Stormwater Management Design Report

East Side Auto Transport
Automotive Storage Facility

4A Research Parkway
Wallingford, Connecticut

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Prepared for:

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1.0 Introduction

This Stormwater Management Design Report has been prepared on behalf of Six Research, LLC who has submitted applications to the Town of Wallingford Inland Wetlands and Watercourses Commission and Planning and Zoning Commission seeking approval to develop an approximate 3-acre land parcel located in the northeastern portion of the Town on Research Parkway (Figure 1).

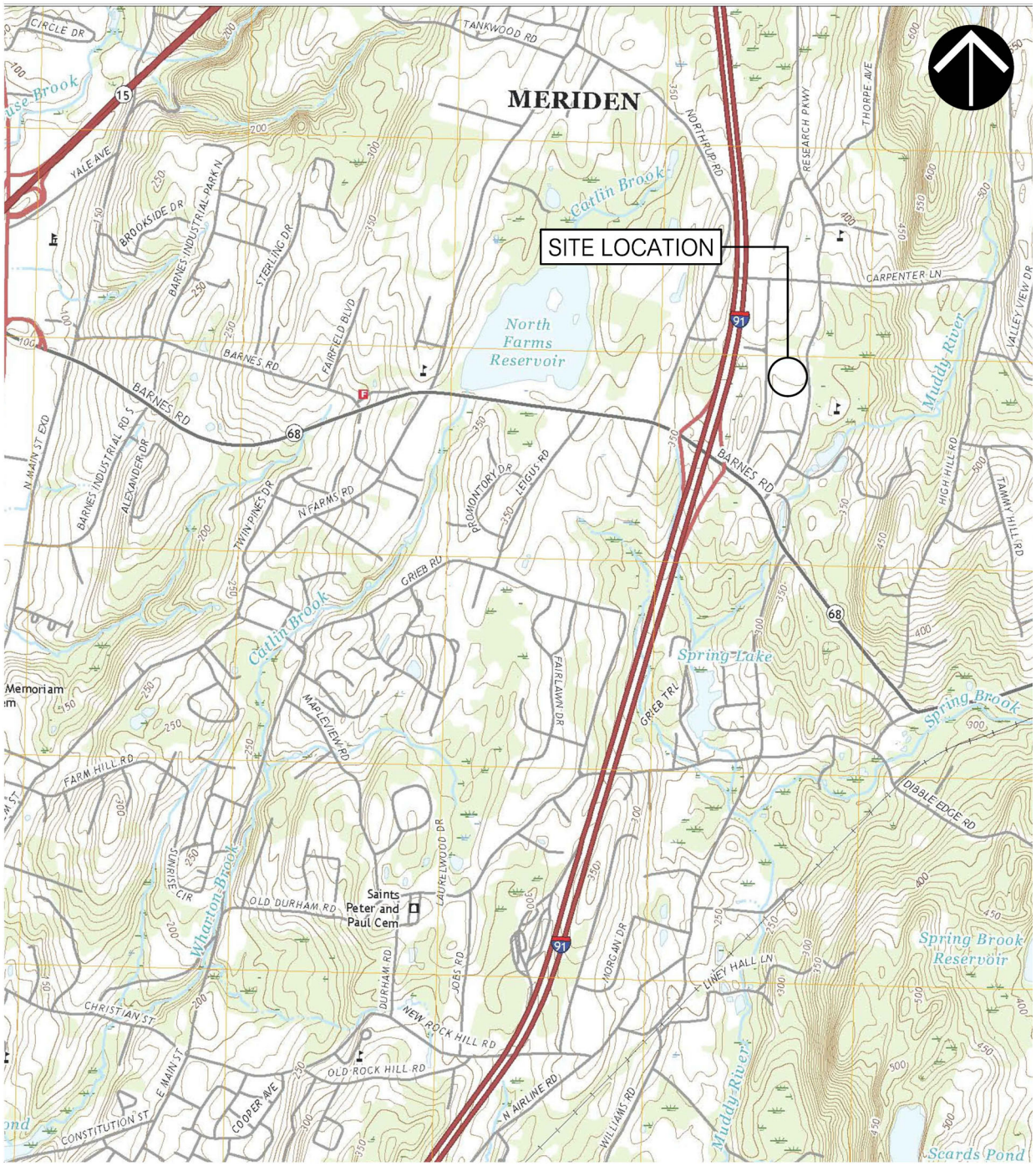

Figure 1. Project Location
U.S.G.S. Wallingford Connecticut Quadrangle

The parcel is located on the west side of Research Parkway approximately 0.4 miles north of its intersection with Barnes Road (State Route 68). The parcel is a through-lot having frontage on Research Parkway to the east and Thorpe Avenue to the west. A developed commercial parcel is located immediately to the south and an East Side Auto Transport facility owned by the applicant is located immediately to the north.

The planned development proposal is an expansion of the adjoining East Side Auto Transport facility that received Town of Wallingford land use commission approvals in 2019. The proposal will add a 6,000 square foot building to be used for storage and a hardstand and parking area for car carrier trucks and employee parking. The total area of impervious land cover associated with the proposal is approximately 61,740 square feet.

The site is located within an Industrial Expansion (IX) zoning district and within the Towns Watershed Protection District (WPD).

The existing land uses adjacent to and in the vicinity of the site having frontage on Research Parkway are commercial and the land use associated with the parcels on the west side of Thorpe Avenue is single family residential.

The current site is undeveloped and there are no improvements on the site. The land cover on the site is chiefly brush and un-maintained grass cover.

The site is served by the Town of Wallingford Public Utilities Department Water Division public water system and public communication, gas and power utilities within the Research Parkway and Thorpe Avenue rights-of-way.

The site is located within the Muddy River subregional drainage basin (HUC 5208) and within a public water supply watershed area. Surface water runoff from the site ultimately enters the Research Parkway roadway storm drainage system and is discharged to an inland wetland associated with the Muddy River to the east of Research Parkway. The Muddy River flows southerly and enters the Mackenzie Water Supply Reservoir approximately 3 miles south of the site.

The site is not located within a special flood hazard area zone or an aquifer protection area.

There are no waterbodies or wetlands located on the project site. The wetland on the east side of Research Parkway appears to be a minimum of 90 feet from the site's easterly boundary and over 100 feet from the location of the planned stormwater discharge from the site.

The Natural Resources Conservation Service Soil Survey of the State of Connecticut indicates that the upland surficial soil types on and in the near vicinity of the site are classified as Cheshire fine sandy loam, 3-8% slopes. Although these soils are classified as well drained, test pit excavations conducted in the Spring of 2019 on the adjoining site indicated dense soil layers that weren't favorable for the use of infiltration practices as the primary means of reducing the peak rates of discharge of stormwater runoff from the developed site.

2.0 Hydrologic Model Development

The site stormwater management system has been designed in accordance with standard hydrologic and hydraulic engineering practices.

HydroCAD Version 10.10 hydrologic modeling software (HydroCAD Software Solutions, LLC) was used to create the hydrologic models and estimates of peak rates of discharge of stormwater runoff. The U.S. Department of Agriculture Soil Conservation Service (now Natural Resources Conservation Service) Technical Release 20 Computer Program for Project Formulation Hydrology methodology was used within the HydroCAD software program. TR-20 is a single event, lumped parameter surface water hydrologic model that simulates the precipitation-runoff relationships of a drainage area. The model uses the Soil Conservation Service Curve Number and Unit-Hydrograph methods to represent infiltration losses and to transform excess precipitation into runoff, and the Modified Puls (Storage-Indication) method to perform reservoir routing.

NOAA Precipitation Frequency Atlas 14 for the Northeastern States 24-hour rainfall depths in the project site vicinity shown in Table 1 were accessed from the NOAA precipitation frequency data server and entered into the models.

Table 1. 24-Hour Rainfall Depths for Wallingford, Connecticut

Recurrence Interval Year	Rainfall Depth Inches
2	3.38
5	4.40
10	5.25
25	6.41
50	7.27
100	8.21

Partial duration series precipitation frequency data was also accessed from the NOAA precipitation frequency data server and entered into the models to create a synthetic rainfall distribution specific to the project site vicinity.

Drainage area boundaries were delineated using the existing conditions mapping for the site. The delineations were checked and adjusted based on a field inspection.

Drainage area composite runoff curve numbers and times of concentration were computed using procedures and parameter values presented in the National Engineering Handbook, Section 4 - Hydrology (1985).

Antecedent moisture condition II was used to represent the soil moisture condition in the drainage areas prior to the modeled rainfall events.

3.0 Stormwater Management System

The site stormwater management system consists of a typical catch basin inlet structure and storm sewer collection and conveyance system that will direct stormwater runoff from the developed sites hardstand and parking area pavement to stormwater treatment and peak discharge control facilities.

The site stormwater collection and conveyance system was designed in accordance with the procedures outlined in the Connecticut Department of Transportation Drainage Manual. Drainage structure inlets and storm sewers have been designed for peak discharges generated from a 25-year design frequency rainfall event computed using the Rational Method.

A flow diversion manhole structure located immediately upstream of the treatment and peak discharge control facilities will direct the computed water quality (treatment) flow through an oil grit separator structure and then to a stormwater sand filter. The computed water quality flow is based on a runoff depth to be treated of just under one-inch over the proposed pavement surface.

Stormwater runoff discharges in excess of the water quality flow will be directed to a stormwater detention basin formed by both excavation and earthen embankment construction. A precast concrete outlet control structure within the basin will control the rates of peak discharge leaving the basin such that they are equal to or less than the computed peak discharge rates in the existing pre-developed condition.

The elevation of the principal outlet of the structure has been set seven inches above the bottom of the basin to allow for the temporary storage of the computed groundwater recharge volume, allowing that volume to infiltrate into the underlying natural soils.

The outlet control structure contains 3-36" x 8" ports and a horizontal inlet grate on the top of the structure to provide for emergency outflows should the principal outlet become clogged. The emergency port bottom elevations have been set at the computed 100-year peak stage in the basin and the inlet grate elevation has been set one-foot below the top berm elevation of the basin.

Stormwater runoff from the roof of the planned storage building will be directed through its gutter and rainwater leader system to the ground where it will travel over a mild sloped lawn area to the west of the building and allowed to infiltrate into the underlying natural soils.

The stormwater management system has been designed to meet the water quality volume and annual groundwater recharge volume requirements contained in the Connecticut Department of Energy and Environmental Protection (CTDEEP) Stormwater Quality Manual. The available storage volume within the stormwater sand filter and within the

stormwater detention basin below the principal outlet exceeds the computed design values for these hydrologic sizing criteria.

A summary comparison of the rates of peak discharges and the reservoir routing results is given below.

Table 2. Summary Comparison of Peak Discharges (cfs) and Reservoir Routings

	Recurrence Interval					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Existing Condition (EC 1)	0.6	1.4	2.0	3.0	3.8	4.7
Developed Condition (DC 1)	3.6	5.5	7.0	9.2	10.8	12.6
Routed Outflow (DC 1)	0.7	0.9	1.0	1.2	1.3	1.4
SWMB Peak Stage	354.3	354.6	354.9	355.3	355.6	356.0
Combined (DC1 + DC 2)	0.7	0.9	1.0	1.2	1.4	1.6

A reservoir routing was performed to check the peak stage in the basin assuming that the principal outlet is not functioning. The routing indicates that the computed 100-year peak discharge can be conveyed through the three emergency ports at a water surface elevation of 356.3, 1.7 feet below the top berm elevation of the basin. The inlet grate capacity was also checked and the computations indicate that the grate can also convey the 100-year discharge at a water surface elevation below the top berm elevation.

The anticipated potential stormwater pollutant sources and loadings associated with the planned project are those typical of a commercial truck terminal facility including the winter season snow and ice control operations required for the pavement surfaces.

The maintenance of the hardstand and truck parking areas and the stormwater management system is anticipated to be performed by the land parcel owner. A general site operation and maintenance plan for the project is included at Appendix E.

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Appendix A
Design Computations

Summer Hill

Civil Engineers & Land Surveyors, P.C.

BY: MJO DATE: 4-1-21 SUBJECT: East Side Auto Wallingford, Connecticut SHEET No.: 1 OF 5

CHECKED: LJM DATE: 4-1-21 Stormwater Management System Design Computations PROJECT No.: 21-12

1. Water quality volume (WQV) and precipitation depth (P) treated

   Contributing drainage area = 55,740 ft^2 = 1.28 Ac.

   Stormwater sand filter storage volume:

Elevation ft	Area ft^2	Average Area ft^2	Incremental Volume ft^3	Cummulative Volume ft^3	Cummulative Volume Ac-ft
355.67	1,200	1,200	0	0	0.0000
356.00	1,271	1,236	309	309	0.0071
356.50	1,419	1,345	673	981	0.0225
357.00	1,575	1,497	749	1,730	0.0397
357.50	1,739	1,657	829	2,558	0.0587
358.00	1,911	1,825	913	3,471	0.0797
358.50	2,091	2,001	1,001	4,471	0.1026
359.00	2,279	2,185	1,093	5,564	0.1277
359.50	2,475	2,377	1,189	6,752	0.1550

   WQV = storage volume at elevation 358.50 (one foot below top of sand filter slope) = 4,471 ft^3

   P = (4,471 ft^3 x 12 in/1 ft)/55,740 ft^2 = 0.96 in

2. Water quality flow (WQF) using SCS (NRCS) TR-55 Graphical Peak Discharge Method

   WQF = $(q_u)(A)(Q)$, where:

   WQF, Water Quality Flow (cfs)
   Q_u, Unit Peak Discharge (csm/in)
   A, Area (mi^2)
   Q, Runoff Depth (in)

   Runoff Curve Number (CN) = 98

   Precipitation Depth (in) = 0.96

   From Table 4-1, Initial Abstraction (I_a) = 0.041

   I_a/P = 0.041/0.96 = 0.0427

   Drainage area = 55,740 ft^2 = 1.28 Ac.

   From Exhibit 4-III, Unit Peak Discharge (Q_u) = 700 csm/in (limiting value)

   WQF = $(Q_u)(A)(Q)$ = (700)(0.0022)(0.96) = 1.5 cfs

3. Groundwater recharge volume computed using CT Stormwater Quality Manual equation

   GRV = D(A)(I)/12, where:

   GRV, Groundwater Recharge Volume (Ac-ft)
   D, Depth of runoff to be recharged (in)
   A, Site area (Ac.)
   I, Net increase in percent of impervious cover

For Hydrologic Soil Group B, D = 0.25 in

A = 130,633 ft^2 = 3.20 Ac.

I (Existing) = 0.00 ft^2

I (Proposed) = 61,740 ft^2 / 139,633 ft^2 = 0.44

Net increase = 0.44 – 0.00 = 0.44

GRV = (0.25 in x 3.20 Ac. x 0.44)/12 = 0.0293 Ac-ft = 1,278 ft^3

4. Flow diversion manhole hydraulic computations

Orifice equation: $Q = (C)(A)(2gh)^{0.5}$, where:

Q, Discharge (cfs)
C, Discharge Coefficient = 0.60
A, Orifice Cross Section Area (ft^2)
g, Gravitational Acceleration Constant = 32.2 ft/s^2
h, Effective Head above Orifice Centroid (ft)

Weir equation: $Q = (C)(L)H^{3/2}$

Q, Discharge (cfs)
C, Discharge Coefficient = 3.0
L, Weir Crest Length (ft)
h, Effective Head above Weir Crest (ft)

8 Inch Dia. Circular Orifice Centerline EL. 356.46			4 Foot Length Weir Crest EL. 357.25			
Stage (ft)	H_o (ft)	Q_o (cfs)	Stage (ft)	H_w (ft)	Q_w (cfs)	Q_{Total} (cfs)
356,00		0.00	356,00		0.00	0.00
356,25		0.00	356,25		0.00	0.00
356.50	0.04	0.34	356.50		0.00	0.34
356.75	0.29	0.91	356.75		0.00	0.91
357.00	0.54	1.24	357.00		0.00	1.24
357.25	0.79	1.49	357.25		0.00	1.49
357.50	1.04	1.71	357.50	0.25	1.67	3.38
357.75	1.29	1.91	357.75	0.50	4.71	6.62
357.80	1.34	1.95	357.80	0.55	5.43	7.38
357.85	1.39	1.98	357.85	0.60	6.19	8.17
357.90	1.44	2.02	357.90	0.65	6.98	9.00
357.95	1.49	2.05	357.95	0.70	7.80	9.85
358.00	1.54	2.09	358.00	0.75	8.65	10.74
358.25	1.79	2.25	358.25	1.00	13.32	15.57
358.50	2.04	2.40	358.50	1.25	18.62	21.02
358.75	2.29	2.54	358.75	1.50	24.47	27.01
359.00	2.54	2.68	359.00	1.75	30.84	33.51

5. Site Hydrologic Analysis

24-Hour Rainfall Depths

Recurrence Interval Year	Rainfall Depth Inches
2	3.38
5	4.40
10	5.25
25	6.41
50	7.27
100	8.21

Drainage Area Model Hydrologic Parameters

Existing Condition

Drainage Area	Area ft^2	Area Ac.	CN	T_c hr
EC 1	56,985	1.31	65	0.23

Developed Condition

Drainage Area	Area ft^2	Area Ac.	CN	T_c hr
DC 1	73,980	1.68	82	0.10
DC 2	28,190	0.71	36	0.23

Stormwater Management Basin Stage-Storage

Elevation ft	Area ft^2	Average Area ft^2	Incremental Volume ft^3	Cummulative Volume ft^3	Cummulative Volume Ac-ft
352.00	2,588	2,588	0	0	0.0000
352.50	3,043	2,816	1,408	1,408	0.0323
353.00	3,524	3,284	1,642	3,050	0.0700
353.50	4,029	3,777	1,888	4,938	0.1134
354.00	4,560	4,295	2,147	7,085	0.1626
354.50	5,116	4,838	2,419	9,504	0.2182
355.00	5,697	5,407	2,703	12,207	0.2802
355.50	6,934	6,316	3,158	15,365	0.3527
356.00	6,304	6,619	3,310	18,675	0.4287
356.50	7,590	6,947	3,474	22,148	0.5084
357.00	8,269	7,930	3,965	26,113	0.5995
357.50	8,975	8,622	4,311	30,424	0.6984
358.00	9,682	9,329	4,664	35,088	0.8055

Summary Comparison of Peak Discharges (cfs) and Reservoir Routings

	Recurrence Interval					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Existing Condition (EC 1)	0.6	1.4	2.0	3.0	3.8	4.7
Developed Condition (DC 1)	3.6	5.5	7.0	9.2	10.8	12.6
Routed Outflow (DC 1)	0.7	0.9	1.0	1.2	1.3	1.4
SWMB Peak Stage	354.3	354.6	354.9	355.3	355.6	356.0
Combined (DC 1 + DC 2)	0.7	0.9	1.0	1.2	1.4	1.6

6. Stormwater management basin outlet control structure inlet grate capacity computations

Grate inlet capacity using ConnDOT Drainage Manual equations:

Capacity of grate inlets operating as a weir (0 ft $\leq$ d $\leq$ 0.4 ft):

$Q_w = CPd^{1.5}/CFS$, where:

Q, Discharge (cfs)
C, Weir Discharge Coefficient = 3.0
P, Grate perimeter (ft)
d, Depth over grate (ft)
CFS, Factor of safety for clogging = 1.0 - 2.0

Capacity of grate inlets operating as an orifice (d $\geq$ 1.4 ft):

$Q_o = CA(2gd)^{0.5}/CFS$, where:

Q, Discharge (cfs)
C, Orifice Discharge Coefficient = 0.67
A, Grate clear opening area (ft^2)
g, Gravitational constant = 32.2 (ft/s^2)
d, Depth over grate (ft)
CFS, Factor of safety for clogging = 1.0 – 2.0

Check grate inlet capacity for 100-year inflow peak discharge = 12.6 cfs at water surface elevation = 158.00 = top of stormwater management basin berm elevation:

Grate perimeter (P) = (4 + 4 + 4 +4) ft = 16.0 ft

Grate clear open area (A) (ignore openings at grate perimeter):

5 rows x 11 rows = 55 openings

55 x (0.3125 ft x 0.5833 ft) = 10.0 ft^2

$Q_w = 3.0(16.0)(1.00)^{1.5}/2.0 = 24.0$ cfs > 12.6 cfs

$Q_o = 0.67(10.0)(2(32.2)(1.00))^{0.5}/2.0 = 26.8$ cfs > 12.6 cfs

7. Outlet Protection Computations

Riprap apron dimensions based on ConnDOT Drainage Manual design procedure:

Using critical depth (dc) as tailwater depth (TW), dc for design discharge (Q_{100}) = 12.6 ft^3/s = 1.28 ft

1.28 ft > $0.5R_p$ = 0.5(2.0) = 1.00 ft

Type B Riprap Apron (maximum tailwater condition) dimensions:

$L_a = (3.0(Q - 5)/S_p^{1.5}) + 10$
$W1 = 3\ S_p$ (min.)
$W2 = 3\ S_p + 0.4\ L_a$

