



September 25, 2023

Ref: 43323.00

Bradley Parsons, PE, PMP  
Verogy  
124 LaSalle Road  
West Hartford, Connecticut

Re: Wetlands and Watercourses Delineation Report  
3MW-AC Solar Project, 17 Wickham Road, Glastonbury, Connecticut

Bradley,

VHB completed an on-site investigation to determine the presence or absence of wetlands and/or watercourses at 17 Wickham Road (Glastonbury Assessor's MBL G5-2920-S0054) in Glastonbury, Connecticut (Figure 1) as requested and authorized. This investigation encompassed the entire parcel (herein referred to as the Project Site) and was completed by a Certified Professional Soil Scientist and conducted in accordance with the principles and practices noted in the United States Department of Agriculture (USDA) Soil Survey Manual (2017). The soil classification system of the National Cooperative Soil Survey was used in this investigation to identify the soil map units present on the Project Site. This report includes descriptions of site conditions, photographic documentation (Appendix A), and a Delineated Resources Map (Figure 2) displaying delineated wetland/watercourse resources within the Project Site.

## INVESTIGATION & METHODOLOGY

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The Project Site was investigated on July 17 and August 31, 2023, during which time a delineation based on criteria used in the State of Connecticut Inland Wetlands and Watercourse Act was completed. Weather was seasonable, sunny with temperatures in the high-80's. The Project Area is an agricultural parcel spanning approximately 15 acres. The majority of the central and eastern part of the parcel has been tilled; the western portion of the parcel is vegetated with mostly native, non-agricultural vegetation. The surrounding area is mostly residential development.

Soil types are identified by observing soil morphology (soil texture, color, structure, etc.). Soil morphology is evaluated through numerous test pits and/or hand borings (generally to a depth of at least two feet). If a wetland and/or watercourse were determined to be present, their boundaries are identified with flags and hung from vegetation or small wire stakes if in fields or grass communities. For wetlands, these flags are labeled "Wetland Delineation" and generally spaced a maximum of approximately 50 feet apart. For

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watercourses, these flags are blue and generally spaced a maximum of 50 feet apart. If the boundary between wetland and watercourse were found to be within 10 feet of each other, a single line is delineated. It is important to note that flagged wetland and watercourse boundaries are subject to change until verified by local, state, or federal regulatory agencies.

## REGULATORY INFORMATION

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Wetlands and watercourses are regulated by both state and federal laws each with different criteria for establishing regulatory limits. Accordingly, the State may regulate waters that fall outside of federal jurisdiction; however, where federal jurisdiction exists concurrent State jurisdiction is almost always present.

### State Regulation

*Wetland* determinations are based on the presence of poorly drained, very poorly drained, alluvial, or floodplain soils and submerged land. Drainage class identifies the natural drainage condition of the soil (USDA-NRCS 2014). It refers to the frequency and duration of wet periods under conditions similar to those under which the soil developed. Drainage class is inferred from observation of landscape position and relies principally on presence of absence of features in the soil profile associated with soil development under saturated conditions.

*Watercourses* are defined as "rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the state or any portion thereof." *Intermittent watercourse* determinations are made based on the presence of a defined permanent channel and bank, and two of the following characteristics: (1) evidence of scour or deposits of recent alluvium or detritus, (2) the presence of standing or flowing water for a duration longer than a particular storm incident, and (3) the presence of hydrophytic vegetation. (See Inland Wetlands and Watercourses Act §22a-38 CGS.)

### Federal Regulation

Federal wetlands were delineated in accordance with the Corps of Engineers 1987 Manual (Environmental Lab. 1987) in conjunction with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0, January 2012). This method relies on the documentation of the presence of three parameters 1) wetland soils, 2) hydrophytic vegetation, and 3) wetland hydrology for an area to be mapped as a wetland. Field Indicators for Identifying Hydric Soils in New England- Version 4 and by inference Field Indicators of Hydric Soils in the United States A Guide for Identifying and Delineating Hydric Soils Version 8.2 were used to document the presence of hydric soils.

## WETLAND DELINEATION RESULTS

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Wetland classifications used to identify the type of wetland(s) occurring on the Project site are based on classifications from the U.S. Fish and Wildlife Service (USFWS) (Cowardin et.al. 1979). These are further



qualified with morphological landscape characteristics using the Hydrogeomorphic Method of wetland classification (Brinson, 1993).

