

# Stormwater Management Plan

Candlewood Solar  
New Milford, Connecticut

**Prepared for:**  
Candlewood Solar LLC  
111 Speen Street, Suite 410  
Framingham, Massachusetts

**Prepared by:**  
Amec Foster Wheeler  
Environment & Infrastructure, Inc.

271 Mill Rd, 3<sup>rd</sup> Floor  
Chelmsford, MA 01824

**June 2017**

Project No. 3652160082



## TABLE OF CONTENTS

---

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Applicant Information.....	1
1.2	Site Information .....	1
<b>2.0</b>	<b>PROJECT NARRATIVE .....</b>	<b>2</b>
2.1	Project Description and Purpose.....	2
2.1.1	Natural and Manmade Features .....	2
2.1.2	Site Topography, Drainage Patterns, Flow Paths, and Ground Cover.....	2
2.1.3	Impervious Area and Runoff Coefficient.....	2
2.1.4	Site Soils as Defined by USDA Surveys.....	2
2.1.5	Stormwater Discharges .....	2
2.1.6	Critical Areas and Buffers .....	2
2.1.7	Water Quality Classifications .....	2
2.2	Potential Stormwater Impacts .....	3
2.2.1	Potential Pollutant Sources.....	3
2.2.2	Pre- and Post-Development Peak Flow Rates .....	3
2.3	Critical On-Site Resources .....	3
2.3.1	Wells 3	
2.3.2	Aquifers.....	3
2.3.3	Wetlands, Streams, and Ponds .....	3
2.3.4	Public Drinking Water Supplies .....	3
2.4	Critical Off-Site Resources .....	4
2.4.1	Neighboring land uses .....	4
2.4.2	Wells 4	
2.4.3	Aquifers.....	4
2.4.4	Wetlands, Streams, and Ponds .....	4
2.4.5	Public Drinking Water Supplies .....	4
2.5	Proposed Stormwater Management Practices .....	4
2.5.1	Source Controls and Pollution Prevention.....	4
2.5.2	Alternative Site Planning and Design .....	5
2.5.3	Stormwater Treatment .....	5
2.5.4	Flood Control and Peak Runoff Attenuation .....	5
2.6	Site Plans .....	5
2.7	Construction Schedule .....	5
<b>3.0</b>	<b>CALCULATIONS .....</b>	<b>6</b>
<b>4.0</b>	<b>DESIGN DRAWINGS AND SPECIFICATIONS .....</b>	<b>7</b>
<b>5.0</b>	<b>CONSTRUCTION EROSION AND SEDIMENTATION CONTROLS .....</b>	<b>8</b>
<b>6.0</b>	<b>SUPPORTING DOCUMENTS AND STUDIES .....</b>	<b>9</b>
<b>7.0</b>	<b>OTHER REQUIRED PERMITS.....</b>	<b>10</b>
<b>8.0</b>	<b>OPERATION AND MAINTENANCE.....</b>	<b>11</b>
8.1	Inspection and Maintenance Tasks and Schedules.....	11
8.2	Legally Responsible Party.....	11

8.3	Provisions for Financing .....	11
8.4	As-built Plans of Completed Structures .....	11
8.5	Designer's Letter of Compliance .....	11
8.6	Post-Construction Documentation .....	11

## **FIGURES**

---

Figure 1      Site Locus Map

## **APPENDICES**

---

Appendix A – Calculations

    Appendix A1 – Calculations and Modeling Summary

    Appendix A2 – Watershed Maps – Existing and Proposed Conditions

    Appendix A3 – Existing and Proposed Modeling Reports

Appendix B – Erosion and Sediment Control Plan

Appendix C – Project Drawings

Appendix D – Supporting Studies

## **1.0 INTRODUCTION**

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has prepared this Stormwater Management Plan on behalf of Candlewood Solar LLC (Candlewood Solar) for the proposed installation of a 20 megawatt (MW) AC (MWac), solar photovoltaic (PV) electric generating facility (the Facility) in the Town of New Milford, Connecticut. This Stormwater Management Plan has been prepared in accordance with the 2004 Connecticut Stormwater Quality Manual.

