |
|   | 28,978    | 70 | Woods, Good, HSG C              |
|   | 51,192    | 70 | Weighted Average                |
|   | 48,138    |    | 94.03% Pervious Area            |
|   | 3,054     |    | 5.97% Impervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 66.0        | 100              | 0.0050           | 0.03                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 10.8        | 205              | 0.0040           | 0.32                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 2.1         | 49               | 0.0058           | 0.38                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 1.0         | 98               | 0.0069           | 1.69                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 79.9        | 452              | Total            |                      |                   |                                                           |

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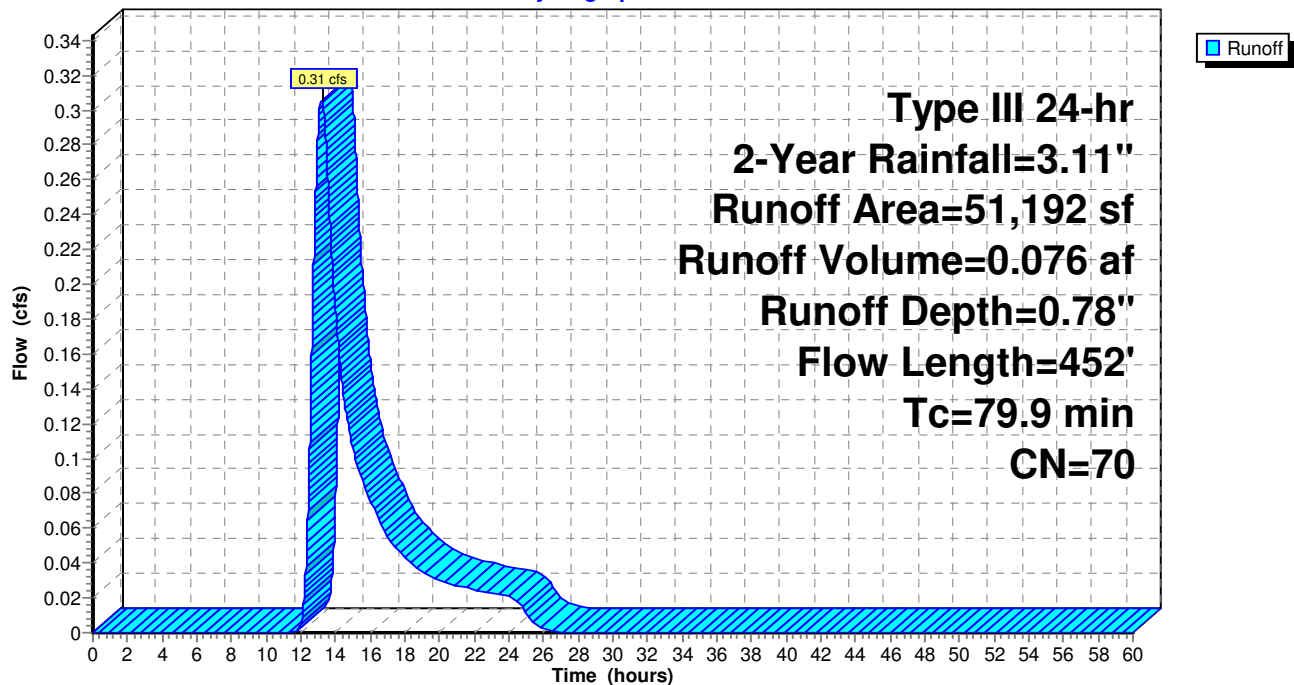
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### Subcatchment E6: E6

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**Summary for Pond EP1: EP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 2.00" for 2-Year event  
 Inflow = 4.66 cfs @ 12.55 hrs, Volume= 0.693 af  
 Outflow = 4.49 cfs @ 12.67 hrs, Volume= 0.693 af, Atten= 4%, Lag= 6.9 min  
 Primary = 3.92 cfs @ 12.67 hrs, Volume= 0.683 af  
     Routed to Link DP1 : DP1  
 Secondary = 0.58 cfs @ 12.67 hrs, Volume= 0.011 af  
     Routed to Link DP2 : DP2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 73.94' @ 12.67 hrs Surf.Area= 5,354 sf Storage= 2,270 cf

Plug-Flow detention time= 9.5 min calculated for 0.693 af (100% of inflow)  
 Center-of-Mass det. time= 9.5 min ( 855.4 - 845.9 )

| Volume | Invert | Avail.Storage | Storage Description                            |
|--------|--------|---------------|------------------------------------------------|
| #1     | 72.98' | 14,104 cf     | <b>Swale (Pyramidal)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 72.98               | 5                    | 0                         | 0                         | 5                   |
| 73.00               | 408                  | 3                         | 3                         | 408                 |
| 74.00               | 5,866                | 2,607                     | 2,610                     | 5,869               |
| 75.00               | 18,266               | 11,494                    | 14,104                    | 18,277              |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                 |
|--------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b><br>L= 47.7' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900<br>n= 0.013, Flow Area= 4.91 sf                                                                                      |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50<br>Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68<br>2.72 2.81 2.92 2.97 3.07 3.32 |

**Primary OutFlow** Max=3.92 cfs @ 12.67 hrs HW=73.94' TW=0.00' (Dynamic Tailwater)

↑ **1=RCP\_Round 30"** (Barrel Controls 3.92 cfs @ 3.35 fps)

**Secondary OutFlow** Max=0.58 cfs @ 12.67 hrs HW=73.94' TW=0.00' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.58 cfs @ 0.48 fps)

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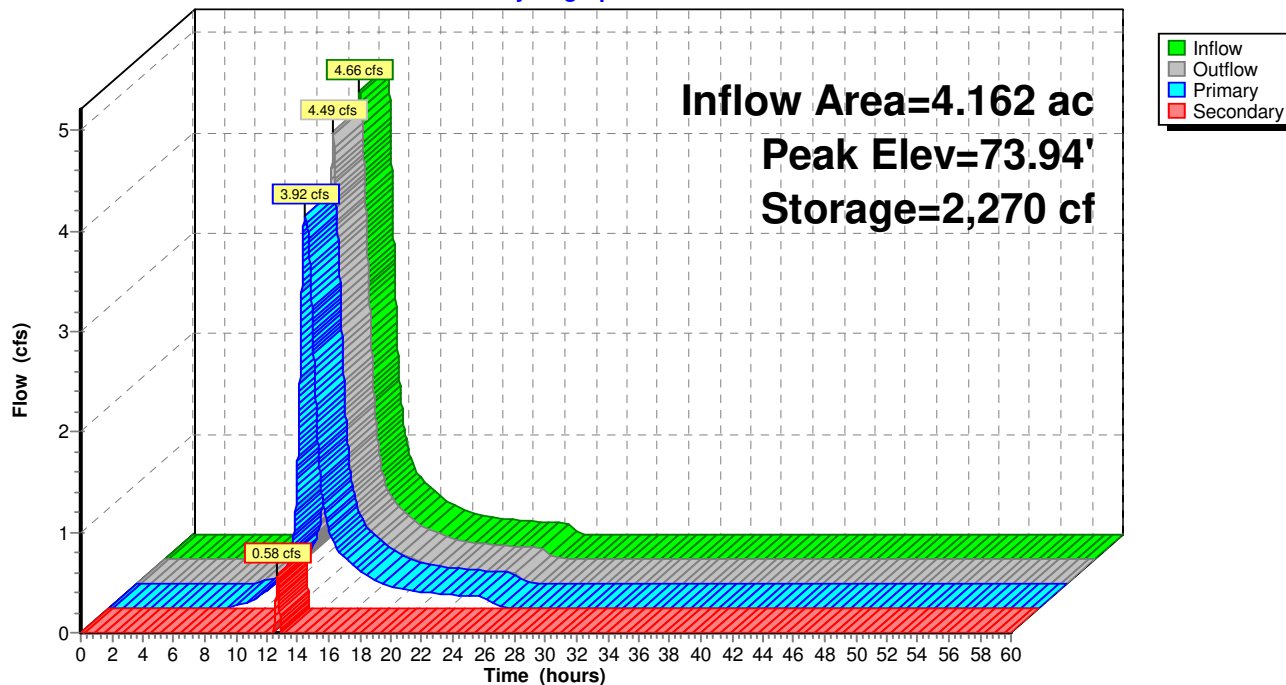
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### Pond EP1: EP1

Hydrograph



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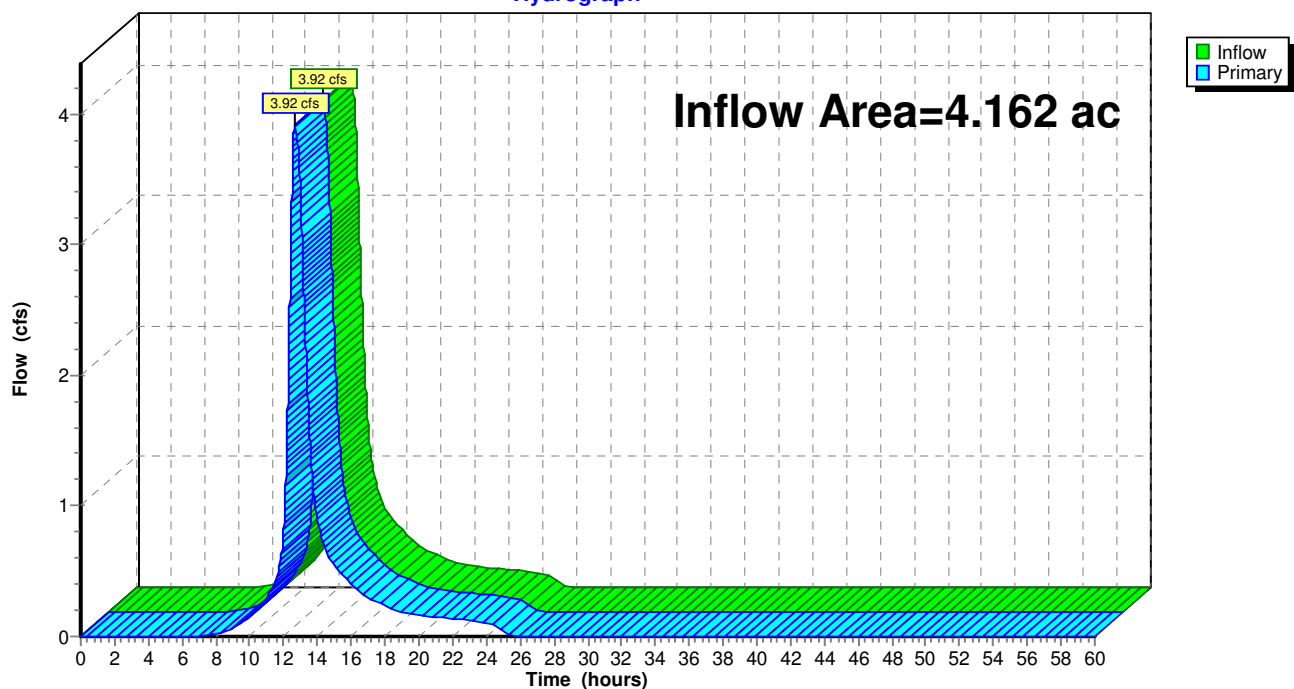
### Summary for Link DP1: DP1

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 1.97" for 2-Year event  
Inflow = 3.92 cfs @ 12.67 hrs, Volume= 0.683 af  
Primary = 3.92 cfs @ 12.67 hrs, Volume= 0.683 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP1: DP1

Hydrograph



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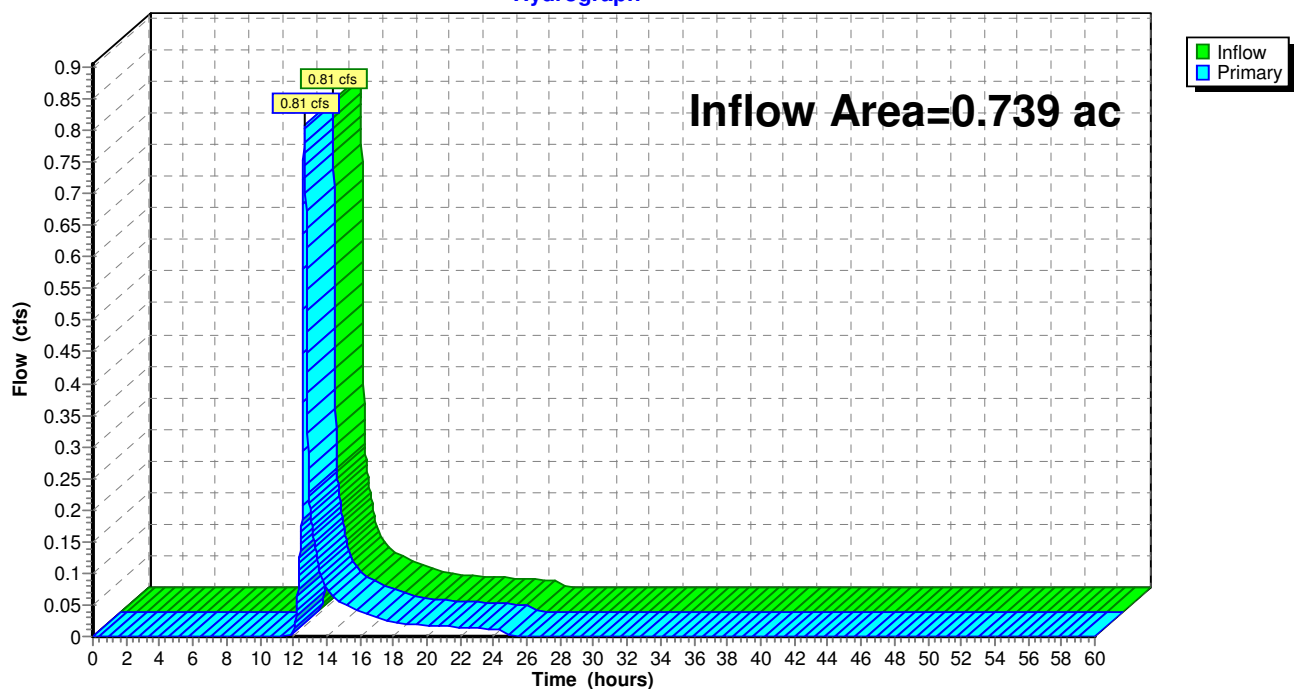
### Summary for Link DP2: DP2

Inflow Area = 0.739 ac, 0.00% Impervious, Inflow Depth = 0.90" for 2-Year event  
Inflow = 0.81 cfs @ 12.67 hrs, Volume= 0.056 af  
Primary = 0.81 cfs @ 12.67 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP2: DP2

Hydrograph



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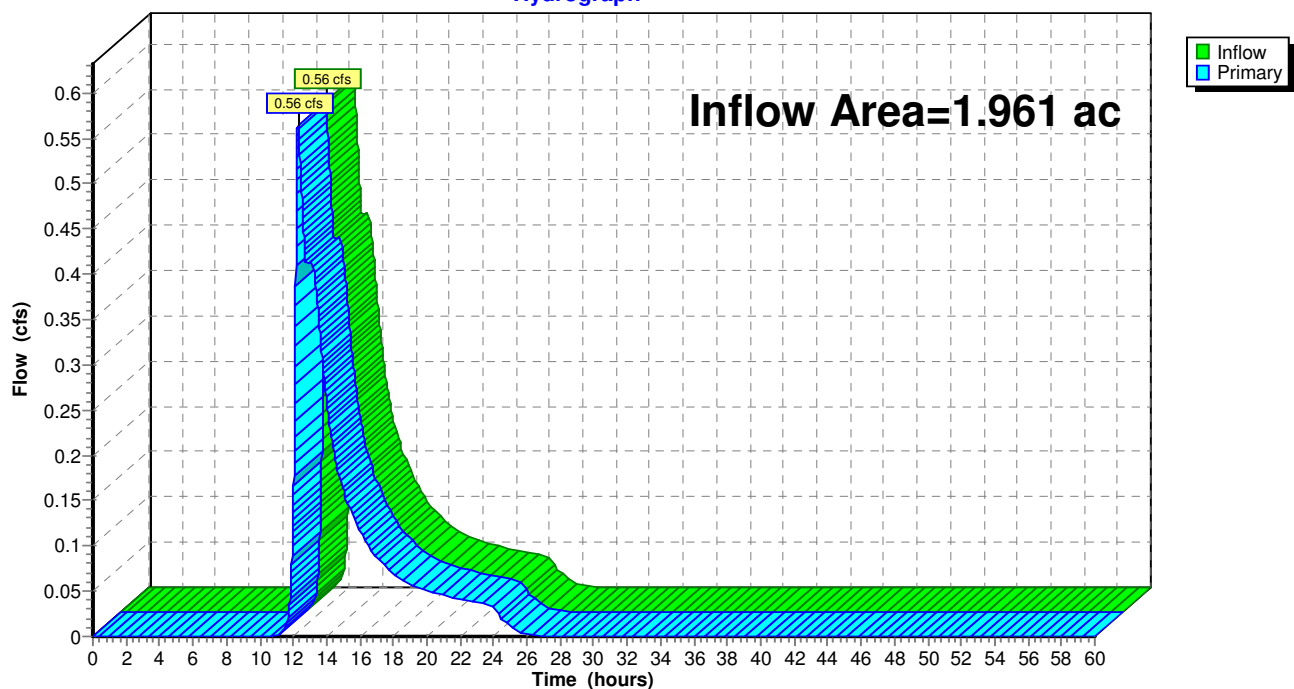
### Summary for Link DP3: DP3

Inflow Area = 1.961 ac, 16.56% Impervious, Inflow Depth = 0.83" for 2-Year event  
Inflow = 0.56 cfs @ 12.29 hrs, Volume= 0.135 af  
Primary = 0.56 cfs @ 12.29 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP3: DP3

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.94"

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**Summary for Subcatchment E1: E1 (DP4)**

Runoff = 1.86 cfs @ 12.88 hrs, Volume= 0.347 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.94"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 2,051     | 74 | >75% Grass cover, Good, HSG C   |
| 24,104    | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 7,863   | 98 | Paved parking, HSG B/D          |
| 4,120     | 98 | Paved parking, HSG C            |
| 4,313     | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 12,549  | 66 | Woods, Good, HSG B/D            |
| 1,484     | 70 | Woods, Good, HSG C              |
| 56,484    | 84 | Weighted Average                |
| 20,397    |    | 36.11% Pervious Area            |
| 36,087    |    | 63.89% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                        |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------------------------------------|
| 25.8     | 100           | 0.0047        | 0.06              |                | <b>Sheet Flow, Grass Sheet Flow</b><br>Grass: Dense n= 0.240 P2= 3.11"             |
| 0.5      | 30            | 0.0184        | 0.95              |                | <b>Shallow Concentrated Flow, Grass Shallow</b><br>Short Grass Pasture Kv= 7.0 fps |
| 37.1     | 193           | 0.0003        | 0.09              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps       |
| 63.4     | 323           | Total         |                   |                |                                                                                    |

**Summary for Subcatchment E2: E2**Runoff = 8.51 cfs @ 12.55 hrs, Volume= 1.288 af, Depth= 3.71"  
Routed to Pond EP1 : EP1Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.94"

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|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 0         | 61 | >75% Grass cover, Good, HSG B   |
| * | 14,877    | 71 | >75% Grass cover, Good, HSG B/D |
|   | 12,913    | 74 | >75% Grass cover, Good, HSG C   |
|   | 1,215     | 98 | Paved parking, HSG A            |
|   | 0         | 98 | Paved parking, HSG B            |
| * | 12,802    | 98 | Paved parking, HSG B/D          |
|   | 109,808   | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 0         | 55 | Woods, Good, HSG B              |
| * | 4,540     | 66 | Woods, Good, HSG B/D            |
|   | 25,134    | 70 | Woods, Good, HSG C              |
|   | 181,289   | 89 | Weighted Average                |
|   | 57,464    |    | 31.70% Pervious Area            |
|   | 123,825   |    | 68.30% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                           |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------------------------------------------------------------|
| 29.4        | 100              | 0.0379           | 0.06                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 8.0         | 24               | 0.0001           | 0.05                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 3.1         | 85               | 0.0005           | 0.45                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps       |
| 1.8         | 586              | 0.1303           | 5.41                 |                   | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 42.3        | 795              | Total            |                      |                   |                                                                                       |

**Summary for Subcatchment E3: E3**

Runoff = 0.71 cfs @ 12.73 hrs, Volume= 0.118 af, Depth= 1.91"  
Routed to Link DP2 : DP2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Rainfall=4.94"

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| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 23        | 61 | >75% Grass cover, Good, HSG B   |
| * 203     | 71 | >75% Grass cover, Good, HSG B/D |
| 245       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 237       | 55 | Woods, Good, HSG B              |
| * 6,562   | 66 | Woods, Good, HSG B/D            |
| 24,922    | 70 | Woods, Good, HSG C              |
| 32,192    | 69 | Weighted Average                |
| 32,192    |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                           |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------|
| 43.7     | 100           | 0.0140        | 0.04              |                | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 5.8      | 70            | 0.0016        | 0.20              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 0.1      | 15            | 0.0510        | 3.39              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 49.6     | 185           | Total         |                   |                |                                                                                       |

**Summary for Subcatchment E4: E4**

Runoff = 0.62 cfs @ 12.28 hrs, Volume= 0.066 af, Depth= 2.15"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=4.94"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 845       | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 104       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 5,124     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 6,563     | 55 | Woods, Good, HSG B              |
| * 0       | 66 | Woods, Good, HSG B/D            |
| 3,304     | 70 | Woods, Good, HSG C              |
| 15,940    | 72 | Weighted Average                |
| 10,816    |    | 67.85% Pervious Area            |
| 5,124     |    | 32.15% Impervious Area          |

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| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 17.9        | 75               | 0.0739           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.4         | 15               | 0.0056           | 0.56                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 1.0         | 114              | 0.0080           | 1.82                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 19.3        | 204              | Total            |                      |                   |                                                                                   |

**Summary for Subcatchment E5: E5**

Runoff = 0.76 cfs @ 12.25 hrs, Volume= 0.078 af, Depth= 2.23"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=4.94"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 3,677     | 61 | >75% Grass cover, Good, HSG B   |
|   | 0         | 71 | >75% Grass cover, Good, HSG B/D |
|   | 195       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 5,968     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 0         | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 4,836     | 55 | Woods, Good, HSG B              |
| * | 0         | 66 | Woods, Good, HSG B/D            |
|   | 3,616     | 70 | Woods, Good, HSG C              |
|   | 18,292    | 73 | Weighted Average                |
|   | 12,324    |    | 67.37% Pervious Area            |
|   | 5,968     |    | 32.63% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 14.9        | 65               | 0.0871           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.7         | 35               | 0.0113           | 0.87                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 2.5         | 224              | 0.0055           | 1.51                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 18.1        | 324              | Total            |                      |                   |                                                                                   |

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**Summary for Subcatchment E6: E6**

Runoff = 0.87 cfs @ 13.06 hrs, Volume= 0.195 af, Depth= 1.99"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=4.94"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 1,285     | 61 | >75% Grass cover, Good, HSG B   |
| * | 20        | 71 | >75% Grass cover, Good, HSG B/D |
|   | 3,754     | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 2,999     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 55        | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 5,069     | 55 | Woods, Good, HSG B              |
| * | 9,032     | 66 | Woods, Good, HSG B/D            |
|   | 28,978    | 70 | Woods, Good, HSG C              |
|   | 51,192    | 70 | Weighted Average                |
|   | 48,138    |    | 94.03% Pervious Area            |
|   | 3,054     |    | 5.97% Impervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 66.0        | 100              | 0.0050           | 0.03                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 10.8        | 205              | 0.0040           | 0.32                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 2.1         | 49               | 0.0058           | 0.38                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 1.0         | 98               | 0.0069           | 1.69                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 79.9        | 452              | Total            |                      |                   |                                                           |

**Summary for Pond EP1: EP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 3.71" for 10-Year event  
 Inflow = 8.51 cfs @ 12.55 hrs, Volume= 1.288 af  
 Outflow = 8.45 cfs @ 12.60 hrs, Volume= 1.288 af, Atten= 1%, Lag= 2.7 min  
 Primary = 4.67 cfs @ 12.60 hrs, Volume= 1.122 af  
 Routed to Link DP1 : DP1  
 Secondary = 3.78 cfs @ 12.60 hrs, Volume= 0.166 af  
 Routed to Link DP2 : DP2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 74.04' @ 12.60 hrs Surf.Area= 6,188 sf Storage= 2,824 cf

Plug-Flow detention time= 8.2 min calculated for 1.288 af (100% of inflow)

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Center-of-Mass det. time= 8.3 min ( 836.7 - 828.5 )

| Volume              | Invert               | Avail.Storage             | Storage Description                            |                     |  |
|---------------------|----------------------|---------------------------|------------------------------------------------|---------------------|--|
| #1                  | 72.98'               | 14,104 cf                 | <b>Swale (Pyramidal)</b> Listed below (Recalc) |                     |  |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                      | Wet.Area<br>(sq-ft) |  |
| 72.98               | 5                    | 0                         | 0                                              | 5                   |  |
| 73.00               | 408                  | 3                         | 3                                              | 408                 |  |
| 74.00               | 5,866                | 2,607                     | 2,610                                          | 5,869               |  |
| 75.00               | 18,266               | 11,494                    | 14,104                                         | 18,277              |  |

| Device | Routing   | Invert | Outlet Devices                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|--------|-----------|--------|----------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b>                                                 |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | L= 47.7' RCP, mitered to conform to fill, Ke= 0.700                              |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900                   |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | n= 0.013, Flow Area= 4.91 sf                                                     |  |  |  |  |  |  |  |  |  |  |  |  |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b> |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00                    |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | 2.50 3.00 3.50 4.00 4.50                                                         |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68                     |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | 2.72 2.81 2.92 2.97 3.07 3.32                                                    |  |  |  |  |  |  |  |  |  |  |  |  |

**Primary OutFlow** Max=4.67 cfs @ 12.60 hrs HW=74.04' TW=0.00' (Dynamic Tailwater)↑ **1=RCP\_Round 30"** (Barrel Controls 4.67 cfs @ 3.50 fps)**Secondary OutFlow** Max=3.78 cfs @ 12.60 hrs HW=74.04' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 3.78 cfs @ 0.89 fps)**Summary for Link DP1: DP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 3.23" for 10-Year event  
 Inflow = 4.67 cfs @ 12.60 hrs, Volume= 1.122 af  
 Primary = 4.67 cfs @ 12.60 hrs, Volume= 1.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP2: DP2**

Inflow Area = 0.739 ac, 0.00% Impervious, Inflow Depth = 4.62" for 10-Year event  
 Inflow = 4.46 cfs @ 12.61 hrs, Volume= 0.284 af  
 Primary = 4.46 cfs @ 12.61 hrs, Volume= 0.284 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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*Type III 24-hr 10-Year Rainfall=4.94"*

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### Summary for Link DP3: DP3

Inflow Area = 1.961 ac, 16.56% Impervious, Inflow Depth = 2.07" for 10-Year event

Inflow = 1.57 cfs @ 12.29 hrs, Volume= 0.339 af

Primary = 1.57 cfs @ 12.29 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment E1: E1 (DP4)**

Runoff = 2.45 cfs @ 12.83 hrs, Volume= 0.462 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.08"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 2,051     | 74 | >75% Grass cover, Good, HSG C   |
| 24,104    | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 7,863   | 98 | Paved parking, HSG B/D          |
| 4,120     | 98 | Paved parking, HSG C            |
| 4,313     | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 12,549  | 66 | Woods, Good, HSG B/D            |
| 1,484     | 70 | Woods, Good, HSG C              |
| 56,484    | 84 | Weighted Average                |
| 20,397    |    | 36.11% Pervious Area            |
| 36,087    |    | 63.89% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                        |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------------------------------------|
| 25.8     | 100           | 0.0047        | 0.06              |                | <b>Sheet Flow, Grass Sheet Flow</b><br>Grass: Dense n= 0.240 P2= 3.11"             |
| 0.5      | 30            | 0.0184        | 0.95              |                | <b>Shallow Concentrated Flow, Grass Shallow</b><br>Short Grass Pasture Kv= 7.0 fps |
| 37.1     | 193           | 0.0003        | 0.09              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps       |
| 63.4     | 323           | Total         |                   |                |                                                                                    |

**Summary for Subcatchment E2: E2**Runoff = 10.91 cfs @ 12.55 hrs, Volume= 1.669 af, Depth= 4.81"  
Routed to Pond EP1 : EP1Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.08"

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| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 14,877  | 71 | >75% Grass cover, Good, HSG B/D |
| 12,913    | 74 | >75% Grass cover, Good, HSG C   |
| 1,215     | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 12,802  | 98 | Paved parking, HSG B/D          |
| 109,808   | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 4,540   | 66 | Woods, Good, HSG B/D            |
| 25,134    | 70 | Woods, Good, HSG C              |
| 181,289   | 89 | Weighted Average                |
| 57,464    |    | 31.70% Pervious Area            |
| 123,825   |    | 68.30% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                           |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------|
| 29.4     | 100           | 0.0379        | 0.06              |                | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 8.0      | 24            | 0.0001        | 0.05              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 3.1      | 85            | 0.0005        | 0.45              |                | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps       |
| 1.8      | 586           | 0.1303        | 5.41              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 42.3     | 795           | Total         |                   |                |                                                                                       |

**Summary for Subcatchment E3: E3**

Runoff = 1.04 cfs @ 12.72 hrs, Volume= 0.171 af, Depth= 2.78"  
Routed to Link DP2 : DP2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.08"

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Type III 24-hr 25-Year Rainfall=6.08"

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| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 23        | 61 | >75% Grass cover, Good, HSG B   |
| * 203     | 71 | >75% Grass cover, Good, HSG B/D |
| 245       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 237       | 55 | Woods, Good, HSG B              |
| * 6,562   | 66 | Woods, Good, HSG B/D            |
| 24,922    | 70 | Woods, Good, HSG C              |
| 32,192    | 69 | Weighted Average                |
| 32,192    |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                           |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------|
| 43.7     | 100           | 0.0140        | 0.04              |                | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 5.8      | 70            | 0.0016        | 0.20              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 0.1      | 15            | 0.0510        | 3.39              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 49.6     | 185           | Total         |                   |                |                                                                                       |

**Summary for Subcatchment E4: E4**

Runoff = 0.89 cfs @ 12.27 hrs, Volume= 0.093 af, Depth= 3.06"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=6.08"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 845       | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 104       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 5,124     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 6,563     | 55 | Woods, Good, HSG B              |
| * 0       | 66 | Woods, Good, HSG B/D            |
| 3,304     | 70 | Woods, Good, HSG C              |
| 15,940    | 72 | Weighted Average                |
| 10,816    |    | 67.85% Pervious Area            |
| 5,124     |    | 32.15% Impervious Area          |

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| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 17.9        | 75               | 0.0739           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.4         | 15               | 0.0056           | 0.56                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 1.0         | 114              | 0.0080           | 1.82                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 19.3        | 204              | Total            |                      |                   |                                                                                   |

**Summary for Subcatchment E5: E5**

Runoff = 1.09 cfs @ 12.25 hrs, Volume= 0.110 af, Depth= 3.16"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=6.08"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 3,677     | 61 | >75% Grass cover, Good, HSG B   |
|   | 0         | 71 | >75% Grass cover, Good, HSG B/D |
|   | 195       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 5,968     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 0         | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 4,836     | 55 | Woods, Good, HSG B              |
| * | 0         | 66 | Woods, Good, HSG B/D            |
|   | 3,616     | 70 | Woods, Good, HSG C              |
|   | 18,292    | 73 | Weighted Average                |
|   | 12,324    |    | 67.37% Pervious Area            |
|   | 5,968     |    | 32.63% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 14.9        | 65               | 0.0871           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.7         | 35               | 0.0113           | 0.87                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 2.5         | 224              | 0.0055           | 1.51                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 18.1        | 324              | Total            |                      |                   |                                                                                   |

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**Summary for Subcatchment E6: E6**

Runoff = 1.29 cfs @ 13.05 hrs, Volume= 0.281 af, Depth= 2.87"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=6.08"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 1,285     | 61 | >75% Grass cover, Good, HSG B   |
| * 20      | 71 | >75% Grass cover, Good, HSG B/D |
| 3,754     | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 2,999     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 55        | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 5,069     | 55 | Woods, Good, HSG B              |
| * 9,032   | 66 | Woods, Good, HSG B/D            |
| 28,978    | 70 | Woods, Good, HSG C              |
| 51,192    | 70 | Weighted Average                |
| 48,138    |    | 94.03% Pervious Area            |
| 3,054     |    | 5.97% Impervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                               |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------|
| 66.0     | 100           | 0.0050        | 0.03              |                | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|          |               |               |                   |                | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 10.8     | 205           | 0.0040        | 0.32              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                                      |
| 2.1      | 49            | 0.0058        | 0.38              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                                      |
| 1.0      | 98            | 0.0069        | 1.69              |                | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                        |
| 79.9     | 452           | Total         |                   |                |                                                           |

**Summary for Pond EP1: EP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 4.81" for 25-Year event  
 Inflow = 10.91 cfs @ 12.55 hrs, Volume= 1.669 af  
 Outflow = 10.83 cfs @ 12.59 hrs, Volume= 1.669 af, Atten= 1%, Lag= 2.3 min  
 Primary = 5.02 cfs @ 12.59 hrs, Volume= 1.373 af  
 Routed to Link DP1 : DP1  
 Secondary = 5.81 cfs @ 12.59 hrs, Volume= 0.297 af  
 Routed to Link DP2 : DP2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 74.08' @ 12.59 hrs Surf.Area= 6,597 sf Storage= 3,102 cf

Plug-Flow detention time= 7.7 min calculated for 1.669 af (100% of inflow)

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Center-of-Mass det. time= 7.7 min ( 829.1 - 821.4 )

| Volume | Invert | Avail.Storage | Storage Description                            |
|--------|--------|---------------|------------------------------------------------|
| #1     | 72.98' | 14,104 cf     | <b>Swale (Pyramidal)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 72.98               | 5                    | 0                         | 0                         | 5                   |
| 73.00               | 408                  | 3                         | 3                         | 408                 |
| 74.00               | 5,866                | 2,607                     | 2,610                     | 5,869               |
| 75.00               | 18,266               | 11,494                    | 14,104                    | 18,277              |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                 |
|--------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b><br>L= 47.7' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900<br>n= 0.013, Flow Area= 4.91 sf                                                                                      |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50<br>Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68<br>2.72 2.81 2.92 2.97 3.07 3.32 |

**Primary OutFlow** Max=5.02 cfs @ 12.59 hrs HW=74.08' TW=0.00' (Dynamic Tailwater)↑**1=RCP\_Round 30"** (Barrel Controls 5.02 cfs @ 3.56 fps)**Secondary OutFlow** Max=5.81 cfs @ 12.59 hrs HW=74.08' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** (Weir Controls 5.81 cfs @ 1.02 fps)**Summary for Link DP1: DP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 3.96" for 25-Year event  
 Inflow = 5.02 cfs @ 12.59 hrs, Volume= 1.373 af  
 Primary = 5.02 cfs @ 12.59 hrs, Volume= 1.373 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP2: DP2**

Inflow Area = 0.739 ac, 0.00% Impervious, Inflow Depth = 7.59" for 25-Year event  
 Inflow = 6.82 cfs @ 12.60 hrs, Volume= 0.467 af  
 Primary = 6.82 cfs @ 12.60 hrs, Volume= 0.467 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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### Summary for Link DP3: DP3

Inflow Area = 1.961 ac, 16.56% Impervious, Inflow Depth = 2.97" for 25-Year event

Inflow = 2.30 cfs @ 12.28 hrs, Volume= 0.485 af

Primary = 2.30 cfs @ 12.28 hrs, Volume= 0.485 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Subcatchment E1: E1 (DP4)**

Runoff = 2.89 cfs @ 12.82 hrs, Volume= 0.546 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.91"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 2,051     | 74 | >75% Grass cover, Good, HSG C   |
| 24,104    | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 7,863   | 98 | Paved parking, HSG B/D          |
| 4,120     | 98 | Paved parking, HSG C            |
| 4,313     | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 12,549  | 66 | Woods, Good, HSG B/D            |
| 1,484     | 70 | Woods, Good, HSG C              |
| 56,484    | 84 | Weighted Average                |
| 20,397    |    | 36.11% Pervious Area            |
| 36,087    |    | 63.89% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                        |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------------------------------------|
| 25.8     | 100           | 0.0047        | 0.06              |                | <b>Sheet Flow, Grass Sheet Flow</b><br>Grass: Dense n= 0.240 P2= 3.11"             |
| 0.5      | 30            | 0.0184        | 0.95              |                | <b>Shallow Concentrated Flow, Grass Shallow</b><br>Short Grass Pasture Kv= 7.0 fps |
| 37.1     | 193           | 0.0003        | 0.09              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps       |
| 63.4     | 323           | Total         |                   |                |                                                                                    |

**Summary for Subcatchment E2: E2**Runoff = 12.64 cfs @ 12.55 hrs, Volume= 1.949 af, Depth= 5.62"  
Routed to Pond EP1 : EP1Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.91"

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|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 0         | 61 | >75% Grass cover, Good, HSG B   |
| * | 14,877    | 71 | >75% Grass cover, Good, HSG B/D |
|   | 12,913    | 74 | >75% Grass cover, Good, HSG C   |
|   | 1,215     | 98 | Paved parking, HSG A            |
|   | 0         | 98 | Paved parking, HSG B            |
| * | 12,802    | 98 | Paved parking, HSG B/D          |
|   | 109,808   | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 0         | 55 | Woods, Good, HSG B              |
| * | 4,540     | 66 | Woods, Good, HSG B/D            |
|   | 25,134    | 70 | Woods, Good, HSG C              |
|   | 181,289   | 89 | Weighted Average                |
|   | 57,464    |    | 31.70% Pervious Area            |
|   | 123,825   |    | 68.30% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                           |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------------------------------------------------------------|
| 29.4        | 100              | 0.0379           | 0.06                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 8.0         | 24               | 0.0001           | 0.05                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 3.1         | 85               | 0.0005           | 0.45                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps       |
| 1.8         | 586              | 0.1303           | 5.41                 |                   | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 42.3        | 795              | Total            |                      |                   |                                                                                       |

**Summary for Subcatchment E3: E3**

Runoff = 1.30 cfs @ 12.68 hrs, Volume= 0.212 af, Depth= 3.44"  
Routed to Link DP2 : DP2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.91"

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| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 23        | 61 | >75% Grass cover, Good, HSG B   |
| * 203     | 71 | >75% Grass cover, Good, HSG B/D |
| 245       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 237       | 55 | Woods, Good, HSG B              |
| * 6,562   | 66 | Woods, Good, HSG B/D            |
| 24,922    | 70 | Woods, Good, HSG C              |
| 32,192    | 69 | Weighted Average                |
| 32,192    |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                           |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------|
| 43.7     | 100           | 0.0140        | 0.04              |                | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 5.8      | 70            | 0.0016        | 0.20              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 0.1      | 15            | 0.0510        | 3.39              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 49.6     | 185           | Total         |                   |                |                                                                                       |

**Summary for Subcatchment E4: E4**

Runoff = 1.10 cfs @ 12.27 hrs, Volume= 0.114 af, Depth= 3.75"  
Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.91"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 845       | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 104       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 5,124     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 6,563     | 55 | Woods, Good, HSG B              |
| * 0       | 66 | Woods, Good, HSG B/D            |
| 3,304     | 70 | Woods, Good, HSG C              |
| 15,940    | 72 | Weighted Average                |
| 10,816    |    | 67.85% Pervious Area            |
| 5,124     |    | 32.15% Impervious Area          |

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| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 17.9        | 75               | 0.0739           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.4         | 15               | 0.0056           | 0.56                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 1.0         | 114              | 0.0080           | 1.82                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 19.3        | 204              | Total            |                      |                   |                                                                                   |

**Summary for Subcatchment E5: E5**

Runoff = 1.34 cfs @ 12.25 hrs, Volume= 0.135 af, Depth= 3.86"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.91"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 3,677     | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 195       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 5,968     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 4,836     | 55 | Woods, Good, HSG B              |
| * 0       | 66 | Woods, Good, HSG B/D            |
| 3,616     | 70 | Woods, Good, HSG C              |
| 18,292    | 73 | Weighted Average                |
| 12,324    |    | 67.37% Pervious Area            |
| 5,968     |    | 32.63% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 14.9        | 65               | 0.0871           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.7         | 35               | 0.0113           | 0.87                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 2.5         | 224              | 0.0055           | 1.51                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 18.1        | 324              | Total            |                      |                   |                                                                                   |

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**Summary for Subcatchment E6: E6**

Runoff = 1.60 cfs @ 13.05 hrs, Volume= 0.347 af, Depth= 3.54"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.91"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 1,285     | 61 | >75% Grass cover, Good, HSG B   |
| * | 20        | 71 | >75% Grass cover, Good, HSG B/D |
|   | 3,754     | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 2,999     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 55        | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 5,069     | 55 | Woods, Good, HSG B              |
| * | 9,032     | 66 | Woods, Good, HSG B/D            |
|   | 28,978    | 70 | Woods, Good, HSG C              |
|   | 51,192    | 70 | Weighted Average                |
|   | 48,138    |    | 94.03% Pervious Area            |
|   | 3,054     |    | 5.97% Impervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 66.0        | 100              | 0.0050           | 0.03                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 10.8        | 205              | 0.0040           | 0.32                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 2.1         | 49               | 0.0058           | 0.38                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 1.0         | 98               | 0.0069           | 1.69                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 79.9        | 452              | Total            |                      |                   |                                                           |

**Summary for Pond EP1: EP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 5.62" for 50-Year event  
 Inflow = 12.64 cfs @ 12.55 hrs, Volume= 1.949 af  
 Outflow = 12.57 cfs @ 12.58 hrs, Volume= 1.949 af, Atten= 1%, Lag= 2.0 min  
 Primary = 5.26 cfs @ 12.58 hrs, Volume= 1.549 af  
 Routed to Link DP1 : DP1  
 Secondary = 7.31 cfs @ 12.58 hrs, Volume= 0.400 af  
 Routed to Link DP2 : DP2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 74.11' @ 12.58 hrs Surf.Area= 6,868 sf Storage= 3,293 cf

