DRAINAGE REPORT

Powder Hill Road Solar
Powder Hill Road
Enfield, CT

September 10, 2019

Prepared for:

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Project No. 2018-059

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I. INTRODUCTION

A. Project Summary

LSE Delphinus LLC is proposing the construction of a 1.992 MW AC solar photovoltaic facility at the Powder Hill Sand and Gravel pit on Powder Hill Road in Enfield, Connecticut. The project will include limited clearing and grubbing, construction of access roads, layout and placement of foundation systems, racking, and solar PV panels, installation of utility pads and associated electrical equipment, installation of electrical conduit, conduit supports, electrical poles, and overhead wire, and security fencing. The access road will be constructed to accommodate emergency vehicles and fire trucks.

B. Existing Conditions

The project site is a 24.4 acre parcel owned by Powder Hill Sand & Gravel LLC located on the east side of Powder Hill Road approximately 1,700 feet north of Abbe Road in Enfield. The site is currently accessed via a paved driveway off of Powder Hill Road.

With the exception of the very southern and western portions, the entire site has been previously disturbed by historical gravel removal operations. These operations have resulted in the presence of slopes from the northern, eastern and southern boundaries down into a relatively flat area (the gravel pit bottom) in the central portion of the site. The majority of the pit bottom and side slopes currently consist of exposed, unvegetated soil.

Runoff from the northern and central portions of the proposed solar array currently sheet flows westerly to a low spot along the western edge of the site where it ponds and eventually infiltrates back into the sandy soils. Similarly, runoff from the southern portion of the solar array currently flows southerly to another low spot along the southern edge of the property where it also ponds and eventually infiltrates back into the sandy soils. The only runoff from the project area that appears to leave the site is from around the site driveway. Runoff from this area is collected via a pipe inlet and catchbasin and piped to Town's drainage system at the edge of Powder Hill Road.

C. Soils

Based on a review of the USDA Soil Survey of Hartford County, the soil type identified in the proposed area of the solar development includes Udorthents-Pits complex, gravelly (See Soils Map in Appendix 1). The USDA Soil Survey defines groups of soils into Hydrologic Soil Groups (HSG) according to their runoff-producing characteristics. Soils are assigned to four groups (A, B, C, and D Groups). In group A, are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They typically are deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils

having a very slow infiltration rate and thus a high runoff potential. They have a hardpan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other nearly impervious material. The HSG classification of the Udorthents-Pits complex soils is C.

II. STORMWATER RUNOFF ANALYSIS

A. Methodology

Peak runoff flow rates on-site were determined for pre- and post-development conditions using Applied Microcomputer System's HydroCAD™ Stormwater Modeling System. This computer software employs the SCS Technical Release 55 and 20 (TR-55 & TR-20) methodology. The potential stormwater impacts were evaluated for the 2-yr, 10-yr, 25-yr, and 100-yr; Type III 24-hour storm events.

Based on the present and proposed drainage patterns at the site, three design points were selected for the analysis. Design point 1 is the western property line where runoff pools and infiltrates into the ground. Design point 2 is the low spot along the southern property line where runoff pools and infiltrates into the ground. Design point 3 is the edge of the roadway at the site entrance where runoff discharges off of the site. The design points are shown on the Drainage Area Maps in Appendix 2.

B. Pre-Development Hydrology

The pre-development site was divided into three subcatchments associated with the two design points. Subcatchment (1) discharges to design point 1 and consists of 10.08 acres of woodland and bare soil. Subcatchment (2) discharges to design point 2 and consists of 3.17 acres of bare soil and pavement. Subcatchment (3) consists of 0.77 acres in the vicinity of the site driveway that ultimately discharges into the street. These subcatchments are shown on the attached Pre-Development Drainage Area Map in Appendix 2. Pre-development runoff characteristics for each of the subcatchments are provided in Appendix 3. A summary of the calculated peak flows is provided in the table below.