Q Design Discharge (ft^3/s)
S_p Pipe Span (ft)
R_p Pipe Rise (ft)
L_a Length of Apron (ft)
W_1 Width of Apron at Pipe Outlet (ft)
W_2 Width of Apron at Apron Outlet (ft)

Stormwater Management Basin Inlet

Q_{25} = 8.42 ft^3/s
S_p = 1.25 ft
R_p = 1.25 ft
$L_a = 3.0(8.42 – 5)/2.0^{1.5} + 10$ = 13.6 ft – Use 14 ft
$W_1 = 3(1.25)$ = 3.75 ft – Use 4 ft
$W_2 = 3(1.25) + 0.4(14.0)$ = 9.4 ft – Use 10 ft

Use modified riprap (D_{50} = 0.42 ft)

Depth (d) = 1.0 ft

Stormwater Management Basin Outlet

Q_{100} = 12.6 ft^3/s
S_p = 2.0 ft
R_p = 2.0 ft
$L_a = 3.0(12.6 – 5)/2.0^{1.5} + 10$ = 18.1 ft – Use 18 ft
$W_1 = 3(2.0)$ = 6.0 ft
$W_2 = 3(2.0) + 0.4(18.0)$ = 13.2 ft – Use 13 ft

Use modified riprap (D_{50} = 0.42 ft)

Depth (d) = 1.0 ft

STORM SEWER DESIGN COMPUTATION SHEET

PROJECT: 4A Research Parkway Wallingford, Connecticut

PROJECT No.: 21-12

SHEET No.: 1 OF 1

DATE: 4-1-21

DESIGNED: MJO

CHECKED: LJM

DESIGN FREQUENCY: 25 Year

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
Structure		Drainage Area A (Ac.)			A x C		Time of Concentration T_c												Invert Elevation	
Station	Station	Incr.	Total	Runoff Coefficient C	Incr.	Total	Inlet (min.)	Section (min.)	Total T_c (min.)	Rainfall Intensity I (in/hr)	Design Discharge Q (cfs)	Diameter (in)	Length (ft)	Slope (ft/ft)	Roughness Coefficient n	Full Capacity (cfs)	Average Velocity (fps)	Design Discharge Velocity (fps)	U/S	D/S
CB 1	CB 2	0.84	0.84	0.90	0.76	0.76	5	-	5	6.70	5.07	15	45	0.0100	0.012	7.53	6.29	6.22	357.25	356.80
CB 2	MH 1	0.44	1.28	0.90	0.40	1.15	5	-	5	6.70	7.72	15	54	0.0125	0.012	8.42	7.03	6.15	356.80	356.13
MH 1	MH 2	-	-	-	-	1.15	-	-	5	6.70	7.72	15	60	0.0125	0.012	8.42	7.03	7.27	356.13	355.38
MH 2	OUTLET	-	-	-	-	1.15	-	-	5	6.70	7.72	15	95	0.0125	0.012	8.42	7.03	7.27	353.19	352.00

Worksheet 2: Runoff curve number and runoff

Project 4A Research Parkway By MJO Date 4-1-21

Location Wallingford, Connecticut Checked LJM Date 4-1-21

Circle one: Present Developed EC 1

1. Runoff Curve Number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrolgic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1/] Table 2-2	CN [1/] Fig. 2-3	CN [1/] Fig. 2-4	Area x / acres / mi^2 / %	Product of CN x area
B	Woods/Grass Combination (Fair)	65			1.31	85.15
	Totals =				1.31	85.15

[1/] Use only one CN source per line.

Use CN = 65

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{85.15}{1.31} = 65.0$$

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

(After Soil Conservation Service TR-55, Second Edition, June 1986)

Worksheet 3: Time of Concentration (T_c) or Travel Time (T_t)

Project	4A Research Parkway	By	MJO	Date	4-1-21
Location	Wallingford, Connecticut	Checked	LJM	Date	4-1-21

Circle one: **Present** / Developed — EC 1

Circle one: **T_c** / T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)	Segment ID		AB					
1. Surface Description (table 3-1)			Dense Grass					
2. Manning's roughness coeff., n (table 3-1)			0.24					
3. Flow Length, L (total L $\leq$ 300 ft)		ft	100					
4. Two-yr 24-hr rainfall, P_2		in	3.38					
5. Land Slope, s		ft/ft	0.0300					
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\, s^{0.4}}$	Compute T_t	hr	0.20	+		=	0.20	
Shallow concentrated flow	Segment ID		BC					
7. Surface description (paved or unpaved)			Unpaved					
8. Flow length, L		ft	170					
9. Watercourse slope, s		ft/ft	0.0265					
10. Average velocity, V (figure 3-1)		ft/s	2.6					
11. $I_t = \frac{L}{3600\, V}$	Compute T_t	hr	0.02	+		=	0.03	
Channel flow	Segment ID							
12. Cross sectional flow area, a		ft^2						
13. Wetted perimeter, p_w		ft						
14. Hydraulic radius, $r = \frac{a}{p_w}$		ft						
15. Channel slope, s		ft/ft						
16. Manning's roughness coeff., n								
17. $V = \frac{1.49\, r^{2/3}\, s^{1/2}}{n}$		ft/s						
18. Flow length, L		ft						
19. $I_t = \frac{L}{3600\, V}$	Compute T_t	hr		+		=		
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)						hr =	0.23	

(After Soil Conservation Service TR-55, Second Edition, June 1986)

Worksheet 2: Runoff curve number and runoff

Project	4A Research Parkway	By	MJO	Date	4-1-21
Location	Wallingford, Connecticut	Checked	LJM	Date	4-1-21

Circle one: Present [Developed] DC 1

1. Runoff Curve Number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrolgic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1/] Table 2-2	Fig. 2-3	Fig. 2-4	Area [x] acres / mi² / %	Product of CN x area
B	Lawn	30			0.40	12.00
-	Pavement	98			1.28	125.44
		Totals =			1.68	137.44

[1/] Use only one CN source per line.

Use CN = 82

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{137.44}{1.68} = 81.8$$

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project 4A Research Parkway By MJO Date 4-1-21

Location Wallingford, Connecticut Checked LJM Date 4-1-21

Circle one: Present [Developed] DC 2

1. Runoff Curve Number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrolgic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1/] Table 2-2	Fig. 2-3	Fig. 2-4	Area [x] acres / mi² / %	Product of CN x area
B	Lawn	30			0.58	17.40
B	Woods/Grass Combination (Fair)	65			0.13	8.45
		Totals =			0.71	25.85

[1/] Use only one CN source per line.

Use CN = 36

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{25.85}{0.71} =$ 36.4

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

(After Soil Conservation Service TR-55, Second Edition, June 1986)

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100-yr	CT-Wallingford-2 24-hr S1	100-yr	Default	24.00	1	8.21	2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1 Runoff Area=1.680 ac 0.00% Impervious Runoff Depth>6.05"
Tc=6.0 min CN=82 Runoff=12.56 cfs 0.847 af

Pond 25: SWMB Peak Elev=356.33' Storage=20,912 cf Inflow=12.56 cfs 0.847 af
Outflow=5.53 cfs 0.527 af

Total Runoff Area = 1.680 ac Runoff Volume = 0.847 af Average Runoff Depth = 6.05"
100.00% Pervious = 1.680 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 20: DC 1

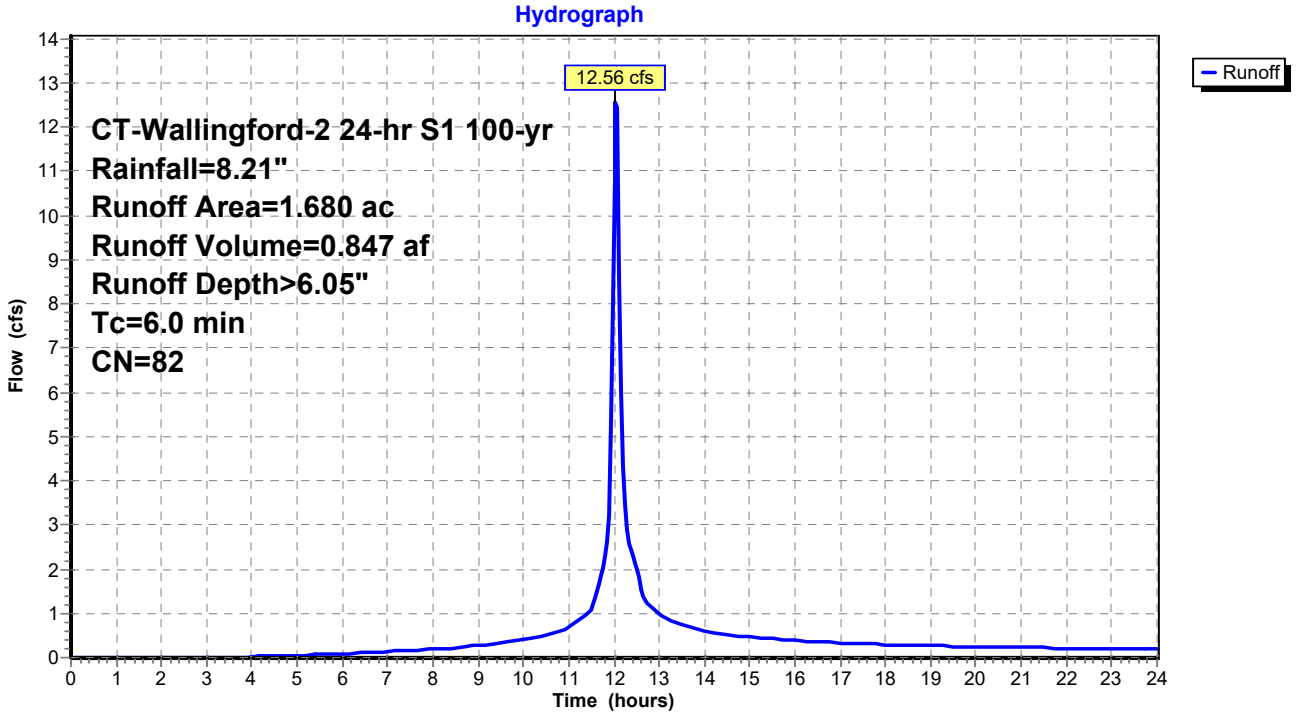
Runoff = 12.56 cfs @ 12.04 hrs, Volume= 0.847 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 100-yr Rainfall=8.21"

	Area (ac)	CN	Description
*	1.680	82	
	1.680		100.00% Pervious Area

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

Subcatchment 20: DC 1



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, 0.00% Impervious, Inflow Depth > 6.05" for 100-yr event
Inflow = 12.56 cfs @ 12.04 hrs, Volume= 0.847 af
Outflow = 5.53 cfs @ 12.17 hrs, Volume= 0.527 af, Atten= 56%, Lag= 7.9 min
Primary = 5.53 cfs @ 12.17 hrs, Volume= 0.527 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 356.33' @ 12.17 hrs Surf.Area= 7,159 sf Storage= 20,912 cf (15,974 cf above start)

Plug-Flow detention time= 304.6 min calculated for 0.413 af (49% of inflow)
Center-of-Mass det. time= 107.0 min (917.3 - 810.2)

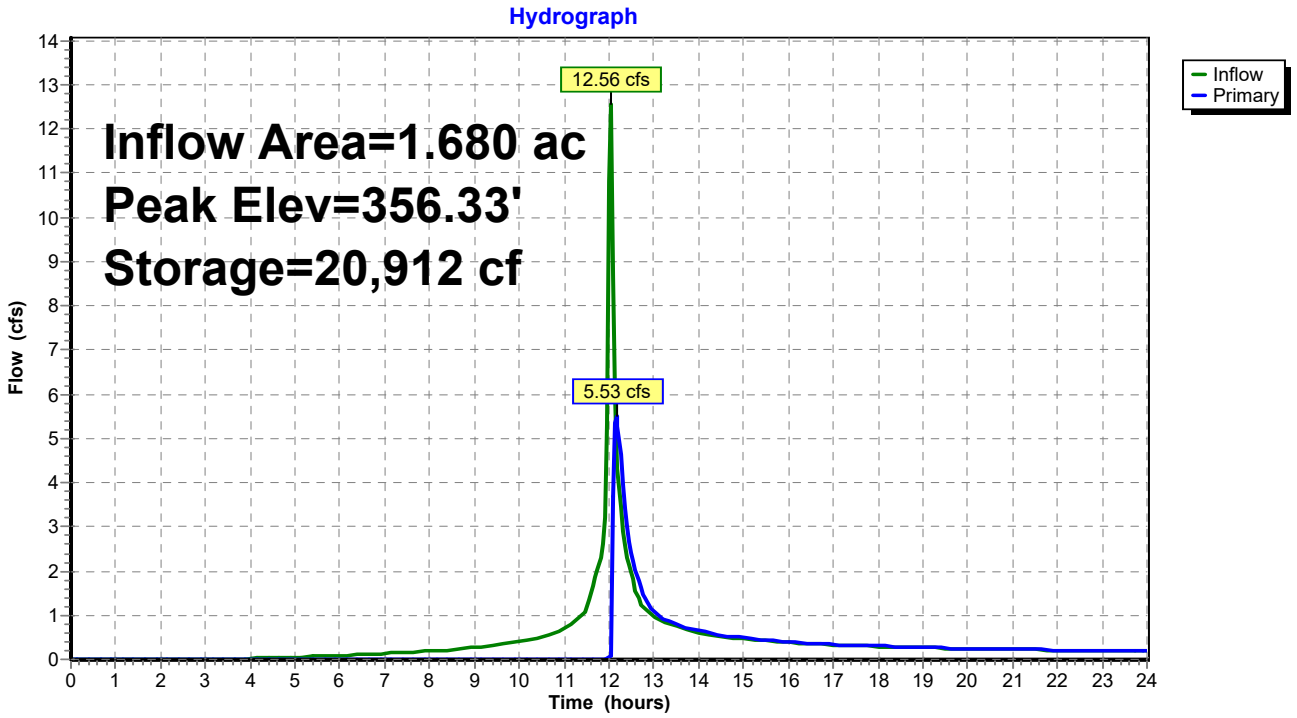
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	356.00'	**36.0" W x 8.0" H Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	357.00'	**3.7" x 7.7" Horiz. Orifice/Grate X 12.00 columns** X 6 rows C= 0.600 in 48.0" x 48.0" Grate (89% open area) Limited to weir flow at low heads

Primary OutFlow Max=5.31 cfs @ 12.17 hrs HW=356.32' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 5.31 cfs @ 1.82 fps)
└—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 25: SWMB


Hydrograph
Inflow Area=1.680 ac
Peak Elev=356.33'
Storage=20,912 cf
12.56 cfs
5.53 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Appendix B
Hydrologic Model Input Data and Results

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	CT-Wallingford-2 24-hr S1	2-yr	Default	24.00	1	3.38	2
2	5-yr	CT-Wallingford-2 24-hr S1	5-yr	Default	24.00	1	4.40	2
3	10-yr	CT-Wallingford-2 24-hr S1	10-yr	Default	24.00	1	5.25	2
4	25-yr	CT-Wallingford-2 24-hr S1	25-yr	Default	24.00	1	6.41	2
5	50-yr	CT-Wallingford-2 24-hr S1	50-yr	Default	24.00	1	7.27	2
6	100-yr	CT-Wallingford-2 24-hr S1	100-yr	Default	24.00	1	8.21	2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC Runoff Area=1.308 ac Runoff Depth>0.69"
Tc=14.0 min CN=65 Runoff=0.64 cfs 0.075 af

Total Runoff Area = 1.308 ac Runoff Volume = 0.075 af Average Runoff Depth = 0.69"

Summary for Subcatchment 10: EC

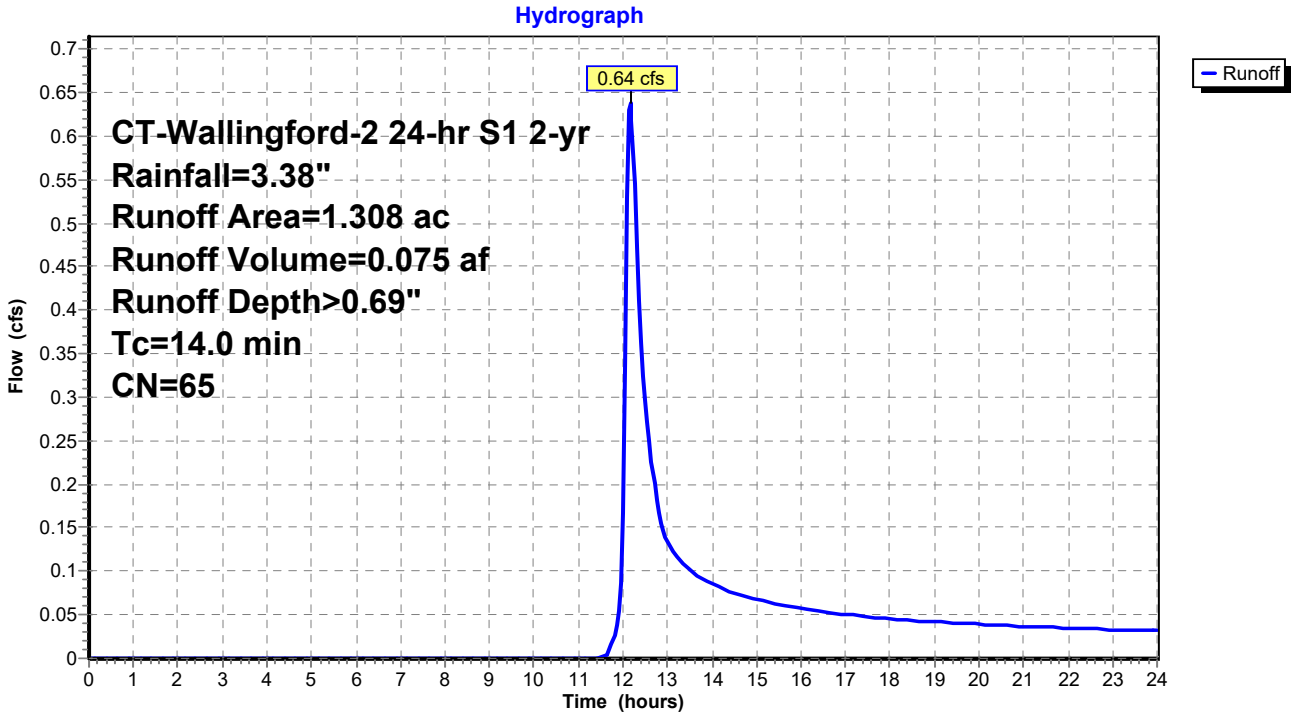
Runoff = 0.64 cfs @ 12.17 hrs, Volume= 0.075 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 2-yr Rainfall=3.38"

Area (ac)	CN	Description
1.308	65	Woods/grass comb., Fair, HSG B

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

Subcatchment 10: EC



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC Runoff Area=1.308 ac Runoff Depth>1.26"
Tc=14.0 min CN=65 Runoff=1.35 cfs 0.137 af

Total Runoff Area = 1.308 ac Runoff Volume = 0.137 af Average Runoff Depth = 1.26"

Summary for Subcatchment 10: EC

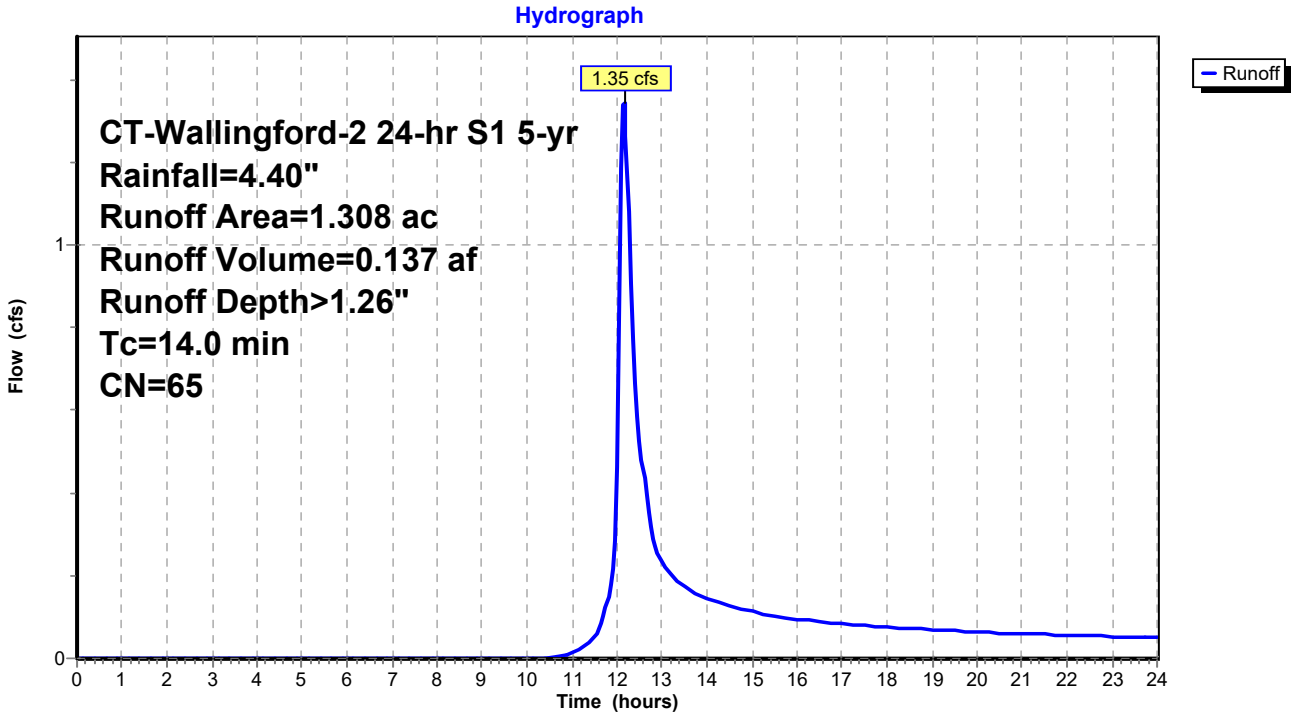
Runoff = 1.35 cfs @ 12.16 hrs, Volume= 0.137 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 5-yr Rainfall=4.40"