Plug-Flow detention time= 7.5 min calculated for 1.949 af (100% of inflow)

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Center-of-Mass det. time= 7.5 min ( 824.7 - 817.3 )

| Volume | Invert | Avail.Storage | Storage Description                            |
|--------|--------|---------------|------------------------------------------------|
| #1     | 72.98' | 14,104 cf     | <b>Swale (Pyramidal)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 72.98               | 5                    | 0                         | 0                         | 5                   |
| 73.00               | 408                  | 3                         | 3                         | 408                 |
| 74.00               | 5,866                | 2,607                     | 2,610                     | 5,869               |
| 75.00               | 18,266               | 11,494                    | 14,104                    | 18,277              |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                 |
|--------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b><br>L= 47.7' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900<br>n= 0.013, Flow Area= 4.91 sf                                                                                      |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50<br>Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68<br>2.72 2.81 2.92 2.97 3.07 3.32 |

**Primary OutFlow** Max=5.26 cfs @ 12.58 hrs HW=74.11' TW=0.00' (Dynamic Tailwater)↑ **1=RCP\_Round 30"** (Barrel Controls 5.26 cfs @ 3.60 fps)**Secondary OutFlow** Max=7.31 cfs @ 12.58 hrs HW=74.11' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 7.31 cfs @ 1.10 fps)**Summary for Link DP1: DP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 4.47" for 50-Year event  
 Inflow = 5.26 cfs @ 12.58 hrs, Volume= 1.549 af  
 Primary = 5.26 cfs @ 12.58 hrs, Volume= 1.549 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP2: DP2**

Inflow Area = 0.739 ac, 0.00% Impervious, Inflow Depth = 9.93" for 50-Year event  
 Inflow = 8.56 cfs @ 12.60 hrs, Volume= 0.612 af  
 Primary = 8.56 cfs @ 12.60 hrs, Volume= 0.612 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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### Summary for Link DP3: DP3

Inflow Area = 1.961 ac, 16.56% Impervious, Inflow Depth = 3.65" for 50-Year event

Inflow = 2.85 cfs @ 12.28 hrs, Volume= 0.596 af

Primary = 2.85 cfs @ 12.28 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100-Year Rainfall=7.84"

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**Summary for Subcatchment E1: E1 (DP4)**

Runoff = 3.37 cfs @ 12.82 hrs, Volume= 0.642 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.84"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 2,051     | 74 | >75% Grass cover, Good, HSG C   |
| 24,104    | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 7,863   | 98 | Paved parking, HSG B/D          |
| 4,120     | 98 | Paved parking, HSG C            |
| 4,313     | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 12,549  | 66 | Woods, Good, HSG B/D            |
| 1,484     | 70 | Woods, Good, HSG C              |
| 56,484    | 84 | Weighted Average                |
| 20,397    |    | 36.11% Pervious Area            |
| 36,087    |    | 63.89% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                        |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------------------------------------|
| 25.8     | 100           | 0.0047        | 0.06              |                | <b>Sheet Flow, Grass Sheet Flow</b><br>Grass: Dense n= 0.240 P2= 3.11"             |
| 0.5      | 30            | 0.0184        | 0.95              |                | <b>Shallow Concentrated Flow, Grass Shallow</b><br>Short Grass Pasture Kv= 7.0 fps |
| 37.1     | 193           | 0.0003        | 0.09              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps       |
| 63.4     | 323           | Total         |                   |                |                                                                                    |

**Summary for Subcatchment E2: E2**Runoff = 14.58 cfs @ 12.55 hrs, Volume= 2.265 af, Depth= 6.53"  
Routed to Pond EP1 : EP1Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.84"

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|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 0         | 61 | >75% Grass cover, Good, HSG B   |
| * | 14,877    | 71 | >75% Grass cover, Good, HSG B/D |
|   | 12,913    | 74 | >75% Grass cover, Good, HSG C   |
|   | 1,215     | 98 | Paved parking, HSG A            |
|   | 0         | 98 | Paved parking, HSG B            |
| * | 12,802    | 98 | Paved parking, HSG B/D          |
|   | 109,808   | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 0         | 55 | Woods, Good, HSG B              |
| * | 4,540     | 66 | Woods, Good, HSG B/D            |
|   | 25,134    | 70 | Woods, Good, HSG C              |
|   | 181,289   | 89 | Weighted Average                |
|   | 57,464    |    | 31.70% Pervious Area            |
|   | 123,825   |    | 68.30% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                           |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------------------------------------------------------------|
| 29.4        | 100              | 0.0379           | 0.06                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 8.0         | 24               | 0.0001           | 0.05                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 3.1         | 85               | 0.0005           | 0.45                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps       |
| 1.8         | 586              | 0.1303           | 5.41                 |                   | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 42.3        | 795              | Total            |                      |                   |                                                                                       |

**Summary for Subcatchment E3: E3**

Runoff = 1.60 cfs @ 12.68 hrs, Volume= 0.260 af, Depth= 4.21"  
 Routed to Link DP2 : DP2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=7.84"

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| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 23        | 61 | >75% Grass cover, Good, HSG B   |
| * 203     | 71 | >75% Grass cover, Good, HSG B/D |
| 245       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 237       | 55 | Woods, Good, HSG B              |
| * 6,562   | 66 | Woods, Good, HSG B/D            |
| 24,922    | 70 | Woods, Good, HSG C              |
| 32,192    | 69 | Weighted Average                |
| 32,192    |    | 100.00% Pervious Area           |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                           |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------|
| 43.7     | 100           | 0.0140        | 0.04              |                | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11"     |
| 5.8      | 70            | 0.0016        | 0.20              |                | <b>Shallow Concentrated Flow, Woods Shallow Flow</b><br>Woodland Kv= 5.0 fps          |
| 0.1      | 15            | 0.0510        | 3.39              |                | <b>Shallow Concentrated Flow, Grass Shallow Flow</b><br>Grassed Waterway Kv= 15.0 fps |
| 49.6     | 185           | Total         |                   |                |                                                                                       |

**Summary for Subcatchment E4: E4**

Runoff = 1.34 cfs @ 12.26 hrs, Volume= 0.139 af, Depth= 4.55"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=7.84"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 845       | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 104       | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 5,124     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 6,563     | 55 | Woods, Good, HSG B              |
| * 0       | 66 | Woods, Good, HSG B/D            |
| 3,304     | 70 | Woods, Good, HSG C              |
| 15,940    | 72 | Weighted Average                |
| 10,816    |    | 67.85% Pervious Area            |
| 5,124     |    | 32.15% Impervious Area          |

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| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 17.9        | 75               | 0.0739           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.4         | 15               | 0.0056           | 0.56                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 1.0         | 114              | 0.0080           | 1.82                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 19.3        | 204              | Total            |                      |                   |                                                                                   |

**Summary for Subcatchment E5: E5**

Runoff = 1.62 cfs @ 12.25 hrs, Volume= 0.163 af, Depth= 4.67"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=7.84"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 3,677     | 61 | >75% Grass cover, Good, HSG B   |
|   | 0         | 71 | >75% Grass cover, Good, HSG B/D |
|   | 195       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 5,968     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 0         | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 4,836     | 55 | Woods, Good, HSG B              |
| * | 0         | 66 | Woods, Good, HSG B/D            |
|   | 3,616     | 70 | Woods, Good, HSG C              |
|   | 18,292    | 73 | Weighted Average                |
|   | 12,324    |    | 67.37% Pervious Area            |
|   | 5,968     |    | 32.63% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                       |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------------|
| 14.9        | 65               | 0.0871           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.7         | 35               | 0.0113           | 0.87                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 2.5         | 224              | 0.0055           | 1.51                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 18.1        | 324              | Total            |                      |                   |                                                                                   |

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**Summary for Subcatchment E6: E6**

Runoff = 1.97 cfs @ 13.05 hrs, Volume= 0.424 af, Depth= 4.33"  
 Routed to Link DP3 : DP3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=7.84"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 1,285     | 61 | >75% Grass cover, Good, HSG B   |
| * | 20        | 71 | >75% Grass cover, Good, HSG B/D |
|   | 3,754     | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 2,999     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 55        | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 5,069     | 55 | Woods, Good, HSG B              |
| * | 9,032     | 66 | Woods, Good, HSG B/D            |
|   | 28,978    | 70 | Woods, Good, HSG C              |
|   | 51,192    | 70 | Weighted Average                |
|   | 48,138    |    | 94.03% Pervious Area            |
|   | 3,054     |    | 5.97% Impervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 66.0        | 100              | 0.0050           | 0.03                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 10.8        | 205              | 0.0040           | 0.32                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 2.1         | 49               | 0.0058           | 0.38                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 1.0         | 98               | 0.0069           | 1.69                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 79.9        | 452              | Total            |                      |                   |                                                           |

**Summary for Pond EP1: EP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 6.53" for 100-Year event  
 Inflow = 14.58 cfs @ 12.55 hrs, Volume= 2.265 af  
 Outflow = 14.50 cfs @ 12.58 hrs, Volume= 2.265 af, Atten= 1%, Lag= 1.8 min  
 Primary = 5.50 cfs @ 12.58 hrs, Volume= 1.742 af  
 Routed to Link DP1 : DP1  
 Secondary = 9.00 cfs @ 12.58 hrs, Volume= 0.522 af  
 Routed to Link DP2 : DP2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 74.14' @ 12.58 hrs Surf.Area= 7,147 sf Storage= 3,492 cf

Plug-Flow detention time= 7.2 min calculated for 2.264 af (100% of inflow)

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Center-of-Mass det. time= 7.2 min ( 820.6 - 813.3 )

| Volume              | Invert               | Avail.Storage             | Storage Description                            |                     |  |
|---------------------|----------------------|---------------------------|------------------------------------------------|---------------------|--|
| #1                  | 72.98'               | 14,104 cf                 | <b>Swale (Pyramidal)</b> Listed below (Recalc) |                     |  |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                      | Wet.Area<br>(sq-ft) |  |
| 72.98               | 5                    | 0                         | 0                                              | 5                   |  |
| 73.00               | 408                  | 3                         | 3                                              | 408                 |  |
| 74.00               | 5,866                | 2,607                     | 2,610                                          | 5,869               |  |
| 75.00               | 18,266               | 11,494                    | 14,104                                         | 18,277              |  |

| Device | Routing   | Invert | Outlet Devices                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|--------|-----------|--------|----------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b>                                                 |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | L= 47.7' RCP, mitered to conform to fill, Ke= 0.700                              |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900                   |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | n= 0.013, Flow Area= 4.91 sf                                                     |  |  |  |  |  |  |  |  |  |  |  |  |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b> |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00                    |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | 2.50 3.00 3.50 4.00 4.50                                                         |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68                     |  |  |  |  |  |  |  |  |  |  |  |  |
|        |           |        | 2.72 2.81 2.92 2.97 3.07 3.32                                                    |  |  |  |  |  |  |  |  |  |  |  |  |

**Primary OutFlow** Max=5.50 cfs @ 12.58 hrs HW=74.14' TW=0.00' (Dynamic Tailwater)↑ **1=RCP\_Round 30"** (Barrel Controls 5.50 cfs @ 3.64 fps)**Secondary OutFlow** Max=9.00 cfs @ 12.58 hrs HW=74.14' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 9.00 cfs @ 1.18 fps)**Summary for Link DP1: DP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 5.02" for 100-Year event  
 Inflow = 5.50 cfs @ 12.58 hrs, Volume= 1.742 af  
 Primary = 5.50 cfs @ 12.58 hrs, Volume= 1.742 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

**Summary for Link DP2: DP2**

Inflow Area = 0.739 ac, 0.00% Impervious, Inflow Depth = 12.70" for 100-Year event  
 Inflow = 10.54 cfs @ 12.59 hrs, Volume= 0.782 af  
 Primary = 10.54 cfs @ 12.59 hrs, Volume= 0.782 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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### Summary for Link DP3: DP3

Inflow Area = 1.961 ac, 16.56% Impervious, Inflow Depth = 4.44" for 100-Year event  
Inflow = 3.48 cfs @ 12.28 hrs, Volume= 0.726 af  
Primary = 3.48 cfs @ 12.28 hrs, Volume= 0.726 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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**Summary for Pond EP1: EP1**

Inflow Area = 4.162 ac, 68.30% Impervious, Inflow Depth = 6.53" for 100-Year event  
 Inflow = 14.58 cfs @ 12.55 hrs, Volume= 2.265 af  
 Outflow = 14.50 cfs @ 12.58 hrs, Volume= 2.265 af, Atten= 1%, Lag= 1.8 min  
 Primary = 5.50 cfs @ 12.58 hrs, Volume= 1.742 af  
     Routed to Link DP1 : DP1  
 Secondary = 9.00 cfs @ 12.58 hrs, Volume= 0.522 af  
     Routed to Link DP2 : DP2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 74.14' @ 12.58 hrs Surf.Area= 7,147 sf Storage= 3,492 cf

Plug-Flow detention time= 7.2 min calculated for 2.264 af (100% of inflow)  
 Center-of-Mass det. time= 7.2 min ( 820.6 - 813.3 )

| Volume | Invert | Avail.Storage | Storage Description                            |
|--------|--------|---------------|------------------------------------------------|
| #1     | 72.98' | 14,104 cf     | <b>Swale (Pyramidal)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 72.98               | 5                    | 0                         | 0                         | 5                   |
| 73.00               | 408                  | 3                         | 3                         | 408                 |
| 74.00               | 5,866                | 2,607                     | 2,610                     | 5,869               |
| 75.00               | 18,266               | 11,494                    | 14,104                    | 18,277              |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                               |
|--------|-----------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b><br>L= 47.7' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 ' S= 0.0040 ' Cc= 0.900<br>n= 0.013, Flow Area= 4.91 sf                                                                          |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 ' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50<br>Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68<br>2.72 2.81 2.92 2.97 3.07 3.32 |

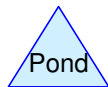
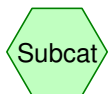
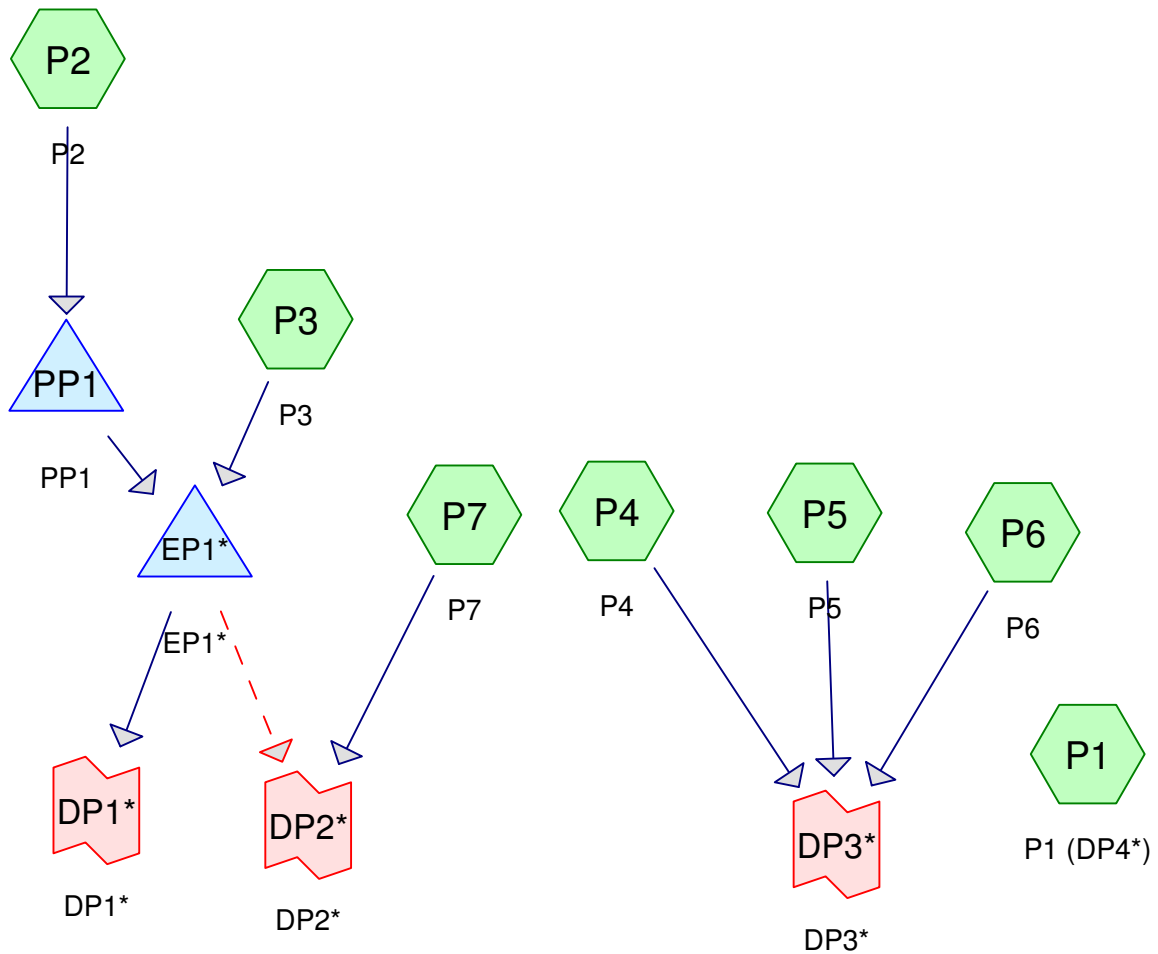
**Primary OutFlow** Max=5.50 cfs @ 12.58 hrs HW=74.14' TW=0.00' (Dynamic Tailwater)

↑ **1=RCP\_Round 30"** (Barrel Controls 5.50 cfs @ 3.64 fps)

**Secondary OutFlow** Max=9.00 cfs @ 12.58 hrs HW=74.14' TW=0.00' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 9.00 cfs @ 1.18 fps)

**APPENDIX B**  
**Watershed Computations**  
**(Post-Development Drainage HydroCAD Report)**



**2509.P HydroCAD**

Prepared by Design Professionals, Inc.

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Proposed Conditions  
Type III 24-hr 2-Year Rainfall=3.11"

Printed 10/3/2022

Page 2

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: P1 (DP4\*)**

Runoff Area=53,762 sf 58.66% Impervious Runoff Depth=1.54"  
Flow Length=406' Tc=62.4 min CN=83 Runoff=0.85 cfs 0.158 af

**Subcatchment P2: P2**

Runoff Area=157,251 sf 75.21% Impervious Runoff Depth=2.27"  
Flow Length=306' Tc=28.8 min CN=92 Runoff=5.44 cfs 0.681 af

**Subcatchment P3: P3**

Runoff Area=56,054 sf 68.76% Impervious Runoff Depth=2.00"  
Flow Length=413' Tc=86.7 min CN=89 Runoff=0.94 cfs 0.214 af

**Subcatchment P4: P4**

Runoff Area=18,774 sf 27.29% Impervious Runoff Depth=0.87"  
Flow Length=285' Tc=20.7 min CN=72 Runoff=0.27 cfs 0.031 af

**Subcatchment P5: P5**

Runoff Area=18,293 sf 32.62% Impervious Runoff Depth=0.93"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=0.29 cfs 0.032 af

**Subcatchment P6: P6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=0.78"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=0.31 cfs 0.076 af

**Subcatchment P7: P7**

Runoff Area=2,432 sf 0.00% Impervious Runoff Depth=0.93"  
Tc=6.0 min CN=73 Runoff=0.06 cfs 0.004 af

**Pond EP1\*: EP1\***

Peak Elev=73.93' Storage=2,421 cf Inflow=4.45 cfs 0.894 af  
Primary=3.87 cfs 0.884 af Secondary=0.44 cfs 0.010 af Outflow=4.31 cfs 0.894 af

**Pond PP1: PP1**

Peak Elev=74.72' Storage=15,744 cf Inflow=5.44 cfs 0.681 af  
18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0105 ' Outflow=3.81 cfs 0.680 af

**Link DP1\*: DP1\***

Inflow=3.87 cfs 0.884 af  
Primary=3.87 cfs 0.884 af

**Link DP2\*: DP2\***

Inflow=0.45 cfs 0.014 af  
Primary=0.45 cfs 0.014 af

**Link DP3\*: DP3\***

Inflow=0.60 cfs 0.140 af  
Primary=0.60 cfs 0.140 af

**Total Runoff Area = 8.213 ac Runoff Volume = 1.198 af Average Runoff Depth = 1.75"**  
**43.40% Pervious = 3.564 ac 56.60% Impervious = 4.649 ac**

**2509.P HydroCAD**

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Proposed Conditions  
Type III 24-hr 10-Year Rainfall=4.94"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: P1 (DP4\*)**

Runoff Area=53,762 sf 58.66% Impervious Runoff Depth=3.12"  
Flow Length=406' Tc=62.4 min CN=83 Runoff=1.74 cfs 0.321 af

**Subcatchment P2: P2**

Runoff Area=157,251 sf 75.21% Impervious Runoff Depth=4.03"  
Flow Length=306' Tc=28.8 min CN=92 Runoff=9.44 cfs 1.213 af

**Subcatchment P3: P3**

Runoff Area=56,054 sf 68.76% Impervious Runoff Depth=3.71"  
Flow Length=413' Tc=86.7 min CN=89 Runoff=1.72 cfs 0.398 af

**Subcatchment P4: P4**

Runoff Area=18,774 sf 27.29% Impervious Runoff Depth=2.15"  
Flow Length=285' Tc=20.7 min CN=72 Runoff=0.71 cfs 0.077 af

**Subcatchment P5: P5**

Runoff Area=18,293 sf 32.62% Impervious Runoff Depth=2.23"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=0.76 cfs 0.078 af

**Subcatchment P6: P6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=1.99"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=0.87 cfs 0.195 af

**Subcatchment P7: P7**

Runoff Area=2,432 sf 0.00% Impervious Runoff Depth=2.23"  
Tc=6.0 min CN=73 Runoff=0.15 cfs 0.010 af

**Pond EP1\*: EP1\***

Peak Elev=74.03' Storage=3,027 cf Inflow=8.14 cfs 1.609 af  
Primary=4.61 cfs 1.404 af Secondary=3.49 cfs 0.205 af Outflow=8.10 cfs 1.609 af

**Pond PP1: PP1**

Peak Elev=75.03' Storage=19,319 cf Inflow=9.44 cfs 1.213 af  
18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0105 '/' Outflow=7.00 cfs 1.211 af

**Link DP1\*: DP1\***

Inflow=4.61 cfs 1.404 af  
Primary=4.61 cfs 1.404 af

**Link DP2\*: DP2\***

Inflow=3.51 cfs 0.216 af  
Primary=3.51 cfs 0.216 af

**Link DP3\*: DP3\***

Inflow=1.66 cfs 0.351 af  
Primary=1.66 cfs 0.351 af

**Total Runoff Area = 8.213 ac Runoff Volume = 2.293 af Average Runoff Depth = 3.35"**  
**43.40% Pervious = 3.564 ac 56.60% Impervious = 4.649 ac**

**2509.P HydroCAD**

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Proposed Conditions  
Type III 24-hr 25-Year Rainfall=6.08"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

|                                   |                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment P1: P1 (DP4*)</b> | Runoff Area=53,762 sf 58.66% Impervious Runoff Depth=4.17"<br>Flow Length=406' Tc=62.4 min CN=83 Runoff=2.31 cfs 0.428 af                       |
| <b>Subcatchment P2: P2</b>        | Runoff Area=157,251 sf 75.21% Impervious Runoff Depth=5.15"<br>Flow Length=306' Tc=28.8 min CN=92 Runoff=11.90 cfs 1.549 af                     |
| <b>Subcatchment P3: P3</b>        | Runoff Area=56,054 sf 68.76% Impervious Runoff Depth=4.81"<br>Flow Length=413' Tc=86.7 min CN=89 Runoff=2.21 cfs 0.516 af                       |
| <b>Subcatchment P4: P4</b>        | Runoff Area=18,774 sf 27.29% Impervious Runoff Depth=3.06"<br>Flow Length=285' Tc=20.7 min CN=72 Runoff=1.02 cfs 0.110 af                       |
| <b>Subcatchment P5: P5</b>        | Runoff Area=18,293 sf 32.62% Impervious Runoff Depth=3.16"<br>Flow Length=324' Tc=18.1 min CN=73 Runoff=1.09 cfs 0.110 af                       |
| <b>Subcatchment P6: P6</b>        | Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=2.87"<br>Flow Length=452' Tc=79.9 min CN=70 Runoff=1.29 cfs 0.281 af                        |
| <b>Subcatchment P7: P7</b>        | Runoff Area=2,432 sf 0.00% Impervious Runoff Depth=3.16"<br>Tc=6.0 min CN=73 Runoff=0.21 cfs 0.015 af                                           |
| <b>Pond EP1*: EP1*</b>            | Peak Elev=74.07' Storage=3,347 cf Inflow=10.40 cfs 2.063 af<br>Primary=4.95 cfs 1.694 af Secondary=5.40 cfs 0.370 af Outflow=10.35 cfs 2.063 af |
| <b>Pond PP1: PP1</b>              | Peak Elev=75.20' Storage=21,423 cf Inflow=11.90 cfs 1.549 af<br>18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0105 ' Outflow=8.93 cfs 1.547 af |
| <b>Link DP1*: DP1*</b>            | Inflow=4.95 cfs 1.694 af<br>Primary=4.95 cfs 1.694 af                                                                                           |
| <b>Link DP2*: DP2*</b>            | Inflow=5.43 cfs 0.384 af<br>Primary=5.43 cfs 0.384 af                                                                                           |
| <b>Link DP3*: DP3*</b>            | Inflow=2.43 cfs 0.501 af<br>Primary=2.43 cfs 0.501 af                                                                                           |

**Total Runoff Area = 8.213 ac Runoff Volume = 3.009 af Average Runoff Depth = 4.40"**  
**43.40% Pervious = 3.564 ac 56.60% Impervious = 4.649 ac**

**2509.P HydroCAD**

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Proposed Conditions  
Type III 24-hr 50-Year Rainfall=6.91"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment P1: P1 (DP4\*)**

Runoff Area=53,762 sf 58.66% Impervious Runoff Depth=4.94"  
Flow Length=406' Tc=62.4 min CN=83 Runoff=2.73 cfs 0.508 af

**Subcatchment P2: P2**

Runoff Area=157,251 sf 75.21% Impervious Runoff Depth=5.97"  
Flow Length=306' Tc=28.8 min CN=92 Runoff=13.69 cfs 1.795 af

**Subcatchment P3: P3**

Runoff Area=56,054 sf 68.76% Impervious Runoff Depth=5.62"  
Flow Length=413' Tc=86.7 min CN=89 Runoff=2.57 cfs 0.603 af

**Subcatchment P4: P4**

Runoff Area=18,774 sf 27.29% Impervious Runoff Depth=3.75"  
Flow Length=285' Tc=20.7 min CN=72 Runoff=1.26 cfs 0.135 af

**Subcatchment P5: P5**

Runoff Area=18,293 sf 32.62% Impervious Runoff Depth=3.86"  
Flow Length=324' Tc=18.1 min CN=73 Runoff=1.34 cfs 0.135 af

**Subcatchment P6: P6**

Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=3.54"  
Flow Length=452' Tc=79.9 min CN=70 Runoff=1.60 cfs 0.347 af

**Subcatchment P7: P7**

Runoff Area=2,432 sf 0.00% Impervious Runoff Depth=3.86"  
Tc=6.0 min CN=73 Runoff=0.25 cfs 0.018 af

**Pond EP1\*: EP1\***

Peak Elev=74.10' Storage=3,575 cf Inflow=12.00 cfs 2.396 af  
Primary=5.18 cfs 1.896 af Secondary=6.77 cfs 0.500 af Outflow=11.95 cfs 2.396 af

**Pond PP1: PP1**

Peak Elev=75.32' Storage=22,942 cf Inflow=13.69 cfs 1.795 af  
18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0105 '/' Outflow=10.29 cfs 1.793 af

**Link DP1\*: DP1\***

Inflow=5.18 cfs 1.896 af  
Primary=5.18 cfs 1.896 af

**Link DP2\*: DP2\***

Inflow=6.81 cfs 0.518 af  
Primary=6.81 cfs 0.518 af

**Link DP3\*: DP3\***

Inflow=3.01 cfs 0.617 af  
Primary=3.01 cfs 0.617 af

**Total Runoff Area = 8.213 ac Runoff Volume = 3.541 af Average Runoff Depth = 5.17"**  
**43.40% Pervious = 3.564 ac 56.60% Impervious = 4.649 ac**

**2509.P HydroCAD**

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Type III 24-hr 100-Year Rainfall=7.84"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

|                                   |                                                                                                                                                    |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment P1: P1 (DP4*)</b> | Runoff Area=53,762 sf 58.66% Impervious Runoff Depth=5.82"<br>Flow Length=406' Tc=62.4 min CN=83 Runoff=3.20 cfs 0.599 af                          |
| <b>Subcatchment P2: P2</b>        | Runoff Area=157,251 sf 75.21% Impervious Runoff Depth=6.89"<br>Flow Length=306' Tc=28.8 min CN=92 Runoff=15.68 cfs 2.071 af                        |
| <b>Subcatchment P3: P3</b>        | Runoff Area=56,054 sf 68.76% Impervious Runoff Depth=6.53"<br>Flow Length=413' Tc=86.7 min CN=89 Runoff=2.97 cfs 0.700 af                          |
| <b>Subcatchment P4: P4</b>        | Runoff Area=18,774 sf 27.29% Impervious Runoff Depth=4.55"<br>Flow Length=285' Tc=20.7 min CN=72 Runoff=1.53 cfs 0.164 af                          |
| <b>Subcatchment P5: P5</b>        | Runoff Area=18,293 sf 32.62% Impervious Runoff Depth=4.67"<br>Flow Length=324' Tc=18.1 min CN=73 Runoff=1.62 cfs 0.163 af                          |
| <b>Subcatchment P6: P6</b>        | Runoff Area=51,192 sf 5.97% Impervious Runoff Depth=4.33"<br>Flow Length=452' Tc=79.9 min CN=70 Runoff=1.97 cfs 0.424 af                           |
| <b>Subcatchment P7: P7</b>        | Runoff Area=2,432 sf 0.00% Impervious Runoff Depth=4.67"<br>Tc=6.0 min CN=73 Runoff=0.31 cfs 0.022 af                                              |
| <b>Pond EP1*: EP1*</b>            | Peak Elev=74.12' Storage=3,819 cf Inflow=13.76 cfs 2.770 af<br>Primary=5.41 cfs 2.115 af Secondary=8.31 cfs 0.655 af Outflow=13.71 cfs 2.770 af    |
| <b>Pond PP1: PP1</b>              | Peak Elev=75.45' Storage=24,655 cf Inflow=15.68 cfs 2.071 af<br>18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0105 '/' Outflow=11.77 cfs 2.070 af |
| <b>Link DP1*: DP1*</b>            | Inflow=5.41 cfs 2.115 af<br>Primary=5.41 cfs 2.115 af                                                                                              |
| <b>Link DP2*: DP2*</b>            | Inflow=8.34 cfs 0.677 af<br>Primary=8.34 cfs 0.677 af                                                                                              |
| <b>Link DP3*: DP3*</b>            | Inflow=3.68 cfs 0.751 af<br>Primary=3.68 cfs 0.751 af                                                                                              |

**Total Runoff Area = 8.213 ac Runoff Volume = 4.143 af Average Runoff Depth = 6.05"**  
**43.40% Pervious = 3.564 ac 56.60% Impervious = 4.649 ac**

**2509.P HydroCAD**

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Type III 24-hr 2-Year Rainfall=3.11"

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**Summary for Subcatchment P1: P1 (DP4\*)**

Runoff = 0.85 cfs @ 12.83 hrs, Volume= 0.158 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 749     | 71 | >75% Grass cover, Good, HSG B/D |
| 3,886     | 74 | >75% Grass cover, Good, HSG C   |
| 23,131    | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 7,507   | 98 | Paved parking, HSG B/D          |
| 901       | 98 | Paved parking, HSG C            |
| 4,313     | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 11,978  | 66 | Woods, Good, HSG B/D            |
| 1,297     | 70 | Woods, Good, HSG C              |
| 53,762    | 83 | Weighted Average                |
| 22,223    |    | 41.34% Pervious Area            |
| 31,539    |    | 58.66% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                          |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------|
| 7.9         | 30               | 0.0900           | 0.06                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"           |
| 15.3        | 70               | 0.0086           | 0.08                 |                   | <b>Sheet Flow, Grass Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Grass: Dense n= 0.240 P2= 3.11"                      |
| 2.1         | 113              | 0.0035           | 0.89                 |                   | <b>Shallow Concentrated Flow, Grass Shallow Flow</b> |
|             |                  |                  |                      |                   | Grassed Waterway Kv= 15.0 fps                        |
| 37.1        | 193              | 0.0003           | 0.09                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b> |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                 |
| 62.4        | 406              | Total            |                      |                   |                                                      |

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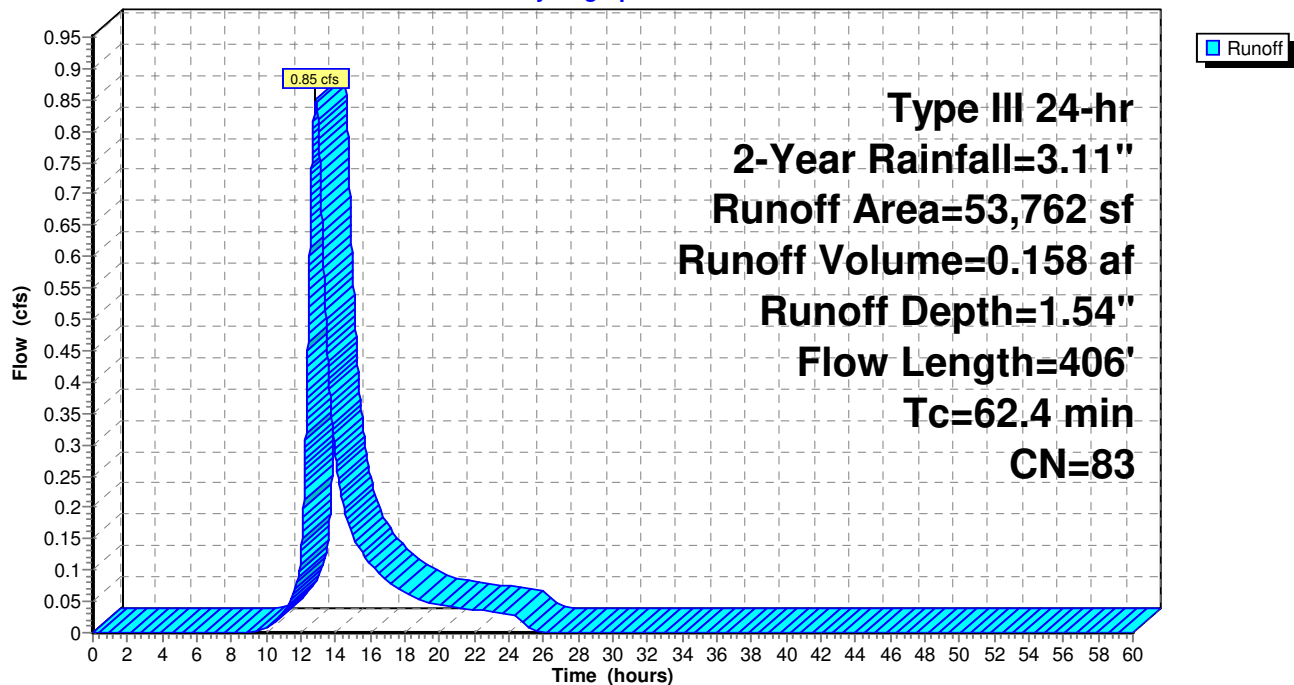
Type III 24-hr 2-Year Rainfall=3.11"

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### Subcatchment P1: P1 (DP4\*)

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.11"

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**Summary for Subcatchment P2: P2**

Runoff = 5.44 cfs @ 12.38 hrs, Volume= 0.681 af, Depth= 2.27"  
 Routed to Pond PP1 : PP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 0         | 61 | >75% Grass cover, Good, HSG B   |
| * 6,844   | 71 | >75% Grass cover, Good, HSG B/D |
| 24,117    | 74 | >75% Grass cover, Good, HSG C   |
| 2,187     | 98 | Paved parking, HSG A            |
| 0         | 98 | Paved parking, HSG B            |
| * 2,619   | 98 | Paved parking, HSG B/D          |
| 113,459   | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 0         | 55 | Woods, Good, HSG B              |
| * 11      | 66 | Woods, Good, HSG B/D            |
| 8,014     | 70 | Woods, Good, HSG C              |
| 157,251   | 92 | Weighted Average                |
| 38,986    |    | 24.79% Pervious Area            |
| 118,265   |    | 75.21% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                          |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------|
| 7.9         | 29               | 0.0862           | 0.06                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"           |
| 16.7        | 71               | 0.0070           | 0.07                 |                   | <b>Sheet Flow, Grass Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Grass: Dense n= 0.240 P2= 3.11"                      |
| 4.2         | 206              | 0.0267           | 0.82                 |                   | <b>Shallow Concentrated Flow, Grass Shallow Flow</b> |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                 |
| 28.8        | 306              | Total            |                      |                   |                                                      |

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Proposed Conditions

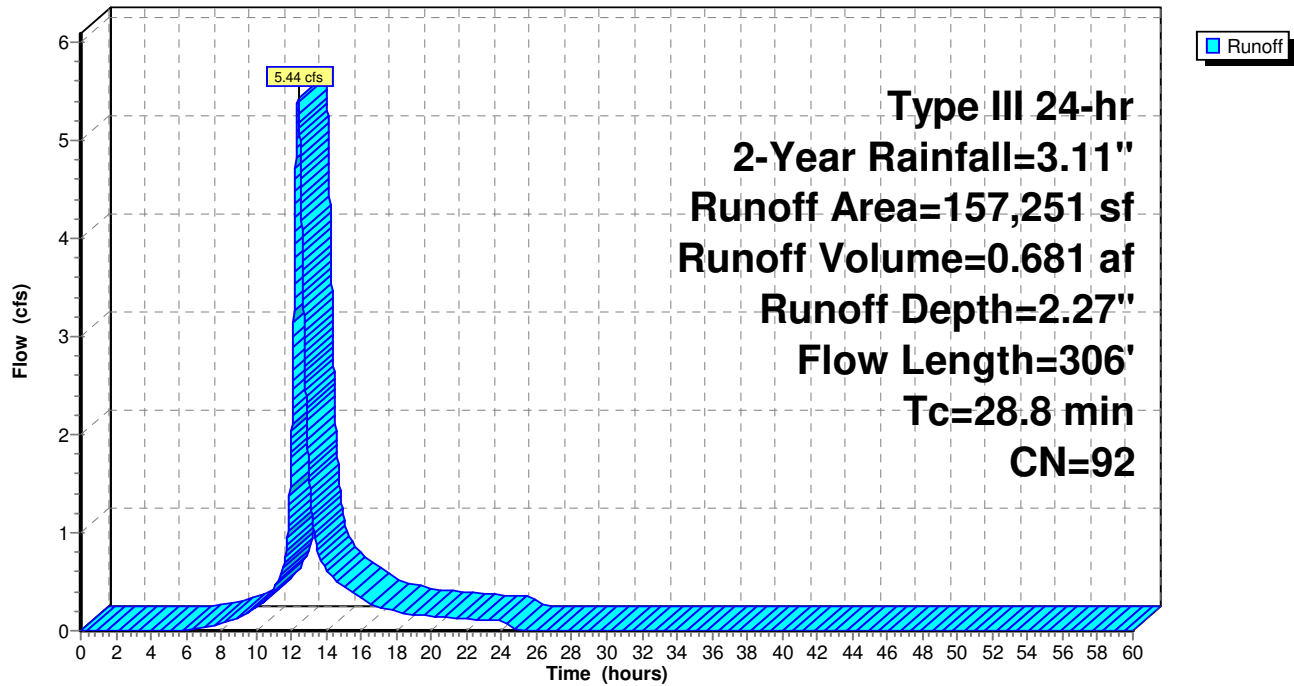
Type III 24-hr 2-Year Rainfall=3.11"

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### Subcatchment P2: P2

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.11"

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**Summary for Subcatchment P3: P3**

Runoff = 0.94 cfs @ 13.19 hrs, Volume= 0.214 af, Depth= 2.00"  
 Routed to Pond EP1\* : EP1\*

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 0         | 61 | >75% Grass cover, Good, HSG B   |
| * | 13,070    | 71 | >75% Grass cover, Good, HSG B/D |
|   | 591       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 0         | 98 | Paved parking, HSG B            |
| * | 12,798    | 98 | Paved parking, HSG B/D          |
|   | 25,742    | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 0         | 55 | Woods, Good, HSG B              |
| * | 3,818     | 66 | Woods, Good, HSG B/D            |
|   | 35        | 70 | Woods, Good, HSG C              |
|   | 56,054    | 89 | Weighted Average                |
|   | 17,514    |    | 31.24% Pervious Area            |
|   | 38,540    |    | 68.76% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                          |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------|
| 68.3        | 100              | 0.0046           | 0.02                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"           |
| 18.4        | 313              | 0.0032           | 0.28                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b> |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                 |
| 86.7        | 413              | Total            |                      |                   |                                                      |

