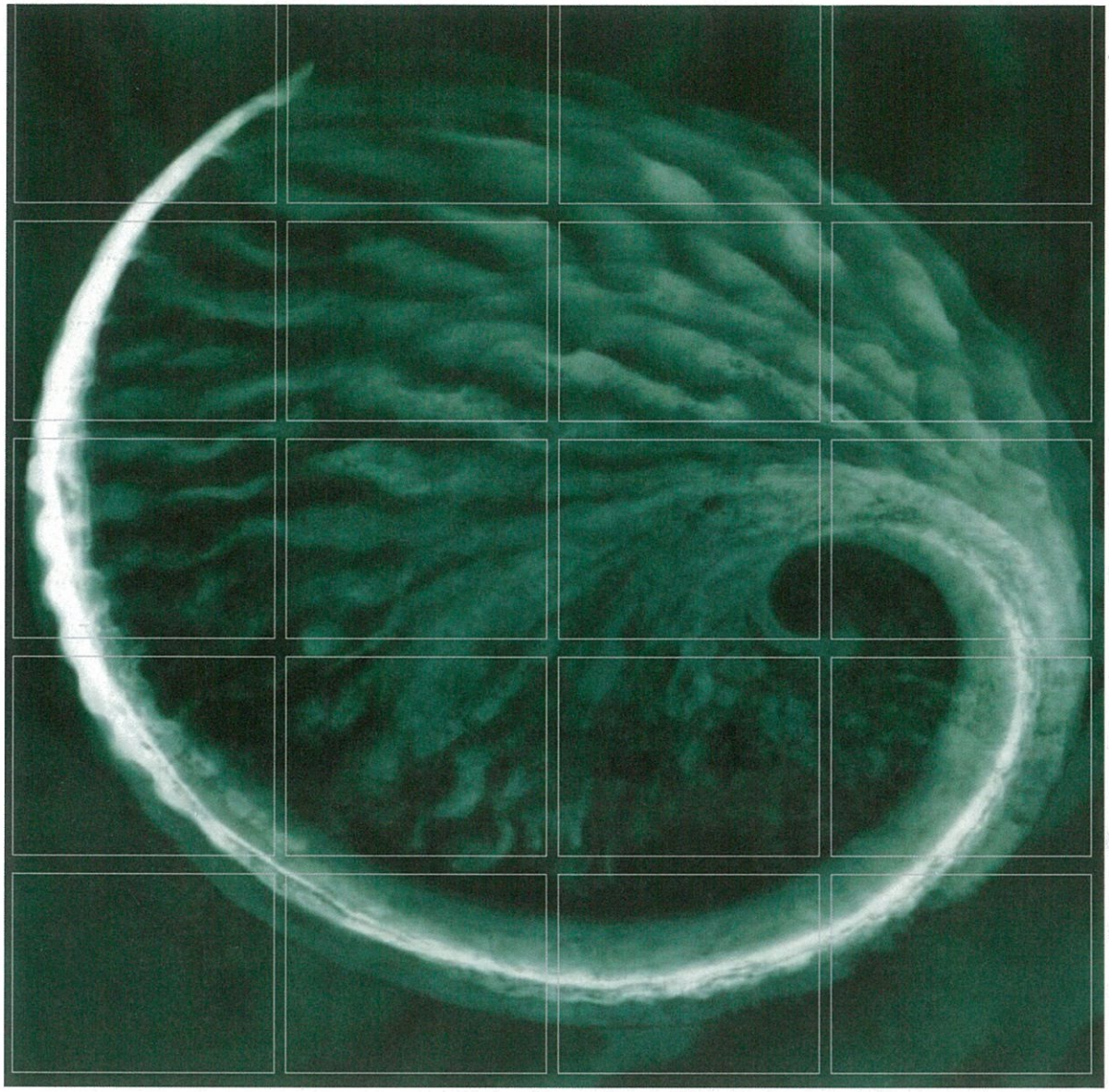

# Wetland Delineation Report
# Landau Solar, LLC Site

*2986 – 3040 Route 32*
*Kingston, New York 12401*
*Town of Ulster, Ulster County*

*Prepared For:*
Landau Solar, LLC and
Cypress Creek Renewables, LLC
3250 Ocean Park Boulevard, Suite 355
Santa Monica, California 90405

*Prepared by:*
Environmental Resources Management, Inc.