During the site investigations, multiple soil test pits were taken throughout the project site and evaluated for wetland soil drainage class and hydric soil indicators. These test pits were along transects where the potential for wetlands may occur and begin in uplands and continue through the suspect wetland areas. One wetland was observed in the southeast portion of the property and described below as well as

Wetland W01 is a palustrine forested, broad-leafed deciduous, seasonally saturated/flooded (PFO1E) depression wetland. The wetland is located in the southeast corner of the project site and continues off-site. Soils observed within the wetland contained distinct redoximorphic features from two inches below the surface and continued deeper throughout the profile and were consistent with poorly drained characteristics. Saturation was observed within three inches of the surface and the observed water table appeared at seven inches. These characteristics within the soils of the wetland meet the criteria to be classified as the Redox Dark Surface hydric soil indicator, as described by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Hydrophytic vegetation observed onsite includes jewelweed (*Impatiens capensis*), skunk cabbage (*Symplocarpus foetidus*), fowl blue grass (*Poa palustris*), northern spicebush (*Lindera benzoin*), and red maple (*Acer rubrum*).

Delineated resource areas are listed in Table 1 below while dominant vegetation species observed are presented in Table 2 below.

**TABLE 1: Delineated Wetlands and Watercourses within the Project Area**

Wetland ID	Wetland Classification	HGM	Description
W01	PFO1E	Depression	This wetland is located in the southeast corner of the project site and continues off-site.

**TABLE 2: Dominant Vegetation Onsite (Common (Scientific) names)**

TREES & SAPLINGS				
Scientific	Common	Indicator	Wetland	Upland
<i>Acer rubrum</i>	Red maple	FAC	X	X

SHRUBS				
Scientific	Common	Indicator	Wetland	Upland
<i>Lindera benzoin</i>	Northern spicebush	FACW	X	



HERBS & VINES				
Scientific	Common	Indicator	Wetland	Upland
<i>Impatiens capensis</i>	Jewelweed	FACW	X	X
<i>Symplocarpus foetidus</i>	Skunk cabbage	OBL	X	
<i>Poa palustris</i>	Fowl blue grass	FACW	X	X
<i>Persicaria sagittata</i>	Arrow-leaved tearthumb	OBL	X	X
<i>Solidago rugosa</i>	Common wrinkle-leaved goldenrod	FAC	X	X
<i>Parthenocissus quinquefolia</i>	Virginia creeper	FACU	X	X

\*Denotes state-listed non-native invasive species

## SOIL MAP TYPES

The Cooperative Soil Survey used seven map units when they mapped the Site. The map units, listed below, are upland soils; no wetland units were mapped within the project area. Descriptions of the named series which make up these map units are presented below including information from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Official Series Descriptions. Mapping from the NRCS Web Soil Survey tool is included in Appendix E. Further information on these and other soils, please refer to the internet site at <http://soils.usda.gov/technical/classification/osd/index.html>.

### Upland Soils

The following soil series or their similar analogs were observed in the field.

#### Ellington (Eh) silt loam

The Ellington series consists of very deep, moderately well drained soils formed in loamy over sandy and gravelly glacial outwash. Slope commonly is 0 to 8 percent, but the range includes 0 to 15 percent. The soils formed in loamy over stratified sandy and gravelly outwash derived from reddish brown sedimentary rocks and basalt. Diagnostic horizons and other features in this pedon include an ochric epipedon from 0 to 8 inches (Ap horizon) a cambic horizon from 8 to 26 inches (Bw1 and Bw2 horizons) and aquic features (low chroma iron depletions are within a depth of 24 inches from the surface (Bw horizon)).

#### Enfield (704B) silt loam

The Enfield series consists of very deep, well-drained loamy soils formed in a silty mantle overlying glacial outwash. Enfield soils are nearly level to sloping soils on terraces and outwash plains. Slopes range from 0 to 15 percent but are generally less than 8 percent. The soils formed in a silty mantle over stratified sandy and gravelly fluvial materials derived from a variety of acidic rocks. The soils diagnostic horizons include an ochric epipedon – (0 to 7 inches (Ap horizons)) and a cambic horizon (from 7 to 25 inches (the Bw horizon)).



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### Hartford sandy loam (33)

The Hartford series consists of very deep, somewhat excessively drained soils formed in sandy glacial outwash. They are nearly level to strongly sloping soils on plains and terraces. Slope ranges from 0 to 8 percent. The soils formed sandy and gravelly glaciofluvial materials derived mainly from red sedimentary rocks and basalt. The soils diagnostic horizons include an Ochric epipedon (0 to 8 inches (Ap horizon), and a cambic horizon (8 to 26 inches (Bw horizon).

