



# **STORMWATER MANAGEMENT REPORT**

PROPOSED  
CPG - ELLINGTON  
SOLAR PROJECT

24 MIDDLE ROAD  
ELLINGTON, CONNECTICUT  
TOLLAND COUNTY

**Prepared for:**

**Community Power Group  
5636 Connecticut Avenue #42729  
Washington, DC 20015**

**Prepared by:**

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**December 2022**

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## **Introduction**

At the request of Community Power Group, All-Points Technology Corporation, P.C. ("APT") has prepared the following analysis of and design to address stormwater impacts resulting from the development of a proposed 5.98 MW direct current ("DC") (4.00 MW alternating current ("AC")) solar electric generating facility herein referred to as Ellington Solar (the "Project") located at 24 Middle Road, Ellington, Connecticut (the "Site").

The purpose of this report is to provide a description and analysis of the potential stormwater drainage impacts associated with the Project, as well as a description of the design to mitigate such potential stormwater drainage impacts. The design is intended to be in full compliance with the State and Town regulations while taking prevailing site conditions and practical factors into account.

## **Existing Site Conditions**

The Site is a privately owned, 60.55-acre parcel south of Middle Road and west of Route 286 - Pinney Street. The Site is mostly undeveloped active agricultural land; the western extent of the Site is wooded. Pinney Brook flows generally north to south through the western portion of the Site. The Site is zoned RAR - Rural Agricultural Residential.

The Site's existing topography varies, ranging from approximately 247 feet above mean sea level ("AMSL") to 295 feet AMSL. In general, elevations decrease from the central northern Site boundary to southeastern and southwestern boundaries. Grades within the Project Area supporting the Facility slope gently from north to southeast/southwest, with ground elevations ranging from approximately 290 feet AMSL in the north to approximately 250 feet AMSL in the southeast/southwest.

## **Developed Site Conditions**

The Project will be constructed in an existing agricultural field with established ground cover, and there is no tree clearing proposed for the installation of the array or access. Access to the Project area will be provided from Middle Road north of the project area. The Project includes the installation of (9,963) 600W solar panel modules, associated fencing, access road, utilities, and stormwater management features within approximately 28.44± acres of the Site.

The proposed solar panels will be installed on a post driven ground mounted racking system, with minimal changes to the existing grades. As a result, the post-development site conditions will mimic the pre-developed site conditions. Areas of existing ground cover that are disturbed during construction will be reseeded with a low growth seed mix. To address water quality requirements two grass lined swales are proposed along the eastern and western edges of the solar array that will direct stormwater runoff to the two proposed stormwater basins that shall be constructed at the southeastern and southwestern boundaries of the Project area.

## Stormwater Management

### *Analysis Methodology*

The hydrologic analysis was performed using the HydroCAD stormwater modeling system computer program developed by HydroCAD Software Solutions, LLC.

Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method with a Type III rainfall distribution. Hydrographs were developed for the NOAA Atlas 14, Volume 10, Version 3 Precipitation 2-, 25-, 50-, and 100-year storm event with rainfall depths of 3.2, 6.2, 7.0, and 8.0 inches respectively.

The existing and proposed drainage areas used in the calculations are illustrated on the Existing and Proposed Drainage Area Plans (EDA-1 & PDA-1). These maps and the corresponding HydroCAD output are attached.

The Water Quality Volume ("WQV") for the site will be calculated assuming that the roadways, gravel surfaces, and transformer pads are effective impervious cover. The panels are not considered impervious cover for purposes of the WQV calculations.

The Project area soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service consist of a HSG rating of "B" and "C". The specific Map Unit Symbol soils include 53A, 53B, and 66B.

Specific details for each soil Map Unit Symbol are provided in Appendix A with their extent shown on the Drainage Area Plans.

### *Existing Drainage Patterns*

The Project area generally drains to the east and west divided by a north/south ridgeline in the middle of the site. The Site is modeled at two (2) Analysis Points ("AP-1" & "AP-2"). AP-1 discharges to an existing wetland to the southwest of the site. AP-2 discharges to an existing wetland to the east of the site. Peak discharges have been computed at the points of study for the 2-, 25-, 50-, and 100-year storm events.

The pre-development peak discharges at each analysis point are tabulated in Table 1.

**Table 1**

<i>Analysis Point</i>	<b>Pre-developed Peak Storm Runoff (Q), cubic feet per second (cfs)</b>			
	<b>2-year</b>	<b>25-year</b>	<b>50-year</b>	<b>100-year</b>
AP-1	8.90	43.46	54.26	68.26
AP-2	9.01	35.93	44.04	54.45

*Proposed Drainage Patterns*

The Project will maintain existing hydrological conditions to the extent practicable, as only limited grading is required for the installation of the access drive, equipment pads, water quality swales, and stormwater detention basins. Upon completion of construction, the Site will be stabilized using a mix of native flowering grasses and plants selected specifically for solar installations (Ernst Solar Farm Seed Mix), which will create a meadow condition.

Appendix I requires that the hydrologic soil group be reduced by a half-drop in those areas subject to heavy machinery traffic (i.e., the solar field and access), which typically results in a higher curve number. However, the Project’s change from the existing condition of Hayfield ground cover to proposed meadow ground cover results in an equal value for the site, even accounting for the half-drop in hydrologic soil group.

To appropriately manage Site drainage and provide requisite water quality treatment volumes, two (2) swales are proposed along the access road at the northeastern portion of the site and to the west of the solar array to capture and treat the runoff from the access drive and contributing project area. Based on the site area and portion of proposed impervious cover the project requires approximately 9,037 cu-ft of water quality treatment volume. The volume provided below the culvert inlets (i.e. retained) in the proposed stormwater detention basins is approximately 30,082 cu-ft, which is greater than the required volume and therefore in compliance with this requirement.

The post-development conditions were modeled using the same two Analysis Points. Peak discharges have been computed at the points of study for the 2-year, 25-year, 50-year, and 100-year storm events and tabulated in Table 2 below.

**Table 2**

<i>Analysis Point</i>	<b>Post-developed Peak Storm Runoff (Q), cubic feet per second (cfs)</b>			
	<b>2-year</b>	<b>25-year</b>	<b>50-year</b>	<b>100-year</b>
AP-1	1.20	23.18	34.24	48.47
AP-2	1.65	24.48	32.93	43.23

The reduction in runoff achieved by the post-development discharges in comparison with the pre-development discharges are tabulated in Table 3.

**Table 3**

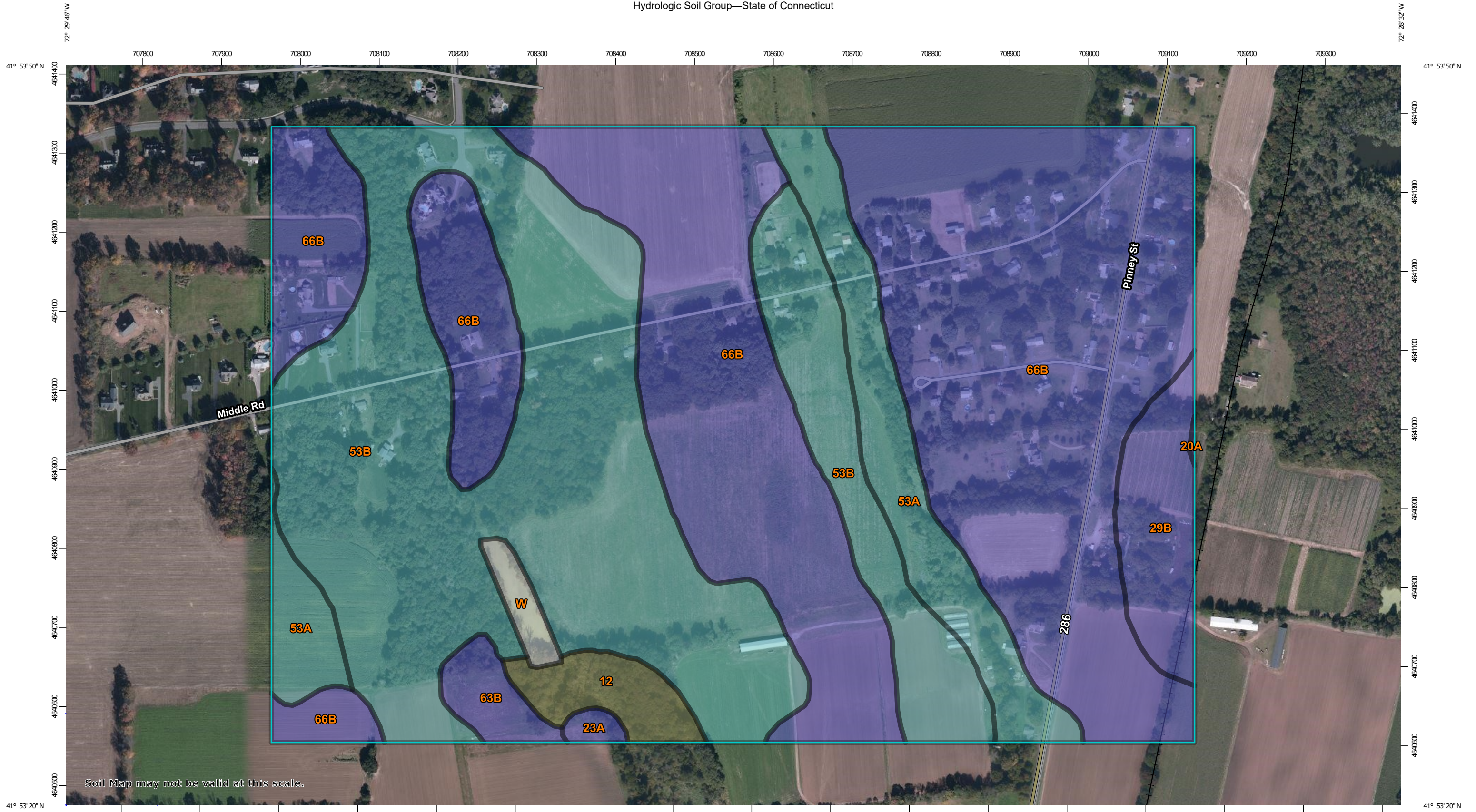
<i>Analysis Point</i>	<b>Peak Storm Runoff (Q) Comparison Pre- and Post-, Percent (%) Change</b>			
	<b>2-year</b>	<b>25-year</b>	<b>50-year</b>	<b>100-year</b>
AP-1	-87%	-47%	-37%	-29%
AP-2	-82%	-32%	-25%	-21%

## **Conclusion**

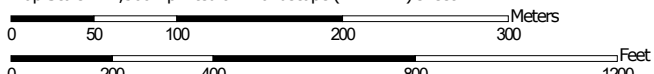
The stormwater management for the proposed Project has been designed such that the post-development peak discharges to the waters of the State of Connecticut for the 2-, 25-, 50-, and 100- year storm events are less than the pre-development peak discharges. As a result, the proposed solar array is not predicted to result in any adverse conditions to the surrounding areas and properties.

**APPENDIX A: NRCS SOIL SURVEY**

Hydrologic Soil Group—State of Connecticut



Map Scale: 1:4,560 if printed on B landscape (17" x 11") sheet.