Area (ac)	CN	Description
1.308	65	Woods/grass comb., Fair, HSG B

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

Subcatchment 10: EC



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC Runoff Area=1.308 ac Runoff Depth>1.81"
Tc=14.0 min CN=65 Runoff=2.02 cfs 0.198 af

Total Runoff Area = 1.308 ac Runoff Volume = 0.198 af Average Runoff Depth = 1.81"

Summary for Subcatchment 10: EC

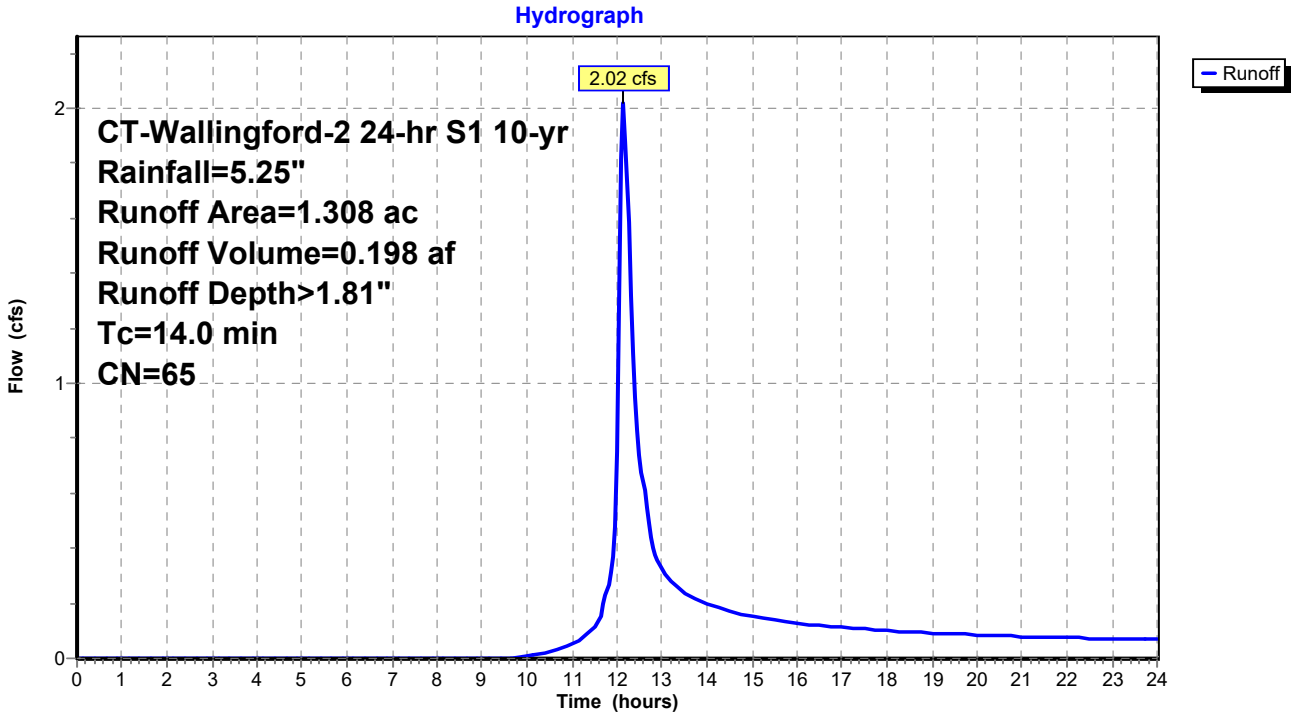
Runoff = 2.02 cfs @ 12.15 hrs, Volume= 0.198 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 10-yr Rainfall=5.25"

Area (ac)	CN	Description
1.308	65	Woods/grass comb., Fair, HSG B

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

Subcatchment 10: EC



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC Runoff Area=1.308 ac Runoff Depth>2.64"
Tc=14.0 min CN=65 Runoff=3.03 cfs 0.288 af

Total Runoff Area = 1.308 ac Runoff Volume = 0.288 af Average Runoff Depth = 2.64"

Summary for Subcatchment 10: EC

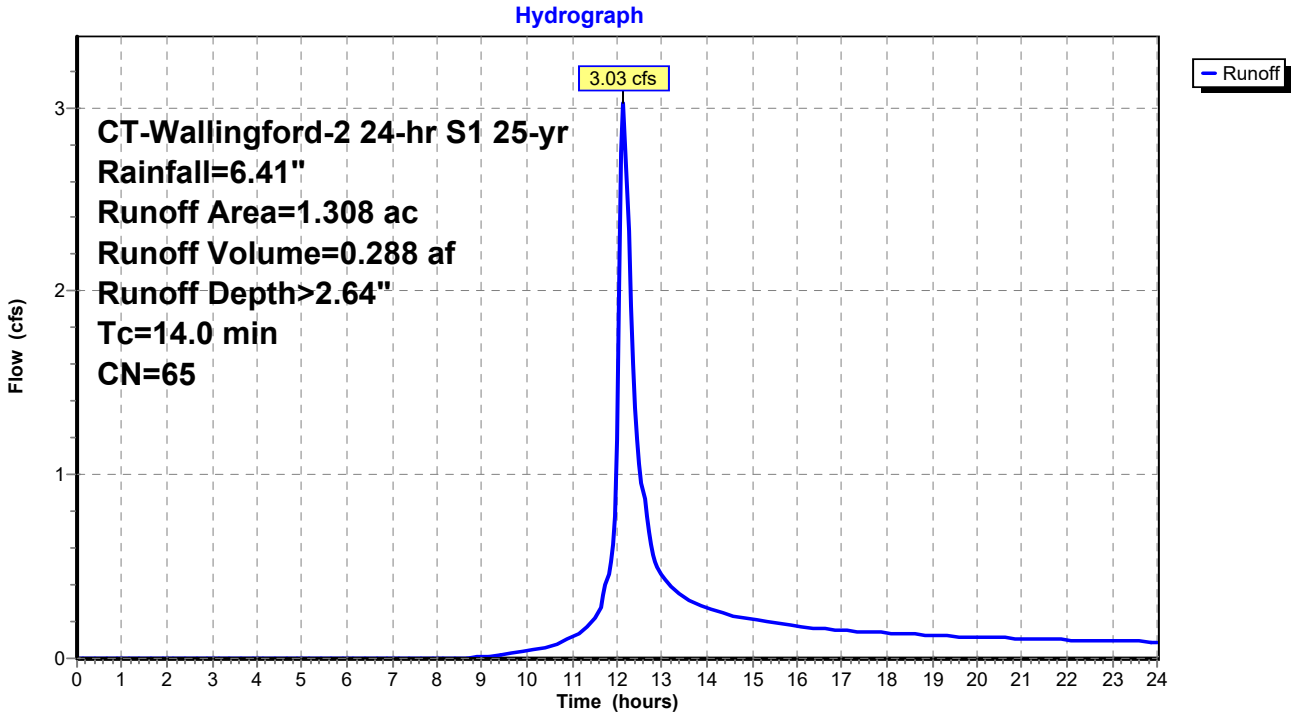
Runoff = 3.03 cfs @ 12.15 hrs, Volume= 0.288 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 25-yr Rainfall=6.41"

Area (ac)	CN	Description
1.308	65	Woods/grass comb., Fair, HSG B

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

Subcatchment 10: EC



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC Runoff Area=1.308 ac Runoff Depth>3.30"
Tc=14.0 min CN=65 Runoff=3.82 cfs 0.359 af

Total Runoff Area = 1.308 ac Runoff Volume = 0.359 af Average Runoff Depth = 3.30"

Summary for Subcatchment 10: EC

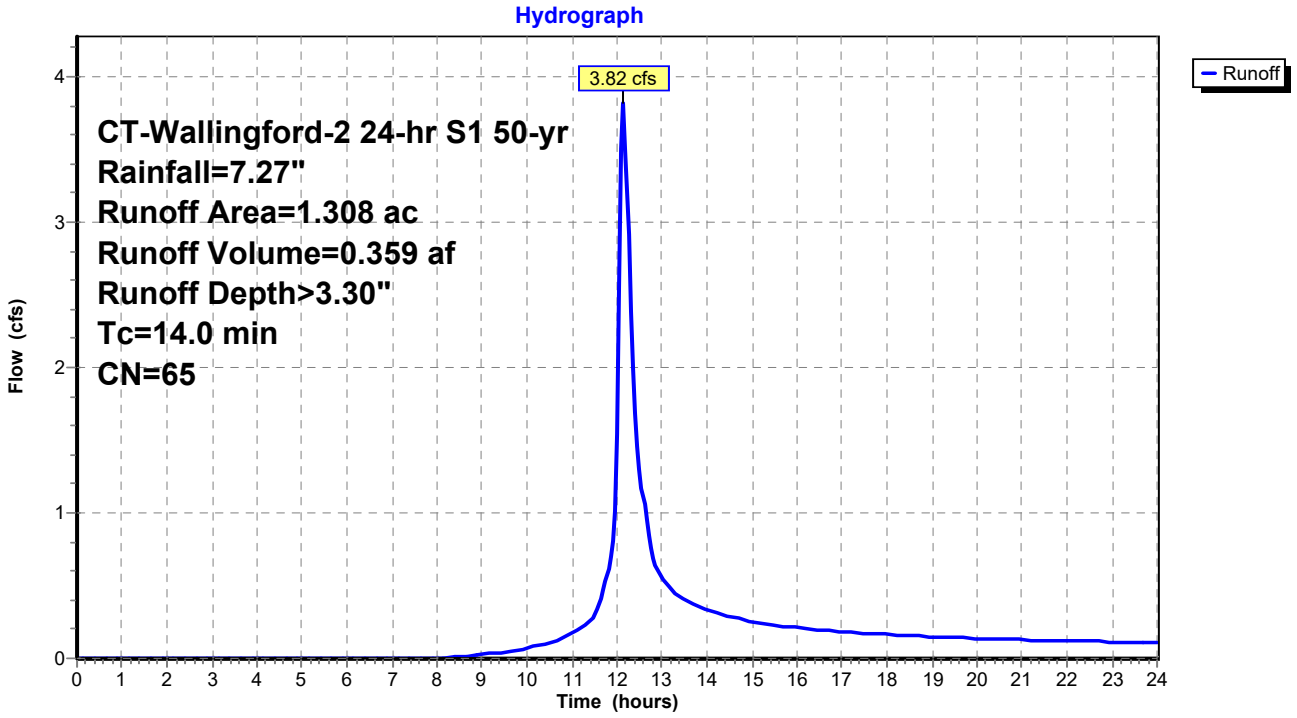
Runoff = 3.82 cfs @ 12.15 hrs, Volume= 0.359 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 50-yr Rainfall=7.27"

Area (ac)	CN	Description
1.308	65	Woods/grass comb., Fair, HSG B

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

Subcatchment 10: EC



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC Runoff Area=1.308 ac Runoff Depth>4.05"
Tc=14.0 min CN=65 Runoff=4.70 cfs 0.441 af

Total Runoff Area = 1.308 ac Runoff Volume = 0.441 af Average Runoff Depth = 4.05"

Summary for Subcatchment 10: EC

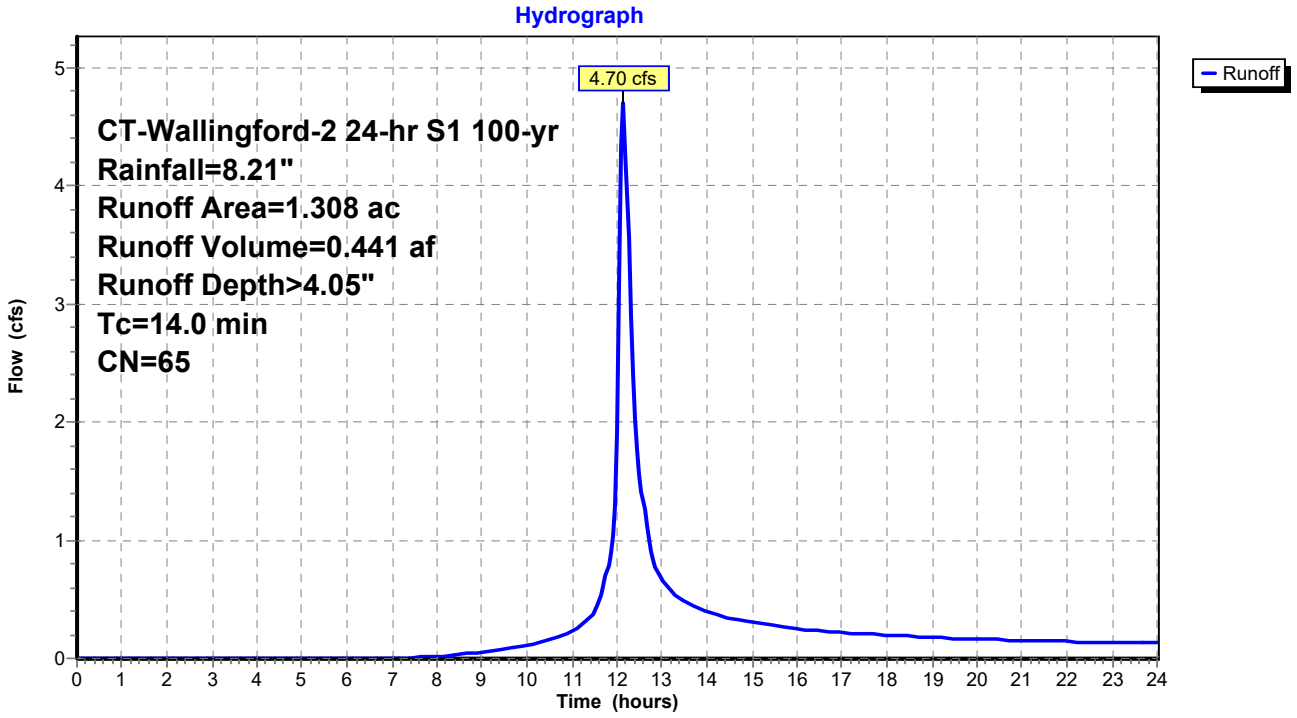
Runoff = 4.70 cfs @ 12.15 hrs, Volume= 0.441 af, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 100-yr Rainfall=8.21"

Area (ac)	CN	Description
1.308	65	Woods/grass comb., Fair, HSG B

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

Subcatchment 10: EC



Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	CT-Wallingford-2 24-hr S1	2-yr	Default	24.00	1	3.38	2
2	5-yr	CT-Wallingford-2 24-hr S1	5-yr	Default	24.00	1	4.40	2
3	10-yr	CT-Wallingford-2 24-hr S1	10-yr	Default	24.00	1	5.25	2
4	25-yr	CT-Wallingford-2 24-hr S1	25-yr	Default	24.00	1	6.41	2
5	50-yr	CT-Wallingford-2 24-hr S1	50-yr	Default	24.00	1	7.27	2
6	100-yr	CT-Wallingford-2 24-hr S1	100-yr	Default	24.00	1	8.21	2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 20: DC 1 Runoff Area=1.680 ac Runoff Depth>1.68"
Tc=6.0 min CN=82 Runoff=3.63 cfs 0.235 af

Subcatchment 30: DC 2 Runoff Area=0.710 ac Runoff Depth=0.00"
Tc=14.0 min CN=36 Runoff=0.00 cfs 0.000 af

Pond 25: SWMB Peak Elev=354.26' Storage=8,323 cf Inflow=3.63 cfs 0.235 af
Outflow=0.68 cfs 0.221 af

Link 35: Outlet Inflow=0.68 cfs 0.221 af
Primary=0.68 cfs 0.221 af

Total Runoff Area = 2.390 ac Runoff Volume = 0.235 af Average Runoff Depth = 1.18"

Summary for Subcatchment 20: DC 1

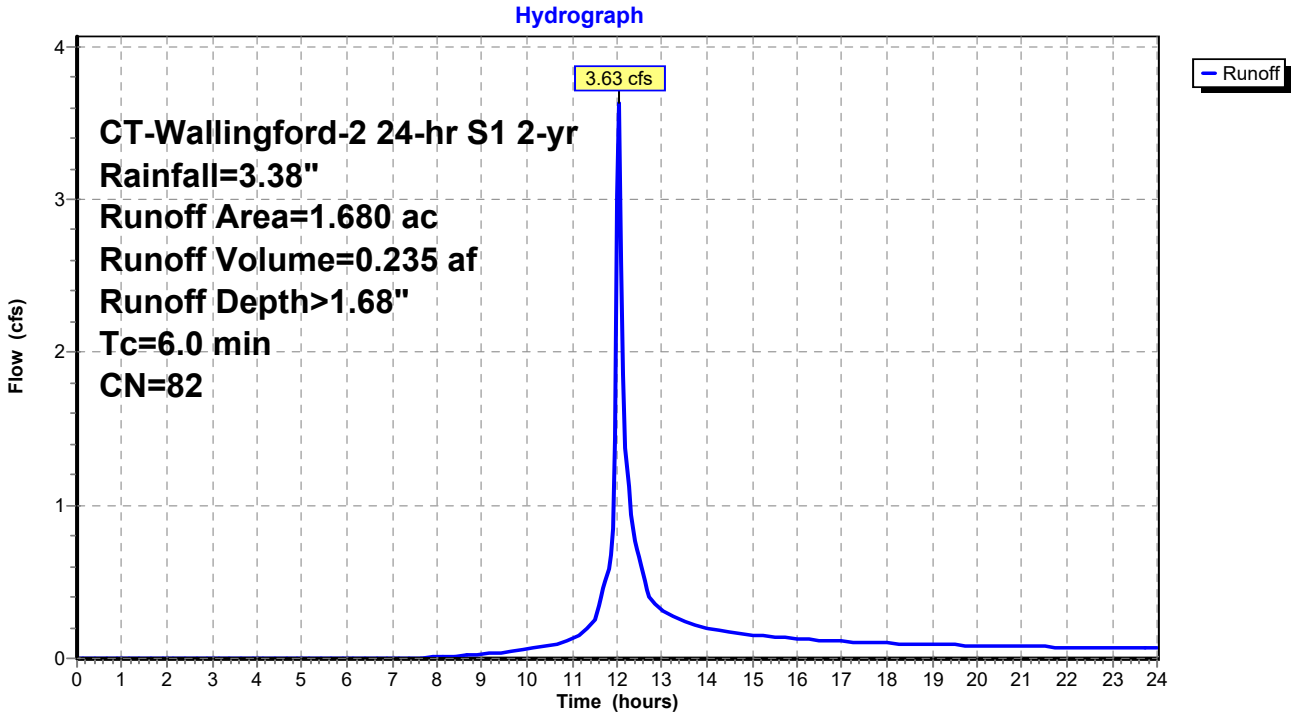
Runoff = 3.63 cfs @ 12.04 hrs, Volume= 0.235 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 2-yr Rainfall=3.38"