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### Tisbury silt loam

The Tisbury series consists of very deep, moderately well drained loamy soils formed in silty eolian deposits overlying outwash materials derived from a variety of acid rocks. They are nearly level and gently sloping soils on outwash plains and terraces, typically in slight depressions and broad drainageways. The slope ranges from 0 to 3 percent. Diagnostic horizons in this pedon include an ochric epipedon (0 to 8 inches (Ap)), and a cambic horizon (8 to 26 inches).

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### Wethersfield Series

The Wethersfield series consists of very deep, well drained loamy soils formed in dense glacial till on uplands. The soils are moderately deep to dense basal till. They are nearly level to steep soils on till plains, low ridges, and drumlins. The soils formed in acid glacial till derived mostly from reddish sandstone, shale, and conglomerate with some basalt. Diagnostic horizons include: an ochric epipedon (1 to 3 inches, A horizon) and a cambic horizon (3 to 27 inches, Bw horizon).

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## REFERENCES

1. Brinson, M.M. 1993. *A Hydrogeomorphic Classification for Wetlands*. Tech. Rpt.WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
2. Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe, 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service. Washington, D.C. FWS/OBS-79/31.
3. Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
4. U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*. ERDC/EL TR-12-1
5. United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil descriptions. Internet site: <http://soils.usda.gov/technical/classification/osd/index.html>).

Bradley Parsons, PE, PMP  
Verogy  
Ref: 43323.00  
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Page 6



## CLOSING

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Thank you for the opportunity to work with you on this Project. Please contact Jeffrey Shamas at 860-807-4388 if you have any questions or require additional assistance.

Sincerely,

Vanasse Hangen Brustlin, Inc.

A handwritten signature in black ink, appearing to read "Sf", positioned above the name Sara Berryman.

Sara Berryman, CSS  
Wetland Scientist  
[Sberryman@vhb.com](mailto:Sberryman@vhb.com)

A handwritten signature in black ink, appearing to read "J. Shamas", positioned above the name Jeffrey R. Shamas.

Jeffrey R. Shamas, CE, CSS, EVN SP, SPWS  
Director, Energy & Natural Sciences  
[Jshamas@vhb.com](mailto:Jshamas@vhb.com)

### Attachments:

- Figure 1 – USGS Site Location Map
- Figure 2 – Delineated Resources Map
- Appendix A – Site Photograph Log
- Appendix B – Web Soil Survey Map