October 9, 2017

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## 1.0 *INTRODUCTION*

Environmental Resources Management, Inc. (ERM) was retained by Landau Solar, LLC to conduct a routine wetland delineation within an approximately 200-acre site in the Town of Ulster, Ulster County, New York. Cypress Creek Renewables, LLC (CCR) proposes the installation of Landau Solar, LLC (Project), a 3,000 kW ground-mounted Photovoltaic (PV) solar system. The system will operate as a Community Distributed Generation (CDG) facility as prescribed by the New York State Public Service Commission under the electric tariffs of New York State Electric & Gas (NYSEG) and is designed to meet the size and energy generating requirements under the New York State Energy Research and Development Authority (NYSERDA) Megawatt Block Incentive Program. The Project will comprise approximately 35 acres of land and is sited within an approximate 200-acre parcel (Study Area) under evaluation. The Project will consist of ground-mounted, solar PV panels in a fixed-tilt configuration and associated racking and electrical equipment at a maximum height of 12 feet. Electrical connections, between the array and inverter and between the transformer and riser, are primarily underground. Typical construction of the system will involve driving posts approximately 4 to 6 feet into the ground every 12 to 16 feet followed by mounting the panel racks to the posts. Ancillary facilities including inverters and transformers will be installed on a concrete pad approximately 500-square feet in size and fencing installed around the Project for security. The Project will require tree clearing; however, the Project will be designed to minimize tree clearing to the extent practicable. Perimeter roads will be established during the construction period to allow heavy equipment access; however, improved travel infrastructure is not proposed. Once constructed, the site will be seeded with a mixture of native, low growing grasses that will undergo mechanical maintenance, as needed.

Cypress Creek Renewables, LLC is evaluating the environmental features of the site to assess the feasibility of constructing the above-described solar energy project on the property. The purpose of this study was to identify and delineate the extent of all wetlands and waters on the subject property.

## 2.0 *SITE LOCATION*

The Landau Solar, LLC Site (Site) was located east of State Route 31 and west of State Route 213, in the Town of Ulster, Ulster County, New York (41.901786, -74.021906). The Site consists of five tax parcels (PCA 56.14-1-24, PCA 56.14-2-36.1, PCA 56.14-2-18, 56.14-2-20, and 56.14-2-35)

approximately 200 acres in total area, and has been developed in the past. The site is an irregular polygon shape within a rural residential area on the Kingston West, NY (1960) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (Figure 1). An aerial photograph of the site is provided as Figure 2.

The Site is located in the Lower Hudson River Basin and situated in the Upper Rondout Creek Watershed (Watershed Unit 02020007-05). According to the Federal Management Agency (FEMA) Flood Map Service Center online database[1], the southern edge of the Site adjacent to State Route 213/Mountain Road is located within the 100-year and 500-year floodplains as shown on Figure 3.

## *3.0 EXISTING SITE CONDITIONS*

The site contained numerous small unpaved roads which appeared to be actively used by all-terrain vehicles (ATVs). In addition, the site contained several large abandoned structures as well as underground piping associated with those structures. An active mechanic shop was observed directly across the street from the site boundary. It is apparent the site has been used to dump trash for several years. During the survey several large appliances, two cars, several tire piles, and empty metal drums were observed on the site.

The site was dominated by hardwood forest. Wetland cover types included shallow emergent marsh and red maple hardwood swamp. Upland cover types within the property boundary included:

- Unpaved road/path;
- Urban structure exterior;
- Mine spoils;
- Urban vacant lot; and
- Successional southern hardwood forest
- Red-maple hardwood swamp

Vegetation consisted of upland and wetland forest. Within upland forested areas dominant species included eastern hemlock (*Tsuga canadensis*), tree of heaven (*Ailanthus altissima*), and red oak (*Quercus rubra*), white oak (*Quercus alba*), and red maple (*Acer rubrum*). Forested wetland areas were dominated by red maple, swamp oak (*Quercus*

[1] https://msc.fema.gov/portal/search

*palustris*), and American elm (*Ulmus americana*). United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (Figure 4) maps indicated the presence of federal wetlands on the site. New York State Department of Environmental Conservation (NYSDEC) freshwater wetlands maps (Figure 5) did not show state regulated wetlands on the site. Three unnamed streams were identified on the site by the NHD mapping (Figure 4).

The site topography was slightly convex with the top of the slope near the eastern boundary of the site. The property ranged in elevation from approximately 180 feet to 320 feet above mean sea level, with highest elevations in the eastern portion of the site and lowest elevations in the western portion of the site.

Soils on the site consisted of sandy loams and silt loams with slopes ranging from nearly level in the northern and central portion of the site to greater than 15 percent in southern portion of the site. As shown on Figure 6, the U.S. Department of Agriculture (USDA) Natural Resource Conservation Science (NRCS) county soil survey, the following soil mapping units were identified on the site:

- Bath-Nassau complex, 8 to 25 percent slopes;
- Bath-Nassau-Rock outcrop complex, hilly;
- Farmington-Rock outcrop complex, steep;
- Gravel pit;
- Nassau-Bath-Rock outcrop complex, very steep;
- Plainfield loamy sand, 8 to 15 percent slopes;
- Plainfield-Rock outcrop complex, rolling;
- Quarry;
- Raynham silt loam;
- Riverhead fine sandy loam, 3 to 8 percent slopes; and
- Stockbridge-Farmington-Rock outcrop complex, hilly

The Bath-Nassau complex, Bath-Nassau-Rock outcrop complex, Farmington-Rock outcrop, Nassau-Bath-Rock outcrop, Plainfield loamy sand, Quarry, Riverhead fine sandy loam, and Stockbridge-Farmington-Rock outcrop complex soil series are generally well drained soils found in uplands. The Gravel pit and Raynham silt loam are identified as hydric soils by the USDA National Technical Committee for Hydric Soils[2].