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



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey



## 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 22, Sep 12, 2022

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

Date(s) aerial images were photographed: Aug 24, 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.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
12	Raypol silt loam	C/D	4.4	1.9%
20A	Ellington silt loam, 0 to 5 percent slopes	B	0.1	0.0%
23A	Sudbury sandy loam, 0 to 5 percent slopes	B	0.7	0.3%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	7.8	3.4%
53A	Wapping very fine sandy loam, 0 to 3 percent slopes	C	16.9	7.5%
53B	Wapping very fine sandy loam, 3 to 8 percent slopes	C	80.4	35.5%
63B	Cheshire fine sandy loam, 3 to 8 percent slopes	B	2.9	1.3%
66B	Narragansett silt loam, 2 to 8 percent slopes	B	111.4	49.2%
W	Water		1.7	0.7%
<b>Totals for Area of Interest</b>			<b>226.1</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

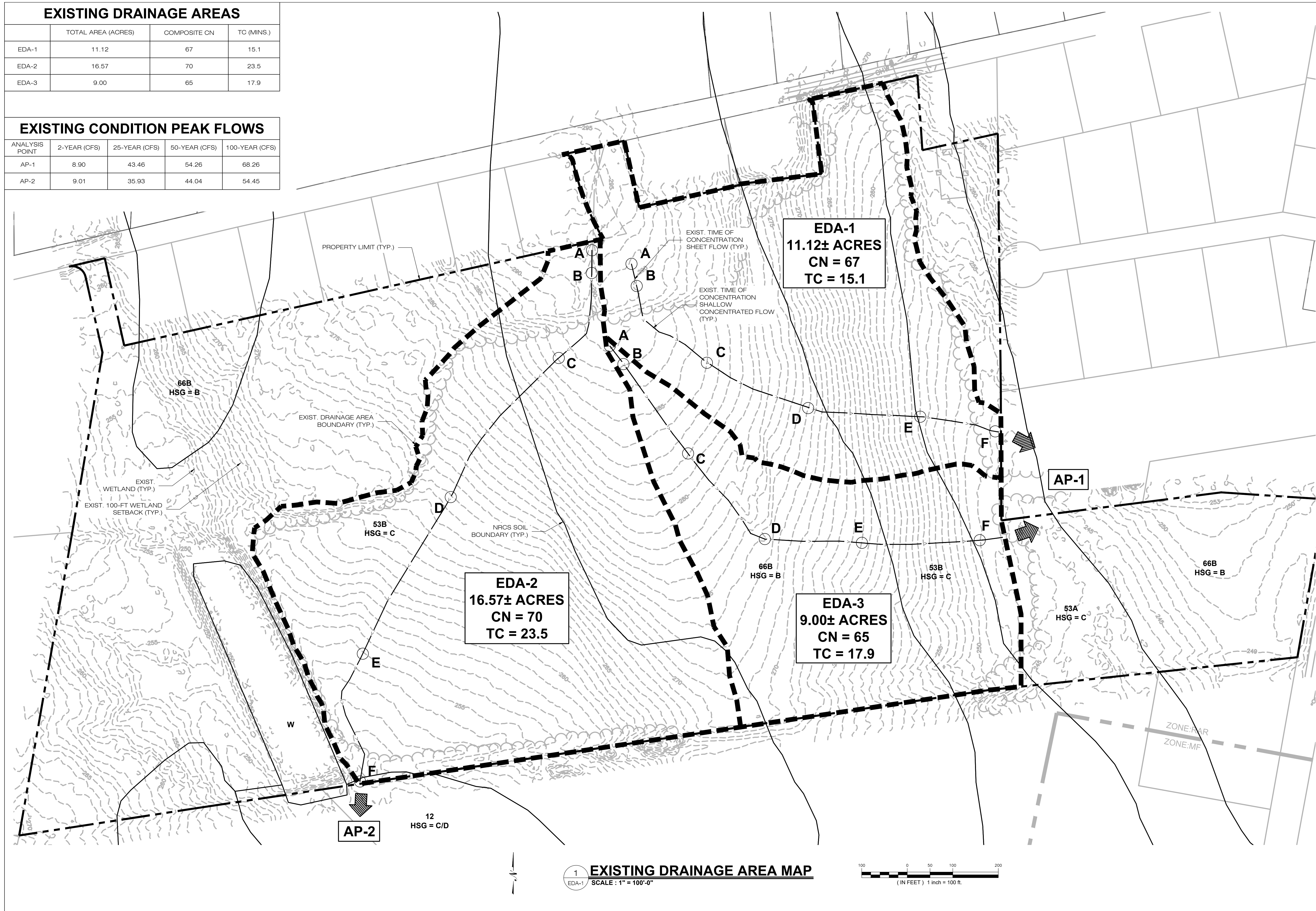
*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

**APPENDIX B: EXISTING DRAINAGE AREA MAP (EDA-1) &  
HYDROLOGIC COMPUTATION (HYDROCAD)**

EXISTING DRAINAGE AREAS			
	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
EDA-1	11.12	67	15.1
EDA-2	16.57	70	23.5
EDA-3	9.00	65	17.9

EXISTING CONDITION PEAK FLOWS				
ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	8.90	43.46	54.26	68.26
AP-2	9.01	35.93	44.04	54.45



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**ALL-POINTS**  
 TECHNOLOGY CORPORATION  
 567 VAUXHAUL STREET EXTENSION - SUITE 311  
 WATERFORD, CT 06385 PHONE: (860)-663-1697  
 WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET		
NO	DATE	REVISION
0	12/20/22	FOR REVIEW: KAM
1		
2		
3		
4		
5		
6		

**NOT FOR CONSTRUCTION**

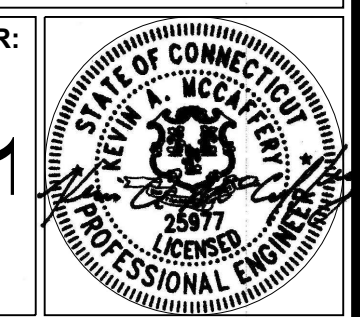
**DESIGN PROFESSIONAL OF RECORD**  
 PROF: KEVIN A. MCCAFFERY, PE  
 COMP: ALL-POINTS TECHNOLOGY CORPORATION  
 ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385  
 OWNER: PHRUMB PROPERTIES, LLC  
 ADDRESS:

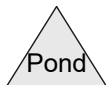
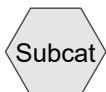
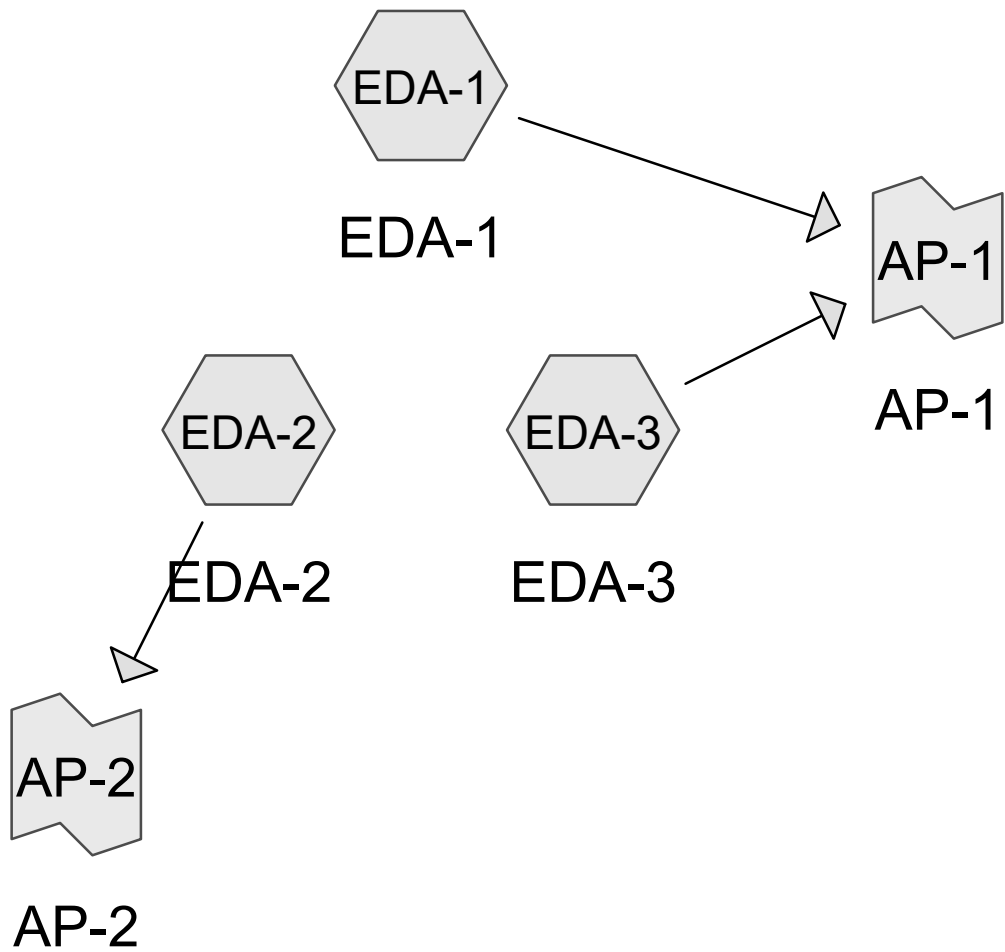
**ELLINGTON SOLAR**  
 SITE: 24 MIDDLE ROAD  
 ADDRESS: ELLINGTON, CT 06029  
 APT FILING NUMBER: CT722100  
 DRAWN BY: JAB  
 DATE: 12/20/22 CHECKED BY: KAM

SHEET TITLE:  
**EXISTING DRAINAGE AREA MAP**

SHEET NUMBER:  
**EDA-1**

**1 EXISTING DRAINAGE AREA MAP**  
 SCALE: 1" = 100'-0"  
 (IN FEET) 1 inch = 100 ft.





**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
580,087	61	Pasture/grassland/range, Good, HSG B (EDA-1, EDA-2, EDA-3)
900,691	74	Pasture/grassland/range, Good, HSG C (EDA-1, EDA-2, EDA-3)
640	80	Pasture/grassland/range, Good, HSG D (EDA-2)
101,348	55	Woods, Good, HSG B (EDA-1, EDA-2)
14,405	70	Woods, Good, HSG C (EDA-1, EDA-2, EDA-3)
1,028	77	Woods, Good, HSG D (EDA-2)
<b>1,598,199</b>	<b>68</b>	<b>TOTAL AREA</b>

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
681,435	HSG B	EDA-1, EDA-2, EDA-3
915,096	HSG C	EDA-1, EDA-2, EDA-3
1,668	HSG D	EDA-2
0	Other	
<b>1,598,199</b>		<b>TOTAL AREA</b>



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 EDA-1: EDA-1**

Runoff Area=484,583 sf 0.00% Impervious Runoff Depth=0.69"  
Flow Length=1,028' Tc=15.1 min CN=67 Runoff=5.54 cfs 27,745 cf

**Subcatchment EDA-2: EDA-2**

Runoff Area=721,744 sf 0.00% Impervious Runoff Depth=0.83"  
Flow Length=1,355' Tc=23.5 min CN=70 Runoff=9.01 cfs 49,805 cf