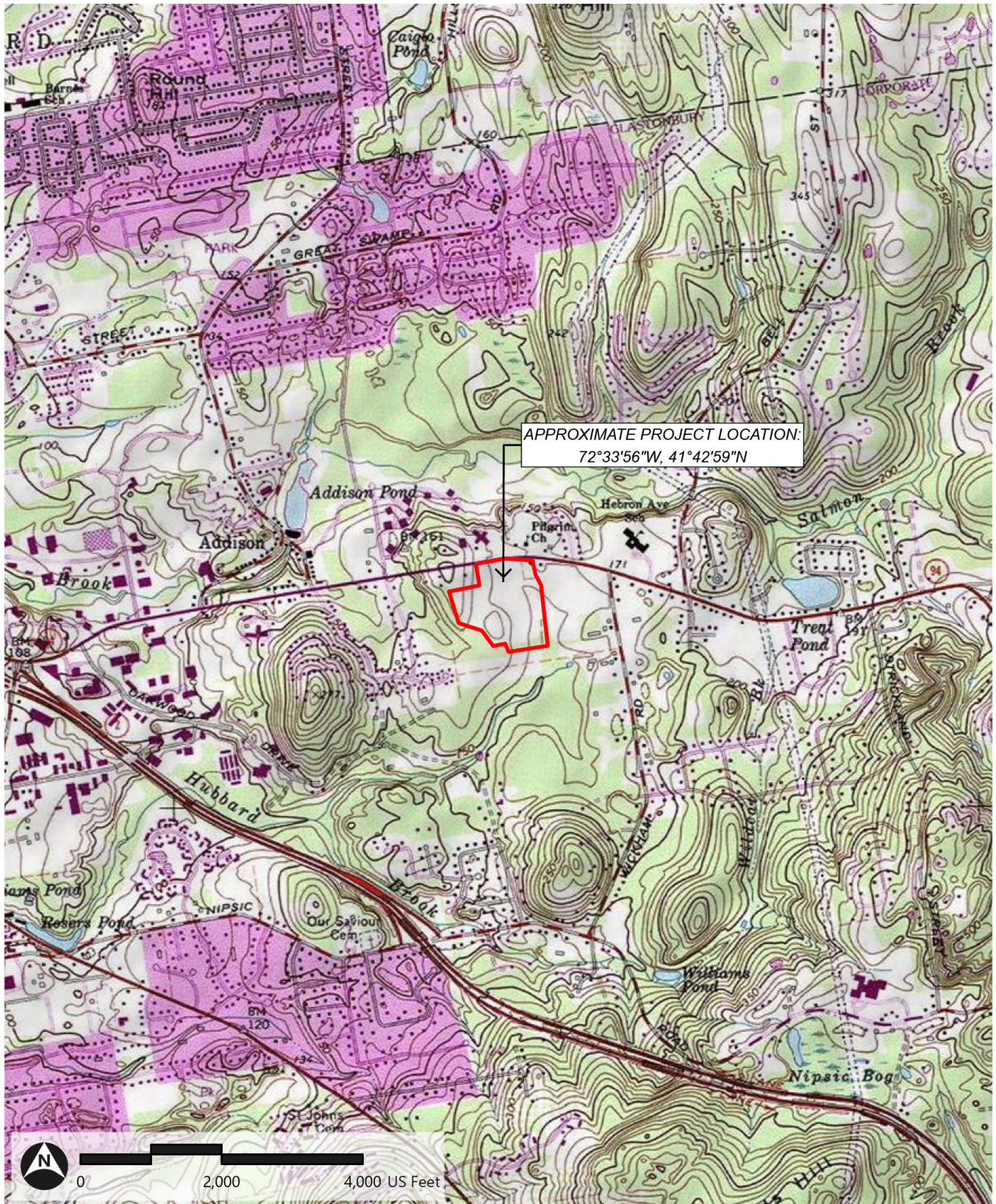


Figure 1 USGS Site Location Map

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# Figure 1: USGS Site Location Map

Verogy | Glastonbury, Connecticut



— Project Area

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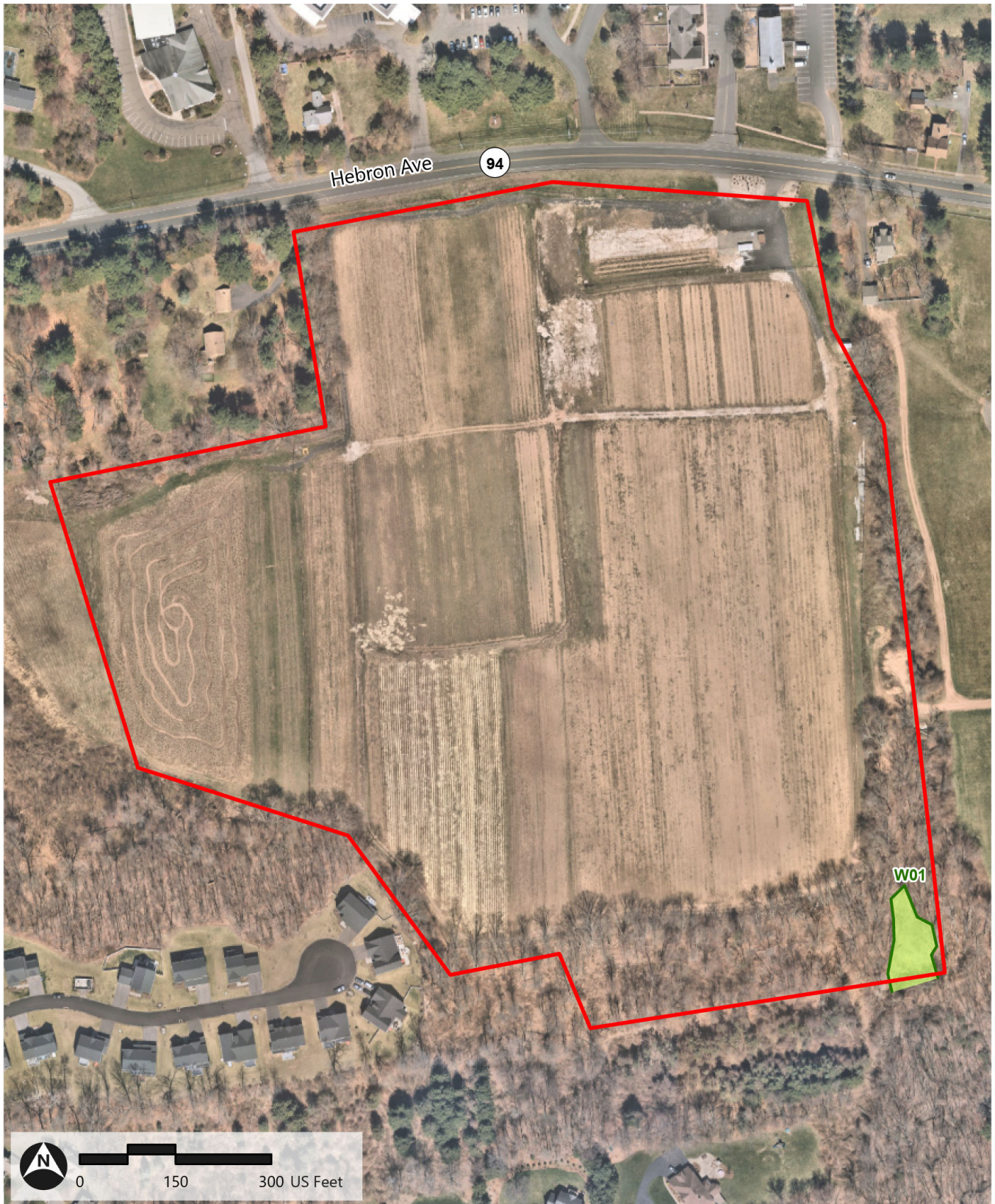