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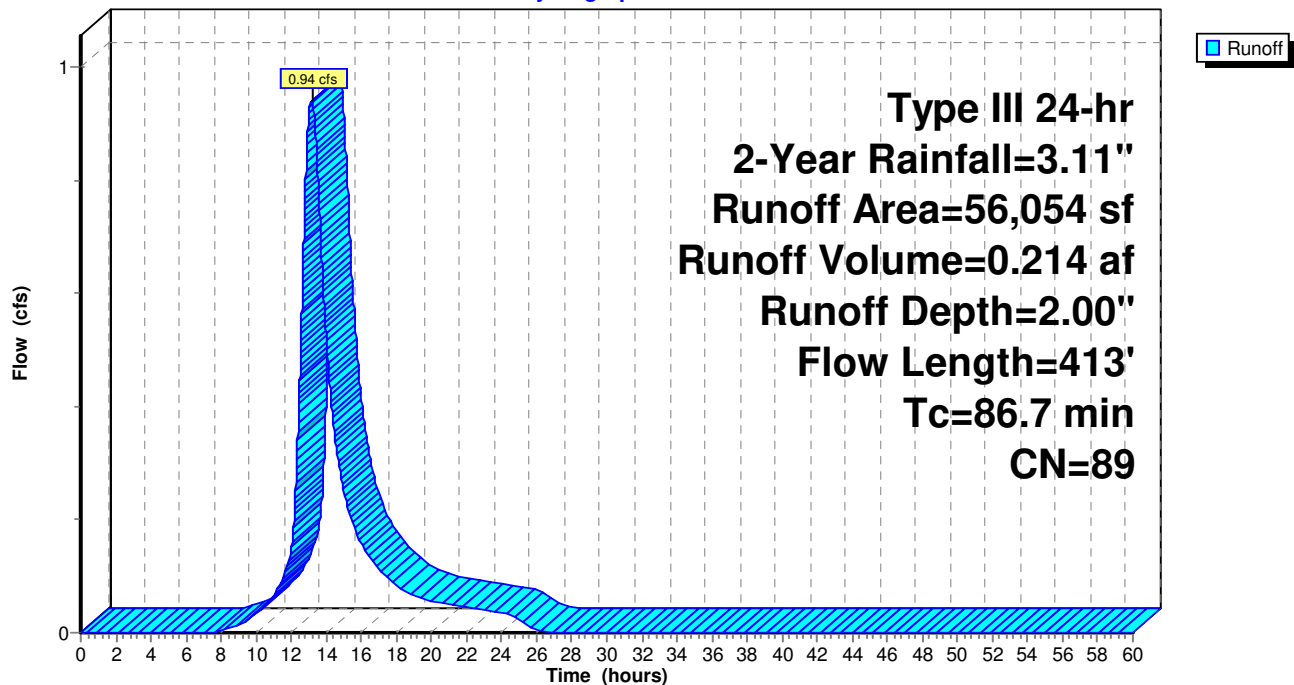
Type III 24-hr 2-Year Rainfall=3.11"

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### Subcatchment P3: P3

Hydrograph



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**Summary for Subcatchment P4: P4**

Runoff = 0.27 cfs @ 12.31 hrs, Volume= 0.031 af, Depth= 0.87"  
 Routed to Link DP3\* : DP3\*

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 630       | 61 | >75% Grass cover, Good, HSG B   |
| * 0       | 71 | >75% Grass cover, Good, HSG B/D |
| 0         | 74 | >75% Grass cover, Good, HSG C   |
| 0         | 98 | Paved parking, HSG A            |
| 5,124     | 98 | Paved parking, HSG B            |
| * 0       | 98 | Paved parking, HSG B/D          |
| 0         | 98 | Paved parking, HSG C            |
| 0         | 30 | Woods, Good, HSG A              |
| 7,037     | 55 | Woods, Good, HSG B              |
| * 0       | 66 | Woods, Good, HSG B/D            |
| 5,983     | 70 | Woods, Good, HSG C              |
| 18,774    | 72 | Weighted Average                |
| 13,650    |    | 72.71% Pervious Area            |
| 5,124     |    | 27.29% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                       |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------|
| 1.7      | 20            | 0.1591        | 0.19              |                | <b>Sheet Flow, Grass Sheet Flow</b><br>Grass: Dense n= 0.240 P2= 3.11"            |
| 16.6     | 55            | 0.0478        | 0.06              |                | <b>Sheet Flow, Woods Sheet Flow</b><br>Woods: Dense underbrush n= 0.800 P2= 3.11" |
| 0.6      | 25            | 0.0066        | 0.66              |                | <b>Sheet Flow, Impervious Sheet Flow</b><br>Smooth surfaces n= 0.011 P2= 3.11"    |
| 1.8      | 185           | 0.0068        | 1.67              |                | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b><br>Paved Kv= 20.3 fps   |
| 20.7     | 285           | Total         |                   |                |                                                                                   |

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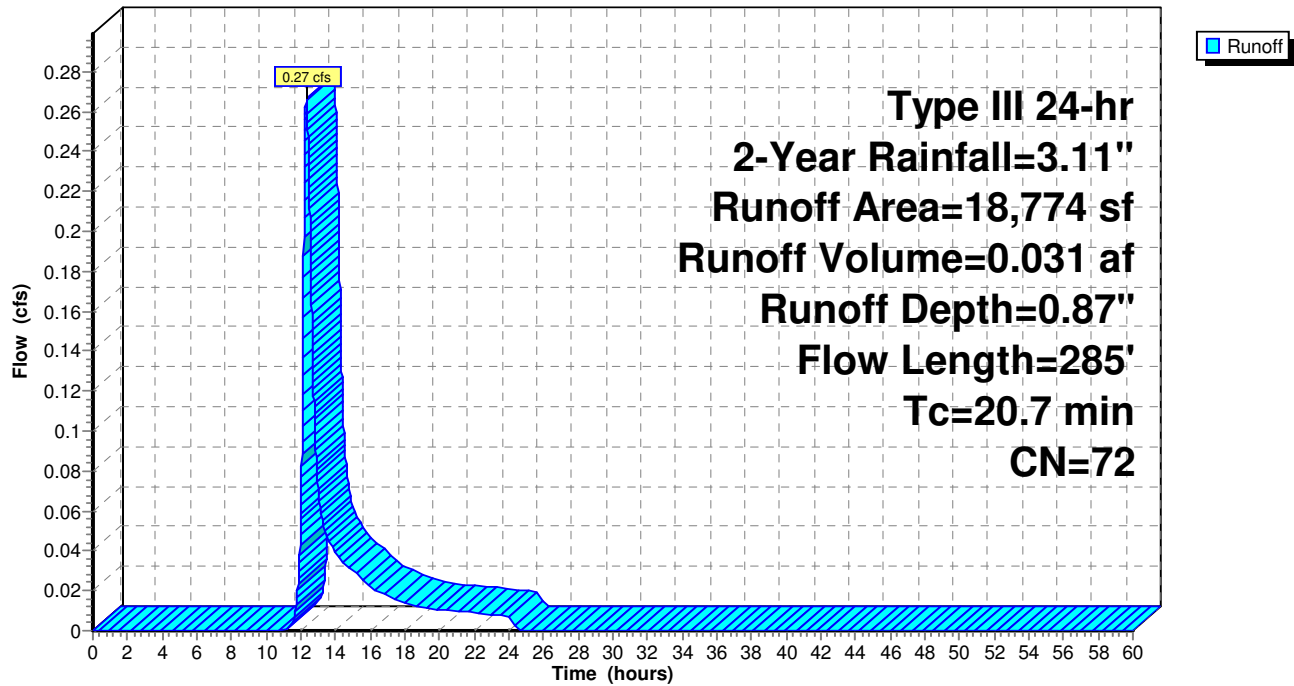
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### Subcatchment P4: P4

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**Summary for Subcatchment P5: P5**

Runoff = 0.29 cfs @ 12.27 hrs, Volume= 0.032 af, Depth= 0.93"  
 Routed to Link DP3\* : DP3\*

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 3,623     | 61 | >75% Grass cover, Good, HSG B   |
| * | 0         | 71 | >75% Grass cover, Good, HSG B/D |
|   | 186       | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 5,968     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 0         | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 4,890     | 55 | Woods, Good, HSG B              |
| * | 0         | 66 | Woods, Good, HSG B/D            |
|   | 3,626     | 70 | Woods, Good, HSG C              |
|   | 18,293    | 73 | Weighted Average                |
|   | 12,325    |    | 67.38% Pervious Area            |
|   | 5,968     |    | 32.62% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 14.9        | 65               | 0.0871           | 0.07                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 0.7         | 35               | 0.0113           | 0.87                 |                   | <b>Sheet Flow, Impervious Sheet Flow</b>                  |
|             |                  |                  |                      |                   | Smooth surfaces n= 0.011 P2= 3.11"                        |
| 2.5         | 224              | 0.0055           | 1.51                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 18.1        | 324              | Total            |                      |                   |                                                           |

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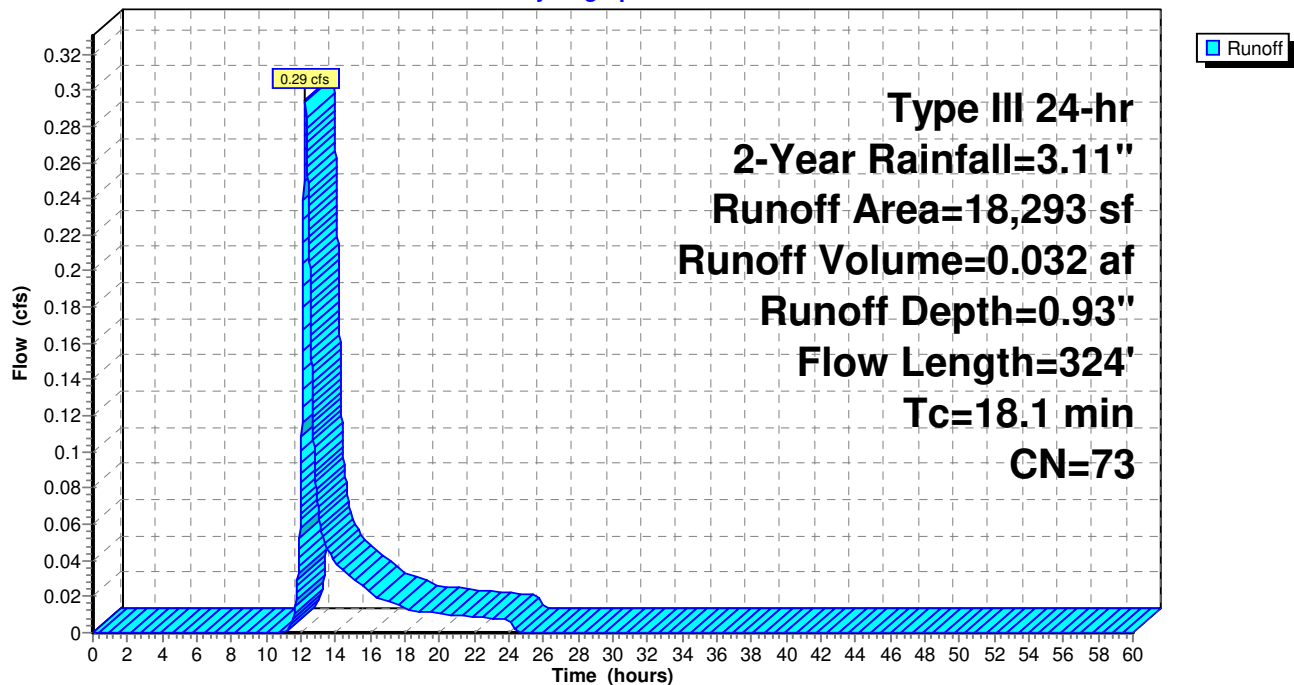
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### Subcatchment P5: P5

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**Summary for Subcatchment P6: P6**

Runoff = 0.31 cfs @ 13.22 hrs, Volume= 0.076 af, Depth= 0.78"  
 Routed to Link DP3\* : DP3\*

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
|   | 1,285     | 61 | >75% Grass cover, Good, HSG B   |
| * | 20        | 71 | >75% Grass cover, Good, HSG B/D |
|   | 3,754     | 74 | >75% Grass cover, Good, HSG C   |
|   | 0         | 98 | Paved parking, HSG A            |
|   | 2,999     | 98 | Paved parking, HSG B            |
| * | 0         | 98 | Paved parking, HSG B/D          |
|   | 55        | 98 | Paved parking, HSG C            |
|   | 0         | 30 | Woods, Good, HSG A              |
|   | 5,069     | 55 | Woods, Good, HSG B              |
| * | 9,032     | 66 | Woods, Good, HSG B/D            |
|   | 28,978    | 70 | Woods, Good, HSG C              |
|   | 51,192    | 70 | Weighted Average                |
|   | 48,138    |    | 94.03% Pervious Area            |
|   | 3,054     |    | 5.97% Impervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                               |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------|
| 66.0        | 100              | 0.0050           | 0.03                 |                   | <b>Sheet Flow, Woods Sheet Flow</b>                       |
|             |                  |                  |                      |                   | Woods: Dense underbrush n= 0.800 P2= 3.11"                |
| 10.8        | 205              | 0.0040           | 0.32                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 2.1         | 49               | 0.0058           | 0.38                 |                   | <b>Shallow Concentrated Flow, Woods Shallow Flow</b>      |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                                      |
| 1.0         | 98               | 0.0069           | 1.69                 |                   | <b>Shallow Concentrated Flow, Impervious Shallow Flow</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                        |
| 79.9        | 452              | Total            |                      |                   |                                                           |

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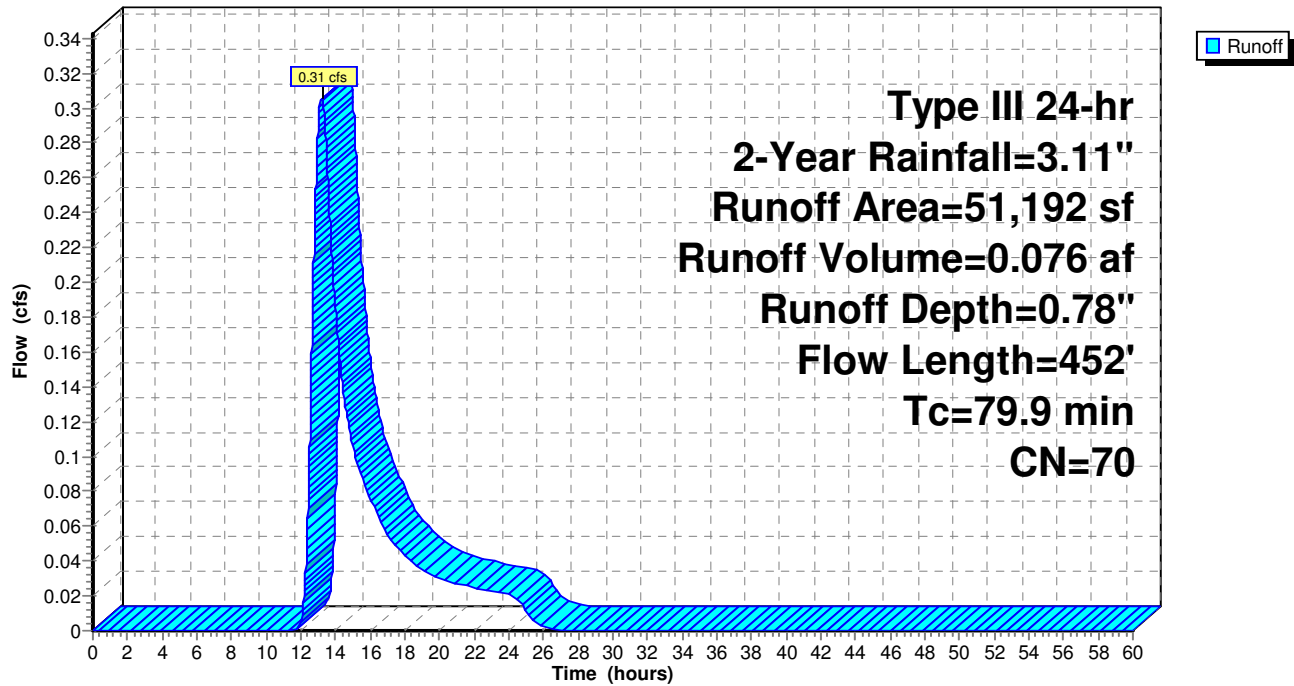
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### Subcatchment P6: P6

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### Summary for Subcatchment P7: P7

Runoff = 0.06 cfs @ 12.10 hrs, Volume= 0.004 af, Depth= 0.93"  
Routed to Link DP2\* : DP2\*

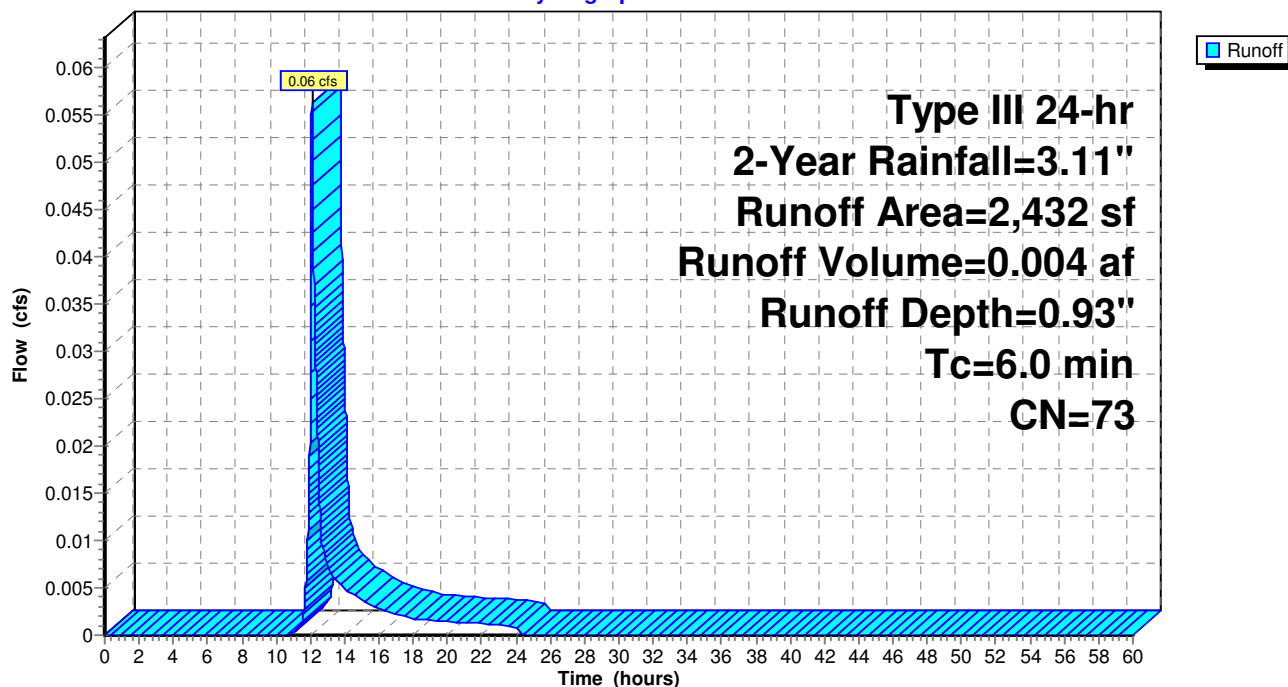
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-Year Rainfall=3.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 313       | 70 | >75% Grass cover, Good, HSG B/D |
|   | 2,119     | 74 | >75% Grass cover, Good, HSG C   |
|   | 2,432     | 73 | Weighted Average                |
|   | 2,432     |    | 100.00% Pervious Area           |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, |

### Subcatchment P7: P7

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**Summary for Pond EP1\*: EP1\***

Inflow Area = 4.897 ac, 73.51% Impervious, Inflow Depth > 2.19" for 2-Year event  
 Inflow = 4.45 cfs @ 12.70 hrs, Volume= 0.894 af  
 Outflow = 4.31 cfs @ 12.82 hrs, Volume= 0.894 af, Atten= 3%, Lag= 7.5 min  
 Primary = 3.87 cfs @ 12.82 hrs, Volume= 0.884 af  
     Routed to Link DP1\* : DP1\*  
 Secondary = 0.44 cfs @ 12.82 hrs, Volume= 0.010 af  
     Routed to Link DP2\* : DP2\*

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 73.93' @ 12.82 hrs Surf.Area= 5,826 sf Storage= 2,421 cf

Plug-Flow detention time= 10.1 min calculated for 0.894 af (100% of inflow)  
 Center-of-Mass det. time= 10.1 min ( 896.1 - 886.0 )

| Volume | Invert | Avail.Storage | Storage Description                            |
|--------|--------|---------------|------------------------------------------------|
| #1     | 72.98' | 26,597 cf     | <b>Swale (Pyramidal)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 72.98               | 5                    | 0                         | 0                         | 5                   |
| 73.00               | 408                  | 3                         | 3                         | 408                 |
| 74.00               | 6,458                | 2,830                     | 2,833                     | 6,461               |
| 75.00               | 47,348               | 23,764                    | 26,597                    | 47,356              |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                 |
|--------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b><br>L= 47.7' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900<br>n= 0.013, Flow Area= 4.91 sf                                                                                      |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50<br>Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68<br>2.72 2.81 2.92 2.97 3.07 3.32 |

**Primary OutFlow** Max=3.87 cfs @ 12.82 hrs HW=73.93' TW=0.00' (Dynamic Tailwater)

↑ **1=RCP\_Round 30"** (Barrel Controls 3.87 cfs @ 3.34 fps)

**Secondary OutFlow** Max=0.44 cfs @ 12.82 hrs HW=73.93' TW=0.00' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.44 cfs @ 0.44 fps)

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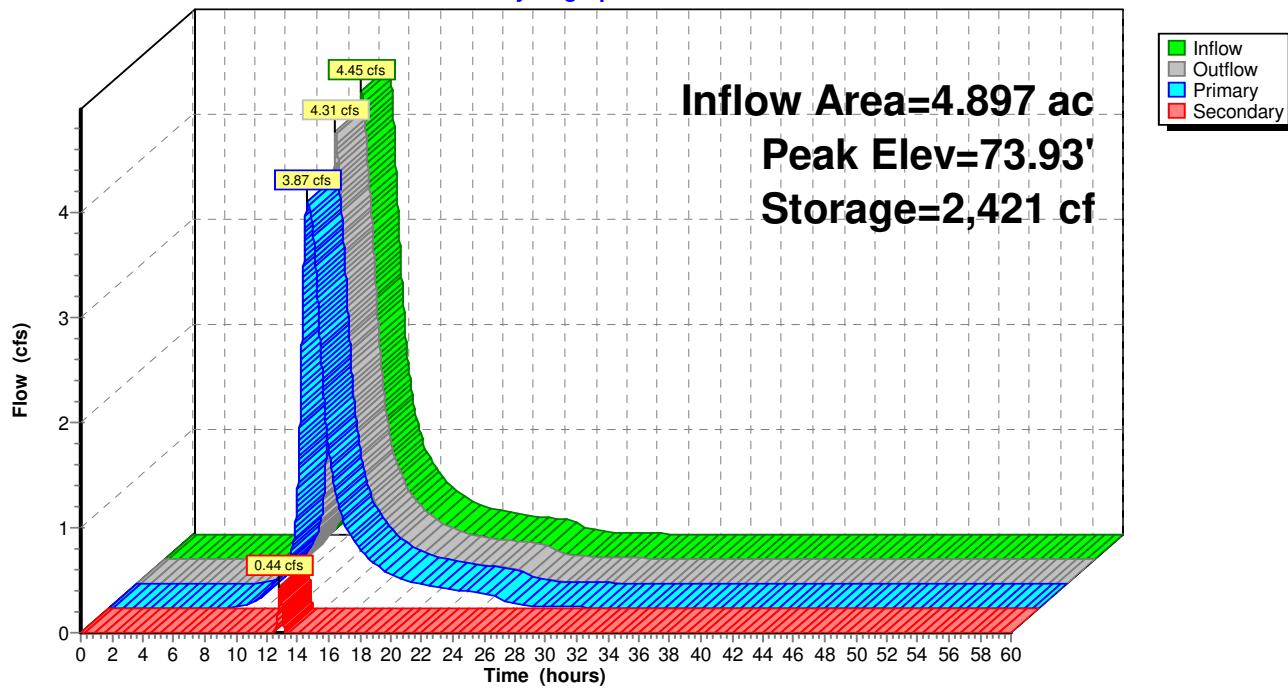
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### Pond EP1\*: EP1\*

Hydrograph



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**Summary for Pond PP1: PP1**

Inflow Area = 3.610 ac, 75.21% Impervious, Inflow Depth = 2.27" for 2-Year event  
 Inflow = 5.44 cfs @ 12.38 hrs, Volume= 0.681 af  
 Outflow = 3.81 cfs @ 12.65 hrs, Volume= 0.680 af, Atten= 30%, Lag= 15.6 min  
 Primary = 3.81 cfs @ 12.65 hrs, Volume= 0.680 af  
 Routed to Pond EP1\* : EP1\*

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Starting Elev= 74.00' Surf.Area= 8,585 sf Storage= 8,785 cf

Peak Elev= 74.72' @ 12.65 hrs Surf.Area= 10,835 sf Storage= 15,744 cf (6,959 cf above start)

Plug-Flow detention time= 227.5 min calculated for 0.478 af (70% of inflow)

Center-of-Mass det. time= 65.7 min ( 885.7 - 819.9 )

| Volume | Invert | Avail.Storage | Storage Description                             |
|--------|--------|---------------|-------------------------------------------------|
| #1     | 72.00' | 32,752 cf     | <b>Pond 1 (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 72.00               | 2,385                | 0                         | 0                         |
| 73.00               | 3,300                | 2,843                     | 2,843                     |
| 74.00               | 8,585                | 5,943                     | 8,785                     |
| 75.00               | 11,725               | 10,155                    | 18,940                    |
| 76.00               | 15,899               | 13,812                    | 32,752                    |

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                             |
|--------|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 74.00' | <b>18.0" Round Culvert X 2.00</b><br>L= 19.0' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 74.00' / 73.80' S= 0.0105 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.81 cfs @ 12.65 hrs HW=74.72' TW=73.89' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 3.81 cfs @ 3.35 fps)

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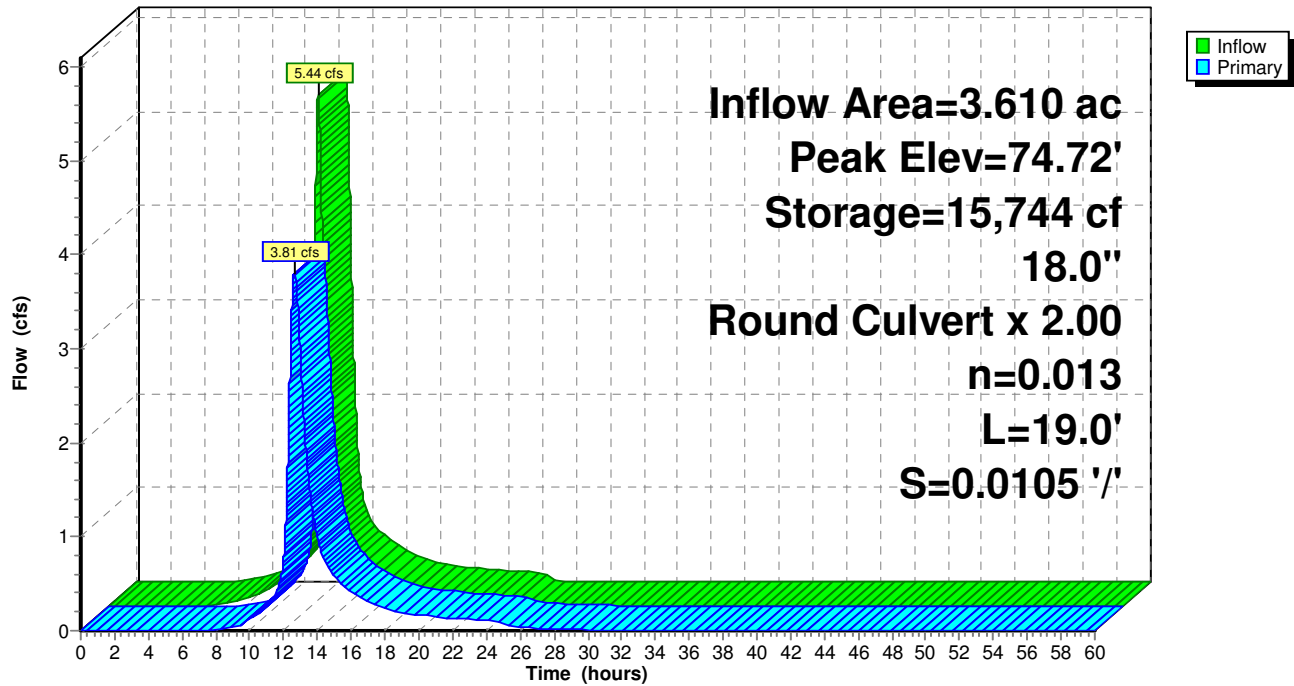
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### Pond PP1: PP1

Hydrograph



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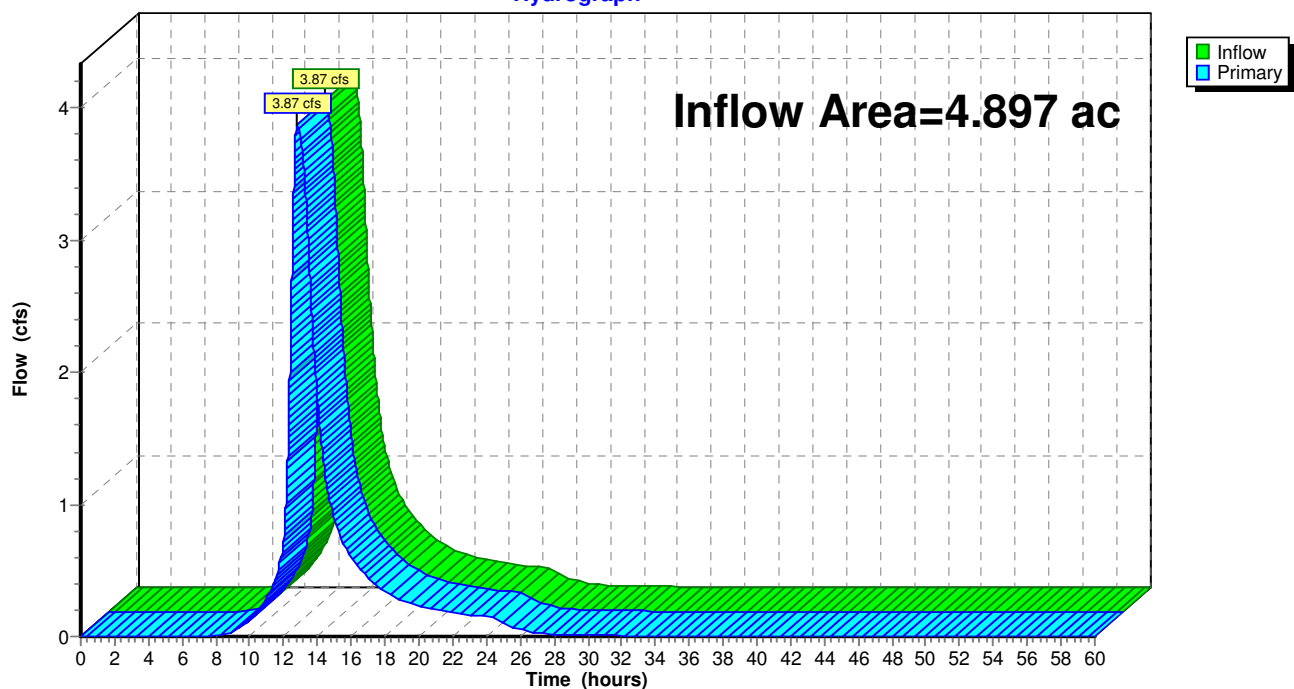
### Summary for Link DP1\*: DP1\*

Inflow Area = 4.897 ac, 73.51% Impervious, Inflow Depth > 2.17" for 2-Year event  
Inflow = 3.87 cfs @ 12.82 hrs, Volume= 0.884 af  
Primary = 3.87 cfs @ 12.82 hrs, Volume= 0.884 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP1\*: DP1\*

Hydrograph



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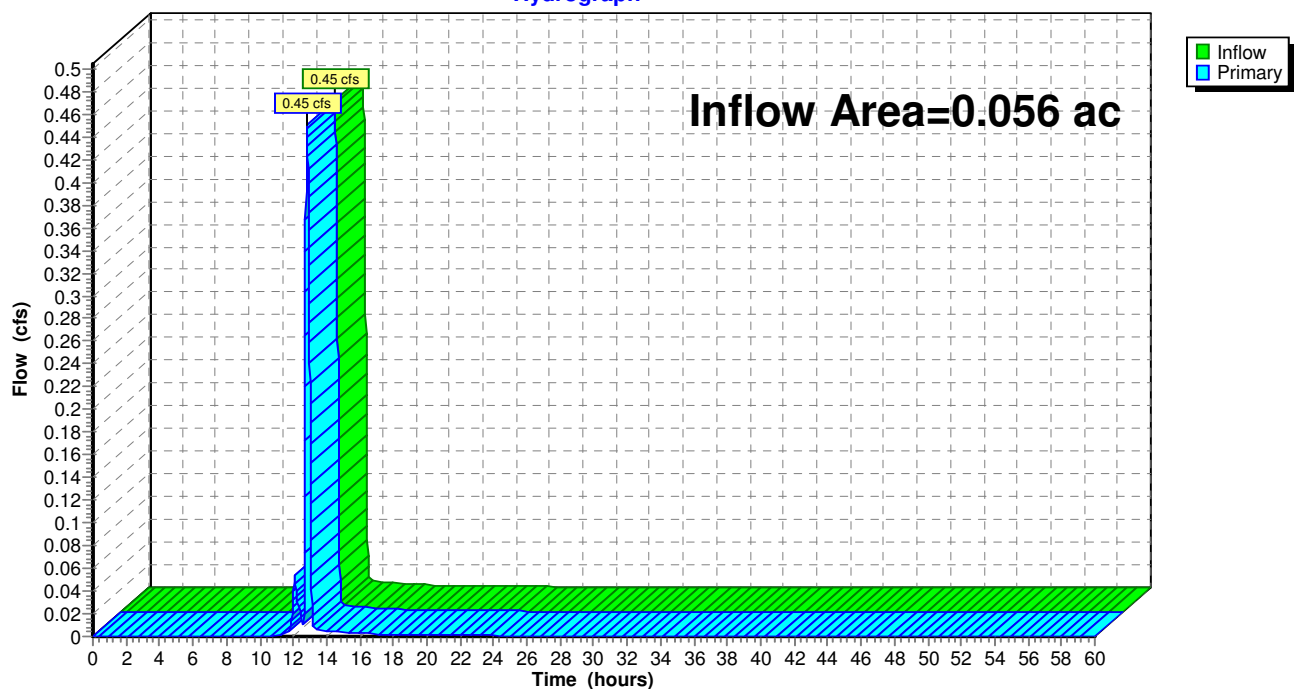
### Summary for Link DP2\*: DP2\*

Inflow Area = 0.056 ac, 0.00% Impervious, Inflow Depth = 3.11" for 2-Year event  
Inflow = 0.45 cfs @ 12.82 hrs, Volume= 0.014 af  
Primary = 0.45 cfs @ 12.82 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP2\*: DP2\*

Hydrograph



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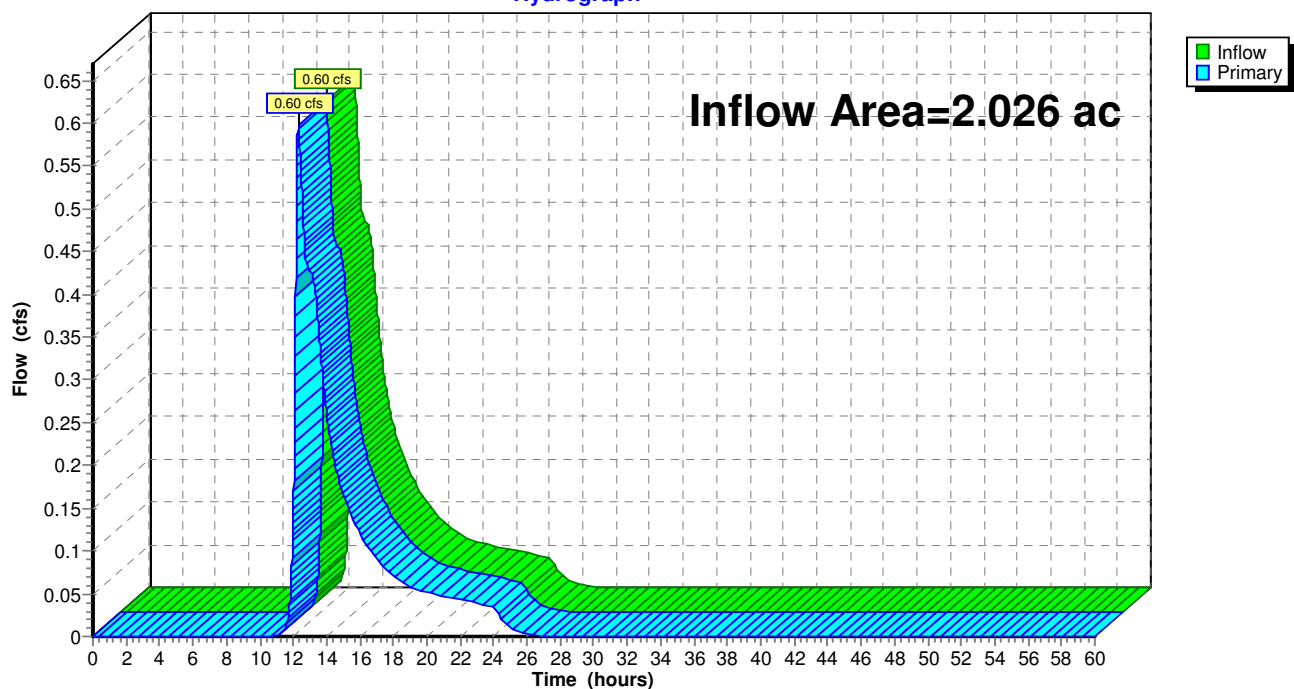
### Summary for Link DP3\*: DP3\*

Inflow Area = 2.026 ac, 16.03% Impervious, Inflow Depth = 0.83" for 2-Year event  
Inflow = 0.60 cfs @ 12.31 hrs, Volume= 0.140 af  
Primary = 0.60 cfs @ 12.31 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

### Link DP3\*: DP3\*

Hydrograph



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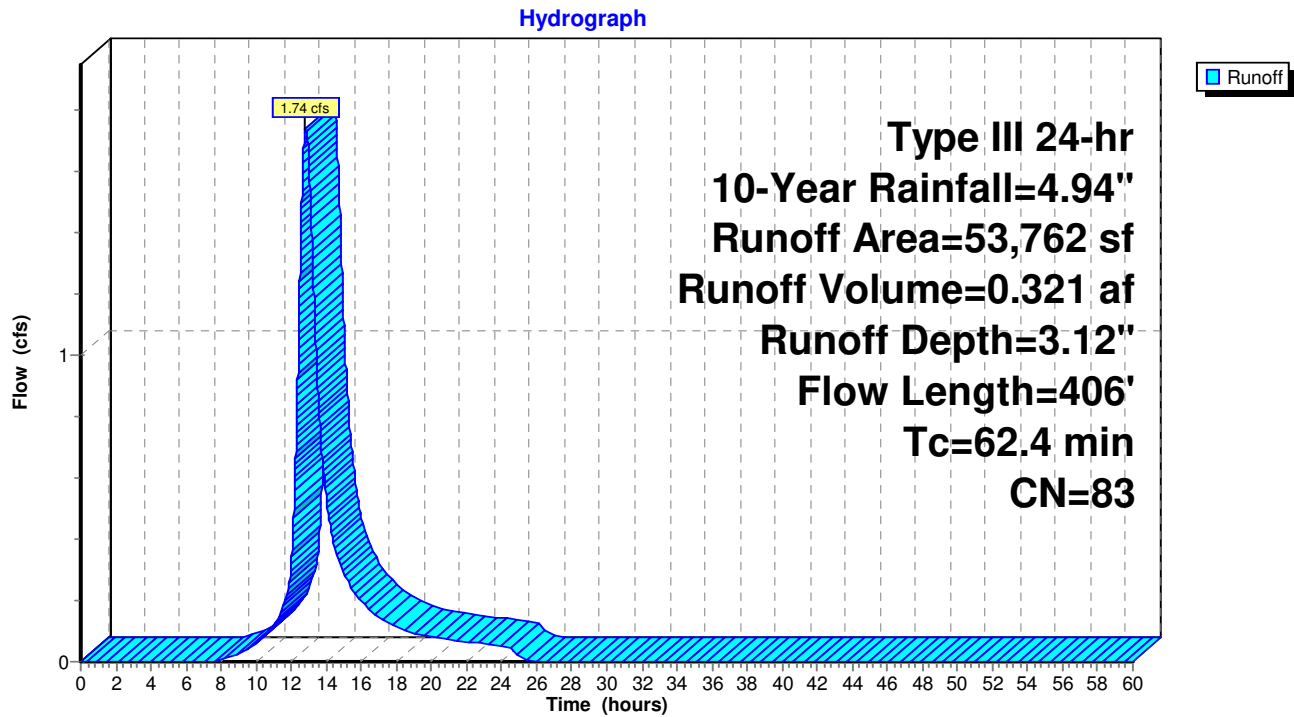
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Type III 24-hr 10-Year Rainfall=4.94"