[2] http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/

## 4.0 *METHODOLOGY*

Wetlands and other waters of the U.S. are federally protected under Section 404 of the Clean Water Act. The definition of wetlands[3] is, "*those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.*"

ERM performed a wetlands/waters of the U.S. delineation of the Site on October 25, 27, & 29, 2016, in accordance with the three-parameter methodology outlined in the 1987 United States Army Corps of Engineers (*USACE) Wetlands Delineation Manual* (Manual), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, and per recent guidance issued jointly by the U.S. Environmental Protection Agency and the USACE that resulted from the *Rapanos vs. U.S.* and *Carabell vs. U.S.* Supreme Court decisions.

The three parameters required for identifying a jurisdictional wetland are as follows:

- <u>The predominance of hydrophytic vegetation</u> - Hydrophytic vegetation, defined as vegetation that is classified as obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC) in the current National Wetland Plant List[4], must exhibit predominance at any given data sampling point within a wetland. Predominance is determined in a sequence of up to four indicator tests that are performed on an if/then logic test basis. Once predominance is established by any of the steps, no further tests need be performed. Indicator test 1 is the rapid test of hydrophytic vegetation. This indicator confirms hydrophytic vegetation dominance if all dominant plant species across all vegetation strata (forb/herb, shrub, tree) are classified as OBL or FACW. Indicator test 2 is the dominance test. Hydrophytic vegetation is considered to be dominant if more than 50% of the dominant plant species (those occupying 20% or more of the sampling plot) across all strata are rated OBL, FACW, or FAC. Indicator test 3 is based on a prevalence index. The prevalence index ranges from 1 to 5, and is a

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[3] 40 CFR §230.3(t)

[4]Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List. 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

weighted average of wetland indicator status of all plant species in a sample plot. Each wetland indicator status is assigned a value: OBL=1; FACW=2; FAC=3; FACU (facultative upland)=4; and UPL (upland)=5. These assigned values are multiplied by the absolute percent cover of all plant species assigned that indicator status. The product of each indicator value is then added, then divided by the total percent cover, yielding the prevalence index. In order for a sample plot to have dominant hydrophytic vegetation, it must yield a prevalence index of 3 or less. Indicator test 4 is based on observation of morphological adaptations of plants. Some plant species have evolved morphological adaptations to survive in persistently flooded or saturated soils. Such adaptations include: multi-stemmed trunks, buttressed trunks, shallow root systems, tussock growth formation, adventitious roots, and hypertrophied lenticels. Observations of such adaptations provide evidence of hydrophytic vegetation dominance.

- The presence of hydrology – Each data sample point is also evaluated for evidence of wetland hydrology, or persistent saturation or inundation of soils. The Manual identifies both primary and secondary hydrologic indicators, and one primary indicator or two secondary indicators must be observed in order for the sample point to meet the hydrology criterion. Indicators include saturated soils in the upper 12 inches, inundation, water marks, drift lines, sediment deposits, drainage patterns, oxidized root channels in the upper 12 inches, water-stained leaves, local soil survey data, and others.

- The presence of hydric soils – Soils in each sample plot are sampled with a soil spade to a depth of at least 20 inches, or to the B horizon, whichever appears first. The delineator obtains a profile description and identifies hydric soil indicators based on soil texture(s) and soil color(s). Soil textures are determined by manual tactile sampling (by "feel"), and by conducting a ribbon test. Soil colors (in a moist condition) are compared to Munsell Soil-Color charts (2009 Edition, 2015 production year, Munsell Color, Grand Rapids, MI, USA) to determine hue, value, and chroma. The most frequent hydric soil indicator in New York soils is typically a depleted soil matrix in the B-horizon, indicated by soil chroma numbers $\leq 3$, though others may also be evident.

Under the USACE methodology, an area is classified as a wetland only in instances where all three parameters exist under normal circumstances. If one or more criteria are absent, then the area is deemed upland.

To identify wetlands within the site, the area was traversed on foot. Sampling plots were established within each wetland and in adjacent uplands to determine the location of the wetland boundary. Each wetland boundary point was established at the upper extent of any of the three wetland indicators: wetland soils, hydrophytic vegetation, and hydrology.

ERM utilized a Trimble GeoXH Global Positioning System (GPS)(Trimble Navigation Limited, Sunnyvale, CA, USA) to obtain coordinates for the wetland data points, and wetland boundaries. This unit was capable of sub-foot accuracy (following post-processing and differential correction via a known base station) and allowed the digital data to be incorporated into drawings for mapping/design purposes.