### **1.1 Applicant Information**

Applicant Name: Candlewood Solar LLC c/o Joel Lindsay

Legal Address: 111 Speen Street, Suite 410, Framingham, Massachusetts

Phone: 508-661-2200

Fax: 508-661-2202

### **1.2 Site Information**

The project site is located on portions of three (3) parcels to accommodate the proposed solar PV array, access road, and electric interconnection route (New Milford Assessor Map parcels 26/67.1, 9/6, and 34/31.1).

The physical address of the new solar array will be on parcel 26/67.1 (187 Candlewood Mountain Road) located on the southern flank of Candlewood Mountain. This parcel has a total area of 163.5 acres, of which the array will occupy approximately 73.0 acres (Project Area).

The interconnection route will cross parcels 9/6 and 34/31.1. A Site Locus Map is included as Figure 1.

## **2.0 PROJECT NARRATIVE**

### **2.1 Project Description and Purpose**

This project involves the construction of a solar energy generation facility in New Milford, Connecticut. The parcel housing the array area (26/67.1) is partially wooded, with approximately 15.9 acres of hay field/horse pasture. The route of the interconnection is planned to follow existing cleared access road and utility corridors to the extent practicable across the adjacent Site parcels to the east. The 26/67.1 parcel is adjacent to an old mine, which is located on the parcel immediately to the east. Adjacent parcels to the north, east and south are largely wooded and undeveloped. Rural residential properties occur along Candlewood Mountain Road to the southwest and west.

#### **2.1.1 Natural and Manmade Features**

Natural and manmade features on the site include wetlands, a vernal pool, wooded areas, hay field and pasture, and a separate dirt access road.

#### **2.1.2 Site Topography, Drainage Patterns, Flow Paths, and Ground Cover**

Site topography is shown on the drawings. Watershed subcatchments have been delineated for the existing conditions and proposed development areas and are shown on the Watershed Maps (Appendix A).. In general, stormwater runoff flows downgradient from the peak/ridge of Candlewood Mountain in easterly, westerly, and southerly directions. Time of concentration flow paths are shown on the Watershed Maps (Appendix A).

With the exception of the residential development, hayfield areas, existing utility corridors, and dirt access road, the majority of the site remains as undeveloped hardwood forested areas.

#### **2.1.3 Impervious Area and Runoff Coefficient**

Impervious areas and runoff coefficients have been evaluated, and are included in the runoff modelling reports prepared for the site (Appendix A).

#### **2.1.4 Site Soils as Defined by USDA Surveys**

Site soils are shown on the Watershed Maps (Appendix A).

#### **2.1.5 Stormwater Discharges**

In general, existing stormwater discharges from the site include sheet flows and shallow concentrated flows from the site areas described above. Following development, discharges will remain as sheet flows and shallow concentrated flows, at approximately the same velocities, rates, and locations as the existing discharges. No known pollutants originating at the site are known for current conditions, nor are they anticipated under future developed conditions.

#### **2.1.6 Critical Areas and Buffers**

Buffers are shown on the project drawings (Appendix C).

#### **2.1.7 Water Quality Classifications**

The groundwater quality underlying the Project Area is classified by CTDEEP as "GA". As noted on the Water Quality Classifications, New Milford, CT map created November 2015, Class GA designated uses are existing private and potential public or private supplies of water suitable for

drinking without treatment and base flow for hydraulically-connected surface water bodies. All ground waters not specifically classified are considered as Class GA. Discharges are restricted to discharge from septage treatment facilities subject to stringent treatment and discharge requirements, and other wastes of natural origin that easily biodegrade and present no threat to groundwater.

## **2.2 Potential Stormwater Impacts**

This subsection describes the project's potential for site stormwater to impact water quality, peak flow, and groundwater recharge.

### **2.2.1 Potential Pollutant Sources**

Potential Pollutant Sources are described in the Erosion and Sediment Control Plan, included as Appendix B. Potential pollutants include steep slopes, vehicle fueling, and exposed surface soils (sediment) during construction. Measures have been proposed in the Erosion and Sediment Control Plan to mitigate the potential for these pollutants to impact water quality.

### **2.2.2 Pre- and Post-Development Peak Flow Rates**

Preliminary pre-development peak flow rates and post-development peak flow rates have been developed and are included in Appendix A. These values may be further refined prior to initiating construction activities.