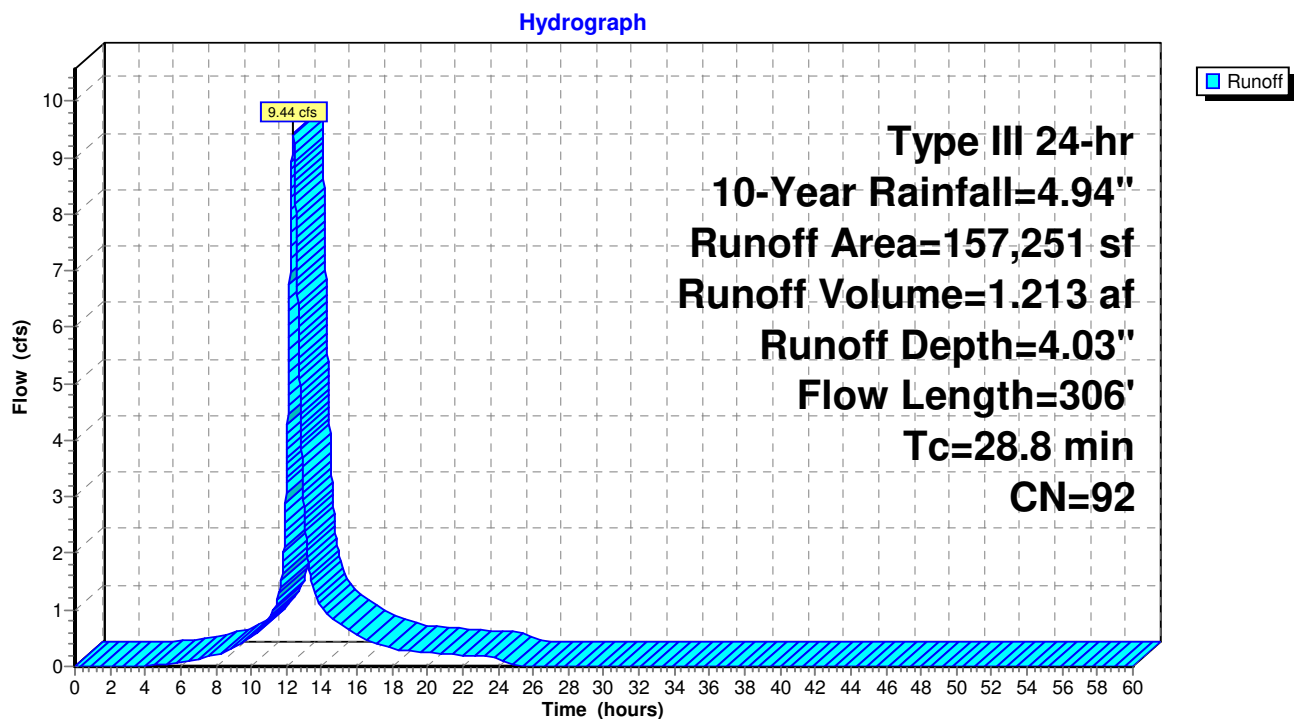
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### Subcatchment P1: P1 (DP4\*)



### Subcatchment P2: P2



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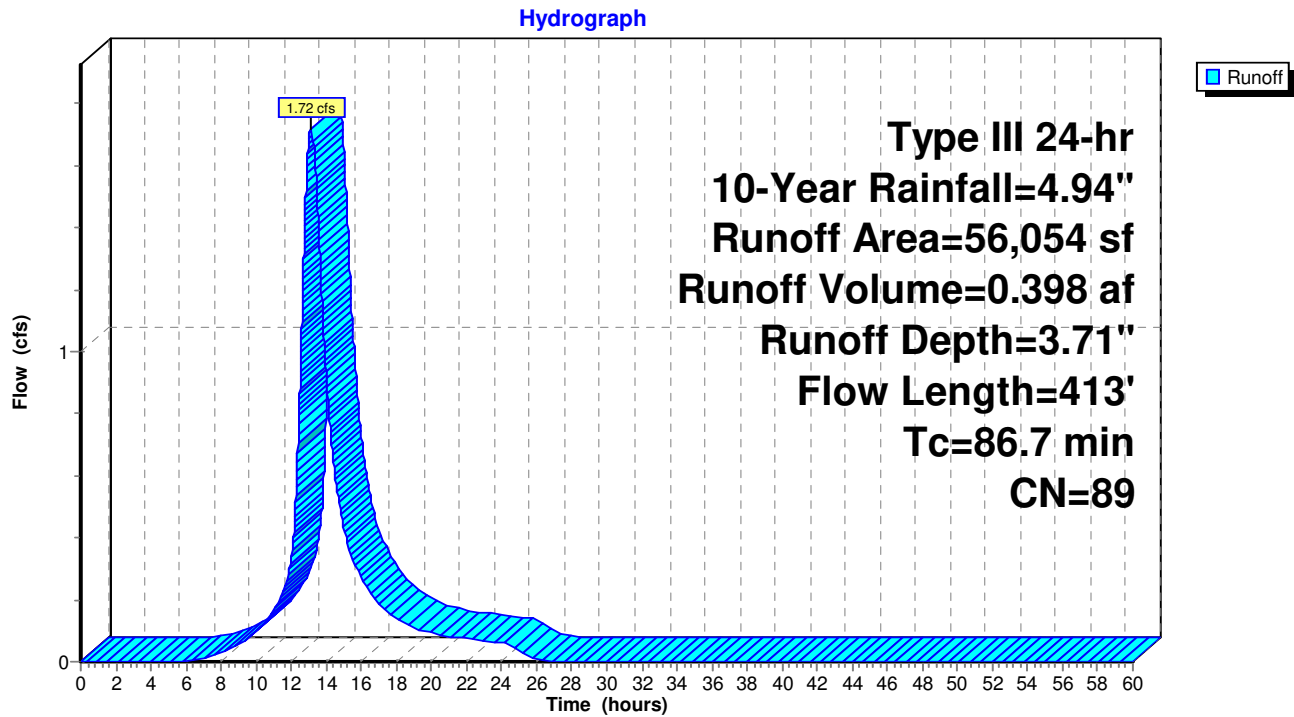
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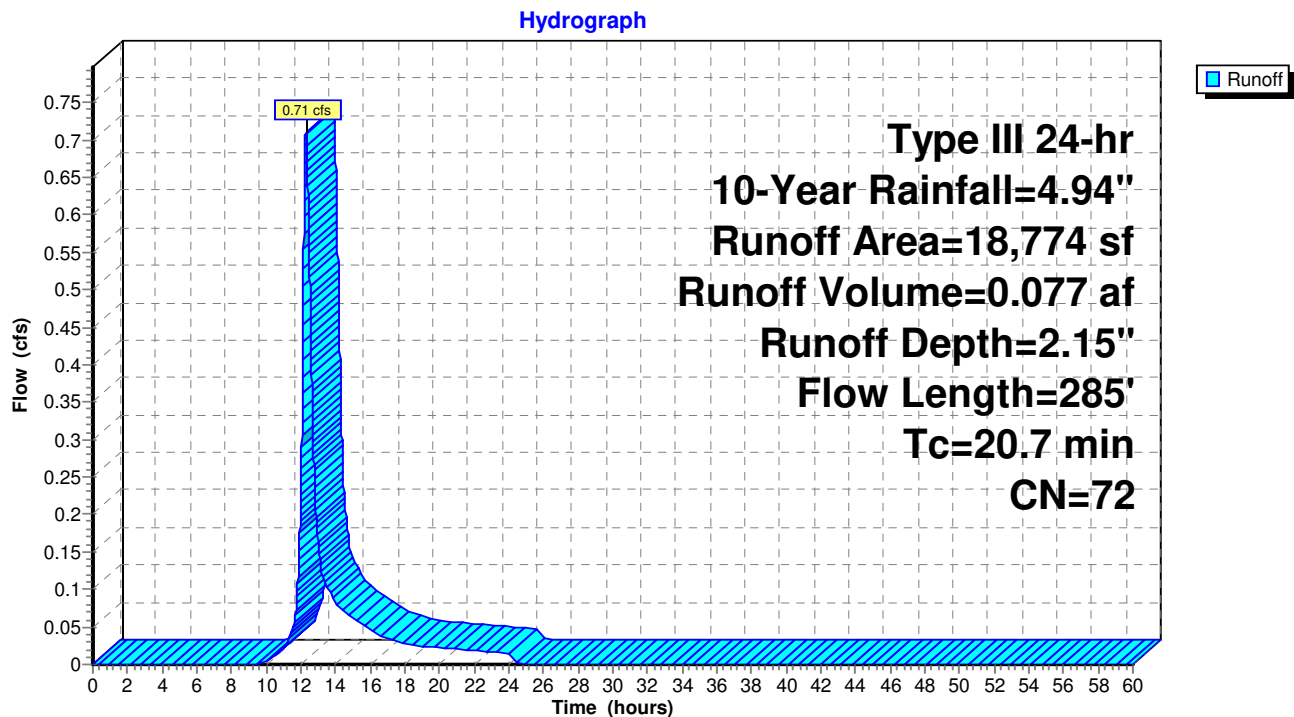
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### Subcatchment P3: P3



### Subcatchment P4: P4



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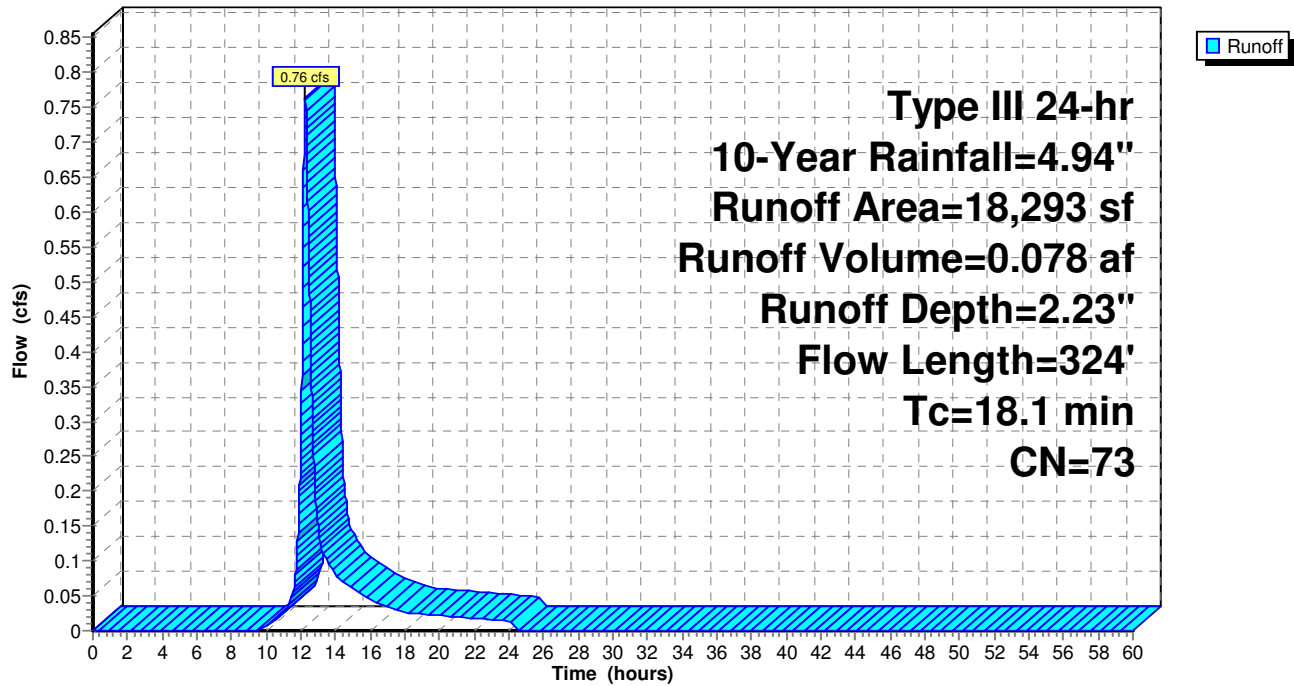
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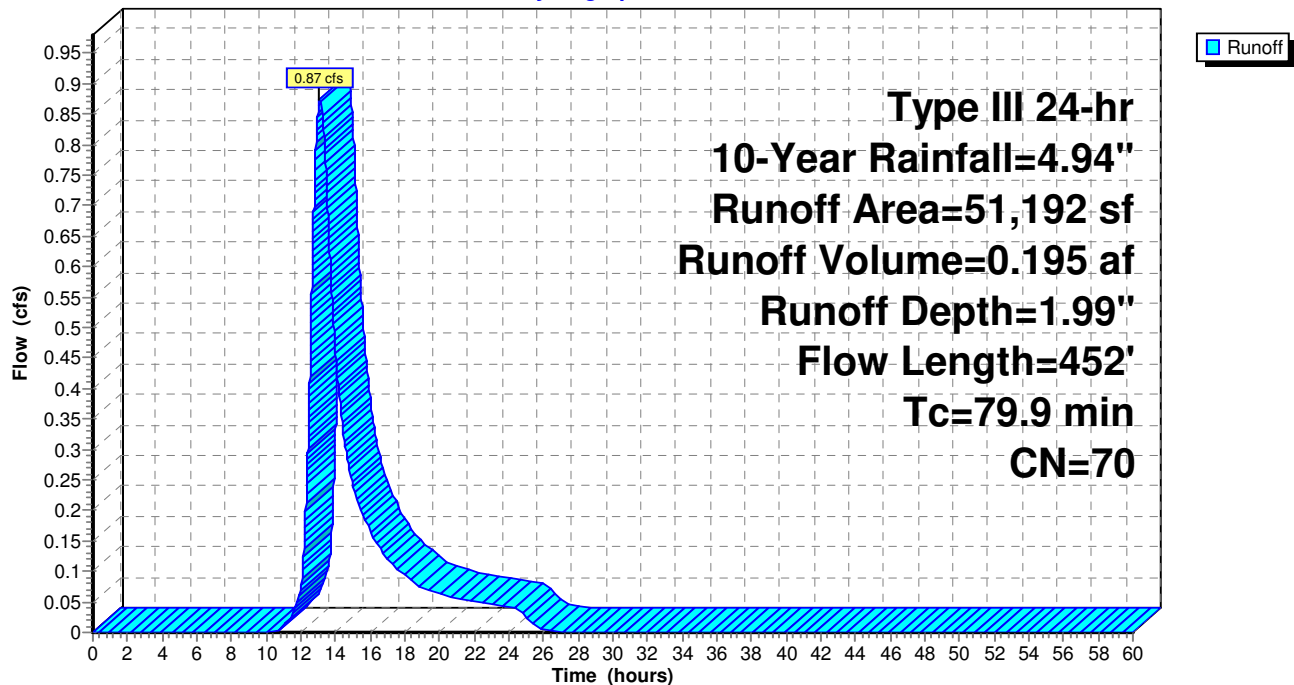
### Subcatchment P5: P5

Hydrograph



### Subcatchment P6: P6

Hydrograph



## 2509.P HydroCAD

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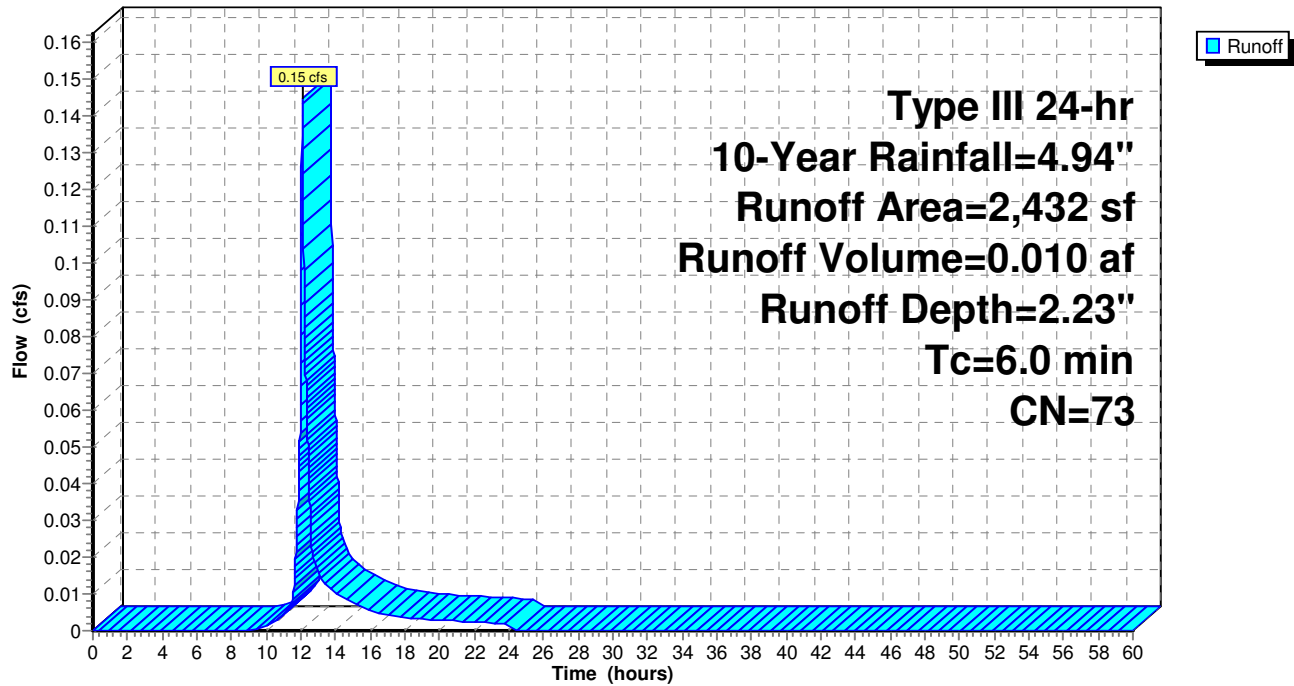
Proposed Conditions  
Type III 24-hr 10-Year Rainfall=4.94"

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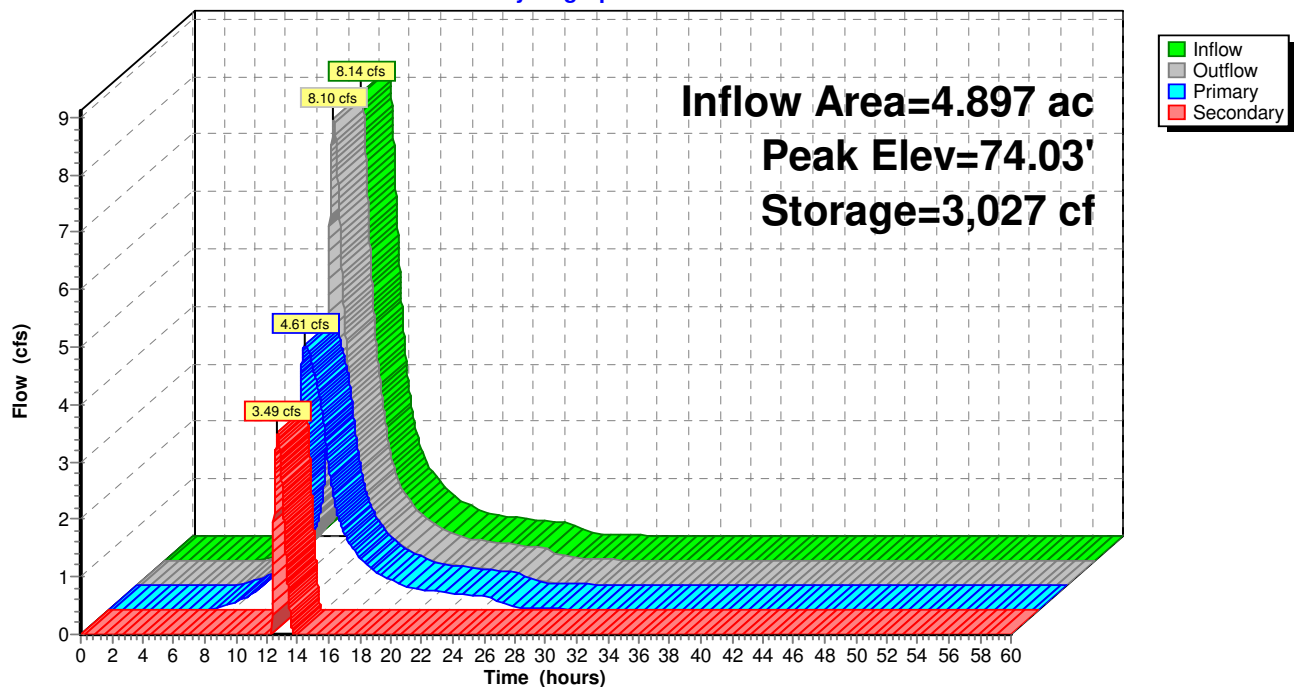
### Subcatchment P7: P7

Hydrograph



### Pond EP1\*: EP1\*

Hydrograph



## 2509.P HydroCAD

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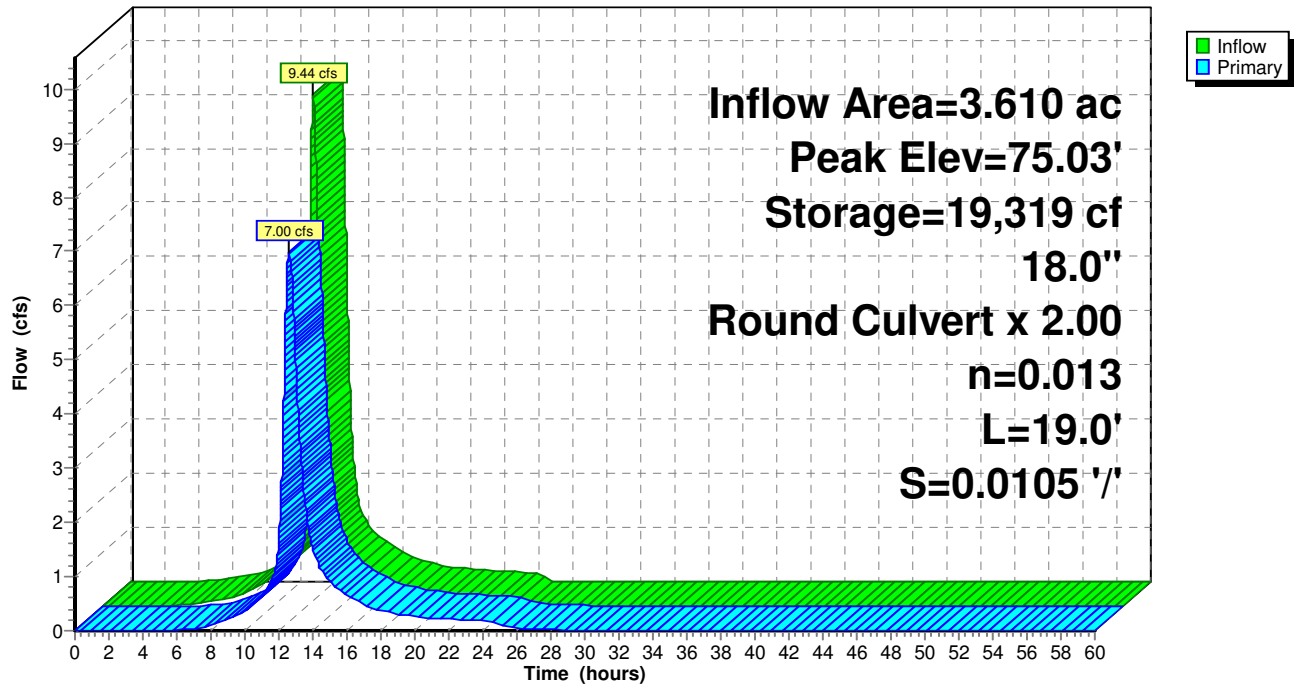
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Type III 24-hr 10-Year Rainfall=4.94"

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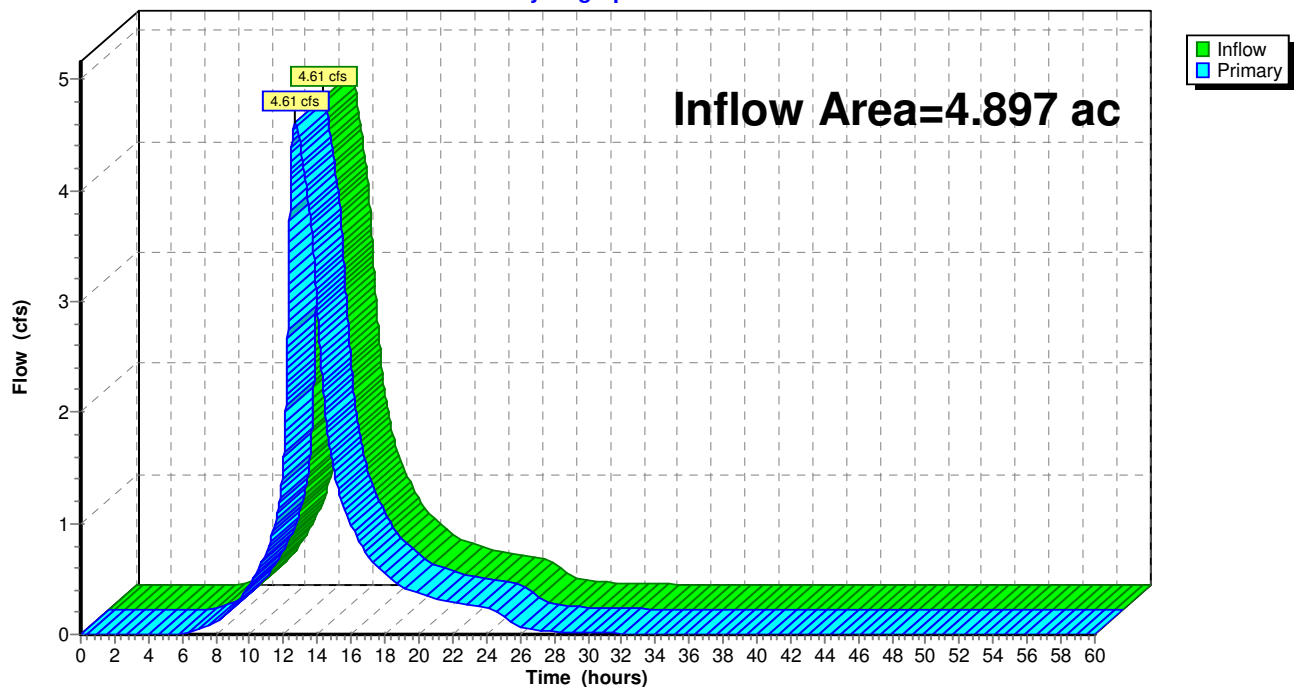
### Pond PP1: PP1

Hydrograph



### Link DP1\*: DP1\*

Hydrograph



## 2509.P HydroCAD

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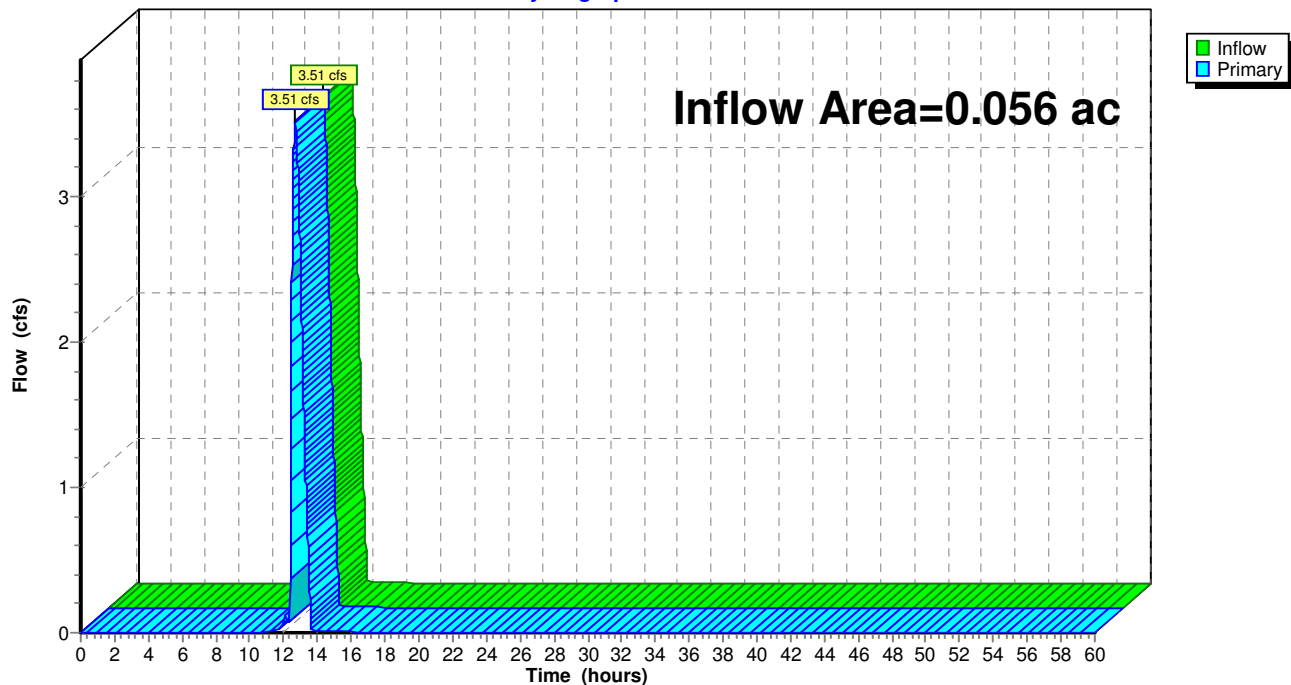
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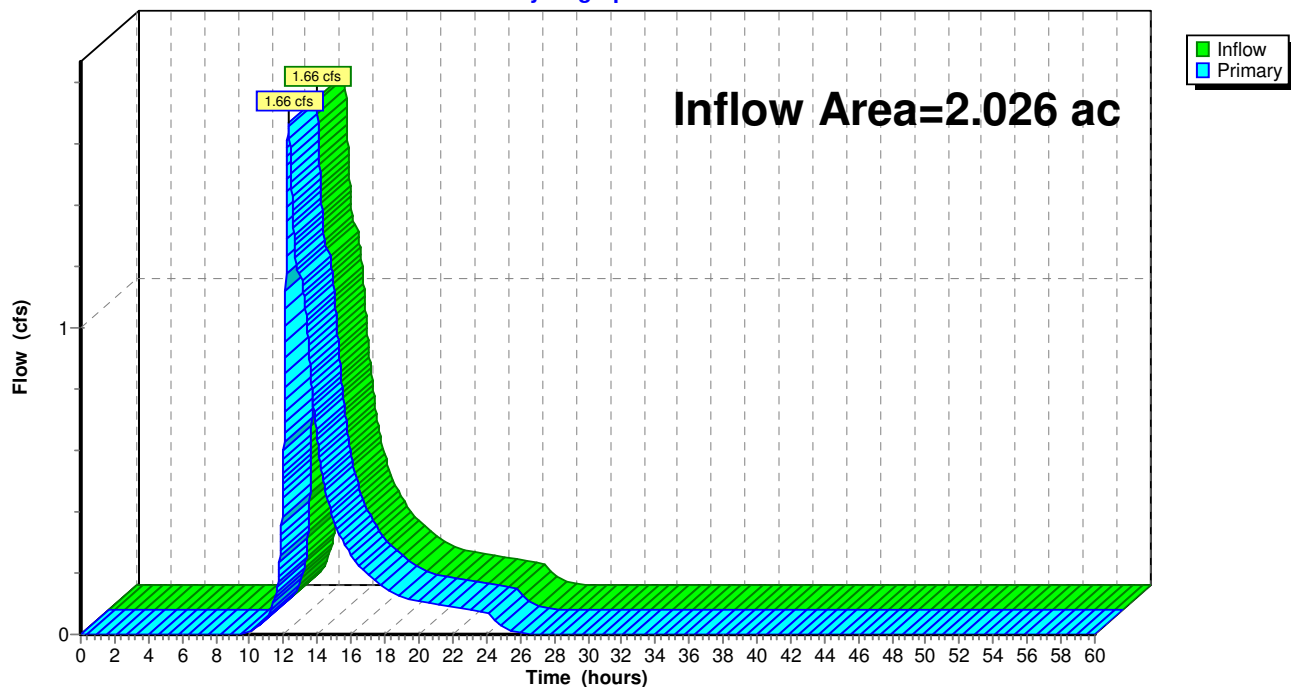
### Link DP2\*: DP2\*

Hydrograph



### Link DP3\*: DP3\*

Hydrograph



## 2509.P HydroCAD

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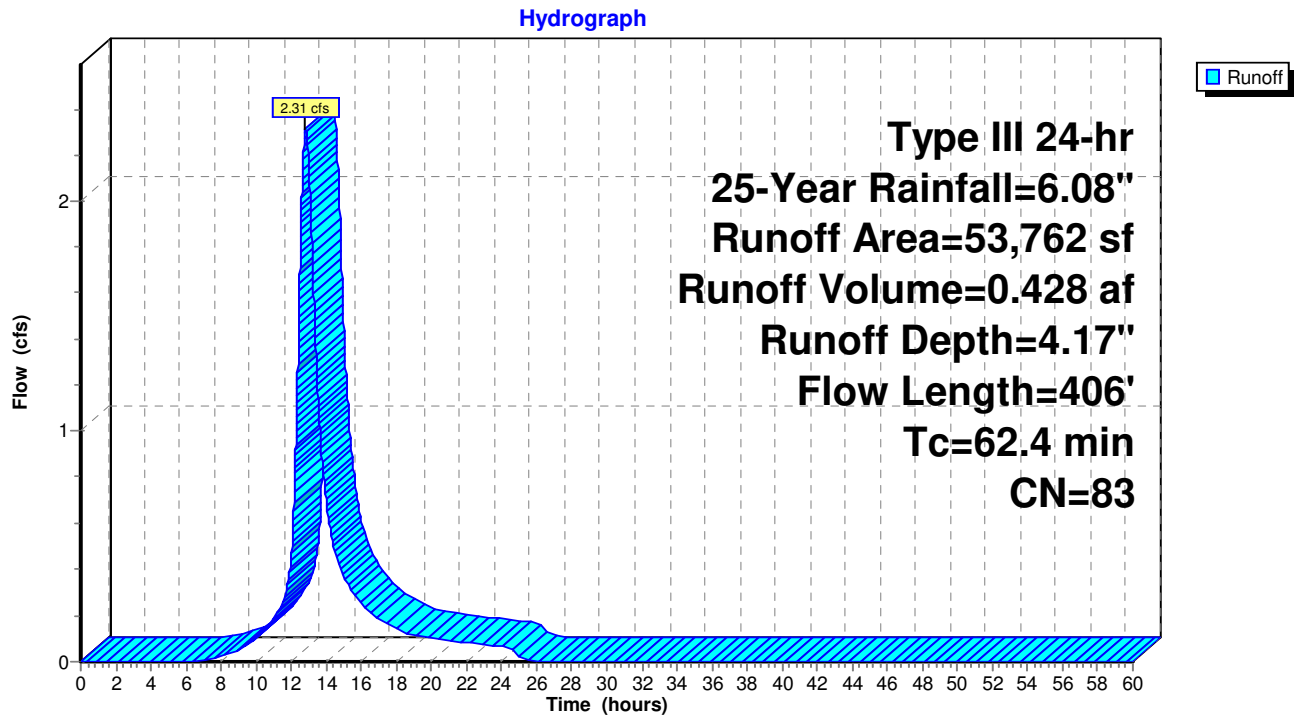
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Proposed Conditions  
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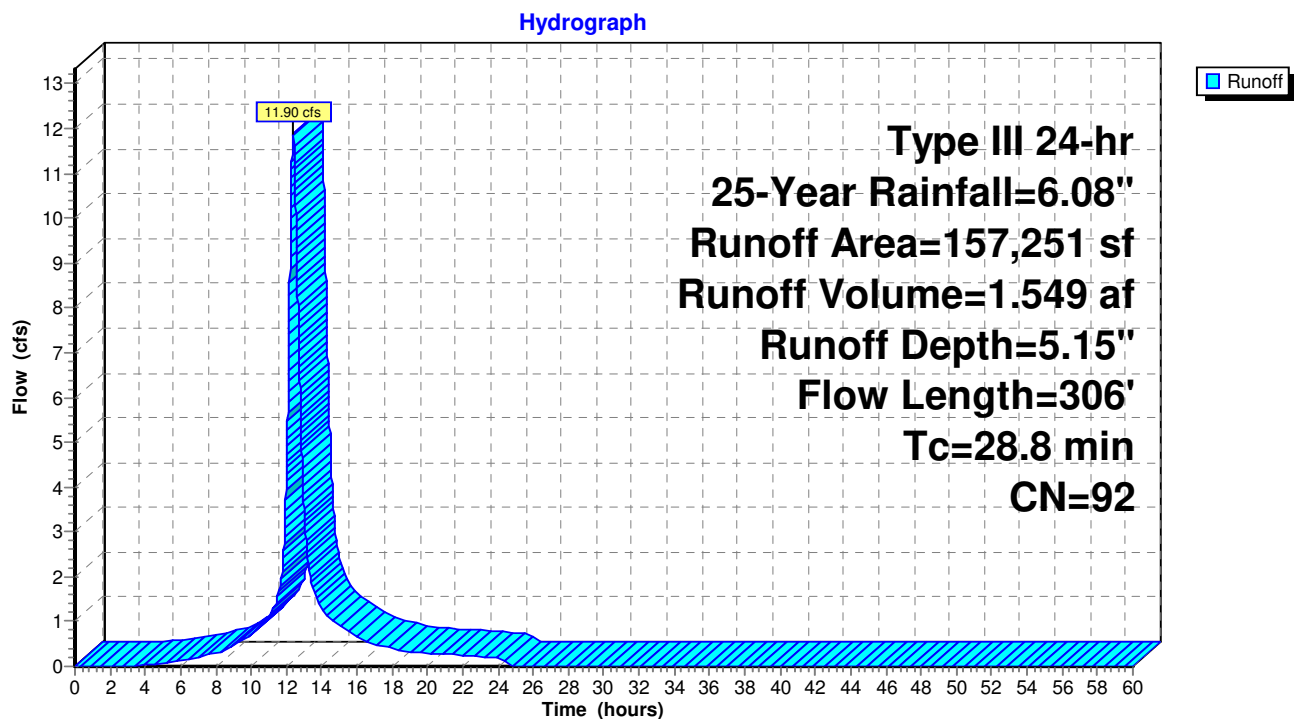
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### Subcatchment P1: P1 (DP4\*)



### Subcatchment P2: P2



## 2509.P HydroCAD

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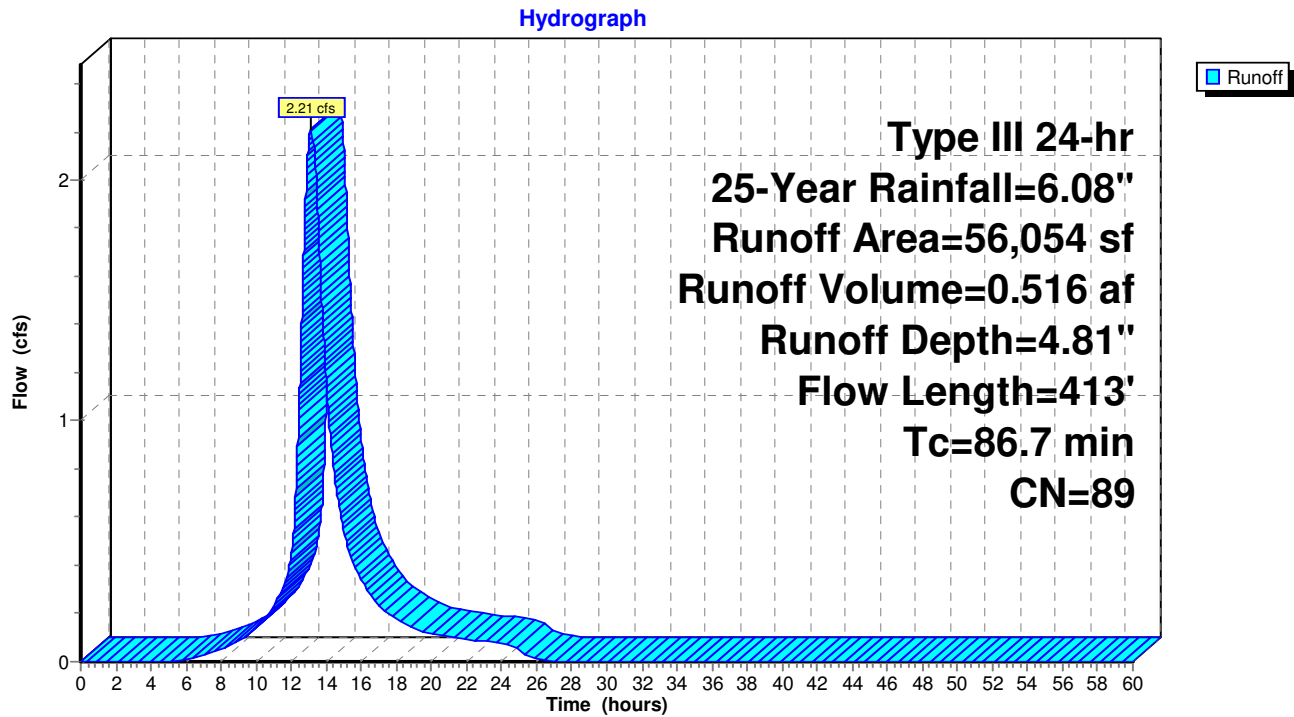
HydroCAD® 10.10-7c s/n 09320 © 2022 HydroCAD Software Solutions LLC

Proposed Conditions  
Type III 24-hr 25-Year Rainfall=6.08"

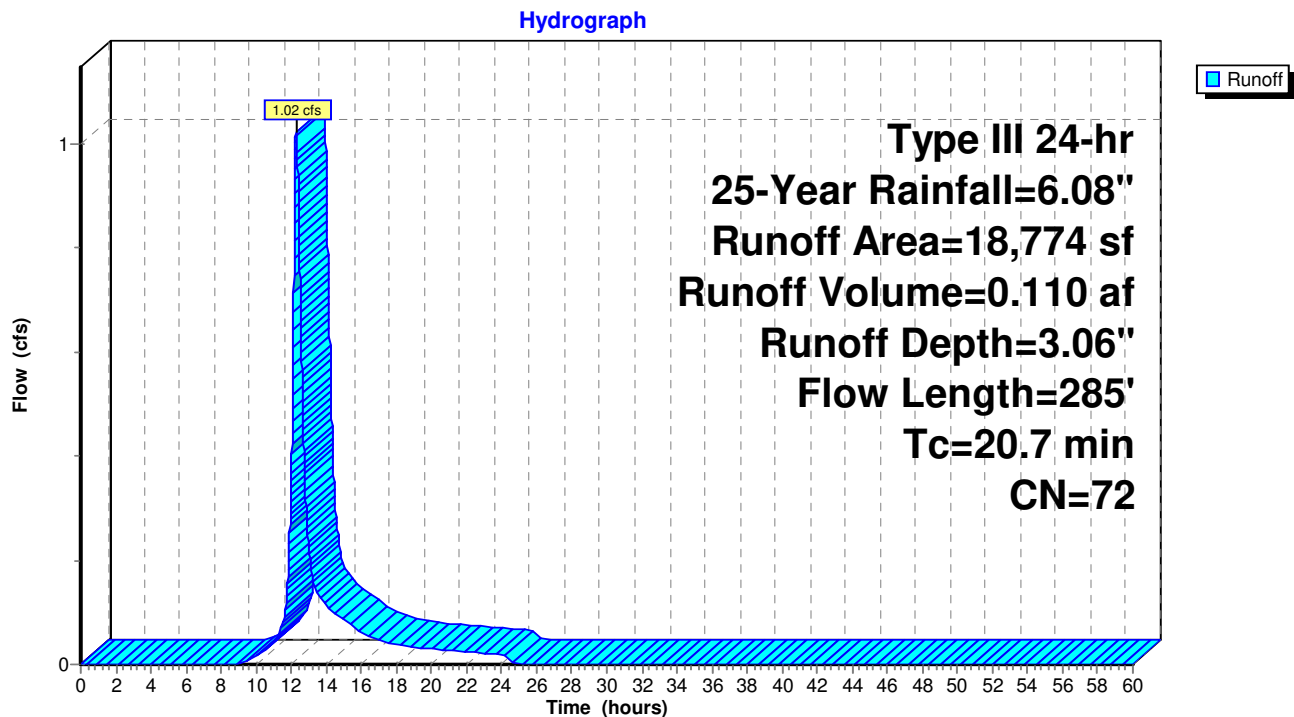
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### Subcatchment P3: P3