**Subcatchment EDA-3: EDA-3**

Runoff Area=391,872 sf 0.00% Impervious Runoff Depth=0.60"  
Flow Length=1,024' Tc=17.9 min CN=65 Runoff=3.46 cfs 19,606 cf

**Link AP-1: AP-1**

Inflow=8.90 cfs 47,351 cf  
Primary=8.90 cfs 47,351 cf

**Link AP-2: AP-2**

Inflow=9.01 cfs 49,805 cf  
Primary=9.01 cfs 49,805 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 97,156 cf Average Runoff Depth = 0.73"**  
**100.00% Pervious = 1,598,199 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment EDA-1: EDA-1**

Runoff = 5.54 cfs @ 12.25 hrs, Volume= 27,745 cf, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-YEAR Rainfall=3.20"

Area (sf)	CN	Description
77,705	55	Woods, Good, HSG B
7,351	70	Woods, Good, HSG C
142,475	61	Pasture/grassland/range, Good, HSG B
257,052	74	Pasture/grassland/range, Good, HSG C
484,583	67	Weighted Average
484,583		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0303	0.20		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
5.6	387	0.0270	1.15		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.2	202	0.0500	1.57		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.7	211	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.3	178	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.1	1,028	Total			

**Summary for Subcatchment EDA-2: EDA-2**

Runoff = 9.01 cfs @ 12.37 hrs, Volume= 49,805 cf, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-YEAR Rainfall=3.20"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
5,987	70	Woods, Good, HSG C
169,141	61	Pasture/grassland/range, Good, HSG B
521,305	74	Pasture/grassland/range, Good, HSG C
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,744	70	Weighted Average
721,744		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
3.7	217	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.6	389	0.0400	1.40		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.2	394	0.0330	1.27		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.1	305	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
23.5	1,355	Total			

**Summary for Subcatchment EDA-3: EDA-3**

Runoff = 3.46 cfs @ 12.31 hrs, Volume= 19,606 cf, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-YEAR Rainfall=3.20"

Area (sf)	CN	Description
268,471	61	Pasture/grassland/range, Good, HSG B
122,334	74	Pasture/grassland/range, Good, HSG C
1,067	70	Woods, Good, HSG C
391,872	65	Weighted Average
391,872		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.0217	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.0	241	0.0208	1.01		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
3.5	259	0.0307	1.23		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.6	214	0.0374	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.4	260	0.0654	1.79		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
17.9	1,024	Total			

**Summary for Link AP-1: AP-1**

Inflow Area = 876,455 sf, 0.00% Impervious, Inflow Depth = 0.65" for 2-YEAR event  
 Inflow = 8.90 cfs @ 12.27 hrs, Volume= 47,351 cf  
 Primary = 8.90 cfs @ 12.27 hrs, Volume= 47,351 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,744 sf, 0.00% Impervious, Inflow Depth = 0.83" for 2-YEAR event  
Inflow = 9.01 cfs @ 12.37 hrs, Volume= 49,805 cf  
Primary = 9.01 cfs @ 12.37 hrs, Volume= 49,805 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**CT722100-EX***Type III 24-hr 25-YEAR Rainfall=6.20"*

Prepared by All Points Technology Corp.

Printed 12/2/2022

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 EDA-1: EDA-1**

Runoff Area=484,583 sf 0.00% Impervious Runoff Depth=2.68"  
 Flow Length=1,028' Tc=15.1 min CN=67 Runoff=25.90 cfs 108,301 cf

**Subcatchment EDA-2: EDA-2**

Runoff Area=721,744 sf 0.00% Impervious Runoff Depth=2.96"  
 Flow Length=1,355' Tc=23.5 min CN=70 Runoff=35.93 cfs 178,315 cf

**Subcatchment EDA-3: EDA-3**

Runoff Area=391,872 sf 0.00% Impervious Runoff Depth=2.50"  
 Flow Length=1,024' Tc=17.9 min CN=65 Runoff=18.10 cfs 81,568 cf

**Link AP-1: AP-1**

Inflow=43.46 cfs 189,869 cf  
 Primary=43.46 cfs 189,869 cf

**Link AP-2: AP-2**

Inflow=35.93 cfs 178,315 cf  
 Primary=35.93 cfs 178,315 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 368,183 cf Average Runoff Depth = 2.76"**  
**100.00% Pervious = 1,598,199 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment EDA-1: EDA-1**

Runoff = 25.90 cfs @ 12.22 hrs, Volume= 108,301 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YEAR Rainfall=6.20"

Area (sf)	CN	Description
77,705	55	Woods, Good, HSG B
7,351	70	Woods, Good, HSG C
142,475	61	Pasture/grassland/range, Good, HSG B
257,052	74	Pasture/grassland/range, Good, HSG C
484,583	67	Weighted Average
484,583		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0303	0.20		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
5.6	387	0.0270	1.15		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.2	202	0.0500	1.57		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.7	211	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.3	178	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.1	1,028	Total			

**Summary for Subcatchment EDA-2: EDA-2**

Runoff = 35.93 cfs @ 12.33 hrs, Volume= 178,315 cf, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YEAR Rainfall=6.20"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
5,987	70	Woods, Good, HSG C
169,141	61	Pasture/grassland/range, Good, HSG B
521,305	74	Pasture/grassland/range, Good, HSG C
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,744	70	Weighted Average
721,744		100.00% Pervious Area

**CT722100-EX**

Type III 24-hr 25-YEAR Rainfall=6.20"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
3.7	217	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.6	389	0.0400	1.40		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.2	394	0.0330	1.27		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.1	305	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
23.5	1,355	Total			

**Summary for Subcatchment EDA-3: EDA-3**

Runoff = 18.10 cfs @ 12.26 hrs, Volume= 81,568 cf, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YEAR Rainfall=6.20"

Area (sf)	CN	Description
268,471	61	Pasture/grassland/range, Good, HSG B
122,334	74	Pasture/grassland/range, Good, HSG C
1,067	70	Woods, Good, HSG C
391,872	65	Weighted Average
391,872		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.0217	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.0	241	0.0208	1.01		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
3.5	259	0.0307	1.23		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.6	214	0.0374	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.4	260	0.0654	1.79		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
17.9	1,024	Total			

**Summary for Link AP-1: AP-1**

Inflow Area = 876,455 sf, 0.00% Impervious, Inflow Depth = 2.60" for 25-YEAR event

Inflow = 43.46 cfs @ 12.23 hrs, Volume= 189,869 cf

Primary = 43.46 cfs @ 12.23 hrs, Volume= 189,869 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,744 sf, 0.00% Impervious, Inflow Depth = 2.96" for 25-YEAR event  
Inflow = 35.93 cfs @ 12.33 hrs, Volume= 178,315 cf  
Primary = 35.93 cfs @ 12.33 hrs, Volume= 178,315 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



**CT722100-EX***Type III 24-hr 50-YEAR Rainfall=7.00"*

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 EDA-1: EDA-1**

Runoff Area=484,583 sf 0.00% Impervious Runoff Depth=3.31"  
 Flow Length=1,028' Tc=15.1 min CN=67 Runoff=32.19 cfs 133,542 cf

**Subcatchment EDA-2: EDA-2**

Runoff Area=721,744 sf 0.00% Impervious Runoff Depth=3.62"  
 Flow Length=1,355' Tc=23.5 min CN=70 Runoff=44.04 cfs 217,630 cf

**Subcatchment EDA-3: EDA-3**

Runoff Area=391,872 sf 0.00% Impervious Runoff Depth=3.10"  
 Flow Length=1,024' Tc=17.9 min CN=65 Runoff=22.72 cfs 101,317 cf

**Link AP-1: AP-1**

Inflow=54.26 cfs 234,859 cf  
 Primary=54.26 cfs 234,859 cf

**Link AP-2: AP-2**

Inflow=44.04 cfs 217,630 cf  
 Primary=44.04 cfs 217,630 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 452,489 cf Average Runoff Depth = 3.40"**  
**100.00% Pervious = 1,598,199 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment EDA-1: EDA-1**

Runoff = 32.19 cfs @ 12.21 hrs, Volume= 133,542 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-YEAR Rainfall=7.00"

Area (sf)	CN	Description
77,705	55	Woods, Good, HSG B
7,351	70	Woods, Good, HSG C
142,475	61	Pasture/grassland/range, Good, HSG B
257,052	74	Pasture/grassland/range, Good, HSG C
484,583	67	Weighted Average
484,583		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0303	0.20		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
5.6	387	0.0270	1.15		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.2	202	0.0500	1.57		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.7	211	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.3	178	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.1	1,028	Total			

**Summary for Subcatchment EDA-2: EDA-2**

Runoff = 44.04 cfs @ 12.33 hrs, Volume= 217,630 cf, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-YEAR Rainfall=7.00"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
5,987	70	Woods, Good, HSG C
169,141	61	Pasture/grassland/range, Good, HSG B
521,305	74	Pasture/grassland/range, Good, HSG C
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,744	70	Weighted Average
721,744		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
3.7	217	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.6	389	0.0400	1.40		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.2	394	0.0330	1.27		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.1	305	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
23.5	1,355	Total			

**Summary for Subcatchment EDA-3: EDA-3**

Runoff = 22.72 cfs @ 12.26 hrs, Volume= 101,317 cf, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-YEAR Rainfall=7.00"

Area (sf)	CN	Description
268,471	61	Pasture/grassland/range, Good, HSG B
122,334	74	Pasture/grassland/range, Good, HSG C
1,067	70	Woods, Good, HSG C
391,872	65	Weighted Average
391,872		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.0217	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.0	241	0.0208	1.01		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
3.5	259	0.0307	1.23		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.6	214	0.0374	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.4	260	0.0654	1.79		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
17.9	1,024	Total			

**Summary for Link AP-1: AP-1**

Inflow Area = 876,455 sf, 0.00% Impervious, Inflow Depth = 3.22" for 50-YEAR event  
 Inflow = 54.26 cfs @ 12.23 hrs, Volume= 234,859 cf  
 Primary = 54.26 cfs @ 12.23 hrs, Volume= 234,859 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,744 sf, 0.00% Impervious, Inflow Depth = 3.62" for 50-YEAR event  
Inflow = 44.04 cfs @ 12.33 hrs, Volume= 217,630 cf  
Primary = 44.04 cfs @ 12.33 hrs, Volume= 217,630 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 EDA-1: EDA-1**

Runoff Area=484,583 sf 0.00% Impervious Runoff Depth=4.12"  
Flow Length=1,028' Tc=15.1 min CN=67 Runoff=40.33 cfs 166,425 cf

**Subcatchment EDA-2: EDA-2**

Runoff Area=721,744 sf 0.00% Impervious Runoff Depth=4.46"  
Flow Length=1,355' Tc=23.5 min CN=70 Runoff=54.45 cfs 268,506 cf

**Subcatchment EDA-3: EDA-3**

Runoff Area=391,872 sf 0.00% Impervious Runoff Depth=3.89"  
Flow Length=1,024' Tc=17.9 min CN=65 Runoff=28.74 cfs 127,170 cf