	Area (ac)	CN	Description
*	1.680	82	

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

Subcatchment 20: DC 1



Summary for Subcatchment 30: DC 2

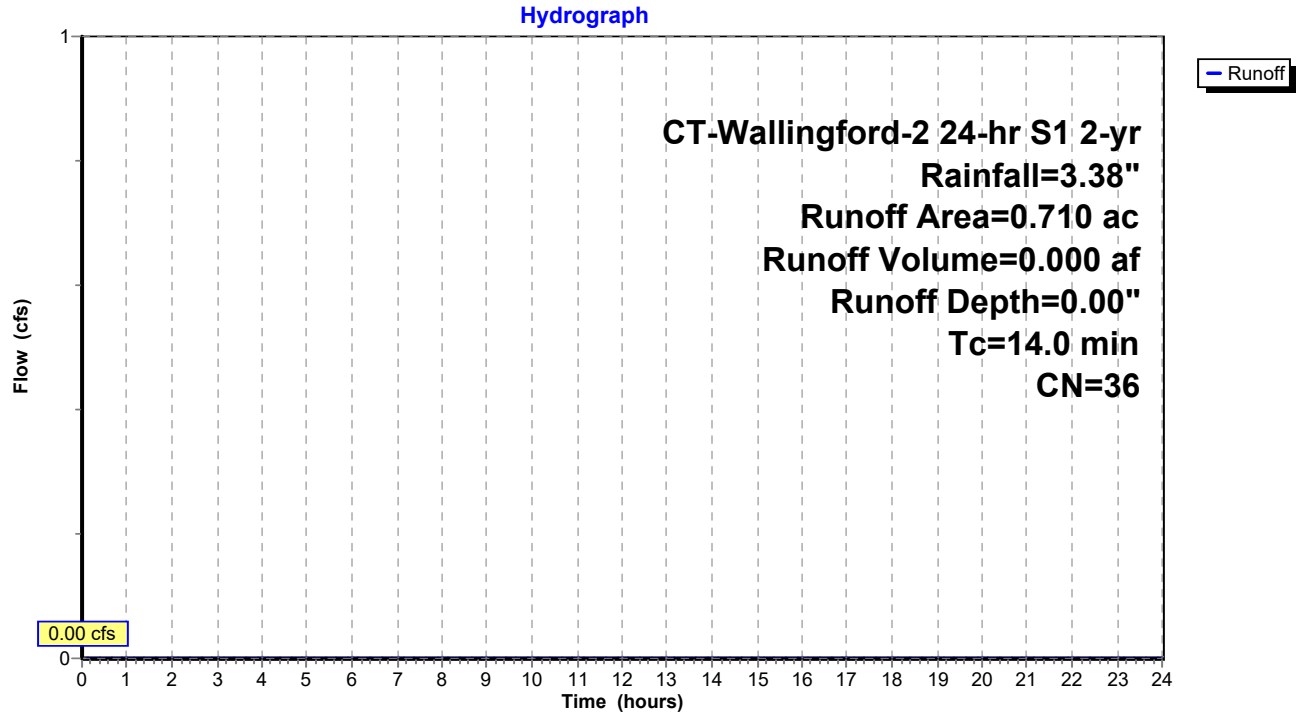
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 2-yr Rainfall=3.38"

	Area (ac)	CN	Description
*	0.710	36	

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

Subcatchment 30: DC 2



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, Inflow Depth > 1.68" for 2-yr event
Inflow = 3.63 cfs @ 12.04 hrs, Volume= 0.235 af
Outflow = 0.68 cfs @ 12.48 hrs, Volume= 0.221 af, Atten= 81%, Lag= 26.4 min
Primary = 0.68 cfs @ 12.48 hrs, Volume= 0.221 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 354.26' @ 12.48 hrs Surf.Area= 4,852 sf Storage= 8,323 cf (3,385 cf above start)

Plug-Flow detention time= 362.4 min calculated for 0.108 af (46% of inflow)
Center-of-Mass det. time= 60.5 min (915.7 - 855.2)

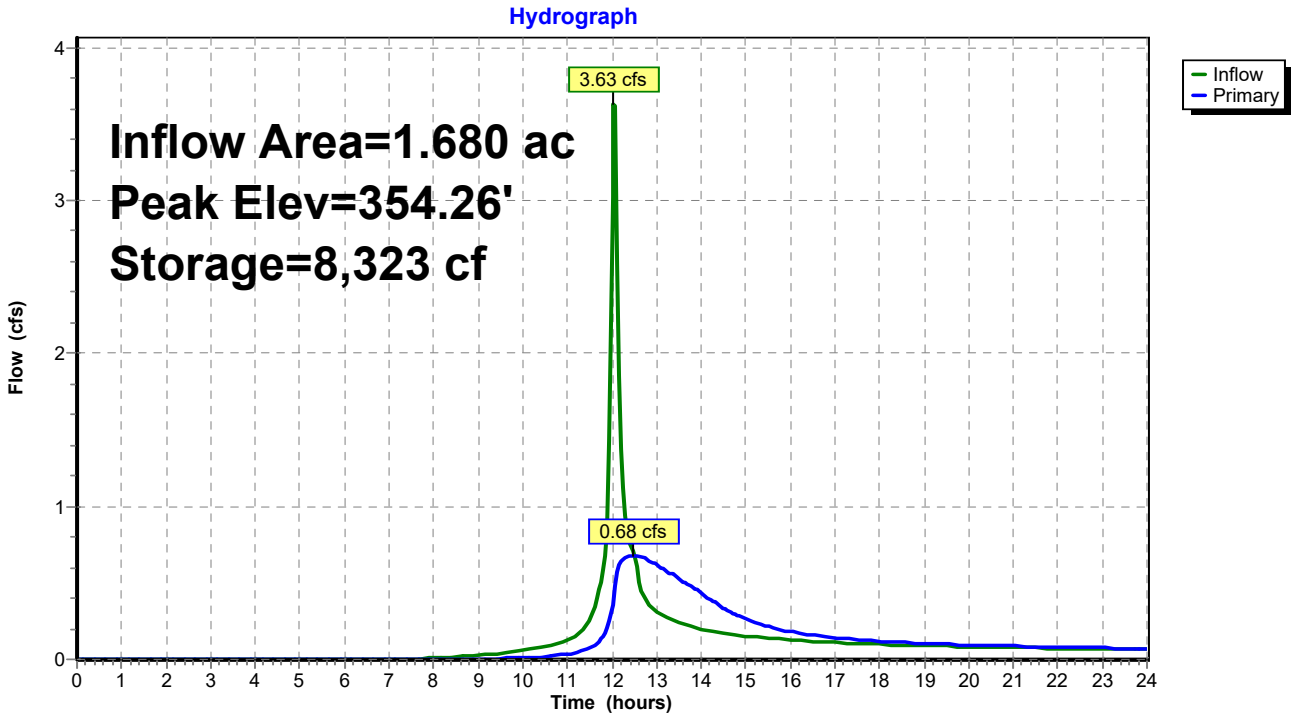
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	353.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.68 cfs @ 12.48 hrs HW=354.26' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.68 cfs @ 3.45 fps)

Pond 25: SWMB

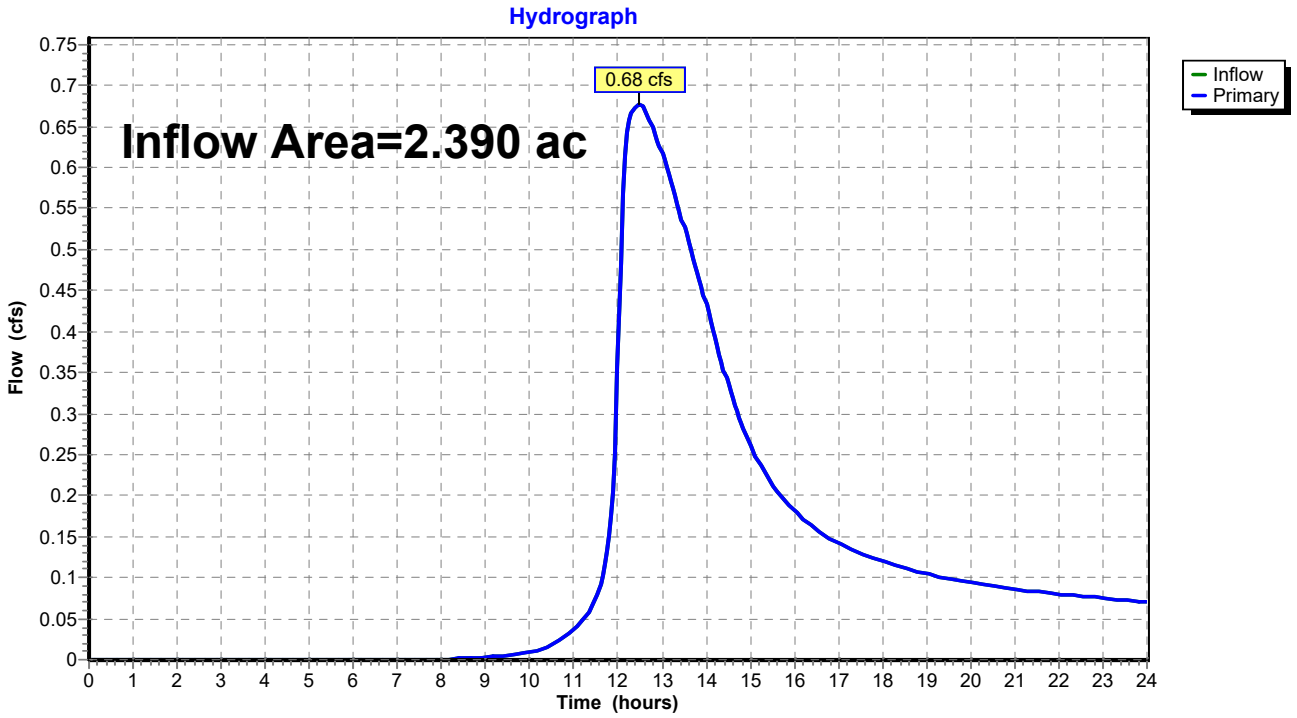

Hydrograph
Inflow Area=1.680 ac
Peak Elev=354.26'
Storage=8,323 cf
3.63 cfs
0.68 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link 35: Outlet

Inflow Area = 2.390 ac, Inflow Depth > 1.11" for 2-yr event
Inflow = 0.68 cfs @ 12.48 hrs, Volume= 0.221 af
Primary = 0.68 cfs @ 12.48 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: Outlet



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 20: DC 1 Runoff Area=1.680 ac Runoff Depth>2.54"
Tc=6.0 min CN=82 Runoff=5.46 cfs 0.356 af

Subcatchment 30: DC 2 Runoff Area=0.710 ac Runoff Depth>0.04"
Tc=14.0 min CN=36 Runoff=0.00 cfs 0.002 af

Pond 25: SWMB Peak Elev=354.63' Storage=10,188 cf Inflow=5.46 cfs 0.356 af
Outflow=0.89 cfs 0.339 af

Link 35: Outlet Inflow=0.89 cfs 0.341 af
Primary=0.89 cfs 0.341 af

Total Runoff Area = 2.390 ac Runoff Volume = 0.358 af Average Runoff Depth = 1.80"

Summary for Subcatchment 20: DC 1

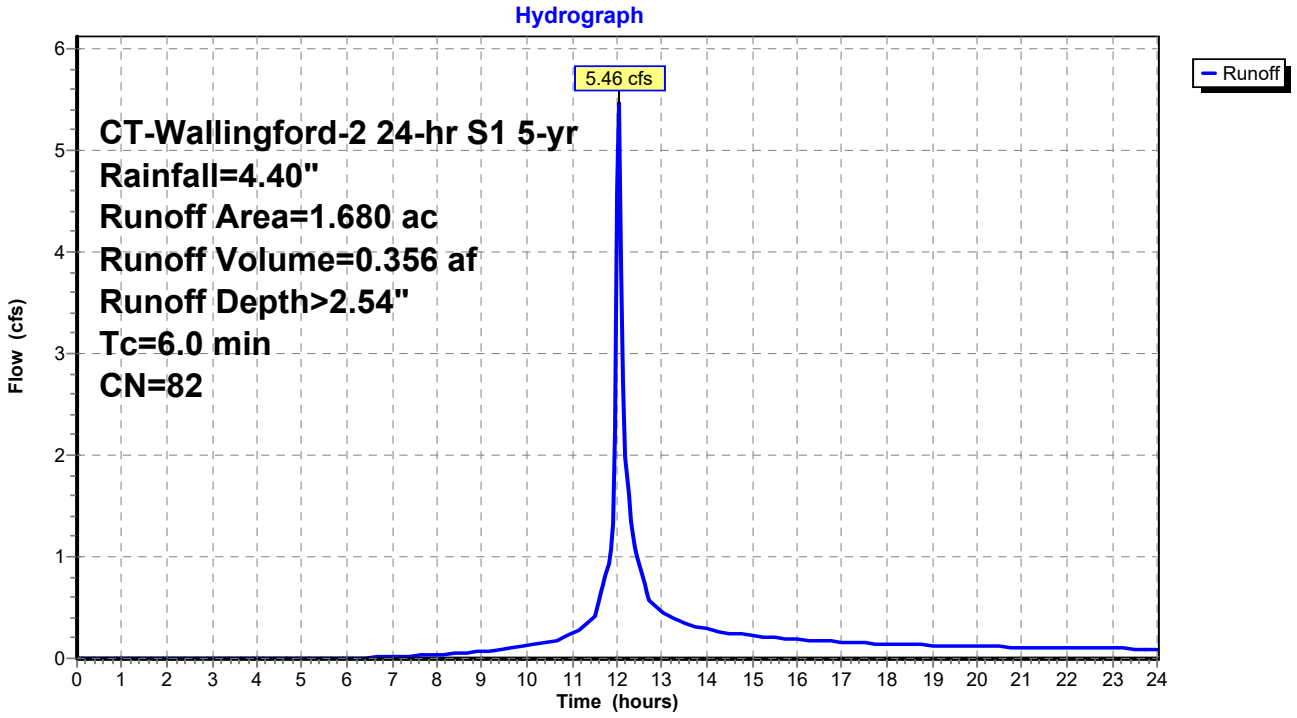
Runoff = 5.46 cfs @ 12.04 hrs, Volume= 0.356 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 5-yr Rainfall=4.40"

	Area (ac)	CN	Description
*	1.680	82	

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

Subcatchment 20: DC 1



Summary for Subcatchment 30: DC 2

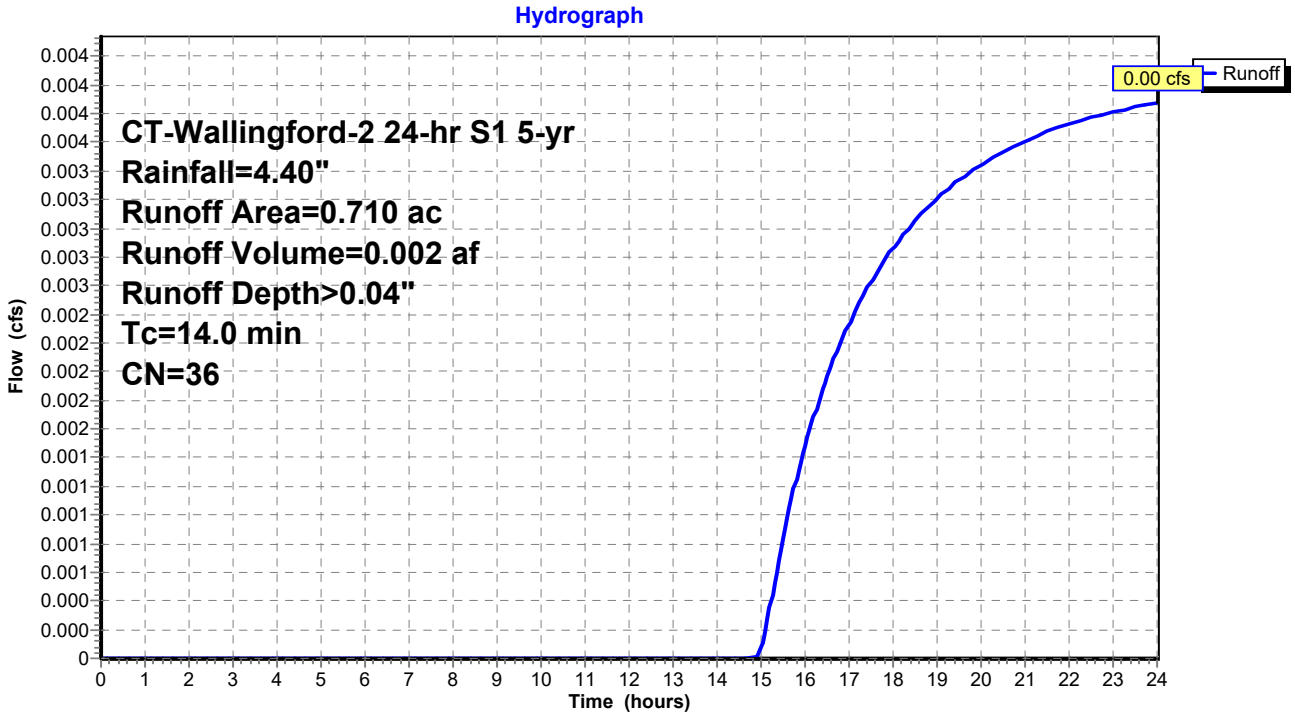
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.002 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 5-yr Rainfall=4.40"

	Area (ac)	CN	Description
*	0.710	36	

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

Subcatchment 30: DC 2



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, Inflow Depth > 2.54" for 5-yr event
Inflow = 5.46 cfs @ 12.04 hrs, Volume= 0.356 af
Outflow = 0.89 cfs @ 12.53 hrs, Volume= 0.339 af, Atten= 84%, Lag= 29.1 min
Primary = 0.89 cfs @ 12.53 hrs, Volume= 0.339 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 354.63' @ 12.53 hrs Surf.Area= 5,269 sf Storage= 10,188 cf (5,250 cf above start)

Plug-Flow detention time= 280.8 min calculated for 0.225 af (63% of inflow)
Center-of-Mass det. time= 65.1 min (906.3 - 841.2)

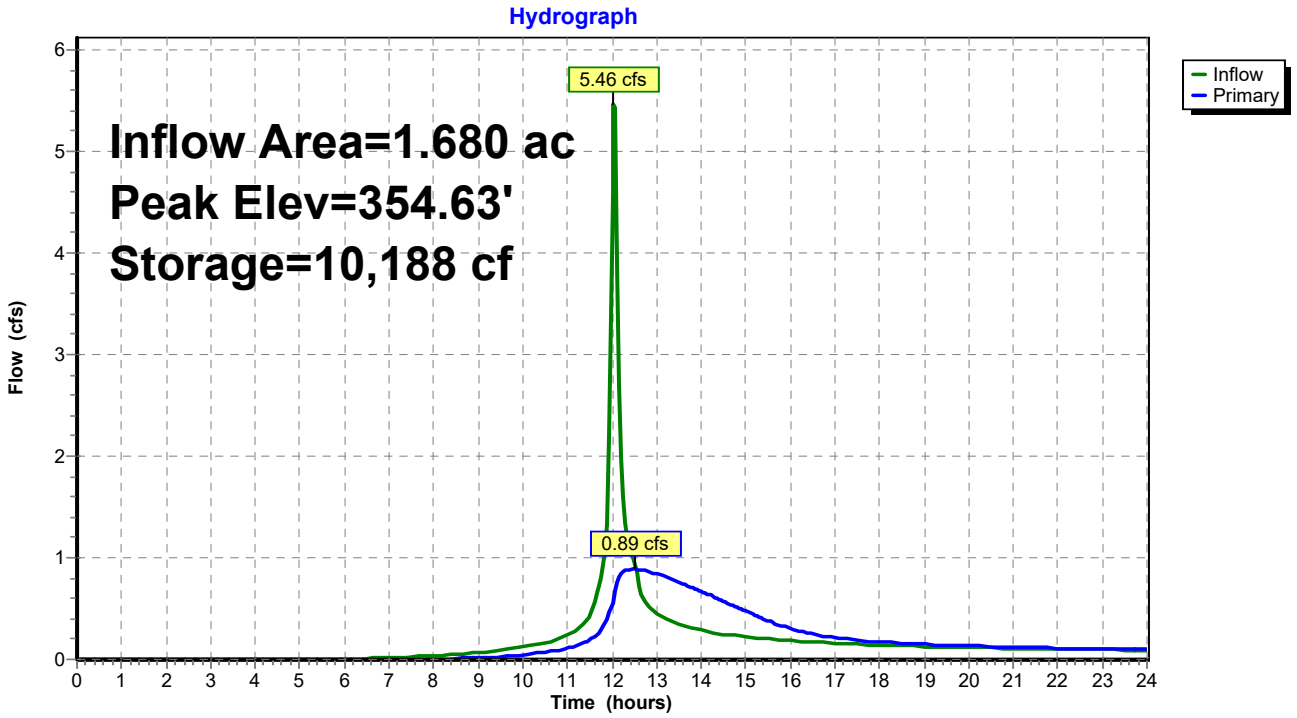
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	353.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.89 cfs @ 12.53 hrs HW=354.63' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.89 cfs @ 4.52 fps)