### Subcatchment P4: P4



## 2509.P HydroCAD

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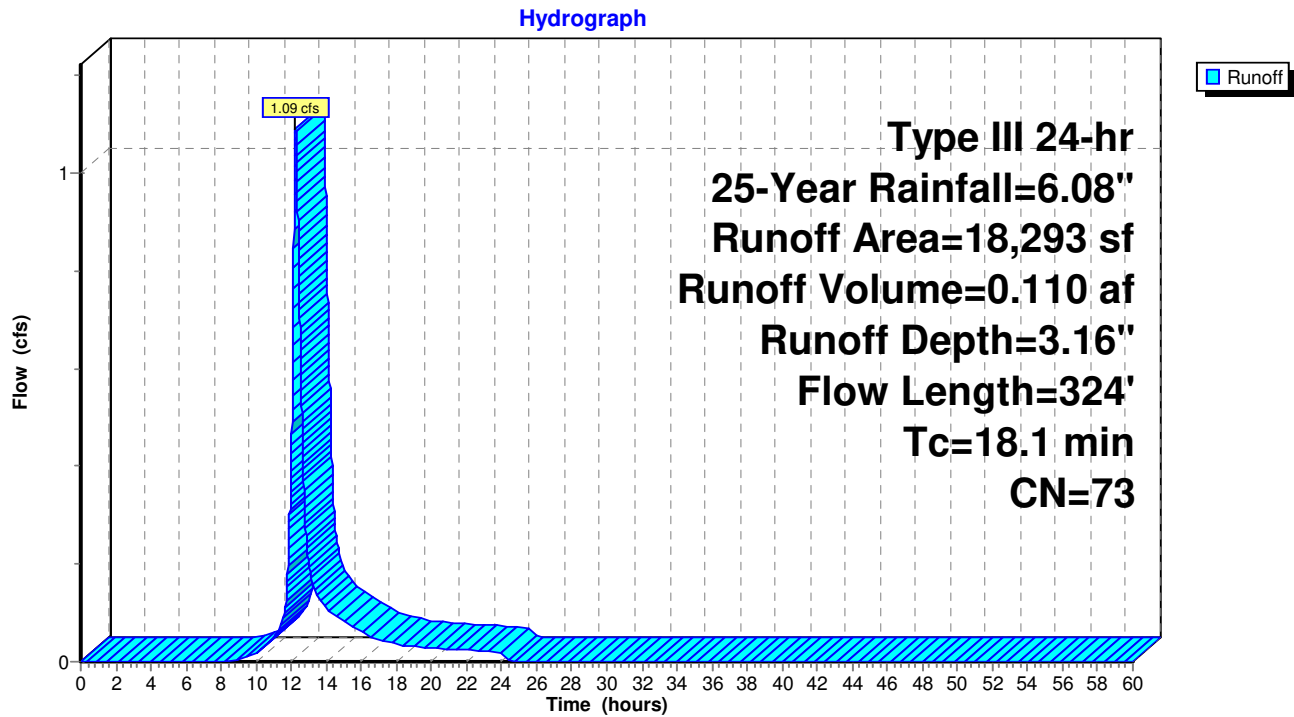
HydroCAD® 10.10-7c s/n 09320 © 2022 HydroCAD Software Solutions LLC

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Type III 24-hr 25-Year Rainfall=6.08"

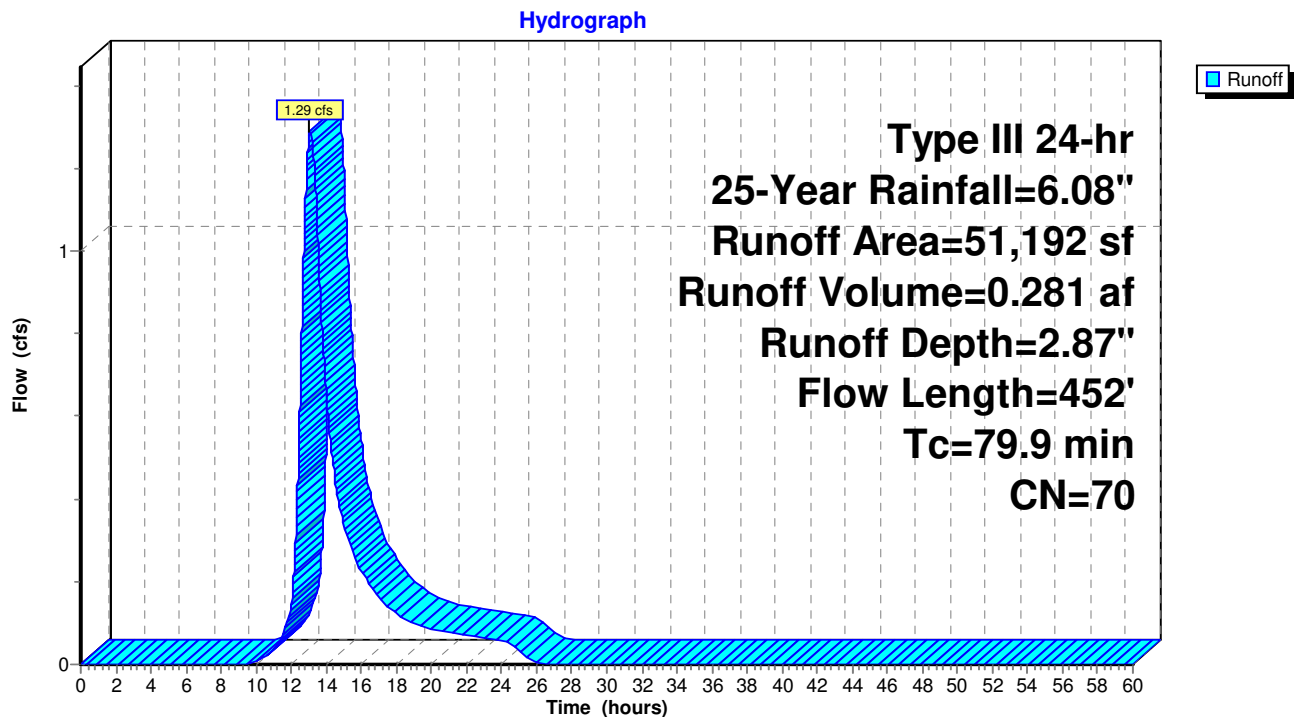
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### Subcatchment P5: P5



### Subcatchment P6: P6



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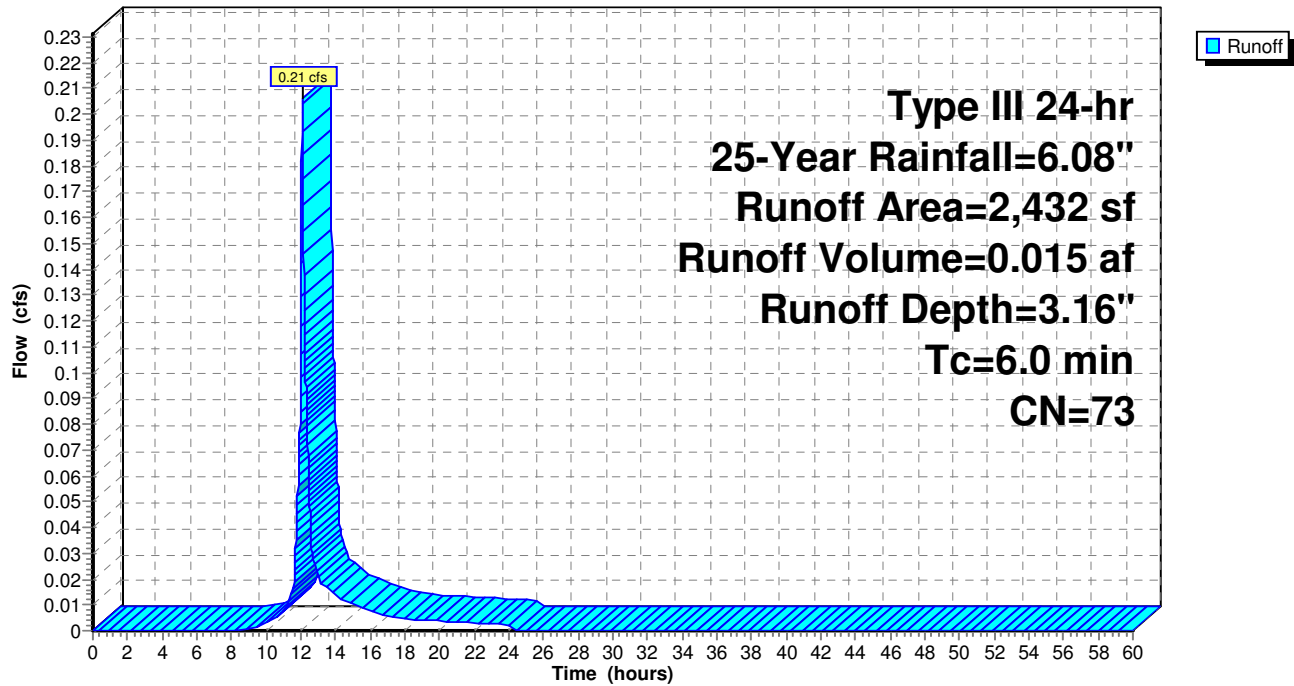
Proposed Conditions  
Type III 24-hr 25-Year Rainfall=6.08"

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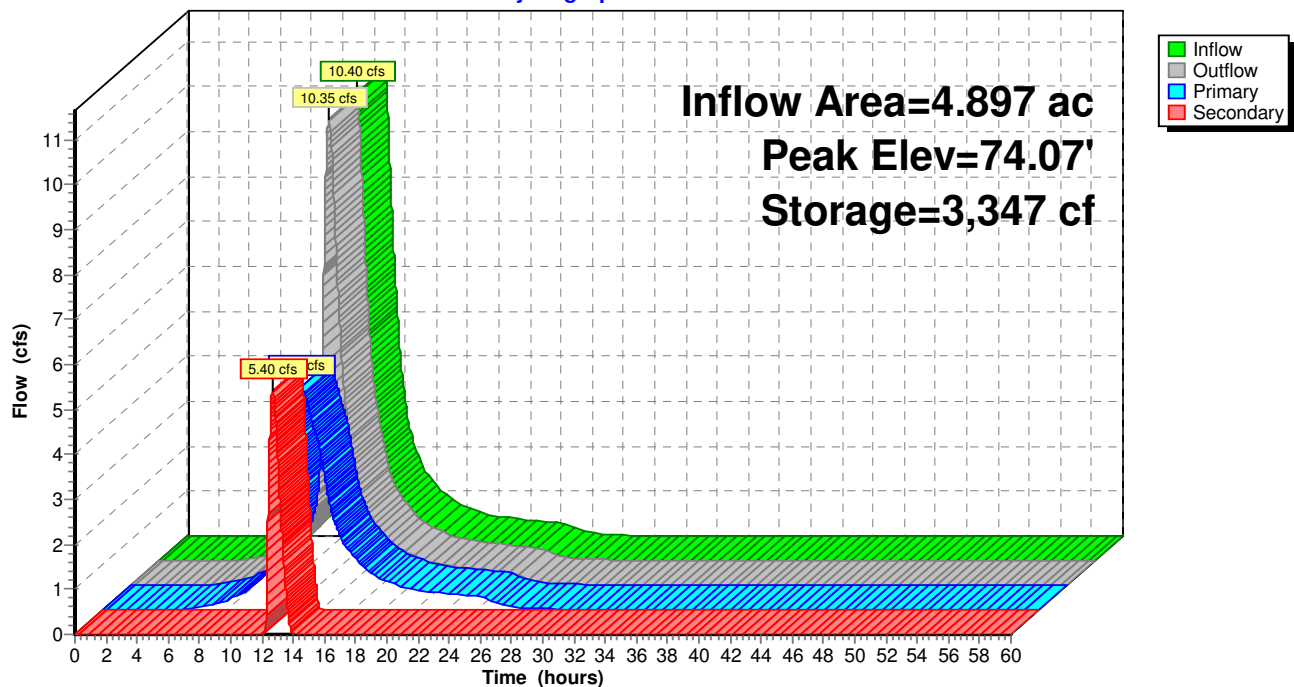
### Subcatchment P7: P7

Hydrograph



### Pond EP1\*: EP1\*

Hydrograph



## 2509.P HydroCAD

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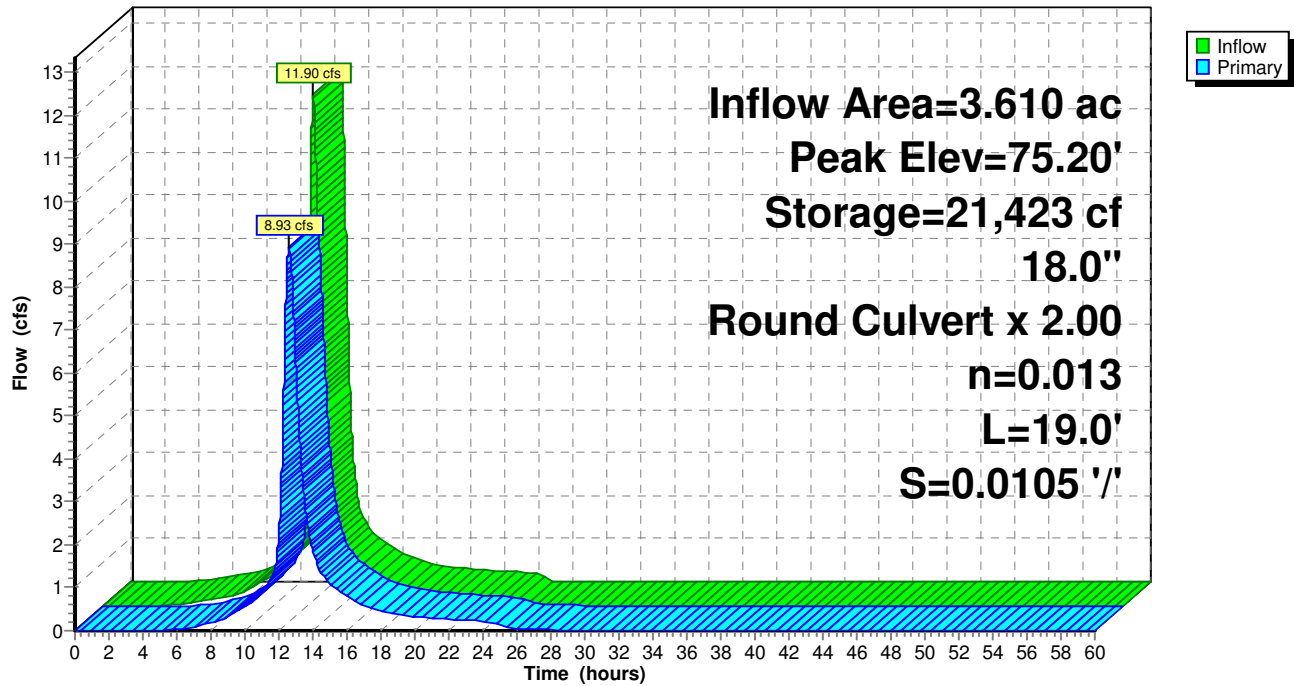
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Type III 24-hr 25-Year Rainfall=6.08"

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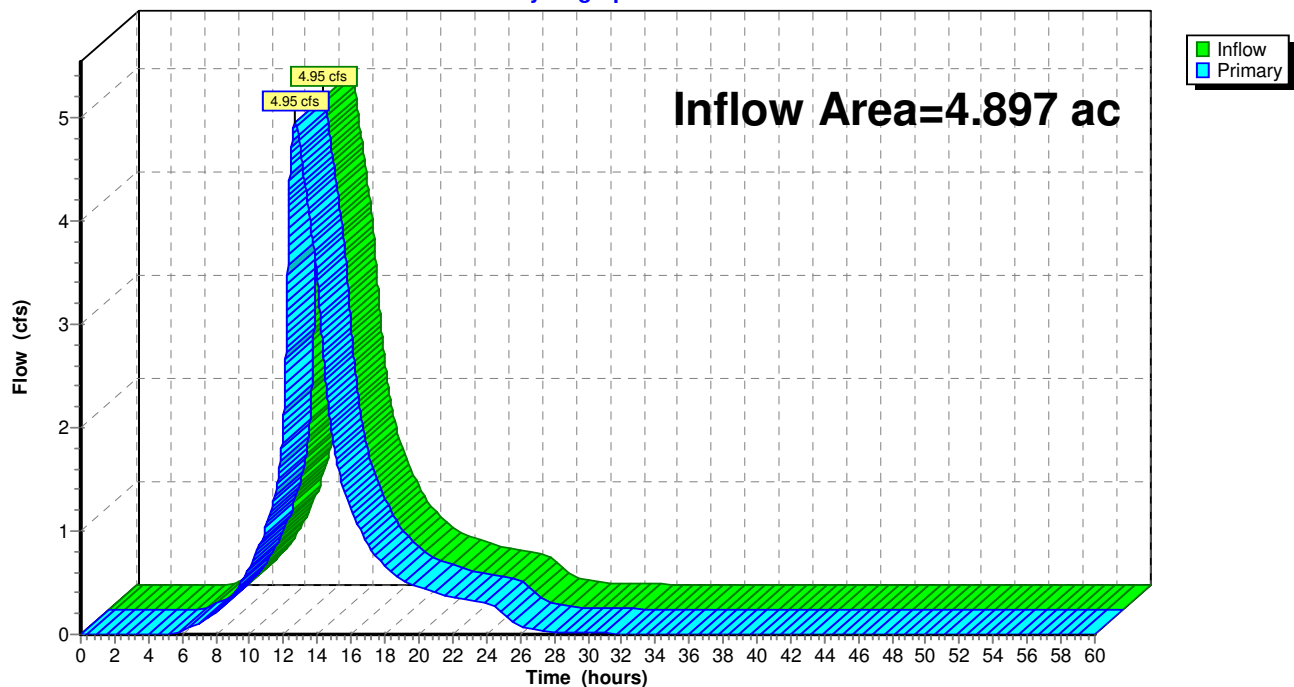
### Pond PP1: PP1

Hydrograph



### Link DP1\*: DP1\*

Hydrograph



## 2509.P HydroCAD

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Proposed Conditions

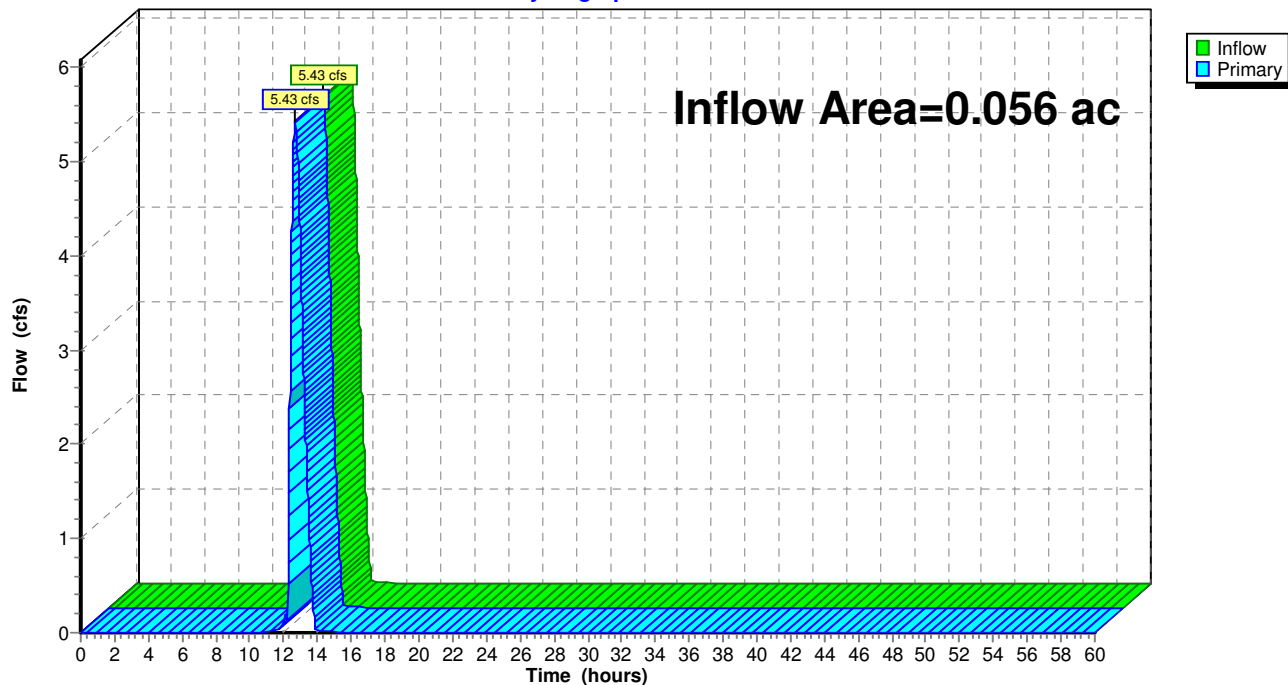
Type III 24-hr 25-Year Rainfall=6.08"

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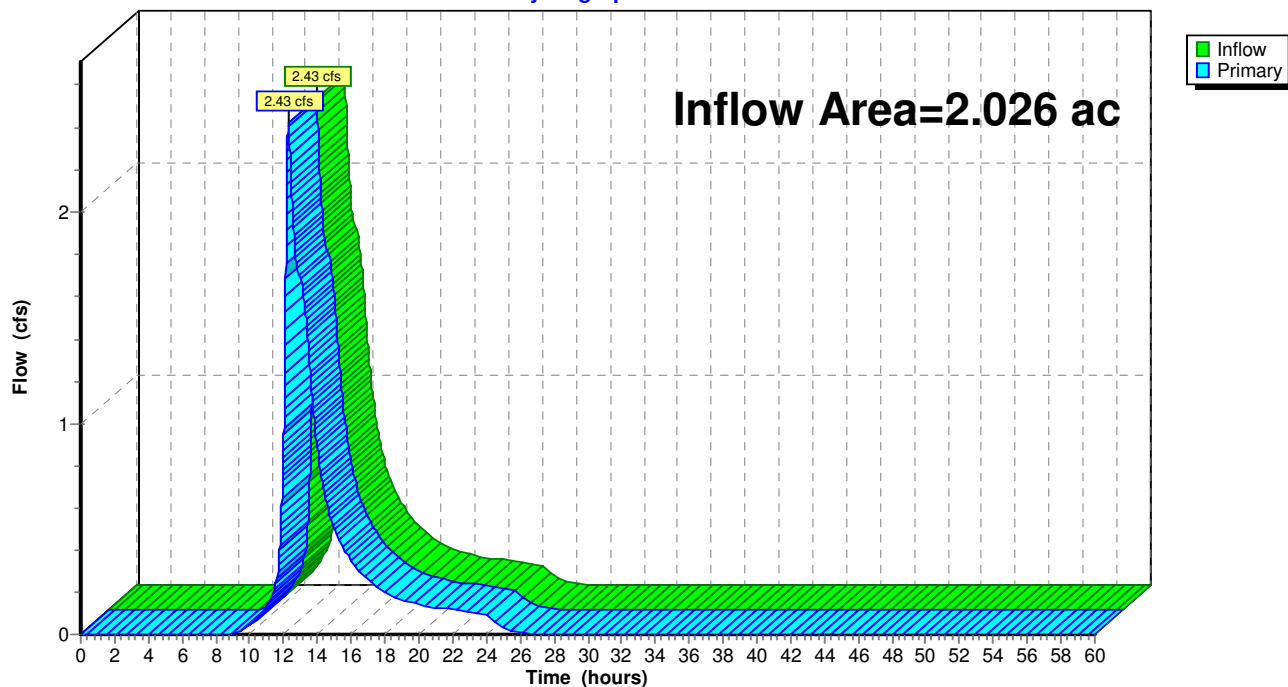
### Link DP2\*: DP2\*

Hydrograph



### Link DP3\*: DP3\*

Hydrograph



## 2509.P HydroCAD

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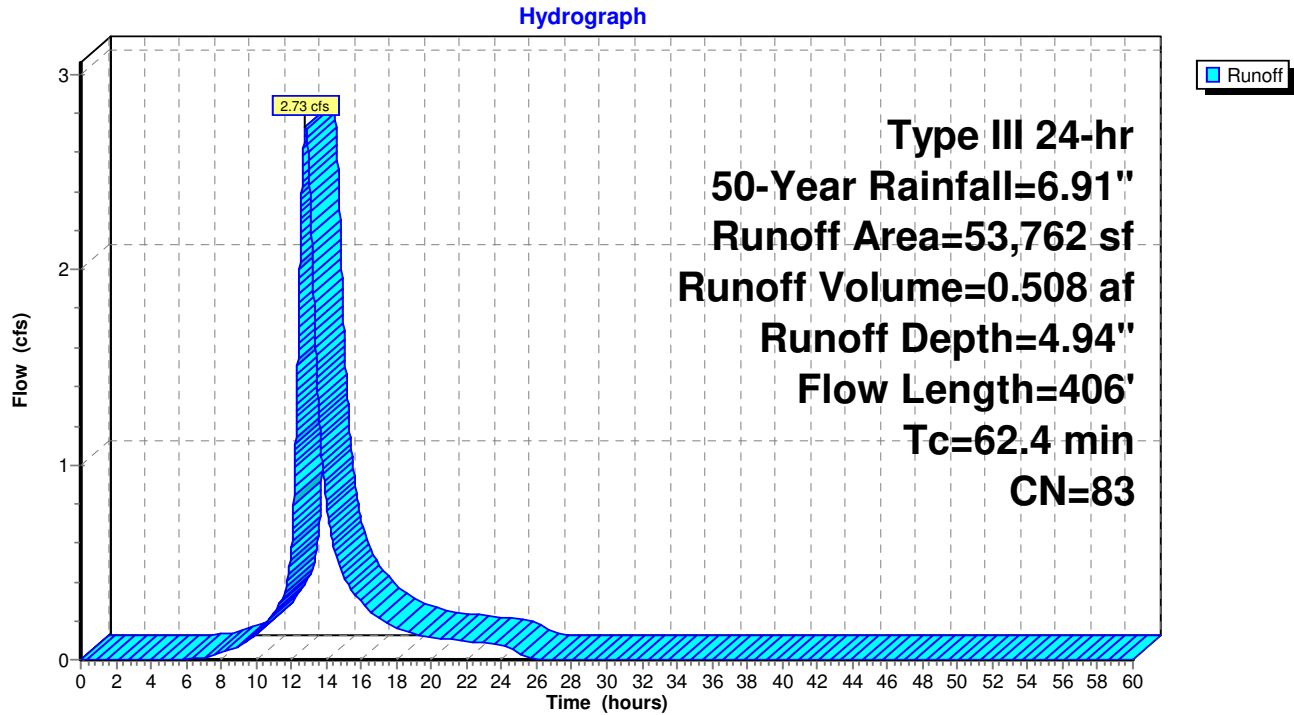
HydroCAD® 10.10-7c s/n 09320 © 2022 HydroCAD Software Solutions LLC

Proposed Conditions  
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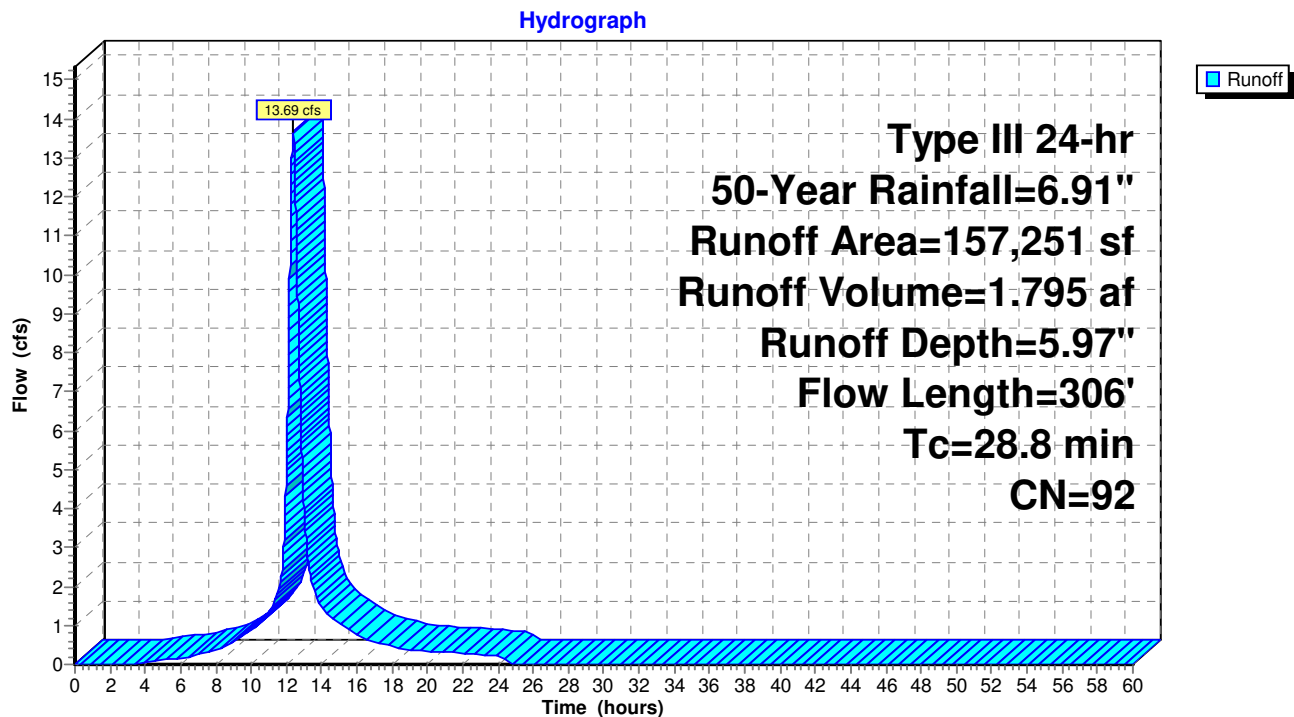
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### Subcatchment P1: P1 (DP4\*)



### Subcatchment P2: P2



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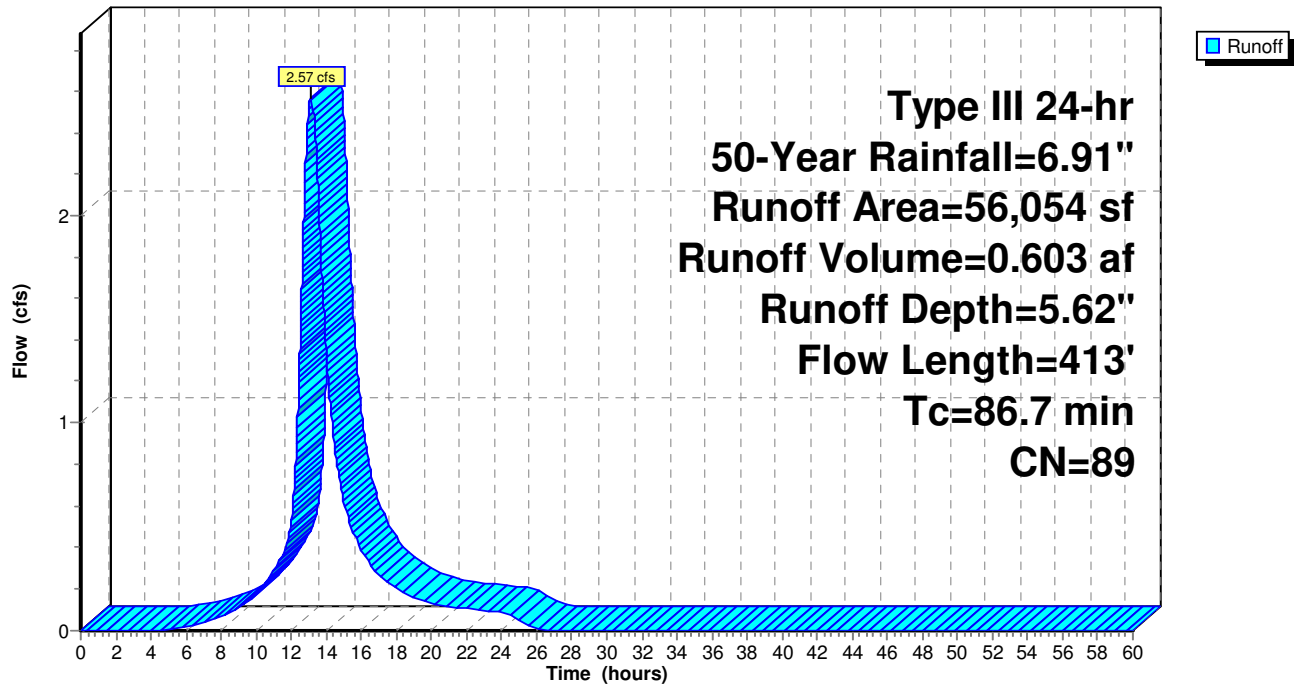
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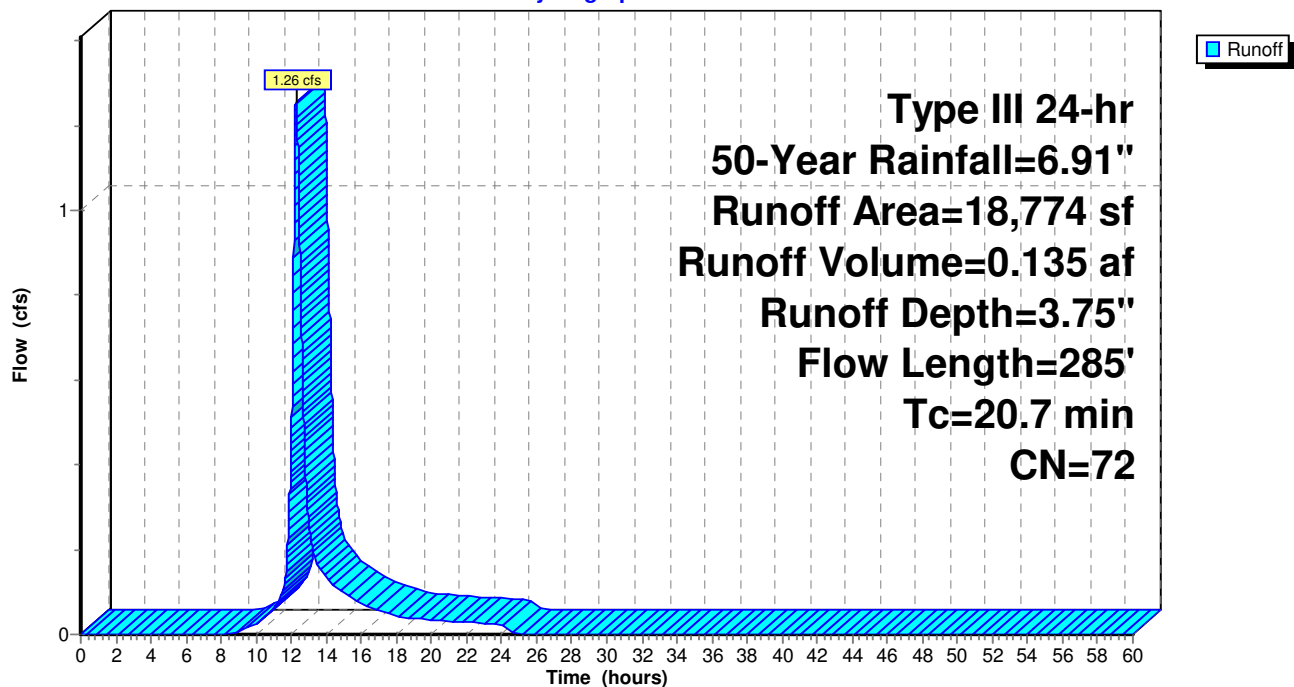
### Subcatchment P3: P3

Hydrograph



### Subcatchment P4: P4

Hydrograph



## 2509.P HydroCAD

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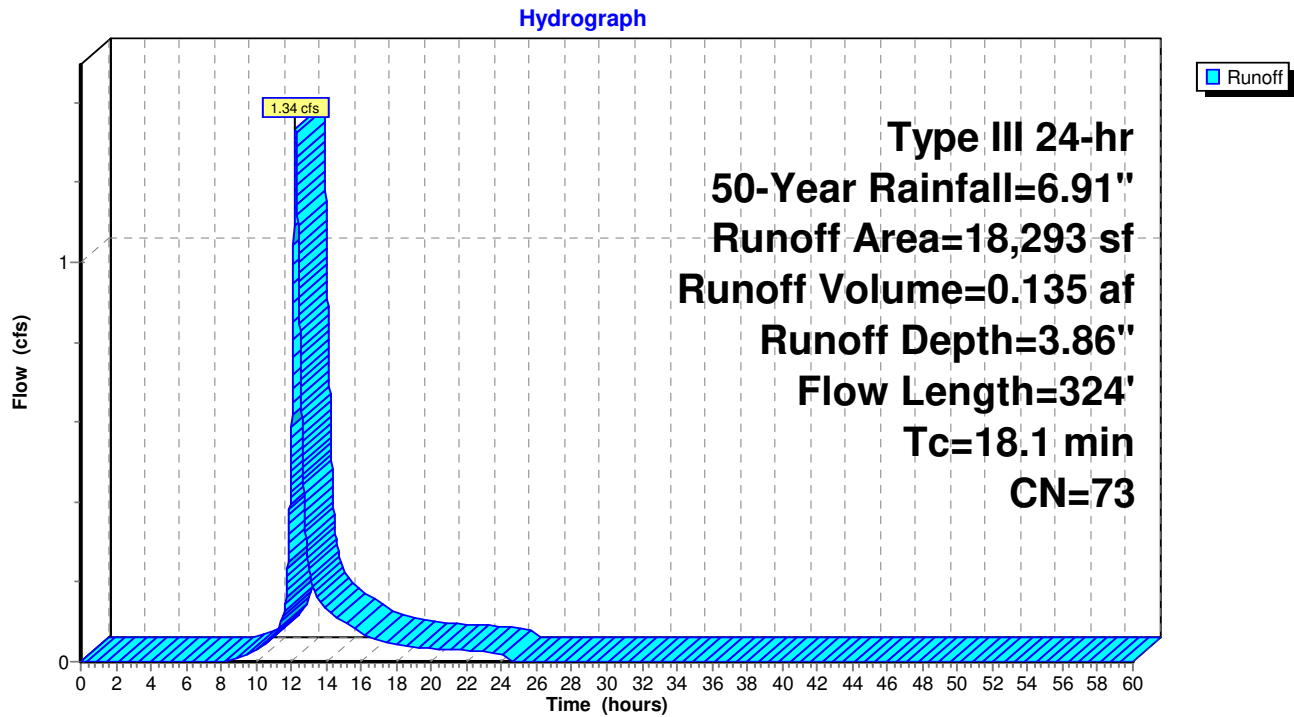
HydroCAD® 10.10-7c s/n 09320 © 2022 HydroCAD Software Solutions LLC

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Type III 24-hr 50-Year Rainfall=6.91"

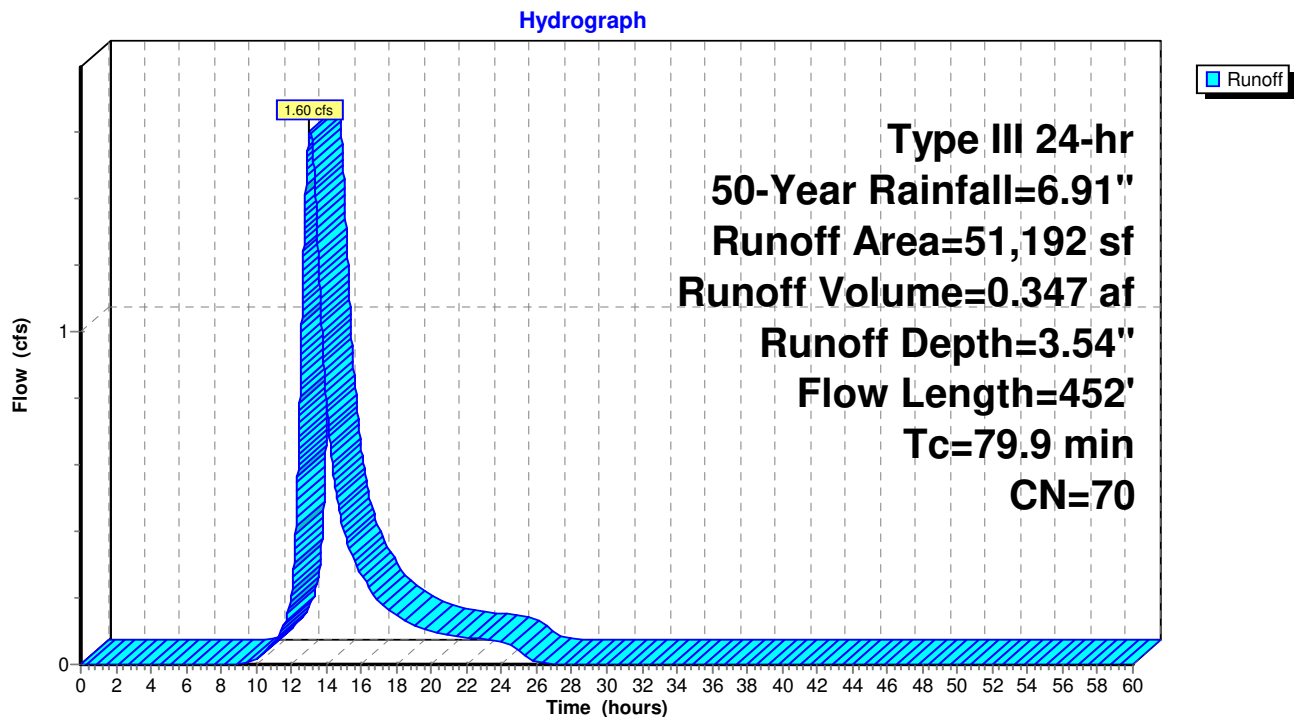
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### Subcatchment P5: P5