**Link AP-1: AP-1**

Inflow=68.26 cfs 293,595 cf  
Primary=68.26 cfs 293,595 cf

**Link AP-2: AP-2**

Inflow=54.45 cfs 268,506 cf  
Primary=54.45 cfs 268,506 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 562,101 cf Average Runoff Depth = 4.22"**  
**100.00% Pervious = 1,598,199 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment EDA-1: EDA-1**

Runoff = 40.33 cfs @ 12.21 hrs, Volume= 166,425 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-YEAR Rainfall=8.00"

Area (sf)	CN	Description
77,705	55	Woods, Good, HSG B
7,351	70	Woods, Good, HSG C
142,475	61	Pasture/grassland/range, Good, HSG B
257,052	74	Pasture/grassland/range, Good, HSG C
484,583	67	Weighted Average
484,583		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0303	0.20		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
5.6	387	0.0270	1.15		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.2	202	0.0500	1.57		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.7	211	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.3	178	0.1000	2.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.1	1,028	Total			

**Summary for Subcatchment EDA-2: EDA-2**

Runoff = 54.45 cfs @ 12.33 hrs, Volume= 268,506 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-YEAR Rainfall=8.00"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
5,987	70	Woods, Good, HSG C
169,141	61	Pasture/grassland/range, Good, HSG B
521,305	74	Pasture/grassland/range, Good, HSG C
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,744	70	Weighted Average
721,744		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
3.7	217	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.6	389	0.0400	1.40		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.2	394	0.0330	1.27		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
5.1	305	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
23.5	1,355	Total			

**Summary for Subcatchment EDA-3: EDA-3**

Runoff = 28.74 cfs @ 12.25 hrs, Volume= 127,170 cf, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-YEAR Rainfall=8.00"

Area (sf)	CN	Description
268,471	61	Pasture/grassland/range, Good, HSG B
122,334	74	Pasture/grassland/range, Good, HSG C
1,067	70	Woods, Good, HSG C
391,872	65	Weighted Average
391,872		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.0217	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.0	241	0.0208	1.01		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
3.5	259	0.0307	1.23		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.6	214	0.0374	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.4	260	0.0654	1.79		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
17.9	1,024	Total			

**Summary for Link AP-1: AP-1**

Inflow Area = 876,455 sf, 0.00% Impervious, Inflow Depth = 4.02" for 100-YEAR event  
 Inflow = 68.26 cfs @ 12.23 hrs, Volume= 293,595 cf  
 Primary = 68.26 cfs @ 12.23 hrs, Volume= 293,595 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,744 sf, 0.00% Impervious, Inflow Depth = 4.46" for 100-YEAR event  
Inflow = 54.45 cfs @ 12.33 hrs, Volume= 268,506 cf  
Primary = 54.45 cfs @ 12.33 hrs, Volume= 268,506 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



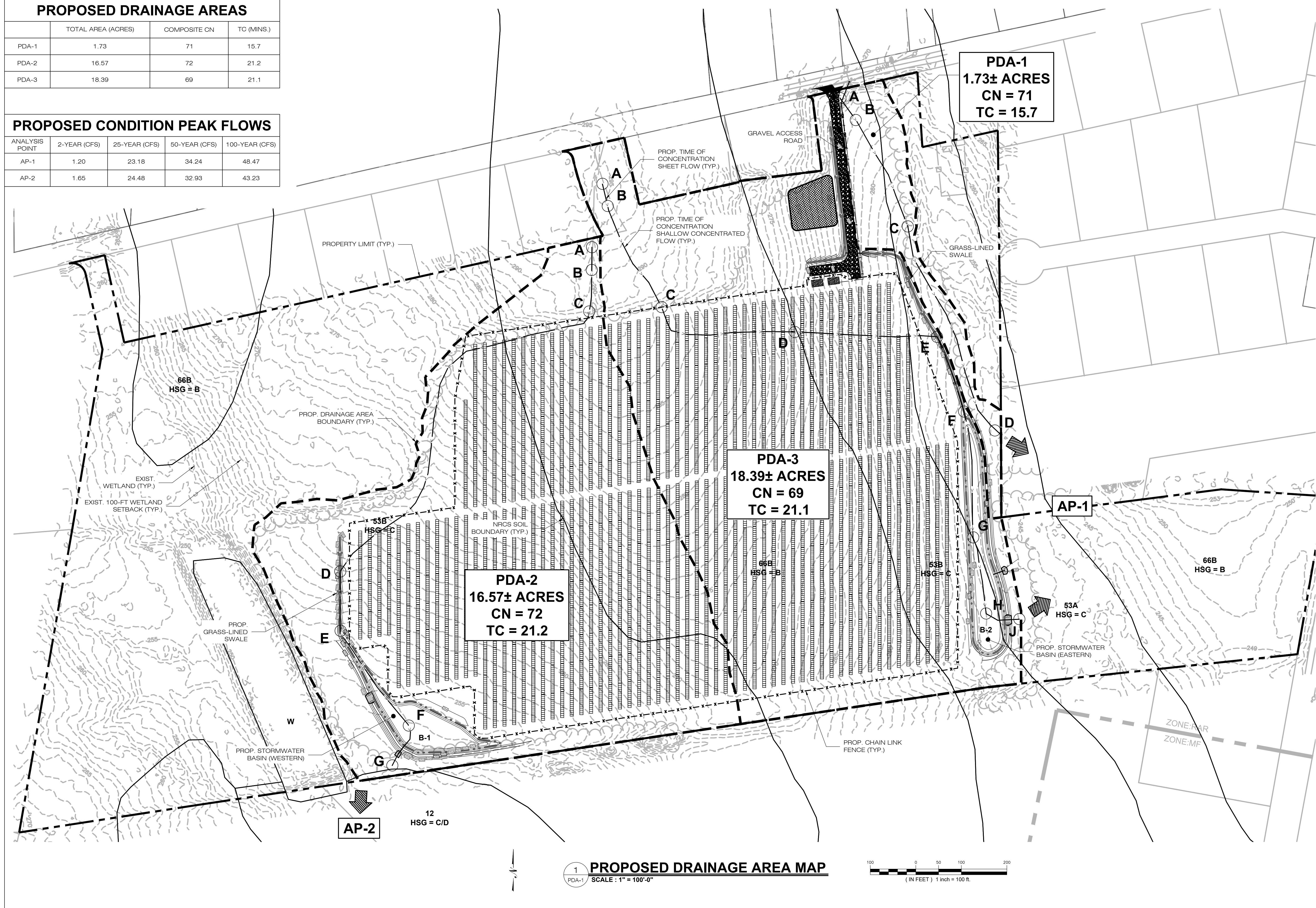
**APPENDIX C: PROPOSED DRAINAGE AREA MAP (PDA-1) &  
HYDROLOGIC COMPUTATION (HYDROCAD)**

**PROPOSED DRAINAGE AREAS**

	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
PDA-1	1.73	71	15.7
PDA-2	16.57	72	21.2
PDA-3	18.39	69	21.1

**PROPOSED CONDITION PEAK FLOWS**

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	1.20	23.18	34.24	48.47
AP-2	1.65	24.48	32.93	43.23



COMMUNITY POWER GROUP  
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**ALL-POINTS**  
 TECHNOLOGY CORPORATION  
 567 VAUXHAUL STREET EXTENSION - SUITE 311  
 WATERFORD, CT 06385 PHONE: (860)-663-1697  
 WWW.ALLPOINTSTECH.COM FAX: (860)-663-0936

**CSC PERMIT SET**

NO	DATE	REVISION
0	12/20/22	FOR REVIEW: KAM
1		
2		
3		
4		
5		
6		

**NOT FOR CONSTRUCTION**

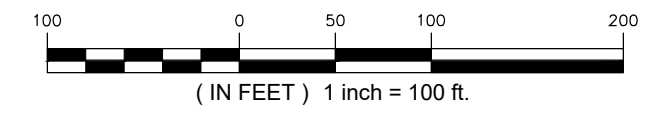
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 PROF: KEVIN A. MCCAFFERY, PE  
 COMP: ALL-POINTS TECHNOLOGY CORPORATION  
 ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311  
 WATERFORD, CT 06385  
 OWNER: PHRUMB PROPERTIES, LLC  
 ADDRESS:

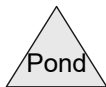
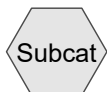
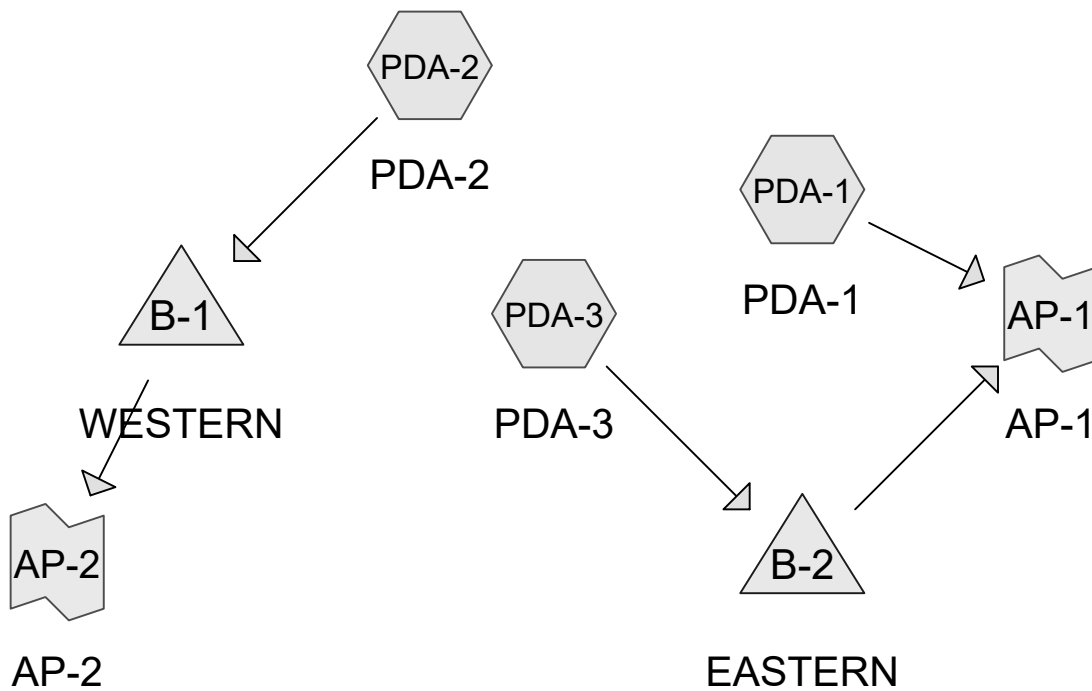
**ELLINGTON SOLAR**  
 SITE: 24 MIDDLE ROAD  
 ADDRESS: ELLINGTON, CT 06029  
 APT FILING NUMBER: CT722100  
 DATE: 12/20/22  
 DRAWN BY: JAB  
 CHECKED BY: KAM

SHEET TITLE:  
**PROPOSED DRAINAGE AREA MAP**

SHEET NUMBER:  
**PDA-1**

**1 PROPOSED DRAINAGE AREA MAP**  
 SCALE: 1" = 100'-0"





**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
10,366	96	Gravel surface, HSG C (PDA-1, PDA-3)
477,755	65	Meadow, non-grazed, HSG B - 0.5HSG (PDA-2, PDA-3)
55,777	71	Meadow, non-grazed, HSG C (PDA-1)
609,928	75	Meadow, non-grazed, HSG C - 0.5HSG (PDA-2, PDA-3)
83,461	68	Pasture/grassland/range, Good, HSG B - 0.5HSG (PDA-3)
18,871	68	Pasture/grassland/range, Good, HSG B-0.5HSG (PDA-2)
224,097	77	Pasture/grassland/range, Good, HSG C - 0.5HSG (PDA-2, PDA-3)
640	80	Pasture/grassland/range, Good, HSG D (PDA-2)
750	98	Unconnected pavement, HSG C (PDA-3)
82,583	55	Woods, Good, HSG B (PDA-2, PDA-3)
32,943	70	Woods, Good, HSG C (PDA-1, PDA-2, PDA-3)
1,028	77	Woods, Good, HSG D (PDA-2)
<b>1,598,199</b>	<b>71</b>	<b>TOTAL AREA</b>

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
662,670	HSG B	PDA-2, PDA-3
933,861	HSG C	PDA-1, PDA-2, PDA-3
1,668	HSG D	PDA-2
0	Other	
<b>1,598,199</b>		<b>TOTAL AREA</b>

**CT722100-PR**

Type III 24-hr 2-YEAR Rainfall=3.20"

Prepared by All Points Technology Corp.