Several portions of the Site were not visited during the site investigation. These areas are shown in red on Figure 7.

## *5.0 FINDINGS*

During the site's wetland delineation, 6 wetland features, 2 ponds, and 18 streams totaling 5.74 acres of wetlands, 0.56 acres of ponds, and 9,035 linear feet of stream were identified and surveyed within the site with approximately 5.51 acres of wetlands, 0 acres of ponds, and 7,403 linear feet of stream being federally regulated. These wetlands and waters are depicted in Figure 7, and metrics of each wetland and water are summarized in Table 5.0-1. Not all areas that contain wetlands are regulated by the USACE and NYSDEC. The USACE only regulates wetlands that are also waters of the United States (U.S.). Certain isolated wetlands and intermittent and ephemeral watercourses are not waters of the U.S., and are not regulated by the USACE. NYSDEC generally only regulates wetland areas that appear on adopted NYDEC Freshwater Wetlands Maps, occur within 50 meters of such wetlands, or are hydrologically connected to such wetlands. NYSDEC may opt to also regulate any freshwater wetland larger than 12.4 acres in size (total) that is not on the map, once the landowner is notified of their intention to regulate such wetland. Therefore, no wetlands on this site should be regulated by NYSDEC.

The wetlands identified on the site in this investigation include the following. Additional information and datasheets for each feature can be found in Appendix C.

- **Wetland 1 (0.18 acres)** was classified as a Palustrine Emergent (PEM1E), seasonally saturated isolated wetland set in a topographical depression. Wetland vegetation was dominated solely by common reed (*Phragmites australis*) which has a wetland

indicator status of FACW. It is more than 750 feet from the nearest relatively permanent water (RPW) and more than one mile from the nearest traditionally navigable water (TNW). This feature does not appear to be regulated by the USACE because it is not connected to a RPW or TNW, either physically, biologically, or chemically. The basin has no physical outlet or inlet, and appears to be a perched basin that receives its hydrology by overland flow. It does not absorb or emit chemicals or nutrients from or to other wetlands or waters, and is therefore not chemically connected to any other wetland. Finally, wildlife species may use this wetland for dispersal across the landscape, and as a water resource, but are not likely to be dependent on this wetland to keep adjacent wetlands populated, especially because of the expansive wetland areas nearby. Therefore, there is no significant nexus between this wetland and RPWs or TNWs, and it should not be regulated. It is not regulated by NYSDEC because it is less than 12.4 acres in size and does not appear on any NYSDEC Freshwater Wetland Map. The approximate center of this feature is 41.903335°N, -74.018922°W.

- **Wetland 2 (3.30 acres)** was classified as a Palustrine Broad-leaved Deciduous Forested (PFO1E), seasonally saturated wetland set in a topographical depression. Wetland vegetation is dominated by swamp white oak (*Quercus palustris*) and red maple (*Acer rubrum*). Japanese stilt grass (*Mirostegium vimineum*) was present in the herbaceous stratum. Wetland 2 has several streams passing through the wetland including Streams 10, 11, and 12. Wetland 2 was physically connected to an RPW (Twaffskill Brook) which discharged to a TNW (Rondout Creek). Although, Wetland 2 was not mapped on the National Wetlands Inventory (NWI) Map it is considered jurisdictional by the USACE because it was physically connected to a RPW. The approximate center of this feature is 41.903403°N, -74.026687°W.

- **Wetland 3 (0.01 acres)** was classified as a PEM1E, seasonally saturated isolated wetland set in an isolated topographical depression. Wetland vegetation was dominated by green ash (*Fraxinus pennsylvanica*) which has a wetland indicator status as FACW. This wetland has a drainage area of less than 10 acres and no surface water inlet or outlet is associated with this wetland. It is more than 750 feet from the nearest RPW and more than one mile from the nearest TNW. This feature does not appear to be regulated by the USACE because it is not connected to a RPW or TNW, either physically, biologically, or chemically. The basin has no physical outlet or inlet, and appears to be a perched basin that receives its

hydrology by overland flow. It does not absorb or emit chemicals or nutrients from or to other wetlands or waters, and is therefore not chemically connected to any other wetland. Finally, wildlife species may use this wetland for dispersal across the landscape, and as a water resource, but are not likely to be dependent on this wetland to keep adjacent wetlands populated, especially because of the expansive wetland areas nearby. Therefore, there is no significant nexus between this wetland and RPWs or TNWs, and it should not be regulated. It is not regulated by NYSDEC because it is less than 12.4 acres in size and does not appear on any NYSDEC Freshwater Wetland Map. The approximate center of this feature is 41.901099°N, -74.0257062°W.