### Subcatchment P6: P6



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Proposed Conditions

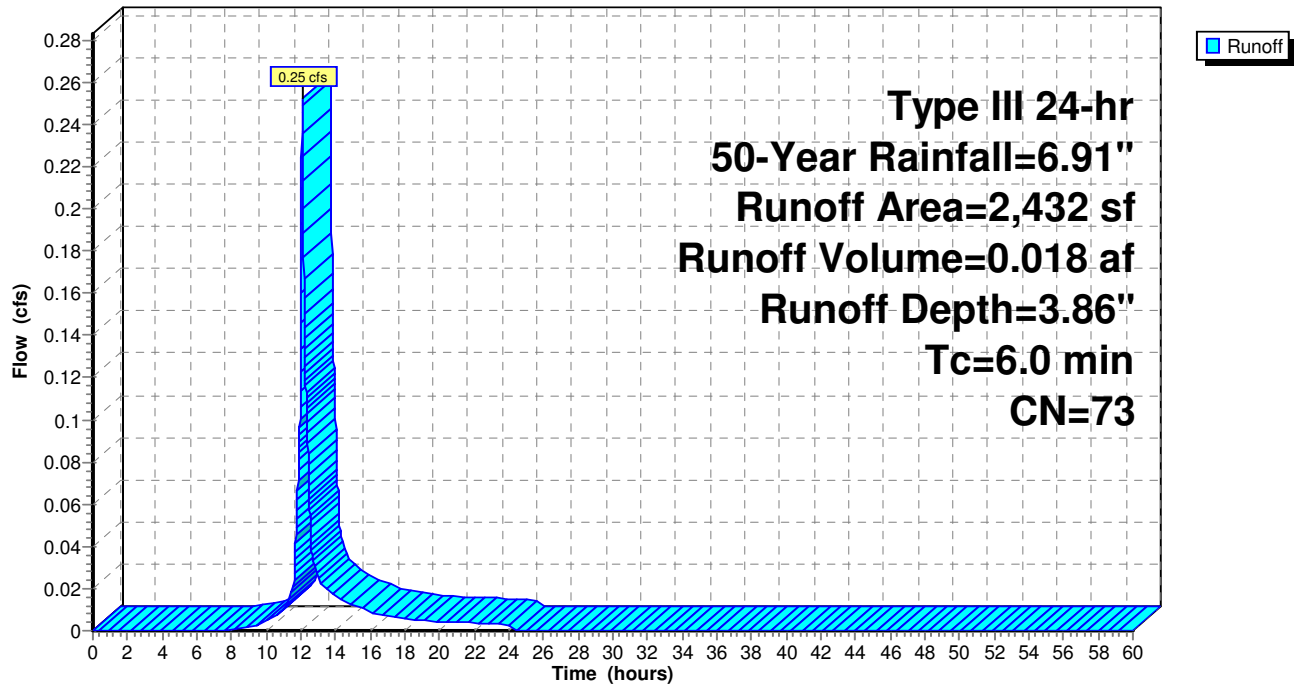
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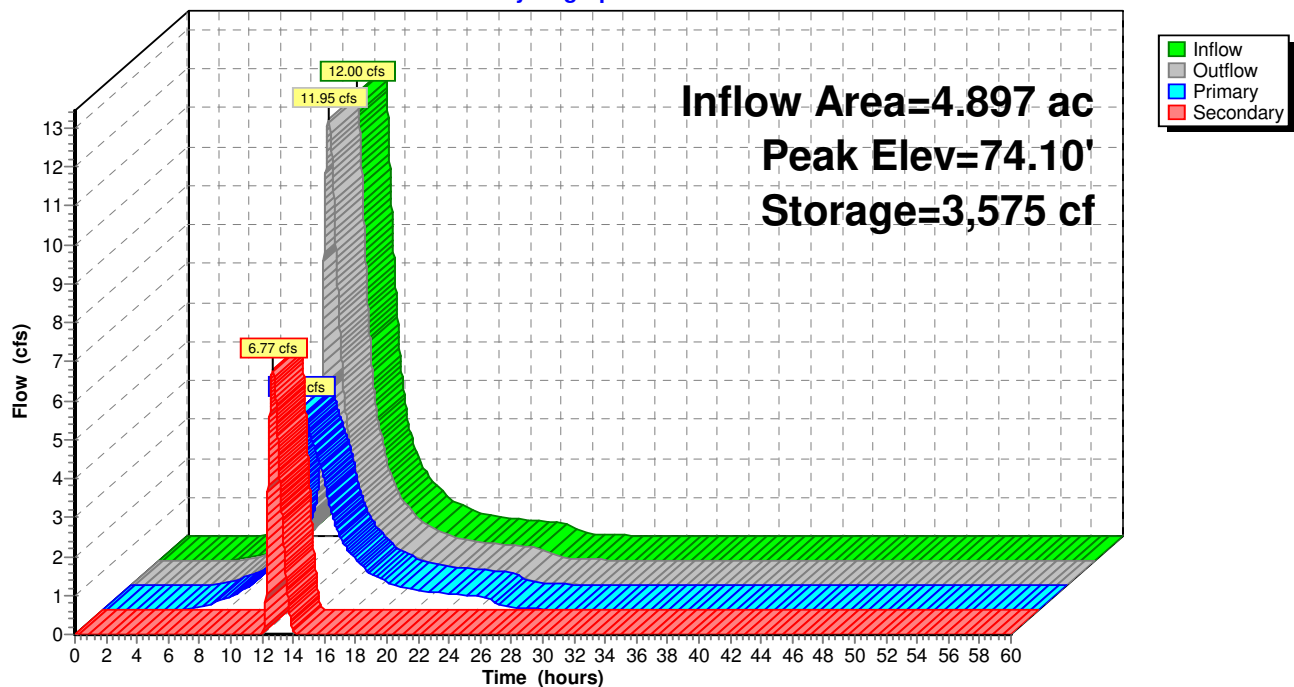
### Subcatchment P7: P7

Hydrograph



### Pond EP1\*: EP1\*

Hydrograph



## 2509.P HydroCAD

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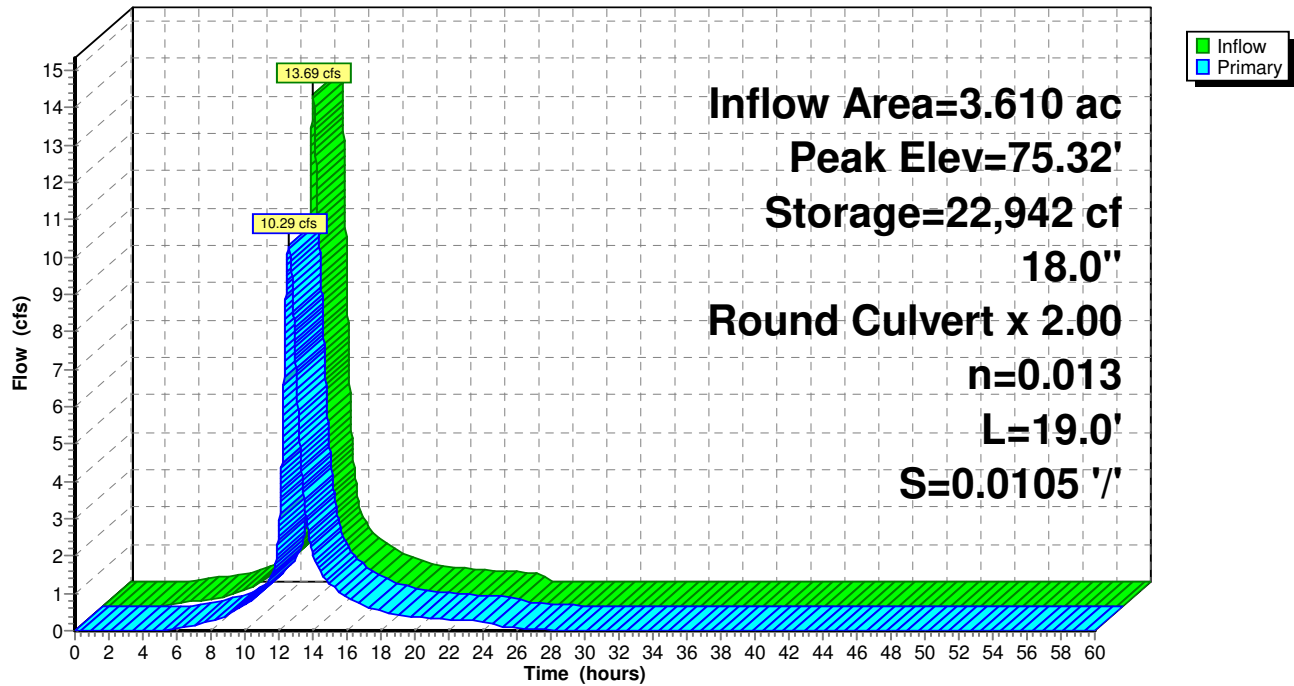
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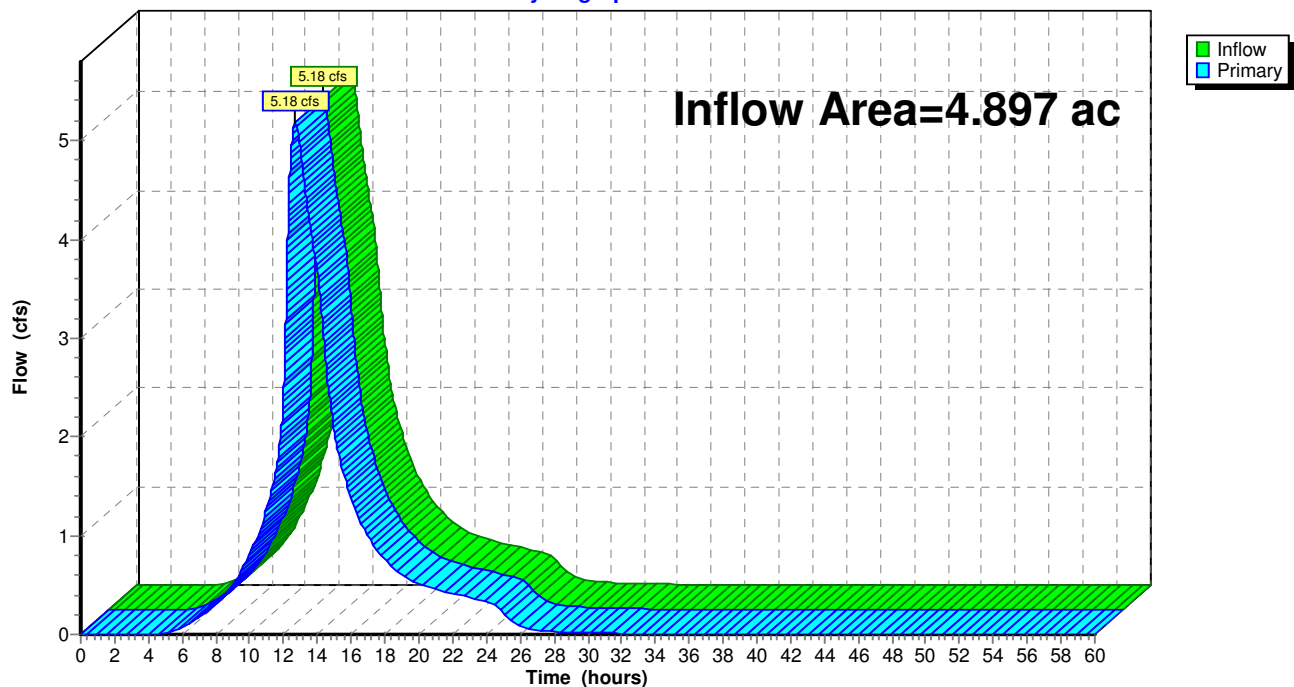
### Pond PP1: PP1

#### Hydrograph



### Link DP1\*: DP1\*

#### Hydrograph



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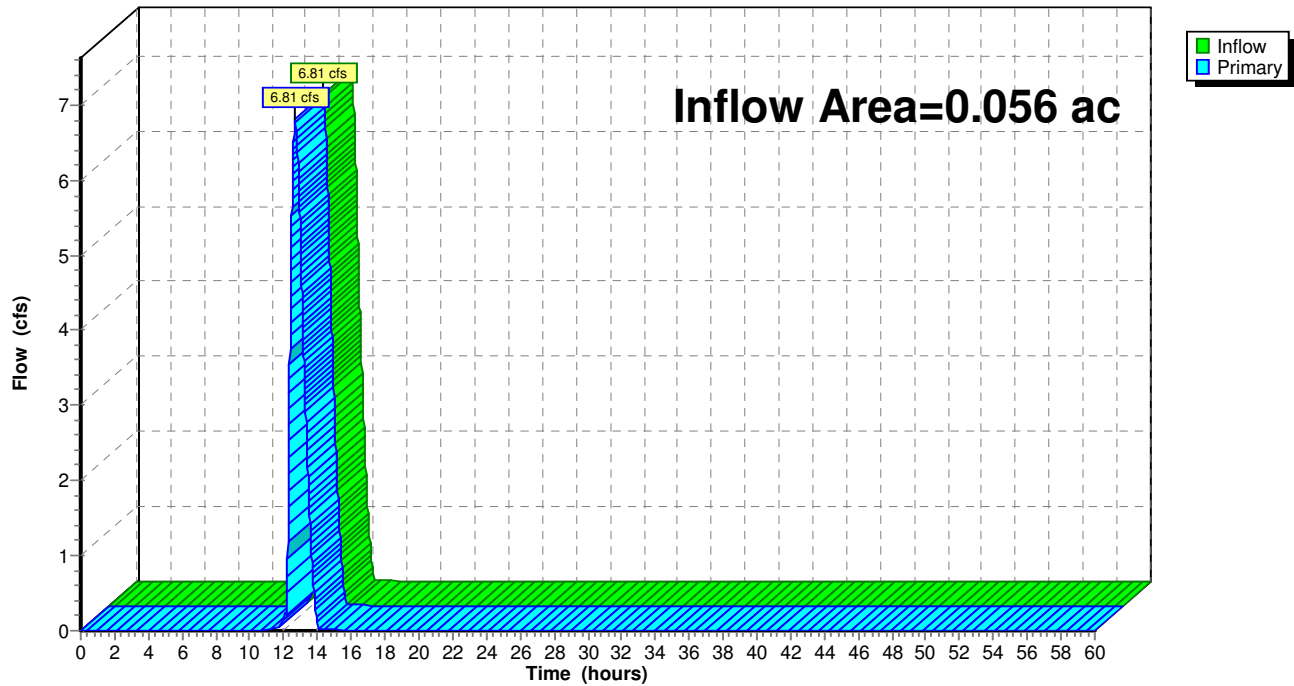
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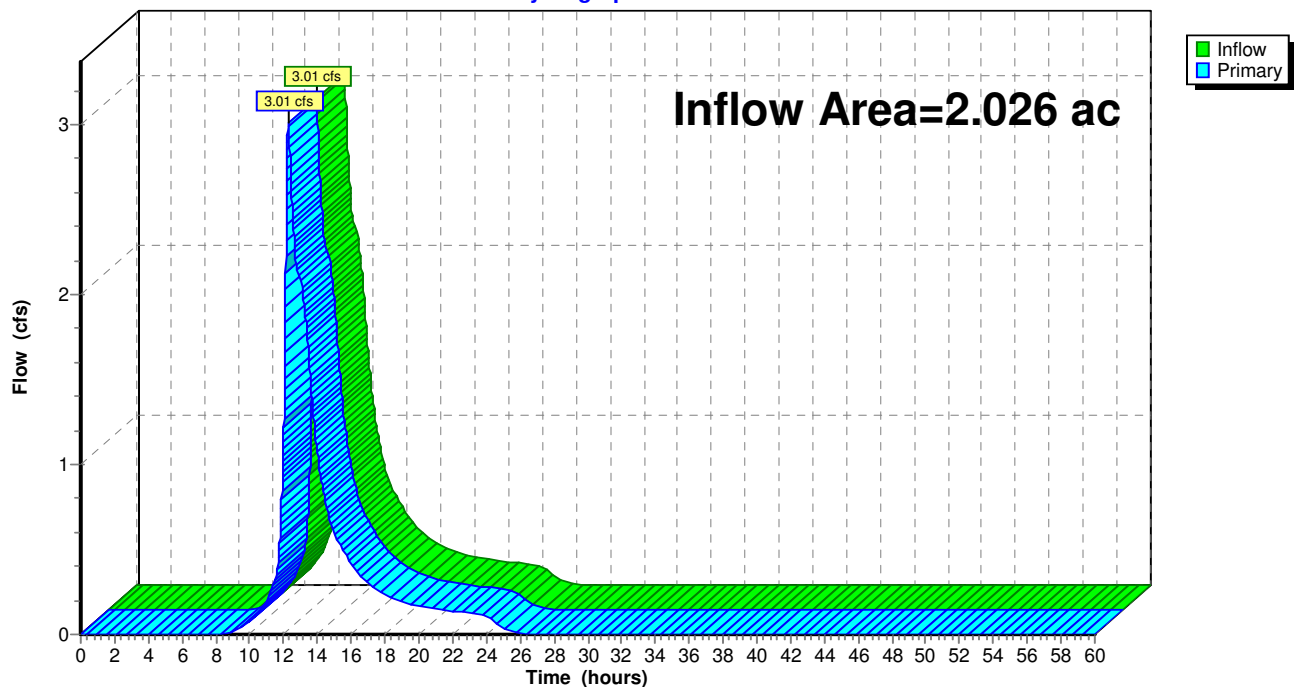
### Link DP2\*: DP2\*

Hydrograph



### Link DP3\*: DP3\*

Hydrograph



## 2509.P HydroCAD

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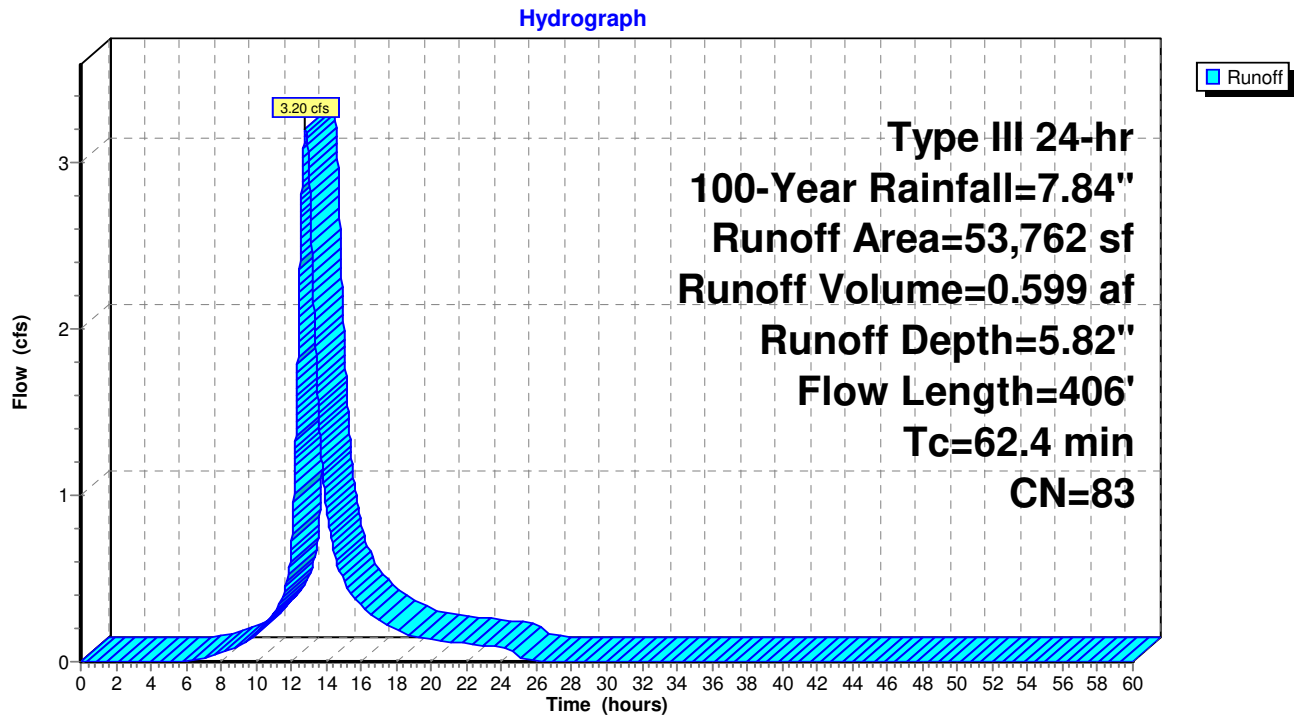
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Proposed Conditions  
Type III 24-hr 100-Year Rainfall=7.84"

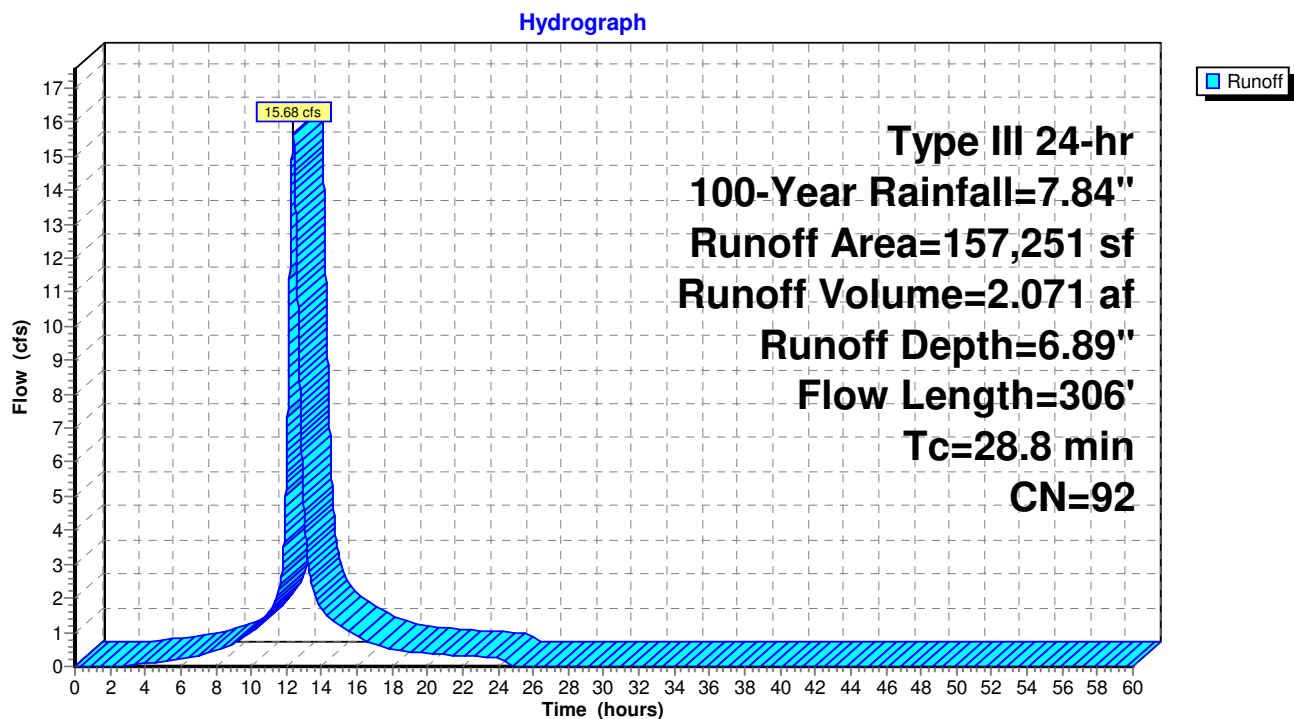
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### Subcatchment P1: P1 (DP4\*)



### Subcatchment P2: P2



## 2509.P HydroCAD

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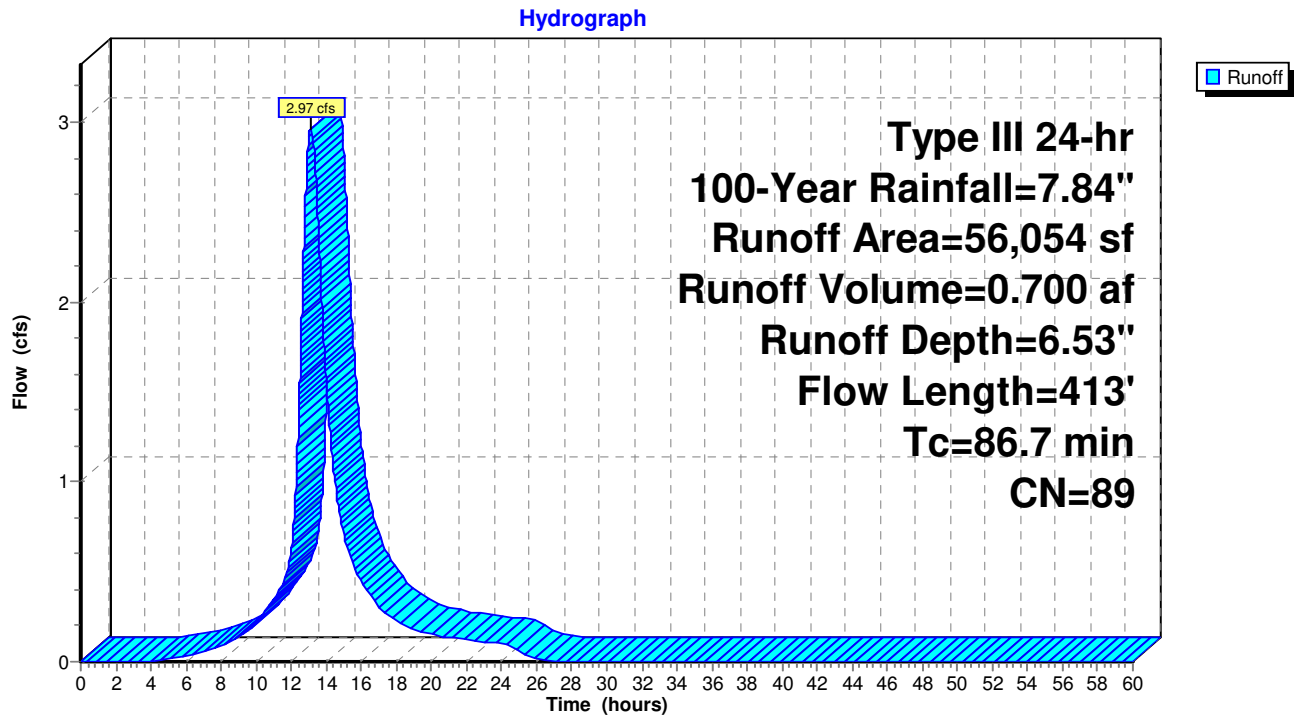
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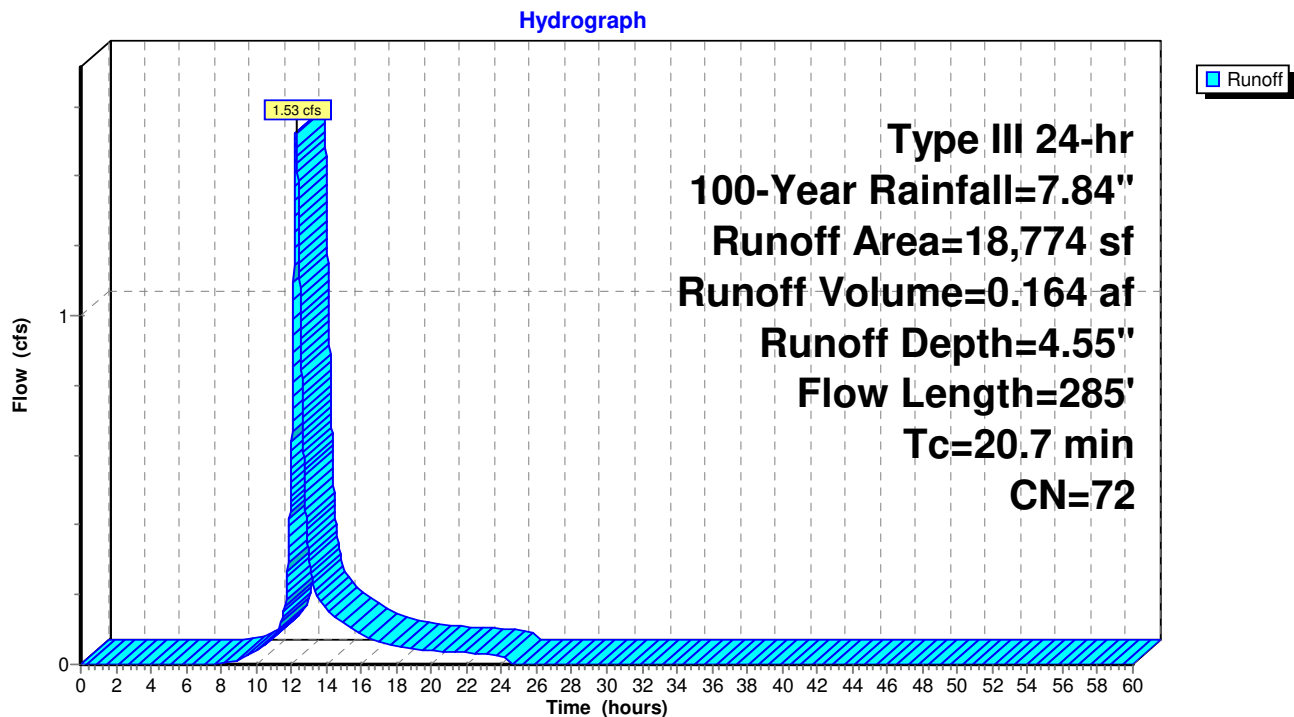
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### Subcatchment P3: P3



### Subcatchment P4: P4



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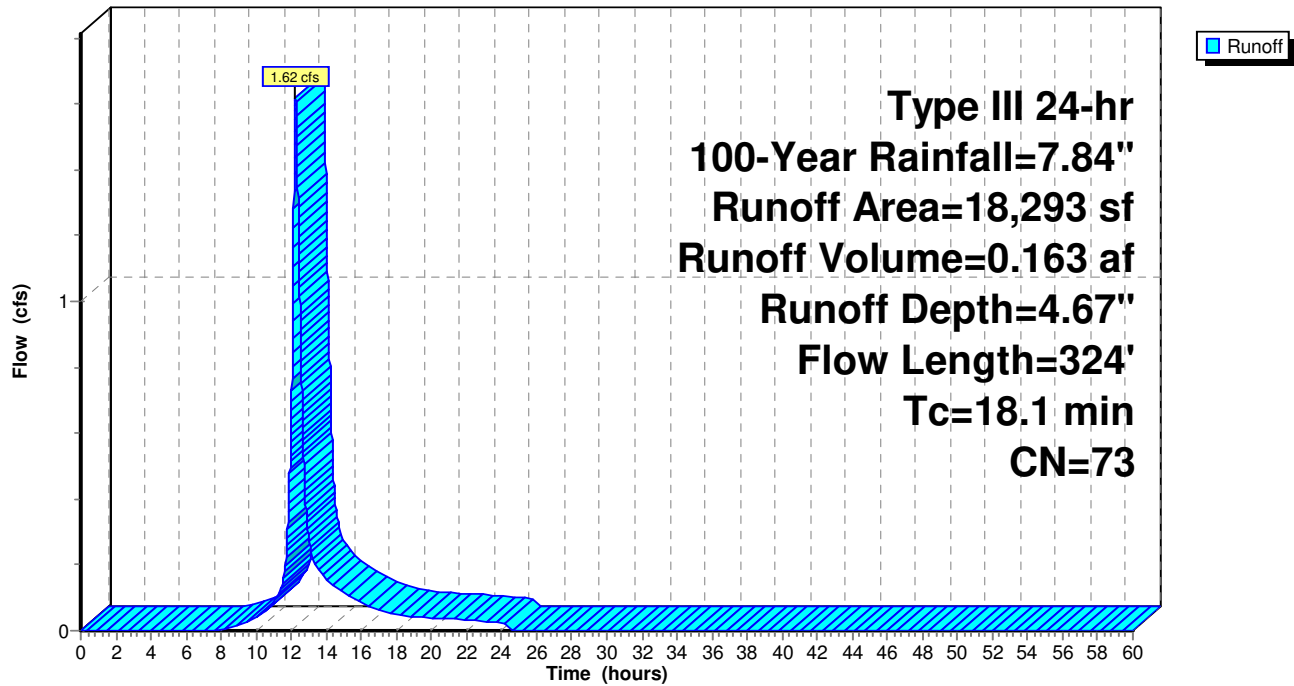
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Printed 10/3/2022

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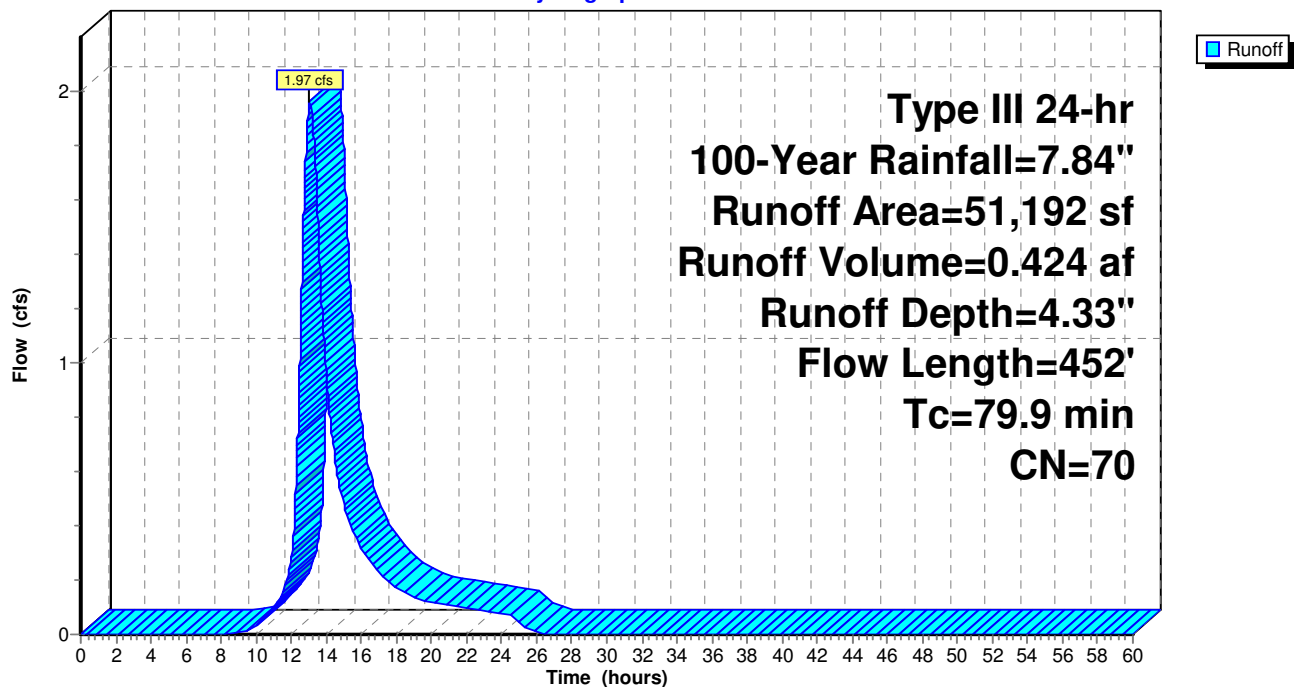
### Subcatchment P5: P5

Hydrograph



### Subcatchment P6: P6

Hydrograph



## 2509.P HydroCAD

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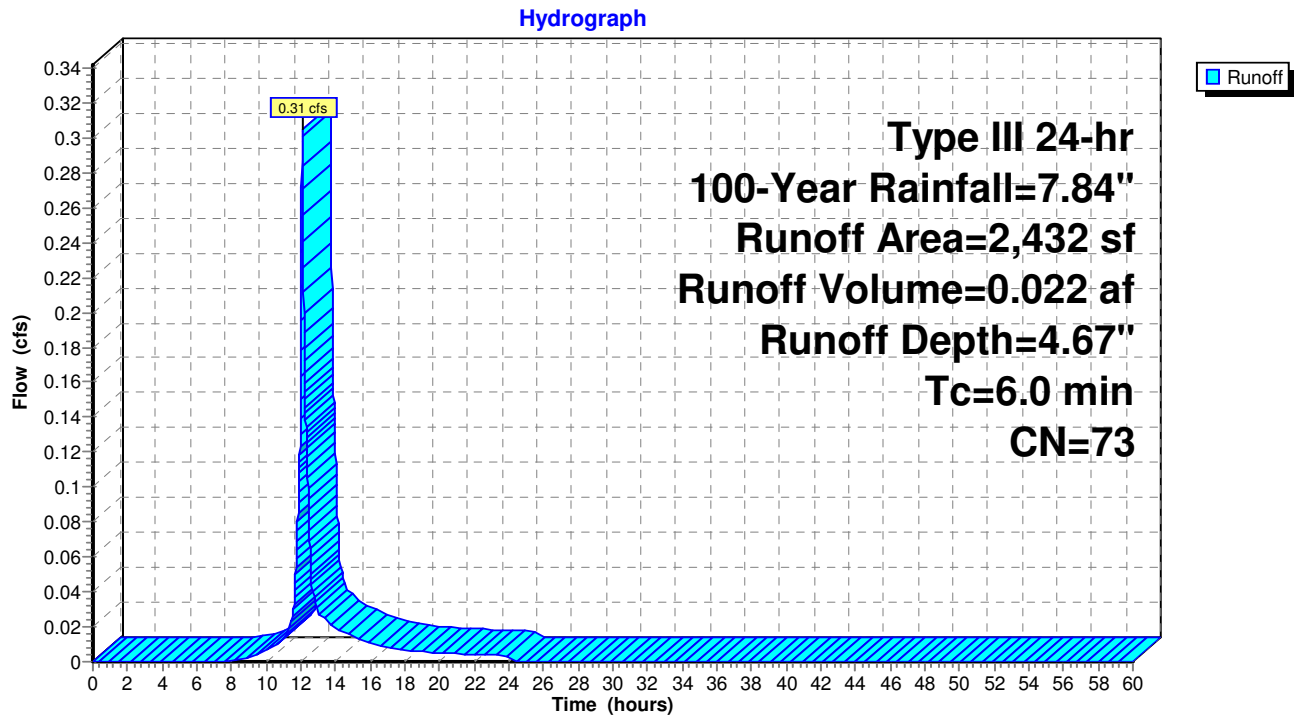
HydroCAD® 10.10-7c s/n 09320 © 2022 HydroCAD Software Solutions LLC

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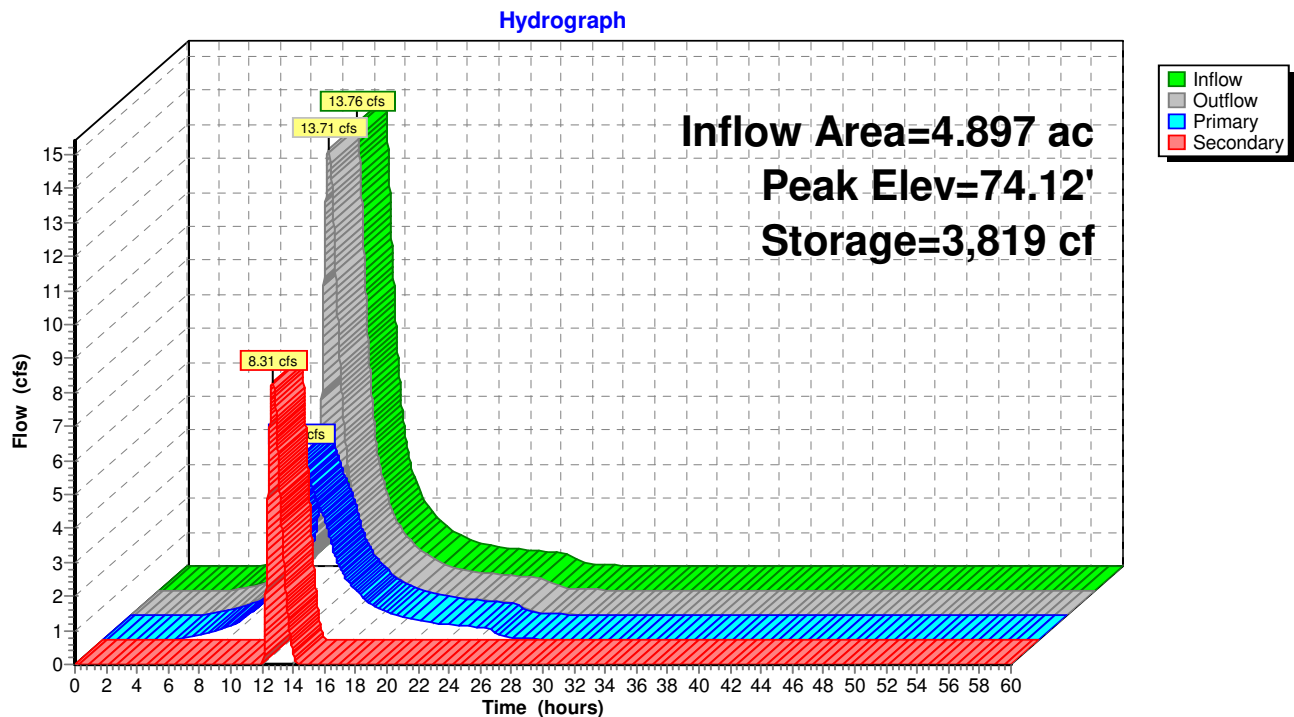
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### Subcatchment P7: P7