Pond 25: SWMB

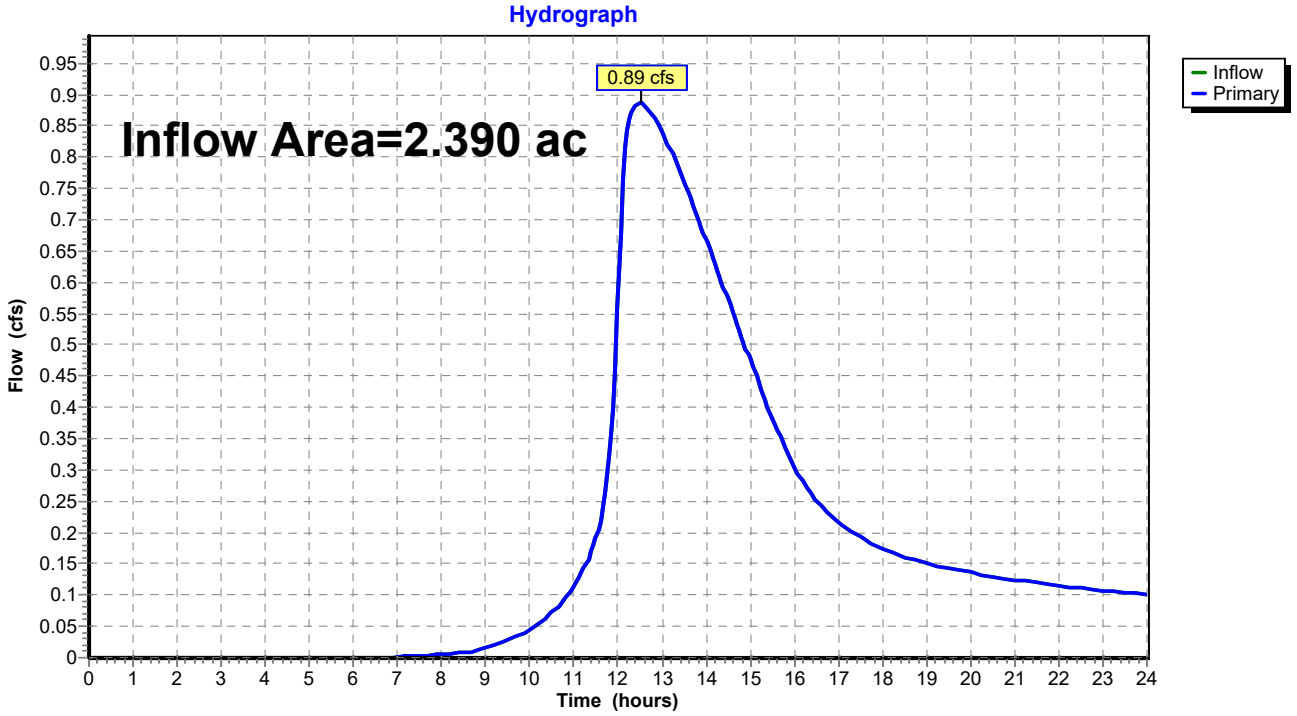

Hydrograph
Inflow Area=1.680 ac
Peak Elev=354.63'
Storage=10,188 cf
5.46 cfs
0.89 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link 35: Outlet

Inflow Area = 2.390 ac, Inflow Depth > 1.71" for 5-yr event
Inflow = 0.89 cfs @ 12.53 hrs, Volume= 0.341 af
Primary = 0.89 cfs @ 12.53 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: Outlet



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 20: DC 1 Runoff Area=1.680 ac Runoff Depth>3.30"
Tc=6.0 min CN=82 Runoff=7.04 cfs 0.462 af

Subcatchment 30: DC 2 Runoff Area=0.710 ac Runoff Depth>0.15"
Tc=14.0 min CN=36 Runoff=0.01 cfs 0.009 af

Pond 25: SWMB Peak Elev=354.94' Storage=11,864 cf Inflow=7.04 cfs 0.462 af
Outflow=1.03 cfs 0.442 af

Link 35: Outlet Inflow=1.03 cfs 0.451 af
Primary=1.03 cfs 0.451 af

Total Runoff Area = 2.390 ac Runoff Volume = 0.470 af Average Runoff Depth = 2.36"

Summary for Subcatchment 20: DC 1

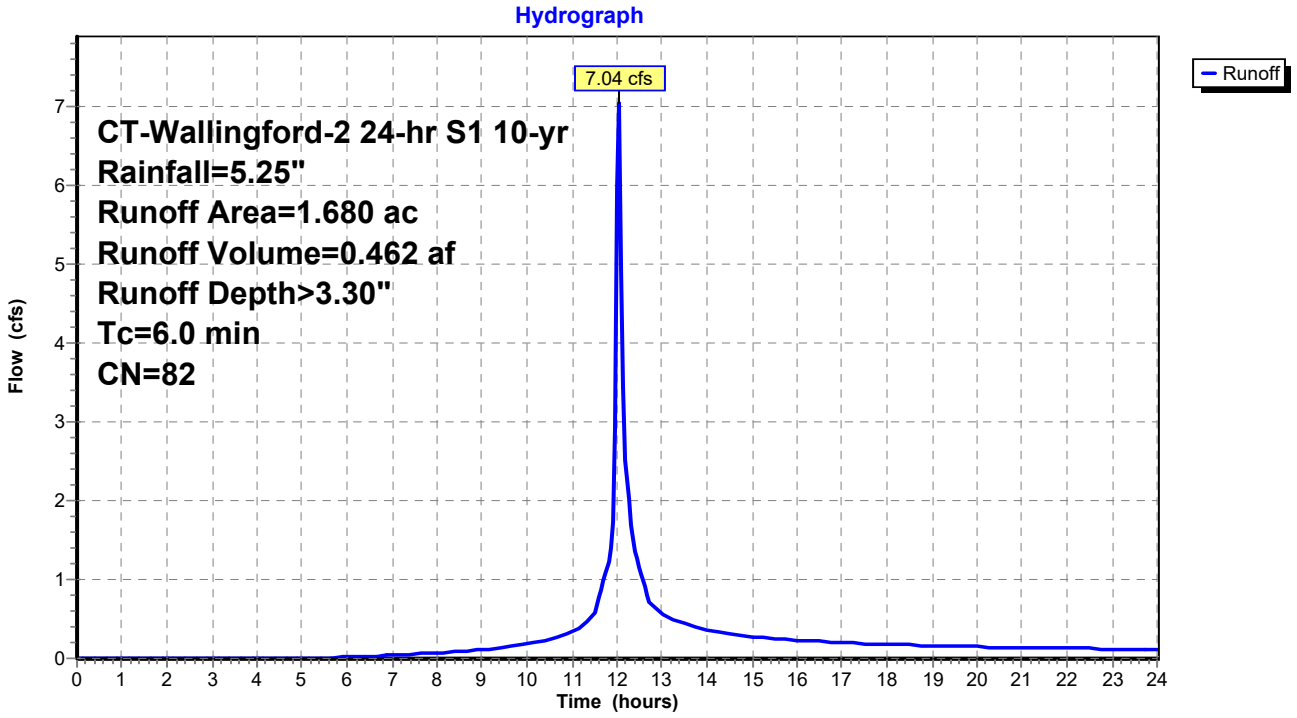
Runoff = 7.04 cfs @ 12.04 hrs, Volume= 0.462 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 10-yr Rainfall=5.25"

	Area (ac)	CN	Description
*	1.680	82	

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

Subcatchment 20: DC 1



Summary for Subcatchment 30: DC 2

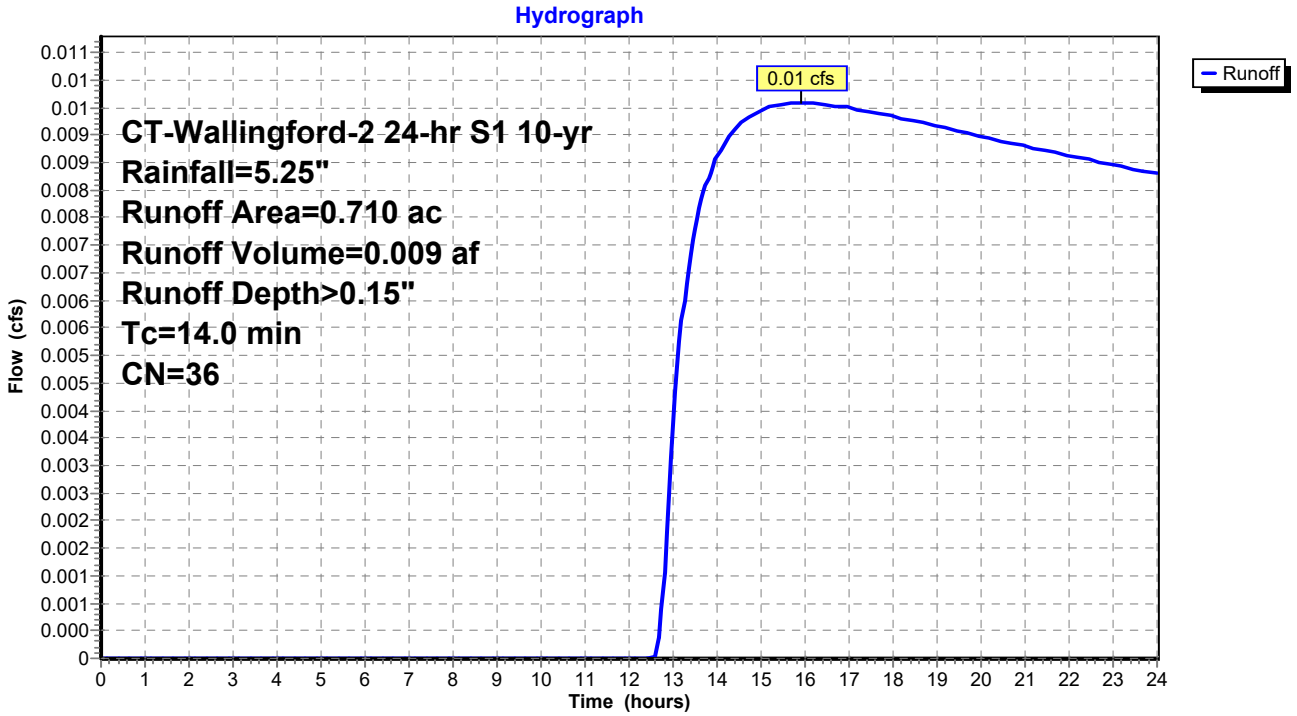
Runoff = 0.01 cfs @ 15.91 hrs, Volume= 0.009 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 10-yr Rainfall=5.25"

	Area (ac)	CN	Description
*	0.710	36	

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

Subcatchment 30: DC 2



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, Inflow Depth > 3.30" for 10-yr event
Inflow = 7.04 cfs @ 12.04 hrs, Volume= 0.462 af
Outflow = 1.03 cfs @ 12.56 hrs, Volume= 0.442 af, Atten= 85%, Lag= 30.9 min
Primary = 1.03 cfs @ 12.56 hrs, Volume= 0.442 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 354.94' @ 12.56 hrs Surf.Area= 5,626 sf Storage= 11,864 cf (6,926 cf above start)

Plug-Flow detention time= 251.4 min calculated for 0.328 af (71% of inflow)
Center-of-Mass det. time= 70.7 min (902.8 - 832.1)

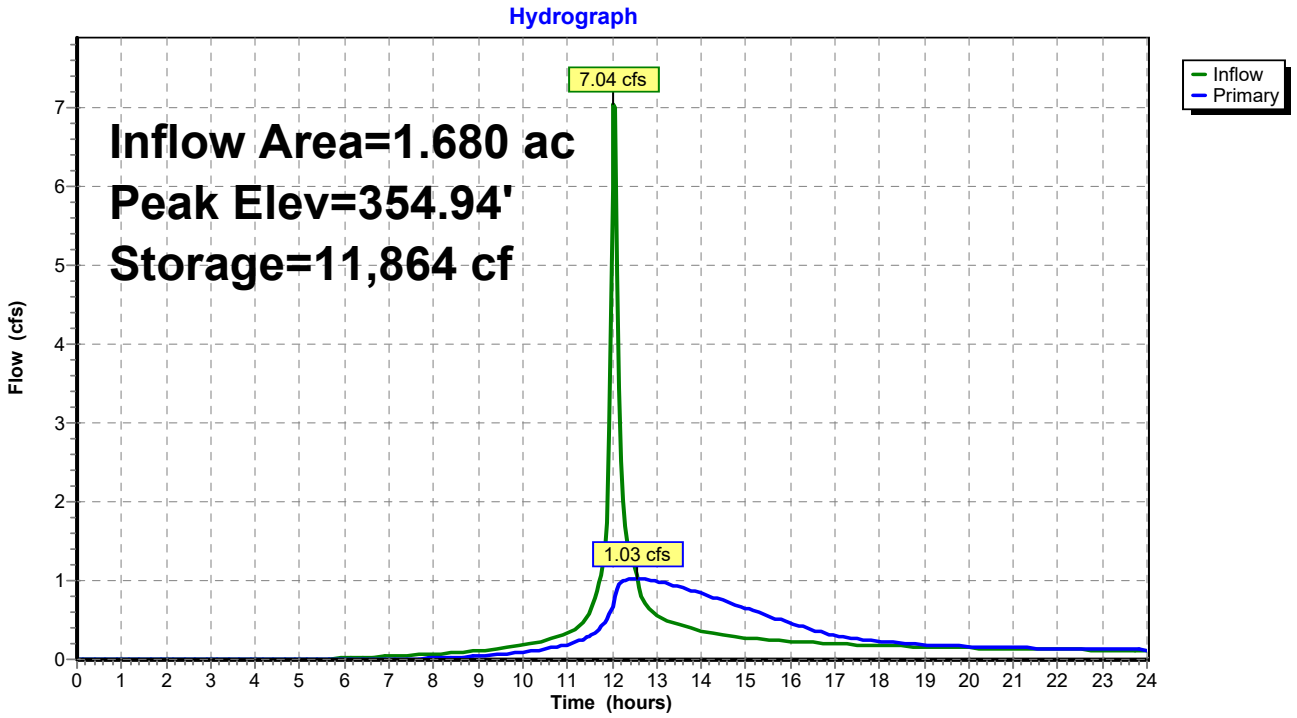
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	353.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.03 cfs @ 12.56 hrs HW=354.94' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.03 cfs @ 5.25 fps)

Pond 25: SWMB

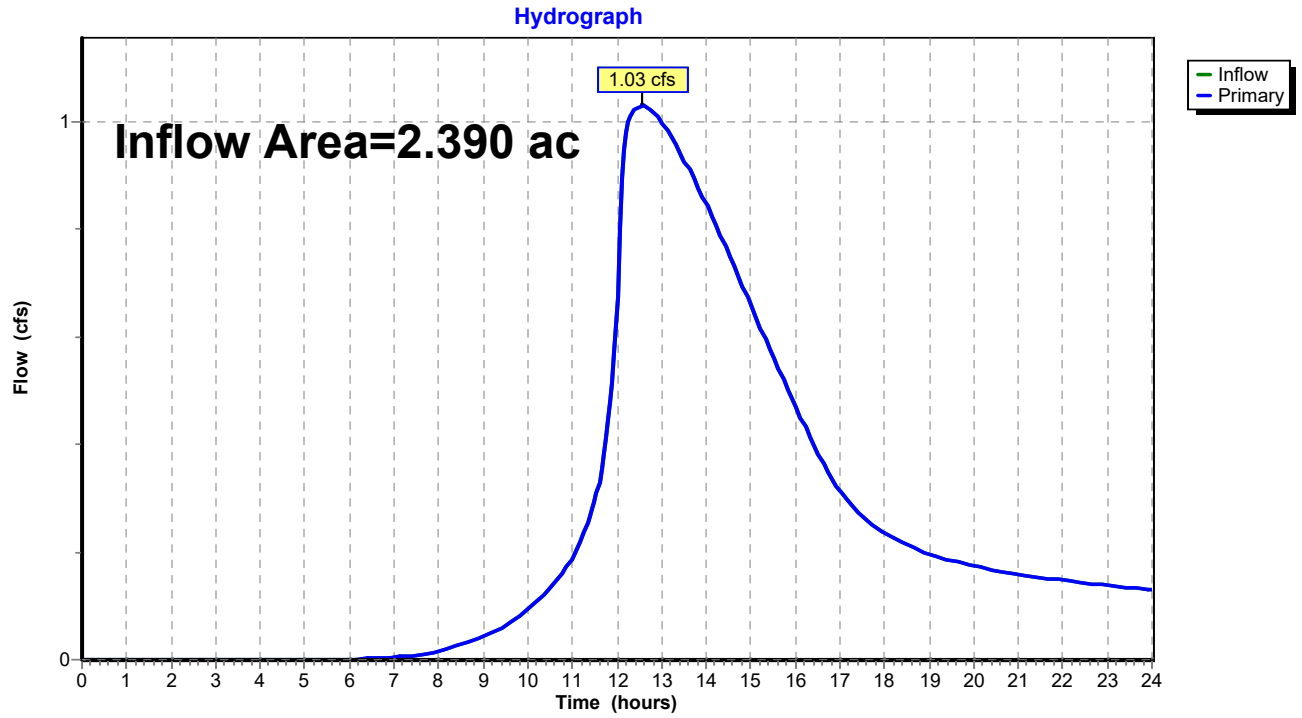

Hydrograph
Inflow Area=1.680 ac
Peak Elev=354.94'
Storage=11,864 cf
7.04 cfs
1.03 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link 35: Outlet

Inflow Area = 2.390 ac, Inflow Depth > 2.26" for 10-yr event
Inflow = 1.03 cfs @ 12.56 hrs, Volume= 0.451 af
Primary = 1.03 cfs @ 12.56 hrs, Volume= 0.451 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: Outlet



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1 Runoff Area=1.680 ac Runoff Depth>4.36"
Tc=6.0 min CN=82 Runoff=9.20 cfs 0.610 af

Subcatchment30: DC 2 Runoff Area=0.710 ac Runoff Depth>0.39"
Tc=14.0 min CN=36 Runoff=0.05 cfs 0.023 af

Pond 25: SWMB Peak Elev=355.34' Storage=14,317 cf Inflow=9.20 cfs 0.610 af
Outflow=1.19 cfs 0.588 af

Link 35: Outlet Inflow=1.24 cfs 0.611 af
Primary=1.24 cfs 0.611 af

Total Runoff Area = 2.390 ac Runoff Volume = 0.634 af Average Runoff Depth = 3.18"

Summary for Subcatchment 20: DC 1

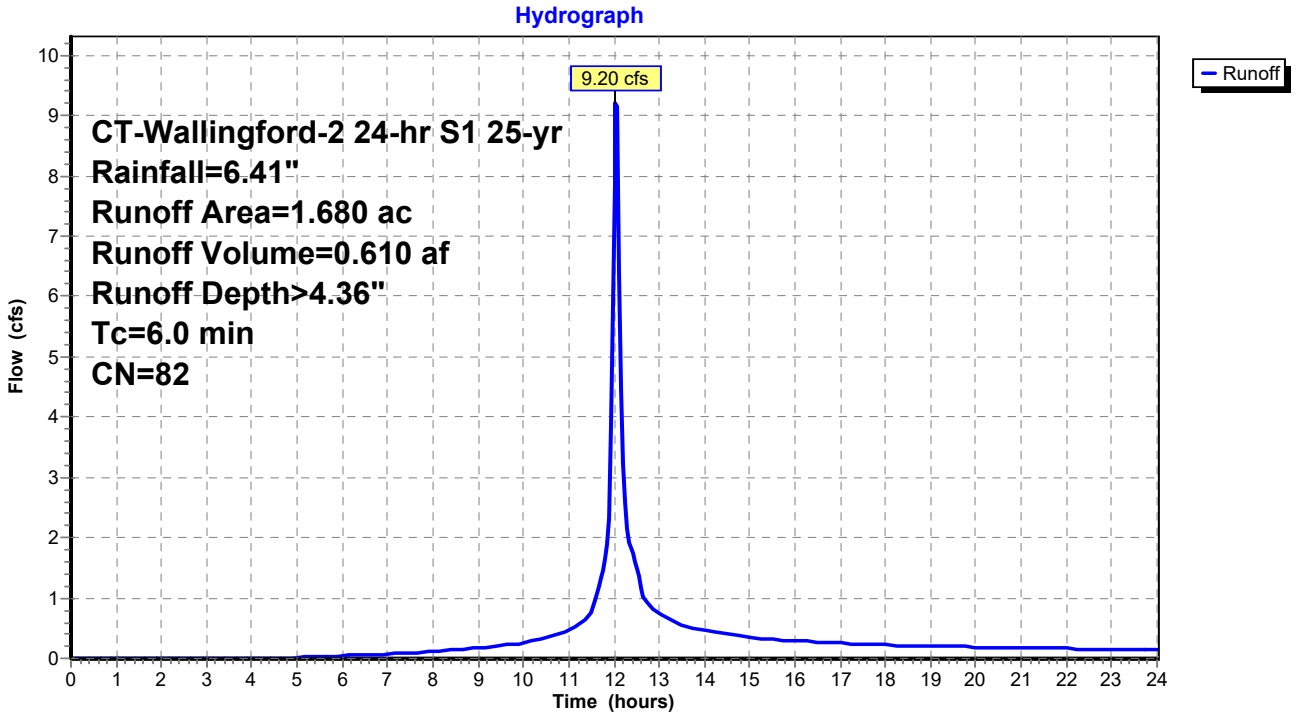
Runoff = 9.20 cfs @ 12.04 hrs, Volume= 0.610 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 25-yr Rainfall=6.41"