- **Wetland 4 (0.04 acres)** was classified as a PEM1E, seasonally saturated isolated wetland set in an isolated topographical depression. Wetland vegetation is dominated by red maple. Shallow sedge (*Carex lurida*) was observed in the herbaceous stratum which has an indicator status of OBL. It is more than 750 feet from the nearest RPW (Twaalfskill Brook) and more than one mile from the nearest TNW (Rondout Creek). This feature does not appear to be regulated by the USACE because it is not connected to a RPW or TNW, either physically, biologically, or chemically. The basin has no physical outlet or inlet, and appears to be a concave basin that receives its hydrology by overland flow. It does not absorb or emit chemicals or nutrients from or to other wetlands or waters, and was therefore not chemically connected to any other wetland. Wildlife species may use this wetland for dispersal across the landscape, and as a water resource, but are not likely to be dependent on this wetland to keep adjacent wetlands populated, especially because of the expansive wetland areas nearby. Therefore, there was not significant nexus between this wetland and RPWs or TNWs, and it should not be regulated. It was not regulated by NYSDEC because it is less than 12.4 acres in size and does not appear on any NYSDEC Freshwater Wetland Map. The approximate center of this feature is 41.9016322°N, -74.0277855°W.

- **Wetland 5 (2.09 acres)** was a Palustrine Broad-leaved Deciduous Forested (PFO1E), seasonally saturated wetland. Wetland vegetation was dominated by red maple and American elm (*Ulmus Americana*). Christmas fern (*Polystichum acrostichoides*), Morrow's honeysuckle (*Lonicera morrowii*), and wrinkleleaf golden rod (*Solidago rugose*) was present in the herbaceous stratum. Wetland 5 had several streams passing through the wetland including Stream 5-10 and 16-18. Wetland 5 was physically connected to a RPW (Twaffskill Brook) via an unnamed tributary, and Twaffskill Brook

discharges to a TNW (Rondout Creek). Although, Wetland 5 is not mapped on the NWI Map it is considered jurisdictional by the USACE because of its connection to a RPW and TNW. The approximate center of this feature is 41.905661°N, -74.021007°W.

- **Wetland 6 (0.12 acres)** was classified as a PEM1E, seasonally saturated wetland that abuts Stream 10. Wetland vegetation was dominated by Canadian clearweed (*Pilea pumila*) which has a wetland indicator status as FACW. This wetland abutted Stream 10, a perennial stream which connects to a RPW. This feature appeared to be regulated by the USACE because it is connected to a RPW or TNW. Although, Wetland 6 was not mapped on the NWI Map it was considered jurisdictional by the USACE because of the connection to a RPW (Twaalfskill Brook). Therefore, there was significant nexus between this wetland and RPWs or TNWs (Rondout Creek), and it should be regulated. It is not regulated by NYSDEC because it is less than 12.4 acres in size and does not appear on any NYSDEC Freshwater Wetland Maps. The approximate center of this feature is 41.906238°N, -74.021569°W.

*Waterbodies*

- **Pond 1 (0.30 acres)** was considered an isolated man-made freshwater pond, approximately 5-feet deep, with a fringe wetland along the boundary. It was mapped on the NWI as a permanently flooded, excavated palustrine pond with unconsolidated bottom (PUBHx). This water body's vegetation was dominated by common reed which is an emergent plant species with a wetland indicator status of FACW. This feature was in an isolated topographic depression with no inlet or outlet, and did not appear to absorb or export nutrients that would benefit another wetland. It was considered an unlikely dispersal stepping stone for amphibians as it was located at the top of a ridge and nearly 1,000 feet in all directions from connected wetland systems. Therefore, it did not exhibit a physical, chemical, or biological nexus to a RPW or TNW, and thus should not be regulated by USACE. The coordinates of the ends of this waterbody on the property were: 41.904947°N, -74.017029°W.

- **Pond 2 (0.22 acres)** was also considered an isolated man-made freshwater pond, with a fringe of sparse woody vegetation around its perimeter. At the time of the delineation, it held no water, but aerial photos indicate it has been inundated in the past, which suggests that it may be seasonally flooded. It was mapped on the NWI as an excavated, semipermanently flooded palustrine pond

with unconsolidated bottom (PUBFx), but its correct classification may be excavated seasonally flooded palustrine pond with unconsolidated (gravel) bottom (PUB1Cx). This feature was in an isolated topographic depression with no inlet or outlet, and did not appear to absorb or export nutrients that would benefit another wetland. It was considered an unlikely dispersal stepping stone for amphibians as it was located at the top of a ridge and nearly 1,000 feet in all directions from connected wetland systems. Therefore, it did not exhibit a physical, chemical, or biological nexus to a RPW or TNW, and thus should not be regulated by USACE. The coordinates of this pond were: 41.901920°N, -74.020931°W.