### Pond EP1\*: EP1\*



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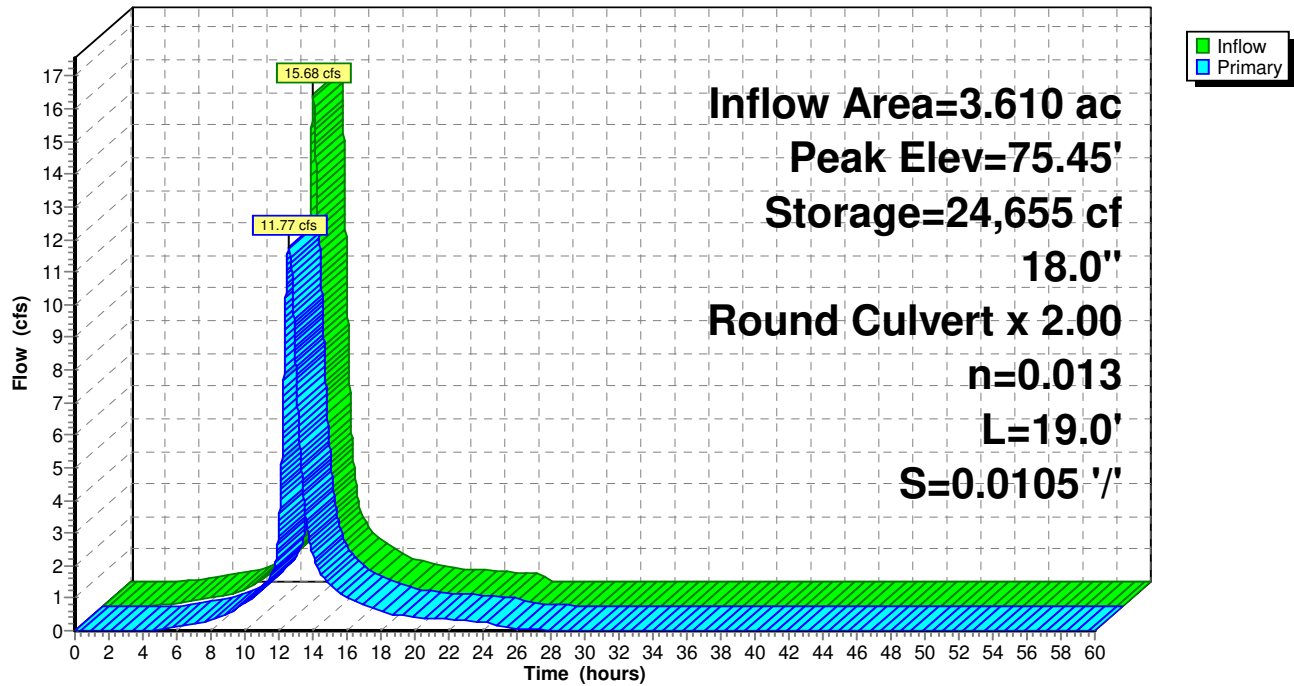
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Type III 24-hr 100-Year Rainfall=7.84"

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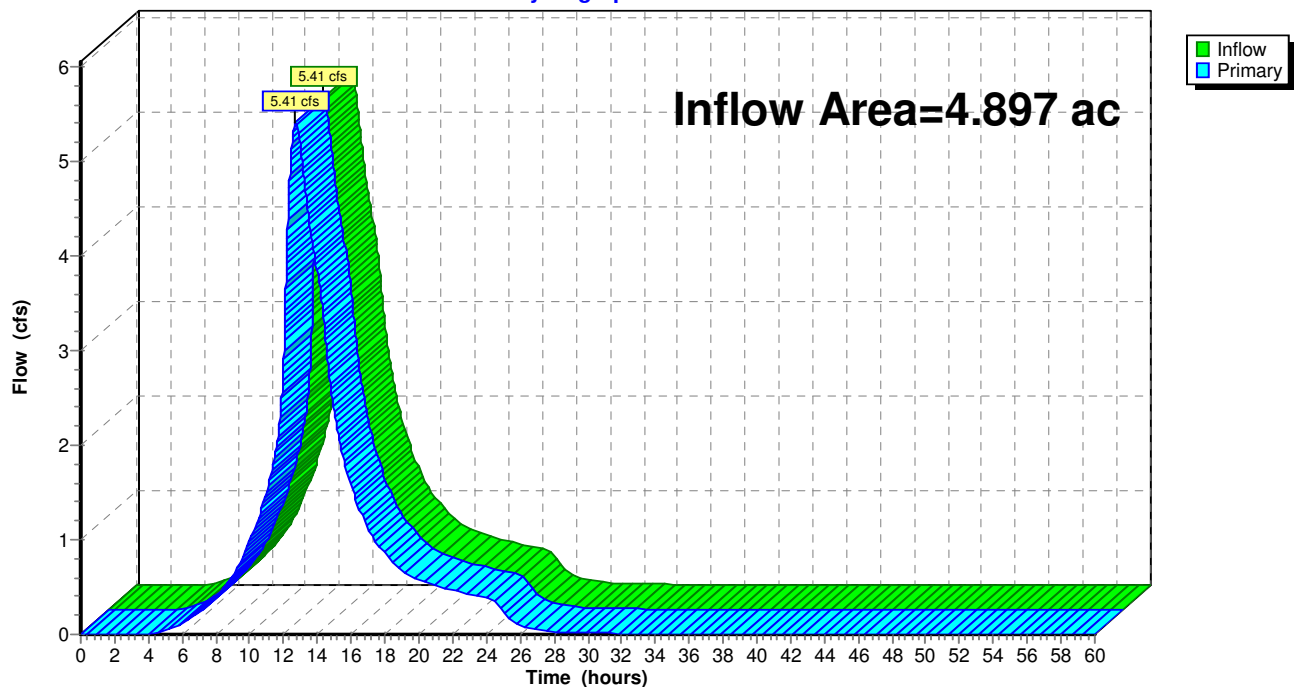
### Pond PP1: PP1

Hydrograph



### Link DP1\*: DP1\*

Hydrograph



## 2509.P HydroCAD

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Proposed Conditions

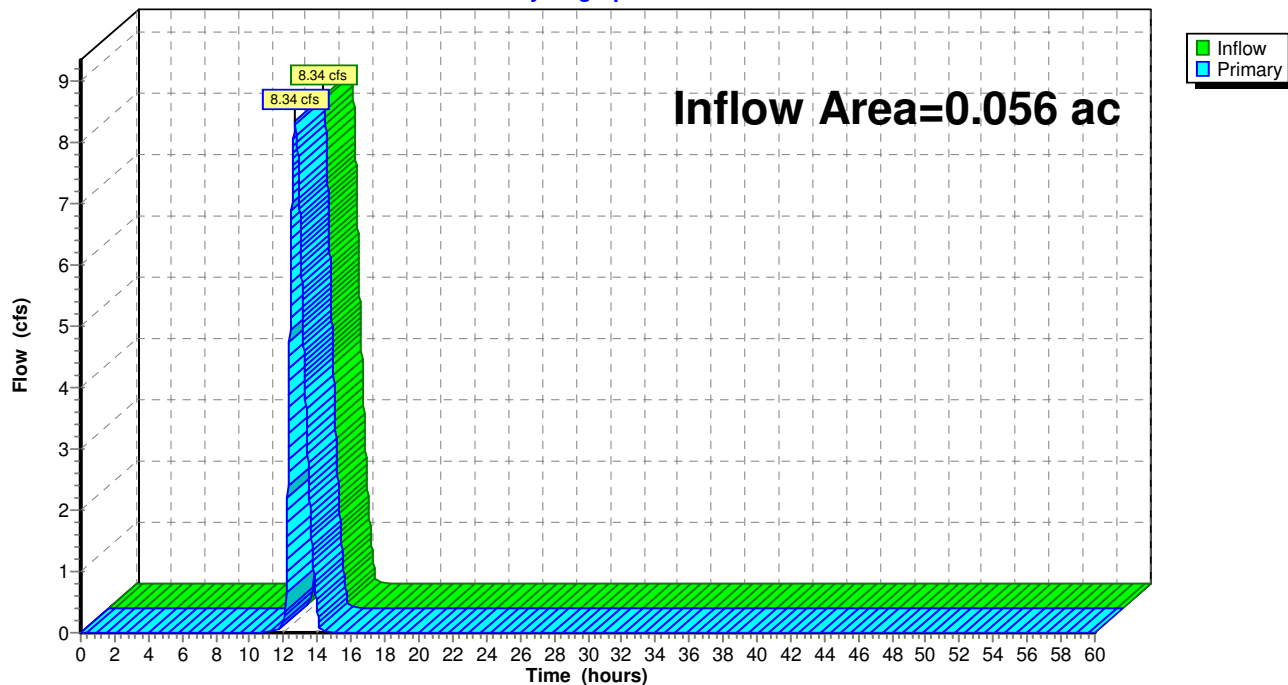
Type III 24-hr 100-Year Rainfall=7.84"

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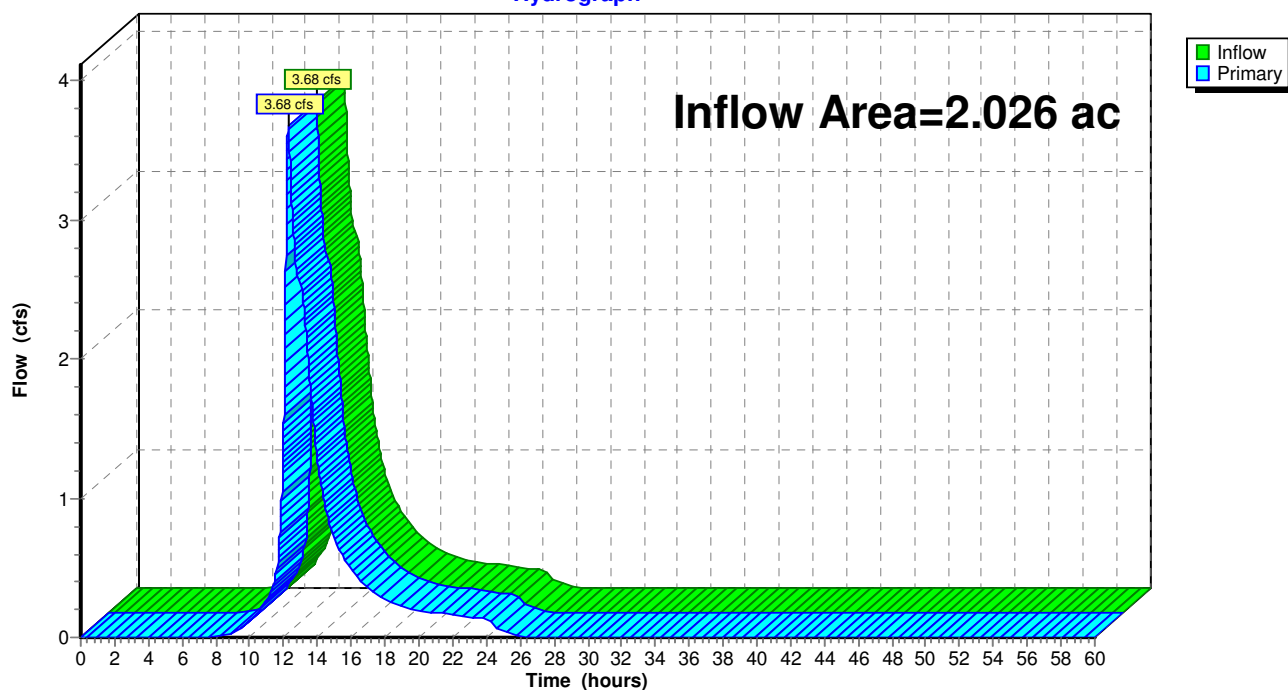
### Link DP2\*: DP2\*

Hydrograph



### Link DP3\*: DP3\*

Hydrograph



**2509.P HydroCAD**

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Proposed Conditions

Type III 24-hr 100-Year Rainfall=7.84"

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**Summary for Pond EP1\*: EP1\***

Inflow Area = 4.897 ac, 73.51% Impervious, Inflow Depth = 6.79" for 100-Year event  
 Inflow = 13.76 cfs @ 12.65 hrs, Volume= 2.770 af  
 Outflow = 13.71 cfs @ 12.69 hrs, Volume= 2.770 af, Atten= 0%, Lag= 2.5 min  
 Primary = 5.41 cfs @ 12.69 hrs, Volume= 2.115 af  
 Routed to Link DP1\* : DP1\*  
 Secondary = 8.31 cfs @ 12.69 hrs, Volume= 0.655 af  
 Routed to Link DP2\* : DP2\*

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 74.12' @ 12.69 hrs Surf.Area= 9,494 sf Storage= 3,819 cf

Plug-Flow detention time= 7.8 min calculated for 2.770 af (100% of inflow)  
 Center-of-Mass det. time= 7.7 min ( 846.7 - 838.9 )

| Volume | Invert | Avail.Storage | Storage Description                            |
|--------|--------|---------------|------------------------------------------------|
| #1     | 72.98' | 26,597 cf     | <b>Swale (Pyramidal)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|---------------------------|---------------------------|---------------------|
| 72.98               | 5                    | 0                         | 0                         | 5                   |
| 73.00               | 408                  | 3                         | 3                         | 408                 |
| 74.00               | 6,458                | 2,830                     | 2,833                     | 6,461               |
| 75.00               | 47,348               | 23,764                    | 26,597                    | 47,356              |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                 |
|--------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 72.98' | <b>30.0" Round RCP_Round 30"</b><br>L= 47.7' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 72.98' / 72.79' S= 0.0040 '/' Cc= 0.900<br>n= 0.013, Flow Area= 4.91 sf                                                                                      |
| #2     | Secondary | 73.90' | <b>30.0' long + 10.0 '/' SideZ x 3.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50<br>Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68<br>2.72 2.81 2.92 2.97 3.07 3.32 |

**Primary OutFlow** Max=5.41 cfs @ 12.69 hrs HW=74.12' TW=0.00' (Dynamic Tailwater)

↑**1=RCP\_Round 30"** (Barrel Controls 5.41 cfs @ 3.62 fps)

**Secondary OutFlow** Max=8.30 cfs @ 12.69 hrs HW=74.12' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 8.30 cfs @ 1.15 fps)

**Summary for Pond PP1: PP1**

Inflow Area = 3.610 ac, 75.21% Impervious, Inflow Depth = 6.89" for 100-Year event  
 Inflow = 15.68 cfs @ 12.38 hrs, Volume= 2.071 af  
 Outflow = 11.77 cfs @ 12.60 hrs, Volume= 2.070 af, Atten= 25%, Lag= 13.1 min  
 Primary = 11.77 cfs @ 12.60 hrs, Volume= 2.070 af  
 Routed to Pond EP1\* : EP1\*

**2509.P HydroCAD**

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Proposed Conditions

Type III 24-hr 100-Year Rainfall=7.84"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Starting Elev= 74.00' Surf.Area= 8,585 sf Storage= 8,785 cf

Peak Elev= 75.45' @ 12.60 hrs Surf.Area= 13,608 sf Storage= 24,655 cf (15,870 cf above start)

Plug-Flow detention time= 121.9 min calculated for 1.868 af (90% of inflow)

Center-of-Mass det. time= 42.9 min ( 833.6 - 790.8 )

| Volume | Invert | Avail.Storage | Storage Description                             |
|--------|--------|---------------|-------------------------------------------------|
| #1     | 72.00' | 32,752 cf     | <b>Pond 1 (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 72.00               | 2,385                | 0                         | 0                         |
| 73.00               | 3,300                | 2,843                     | 2,843                     |
| 74.00               | 8,585                | 5,943                     | 8,785                     |
| 75.00               | 11,725               | 10,155                    | 18,940                    |
| 76.00               | 15,899               | 13,812                    | 32,752                    |

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                             |
|--------|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 74.00' | <b>18.0" Round Culvert X 2.00</b><br>L= 19.0' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 74.00' / 73.80' S= 0.0105 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=11.77 cfs @ 12.60 hrs HW=75.45' TW=74.12' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 11.77 cfs @ 4.29 fps)

**APPENDIX C**  
**NRCS Soil Map & Data**



United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for State of Connecticut



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



# Custom Soil Resource Report

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Jul 15, 2019—Oct 24, 2019

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

## Map Unit Legend

| Map Unit Symbol                    | Map Unit Name                                   | Acres in AOI | Percent of AOI |
|------------------------------------|-------------------------------------------------|--------------|----------------|
| 13                                 | Walpole sandy loam, 0 to 3 percent slopes       | 25.4         | 40.8%          |
| 23A                                | Sudbury sandy loam, 0 to 5 percent slopes       | 1.0          | 1.6%           |
| 36A                                | Windsor loamy sand, 0 to 3 percent slopes       | 2.6          | 4.2%           |
| 36B                                | Windsor loamy sand, 3 to 8 percent slopes       | 1.8          | 2.8%           |
| 306                                | Udorthents-Urban land complex                   | 1.8          | 2.9%           |
| 307                                | Urban land                                      | 0.0          | 0.0%           |
| 701A                               | Ninigret fine sandy loam, 0 to 3 percent slopes | 29.6         | 47.6%          |
| <b>Totals for Area of Interest</b> |                                                 | <b>62.2</b>  | <b>100.0%</b>  |

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## State of Connecticut

### 13—Walpole sandy loam, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2svkl

*Elevation:* 0 to 1,020 feet

*Mean annual precipitation:* 36 to 71 inches

*Mean annual air temperature:* 39 to 55 degrees F

*Frost-free period:* 140 to 250 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Walpole and similar soils:* 80 percent

*Minor components:* 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Walpole

##### Setting

*Landform:* Depressions, outwash plains, outwash terraces, depressions, deltas

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread, dip, talf

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Sandy glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

##### Typical profile

*Oe - 0 to 1 inches:* mucky peat

*A - 1 to 7 inches:* sandy loam

*Bg - 7 to 21 inches:* sandy loam

*BC - 21 to 25 inches:* gravelly sandy loam

*C - 25 to 65 inches:* very gravelly sand

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Poorly drained

*Runoff class:* Very high

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high  
(0.14 to 14.17 in/hr)

*Depth to water table:* About 0 to 4 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Moderate (about 6.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* B/D

*Ecological site:* F144AY028MA - Wet Outwash

*Hydric soil rating:* Yes

## Minor Components

### Sudbury

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, deltas, terraces  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### Scarboro

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, deltas, outwash terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread, dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 23A—Sudbury sandy loam, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 9lkv  
*Elevation:* 0 to 1,200 feet  
*Mean annual precipitation:* 43 to 54 inches  
*Mean annual air temperature:* 45 to 55 degrees F  
*Frost-free period:* 140 to 185 days  
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Sudbury and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Sudbury

#### Setting

*Landform:* Terraces, outwash plains  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 5 inches:* sandy loam  
*Bw1 - 5 to 17 inches:* gravelly sandy loam  
*Bw2 - 17 to 25 inches:* sandy loam  
*2C - 25 to 60 inches:* stratified gravel to sand

**Properties and qualities**

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* About 18 to 36 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 4.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* B  
*Ecological site:* F144AY027MA - Moist Sandy Outwash  
*Hydric soil rating:* No

**Minor Components**

**Agawam**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Merrimac**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains, kames  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Ninigret**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

**Tisbury**

*Percent of map unit:* 3 percent  
*Landform:* Terraces, outwash plains  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Walpole**

*Percent of map unit:* 2 percent  
*Landform:* Drainageways on terraces, depressions on terraces  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

### 36A—Windsor loamy sand, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2svkg

*Elevation:* 0 to 990 feet

*Mean annual precipitation:* 36 to 71 inches

*Mean annual air temperature:* 39 to 55 degrees F

*Frost-free period:* 140 to 240 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Windsor, loamy sand, and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Windsor, Loamy Sand

##### Setting

*Landform:* Outwash plains, outwash terraces, deltas, dunes

*Landform position (three-dimensional):* Tread, riser

*Down-slope shape:* Linear, convex

*Across-slope shape:* Linear, convex

*Parent material:* Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

##### Typical profile

*O - 0 to 1 inches:* moderately decomposed plant material

*A - 1 to 3 inches:* loamy sand

*Bw - 3 to 25 inches:* loamy sand

*C - 25 to 65 inches:* sand

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to very high (1.42 to 99.90 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 3.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2s

*Hydrologic Soil Group:* A

*Ecological site:* F144AY022MA - Dry Outwash

*Hydric soil rating:* No

**Minor Components**

**Deerfield, loamy sand**

*Percent of map unit:* 10 percent  
*Landform:* Deltas, terraces, outwash plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread, talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Hinckley, loamy sand**

*Percent of map unit:* 5 percent  
*Landform:* Deltas, kames, eskers, outwash plains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Head slope, nose slope, side slope, crest, rise  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex, linear  
*Hydric soil rating:* No

**36B—Windsor loamy sand, 3 to 8 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2svkf  
*Elevation:* 0 to 1,210 feet  
*Mean annual precipitation:* 36 to 71 inches  
*Mean annual air temperature:* 39 to 55 degrees F  
*Frost-free period:* 140 to 240 days  
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Windsor, loamy sand, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Windsor, Loamy Sand**

**Setting**

*Landform:* Dunes, outwash plains, deltas, outwash terraces  
*Landform position (three-dimensional):* Tread, riser  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Convex, linear  
*Parent material:* Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

**Typical profile**

*O - 0 to 1 inches:* moderately decomposed plant material

## Custom Soil Resource Report

*A - 1 to 3 inches:* loamy sand  
*Bw - 3 to 25 inches:* loamy sand  
*C - 25 to 65 inches:* sand

### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to very high (1.42 to 99.90 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Low (about 4.5 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2s  
*Hydrologic Soil Group:* A  
*Ecological site:* F144AY022MA - Dry Outwash  
*Hydric soil rating:* No

### Minor Components

#### Hinckley, loamy sand

*Percent of map unit:* 10 percent  
*Landform:* Deltas, kames, eskers, outwash plains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Head slope, nose slope, side slope, crest, rise  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex, linear  
*Hydric soil rating:* No

#### Deerfield, loamy sand

*Percent of map unit:* 5 percent  
*Landform:* Deltas, terraces, outwash plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread, talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

## 306—Udorthents-Urban land complex

### Map Unit Setting

*National map unit symbol:* 9lmg  
*Elevation:* 0 to 2,000 feet  
*Mean annual precipitation:* 43 to 56 inches

## Custom Soil Resource Report

*Mean annual air temperature:* 45 to 55 degrees F

*Frost-free period:* 120 to 185 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Udorthents and similar soils:* 50 percent

*Urban land:* 35 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Udorthents

#### Setting

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Drift

#### Typical profile

*A - 0 to 5 inches:* loam

*C1 - 5 to 21 inches:* gravelly loam

*C2 - 21 to 80 inches:* very gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 25 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)

*Depth to water table:* About 54 to 72 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Moderate (about 6.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Description of Urban Land

#### Typical profile

*H - 0 to 6 inches:* material

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

*Hydrologic Soil Group:* D

*Hydric soil rating:* Unranked

### Minor Components

#### Unnamed, undisturbed soils

*Percent of map unit:* 8 percent

*Hydric soil rating:* No

**Udorthents, wet substratum**

*Percent of map unit: 5 percent*  
*Down-slope shape: Convex*  
*Across-slope shape: Linear*  
*Hydric soil rating: No*

**Rock outcrop**

*Percent of map unit: 2 percent*  
*Hydric soil rating: No*

**307—Urban land**

**Map Unit Setting**

*National map unit symbol: 9lmh*  
*Elevation: 0 to 2,000 feet*  
*Mean annual precipitation: 43 to 56 inches*  
*Mean annual air temperature: 45 to 55 degrees F*  
*Frost-free period: 120 to 185 days*  
*Farmland classification: Not prime farmland*

**Map Unit Composition**

*Urban land: 80 percent*  
*Minor components: 20 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Urban Land**

**Typical profile**

*H - 0 to 6 inches: material*

**Interpretive groups**

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 8*  
*Hydrologic Soil Group: D*  
*Hydric soil rating: Unranked*

**Minor Components**

**Udorthents, wet substratum**

*Percent of map unit: 10 percent*  
*Down-slope shape: Convex*  
*Across-slope shape: Linear*  
*Hydric soil rating: No*

**Unnamed, undisturbed soils**

*Percent of map unit: 10 percent*  
*Hydric soil rating: No*

## **701A—Ninigret fine sandy loam, 0 to 3 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 2y07d

*Elevation:* 0 to 1,260 feet

*Mean annual precipitation:* 43 to 54 inches

*Mean annual air temperature:* 45 to 55 degrees F

*Frost-free period:* 140 to 185 days

*Farmland classification:* All areas are prime farmland

### **Map Unit Composition**

*Ninigret and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Ninigret**

#### **Setting**

*Landform:* Kame terraces, outwash plains, moraines, kames, outwash terraces

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Base slope, tread

*Down-slope shape:* Convex, linear

*Across-slope shape:* Convex, concave

*Parent material:* Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

#### **Typical profile**

*Ap - 0 to 8 inches:* fine sandy loam

*Bw1 - 8 to 16 inches:* fine sandy loam

*Bw2 - 16 to 26 inches:* fine sandy loam

*2C - 26 to 65 inches:* stratified loamy sand to loamy fine sand

#### **Properties and qualities**

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 18 to 38 inches to strongly contrasting textural stratification

*Drainage class:* Moderately well drained

*Runoff class:* Very low

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.17 in/hr)

*Depth to water table:* About 17 to 39 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* C

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*Ecological site:* F144AY026CT - Moist Silty Outwash

*Hydric soil rating:* No

### Minor Components

#### **Merrimac**

*Percent of map unit:* 5 percent

*Landform:* Outwash plains, outwash terraces, eskers, kames, moraines

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Side slope, crest, tread

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Agawam**

*Percent of map unit:* 5 percent

*Landform:* Kame terraces, outwash plains, outwash terraces, moraines, kames

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Side slope, crest, tread

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Tisbury**

*Percent of map unit:* 3 percent

*Landform:* Outwash terraces, valley trains, deltas, outwash plains

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* No

#### **Raypol**

*Percent of map unit:* 2 percent

*Landform:* Drainageways, depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

# **Soil Information for All Uses**

---

## **Soil Properties and Qualities**

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## **Soil Qualities and Features**

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

## **Hydrologic Soil Group**

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.

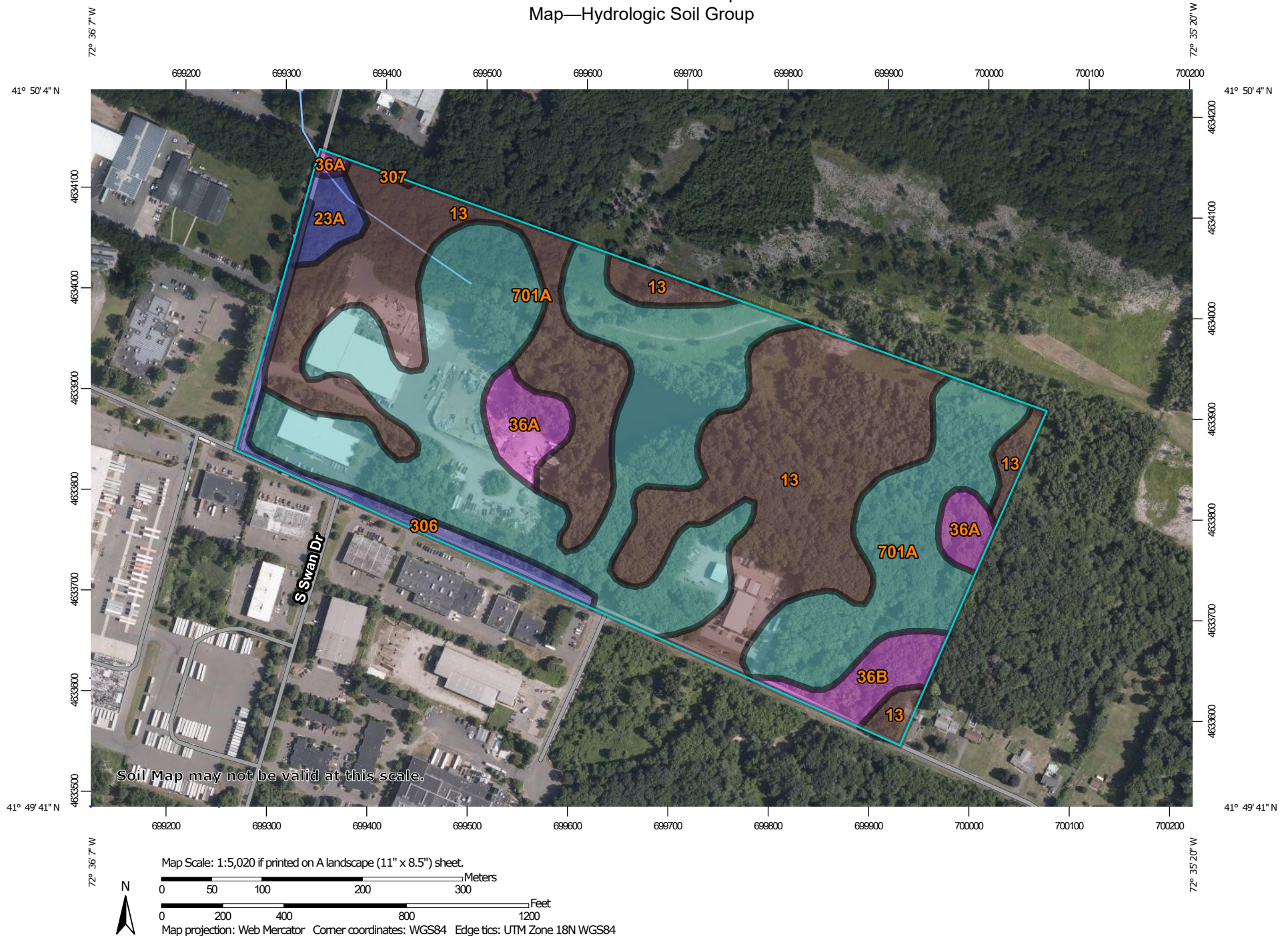
## Custom Soil Resource Report

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.

# Custom Soil Resource Report Map—Hydrologic Soil Group



## 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: Jul 15, 2019—Oct 24, 2019

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

**Table—Hydrologic Soil Group**

| Map unit symbol                    | Map unit name                                   | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|-------------------------------------------------|--------|--------------|----------------|
| 13                                 | Walpole sandy loam, 0 to 3 percent slopes       | B/D    | 25.4         | 40.8%          |
| 23A                                | Sudbury sandy loam, 0 to 5 percent slopes       | B      | 1.0          | 1.6%           |
| 36A                                | Windsor loamy sand, 0 to 3 percent slopes       | A      | 2.6          | 4.2%           |
| 36B                                | Windsor loamy sand, 3 to 8 percent slopes       | A      | 1.8          | 2.8%           |
| 306                                | Udorthents-Urban land complex                   | B      | 1.8          | 2.9%           |
| 307                                | Urban land                                      | D      | 0.0          | 0.0%           |
| 701A                               | Ninigret fine sandy loam, 0 to 3 percent slopes | C      | 29.6         | 47.6%          |
| <b>Totals for Area of Interest</b> |                                                 |        | <b>62.2</b>  | <b>100.0%</b>  |

**Rating Options—Hydrologic Soil Group***Aggregation Method: Dominant Condition**Component Percent Cutoff: None Specified**Tie-break Rule: Higher*

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## Custom Soil Resource Report

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United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

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**APPENDIX D**  
**NOAA Rainfall Data**



**NOAA Atlas 14, Volume 10, Version 3**  
**Location name: South Windsor, Connecticut, USA\***  
**Latitude: 41.8322°, Longitude: -72.599°**  
**Elevation: 73.05 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 & aerals](#)

### PF tabular

| PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) <sup>1</sup> |                                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Duration                                                                                                      | Average recurrence interval (years) |                        |                        |                        |                        |                        |                        |                        |                        |                        |
|                                                                                                               | 1                                   | 2                      | 5                      | 10                     | 25                     | 50                     | 100                    | 200                    | 500                    | 1000                   |
| 5-min                                                                                                         | 4.04<br>(3.13-5.21)                 | 4.90<br>(3.79-6.31)    | 6.29<br>(4.86-8.14)    | 7.44<br>(5.72-9.68)    | 9.04<br>(6.73-12.3)    | 10.2<br>(7.48-14.2)    | 11.5<br>(8.15-16.6)    | 12.9<br>(8.68-19.1)    | 14.9<br>(9.68-22.9)    | 16.6<br>(10.5-26.0)    |
| 10-min                                                                                                        | 2.86<br>(2.22-3.68)                 | 3.47<br>(2.69-4.47)    | 4.46<br>(3.44-5.77)    | 5.27<br>(4.05-6.86)    | 6.40<br>(4.76-8.71)    | 7.25<br>(5.29-10.1)    | 8.14<br>(5.78-11.8)    | 9.14<br>(6.15-13.5)    | 10.6<br>(6.85-16.2)    | 11.8<br>(7.45-18.4)    |
| 15-min                                                                                                        | 2.24<br>(1.74-2.89)                 | 2.72<br>(2.11-3.50)    | 3.50<br>(2.70-4.52)    | 4.14<br>(3.18-5.38)    | 5.02<br>(3.74-6.84)    | 5.68<br>(4.15-7.92)    | 6.38<br>(4.53-9.23)    | 7.17<br>(4.82-10.6)    | 8.30<br>(5.38-12.7)    | 9.22<br>(5.84-14.4)    |
| 30-min                                                                                                        | 1.51<br>(1.17-1.94)                 | 1.83<br>(1.42-2.36)    | 2.36<br>(1.82-3.05)    | 2.80<br>(2.15-3.64)    | 3.40<br>(2.53-4.63)    | 3.86<br>(2.81-5.36)    | 4.33<br>(3.07-6.26)    | 4.87<br>(3.27-7.20)    | 5.63<br>(3.65-8.63)    | 6.26<br>(3.96-9.80)    |
| 60-min                                                                                                        | 0.944<br>(0.732-1.22)               | 1.15<br>(0.891-1.48)   | 1.48<br>(1.15-1.92)    | 1.76<br>(1.35-2.29)    | 2.15<br>(1.60-2.92)    | 2.43<br>(1.78-3.39)    | 2.74<br>(1.94-3.95)    | 3.08<br>(2.07-4.55)    | 3.56<br>(2.31-5.46)    | 3.96<br>(2.50-6.19)    |
| 2-hr                                                                                                          | 0.611<br>(0.476-0.782)              | 0.739<br>(0.576-0.947) | 0.948<br>(0.738-1.22)  | 1.12<br>(0.868-1.45)   | 1.36<br>(1.02-1.85)    | 1.54<br>(1.13-2.14)    | 1.73<br>(1.24-2.50)    | 1.96<br>(1.32-2.88)    | 2.29<br>(1.49-3.49)    | 2.57<br>(1.63-4.00)    |
| 3-hr                                                                                                          | 0.469<br>(0.367-0.598)              | 0.567<br>(0.443-0.724) | 0.727<br>(0.566-0.931) | 0.859<br>(0.666-1.11)  | 1.04<br>(0.785-1.41)   | 1.18<br>(0.870-1.63)   | 1.32<br>(0.954-1.92)   | 1.50<br>(1.01-2.20)    | 1.77<br>(1.15-2.68)    | 2.00<br>(1.27-3.09)    |
| 6-hr                                                                                                          | 0.294<br>(0.232-0.373)              | 0.357<br>(0.281-0.453) | 0.460<br>(0.361-0.586) | 0.545<br>(0.425-0.698) | 0.662<br>(0.502-0.893) | 0.749<br>(0.557-1.03)  | 0.843<br>(0.612-1.22)  | 0.959<br>(0.651-1.40)  | 1.14<br>(0.743-1.72)   | 1.29<br>(0.825-1.99)   |
| 12-hr                                                                                                         | 0.178<br>(0.141-0.225)              | 0.219<br>(0.173-0.276) | 0.284<br>(0.224-0.360) | 0.339<br>(0.266-0.432) | 0.414<br>(0.315-0.555) | 0.469<br>(0.351-0.645) | 0.530<br>(0.387-0.762) | 0.605<br>(0.412-0.876) | 0.723<br>(0.473-1.08)  | 0.824<br>(0.528-1.26)  |
| 24-hr                                                                                                         | 0.104<br>(0.083-0.131)              | 0.130<br>(0.103-0.163) | 0.171<br>(0.136-0.216) | 0.206<br>(0.162-0.260) | 0.253<br>(0.194-0.338) | 0.288<br>(0.217-0.395) | 0.327<br>(0.241-0.469) | 0.376<br>(0.256-0.541) | 0.454<br>(0.298-0.676) | 0.522<br>(0.335-0.793) |
| 2-day                                                                                                         | 0.059<br>(0.047-0.073)              | 0.074<br>(0.059-0.092) | 0.099<br>(0.079-0.124) | 0.120<br>(0.095-0.151) | 0.149<br>(0.115-0.198) | 0.170<br>(0.129-0.232) | 0.193<br>(0.144-0.278) | 0.224<br>(0.154-0.321) | 0.275<br>(0.181-0.408) | 0.321<br>(0.207-0.484) |
| 3-day                                                                                                         | 0.043<br>(0.034-0.053)              | 0.054<br>(0.043-0.067) | 0.072<br>(0.058-0.090) | 0.088<br>(0.070-0.110) | 0.109<br>(0.084-0.144) | 0.124<br>(0.095-0.169) | 0.141<br>(0.106-0.203) | 0.164<br>(0.113-0.234) | 0.202<br>(0.133-0.299) | 0.237<br>(0.153-0.355) |
| 4-day                                                                                                         | 0.034<br>(0.028-0.042)              | 0.043<br>(0.035-0.054) | 0.058<br>(0.047-0.072) | 0.070<br>(0.056-0.088) | 0.087<br>(0.068-0.116) | 0.099<br>(0.076-0.135) | 0.113<br>(0.085-0.162) | 0.132<br>(0.090-0.187) | 0.162<br>(0.107-0.238) | 0.189<br>(0.122-0.284) |
| 7-day                                                                                                         | 0.023<br>(0.019-0.029)              | 0.029<br>(0.024-0.036) | 0.039<br>(0.031-0.048) | 0.046<br>(0.037-0.058) | 0.057<br>(0.045-0.075) | 0.065<br>(0.050-0.088) | 0.074<br>(0.055-0.105) | 0.086<br>(0.059-0.121) | 0.105<br>(0.069-0.153) | 0.122<br>(0.079-0.181) |
| 10-day                                                                                                        | 0.019<br>(0.015-0.023)              | 0.023<br>(0.019-0.028) | 0.030<br>(0.024-0.037) | 0.036<br>(0.029-0.045) | 0.044<br>(0.034-0.058) | 0.050<br>(0.038-0.067) | 0.056<br>(0.042-0.079) | 0.065<br>(0.045-0.091) | 0.078<br>(0.052-0.114) | 0.091<br>(0.059-0.134) |
| 20-day                                                                                                        | 0.014<br>(0.011-0.017)              | 0.016<br>(0.013-0.019) | 0.020<br>(0.016-0.024) | 0.023<br>(0.018-0.028) | 0.027<br>(0.021-0.035) | 0.030<br>(0.023-0.040) | 0.033<br>(0.025-0.046) | 0.038<br>(0.026-0.052) | 0.044<br>(0.029-0.063) | 0.049<br>(0.032-0.073) |
| 30-day                                                                                                        | 0.011<br>(0.009-0.014)              | 0.013<br>(0.011-0.016) | 0.016<br>(0.013-0.019) | 0.018<br>(0.014-0.022) | 0.021<br>(0.016-0.026) | 0.023<br>(0.017-0.030) | 0.025<br>(0.018-0.034) | 0.028<br>(0.019-0.038) | 0.031<br>(0.021-0.045) | 0.034<br>(0.022-0.050) |
| 45-day                                                                                                        | 0.010<br>(0.008-0.012)              | 0.011<br>(0.009-0.013) | 0.012<br>(0.010-0.015) | 0.014<br>(0.011-0.017) | 0.016<br>(0.012-0.020) | 0.017<br>(0.013-0.023) | 0.019<br>(0.014-0.025) | 0.021<br>(0.014-0.028) | 0.023<br>(0.015-0.032) | 0.024<br>(0.016-0.036) |
| 60-day                                                                                                        | 0.008<br>(0.007-0.010)              | 0.009<br>(0.008-0.011) | 0.011<br>(0.009-0.013) | 0.012<br>(0.010-0.014) | 0.013<br>(0.010-0.017) | 0.015<br>(0.011-0.019) | 0.016<br>(0.012-0.021) | 0.017<br>(0.012-0.023) | 0.018<br>(0.012-0.026) | 0.019<br>(0.013-0.028) |

<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.