	Area (ac)	CN	Description
*	1.680	82	

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

Subcatchment 20: DC 1



Summary for Subcatchment 30: DC 2

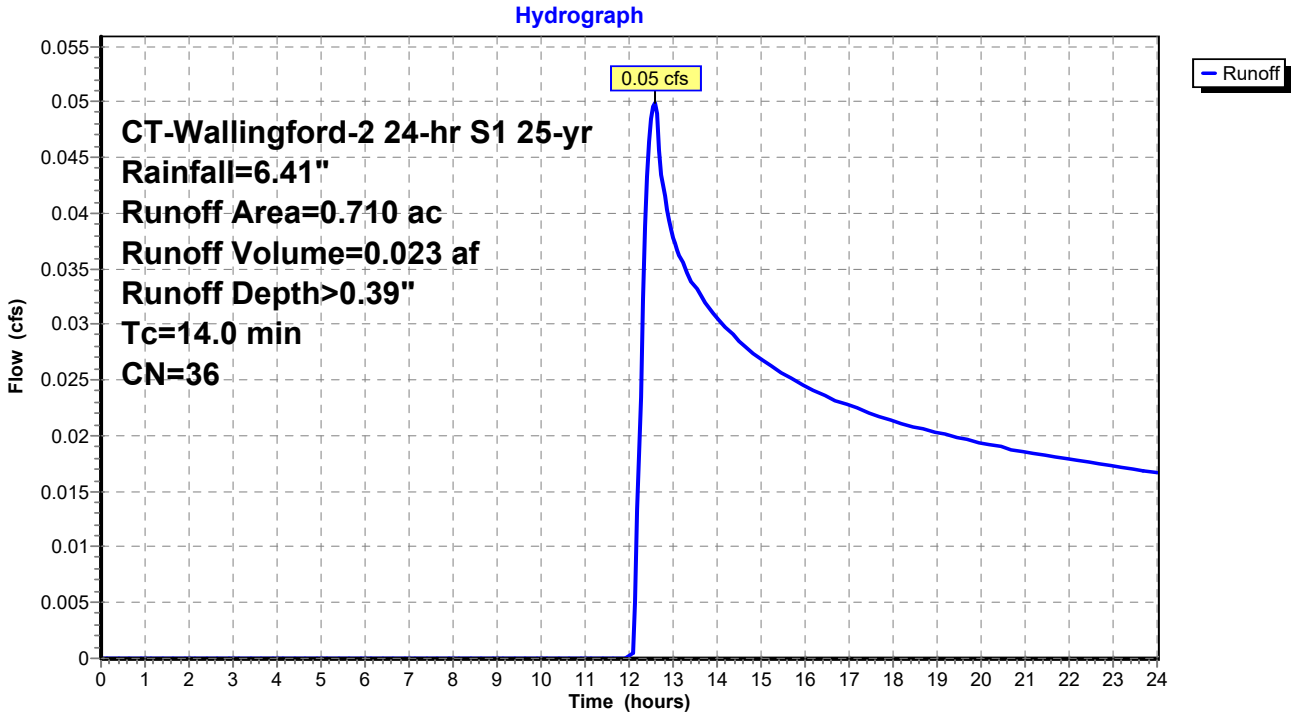
Runoff = 0.05 cfs @ 12.58 hrs, Volume= 0.023 af, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 25-yr Rainfall=6.41"

	Area (ac)	CN	Description
*	0.710	36	

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

Subcatchment 30: DC 2



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, Inflow Depth > 4.36" for 25-yr event
Inflow = 9.20 cfs @ 12.04 hrs, Volume= 0.610 af
Outflow = 1.19 cfs @ 12.59 hrs, Volume= 0.588 af, Atten= 87%, Lag= 33.2 min
Primary = 1.19 cfs @ 12.59 hrs, Volume= 0.588 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 355.34' @ 12.59 hrs Surf.Area= 6,549 sf Storage= 14,317 cf (9,379 cf above start)

Plug-Flow detention time= 232.3 min calculated for 0.475 af (78% of inflow)
Center-of-Mass det. time= 79.4 min (901.3 - 821.9)

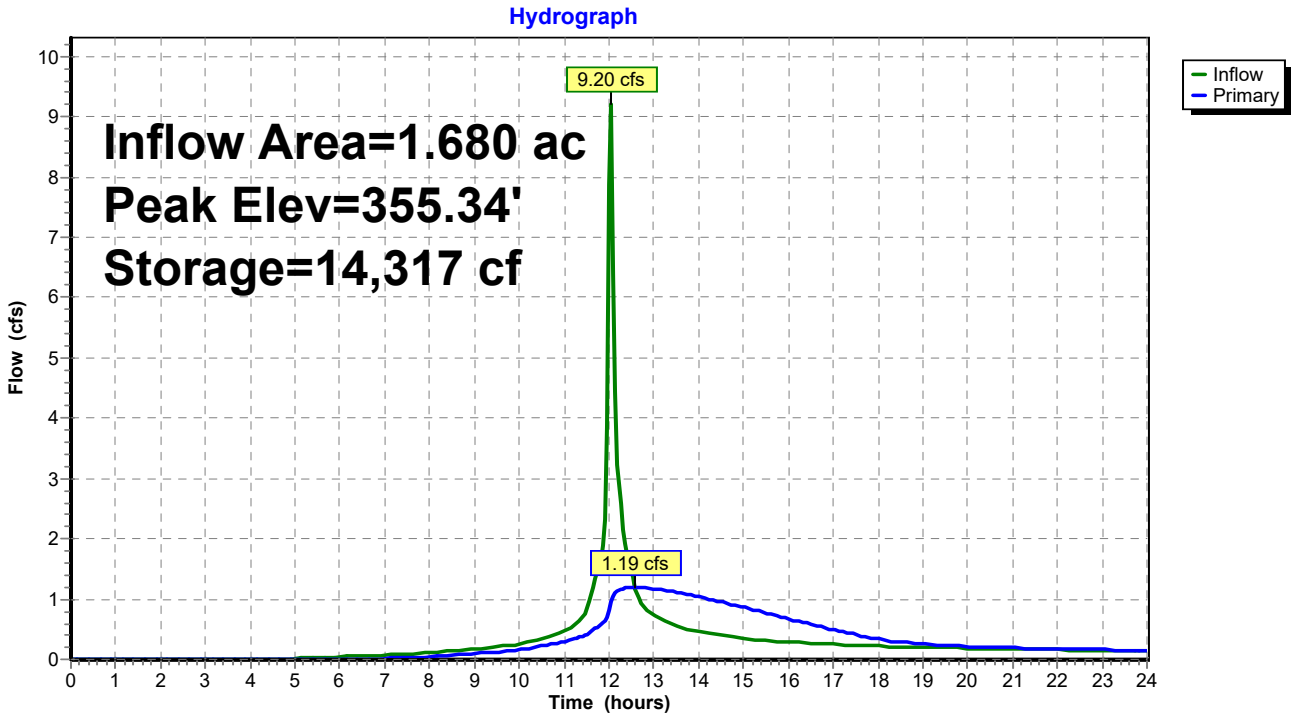
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	353.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 12.59 hrs HW=355.34' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.19 cfs @ 6.08 fps)

Pond 25: SWMB

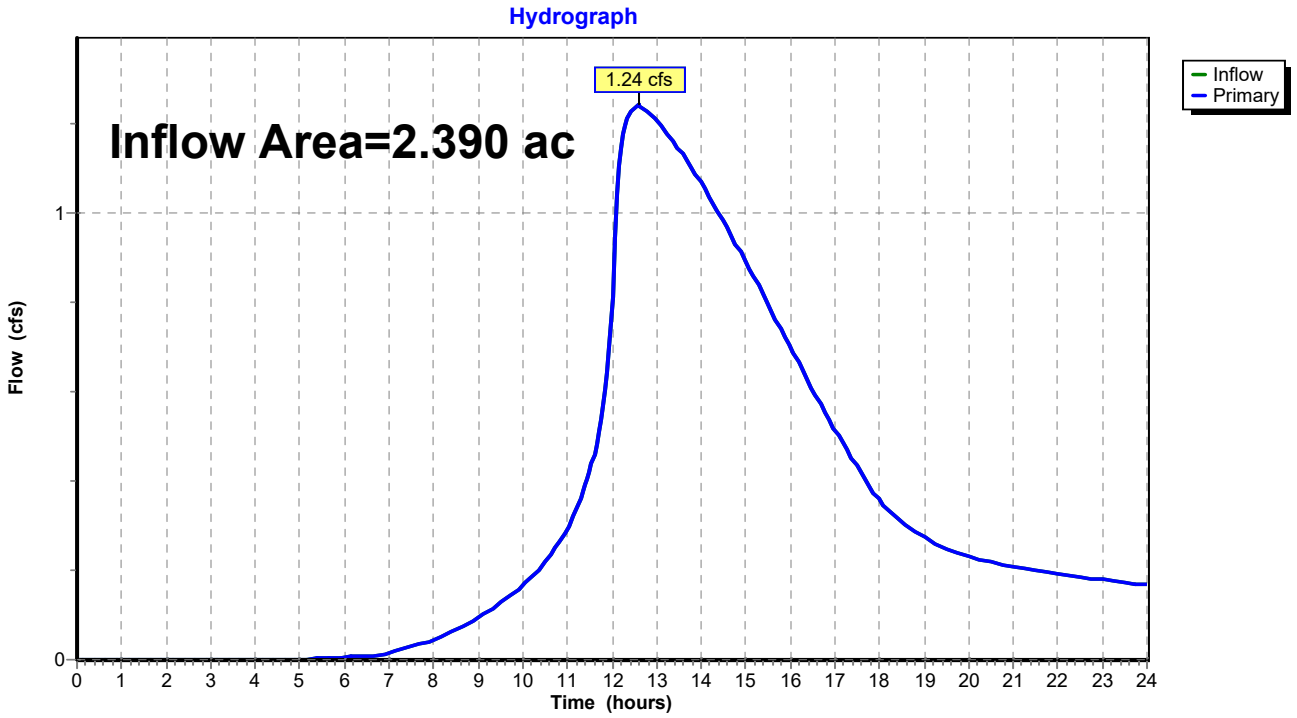

Hydrograph
Inflow Area=1.680 ac
Peak Elev=355.34'
Storage=14,317 cf
9.20 cfs
1.19 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link 35: Outlet

Inflow Area = 2.390 ac, Inflow Depth > 3.07" for 25-yr event
Inflow = 1.24 cfs @ 12.59 hrs, Volume= 0.611 af
Primary = 1.24 cfs @ 12.59 hrs, Volume= 0.611 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: Outlet



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 20: DC 1 Runoff Area=1.680 ac Runoff Depth>5.16"
Tc=6.0 min CN=82 Runoff=10.84 cfs 0.723 af

Subcatchment 30: DC 2 Runoff Area=0.710 ac Runoff Depth>0.64"
Tc=14.0 min CN=36 Runoff=0.12 cfs 0.038 af

Pond 25: SWMB Peak Elev=355.63' Storage=16,239 cf Inflow=10.84 cfs 0.723 af
Outflow=1.30 cfs 0.698 af

Link 35: Outlet Inflow=1.40 cfs 0.736 af
Primary=1.40 cfs 0.736 af

Total Runoff Area = 2.390 ac Runoff Volume = 0.760 af Average Runoff Depth = 3.82"

Summary for Subcatchment 20: DC 1

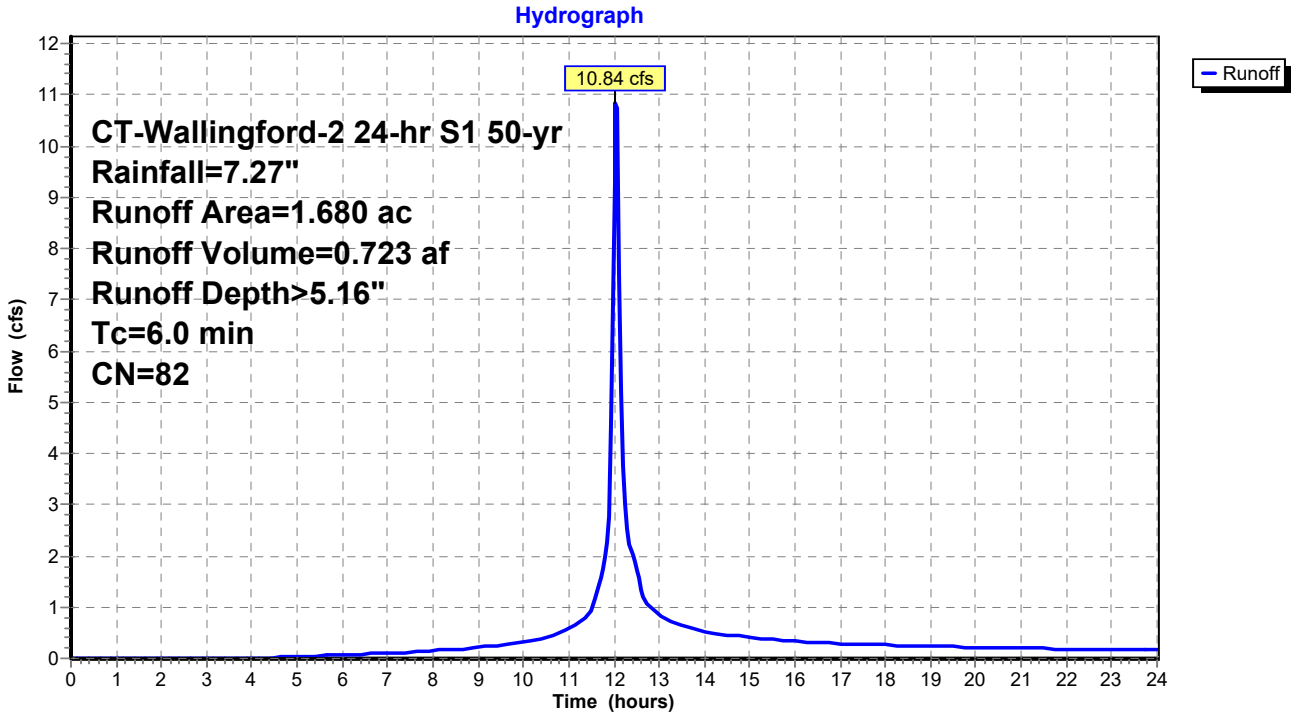
Runoff = 10.84 cfs @ 12.04 hrs, Volume= 0.723 af, Depth> 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 50-yr Rainfall=7.27"

	Area (ac)	CN	Description
*	1.680	82	

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

Subcatchment 20: DC 1



Summary for Subcatchment 30: DC 2

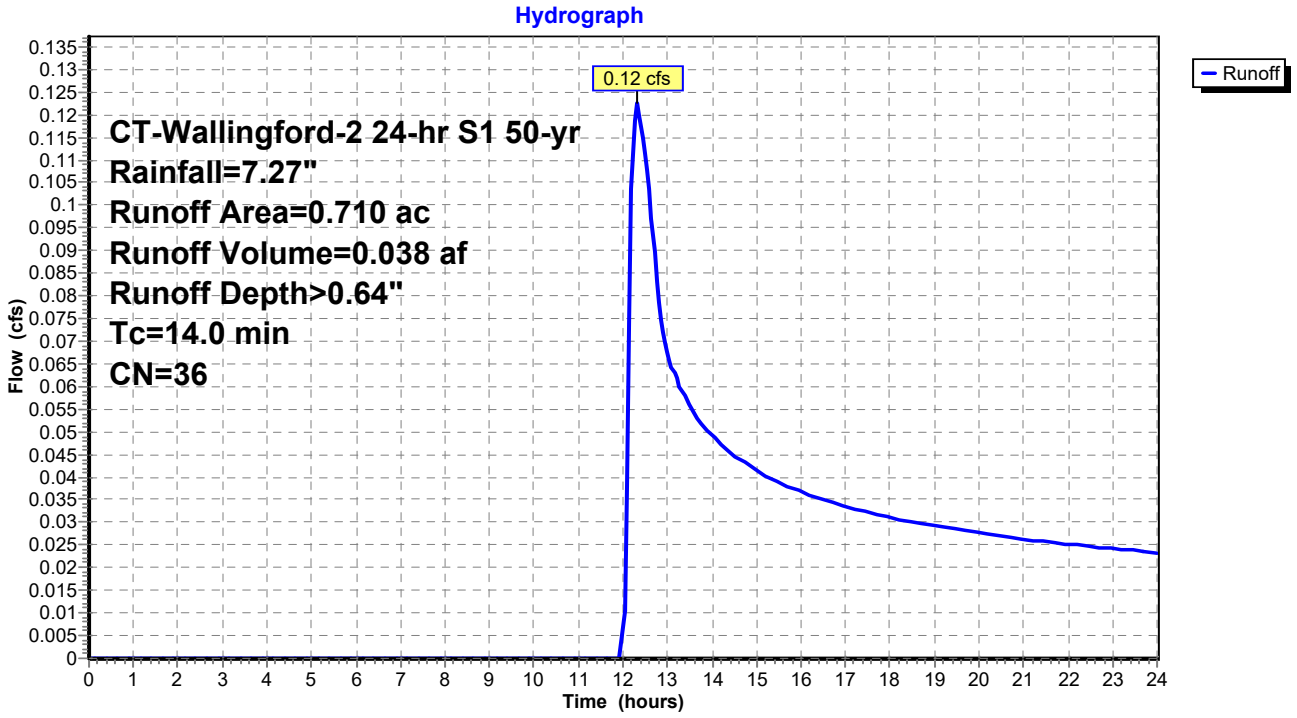
Runoff = 0.12 cfs @ 12.31 hrs, Volume= 0.038 af, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 50-yr Rainfall=7.27"

	Area (ac)	CN	Description
*	0.710	36	

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

Subcatchment 30: DC 2



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, Inflow Depth > 5.16" for 50-yr event
Inflow = 10.84 cfs @ 12.04 hrs, Volume= 0.723 af
Outflow = 1.30 cfs @ 12.62 hrs, Volume= 0.698 af, Atten= 88%, Lag= 34.6 min
Primary = 1.30 cfs @ 12.62 hrs, Volume= 0.698 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 355.63' @ 12.62 hrs Surf.Area= 6,773 sf Storage= 16,239 cf (11,301 cf above start)

Plug-Flow detention time= 225.4 min calculated for 0.585 af (81% of inflow)
Center-of-Mass det. time= 86.6 min (902.3 - 815.7)

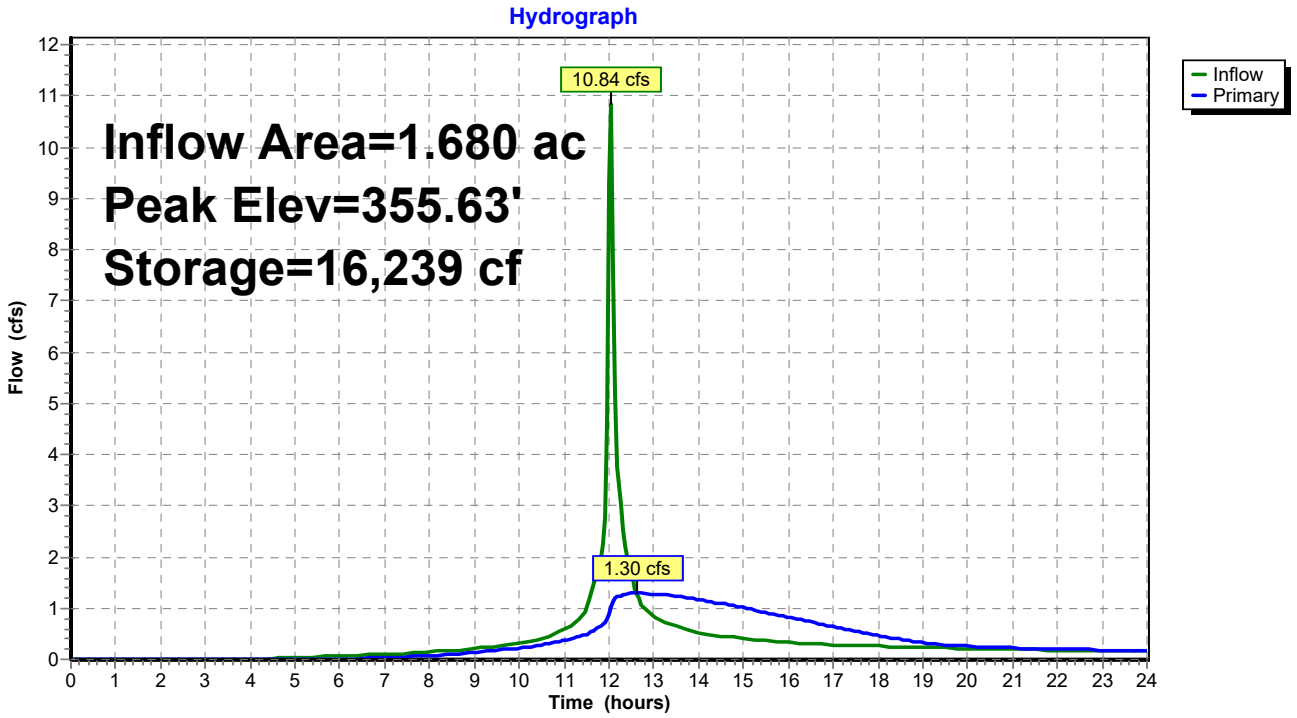
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	353.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.30 cfs @ 12.62 hrs HW=355.63' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.30 cfs @ 6.60 fps)

