

**Drainage Analysis**  
**Burlington Solar One, LLC**  
**Prospect Street - Burlington, Connecticut**

**Prepared by:**

***R.R. Hiltbrand Engineers & Surveyors, LLC***  
575 North Main Street  
Bristol, CT 06010  
(860) 582-4548

**Prepared for:**

***Burlington Solar One, LLC***  
Verogy VCP, LLC  
150 Trumbull Street  
Hartford, CT 06103

## **Burlington Solar One** **Drainage Summary**

The subject site is located in the Town of Burlington, on the north side of Prospect Street, comprising 62.98 acres of Industrial I Zone. Site soils are Hinkley [38], Canton/Charlton [62] soils in the upland areas associated with the proposed solar array. Inland wetland soils comprise 0.44 acres for a centrally located wetland within the property, 4.36 acres east side along the Wildcat Brook and 0.59 acres west side along the Whigville Brook. These wetland locations are all in excess of 100' from any activity associated with the construction of the proposed solar array. Site slopes vary from 1.6% to 13% within the proposed solar array area. Property historically was utilized as an earth removal site from the 1960's to current. Various small excavations and past disturbances are evident in the upland area of the proposed solar array.

The proposed solar project area is 11.6 acres located within a wooded upland area 1,500 l.f. north of Prospect Street. The project area disturbance is 111 l.f. away from wetlands along the Wildcat Brook, 230 l.f. from the centrally located wetland to stormwater quality basin, and 110 l.f. from the same to the outfall from the stormwater quality basin.

The majority of the solar site historically sheet flows to the area around and adjacent to the isolated wetland area (0.44 acres) and infiltrates into existing soils. The isolated wetland and surrounding areas are topographically not connected, in a surface drainage sense, to either the Wildcat Brook or the Whigville Brook drainage sheds.

Some site grading is utilized to establish uniform grades (8% or less) and drainage patterns within the solar site. A combination of two stormwater quality basins, infiltration trenches and grass lined swales are utilized to mitigate increase in run-off due to the project. The stormwater quality basins will have a multi-stage outlet design and emergency overflow. Both stormwater quality features include an up-slope 2% gradient grass infiltration and filter strip to provide primary treatment of up-gradient sheetflows. A stone infiltration trench is provided for both stormwater quality features to enhance the treatment process and will also provide a level of temporary sediment and erosion control during construction. These basins shall be utilized as temporary sediment basins during construction and have been sized appropriately for dry and wet storage requirements. Site design grades are 1%-5% (58% of area), 6%-7% (20% of area) and 8% (22% of area). The western stormwater quality basin will outlet into the eastern stormwater quality basin to further promote groundwater recharge and mitigation of peak run-off flows. Developed drainage flows from this project are not directed or outletted to areas adjacent to the brooks bordering the east and west property lines.

The connection to the solar field from a utility standpoint will follow the existing access road from Prospect Street into the site and northerly to the solar field area.

Overall peak flows have been reduced in the 2-year through 100-year storm events as shown in the tables below. In the area of proposed solar array, the hydrologic soil group has been reduced one group (from A to B, or B to C) in conformance with Appendix I “Stormwater Management at Solar Array Construction Projects”. Additionally, the imperviousness of the solar panels is not needed to be considered as the separation distance between each row of panels is greater than the width of the panels in a horizontal plane. This is also in conformance with Appendix I “Stormwater Management at Solar Array Construction Projects”.

**Burlington Solar One – Peak Flows**

<b><u>Storm (YR)</u></b>	<b><u>Developed to Point of Analysis (CFS)</u></b>	<b><u>Pre-Developed to Point of Analysis (CFS)</u></b>	<b><u>Peak Flow Diff. (CFS)</u></b>
1	0.94	1.49	-0.55
2	2.97	3.85	-0.88
5	9.27	9.54	-0.27
10	15.45	15.51	-0.06
25	24.90	25.07	-0.17
50	32.01	32.55	-0.54
100	39.30	41.38	-2.08

**Stormwater Infiltration Basin #1 Flow/Elevation Data**

<b><u>Storm (YR)</u></b>	<b><u>Routed Outflow (Not Inc. Exfiltration) (CFS)</u></b>	<b><u>Inflow (CFS)</u></b>	<b><u>Peak Flow Diff. (CFS)</u></b>	<b><u>Water Surface Elevation (FT)</u></b>
1	0.00	1.87	-1.87	404.01
2	0.00	3.46	-3.46	404.41
5	0.76	6.56	-5.80	405.39
10	1.14	9.41	-8.27	406.21
25	3.63	13.64	-10.01	407.17
50	8.40	16.82	-8.42	407.36
100	13.08	20.47	-7.39	407.51

**Top Berm Elevation = 408.50**

**Stormwater Infiltration Basin #2 Flow/Elevation Data**

<b><u>Storm (YR)</u></b>	<b><u>Routed Outflow (Not Inc. Exfiltration) (CFS)</u></b>	<b><u>Inflow (CFS)</u></b>	<b><u>Peak Flow Diff. (CFS)</u></b>	<b><u>Water Surface Elevation (FT)</u></b>
1	0.00	3.24	-3.24	392.68
2	1.26	6.00	-4.74	393.65
5	4.85	11.82	-6.97	394.89
10	8.14	17.18	-9.04	395.75
25	13.05	24.90	-11.85	396.89
50	16.77	34.16	-17.39	398.12
100	19.94	46.78	-26.84	399.45

**Top Berm Elevation = 401.00**

**Water Quality Volume Basin #1**

Drainage Area = 9.053 Acres  
% Impervious Surfaces = 2.9%

WQV = 0.057 Ac-Ft (Elevation 404.50)

**Water Quality Volume Basin #2**

Drainage Area = 15.756 Acres  
% Impervious Surfaces = 0.7%

WQV = 0.074 Ac-Ft (Elevation 392.80)

**Temporary Sediment Basin #1 Sizing Calculation**

Drainage Area = 5.77 Acres (Active Construction Area)  
Erosion Rate = 50 tons/acre/year  
Trap Efficiency = 80%  
Delivery Rate = 37%  
Sediment Density = 90

Dry Volume = 0.044 Ac-Ft  
Wet Volume = 0.088 Ac-Ft (2x Dry volume)

Total Storage Volume = 0.132 Ac-Ft (Elevation 405.00)

### **Temporary Sediment Basin #1 Sizing Calculation**

Drainage Area = 9.502 Acres (Active Construction Area)

Erosion Rate = 50 tons/acre/year

Trap Efficiency = 80%

Delivery Rate = 35%

Sediment Density = 90

Dry Volume = 0.068 Ac-Ft

Wet Volume = 0.136 Ac-Ft (2x Dry volume)

Total Storage Volume = 0.204 Ac-Ft (Elevation 393.80)

**Note:** These estimates of sediment storage do not include the sediment that will be trapped or controlled by up-gradient siltation controls shown on the plan.