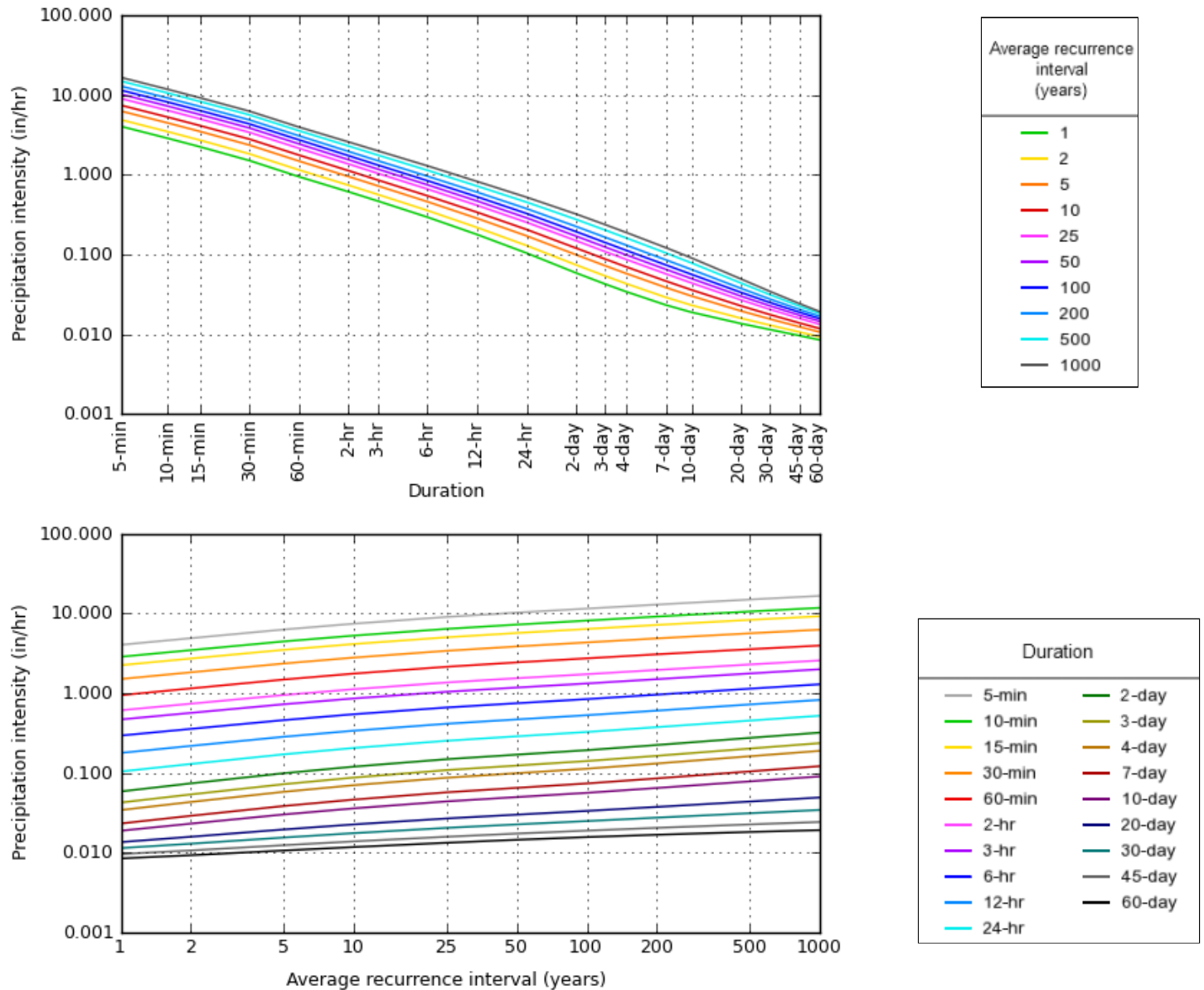
Please refer to NOAA Atlas 14 document for more information.

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### PF graphical

## PDS-based intensity-duration-frequency (IDF) curves

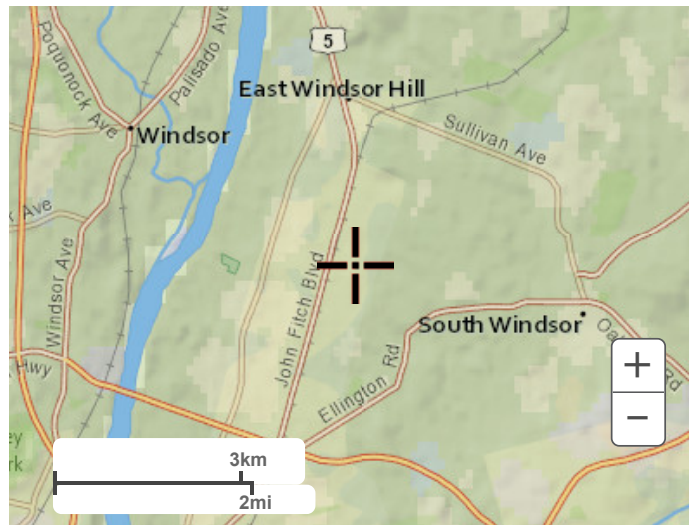
Latitude: 41.8322°, Longitude: -72.5990°



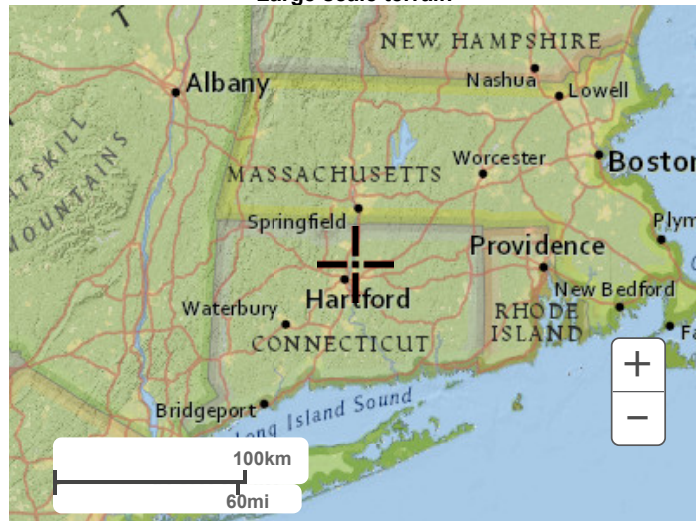
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Wed Sep 7 17:28:50 2022

[Back to Top](#)**Maps & aerials****Small scale terrain**



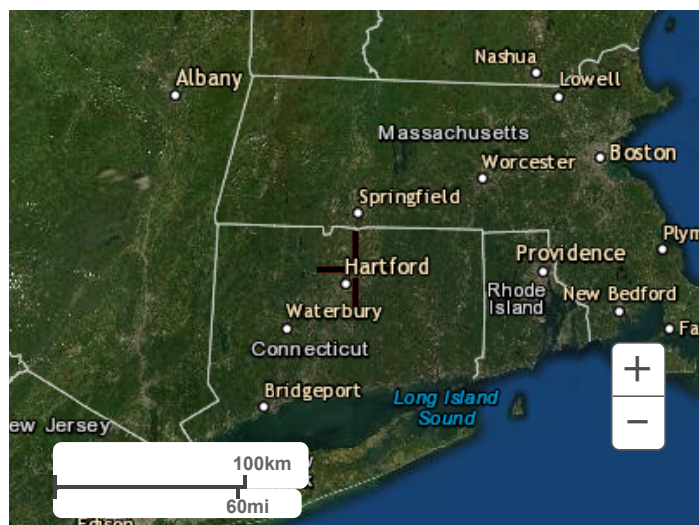
Large scale terrain



Large scale map



Large scale aerial



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[National Weather Service](#)  
[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

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**NOAA Atlas 14, Volume 10, Version 3**  
**Location name: South Windsor, Connecticut, USA\***  
**Latitude: 41.8322°, Longitude: -72.599°**  
**Elevation: 73.05 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 & aerals](#)

### PF tabular

| PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup> |                                     |                        |                        |                        |                       |                       |                       |                      |                      |                      |
|----------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|
| Duration                                                                                                 | Average recurrence interval (years) |                        |                        |                        |                       |                       |                       |                      |                      |                      |
|                                                                                                          | 1                                   | 2                      | 5                      | 10                     | 25                    | 50                    | 100                   | 200                  | 500                  | 1000                 |
| 5-min                                                                                                    | 0.337<br>(0.261-0.434)              | 0.408<br>(0.316-0.526) | 0.524<br>(0.405-0.678) | 0.620<br>(0.477-0.807) | 0.753<br>(0.561-1.02) | 0.853<br>(0.623-1.19) | 0.958<br>(0.679-1.38) | 1.08<br>(0.723-1.59) | 1.25<br>(0.807-1.91) | 1.38<br>(0.876-2.17) |
| 10-min                                                                                                   | 0.477<br>(0.370-0.614)              | 0.578<br>(0.448-0.745) | 0.743<br>(0.574-0.961) | 0.879<br>(0.675-1.14)  | 1.07<br>(0.794-1.45)  | 1.21<br>(0.881-1.68)  | 1.36<br>(0.963-1.96)  | 1.52<br>(1.02-2.25)  | 1.76<br>(1.14-2.70)  | 1.96<br>(1.24-3.07)  |
| 15-min                                                                                                   | 0.561<br>(0.436-0.723)              | 0.680<br>(0.527-0.876) | 0.874<br>(0.676-1.13)  | 1.03<br>(0.794-1.35)   | 1.25<br>(0.934-1.71)  | 1.42<br>(1.04-1.98)   | 1.60<br>(1.13-2.31)   | 1.79<br>(1.21-2.65)  | 2.08<br>(1.34-3.18)  | 2.31<br>(1.46-3.61)  |
| 30-min                                                                                                   | 0.753<br>(0.584-0.969)              | 0.914<br>(0.709-1.18)  | 1.18<br>(0.910-1.52)   | 1.40<br>(1.07-1.82)    | 1.70<br>(1.27-2.32)   | 1.93<br>(1.41-2.68)   | 2.17<br>(1.54-3.13)   | 2.43<br>(1.64-3.60)  | 2.82<br>(1.83-4.32)  | 3.13<br>(1.98-4.90)  |
| 60-min                                                                                                   | 0.944<br>(0.732-1.22)               | 1.15<br>(0.891-1.48)   | 1.48<br>(1.15-1.92)    | 1.76<br>(1.35-2.29)    | 2.15<br>(1.60-2.92)   | 2.43<br>(1.78-3.39)   | 2.74<br>(1.94-3.95)   | 3.08<br>(2.07-4.55)  | 3.56<br>(2.31-5.46)  | 3.96<br>(2.50-6.19)  |
| 2-hr                                                                                                     | 1.22<br>(0.953-1.56)                | 1.48<br>(1.15-1.89)    | 1.90<br>(1.48-2.44)    | 2.25<br>(1.74-2.90)    | 2.73<br>(2.04-3.70)   | 3.08<br>(2.27-4.28)   | 3.46<br>(2.48-5.01)   | 3.91<br>(2.64-5.75)  | 4.58<br>(2.98-6.98)  | 5.15<br>(3.27-8.00)  |
| 3-hr                                                                                                     | 1.41<br>(1.10-1.80)                 | 1.70<br>(1.33-2.17)    | 2.18<br>(1.70-2.80)    | 2.58<br>(2.00-3.33)    | 3.13<br>(2.36-4.24)   | 3.54<br>(2.61-4.90)   | 3.98<br>(2.87-5.75)   | 4.51<br>(3.05-6.60)  | 5.31<br>(3.45-8.06)  | 5.99<br>(3.81-9.28)  |
| 6-hr                                                                                                     | 1.76<br>(1.39-2.24)                 | 2.14<br>(1.68-2.72)    | 2.75<br>(2.16-3.51)    | 3.26<br>(2.54-4.18)    | 3.97<br>(3.00-5.35)   | 4.48<br>(3.34-6.19)   | 5.05<br>(3.67-7.28)   | 5.75<br>(3.90-8.37)  | 6.82<br>(4.45-10.3)  | 7.75<br>(4.94-11.9)  |
| 12-hr                                                                                                    | 2.15<br>(1.70-2.71)                 | 2.63<br>(2.08-3.32)    | 3.43<br>(2.70-4.34)    | 4.08<br>(3.20-5.20)    | 4.99<br>(3.80-6.69)   | 5.66<br>(4.23-7.77)   | 6.38<br>(4.66-9.18)   | 7.29<br>(4.96-10.6)  | 8.71<br>(5.70-13.0)  | 9.93<br>(6.36-15.2)  |
| 24-hr                                                                                                    | 2.50<br>(1.99-3.14)                 | 3.11<br>(2.48-3.90)    | 4.11<br>(3.26-5.17)    | 4.94<br>(3.89-6.25)    | 6.08<br>(4.66-8.12)   | 6.91<br>(5.21-9.48)   | 7.84<br>(5.78-11.3)   | 9.01<br>(6.15-13.0)  | 10.9<br>(7.15-16.2)  | 12.5<br>(8.04-19.0)  |
| 2-day                                                                                                    | 2.82<br>(2.26-3.51)                 | 3.56<br>(2.85-4.43)    | 4.76<br>(3.80-5.96)    | 5.77<br>(4.57-7.26)    | 7.15<br>(5.52-9.53)   | 8.15<br>(6.19-11.2)   | 9.28<br>(6.91-13.3)   | 10.8<br>(7.37-15.4)  | 13.2<br>(8.70-19.6)  | 15.4<br>(9.92-23.2)  |
| 3-day                                                                                                    | 3.07<br>(2.47-3.81)                 | 3.88<br>(3.12-4.82)    | 5.21<br>(4.17-6.49)    | 6.31<br>(5.02-7.91)    | 7.82<br>(6.07-10.4)   | 8.92<br>(6.81-12.2)   | 10.2<br>(7.61-14.6)   | 11.8<br>(8.11-16.9)  | 14.6<br>(9.61-21.5)  | 17.0<br>(11.0-25.6)  |
| 4-day                                                                                                    | 3.29<br>(2.66-4.08)                 | 4.16<br>(3.35-5.15)    | 5.57<br>(4.47-6.93)    | 6.75<br>(5.38-8.44)    | 8.36<br>(6.50-11.1)   | 9.53<br>(7.29-13.0)   | 10.9<br>(8.14-15.6)   | 12.6<br>(8.68-18.0)  | 15.6<br>(10.3-22.9)  | 18.2<br>(11.7-27.2)  |
| 7-day                                                                                                    | 3.91<br>(3.17-4.82)                 | 4.88<br>(3.95-6.02)    | 6.48<br>(5.22-8.01)    | 7.80<br>(6.25-9.70)    | 9.61<br>(7.50-12.7)   | 10.9<br>(8.38-14.8)   | 12.4<br>(9.32-17.6)   | 14.4<br>(9.92-20.3)  | 17.6<br>(11.6-25.7)  | 20.4<br>(13.2-30.5)  |
| 10-day                                                                                                   | 4.53<br>(3.68-5.57)                 | 5.56<br>(4.52-6.84)    | 7.25<br>(5.86-8.94)    | 8.65<br>(6.95-10.7)    | 10.6<br>(8.25-13.8)   | 12.0<br>(9.18-16.1)   | 13.5<br>(10.1-19.1)   | 15.6<br>(10.8-21.9)  | 18.8<br>(12.5-27.4)  | 21.7<br>(14.1-32.2)  |
| 20-day                                                                                                   | 6.53<br>(5.34-7.97)                 | 7.62<br>(6.22-9.31)    | 9.40<br>(7.65-11.5)    | 10.9<br>(8.80-13.4)    | 12.9<br>(10.1-16.7)   | 14.4<br>(11.0-19.1)   | 16.0<br>(11.9-22.1)   | 18.0<br>(12.5-25.2)  | 21.1<br>(14.0-30.4)  | 23.6<br>(15.4-34.9)  |
| 30-day                                                                                                   | 8.24<br>(6.76-10.0)                 | 9.36<br>(7.67-11.4)    | 11.2<br>(9.13-13.7)    | 12.7<br>(10.3-15.6)    | 14.8<br>(11.6-18.9)   | 16.3<br>(12.5-21.4)   | 18.0<br>(13.3-24.4)   | 19.8<br>(13.9-27.6)  | 22.6<br>(15.1-32.4)  | 24.8<br>(16.1-36.4)  |
| 45-day                                                                                                   | 10.4<br>(8.57-12.6)                 | 11.6<br>(9.50-14.0)    | 13.4<br>(11.0-16.3)    | 15.0<br>(12.2-18.3)    | 17.1<br>(13.4-21.7)   | 18.8<br>(14.4-24.3)   | 20.5<br>(15.1-27.3)   | 22.2<br>(15.6-30.6)  | 24.5<br>(16.4-35.0)  | 26.3<br>(17.1-38.4)  |
| 60-day                                                                                                   | 12.2<br>(10.1-14.8)                 | 13.4<br>(11.1-16.2)    | 15.4<br>(12.6-18.6)    | 17.0<br>(13.9-20.7)    | 19.2<br>(15.1-24.2)   | 20.9<br>(16.0-26.9)   | 22.6<br>(16.6-29.9)   | 24.2<br>(17.0-33.3)  | 26.2<br>(17.7-37.4)  | 27.7<br>(18.1-40.3)  |

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

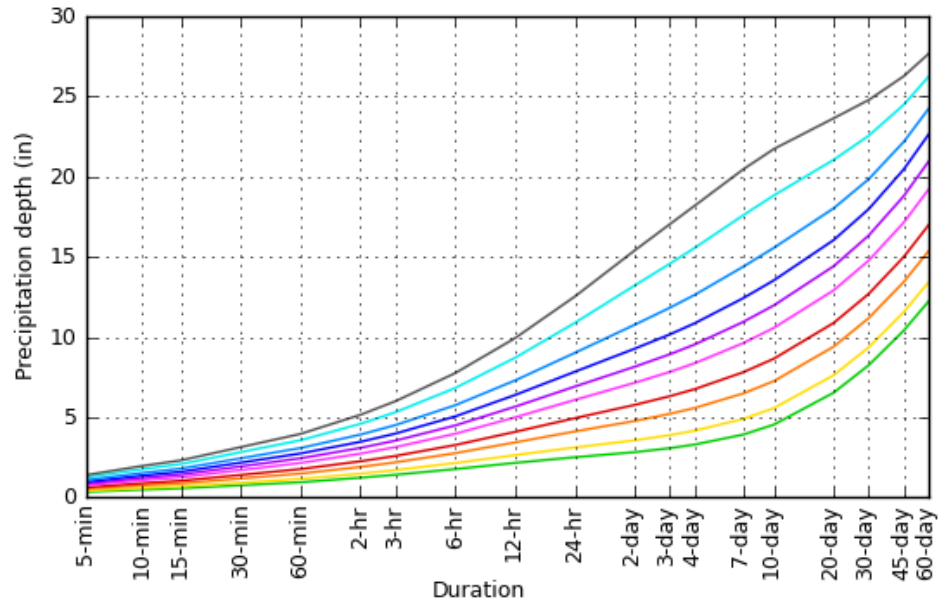
Please refer to NOAA Atlas 14 document for more information.

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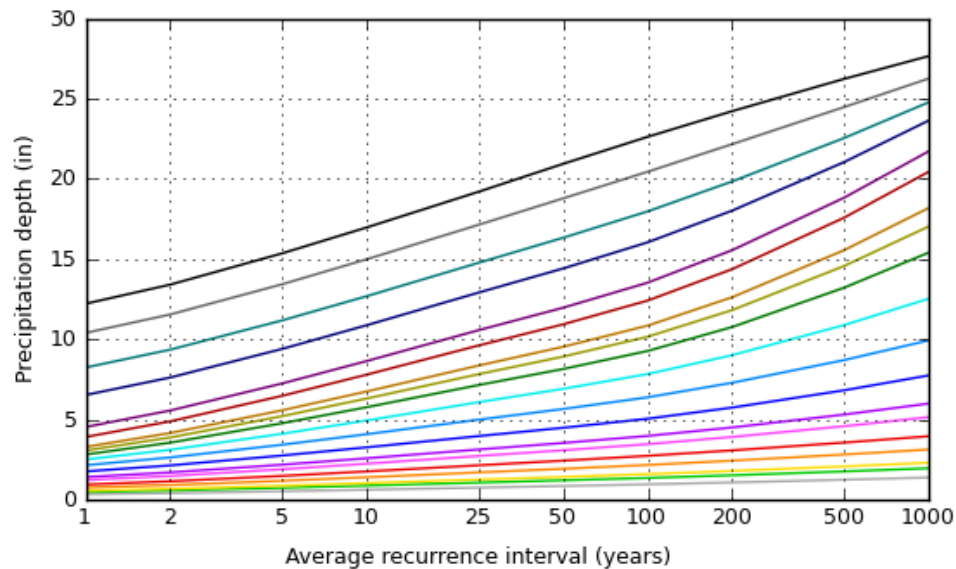
### PF graphical

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

Latitude: 41.8322°, Longitude: -72.5990°



| Average recurrence interval (years) |
|-------------------------------------|
| 1                                   |
| 2                                   |
| 5                                   |
| 10                                  |
| 25                                  |
| 50                                  |
| 100                                 |
| 200                                 |
| 500                                 |
| 1000                                |

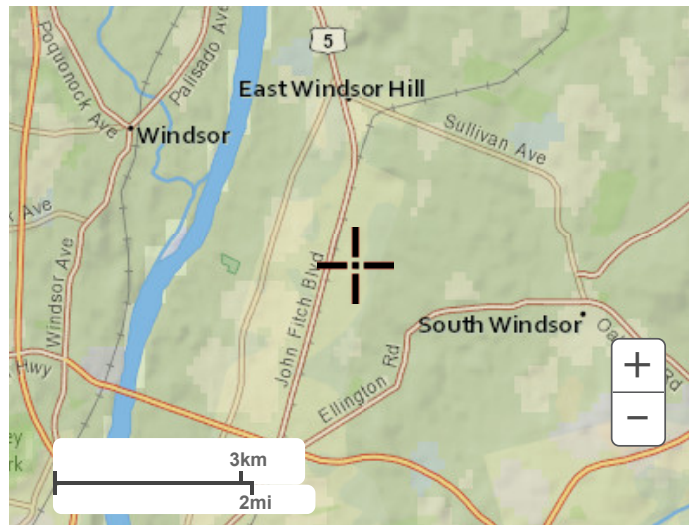


| Duration |        |
|----------|--------|
| 5-min    | 2-day  |
| 10-min   | 3-day  |
| 15-min   | 4-day  |
| 30-min   | 7-day  |
| 60-min   | 10-day |
| 2-hr     | 20-day |
| 3-hr     | 30-day |
| 6-hr     | 45-day |
| 12-hr    | 60-day |
| 24-hr    |        |

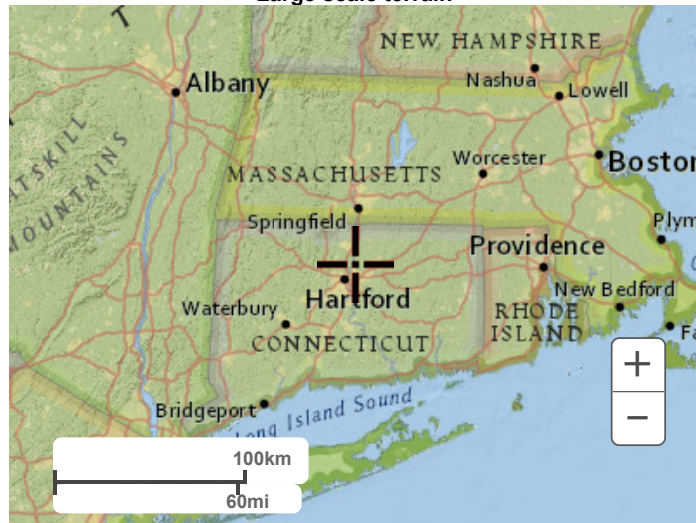
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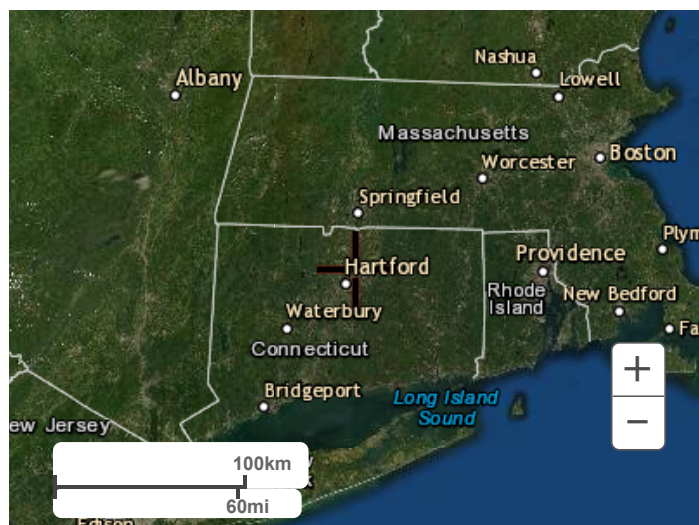
Large scale terrain



Large scale map



Large scale aerial



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**APPENDIX E**  
**Storm Sewer Analysis**

# Storm Sewer Tabulation

| Station                                                                                                  |            | Len     | Drng Area |       | Rnoff<br>coeff | Area x C |       | Tc    |       | Rain<br>(I) | Total<br>flow | Cap<br>full | Vel    | Pipe |       | Invert Elev        |       | HGL Elev |       | Grnd / Rim Elev     |       | Line ID    |
|----------------------------------------------------------------------------------------------------------|------------|---------|-----------|-------|----------------|----------|-------|-------|-------|-------------|---------------|-------------|--------|------|-------|--------------------|-------|----------|-------|---------------------|-------|------------|
| Line                                                                                                     | To<br>Line |         | Incr      | Total |                | Incr     | Total | Inlet | Syst  |             |               |             |        | Size | Slope | Dn                 | Up    | Dn       | Up    | Dn                  | Up    |            |
|                                                                                                          |            | (ft)    | (ac)      | (ac)  | (C)            |          |       | (min) | (min) | (in/hr)     | (cfs)         | (cfs)       | (ft/s) | (in) | (%)   | (ft)               | (ft)  | (ft)     | (ft)  | (ft)                | (ft)  |            |
| 1                                                                                                        | End        | 110.061 | 0.00      | 0.48  | 0.00           | 0.00     | 0.43  | 0.0   | 8.1   | 6.0         | 2.56          | 5.25        | 4.04   | 15   | 0.56  | 74.75              | 75.37 | 75.39    | 76.01 | 76.30               | 78.73 | DMH1 - FE1 |
| 2                                                                                                        | 1          | 149.778 | 0.25      | 0.48  | 0.90           | 0.23     | 0.43  | 6.0   | 7.0   | 6.4         | 2.74          | 5.14        | 4.20   | 15   | 0.54  | 75.37              | 76.18 | 76.02    | 76.84 | 78.73               | 79.80 | CB1 - DMH1 |
| 3                                                                                                        | 2          | 34.336  | 0.00      | 0.22  | 0.00           | 0.00     | 0.20  | 0.0   | 6.7   | 6.5         | 1.31          | 2.79        | 3.49   | 12   | 0.52  | 76.43              | 76.61 | 76.91    | 77.09 | 79.80               | 80.58 | BEND - CB1 |
| 4                                                                                                        | 3          | 71.874  | 0.22      | 0.22  | 0.90           | 0.20     | 0.20  | 6.0   | 6.0   | 6.9         | 1.38          | 2.84        | 3.56   | 12   | 0.54  | 76.61              | 77.00 | 77.10    | 77.50 | 80.58               | 79.00 | RL1 - BEND |
| 5                                                                                                        | End        | 267.152 | 0.45      | 0.45  | 0.90           | 0.41     | 0.41  | 6.0   | 6.0   | 6.9         | 2.80          | 3.95        | 4.65   | 12   | 1.05  | 75.00              | 77.80 | 75.72    | 78.52 | 75.16               | 80.10 | RL2 - FE2  |
| Project File: 2509.P Storm Sewer.stm                                                                     |            |         |           |       |                |          |       |       |       |             |               |             |        |      |       | Number of lines: 5 |       |          |       | Run Date: 10/3/2022 |       |            |
| NOTES:Intensity = 37.27 / (Inlet time + 4.00) ^ 0.73; Return period =Yrs. 10 ; c = cir e = ellip b = box |            |         |           |       |                |          |       |       |       |             |               |             |        |      |       |                    |       |          |       |                     |       |            |

**APPENDIX F**  
**Water Quality Flow Calculations and Data**

**444 Nutmeg Road – DPI Project No.:2509.P**

October 3, 2022

**Water Quality Volume Calculations**

Per 2004 Connecticut Stormwater Quality Manual, Section 7.4.1:

Areas for Calculation: Drainage Area P6 to West Basin

|              |        |
|--------------|--------|
|              | P2     |
| Impervious   | 2.01   |
| Pervious     | 0.92   |
| Total Area   | 2.93   |
| % Impervious | 68.60% |

Water Quality Volume (WQV) = (1") (R)(A)/12, where:

R = unitless volumetric runoff coefficient =  $0.05 + 0.009(I)$ , where:

I = percent impervious cover of drainage area = 68.60%

$R = 0.05 + 0.009(I)$

$R = 0.05 + 0.009(68.60)$

$R = \underline{0.667}$

A = drainage area in acres = 2.93 acres

$WQV = (1")(R)(A \text{ acres})/12 \text{ inches per foot}$

$WQV = (1")(0.667)(\underline{2.93} \text{ acres})/12 \text{ inches per foot}$

**WQV = 0.163 acre-feet required = 7,094.15 cft**

**Proposed BMP**

The proposed water quality basin and forebay are proposed to provide **8,785 cft** (below basin outlet FE-3 & FE-5 @ Elev. 74.0) and **1,837 cft** (below forebay spillways) of water quality storage, respectively. The forebays will provide storage for more than 10% of the determined water quality volume draining to the basin. The forebays in combination with the proposed wet pool of the water quality basin will provide a total water quality storage volume of **10,595 cft** of storage; more than 100% of the water quality volume. Water quality basin and forebay stage storage reports are included as a part of this appendix.

**2509.P HydroCAD**

Prepared by Design Professionals, Inc.

Type III 24-hr 100-Year Rainfall=7.84"

Printed 10/3/2022

HydroCAD® 10.10-7c s/n 09320 © 2022 HydroCAD Software Solutions LLC

**Stage-Area-Storage for Pond PP1: PP1**

| Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 72.00               | 2,385              | 0                       | 74.60               | 10,469             | 14,501                  |
| 72.05               | 2,431              | 120                     | 74.65               | 10,626             | 15,029                  |
| 72.10               | 2,476              | 243                     | 74.70               | 10,783             | 15,564                  |
| 72.15               | 2,522              | 368                     | 74.75               | 10,940             | 16,107                  |
| 72.20               | 2,568              | 495                     | 74.80               | 11,097             | 16,658                  |
| 72.25               | 2,614              | 625                     | 74.85               | 11,254             | 17,217                  |
| 72.30               | 2,659              | 757                     | 74.90               | 11,411             | 17,783                  |
| 72.35               | 2,705              | 891                     | 74.95               | 11,568             | 18,358                  |
| 72.40               | 2,751              | 1,027                   | 75.00               | 11,725             | 18,940                  |
| 72.45               | 2,797              | 1,166                   | 75.05               | 11,934             | 19,531                  |
| 72.50               | 2,843              | 1,307                   | 75.10               | 12,142             | 20,133                  |
| 72.55               | 2,888              | 1,450                   | 75.15               | 12,351             | 20,746                  |
| 72.60               | 2,934              | 1,596                   | 75.20               | 12,560             | 21,368                  |
| 72.65               | 2,980              | 1,744                   | 75.25               | 12,769             | 22,002                  |
| 72.70               | 3,026              | 1,894                   | 75.30               | 12,977             | 22,645                  |
| 72.75               | 3,071              | 2,046                   | 75.35               | 13,186             | 23,299                  |
| 72.80               | 3,117              | 2,201                   | 75.40               | 13,395             | 23,964                  |
| 72.85               | 3,163              | 2,358                   | 75.45               | 13,603             | 24,639                  |
| 72.90               | 3,209              | 2,517                   | 75.50               | 13,812             | 25,324                  |
| 72.95               | 3,254              | 2,679                   | 75.55               | 14,021             | 26,020                  |
| 73.00               | 3,300              | 2,843                   | 75.60               | 14,229             | 26,726                  |
| 73.05               | 3,564              | 3,014                   | 75.65               | 14,438             | 27,443                  |
| 73.10               | 3,828              | 3,199                   | 75.70               | 14,647             | 28,170                  |
| 73.15               | 4,093              | 3,397                   | 75.75               | 14,856             | 28,908                  |
| 73.20               | 4,357              | 3,608                   | 75.80               | 15,064             | 29,656                  |
| 73.25               | 4,621              | 3,833                   | 75.85               | 15,273             | 30,414                  |
| 73.30               | 4,885              | 4,070                   | 75.90               | 15,482             | 31,183                  |
| 73.35               | 5,150              | 4,321                   | 75.95               | 15,690             | 31,962                  |
| 73.40               | 5,414              | 4,585                   | 76.00               | <b>15,899</b>      | <b>32,752</b>           |
| 73.45               | 5,678              | 4,863                   |                     |                    |                         |
| 73.50               | 5,943              | 5,153                   |                     |                    |                         |
| 73.55               | 6,207              | 5,457                   |                     |                    |                         |
| 73.60               | 6,471              | 5,774                   |                     |                    |                         |
| 73.65               | 6,735              | 6,104                   |                     |                    |                         |
| 73.70               | 7,000              | 6,447                   |                     |                    |                         |
| 73.75               | 7,264              | 6,804                   |                     |                    |                         |
| 73.80               | 7,528              | 7,174                   |                     |                    |                         |
| 73.85               | 7,792              | 7,557                   |                     |                    |                         |
| 73.90               | 8,057              | 7,953                   |                     |                    |                         |
| 73.95               | 8,321              | 8,362                   |                     |                    |                         |
| <b>74.00</b>        | <b>8,585</b>       | <b>8,785</b>            |                     |                    |                         |
| 74.05               | 8,742              | 9,218                   |                     |                    |                         |
| 74.10               | 8,899              | 9,659                   |                     |                    |                         |
| 74.15               | 9,056              | 10,108                  |                     |                    |                         |
| 74.20               | 9,213              | 10,565                  |                     |                    |                         |
| 74.25               | 9,370              | 11,029                  |                     |                    |                         |
| 74.30               | 9,527              | 11,502                  |                     |                    |                         |
| 74.35               | 9,684              | 11,982                  |                     |                    |                         |
| 74.40               | 9,841              | 12,470                  |                     |                    |                         |
| 74.45               | 9,998              | 12,966                  |                     |                    |                         |
| 74.50               | 10,155             | 13,470                  |                     |                    |                         |
| 74.55               | 10,312             | 13,982                  |                     |                    |                         |

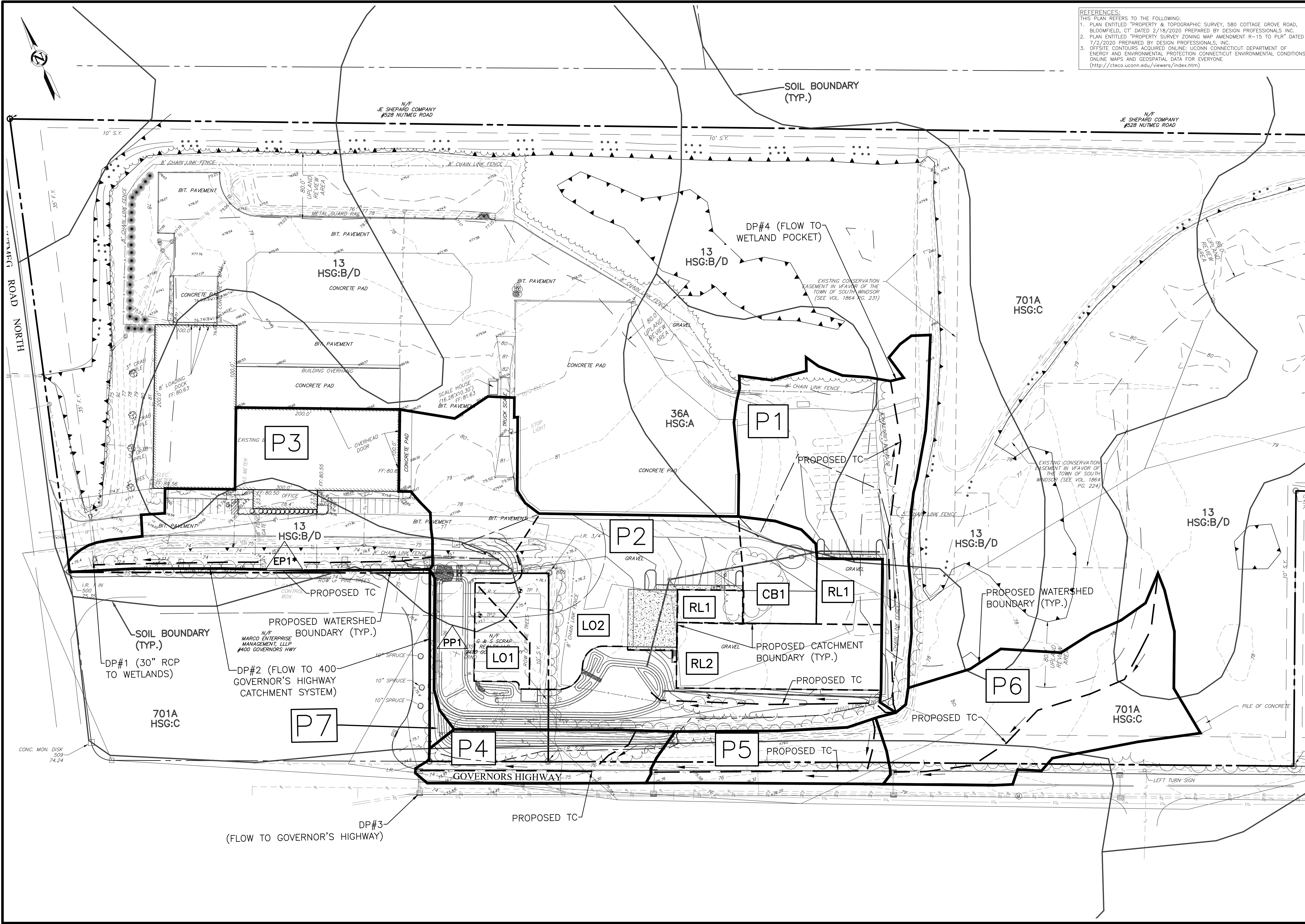
| STAGE STORAGE TABLE (LEAKOFF 1) |                   |                   |                                   |                                    |                                 |                                  |
|---------------------------------|-------------------|-------------------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|
| ELEV                            | AREA<br>(sq. ft.) | DEPT<br>H<br>(ft) | AVG END<br>INC. VOL.<br>(cu. ft.) | AVG END<br>TOTAL VOL.<br>(cu. ft.) | CONIC<br>INC. VOL.<br>(cu. ft.) | CONIC<br>TOTAL VOL.<br>(cu. ft.) |
| 74.00                           | 108.22            | N/A               | N/A                               | 0.00                               | N/A                             | 0.00                             |
| 75.00                           | 357.46            | 1.00              | 232.84                            | 232.84                             | 220.79                          | 220.79                           |
| 76.00                           | 707.72            | 1.00              | 532.59                            | 765.43                             | 522.72                          | 743.51                           |

| STAGE STORAGE TABLE (LEAKOFF 2) |                   |                   |                                   |                                    |                                 |                                  |
|---------------------------------|-------------------|-------------------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|
| ELEV                            | AREA<br>(sq. ft.) | DEPT<br>H<br>(ft) | AVG END<br>INC. VOL.<br>(cu. ft.) | AVG END<br>TOTAL VOL.<br>(cu. ft.) | CONIC<br>INC. VOL.<br>(cu. ft.) | CONIC<br>TOTAL VOL.<br>(cu. ft.) |
| 74.00                           | 45.33             | N/A               | N/A                               | 0.00                               | N/A                             | 0.00                             |
| 75.00                           | 295.52            | 1.00              | 170.43                            | 170.43                             | 152.20                          | 152.20                           |
| 76.00                           | 667.50            | 1.00              | 481.51                            | 651.94                             | 469.05                          | 621.25                           |

| STAGE STORAGE TABLE (CB1) |                   |                   |                                   |                                    |                                 |                                  |
|---------------------------|-------------------|-------------------|-----------------------------------|------------------------------------|---------------------------------|----------------------------------|
| ELEV                      | AREA<br>(sq. ft.) | DEPT<br>H<br>(ft) | AVG END<br>INC. VOL.<br>(cu. ft.) | AVG END<br>TOTAL VOL.<br>(cu. ft.) | CONIC<br>INC. VOL.<br>(cu. ft.) | CONIC<br>TOTAL VOL.<br>(cu. ft.) |
| 73.00                     | 134.15            | N/A               | N/A                               | 0.00                               | N/A                             | 0.00                             |
| 74.00                     | 381.49            | 1.00              | 257.82                            | 257.82                             | 247.29                          | 247.29                           |
| 74.50                     | 528.10            | 0.50              | 227.40                            | 485.21                             | 226.41                          | 473.69                           |

**APPENDIX G**  
**Drainage Area Maps**





REFERENCES:  
1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, 580 COTTAGE GROVE ROAD, BLOOMFIELD, CT" DATED 2/18/2020 PREPARED BY DESIGN PROFESSIONALS, INC.  
2. PLAN ENTITLED "PROPERTY SURVEY ZONING MAP AMENDMENT R-15 TO PLR" DATED 7/2/2020 PREPARED BY DESIGN PROFESSIONALS, INC.  
3. OFFSITE CONTOURS ACQUIRED ONLINE, UCONN CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION CONNECTICUT ENVIRONMENTAL CONDITIONS ONLINE MAPS AND GEOSPATIAL DATA FOR EVERYONE (<http://cteco.uconn.edu/viewers/index.htm>)

|                                       |  |                                                                                           |  |                                                                                                                                                                                                                       |  |
|---------------------------------------|--|-------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>PROPOSED DRAINAGE AREA MAP</b>     |  | <b>PRIME MATERIALS RECOVERY ~ SITE PLAN</b>                                               |  | <b>PREPARED FOR</b>                                                                                                                                                                                                   |  |
| SHEET<br><b>C-DA2</b><br>SHEET 2 OF 2 |  | 410 GOVERNOR'S HIGHWAY & 444 NUTMEG ROAD<br>SOUTH WINDSOR, CT<br>GIS #36900410 & 65100444 |  | Prime Materials Recovery<br>444 Nutmeg Road<br>South Windsor, CT 06074<br>860-622-7626 T                                                                                                                              |  |
| NO. DATE REVISIONS BY                 |  | PROJECT NO. 2509P<br>DATE 03/30/22<br>DESIGNER DJH<br>CHECKER DJH<br>CREATED BY SPC       |  | DESIGN PROFESSIONALS<br>CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS<br>PLANNERS / LANDSCAPE ARCHITECTS<br>21 EHEEY DRIVE<br>P.O. BOX 167<br>SOUTH WINDSOR, CT 06074<br>860-291-9257 - F<br>www.designprofessionals.com |  |