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 PDA-1: PDA-1**

Runoff Area=75,540 sf 0.00% Impervious Runoff Depth=0.88"  
 Flow Length=810' Tc=15.7 min CN=71 Runoff=1.19 cfs 5,528 cf

**Subcatchment PDA-2: PDA-2**

Runoff Area=721,743 sf 0.00% Impervious Runoff Depth=0.93"  
 Flow Length=1,415' Tc=21.2 min CN=72 Runoff=10.86 cfs 55,914 cf

**Subcatchment PDA-3: PDA-3**

Runoff Area=800,916 sf 0.09% Impervious Runoff Depth=0.78"  
 Flow Length=1,575' Tc=21.1 min CN=69 Runoff=9.62 cfs 52,032 cf

**Pond B-1: WESTERN**

Peak Elev=252.75' Storage=25,914 cf Inflow=10.86 cfs 55,914 cf  
 Outflow=1.65 cfs 41,507 cf

**Pond B-2: EASTERN**

Peak Elev=247.58' Storage=28,081 cf Inflow=9.62 cfs 52,032 cf  
 Outflow=1.09 cfs 34,835 cf

**Link AP-1: AP-1**

Inflow=1.20 cfs 40,362 cf  
 Primary=1.20 cfs 40,362 cf

**Link AP-2: AP-2**

Inflow=1.65 cfs 41,507 cf  
 Primary=1.65 cfs 41,507 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 113,474 cf Average Runoff Depth = 0.85"**  
**99.95% Pervious = 1,597,449 sf 0.05% Impervious = 750 sf**

**Summary for Subcatchment PDA-1: PDA-1**

Runoff = 1.19 cfs @ 12.24 hrs, Volume= 5,528 cf, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-YEAR Rainfall=3.20"

Area (sf)	CN	Description
18,775	70	Woods, Good, HSG C
55,777	71	Meadow, non-grazed, HSG C
988	96	Gravel surface, HSG C
75,540	71	Weighted Average
75,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.1	260	0.0230	1.06		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
8.0	500	0.0220	1.04		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.7	810	Total			

**Summary for Subcatchment PDA-2: PDA-2**

Runoff = 10.86 cfs @ 12.33 hrs, Volume= 55,914 cf, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-YEAR Rainfall=3.20"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
* 150,270	65	Meadow, non-grazed, HSG B - 0.5HSG
* 18,871	68	Pasture/grassland/range, Good, HSG B-0.5HSG
5,750	70	Woods, Good, HSG C
* 371,692	75	Meadow, non-grazed, HSG C - 0.5HSG
* 149,849	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,743	72	Weighted Average
721,743		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
1.6	94	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.8	881	0.0317	1.25		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.6	130	0.0538	3.48		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.3	260	0.0160	1.90		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.2	1,415	Total			

**Summary for Subcatchment PDA-3: PDA-3**

Runoff = 9.62 cfs @ 12.34 hrs, Volume= 52,032 cf, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-YEAR Rainfall=3.20"

Area (sf)	CN	Description
58,940	55	Woods, Good, HSG B
8,418	70	Woods, Good, HSG C
* 327,485	65	Meadow, non-grazed, HSG B - 0.5HSG
* 238,236	75	Meadow, non-grazed, HSG C - 0.5HSG
* 83,461	68	Pasture/grassland/range, Good, HSG B - 0.5HSG
* 74,248	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
9,378	96	Gravel surface, HSG C
750	98	Unconnected pavement, HSG C
800,916	69	Weighted Average
800,166		99.91% Pervious Area
750		0.09% Impervious Area
750		100.00% Unconnected



Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
3.3	253	0.0333	1.28		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.1	330	0.0370	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.5	312	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.2	170	0.0250	2.37		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.2	280	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.8	180	0.0050	1.06		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.1	1,575	Total			

**Summary for Pond B-1: WESTERN**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth = 0.93" for 2-YEAR event  
 Inflow = 10.86 cfs @ 12.33 hrs, Volume= 55,914 cf  
 Outflow = 1.65 cfs @ 13.92 hrs, Volume= 41,507 cf, Atten= 85%, Lag= 95.6 min  
 Primary = 1.65 cfs @ 13.92 hrs, Volume= 41,507 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 252.75' @ 13.92 hrs Surf.Area= 17,229 sf Storage= 25,914 cf

Plug-Flow detention time= 302.8 min calculated for 41,464 cf (74% of inflow)  
 Center-of-Mass det. time= 207.6 min ( 1,090.4 - 882.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	86,583 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
251.00	12,687	0	0
252.00	14,970	13,829	13,829
253.00	17,979	16,475	30,303
254.00	26,393	22,186	52,489
255.00	41,794	34,094	86,583

Device	Routing	Invert	Outlet Devices
#1	Primary	252.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 252.00' / 251.00' S= 0.0435 ' S= 0.0435 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	253.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=1.65 cfs @ 13.92 hrs HW=252.75' (Free Discharge)

- 1=Culvert (Inlet Controls 1.65 cfs @ 2.60 fps)
- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B-2: EASTERN**

Inflow Area = 800,916 sf, 0.09% Impervious, Inflow Depth = 0.78" for 2-YEAR event  
 Inflow = 9.62 cfs @ 12.34 hrs, Volume= 52,032 cf  
 Outflow = 1.09 cfs @ 15.37 hrs, Volume= 34,835 cf, Atten= 89%, Lag= 182.2 min  
 Primary = 1.09 cfs @ 15.37 hrs, Volume= 34,835 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 247.58' @ 15.37 hrs Surf.Area= 21,276 sf Storage= 28,081 cf

Plug-Flow detention time= 402.3 min calculated for 34,835 cf (67% of inflow)  
 Center-of-Mass det. time= 288.2 min ( 1,181.5 - 893.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	246.00'	89,153 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
246.00	13,153	0	0
247.00	19,353	16,253	16,253
248.00	22,655	21,004	37,257
249.00	25,934	24,295	61,552
250.00	29,269	27,602	89,153

Device	Routing	Invert	Outlet Devices
#1	Primary	247.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 247.00' / 246.00' S= 0.0435 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	248.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=1.09 cfs @ 15.37 hrs HW=247.58' (Free Discharge)

- 1=Culvert (Inlet Controls 1.09 cfs @ 2.29 fps)
- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Link AP-1: AP-1**

Inflow Area = 876,456 sf, 0.09% Impervious, Inflow Depth > 0.55" for 2-YEAR event  
 Inflow = 1.20 cfs @ 15.19 hrs, Volume= 40,362 cf  
 Primary = 1.20 cfs @ 15.19 hrs, Volume= 40,362 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth > 0.69" for 2-YEAR event  
Inflow = 1.65 cfs @ 13.92 hrs, Volume= 41,507 cf  
Primary = 1.65 cfs @ 13.92 hrs, Volume= 41,507 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 PDA-1: PDA-1** Runoff Area=75,540 sf 0.00% Impervious Runoff Depth=3.06"  
Flow Length=810' Tc=15.7 min CN=71 Runoff=4.59 cfs 19,267 cf

**Subcatchment PDA-2: PDA-2** Runoff Area=721,743 sf 0.00% Impervious Runoff Depth=3.16"  
Flow Length=1,415' Tc=21.2 min CN=72 Runoff=40.13 cfs 189,913 cf

**Subcatchment PDA-3: PDA-3** Runoff Area=800,916 sf 0.09% Impervious Runoff Depth=2.87"  
Flow Length=1,575' Tc=21.1 min CN=69 Runoff=40.31 cfs 191,525 cf

**Pond B-1: WESTERN** Peak Elev=254.33' Storage=61,983 cf Inflow=40.13 cfs 189,913 cf  
Outflow=24.48 cfs 175,469 cf

**Pond B-2: EASTERN** Peak Elev=249.24' Storage=67,955 cf Inflow=40.31 cfs 191,525 cf  
Outflow=21.47 cfs 174,241 cf

**Link AP-1: AP-1** Inflow=23.18 cfs 193,508 cf  
Primary=23.18 cfs 193,508 cf

**Link AP-2: AP-2** Inflow=24.48 cfs 175,469 cf  
Primary=24.48 cfs 175,469 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 400,705 cf Average Runoff Depth = 3.01"**  
**99.95% Pervious = 1,597,449 sf 0.05% Impervious = 750 sf**

**Summary for Subcatchment PDA-1: PDA-1**

Runoff = 4.59 cfs @ 12.22 hrs, Volume= 19,267 cf, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YEAR Rainfall=6.20"

Area (sf)	CN	Description
18,775	70	Woods, Good, HSG C
55,777	71	Meadow, non-grazed, HSG C
988	96	Gravel surface, HSG C
75,540	71	Weighted Average
75,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.1	260	0.0230	1.06		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
8.0	500	0.0220	1.04		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.7	810	Total			

**Summary for Subcatchment PDA-2: PDA-2**

Runoff = 40.13 cfs @ 12.30 hrs, Volume= 189,913 cf, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YEAR Rainfall=6.20"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
* 150,270	65	Meadow, non-grazed, HSG B - 0.5HSG
* 18,871	68	Pasture/grassland/range, Good, HSG B-0.5HSG
5,750	70	Woods, Good, HSG C
* 371,692	75	Meadow, non-grazed, HSG C - 0.5HSG
* 149,849	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,743	72	Weighted Average
721,743		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
1.6	94	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.8	881	0.0317	1.25		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.6	130	0.0538	3.48		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.3	260	0.0160	1.90		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.2	1,415	Total			

**Summary for Subcatchment PDA-3: PDA-3**

Runoff = 40.31 cfs @ 12.30 hrs, Volume= 191,525 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YEAR Rainfall=6.20"