C. Post Development Hydrology

The proposed development will result in the construction of approximately 10 acres of solar panels and gravel access roads within the previously disturbed, relatively flat base of the former gravel pit. No extensive grading is proposed, and the natural drainage patterns to the pre-development design points will be preserved. The project will also involve the relocation of the site driveway to improve sight lines.

The proposed fixed panel solar arrays are installed on elevated racks that provide adequate height above the ground to promote vegetative growth and allow for infiltration underneath. All of the area beneath the solar arrays is pervious with the exception of the small concrete foundation to support the rack system. Thus, water that flows off of the arrays will essentially have the full surrounding area for sheet flow, infiltration, evaporation, etc. As a result, the areas containing the solar arrays are considered pervious groundcover and are modeled as meadow.

The design points selected for calculations of the pre-development condition are also used for the calculations of the post-development condition. The post development site was divided into the same three subcatchments as the pre-development condition, but modeled to reflect the change in cover type. The subcatchments are shown on the Post Development Drainage Area Map in Appendix 2. The post development subcatchment characteristics are summarized in the attached HydroCAD data sheets in Appendix 3.

Using the characteristics described above, the Post Development peak flow rates for the entire site were calculated for the design storms. The table below compares the pre-development peak flows with the post-development peak flows at the design points.

Table 1 – Summary of Peak Discharges

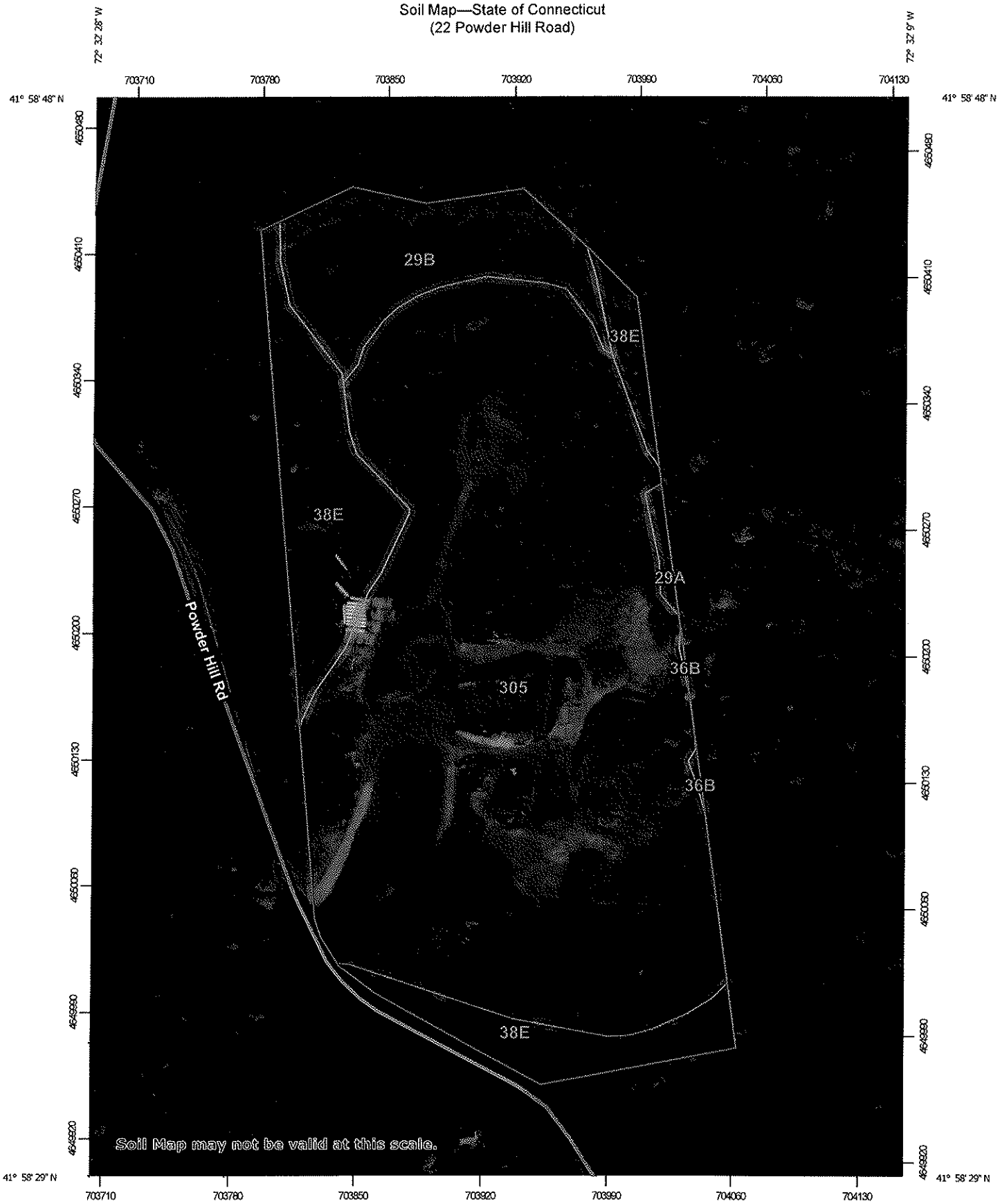
	2-Year	10-Year	25-Year	100-Year
Design Point #1				
Pre	19.1	32.9	40.3	53.3
Post	7.1	16.1	21.5	31.2
Design Point #2				
Pre	7.7	12.3	14.8	19.0
Post	2.0	4.6	6.1	8.8