- **Streams 1, 2, 3, and 4 (1632.31 linear feet)** were linear topographic depressions that contained erosional rills from concentrated surface runoff flowing through constricted spaces and dissipating as sheet flow. The substrate was dominated by gravel. Streams 1-4 were classified as riverine intermittent, sandy streambed (R4SB3) under the Cowardin system. These watercourses appear to carry surface water for only very brief periods after rainfall as it was observed as drainage from a disturbed ATV recreational area. The watercourses were collectively 1632 feet long and typically 1-3 feet wide and interconnected. These watercourses were about 1,000 feet from the nearest RPW or TNW (Rondout Creek); however they were not associated with a NYSDEC or USACE mapped wetland or stream. These features would not appear to be regulated by the USACE because they contained no hydric soil, nor persistent hydrology. They are not regulated by NYSDEC because they are not mapped as regulated streams on the NYSDEC's stream protection maps. Therefore these features are considered to be non-jurisdictional by the USACE and NYSDEC.

- **Stream 5 (491.43 linear feet)** was a linear topographic depression that contained an ephemeral watercourse completely encompassed within Wetland 5. The substrate consisted of cobble, silt/clay, and organic material. It is classified as riverine intermittent, sandy streambed (R4SB3) under the Cowardin system. This watercourse appeared to carry surface water for only very brief periods after rainfall or overflow of wetland surface water. The watercourse was approximately 491 feet long and typically 2.5 feet wide and was fed by Streams 6, 9, 16, 17, and 18. It drained offsite to an unnamed intermittent stream that drained to Twaalfskill Brook (RPW) and then drained to Rondout Creek (TNW); however it is not associated with a NYSDEC mapped wetland or stream. This stream was considered part of Wetland 5, and is therefore regulated by the USACE as a water of the U.S. The coordinates of the ends of this

stream on the property were: 41.905314°N, -74.022142°W; 41.906065°N, -74.020801°W.

- **Stream 6 (736.11 linear feet)** was an unnamed intermittent watercourse which branches off from Stream 5 and was completely encompassed in Wetland 5. The substrate consisted of cobble, silt/clay and organic matter. It is classified as riverine intermittent, sandy streambed (R4SB3) under the Cowardin system. The watercourse was approximately 736 feet long and typically 3 feet wide, 0.3 feet deep and branches off to the south at Stream 7 and 8. It was about 35 feet from the nearest RPW unnamed stream that drains from Twaalfskill Brook (RPW) and then drains from Rondout Creek (TNW); however it is not associated with a NYSDEC mapped wetland or stream. This stream is regulated by the USACE, because it possessed hydrophytic vegetation, hydric soils, and was biologically connected via a RPW and TNW (Rondout Creek) to interstate waters. Therefore this feature is considered to be jurisdictional by the USACE. The coordinates of the ends of this stream on the property were: 41.905348°N, -74.022029°W; 41.903643°N, -74.022544°W.

- **Stream 7 (85.83 linear feet)** was an unnamed intermittent watercourse which branches off from Stream 5 and starts in Wetland 5 and continues outside the wetland. The substrate consisted of cobble, silt/clay and organic material. It was classified as riverine intermittent sandy streambed (R4SB3) under the Cowardin system. The watercourse was approximately 86 feet long and typically 1 foot wide and 0.1 foot deep. It was about 300 feet from the nearest RPW (unnamed stream or Stream 10); however it is not associated with a NYSDEC mapped wetland or stream. This stream was regulated by the USACE, because it possessed hydrology, hydrophytic vegetation, hydric soils, and was biologically and physically connected via a RPW and TNW (Rondout Creek) to interstate waters. Therefore this feature was considered to be jurisdictional by the USACE. The coordinates of the ends of this stream on the property were: 41.904741°N, -74.021984°W; 41.904657°N, -74.022265°W.

- **Stream 8 (72.33 linear feet)** was a linear topographic depression that contained an ephemeral watercourse that started in Wetland 5 then continued outside of the wetland. The substrate consisted of cobble and gravel. It was classified as riverine upper perennial, ephemeral (R4SB3) under the Cowardin system. This watercourse appeared to carry surface water for only very brief periods after rainfall or overflow of wetland surface water. The watercourse was

approximately 72 feet long and typically 1 foot wide and branched off from Stream 5. It was about 500 feet from the nearest RPW (Stream 10) that drains to Twaalfskill Brook (RPW) and then discharges to Rondout Creek (TNW); however it was not associated with a NYSDEC mapped wetland. This stream was regulated by the USACE, because it possessed hydrophytic vegetation, hydric soils, and was biologically and physically connected via a RPW and TNW (Rondout Creek) to interstate waters. Therefore this feature is considered to be jurisdictional by the USACE. The coordinates of the ends of this stream on the property were: 41.903819°N, -74.022947°W; 41.903831°N, -74.022665°W.