Area (sf)	CN	Description
58,940	55	Woods, Good, HSG B
8,418	70	Woods, Good, HSG C
* 327,485	65	Meadow, non-grazed, HSG B - 0.5HSG
* 238,236	75	Meadow, non-grazed, HSG C - 0.5HSG
* 83,461	68	Pasture/grassland/range, Good, HSG B - 0.5HSG
* 74,248	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
9,378	96	Gravel surface, HSG C
750	98	Unconnected pavement, HSG C
800,916	69	Weighted Average
800,166		99.91% Pervious Area
750		0.09% Impervious Area
750		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
3.3	253	0.0333	1.28		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.1	330	0.0370	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.5	312	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.2	170	0.0250	2.37		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.2	280	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.8	180	0.0050	1.06		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.1	1,575	Total			

**Summary for Pond B-1: WESTERN**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth = 3.16" for 25-YEAR event  
 Inflow = 40.13 cfs @ 12.30 hrs, Volume= 189,913 cf  
 Outflow = 24.48 cfs @ 12.59 hrs, Volume= 175,469 cf, Atten= 39%, Lag= 17.2 min  
 Primary = 24.48 cfs @ 12.59 hrs, Volume= 175,469 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 254.33' @ 12.59 hrs Surf.Area= 31,449 sf Storage= 61,983 cf

Plug-Flow detention time= 144.2 min calculated for 175,469 cf (92% of inflow)  
 Center-of-Mass det. time= 105.2 min ( 951.2 - 846.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	86,583 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
251.00	12,687	0	0
252.00	14,970	13,829	13,829
253.00	17,979	16,475	30,303
254.00	26,393	22,186	52,489
255.00	41,794	34,094	86,583

Device	Routing	Invert	Outlet Devices
#1	Primary	252.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 252.00' / 251.00' S= 0.0435 ' S= 0.0435 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	253.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=24.42 cfs @ 12.59 hrs HW=254.33' (Free Discharge)

└─1=Culvert (Inlet Controls 4.51 cfs @ 5.74 fps)

└─2=Broad-Crested Rectangular Weir (Weir Controls 19.91 cfs @ 2.41 fps)

**Summary for Pond B-2: EASTERN**

Inflow Area = 800,916 sf, 0.09% Impervious, Inflow Depth = 2.87" for 25-YEAR event

Inflow = 40.31 cfs @ 12.30 hrs, Volume= 191,525 cf

Outflow = 21.47 cfs @ 12.64 hrs, Volume= 174,241 cf, Atten= 47%, Lag= 20.5 min

Primary = 21.47 cfs @ 12.64 hrs, Volume= 174,241 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 249.24' @ 12.64 hrs Surf.Area= 26,745 sf Storage= 67,955 cf

Plug-Flow detention time= 177.7 min calculated for 174,241 cf (91% of inflow)

Center-of-Mass det. time= 132.9 min ( 985.8 - 853.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	246.00'	89,153 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
246.00	13,153	0	0
247.00	19,353	16,253	16,253
248.00	22,655	21,004	37,257
249.00	25,934	24,295	61,552
250.00	29,269	27,602	89,153

Device	Routing	Invert	Outlet Devices
#1	Primary	247.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 247.00' / 246.00' S= 0.0435 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	248.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=21.44 cfs @ 12.64 hrs HW=249.24' (Free Discharge)

└─1=Culvert (Inlet Controls 4.40 cfs @ 5.61 fps)

└─2=Broad-Crested Rectangular Weir (Weir Controls 17.03 cfs @ 2.30 fps)

**Summary for Link AP-1: AP-1**

Inflow Area = 876,456 sf, 0.09% Impervious, Inflow Depth > 2.65" for 25-YEAR event

Inflow = 23.18 cfs @ 12.62 hrs, Volume= 193,508 cf

Primary = 23.18 cfs @ 12.62 hrs, Volume= 193,508 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



**Summary for Link AP-2: AP-2**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth > 2.92" for 25-YEAR event  
Inflow = 24.48 cfs @ 12.59 hrs, Volume= 175,469 cf  
Primary = 24.48 cfs @ 12.59 hrs, Volume= 175,469 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 PDA-1: PDA-1** Runoff Area=75,540 sf 0.00% Impervious Runoff Depth=3.72"  
Flow Length=810' Tc=15.7 min CN=71 Runoff=5.60 cfs 23,439 cf

**Subcatchment PDA-2: PDA-2** Runoff Area=721,743 sf 0.00% Impervious Runoff Depth=3.83"  
Flow Length=1,415' Tc=21.2 min CN=72 Runoff=48.78 cfs 230,300 cf

**Subcatchment PDA-3: PDA-3** Runoff Area=800,916 sf 0.09% Impervious Runoff Depth=3.51"  
Flow Length=1,575' Tc=21.1 min CN=69 Runoff=49.63 cfs 234,533 cf

**Pond B-1: WESTERN** Peak Elev=254.54' Storage=69,101 cf Inflow=48.78 cfs 230,300 cf  
Outflow=32.93 cfs 215,851 cf

**Pond B-2: EASTERN** Peak Elev=249.51' Storage=75,297 cf Inflow=49.63 cfs 234,533 cf  
Outflow=31.67 cfs 217,235 cf

**Link AP-1: AP-1** Inflow=34.24 cfs 240,674 cf  
Primary=34.24 cfs 240,674 cf

**Link AP-2: AP-2** Inflow=32.93 cfs 215,851 cf  
Primary=32.93 cfs 215,851 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 488,271 cf Average Runoff Depth = 3.67"**  
**99.95% Pervious = 1,597,449 sf 0.05% Impervious = 750 sf**

**Summary for Subcatchment PDA-1: PDA-1**

Runoff = 5.60 cfs @ 12.22 hrs, Volume= 23,439 cf, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-YEAR Rainfall=7.00"

Area (sf)	CN	Description
18,775	70	Woods, Good, HSG C
55,777	71	Meadow, non-grazed, HSG C
988	96	Gravel surface, HSG C
75,540	71	Weighted Average
75,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.1	260	0.0230	1.06		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
8.0	500	0.0220	1.04		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.7	810	Total			

**Summary for Subcatchment PDA-2: PDA-2**

Runoff = 48.78 cfs @ 12.30 hrs, Volume= 230,300 cf, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-YEAR Rainfall=7.00"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
* 150,270	65	Meadow, non-grazed, HSG B - 0.5HSG
* 18,871	68	Pasture/grassland/range, Good, HSG B-0.5HSG
5,750	70	Woods, Good, HSG C
* 371,692	75	Meadow, non-grazed, HSG C - 0.5HSG
* 149,849	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,743	72	Weighted Average
721,743		100.00% Pervious Area

**CT722100-PR**

Type III 24-hr 50-YEAR Rainfall=7.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
1.6	94	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.8	881	0.0317	1.25		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.6	130	0.0538	3.48		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.3	260	0.0160	1.90		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.2	1,415	Total			

**Summary for Subcatchment PDA-3: PDA-3**

Runoff = 49.63 cfs @ 12.30 hrs, Volume= 234,533 cf, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-YEAR Rainfall=7.00"

Area (sf)	CN	Description
58,940	55	Woods, Good, HSG B
8,418	70	Woods, Good, HSG C
* 327,485	65	Meadow, non-grazed, HSG B - 0.5HSG
* 238,236	75	Meadow, non-grazed, HSG C - 0.5HSG
* 83,461	68	Pasture/grassland/range, Good, HSG B - 0.5HSG
* 74,248	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
9,378	96	Gravel surface, HSG C
750	98	Unconnected pavement, HSG C
800,916	69	Weighted Average
800,166		99.91% Pervious Area
750		0.09% Impervious Area
750		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
3.3	253	0.0333	1.28		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.1	330	0.0370	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.5	312	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.2	170	0.0250	2.37		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.2	280	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.8	180	0.0050	1.06		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.1	1,575	Total			

**Summary for Pond B-1: WESTERN**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth = 3.83" for 50-YEAR event  
 Inflow = 48.78 cfs @ 12.30 hrs, Volume= 230,300 cf  
 Outflow = 32.93 cfs @ 12.54 hrs, Volume= 215,851 cf, Atten= 32%, Lag= 14.5 min  
 Primary = 32.93 cfs @ 12.54 hrs, Volume= 215,851 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 254.54' @ 12.54 hrs Surf.Area= 34,760 sf Storage= 69,101 cf

Plug-Flow detention time= 127.5 min calculated for 215,851 cf (94% of inflow)  
 Center-of-Mass det. time= 94.3 min ( 934.8 - 840.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	86,583 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
251.00	12,687	0	0
252.00	14,970	13,829	13,829
253.00	17,979	16,475	30,303
254.00	26,393	22,186	52,489
255.00	41,794	34,094	86,583

Device	Routing	Invert	Outlet Devices
#1	Primary	252.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 252.00' / 251.00' S= 0.0435 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	253.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=32.85 cfs @ 12.54 hrs HW=254.54' (Free Discharge)

1=Culvert (Inlet Controls 4.77 cfs @ 6.07 fps)

2=Broad-Crested Rectangular Weir (Weir Controls 28.09 cfs @ 2.70 fps)

**Summary for Pond B-2: EASTERN**

Inflow Area = 800,916 sf, 0.09% Impervious, Inflow Depth = 3.51" for 50-YEAR event

Inflow = 49.63 cfs @ 12.30 hrs, Volume= 234,533 cf

Outflow = 31.67 cfs @ 12.57 hrs, Volume= 217,235 cf, Atten= 36%, Lag= 16.1 min

Primary = 31.67 cfs @ 12.57 hrs, Volume= 217,235 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 249.51' @ 12.57 hrs Surf.Area= 27,645 sf Storage= 75,297 cf

Plug-Flow detention time= 154.5 min calculated for 217,235 cf (93% of inflow)

Center-of-Mass det. time= 116.5 min ( 963.6 - 847.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	246.00'	89,153 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
246.00	13,153	0	0
247.00	19,353	16,253	16,253
248.00	22,655	21,004	37,257
249.00	25,934	24,295	61,552
250.00	29,269	27,602	89,153

Device	Routing	Invert	Outlet Devices
#1	Primary	247.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 247.00' / 246.00' S= 0.0435 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	248.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=31.53 cfs @ 12.57 hrs HW=249.51' (Free Discharge)

1=Culvert (Inlet Controls 4.73 cfs @ 6.02 fps)

2=Broad-Crested Rectangular Weir (Weir Controls 26.80 cfs @ 2.65 fps)

**Summary for Link AP-1: AP-1**

Inflow Area = 876,456 sf, 0.09% Impervious, Inflow Depth > 3.30" for 50-YEAR event

Inflow = 34.24 cfs @ 12.55 hrs, Volume= 240,674 cf

Primary = 34.24 cfs @ 12.55 hrs, Volume= 240,674 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth > 3.59" for 50-YEAR event  
Inflow = 32.93 cfs @ 12.54 hrs, Volume= 215,851 cf  
Primary = 32.93 cfs @ 12.54 hrs, Volume= 215,851 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 PDA-1: PDA-1** Runoff Area=75,540 sf 0.00% Impervious Runoff Depth=4.58"  
Flow Length=810' Tc=15.7 min CN=71 Runoff=6.90 cfs 28,826 cf

**Subcatchment PDA-2: PDA-2** Runoff Area=721,743 sf 0.00% Impervious Runoff Depth=4.69"  
Flow Length=1,415' Tc=21.2 min CN=72 Runoff=59.82 cfs 282,349 cf