D. Conclusion

Runoff from the majority of the development area is currently contained on-site in depressions where it infiltrates back into the sandy soil. The establishment of vegetation in these areas will improve infiltration characteristics and reduce the amount of runoff which pools in the depressions. The only runoff that discharges from the site occurs in the vicinity of the site entrance. The removal and relocation of the site driveway in this area will result in a decrease in impervious area which, as shown in the table above, will result in a reduction in the peak discharge rate leaving the site. As a result, one can conclude that the proposed development will not have a negative impact on downstream properties.

Appendix 1:
SOILS INFORMATION

Soil Map—State of Connecticut
(22 Powder Hill Road)



Map Scale: 1:2,910 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

N

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 18, Dec 6, 2018

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

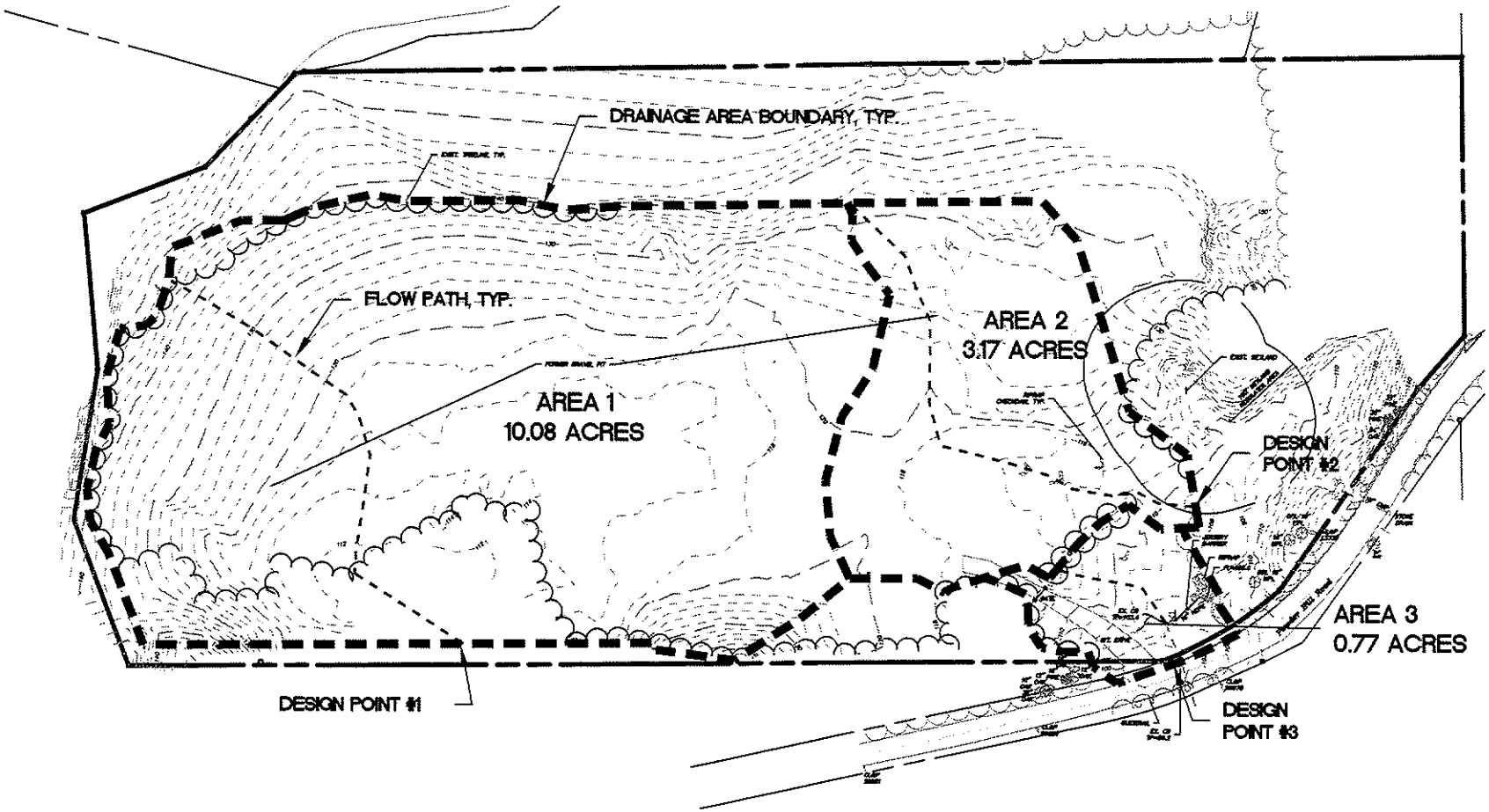
Date(s) aerial images were photographed: Aug 27, 2016—Oct 30, 2017

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.