## **2.3 Critical On-Site Resources**

On-site resources that could potentially be impacted by stormwater runoff are assessed below.

### **2.3.1 Wells**

No drinking water wells have been identified at the Project Area.

### **2.3.2 Aquifers**

No protected aquifers have been identified at the Project Area.

### **2.3.3 Wetlands, Streams, and Ponds**

Thomas Pietras, a Connecticut soil scientist with Pietras Environmental Group, LLC delineated nine (9) wetlands and associated watercourses at the Project Area and along the interconnection route, on December 9, 10, and 11, 2016 and May 4, 2017. All delineated wetlands are regulated pursuant to the Connecticut Inland Wetlands and Watercourses Act ("IWWA") and Inland Wetlands and Watercourses Regulations for the Town of New Milford ("New Milford IWWR"), and with the exception of a small portion of Wetland I and all of Wetland IV, all delineated wetlands are also regulated pursuant to the federal Clean Water Act ("CWA"). Watercourses are associated with each of the wetlands except Wetlands II and III, all of which are intermittent except the Rocky River which flows out of Wetland VI. One naturally occurring vernal pool ("VP") which is also a forested inland wetland (Wetland V), was identified and delineated in the northeast portion of the Facility Parcel by Pietras Environmental Group, LLC.

### **2.3.4 Public Drinking Water Supplies**

See Sections 2.3.1 and 2.3.2 for a discussion of public drinking water supplies.

## **2.4 Critical Off-Site Resources**

This section identifies and describes the locations of off-site resources that could potentially be impacted by stormwater runoff.

### **2.4.1 Neighboring land uses**

The site of the proposed array is adjacent to an old mine, which is located on the parcel immediately to the east. Adjacent parcels to the north, east and south are largely wooded and undeveloped. Rural residential properties occur along Candlewood Mountain Road to the southwest and west.

### **2.4.2 Wells**

Aquarion Water Company (“Aquarion”) provides water to New Milford (commercial, industrial, public authorities, and residential) by private water systems or by private well. Aquarion has six (6) wells that supply water to New Milford customers from two (2) well fields; Indian Field Well Field located off Route 7 approximately 0.4 mile east of the proposed interconnection at its closest point to the well property, and the Peagler Hill Road Well Field located along Peagler Hill Road approximately 1.1 mile east of the proposed interconnection at its closest point to the well property. No impacts to well fields are anticipated.

### **2.4.3 Aquifers**

Both well fields described above contain three (3) stratified drift wells that draw water from the Housatonic Basin Aquifer. There is an existing public water supply aquifer protection area located to the northeast and southeast beyond the Project Area and Candlewood Lake. No protected aquifers exist beneath the Project Area. No impacts to aquifers are anticipated.

### **2.4.4 Wetlands, Streams, and Ponds**

Wetlands, streams, and ponds beyond the Project Area have not been delineated or assessed. Candlewood Lake, the Rocky River, and the Housatonic River are water resources that are mapped near the Project Area. No impacts are anticipated to these or other wetlands and waters resources beyond the Project Area.

### **2.4.5 Public Drinking Water Supplies**

As described above, Aquarion Water Company (“Aquarion”) provides water to New Milford (commercial, industrial, public authorities, and residential) by private water systems or by private well. Aquarion has six (6) wells that supply water to New Milford customers from two (2) well fields. No impacts to public drinking water supplies are anticipated.

## **2.5 Proposed Stormwater Management Practices**

Proposed stormwater management practices were selected for this project to address the requirements of the 2004 Connecticut Stormwater Quality Manual. The practices include:

### **2.5.1 Source Controls and Pollution Prevention**

Management practices selected for addressing pollution prevention at the source are addressed in the Erosion and Sediment Control Plan (Appendix B), and include diversion of stormwater runoff, linear sediment barriers, sediment traps, stockpile management, project phasing, and implementation of stabilization measures.

## **2.5.2 Alternative Site Planning and Design**

Several alternative site planning measures have been incorporated into the proposed design. These measures include:

Designing the Development to Fit the Terrain – Only minor amounts of grading are proposed over the 57.1-acre array area. The array structures have been selected to generally fit the slopes found on Candlewood Mountain, with the exception of a few areas.