Pond 25: SWMB

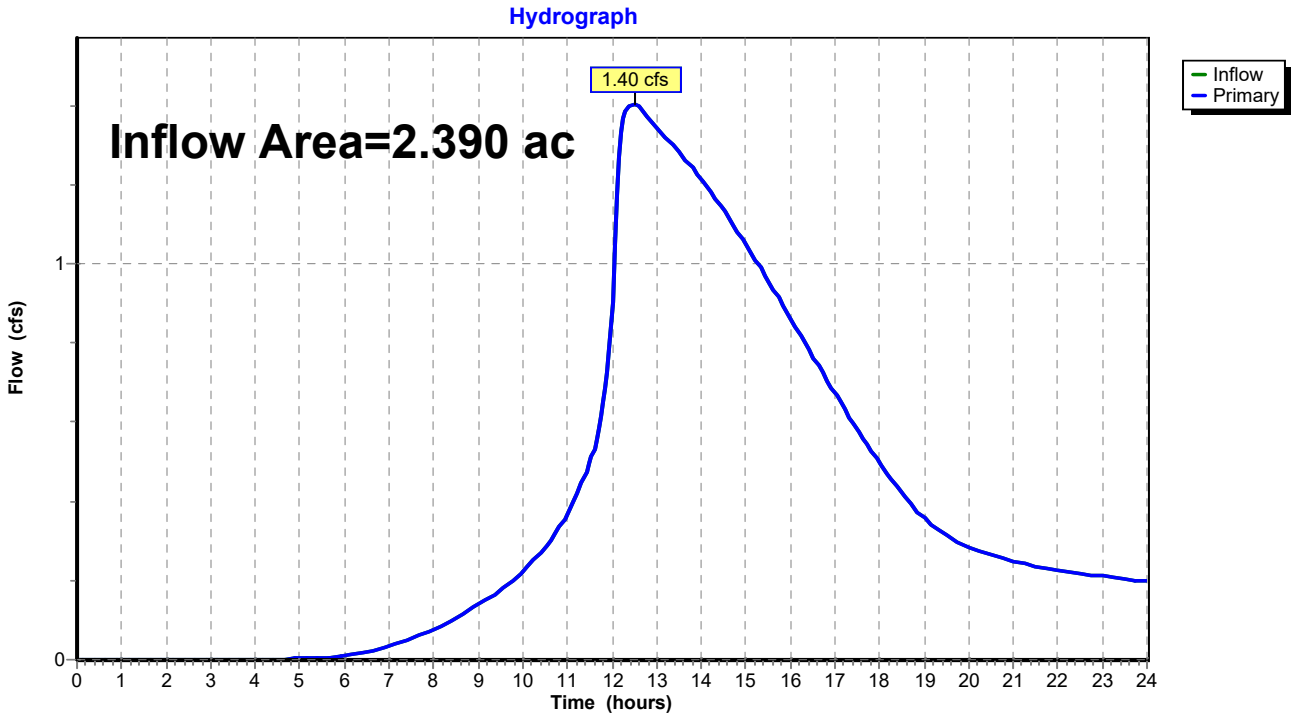

Hydrograph
Inflow Area=1.680 ac
Peak Elev=355.63'
Storage=16,239 cf
10.84 cfs
1.30 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link 35: Outlet

Inflow Area = 2.390 ac, Inflow Depth > 3.70" for 50-yr event
Inflow = 1.40 cfs @ 12.52 hrs, Volume= 0.736 af
Primary = 1.40 cfs @ 12.52 hrs, Volume= 0.736 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: Outlet



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 20: DC 1 Runoff Area=1.680 ac Runoff Depth>6.05"
Tc=6.0 min CN=82 Runoff=12.56 cfs 0.847 af

Subcatchment 30: DC 2 Runoff Area=0.710 ac Runoff Depth>0.96"
Tc=14.0 min CN=36 Runoff=0.28 cfs 0.057 af

Pond 25: SWMB Peak Elev=355.95' Storage=18,330 cf Inflow=12.56 cfs 0.847 af
Outflow=1.40 cfs 0.821 af

Link 35: Outlet Inflow=1.62 cfs 0.877 af
Primary=1.62 cfs 0.877 af

Total Runoff Area = 2.390 ac Runoff Volume = 0.904 af Average Runoff Depth = 4.54"

Summary for Subcatchment 20: DC 1

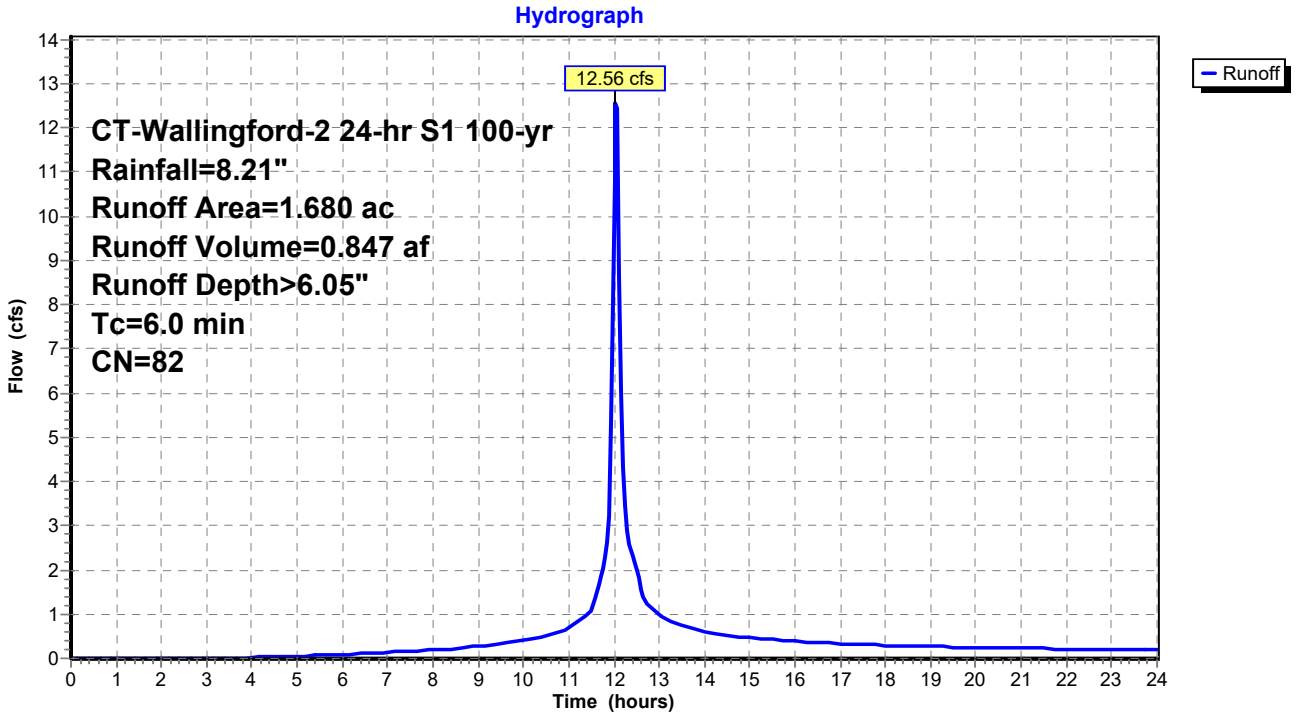
Runoff = 12.56 cfs @ 12.04 hrs, Volume= 0.847 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 100-yr Rainfall=8.21"

	Area (ac)	CN	Description
*	1.680	82	

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

Subcatchment 20: DC 1



Summary for Subcatchment 30: DC 2

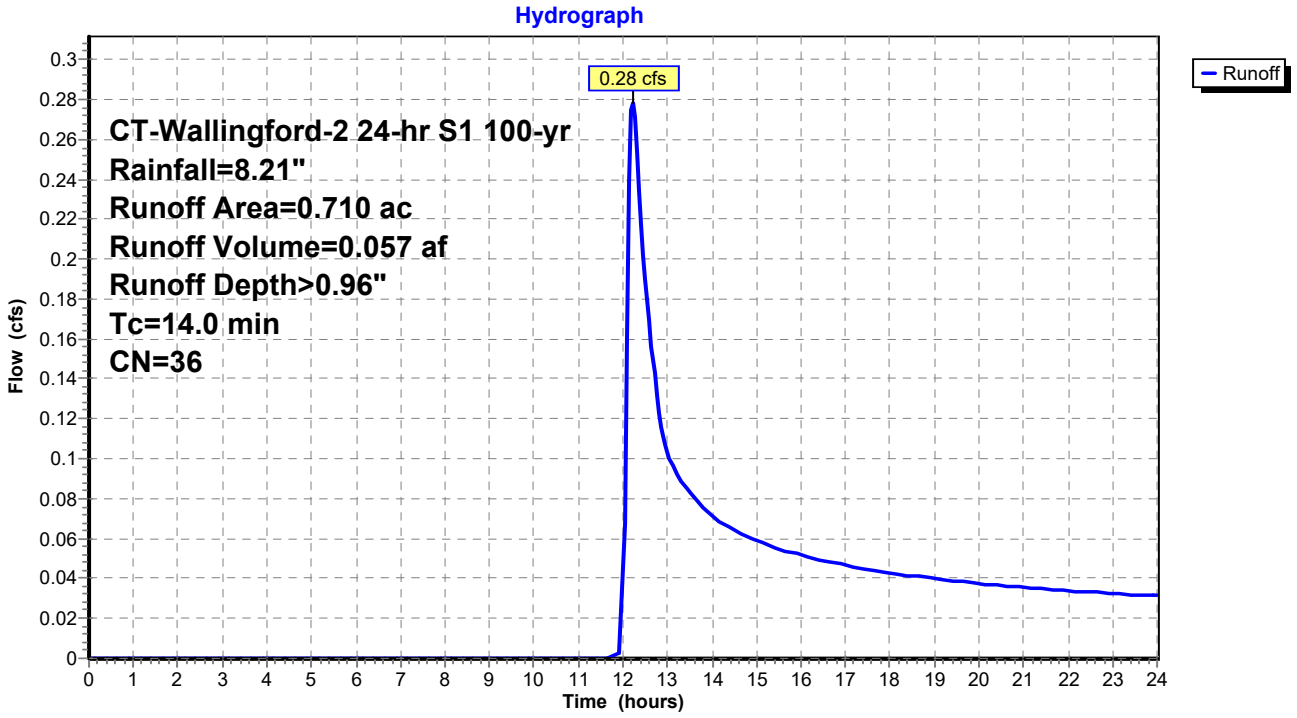
Runoff = 0.28 cfs @ 12.22 hrs, Volume= 0.057 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
CT-Wallingford-2 24-hr S1 100-yr Rainfall=8.21"

	Area (ac)	CN	Description
*	0.710	36	

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

Subcatchment 30: DC 2



Summary for Pond 25: SWMB

Inflow Area = 1.680 ac, Inflow Depth > 6.05" for 100-yr event
Inflow = 12.56 cfs @ 12.04 hrs, Volume= 0.847 af
Outflow = 1.40 cfs @ 12.64 hrs, Volume= 0.821 af, Atten= 89%, Lag= 36.3 min
Primary = 1.40 cfs @ 12.64 hrs, Volume= 0.821 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 353.50' Surf.Area= 4,029 sf Storage= 4,938 cf
Peak Elev= 355.95' @ 12.64 hrs Surf.Area= 6,373 sf Storage= 18,330 cf (13,392 cf above start)

Plug-Flow detention time= 221.5 min calculated for 0.706 af (83% of inflow)
Center-of-Mass det. time= 94.2 min (904.5 - 810.2)

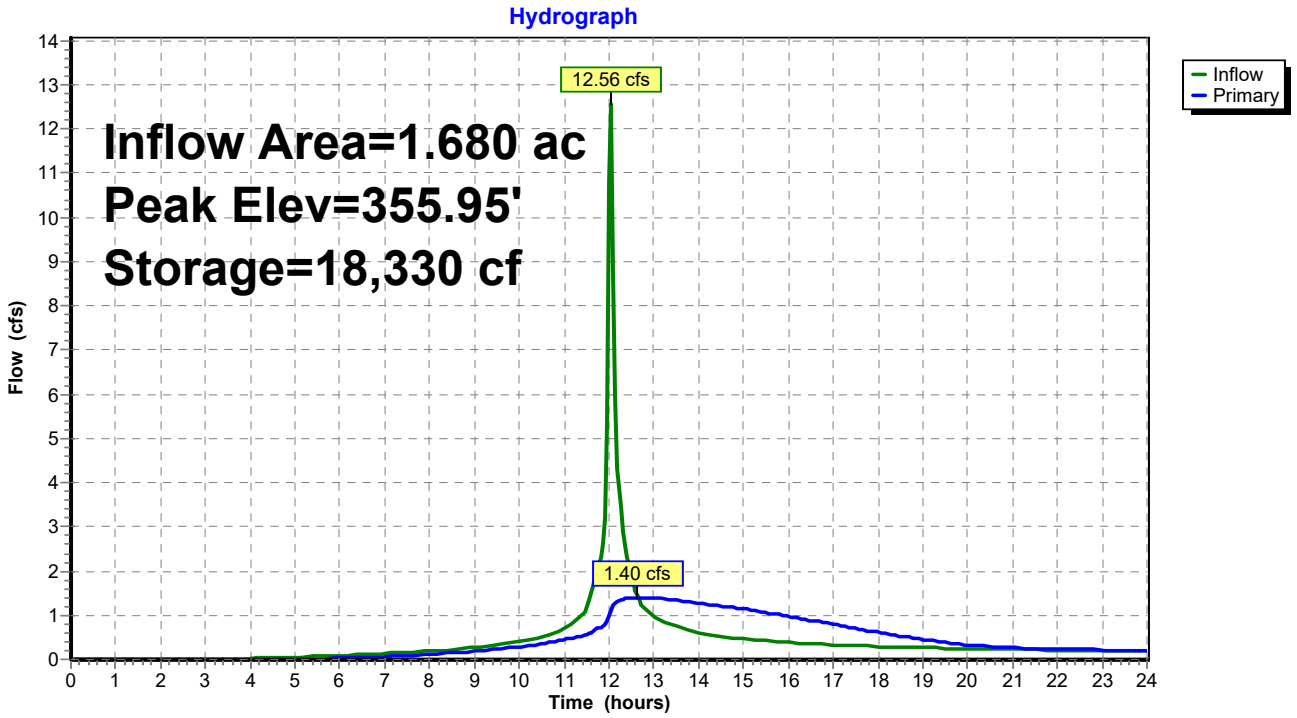
Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	35,088 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	2,588	0	0
352.50	3,043	1,408	1,408
353.00	3,524	1,642	3,050
353.50	4,029	1,888	4,938
354.00	4,560	2,147	7,085
354.50	5,116	2,419	9,504
355.00	5,697	2,703	12,207
355.50	6,934	3,158	15,365
356.00	6,304	3,310	18,675
356.50	7,590	3,474	22,148
357.00	8,269	3,965	26,113
357.50	8,975	4,311	30,424
358.00	9,682	4,664	35,088

Device	Routing	Invert	Outlet Devices
#1	Primary	353.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.40 cfs @ 12.64 hrs HW=355.95' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.40 cfs @ 7.13 fps)

Pond 25: SWMB

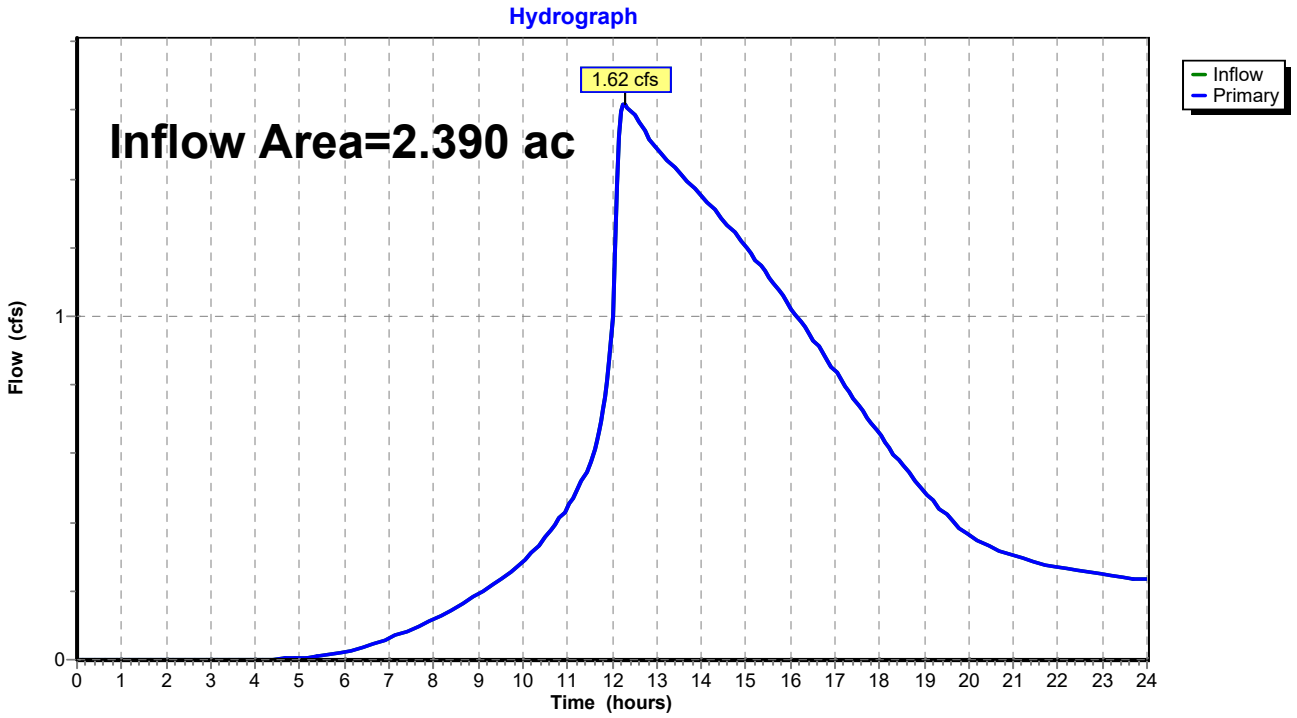

Hydrograph
Inflow Area=1.680 ac
Peak Elev=355.95'
Storage=18,330 cf
12.56 cfs
1.40 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Link 35: Outlet

Inflow Area = 2.390 ac, Inflow Depth > 4.41" for 100-yr event
Inflow = 1.62 cfs @ 12.27 hrs, Volume= 0.877 af
Primary = 1.62 cfs @ 12.27 hrs, Volume= 0.877 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 35: Outlet



Appendix C
NRCS Soils Information

Custom Soil Resource Report
Soil Map

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

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Aug 30, 2019—Oct 15, 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
63B	Cheshire fine sandy loam, 3 to 8 percent slopes	6.1	100.0%
Totals for Area of Interest		**6.1**	**100.0%**

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

63B—Cheshire fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lpw
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

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

Description of Cheshire

Setting

Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from basalt and/or sandstone and shale

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
C - 26 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F145XY013CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Wilbraham

Percent of map unit: 5 percent
Landform: Depressions, drainageways

Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Yalesville

Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Watchaug

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

Wethersfield

Percent of map unit: 3 percent
Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Menlo