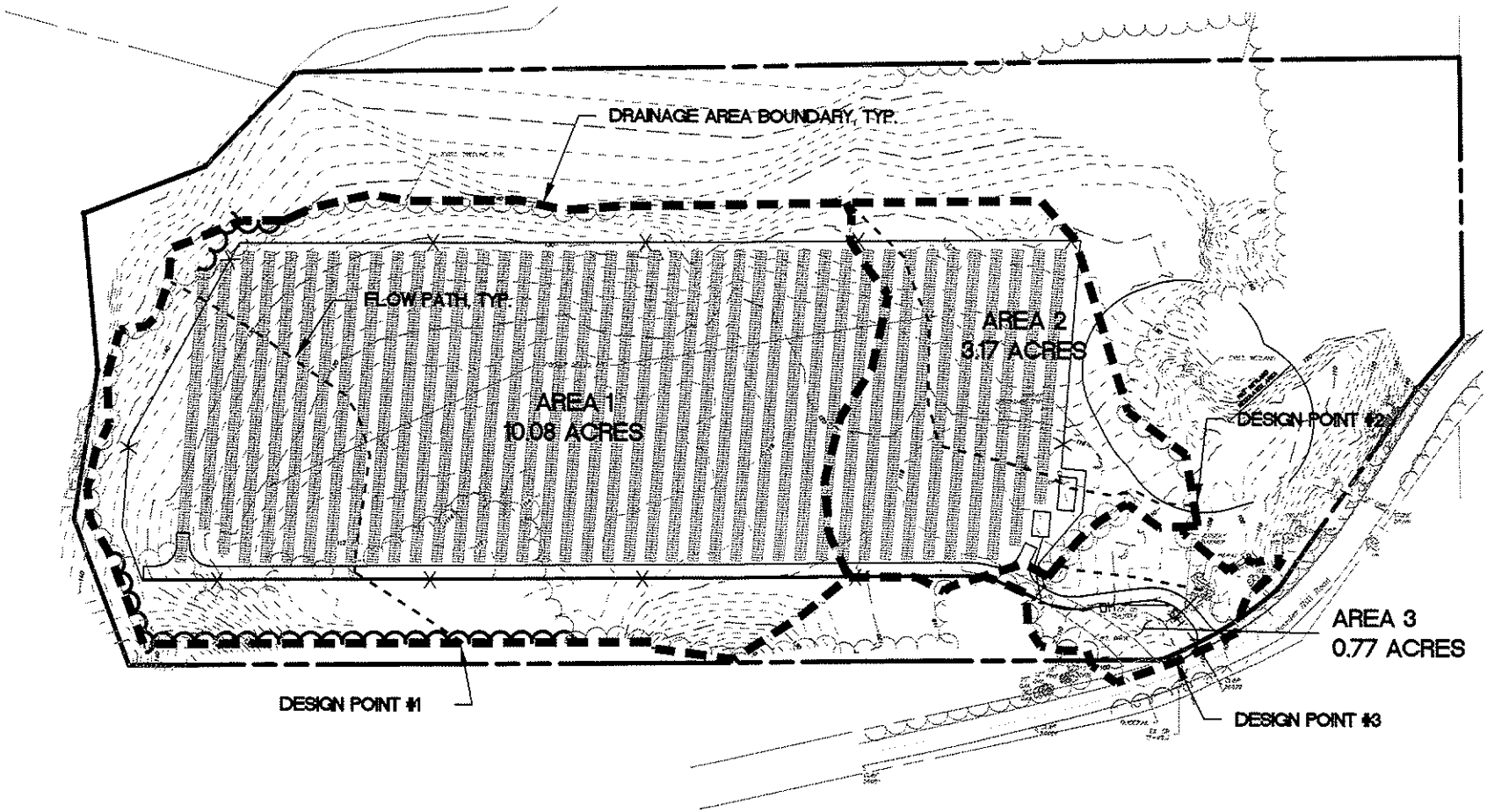
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
29A	Agawam fine sandy loam, 0 to 3 percent slopes	0.1	0.5%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	2.5	10.2%
36B	Windsor loamy sand, 3 to 8 percent slopes	0.0	0.1%
38E	Hinckley loamy sand, 15 to 45 percent slopes	3.9	15.8%
305	Udorthents-Pits complex, gravelly	18.1	73.3%
Totals for Area of Interest		**24.7**	**100.0%**