**Subcatchment PDA-3: PDA-3** Runoff Area=800,916 sf 0.09% Impervious Runoff Depth=4.35"  
Flow Length=1,575' Tc=21.1 min CN=69 Runoff=61.62 cfs 290,308 cf

**Pond B-1: WESTERN** Peak Elev=254.78' Storage=77,602 cf Inflow=59.82 cfs 282,349 cf  
Outflow=43.23 cfs 267,893 cf

**Pond B-2: EASTERN** Peak Elev=249.81' Storage=83,616 cf Inflow=61.62 cfs 290,308 cf  
Outflow=44.75 cfs 272,995 cf

**Link AP-1: AP-1** Inflow=48.47 cfs 301,822 cf  
Primary=48.47 cfs 301,822 cf

**Link AP-2: AP-2** Inflow=43.23 cfs 267,893 cf  
Primary=43.23 cfs 267,893 cf

**Total Runoff Area = 1,598,199 sf Runoff Volume = 601,483 cf Average Runoff Depth = 4.52"**  
**99.95% Pervious = 1,597,449 sf 0.05% Impervious = 750 sf**



**Summary for Subcatchment PDA-1: PDA-1**

Runoff = 6.90 cfs @ 12.22 hrs, Volume= 28,826 cf, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-YEAR Rainfall=8.00"

Area (sf)	CN	Description
18,775	70	Woods, Good, HSG C
55,777	71	Meadow, non-grazed, HSG C
988	96	Gravel surface, HSG C
75,540	71	Weighted Average
75,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
4.1	260	0.0230	1.06		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
8.0	500	0.0220	1.04		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
15.7	810	Total			

**Summary for Subcatchment PDA-2: PDA-2**

Runoff = 59.82 cfs @ 12.29 hrs, Volume= 282,349 cf, Depth= 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-YEAR Rainfall=8.00"

Area (sf)	CN	Description
23,643	55	Woods, Good, HSG B
* 150,270	65	Meadow, non-grazed, HSG B - 0.5HSG
* 18,871	68	Pasture/grassland/range, Good, HSG B-0.5HSG
5,750	70	Woods, Good, HSG C
* 371,692	75	Meadow, non-grazed, HSG C - 0.5HSG
* 149,849	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
1,028	77	Woods, Good, HSG D
640	80	Pasture/grassland/range, Good, HSG D
721,743	72	Weighted Average
721,743		100.00% Pervious Area

**CT722100-PR**

Type III 24-hr 100-YEAR Rainfall=8.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0286	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.20"
1.6	94	0.0200	0.99		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.8	881	0.0317	1.25		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.6	130	0.0538	3.48		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.3	260	0.0160	1.90		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.2	1,415	Total			

**Summary for Subcatchment PDA-3: PDA-3**

Runoff = 61.62 cfs @ 12.30 hrs, Volume= 290,308 cf, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-YEAR Rainfall=8.00"

Area (sf)	CN	Description
58,940	55	Woods, Good, HSG B
8,418	70	Woods, Good, HSG C
* 327,485	65	Meadow, non-grazed, HSG B - 0.5HSG
* 238,236	75	Meadow, non-grazed, HSG C - 0.5HSG
* 83,461	68	Pasture/grassland/range, Good, HSG B - 0.5HSG
* 74,248	77	Pasture/grassland/range, Good, HSG C - 0.5HSG
9,378	96	Gravel surface, HSG C
750	98	Unconnected pavement, HSG C
800,916	69	Weighted Average
800,166		99.91% Pervious Area
750		0.09% Impervious Area
750		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0200	0.17		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.20"
3.3	253	0.0333	1.28		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
4.1	330	0.0370	1.35		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
2.5	312	0.0909	2.11		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.2	170	0.0250	2.37		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.2	280	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
2.8	180	0.0050	1.06		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
21.1	1,575	Total			

**Summary for Pond B-1: WESTERN**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth = 4.69" for 100-YEAR event  
 Inflow = 59.82 cfs @ 12.29 hrs, Volume= 282,349 cf  
 Outflow = 43.23 cfs @ 12.50 hrs, Volume= 267,893 cf, Atten= 28%, Lag= 12.6 min  
 Primary = 43.23 cfs @ 12.50 hrs, Volume= 267,893 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 254.78' @ 12.50 hrs Surf.Area= 38,342 sf Storage= 77,602 cf

Plug-Flow detention time= 112.7 min calculated for 267,893 cf (95% of inflow)  
 Center-of-Mass det. time= 84.7 min ( 919.4 - 834.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	86,583 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
251.00	12,687	0	0
252.00	14,970	13,829	13,829
253.00	17,979	16,475	30,303
254.00	26,393	22,186	52,489
255.00	41,794	34,094	86,583

Device	Routing	Invert	Outlet Devices
#1	Primary	252.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 252.00' / 251.00' S= 0.0435 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	253.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=43.19 cfs @ 12.50 hrs HW=254.78' (Free Discharge)

1=Culvert (Inlet Controls 5.03 cfs @ 6.41 fps)

2=Broad-Crested Rectangular Weir (Weir Controls 38.16 cfs @ 2.99 fps)

**Summary for Pond B-2: EASTERN**

Inflow Area = 800,916 sf, 0.09% Impervious, Inflow Depth = 4.35" for 100-YEAR event  
 Inflow = 61.62 cfs @ 12.30 hrs, Volume= 290,308 cf  
 Outflow = 44.75 cfs @ 12.51 hrs, Volume= 272,995 cf, Atten= 27%, Lag= 12.6 min  
 Primary = 44.75 cfs @ 12.51 hrs, Volume= 272,995 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Peak Elev= 249.81' @ 12.51 hrs Surf.Area= 28,631 sf Storage= 83,616 cf

Plug-Flow detention time= 134.2 min calculated for 272,995 cf (94% of inflow)  
 Center-of-Mass det. time= 102.4 min ( 943.3 - 840.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	246.00'	89,153 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
246.00	13,153	0	0
247.00	19,353	16,253	16,253
248.00	22,655	21,004	37,257
249.00	25,934	24,295	61,552
250.00	29,269	27,602	89,153

Device	Routing	Invert	Outlet Devices
#1	Primary	247.00'	<b>12.0" Round Culvert</b> L= 23.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 247.00' / 246.00' S= 0.0435 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	248.50'	<b>10.0' long x 14.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

**Primary OutFlow** Max=44.68 cfs @ 12.51 hrs HW=249.81' (Free Discharge)

1=Culvert (Inlet Controls 5.07 cfs @ 6.45 fps)

2=Broad-Crested Rectangular Weir (Weir Controls 39.61 cfs @ 3.03 fps)

**Summary for Link AP-1: AP-1**

Inflow Area = 876,456 sf, 0.09% Impervious, Inflow Depth > 4.13" for 100-YEAR event  
 Inflow = 48.47 cfs @ 12.49 hrs, Volume= 301,822 cf  
 Primary = 48.47 cfs @ 12.49 hrs, Volume= 301,822 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 721,743 sf, 0.00% Impervious, Inflow Depth > 4.45" for 100-YEAR event  
Inflow = 43.23 cfs @ 12.50 hrs, Volume= 267,893 cf  
Primary = 43.23 cfs @ 12.50 hrs, Volume= 267,893 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

# **APPENDIX D: NOAA ATLAS 14 PRECIPITATION FREQUENCY TABLE**



**NOAA Atlas 14, Volume 10, Version 3**  
**Location name: Ellington, Connecticut, USA\***  
**Latitude: 41.8947°, Longitude: -72.4849°**  
**Elevation: 272.91 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 & aeriels](#)