Limiting Land Disturbance – Land disturbance has been minimized. The project will improve upon the existing dirt access road, rather than constructing an entirely new access road. The interconnection route generally follows existing rights of way and utility corridors.

Preserving and Utilizing Natural Drainage Systems – Incorporation of level spreaders into the design allows for concentrated flows to be redistributed as sheet flows, thus maintaining the natural flow patterns downgradient of the site.

Minimizing the Creation of Steep Slopes – Steep slopes currently exist in the proposed array area. All proposed grading is intended to reduce the steepness of slopes. All exposed soils will be stabilized upon completion of grading activities. Slopes greater than 3H:1V, which are stabilized with vegetative measures, will be reinforced with erosion control blankets.

Maintaining Pre-Development Vegetation – Although the project involves clearing of vegetation, areas to be cleared outside of the array area will not additionally involve removal of stumps and subgrade vegetation. This strategy will maintain the current erosion resistance of the soils, and allow a faster regeneration of short vegetative growth to maintain interception and evapotranspiration, thus reducing runoff rates and volumes.

## **2.5.3 Stormwater Treatment**

Stormwater runoff will be routed through water quality swales for treatment prior to discharge. Water quality swales are a primary treatment practice in accordance with the 2004 manual, and are beneficial in removing pollutants loads in the form of sediment, phosphorus, nitrogen, metals, and dissolved pollutants. Level spreaders will return the flow to sheet flows, which will decrease the potential for erosion immediately downgradient of treatment devices.

## **2.5.4 Flood Control and Peak Runoff Attenuation**

Water quality swales provide groundwater recharge (dry swale design), which will reduce the volumes and flow rates discharging from this site.

## **2.6 Site Plans**

Site Plans are included in Appendix C.

## **2.7 Construction Schedule**

The anticipated construction schedule is included in the Erosion and Sediment Control Plan (Appendix B).



### **3.0 CALCULATIONS**

Preliminary supporting calculations for the project have been developed and are included in Appendix A. Calculations may be refined prior to construction during final design:

#### **4.0 DESIGN DRAWINGS AND SPECIFICATIONS**

Design drawings and specifications are included in Appendix C.

## **5.0 CONSTRUCTION EROSION AND SEDIMENTATION CONTROLS**

Stormwater management practices proposed for utilization during the construction period are detailed in the Erosion and Sediment Control Plan (Appendix B), which has been prepared in accordance with the 2002 Connecticut Guidelines for Erosion and Sediment Control.

## **6.0 SUPPORTING DOCUMENTS AND STUDIES**

Supporting documents and studies are included in Appendix D.

## 7.0 OTHER REQUIRED PERMITS

Other permits that are anticipated to be required for this project include:

- ▶ Connecticut Inland Wetlands and Watercourses Permit
- ▶ U.S. Army Corps of Engineers Section 404 Connecticut General Permit 6 – Utility Line Activities
- ▶ Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ("Construction General Permit")
- ▶ Local Building Permit
- ▶ Electrical Interconnection Permit

## **8.0 OPERATION AND MAINTENANCE**

This section details operation and maintenance activities and requirements.

### **8.1 Inspection and Maintenance Tasks and Schedules**

Tasks required for operation and maintenance of each stormwater management practice to be implemented for this project are included on the drawing details for each practice (Appendix C).

### **8.2 Legally Responsible Party**

The party legally responsible for the operation and maintenance of stormwater management practices for this project is the applicant, as listed in Section 1.1.

### **8.3 Provisions for Financing**

The applicant attests to having sufficient resources to operate and maintain the stormwater management practices.

### **8.4 As-built Plans of Completed Structures**

No structures have been completed at this time.

### **8.5 Designer's Letter of Compliance**

Design drawings included in Appendix C bear the seal and signature of the Registered Professional Engineer responsible for the design.

### **8.6 Post-Construction Documentation**

The project has not been constructed at this time.

## Figures

# Appendix A

## Calculations



# Appendix A1

## Calculations and Modeling Summary

## Appendix A2

Watershed Maps – Existing and Proposed Conditions

# Appendix A3

Existing and Proposed Modeling Reports

# Appendix B

## Erosion and Sediment Control Plan

# Appendix C

## Project Drawings

# Appendix D

## Supporting Studies