Appendix 2:
FIGURES

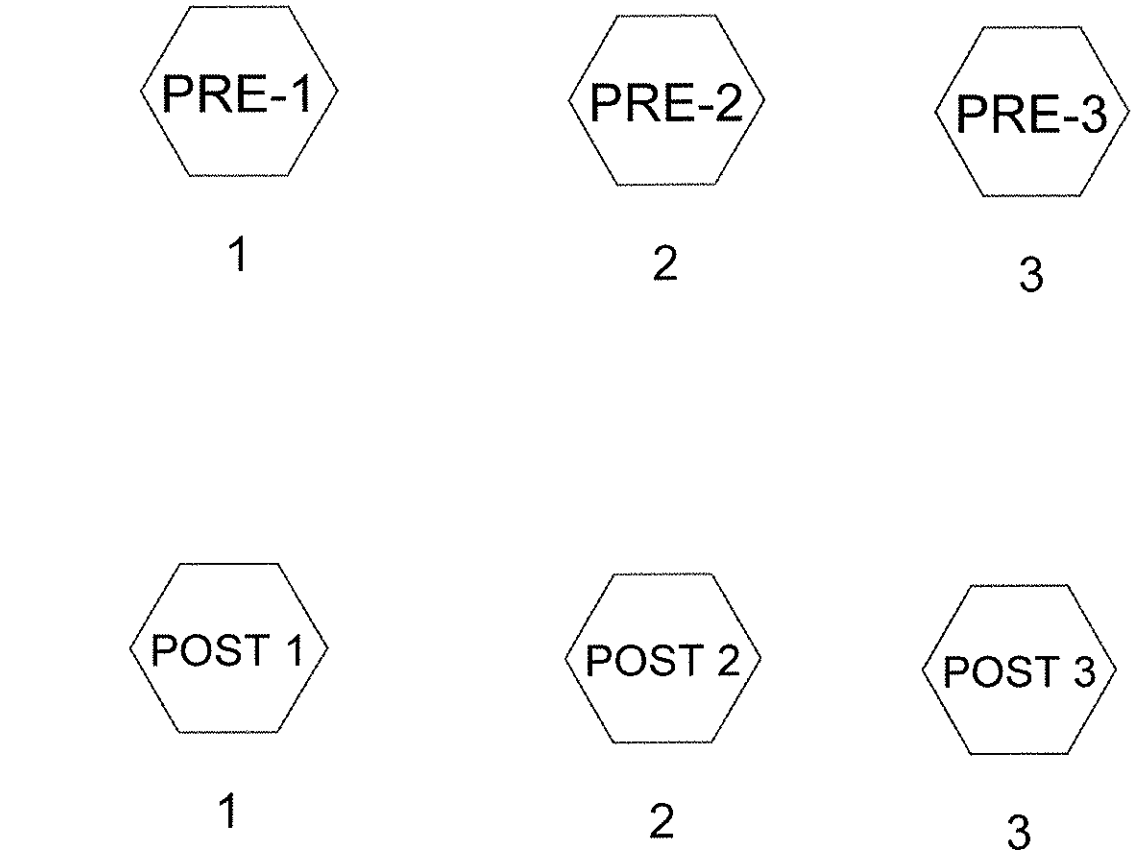


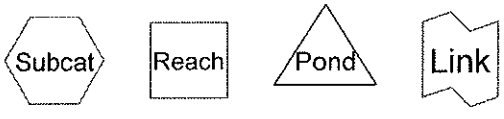
PRE-DEVELOPMENT DRAINAGE AREA MAP
1"=200'



POST DEVELOPMENT DRAINAGE AREA MAP
1"=200'

Appendix 3:
HYDROCAD ANALYSES





Routing Diagram for 2018-059 Powder Hill Solar
Prepared by Microsoft, Printed 9/10/2019
HydroCAD® 10.00-24 s/n 02386 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment POST 1: 1

Runoff = 7.12 cfs @ 12.27 hrs, Volume= 0.705 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (ac)	CN	Description
9.785	71	Meadow, non-grazed, HSG C
0.296	98	Paved parking, HSG C
10.081	72	Weighted Average
9.785		97.06% Pervious Area
0.296		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.17		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
7.0	588	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.7	713	Total			

Summary for Subcatchment POST 2: 2

Runoff = 2.01 cfs @ 12.36 hrs, Volume= 0.221 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (ac)	CN	Description
3.068	71	Meadow, non-grazed, HSG C
0.103	98	Paved parking, HSG C
3.171	72	Weighted Average
3.068		96.75% Pervious Area
0.103		3.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	100	0.0400	0.10		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
6.4	525	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.0	625	Total			

Summary for Subcatchment POST 3: 3

Runoff = 0.67 cfs @ 12.19 hrs, Volume= 0.057 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (ac)	CN	Description
*	0.071	98	Impervious
	0.701	71	Meadow, non-grazed, HSG C
	0.772	73	Weighted Average
	0.701		90.80% Pervious Area
	0.071		9.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment PRE-1: 1

Runoff = 20.76 cfs @ 12.13 hrs, Volume= 1.570 af, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (ac)	CN	Description
8.811	91	Newly graded area, HSG C
1.270	70	Woods, Good, HSG C
10.081	88	Weighted Average
10.081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.1400	0.89		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
3.7	463	0.0430	2.07		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
3.5	150	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	713	Total			