**PF tabular**

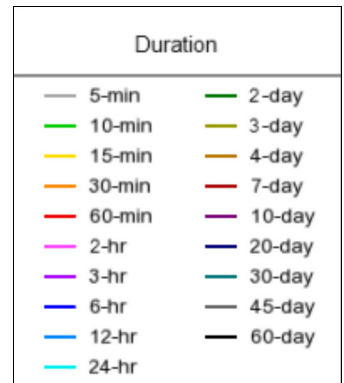
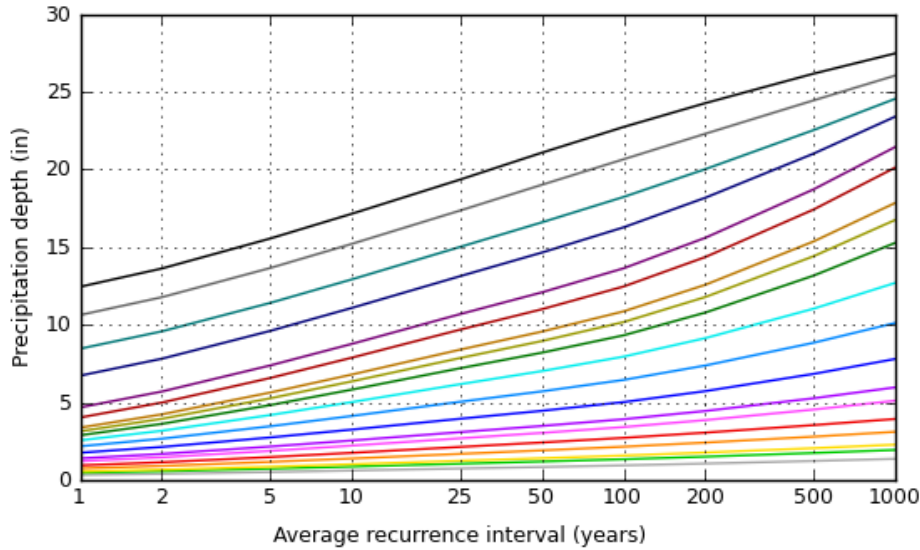
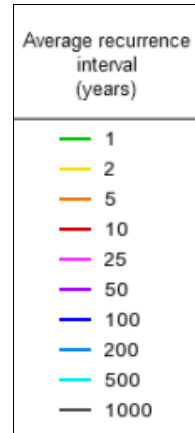
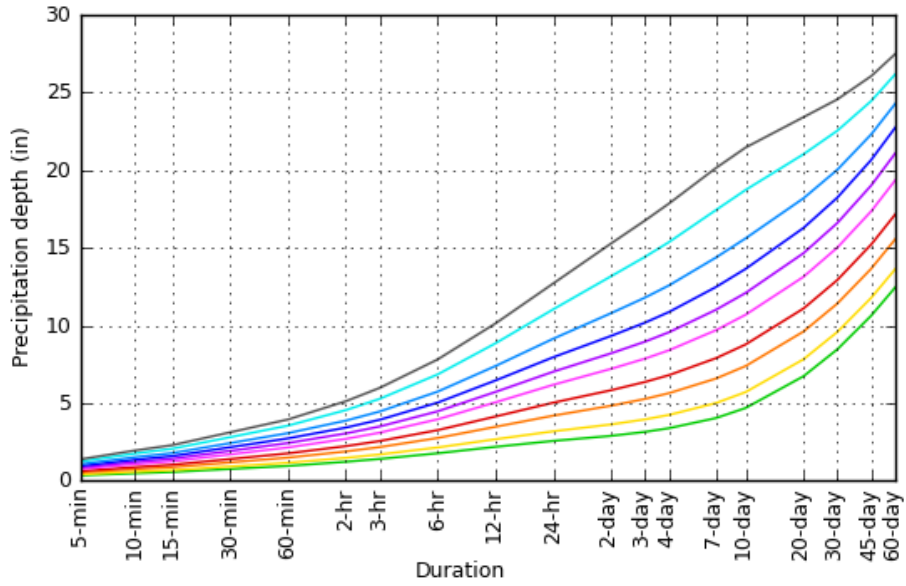
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
<b>Duration</b>	<b>Average recurrence interval (years)</b>									
	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>
<b>5-min</b>	<b>0.333</b> (0.254-0.437)	<b>0.403</b> (0.307-0.529)	<b>0.518</b> (0.393-0.682)	<b>0.614</b> (0.464-0.813)	<b>0.746</b> (0.548-1.03)	<b>0.845</b> (0.609-1.19)	<b>0.948</b> (0.667-1.39)	<b>1.07</b> (0.713-1.59)	<b>1.23</b> (0.797-1.91)	<b>1.37</b> (0.867-2.16)
<b>10-min</b>	<b>0.472</b> (0.360-0.618)	<b>0.572</b> (0.435-0.750)	<b>0.735</b> (0.558-0.967)	<b>0.870</b> (0.657-1.15)	<b>1.06</b> (0.776-1.46)	<b>1.20</b> (0.864-1.69)	<b>1.34</b> (0.945-1.97)	<b>1.51</b> (1.01-2.26)	<b>1.75</b> (1.13-2.70)	<b>1.94</b> (1.23-3.07)
<b>15-min</b>	<b>0.555</b> (0.423-0.728)	<b>0.672</b> (0.512-0.882)	<b>0.864</b> (0.656-1.14)	<b>1.02</b> (0.773-1.35)	<b>1.24</b> (0.913-1.72)	<b>1.41</b> (1.01-1.99)	<b>1.58</b> (1.11-2.32)	<b>1.78</b> (1.19-2.66)	<b>2.06</b> (1.33-3.18)	<b>2.28</b> (1.45-3.61)
<b>30-min</b>	<b>0.751</b> (0.572-0.984)	<b>0.911</b> (0.694-1.20)	<b>1.17</b> (0.891-1.55)	<b>1.39</b> (1.05-1.84)	<b>1.69</b> (1.24-2.34)	<b>1.91</b> (1.38-2.70)	<b>2.15</b> (1.51-3.15)	<b>2.42</b> (1.62-3.62)	<b>2.80</b> (1.81-4.33)	<b>3.11</b> (1.97-4.91)
<b>60-min</b>	<b>0.947</b> (0.722-1.24)	<b>1.15</b> (0.876-1.51)	<b>1.48</b> (1.13-1.95)	<b>1.76</b> (1.33-2.33)	<b>2.14</b> (1.57-2.95)	<b>2.42</b> (1.75-3.42)	<b>2.72</b> (1.91-3.99)	<b>3.06</b> (2.05-4.58)	<b>3.54</b> (2.29-5.48)	<b>3.94</b> (2.49-6.22)
<b>2-hr</b>	<b>1.22</b> (0.931-1.59)	<b>1.47</b> (1.12-1.92)	<b>1.88</b> (1.43-2.46)	<b>2.22</b> (1.69-2.93)	<b>2.69</b> (1.99-3.71)	<b>3.04</b> (2.21-4.29)	<b>3.42</b> (2.43-5.02)	<b>3.87</b> (2.59-5.75)	<b>4.54</b> (2.94-6.99)	<b>5.12</b> (3.25-8.02)
<b>3-hr</b>	<b>1.40</b> (1.07-1.82)	<b>1.69</b> (1.29-2.20)	<b>2.16</b> (1.65-2.82)	<b>2.55</b> (1.94-3.35)	<b>3.09</b> (2.29-4.26)	<b>3.49</b> (2.55-4.92)	<b>3.92</b> (2.81-5.77)	<b>4.45</b> (2.99-6.60)	<b>5.27</b> (3.42-8.08)	<b>5.97</b> (3.80-9.34)
<b>6-hr</b>	<b>1.76</b> (1.36-2.28)	<b>2.13</b> (1.65-2.77)	<b>2.75</b> (2.11-3.57)	<b>3.25</b> (2.49-4.25)	<b>3.95</b> (2.95-5.43)	<b>4.46</b> (3.28-6.28)	<b>5.03</b> (3.62-7.38)	<b>5.73</b> (3.87-8.46)	<b>6.84</b> (4.45-10.4)	<b>7.80</b> (4.98-12.1)
<b>12-hr</b>	<b>2.18</b> (1.69-2.81)	<b>2.67</b> (2.07-3.44)	<b>3.47</b> (2.68-4.49)	<b>4.13</b> (3.17-5.37)	<b>5.04</b> (3.78-6.90)	<b>5.71</b> (4.22-8.00)	<b>6.45</b> (4.67-9.44)	<b>7.38</b> (4.99-10.8)	<b>8.85</b> (5.78-13.4)	<b>10.1</b> (6.48-15.6)
<b>24-hr</b>	<b>2.56</b> (1.99-3.28)	<b>3.18</b> (2.47-4.08)	<b>4.19</b> (3.25-5.39)	<b>5.02</b> (3.88-6.50)	<b>6.18</b> (4.66-8.42)	<b>7.02</b> (5.21-9.80)	<b>7.95</b> (5.80-11.6)	<b>9.14</b> (6.21-13.3)	<b>11.0</b> (7.23-16.6)	<b>12.7</b> (8.15-19.5)
<b>2-day</b>	<b>2.89</b> (2.26-3.68)	<b>3.62</b> (2.83-4.63)	<b>4.83</b> (3.76-6.19)	<b>5.83</b> (4.52-7.51)	<b>7.20</b> (5.46-9.79)	<b>8.21</b> (6.13-11.4)	<b>9.32</b> (6.85-13.6)	<b>10.8</b> (7.34-15.7)	<b>13.2</b> (8.65-19.7)	<b>15.3</b> (9.84-23.3)
<b>3-day</b>	<b>3.14</b> (2.47-4.00)	<b>3.95</b> (3.10-5.03)	<b>5.27</b> (4.11-6.73)	<b>6.36</b> (4.94-8.17)	<b>7.86</b> (5.98-10.7)	<b>8.95</b> (6.71-12.4)	<b>10.2</b> (7.51-14.8)	<b>11.8</b> (8.04-17.1)	<b>14.4</b> (9.49-21.5)	<b>16.8</b> (10.8-25.4)
<b>4-day</b>	<b>3.38</b> (2.66-4.29)	<b>4.24</b> (3.33-5.38)	<b>5.64</b> (4.41-7.19)	<b>6.80</b> (5.30-8.72)	<b>8.40</b> (6.40-11.4)	<b>9.56</b> (7.18-13.3)	<b>10.9</b> (8.02-15.8)	<b>12.6</b> (8.59-18.1)	<b>15.4</b> (10.1-22.9)	<b>17.9</b> (11.5-27.0)
<b>7-day</b>	<b>4.03</b> (3.18-5.10)	<b>5.00</b> (3.94-6.33)	<b>6.57</b> (5.17-8.35)	<b>7.89</b> (6.16-10.1)	<b>9.69</b> (7.40-13.0)	<b>11.0</b> (8.28-15.2)	<b>12.5</b> (9.21-18.0)	<b>14.4</b> (9.85-20.6)	<b>17.4</b> (11.5-25.8)	<b>20.1</b> (13.0-30.3)
<b>10-day</b>	<b>4.68</b> (3.70-5.90)	<b>5.71</b> (4.51-7.21)	<b>7.38</b> (5.82-9.35)	<b>8.77</b> (6.88-11.2)	<b>10.7</b> (8.17-14.3)	<b>12.1</b> (9.09-16.5)	<b>13.6</b> (10.1-19.5)	<b>15.6</b> (10.7-22.3)	<b>18.7</b> (12.4-27.6)	<b>21.5</b> (13.9-32.2)
<b>20-day</b>	<b>6.73</b> (5.35-8.44)	<b>7.82</b> (6.21-9.83)	<b>9.61</b> (7.61-12.1)	<b>11.1</b> (8.73-14.1)	<b>13.1</b> (10.0-17.3)	<b>14.7</b> (11.0-19.7)	<b>16.3</b> (11.9-22.7)	<b>18.2</b> (12.6-25.8)	<b>21.0</b> (14.0-30.8)	<b>23.4</b> (15.2-34.9)
<b>30-day</b>	<b>8.46</b> (6.75-10.6)	<b>9.58</b> (7.63-12.0)	<b>11.4</b> (9.06-14.3)	<b>12.9</b> (10.2-16.3)	<b>15.0</b> (11.5-19.7)	<b>16.6</b> (12.4-22.1)	<b>18.2</b> (13.3-25.1)	<b>20.0</b> (13.9-28.3)	<b>22.5</b> (15.0-32.8)	<b>24.6</b> (16.0-36.5)
<b>45-day</b>	<b>10.6</b> (8.50-13.3)	<b>11.8</b> (9.41-14.7)	<b>13.7</b> (10.9-17.1)	<b>15.2</b> (12.0-19.2)	<b>17.4</b> (13.3-22.6)	<b>19.0</b> (14.2-25.1)	<b>20.7</b> (15.0-28.1)	<b>22.3</b> (15.5-31.3)	<b>24.5</b> (16.4-35.5)	<b>26.1</b> (17.0-38.6)
<b>60-day</b>	<b>12.5</b> (9.98-15.5)	<b>13.6</b> (10.9-17.0)	<b>15.6</b> (12.4-19.5)	<b>17.2</b> (13.6-21.6)	<b>19.4</b> (14.8-25.0)	<b>21.1</b> (15.8-27.7)	<b>22.7</b> (16.4-30.7)	<b>24.3</b> (16.9-34.0)	<b>26.2</b> (17.6-37.8)	<b>27.5</b> (18.0-40.6)

<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: 41.8947°, Longitude: -72.4849°



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**Maps & aerials**

**Small scale terrain**





Large scale terrain



Large scale map



Large scale aerial



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## **APPENDIX E: WATER QUALITY CALCULATIONS**

WATER QUALITY VOLUME CALCULATIONS  
FOR  
ELLINGTON SOLAR  
24 MIDDLE ROAD, ELLINGTON, CT

$$WQV = \frac{(1'')(R)(A)}{12}$$

$$V = WQV + ((P)(A_b)/12)$$

where:  $WQV$  = water quality volume (ac-ft)  $V$  = required basin storage volume (ac-ft)  
 $R$  = volumetric runoff coefficient  $WQV$  = Water Quality Volume (ac-ft)  
           =  $0.05 + 0.009(I)$   $P$  = design water quality precipitation (in)  
 $I$  = percent impervious cover  $A_b$  = basin surface area (ac)  
 $A$  = site area in acres

	Area (ac)	Pervious (ac)	Imperv. (ac)	I	R	WQV (ac-ft)	P (in)	Ab (ac)	V (ac-ft)	Total V Req. (cf)	V Provided (cf)
Eastern Basin	18.39	18.15	0.23	1%	0.06	0.09	1	0.266531	0.12	5,062.33	16,253.00
Western Basin	16.57	16.57	-	0%	0.05	0.07	1	0.266531	0.09	3,974.96	13,829.00

Overall Total V Required = 9,037.29 cf

Overall Total V Provided = 30,082.00 cf