**Figure 2 Delineated Resources Map**

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**Figure 2: Delineated Resources Map**  
Verogy | Glastonbury, Connecticut



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- Project Area
- Delineated Wetland Boundary
- Delineated Wetland Area



## Appendix A Site Photographic Log

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**Client Name:** Verogy

**Site Location:** Glastonbury, CT

**Project No:** 43323.00

**Photo No.:** 1

**Date:** 7/17/2023

**Description:** Facing east, a view from the central portion of the site. The entrance to the field is in the photo to the left.



**Client Name:** Verogy

**Site Location:** Glastonbury, CT

**Project No:** 43323.00

**Photo No.:** 2

**Date:** 7/17/2023

**Description:** Facing north, a view from the central portion of the site. Hebron Avenue is seen in the distance.



**Client Name:** Verogy

**Site Location:** Glastonbury, CT

**Project No:** 43323.00

**Photo No.:** 3

**Date:** 7/17/2023

**Description:** Facing west, a view from the central portion of the site.



**Client Name:** Verogy

**Site Location:** Glastonbury, CT

**Project No:** 43323.00

**Photo No.:** 4

**Date:** 7/17/2023

**Description:** Facing southwest, a view of the site from the northeast corner.



**Client Name:** Verogy      **Site Location:** Glastonbury, CT      **Project No:** 43323.00

**Photo No.:** 5      **Date:** 7/17/2023

**Description:** Facing southeast, a view from the southcentral area of the site.



**Client Name:** Verogy      **Site Location:** Glastonbury, CT      **Project No:** 43323.00

**Photo No.:** 6      **Date:** 7/17/2023


**Description:** Facing east, a view from the southcentral area of the site.



**PHOTOGRAPHIC LOG**

<b>Client Name:</b> Verogy		<b>Site Location:</b> Glastonbury, CT	<b>Project No:</b> 43323.00
<b>Photo No.:</b> 7	<b>Date:</b> 7/17/2023		
<b>Description:</b> Facing east, a view of the site from the southeast corner.			

**PHOTOGRAPHIC LOG**

<b>Client Name:</b> Verogy		<b>Site Location:</b> Glastonbury, CT	<b>Project No:</b> 43323.00
<b>Photo No.:</b> 8	<b>Date:</b> 7/17/2023		
<b>Description:</b> Facing west, a view of the site from the southeast corner.			