Summary for Subcatchment PRE-2: 2

Runoff = 7.72 cfs @ 12.11 hrs, Volume= 0.562 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (ac)	CN	Description
3.152	91	Newly graded area, HSG C
0.019	98	Paved parking, HSG C
3.171	91	Weighted Average
3.152		99.40% Pervious Area
0.019		0.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	100	0.0400	0.54		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
4.5	525	0.0380	1.95		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.6	625	Total			

Summary for Subcatchment PRE-3: 3

Runoff = 0.76 cfs @ 12.18 hrs, Volume= 0.064 af, Depth> 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (ac)	CN	Description
*	0.108	98	Impervious
	0.665	71	Meadow, non-grazed, HSG C
	0.773	75	Weighted Average
	0.665		86.03% Pervious Area
	0.108		13.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment POST 1: 1

Runoff = 16.13 cfs @ 12.26 hrs, Volume= 1.518 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (ac)	CN	Description
9.785	71	Meadow, non-grazed, HSG C
0.296	98	Paved parking, HSG C
10.081	72	Weighted Average
9.785		97.06% Pervious Area
0.296		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.17		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
7.0	588	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.7	713	Total			

Summary for Subcatchment POST 2: 2

Runoff = 4.55 cfs @ 12.33 hrs, Volume= 0.477 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (ac)	CN	Description
3.068	71	Meadow, non-grazed, HSG C
0.103	98	Paved parking, HSG C
3.171	72	Weighted Average
3.068		96.75% Pervious Area
0.103		3.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	100	0.0400	0.10		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
6.4	525	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.0	625	Total			

Summary for Subcatchment POST 3: 3

Runoff = 1.47 cfs @ 12.18 hrs, Volume= 0.121 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (ac)	CN	Description
*	0.071	98	Impervious
	0.701	71	Meadow, non-grazed, HSG C
	0.772	73	Weighted Average
	0.701		90.80% Pervious Area
	0.071		9.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment PRE-1: 1

Runoff = 34.63 cfs @ 12.13 hrs, Volume= 2.678 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (ac)	CN	Description
8.811	91	Newly graded area, HSG C
1.270	70	Woods, Good, HSG C
10.081	88	Weighted Average
10.081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.1400	0.89		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
3.7	463	0.0430	2.07		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
3.5	150	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	713	Total			

Summary for Subcatchment PRE-2: 2

Runoff = 12.34 cfs @ 12.11 hrs, Volume= 0.921 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

Area (ac)	CN	Description
3.152	91	Newly graded area, HSG C
0.019	98	Paved parking, HSG C
3.171	91	Weighted Average
3.152		99.40% Pervious Area
0.019		0.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	100	0.0400	0.54		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
4.5	525	0.0380	1.95		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.6	625	Total			

Summary for Subcatchment PRE-3: 3

Runoff = 1.61 cfs @ 12.17 hrs, Volume= 0.131 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (ac)	CN	Description
*	0.108	98	Impervious
	0.665	71	Meadow, non-grazed, HSG C
	0.773	75	Weighted Average
	0.665		86.03% Pervious Area
	0.108		13.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment POST 1: 1

Runoff = 21.45 cfs @ 12.25 hrs, Volume= 2.007 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (ac)	CN	Description
9.785	71	Meadow, non-grazed, HSG C
0.296	98	Paved parking, HSG C
10.081	72	Weighted Average
9.785		97.06% Pervious Area
0.296		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.17		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
7.0	588	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.7	713	Total			

Summary for Subcatchment POST 2: 2

Runoff = 6.05 cfs @ 12.33 hrs, Volume= 0.630 af, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (ac)	CN	Description
3.068	71	Meadow, non-grazed, HSG C
0.103	98	Paved parking, HSG C
3.171	72	Weighted Average
3.068		96.75% Pervious Area
0.103		3.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	100	0.0400	0.10		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
6.4	525	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.0	625	Total			