- **Streams 9, 16, 17, and 18 (total 701.38 linear feet)** were linear topographic depressions that contained four unnamed ephemeral watercourses. The substrate was dominated by gravel, silt/clay and organic material. Streams 9, 16, 17, and 18 were classified as riverine intermittent streambed, sand bottom (R4SB4) under the Cowardin system and all started within Wetland 5. These watercourses appear to carry surface water for only very brief periods after rainfall. The watercourses average approximately 175 feet long each and typically 1-3 feet wide and connected to the main channel Stream 5. These watercourses were about 50-100 feet from the nearest RPW (Stream 10) or TNW (Rondout Creek). It is not regulated by NYSDEC because it is not mapped on the NYSDEC's freshwater wetland or stream protection maps. These stream reaches are regulated by the USACE, because they possessed hydrophytic vegetation, hydric soils, and were biologically and physically connected via a RPW (Twaalfskill Brook) and TNW (Rondout Creek) to interstate waters.

- **Stream 10 (4,825 linear feet)** is an unnamed natural perennial stream that meanders around a hill, and is regulated by the USACE. Stream 10 starts flowing from abutting Wetland 6 to Wetland 2 where the stream narrows significantly before departing from the wetland and eventually flowing out of the parcel boundary to the northeast until it meets with Twaalfskill Brook (RPW). Stream 10 was identified in the NHD as an Unnamed Stream. The substrate consisted of cobble, gravel, and silt/clay. This feature's Cowardin classification was R3UB1 which is riverine, perennial with a cobble-gravel unconsolidated bottom. The watercourse was approximately 4,825 feet long and typically 15 feet wide and 0.5 feet deep until it enters Wetland 2 where it typically is 9.5 feet wide and 0.5 feet deep. Stream 10 is considered an RPW, and is federally regulated by the USACE because it connects to other RPWs and a TNW (Rondout Creek). This stream was

regulated by the USACE because it possessed hydrology, hydrophytic vegetation, hydric soils, and was biologically and physically connected via a RPW and TNW (Rondout Creek) to interstate waters. Therefore, this feature was considered to be jurisdictional by the USACE. The coordinates of the ends of this stream on the property were: 41.906438°N, -74.020999°W; 41.907891°N, -74.023639°W.

- **Streams 11 and 12 (total 119.32 linear feet)** were unnamed intermittent watercourses which were tributaries to Stream 10. They both started within Wetland 2 and continued outside the wetland. Stream 12, where it is within the delineated portion of the Site and it connects to Stream 10, was identified in the NHD as an Unnamed Stream. Upstream portions of the Unnamed Stream in the NHD were outside the delineated area at the Site and thus not evaluated during the site visit. The substrate of Stream 11 consisted of cobble and silt/clay, and the substrate of Stream 12 was organic material. Stream 11 was classified as riverine intermittent, cobble/gravel stream bed (R4SB3) under the Cowardin system. Stream 12 was classified as riverine intermittent, organic streambed (R4SB6), due to the change in substrate. The watercourses were approximately 119.32 feet long, typically 1-3 foot wide, and ranged from 0.2-0.3 feet deep. Both streams fed Stream 10 which was considered an RPW; however they were not associated with a NYSDEC mapped wetland or stream. These streams were regulated by the USACE, because they possessed hydrology, hydrophytic vegetation, hydric soils, and were biologically and physically connected via a RPW (Twaalfskill Brook) and TNW (Rondout Creek) to interstate waters. Therefore these features were considered to be jurisdictional by the USACE. The coordinates of the ends of this stream on the property were: Stream 11: 41.904242°N, -74.026884°W; 41.904282°N, -74.027013°W. Stream 12: 41.903161°N, -74.026627°W; 41.903032°N, -74.026846°W.

- **Streams 13, 14, and 15 (total 372.67 linear feet)** were all unnamed ephemeral watercourses. Their substrates were dominated by silt/clay and organic material. Streams 13-15 were classified as riverine intermittent, cobble/gravel streambeds (R4SB3) under the Cowardin system. These watercourses appeared to carry surface water for only very brief periods after rainfall as it was observed as straight drainages from Wetland 2. The watercourses were approximately 372 feet long in total and typically 1-3 feet wide. Streams 13 and 14 were connected directly to an RPW (Stream 10), however Stream 15 was about 300 feet from the nearest RPW (Stream 10) or TNW (Rondout Creek). None of these watercourses

were associated with a NYSDEC or USACE mapped wetland. These features appear to be regulated by the USACE due to their connection to RPWs and TNWs. The coordinates of the ends of this stream on the property were: Stream 13: 41.903084°N, -74.025838°W; 41.902805°N, -74.026069. Stream 14: 41.903024°N, -74.025516°W; 41.903857°N, -74.025452°W. Stream 15: 41.902393°N, -74.026246°W; 41.902042°N, -74.026439°W.