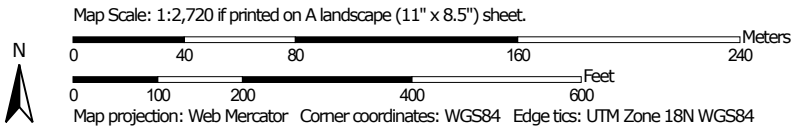


## Appendix B Web Soil Survey Map

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Soil Map—State of Connecticut  
(Verogy 3MW-AC Solar Project, Glastonbury, CT)



## 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 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: Jun 14, 2022—Oct 6, 2022

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
20A	Ellington silt loam, 0 to 5 percent slopes	0.3	1.8%
33A	Hartford sandy loam, 0 to 3 percent slopes	5.1	26.6%
33B	Hartford sandy loam, 3 to 8 percent slopes	5.3	27.6%
87B	Wethersfield loam, 3 to 8 percent slopes	4.9	25.8%
87C	Wethersfield loam, 8 to 15 percent slopes	0.9	4.6%
702A	Tisbury silt loam, 0 to 3 percent slopes	0.0	0.2%
704B	Enfield silt loam, 3 to 8 percent slopes	2.6	13.4%
<b>Totals for Area of Interest</b>		<b>19.1</b>	<b>100.0%</b>



September 29, 2023

Ref: 43323.00

Bradley Parsons, PE, PMP  
Verogy  
124 LaSalle Road  
West Hartford, Connecticut

Re: Vernal Pool Investigation Letter  
3MW-AC Solar Project, 17 Wickham Road, Glastonbury, Connecticut

Bradley,

VHB completed an on-site investigation to determine the presence or absence of inland wetlands and watercourses at 17 Wickham Road (Glastonbury Assessor's MBL G5-2920-S0054) in Glastonbury, Connecticut as requested and authorized. In addition, and as is typical with our delineation field work, we include identifying potential vernal pools. This investigation encompassed the entire parcel (herein referred to as the Project Site) and was completed by a Certified Professional Soil Scientist.

## REGULATORY INFORMATION

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As defined in the Connecticut Inland Wetlands and Watercourses Act §22a-38 CGS, 'watercourses' are defined as "rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, **vernal or intermittent**, public or private, which are contained within, flow through or border upon the state or any portion thereof." Therefore, under state law, vernal pools, which contain a specific ecology, are one type of vernal watercourse. Vernal pools are seasonal depressional wetlands, which in the northeast occur in glaciated areas that are covered by shallow water for variable periods from winter to spring but may be completely dry during the summer and fall.

## INVESTIGATION & METHODOLOGY

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The Project Site was investigated on July 17 and August 31, 2023, during which time a delineation and potential vernal pool investigation based on criteria used in the State of Connecticut Inland Wetlands and Watercourse Act were completed. Weather was seasonable, sunny with temperatures in the high-70's. The Project Area is an agricultural parcel spanning approximately 15 acres, surrounded by residential development.

The Project Site was investigated and any depressional areas with evidence of or having the potential evidence of suitable habitat for amphibian breeding activity. Due to the time of year the investigation occurred, egg masses were not able to be observed, however visual/auditory observations of vernal pool



species, including turning over duff<sup>1</sup> and investigating any suspicious depressional areas that may exhibit a long enough hydroperiod in the spring time of the year was completed. and, if evidence of the site having the potential for vernal pools was found, these results would have been included in our Wetland and Watercourse Delineation Report noted above. Typical vernal pool species include wood frog (*Lithobates sylvaticus*), spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*Ambystoma laterale*), marbled salamander (*Ambystoma opacum*), Jefferson's salamander (*Ambystoma jeffersonianum*), and/or fairy shrimp (*Branchiopoda anostraca*).

No evidence of vernal pool species was observed within the Project Site. While the site was not investigated during the active amphibian breeding season, no auditory observations were heard or evidence of species hiding under duff or stones and only one wetland was observed and delineated on the southeast portion of the project area. As such, no impacts to vernal pool species are anticipated within the project area or additional studies recommended.

## CLOSING

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Thank you for the opportunity to work with you on this Project. Please contact Jeffrey Shamas at 860-807-4388 if you have any questions or require additional assistance.

Sincerely,

Vanasse Hangen Brustlin, Inc.

A handwritten signature in black ink, appearing to read "Sara Berryman".

Sara Berryman, CSS  
Wetland Scientist  
[sberryman@vhb.com](mailto:sberryman@vhb.com)

A handwritten signature in black ink, appearing to read "Jeffrey R. Shamas".

Jeffrey R. Shamas, CE, CSS, ENV SP, SPWS  
Director, Energy & Natural Sciences  
[jshamas@vhb.com](mailto:jshamas@vhb.com)

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<sup>1</sup> Forest duff: is the part of a [forest ecosystem](#) that is the aboveground portion of the [forest](#) and the mineral [soil](#), principally composed of dead and decaying plant matter such as rotting [wood](#) and shed [leaves](#).