Summary for Subcatchment POST 3: 3

Runoff = 1.96 cfs @ 12.17 hrs, Volume= 0.160 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (ac)	CN	Description
*	0.071	98	Impervious
	0.701	71	Meadow, non-grazed, HSG C
	0.772	73	Weighted Average
	0.701		90.80% Pervious Area
	0.071		9.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment PRE-1: 1

Runoff = 42.04 cfs @ 12.13 hrs, Volume= 3.286 af, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (ac)	CN	Description
8.811	91	Newly graded area, HSG C
1.270	70	Woods, Good, HSG C
10.081	88	Weighted Average
10.081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.1400	0.89		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
3.7	463	0.0430	2.07		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
3.5	150	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	713	Total			

Summary for Subcatchment PRE-2: 2

Runoff = 14.79 cfs @ 12.11 hrs, Volume= 1.116 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

Area (ac)	CN	Description
3.152	91	Newly graded area, HSG C
0.019	98	Paved parking, HSG C
3.171	91	Weighted Average
3.152		99.40% Pervious Area
0.019		0.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	100	0.0400	0.54		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
4.5	525	0.0380	1.95		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.6	625	Total			

Summary for Subcatchment PRE-3: 3

Runoff = 2.10 cfs @ 12.17 hrs, Volume= 0.171 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (ac)	CN	Description
*	0.108	98	Impervious
	0.665	71	Meadow, non-grazed, HSG C
	0.773	75	Weighted Average
	0.665		86.03% Pervious Area
	0.108		13.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment POST 1: 1

Runoff = 31.22 cfs @ 12.25 hrs, Volume= 2.919 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

Area (ac)	CN	Description
9.785	71	Meadow, non-grazed, HSG C
0.296	98	Paved parking, HSG C
10.081	72	Weighted Average
9.785		97.06% Pervious Area
0.296		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.17		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
7.0	588	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.7	713	Total			

Summary for Subcatchment POST 2: 2

Runoff = 8.83 cfs @ 12.32 hrs, Volume= 0.916 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

Area (ac)	CN	Description
3.068	71	Meadow, non-grazed, HSG C
0.103	98	Paved parking, HSG C
3.171	72	Weighted Average
3.068		96.75% Pervious Area
0.103		3.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	100	0.0400	0.10		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
6.4	525	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.0	625	Total			

Summary for Subcatchment POST 3: 3

Runoff = 2.83 cfs @ 12.17 hrs, Volume= 0.231 af, Depth> 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (ac)	CN	Description
*	0.071	98	Impervious
	0.701	71	Meadow, non-grazed, HSG C
	0.772	73	Weighted Average
	0.701		90.80% Pervious Area
	0.071		9.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			

Summary for Subcatchment PRE-1: 1

Runoff = 55.27 cfs @ 12.12 hrs, Volume= 4.361 af, Depth> 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

Area (ac)	CN	Description
8.811	91	Newly graded area, HSG C
1.270	70	Woods, Good, HSG C
10.081	88	Weighted Average
10.081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.1400	0.89		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
3.7	463	0.0430	2.07		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
3.5	150	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	713	Total			

Summary for Subcatchment PRE-2: 2

Runoff = 19.04 cfs @ 12.11 hrs, Volume= 1.457 af, Depth> 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

Area (ac)	CN	Description
3.152	91	Newly graded area, HSG C
0.019	98	Paved parking, HSG C
3.171	91	Weighted Average
3.152		99.40% Pervious Area
0.019		0.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	100	0.0400	0.54		**Sheet Flow,** Fallow n= 0.050 P2= 3.20"
4.5	525	0.0380	1.95		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.6	625	Total			

Summary for Subcatchment PRE-3: 3

Runoff = 2.99 cfs @ 12.17 hrs, Volume= 0.244 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=6.90"

	Area (ac)	CN	Description
*	0.108	98	Impervious
	0.665	71	Meadow, non-grazed, HSG C
	0.773	75	Weighted Average
	0.665		86.03% Pervious Area
	0.108		13.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.20"
0.7	70	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	170	Total			