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, brown subsoil

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

Unnamed, less sloping

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

Appendix D
NOAA Atlas 14 Precipitation Information

NOAA Atlas 14, Volume 10, Version 3
Location name: Wallingford, Connecticut, USA*
Latitude: 41.483°, Longitude: -72.7644°
Elevation: 357.99 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.336** (0.262-0.418)	**0.409** (0.319-0.510)	**0.528** (0.410-0.662)	**0.628** (0.484-0.790)	**0.764** (0.570-1.01)	**0.867** (0.635-1.17)	**0.974** (0.692-1.36)	**1.09** (0.738-1.57)	**1.27** (0.821-1.88)	**1.41** (0.891-2.14)
10-min	**0.476** (0.371-0.593)	**0.580** (0.451-0.722)	**0.749** (0.581-0.936)	**0.889** (0.686-1.12)	**1.08** (0.808-1.43)	**1.23** (0.898-1.65)	**1.38** (0.981-1.93)	**1.55** (1.04-2.22)	**1.80** (1.16-2.67)	**2.00** (1.26-3.03)
15-min	**0.560** (0.437-0.697)	**0.682** (0.531-0.849)	**0.881** (0.683-1.10)	**1.05** (0.807-1.32)	**1.27** (0.951-1.68)	**1.44** (1.06-1.95)	**1.62** (1.15-2.27)	**1.82** (1.23-2.61)	**2.11** (1.37-3.14)	**2.35** (1.49-3.56)
30-min	**0.771** (0.601-0.960)	**0.935** (0.728-1.17)	**1.20** (0.933-1.50)	**1.43** (1.10-1.79)	**1.73** (1.29-2.28)	**1.96** (1.43-2.64)	**2.20** (1.57-3.08)	**2.47** (1.67-3.54)	**2.86** (1.86-4.25)	**3.18** (2.02-4.83)
60-min	**0.983** (0.766-1.22)	**1.19** (0.925-1.48)	**1.52** (1.18-1.91)	**1.80** (1.39-2.27)	**2.19** (1.64-2.88)	**2.48** (1.81-3.34)	**2.78** (1.98-3.89)	**3.12** (2.10-4.47)	**3.62** (2.34-5.37)	**4.02** (2.54-6.10)
2-hr	**1.30** (1.02-1.61)	**1.56** (1.22-1.93)	**1.98** (1.55-2.46)	**2.33** (1.81-2.91)	**2.81** (2.12-3.69)	**3.17** (2.35-4.26)	**3.56** (2.56-4.97)	**4.01** (2.71-5.70)	**4.67** (3.04-6.90)	**5.24** (3.32-7.89)
3-hr	**1.51** (1.20-1.86)	**1.81** (1.43-2.23)	**2.29** (1.81-2.84)	**2.70** (2.11-3.35)	**3.25** (2.46-4.24)	**3.66** (2.72-4.89)	**4.10** (2.97-5.72)	**4.63** (3.14-6.56)	**5.42** (3.53-7.97)	**6.09** (3.88-9.14)
6-hr	**1.92** (1.53-2.34)	**2.30** (1.83-2.81)	**2.92** (2.32-3.58)	**3.43** (2.71-4.24)	**4.14** (3.17-5.37)	**4.67** (3.49-6.20)	**5.23** (3.81-7.26)	**5.92** (4.03-8.33)	**6.95** (4.55-10.2)	**7.84** (5.00-11.7)
12-hr	**2.36** (1.90-2.85)	**2.85** (2.29-3.45)	**3.65** (2.92-4.44)	**4.31** (3.43-5.28)	**5.22** (4.02-6.73)	**5.90** (4.45-7.79)	**6.63** (4.86-9.15)	**7.52** (5.14-10.5)	**8.86** (5.81-12.8)	**10.0** (6.40-14.8)
24-hr	**2.76** (2.24-3.32)	**3.38** (2.74-4.07)	**4.40** (3.56-5.32)	**5.25** (4.21-6.38)	**6.41** (4.98-8.22)	**7.27** (5.53-9.56)	**8.21** (6.07-11.3)	**9.37** (6.43-13.0)	**11.2** (7.34-16.1)	**12.7** (8.15-18.7)
2-day	**3.12** (2.55-3.72)	**3.89** (3.18-4.64)	**5.15** (4.20-6.17)	**6.19** (5.02-7.47)	**7.63** (5.99-9.75)	**8.68** (6.68-11.4)	**9.85** (7.38-13.6)	**11.3** (7.83-15.7)	**13.7** (9.07-19.7)	**15.9** (10.2-23.2)
3-day	**3.39** (2.79-4.02)	**4.24** (3.49-5.04)	**5.63** (4.62-6.72)	**6.79** (5.53-8.15)	**8.37** (6.60-10.7)	**9.53** (7.37-12.5)	**10.8** (8.15-14.9)	**12.5** (8.64-17.2)	**15.2** (10.1-21.7)	**17.6** (11.3-25.6)
4-day	**3.64** (3.01-4.31)	**4.54** (3.75-5.39)	**6.02** (4.96-7.17)	**7.25** (5.93-8.68)	**8.95** (7.08-11.3)	**10.2** (7.89-13.3)	**11.6** (8.72-15.8)	**13.3** (9.24-18.3)	**16.2** (10.7-23.0)	**18.7** (12.1-27.2)
7-day	**4.34** (3.62-5.10)	**5.35** (4.45-6.30)	**7.00** (5.80-8.28)	**8.37** (6.89-9.96)	**10.3** (8.15-12.9)	**11.6** (9.05-15.0)	**13.2** (9.95-17.8)	**15.1** (10.5-20.6)	**18.2** (12.1-25.7)	**20.9** (13.5-30.1)
10-day	**5.04** (4.22-5.91)	**6.10** (5.11-7.17)	**7.85** (6.54-9.25)	**9.30** (7.69-11.0)	**11.3** (9.00-14.1)	**12.8** (9.94-16.4)	**14.4** (10.8-19.3)	**16.3** (11.4-22.2)	**19.4** (13.0-27.4)	**22.1** (14.4-31.8)
20-day	**7.23** (6.12-8.41)	**8.38** (7.08-9.76)	**10.2** (8.62-12.0)	**11.8** (9.85-13.9)	**13.9** (11.2-17.2)	**15.5** (12.1-19.6)	**17.2** (13.0-22.6)	**19.2** (13.5-25.8)	**22.0** (14.8-30.7)	**24.4** (15.8-34.8)
30-day	**9.07** (7.72-10.5)	**10.3** (8.71-11.9)	**12.2** (10.3-14.2)	**13.8** (11.6-16.1)	**16.0** (12.9-19.5)	**17.7** (13.8-22.1)	**19.4** (14.5-25.1)	**21.3** (15.0-28.4)	**23.8** (16.0-33.1)	**25.9** (16.9-36.7)
45-day	**11.4** (9.71-13.1)	**12.6** (10.7-14.5)	**14.6** (12.4-16.9)	**16.2** (13.7-18.9)	**18.5** (14.9-22.4)	**20.3** (15.9-25.1)	**22.0** (16.5-28.1)	**23.8** (16.9-31.6)	**26.1** (17.6-36.0)	**27.8** (18.1-39.2)
60-day	**13.3** (11.4-15.2)	**14.5** (12.4-16.7)	**16.6** (14.1-19.1)	**18.3** (15.5-21.2)	**20.6** (16.7-24.8)	**22.4** (17.6-27.6)	**24.2** (18.1-30.7)	**25.9** (18.4-34.3)	**28.0** (18.9-38.5)	**29.4** (19.3-41.5)

[1] 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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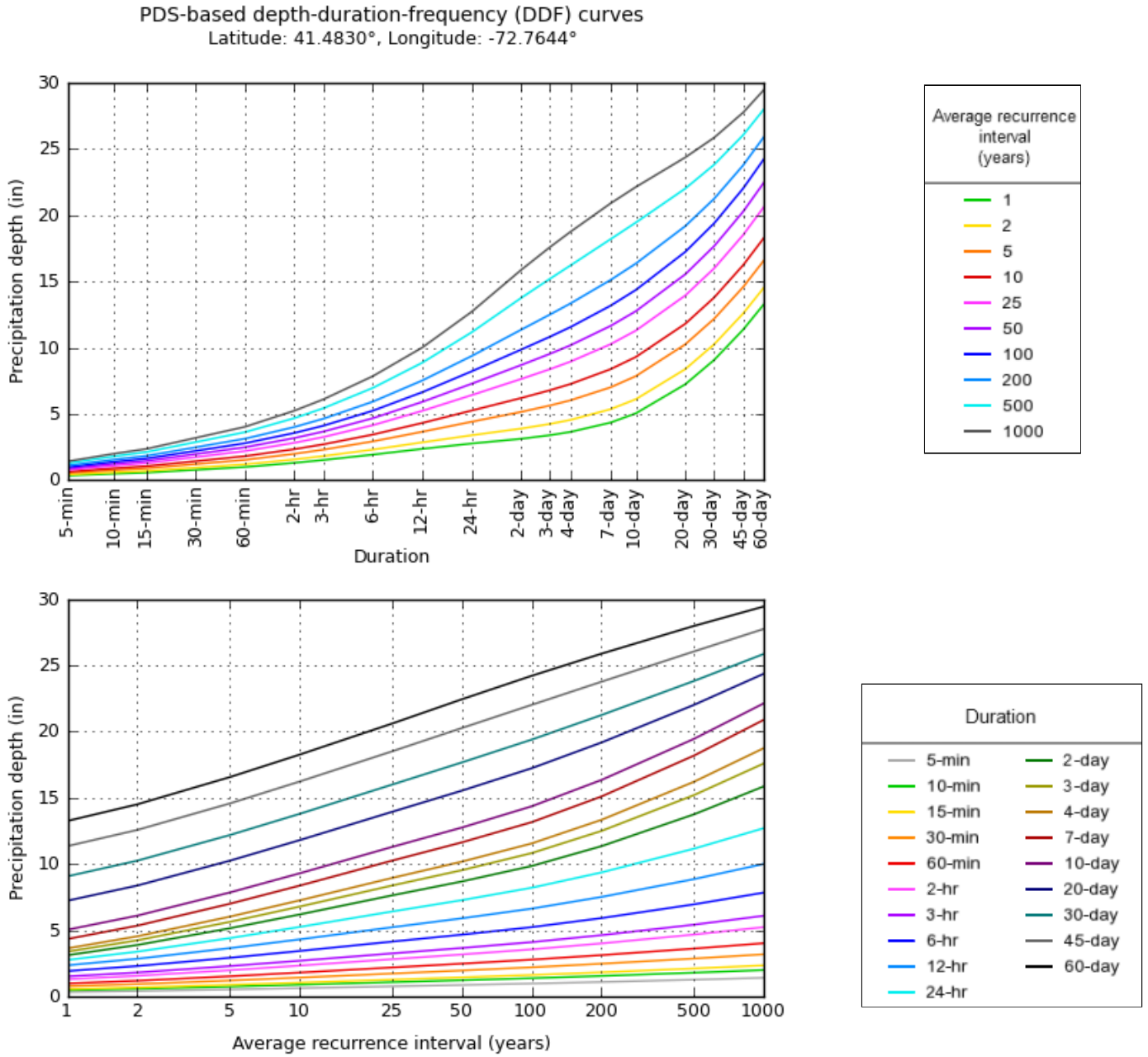
PF graphical



NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Sun Apr 25 13:16:56 2021

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Maps & aerials

Small scale terrain

Appendix E
General Site Operation and Maintenance Plan

Site Operation and Maintenance Plan

4A Research Parkway
Wallingford, Connecticut

- This Site Operation and Maintenance Plan outlines practices and procedures intended to minimize stormwater pollution resulting from the developed sites operation and its infrastructure. The site is located within a public water supply watershed and a municipal watershed protection zoning district, therefore the minimization of stormwater pollution from the site and the protection of surface and groundwater resources is of particular importance.

- The plan includes typical standard of practice best management and good housekeeping practices and pollution prevention measures and procedures for the sites operation and infrastructure including vehicle parking areas, stormwater management system, and lawn and landscaped areas.

- The plan also includes stormwater sampling and laboratory analyses to be conducted by the Town of Wallingford.

- The responsible party for implementation of the best management and good housekeeping practices and pollution prevention measures and procedures should be the site owner or its designated agent.

- The responsible party should maintain a copy of this plan and the site development plans for the site that depict the sites infrastructure including its stormwater management system.

- The responsible party should also maintain records of site inspections and maintenance actions completed and response actions for spills of potentially harmful materials that may occur.

1. Spill Response and Clean-up

   Maintain spill response and clean-up materials on-site for accidental spills of vehicle related fuels, oils and other liquids.

   Spill response materials should include barriers to prevent the entry of spilled materials into the stormwater management system catch basin inlets and prevent spilled materials from entering the adjoining Town road right-of-way or adjoining properties.

   Should a spill occur, the Town of Wallingford Fire Marshalls Office (203-294-2766) should be notified.

2. Vehicle and Equipment Washing and Maintenance

   Washing and maintenance of vehicles and equipment both within the building and outdoors shall be prohibited on this site.

3. Routine Site Inspections and Good Housekeeping Practices

   The minimum frequency of routine site inspections should be twice annually after foliage season and in the spring after winter season snow and ice control operations have ceased. In addition, routine site inspections should be completed after significant rainfall events.

   Other than refuse and recyclable containers, do not store any materials outdoors that may be exposed to stormwater and introduce pollutants into stormwater runoff.

   Hazardous, toxic, or contaminated materials stored within the sites building shall be stored in containers or vessels constructed of non-porous materials.

Containers or vessels storing liquid hazardous, toxic, or contaminated materials within the sites building shall provide secondary containment adequate to store the full volume of the container or vessel.

Ensure that all refuse and recyclables are stored within proper receptacles.

Ensure that receptacle tops are operational and remain in the closed position.

Ensure that drain hole plugs are installed on all receptacles.

Routinely pick up trash and debris and dispose of properly.

Repair eroded slopes and lawn areas.

Adjust and maintain irrigation system sprinkler heads to minimize overspray onto pavements and runoff.

Monitor system run times to maximize soil absorption and minimize runoff.

Install drip irrigation where feasible to increase efficiency and minimize water loss due to over-spray and wind.

Ensure that exterior water spigots are not leaking.

4. Lawn Care and Landscaping Practices

Perform properly timed routine maintenance of all lawn and planted areas.

Use only slow release fertilizers and use fertilizers and pesticides judiciously and in accordance with manufacturer's instructions.

5. Pavement Sweeping

Sweep vehicle parking areas annually at a minimum and periodically as required to remove sediment and debris, reduce exposure of these materials to stormwater and reduce the potential for sediment to leave the paved surfaces in stormwater runoff.

Typically, sweeping operations should be performed in the spring after winter snow and ice control operations have ceased.

Dispose of sweepings off-site properly in accordance with applicable regulations.

6. Winter Season Snow and Ice Control

The use of sodium chloride based anti-icing or de-icing chemicals on this site is prohibited.

The preferred method of snow and ice removal for vehicle parking areas should be mechanical removal.

Apply non sodium chloride based anti-icing and de-icing chemicals for use on building entrances in accordance with manufacturer's instructions and minimize their use as is practicable.

Do not store anti-icing or de-icing chemicals outdoors.

Store snow removed from pavements in lawn areas where melt waters will not drain to catch basin inlets, the stormwater management system or off site to the adjoining Town road right-of-way or adjoining properties.

7. Stormwater Management System

A. Collection and Conveyance System

Clear leaves, trash and other debris from catch basin inlet grates routinely.

Remove sediment from catch basin sumps periodically as required. Sediment removal should be performed when accumulated sediment in the catch basin sumps reaches one-half of the sump depth. Sediment removal should typically be performed in the Spring after Winter Season snow and ice control operations have ceased.

Dispose of sediment off-site properly in accordance with applicable regulations.

Inspect the interior of catch basin and manhole structures to ensure that they are free flowing and in good structural condition and perform any debris removal or maintenance required.

Inspect storm sewers to ensure that they are free flowing and in good structural condition and perform any debris removal or maintenance required.

Remove sediment from oil grit separator structures periodically as required. Sediment removal should be performed when accumulated sediment in the structure reaches a depth of 12 inches. Sediment removal should typically be performed in the Spring after Winter Season snow and ice control operations have ceased.

Dispose of sediment off-site properly in accordance with applicable regulations.

B. Stormwater Sand Filter

Clear leaves, trash, and other debris from the sand filter bed surface routinely.

Maintain the sand filter bed surface free of vegetation.

Routinely inspect inlet pipes to ensure that they are clear and free flowing. Remove accumulated debris as required.

Inspect the concrete block splash pads at the inlet pipe discharge locations to ensure that they are free of accumulated debris and that there is no settlement of the blocks or erosion. Perform any debris removal or maintenance required.

Remove and replace the top one to two inches of the sand bed annually to maintain the infiltrative capacity of the sand bed.

Replace the full depth of the sand filter bed every three to five years or as required.

C. Stormwater Management Basin

Clear leaves, trash, and other debris from the stormwater management basin and the outlet control structure grate routinely.

Ensure that all stormwater management basin slopes and the top of berm have adequate vegetation cover. Seed low percentage cover areas and establish adequate cover.

Mow the stormwater management basin slopes and top of berm twice per year to prevent the establishment of woody vegetation.

Inspect stone riprap outlet protection aprons to ensure they are free of accumulated debris and that there is no settlement of the stone, displaced stones, or erosion. Perform any debris removal or maintenance required.

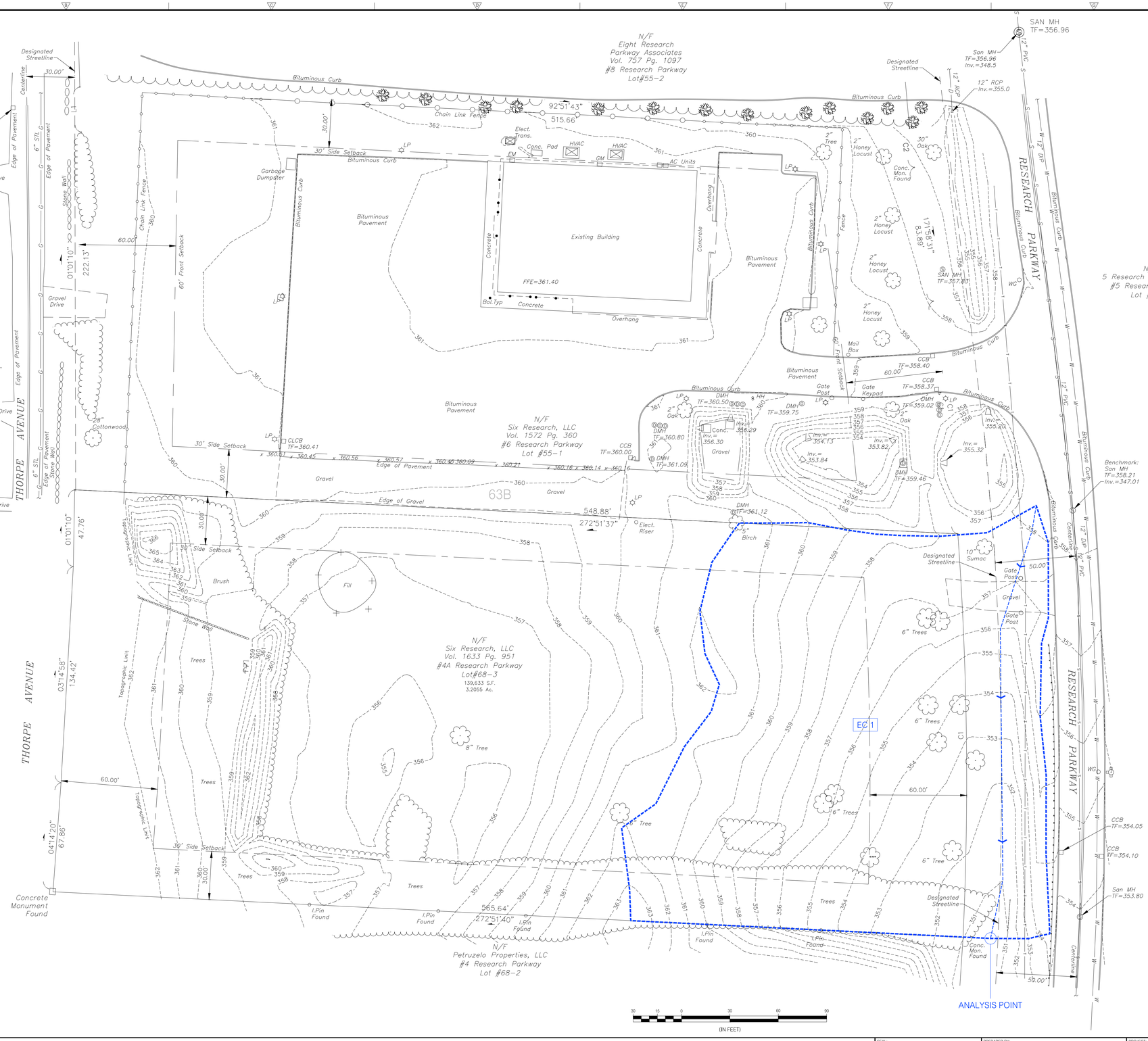
Inspect the outlet control structure to ensure that all water ports and the structure outlet pipe are free flowing and perform any debris removal or maintenance required.

D. Required Sampling and Laboratory Analyses by Municipality

In accordance with the requirements of Section 4.13 of the Town of Wallingford Zoning Regulations, the Town of Wallingford Department of Public Utilities shall cause to have samples of the stormwater discharge from the site collected and analyzed by a certified laboratory to ensure compliance with the water quality standards referenced in the Zoning Regulations.

The Town of Wallingford shall invoice the site owner for the costs associated with the collection of samples and laboratory analyses for up to four samples per year.

Appendix F
Drainage Area Maps



REVISIONS:

NO.	DATE	DESCRIPTION
		REVISIONS

TITLE:

LAND
OF
SIX RESEARCH, LLC
4A RESEARCH PARKWAY
WALLINGFORD, CONNECTICUT

SEAL:

PREPARED BY:

Summer Hill
Civil Engineers & Land Surveyors, P.C.
60 Wall Street
P.O. Box 708
Madison, Connecticut 06443-0708
Telephone: (203) 245-0722

PROJECT:
EASTSIDE AUTO TRANSPORT
4A RESEARCH PARKWAY
WALLINGFORD, CONNECTICUT

DATE: 4-1-21
SCALE: 1"=30'
DESIGNED: MJO
CHECKED: LJM
SHEET: EXISTING CONDITION DRAINAGE AREA MAP
FIELD BOOK: -
PROJECT NO.: 21-12
SHEET NO.: DA 1

REVISIONS:		
NO.	DATE	DESCRIPTION

REVISIONS

TITLE:

LAND
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WALLINGFORD, CONNECTICUT

DATE: 4-1-21
SCALE: 1"=30'
DESIGNED: MJO
CHECKED: LJM

SHEET:

DEVELOPED CONDITION
DRAINAGE AREA MAP

FIELD BOOK: -
PROJECT NO.: 21-12

SHEET NO.: DA 2