**Table 5.0-1. Summary Metrics of Wetlands and Waters of the U.S. on the Landau Solar Site, Town of Ulster, Ulster County, NY**

| Wetland or Stream Name And Order | Cowardin Class | Centroid (Wetland) or End Points (Stream) Coordinates | | Area (acres) | Length/Width (feet) of Stream Bed | Jurisdiction: USACE USACE/NYSDEC Non-Jurisdictional |
|---|---|---|---|---|---|---|
| | | Latitude (DD) °N | Longitude (DD) °W | | | |
| Wetland 1 | PEM1E | 41.903335 | -74.018922 | 0.18 | N/A | Non-Jurisdictional |
| Wetland 2 | PFO1E | 41.903403 | -74.026687 | 3.30 | N/A | USACE |
| Wetland 3 | PEM1E | 41.901099 | -74.0257062 | 0.01 | N/A | Non-Jurisdictional |
| Wetland 4 | PEM1E | 41.9016322 | -74.0277855 | 0.04 | N/A | Non-Jurisdictional |
| Wetland 5 | PFO1E | 41.905661 | -74.021007 | 2.09 | N/A | USACE |
| Wetland 6 | PEM1E | 41.906238 | -74.021569 | 0.12 | N/A | USACE |
| Pond 1 | PUBHx | 41.904947 | -74.017029 | 0.30 | N/A | Non-Jurisdictional |
| Pond 2 | PUBFx | 41.901920 | -74.020931 | 0.26 | N/A | Non-Jurisdictional |
| Stream 1 | R3UB1 | 41.904386<br>41.904957 | -74.017473<br>-74.018929 | N/A | 600 | Non-Jurisdictional |
| Stream 2 | R3UB1 | 41.903939<br>41.905452 | -74.018191<br>-74.017596 | N/A | 698 | Non-Jurisdictional |
| Stream 3 | R3UB1 | 41.904031<br>41.904166 | -74.018073<br>-74.018411 | N/A | 113 | Non-Jurisdictional |
| Stream 4 | R3UB1 | 41.904174<br>41.904534 | -74.017902<br>-74.018229 | N/A | 221 | Non-Jurisdictional |
| Stream 5 (Wetland 5) | R3UB1 | 41.905314<br>41.906065 | -74.022142<br>-74.020801 | N/A | 491 | USACE |
| Stream 6 (Wetland 5) | R4SB3 | 41.905348<br>41.903643 | -74.022029<br>-74.022544 | N/A | 736 | USACE |
| Stream 7 (Wetland 5) | R4SB3 | 41.904741<br>41.904657 | -74.021984<br>-74.022265 | N/A | 86 | USACE |
| Stream 8 (Wetland 5) | R4SB3 | 41.903819<br>41.903831 | -74.022947<br>-74.022665 | N/A | 72 | USACE |
| Stream 9 (Wetland 5) | R4SB3 | 41.904993<br>41.905348 | -74.021461<br>-74.021922 | N/A | 194 | USACE |
| Stream 10 (Wetlands 2 & | R3UB1 | 41.906438<br>41.907891 | -74.020999<br>-74.023639 | N/A | 4,825 | USACE |

| 6) | | | | | | |
|---|---|---|---|---|---|---|
| Stream 11 (Wetland 2) | R4SB3 | 41.904242<br>41.904282 | -74.026884<br>-74.027013 | N/A | 36 | USACE |
| Stream 12 (Wetland 2) | R4SB6 | 41.903161<br>41.903032 | -74.026627<br>-74.026846 | N/A | 84 | USACE |
| Stream 13 (Wetland 2) | R4SB3 | 41.903084<br>41.902805 | -74.025838<br>-74.026069 | N/A | 133 | USACE |
| Stream 14 (Wetland 2) | R4SB3 | 41.903024<br>41.902857 | -74.025516<br>-74.025452 | N/A | 67 | USACE |
| Stream 15 (Wetland 2) | R4SB3 | 41.902393<br>41.902042 | -74.026246<br>-74.026439 | N/A | 172 | USACE |
| Stream 16 (Wetland 5) | R4SB4 | 41.905288<br>41.905575 | -74.021085<br>-74.021514 | N/A | 163 | USACE |
| Stream 17 (Wetland 5) | R4SB4 | 41.905352<br>41.905747 | -74.020758<br>-74.021241 | N/A | 203 | USACE |
| Stream 18 (Wetland 5) | R4SB4 | 41.905555<br>41.905859 | -74.020726<br>-74.021015 | N/A | 141 | USACE |
| Total | -- | -- | -- | 6.30 | 9,035 | -- |
| Total USACE Jurisdictional | -- | -- | -- | 5.51 | 7,403 | -- |

## *6.0 THREATENED AND ENDANGERED SPECIES SURVEY*

The USFWS Information Planning and Conservation (IPaC) report listed the following three federally listed species for the project area: Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), and bog turtle (*Glyptemys muhlenbergii*). There are no designated critical habitats in this location. The NYSDEC EAF Mapper[5] did indicate threatened and/or endangered species for this site, but did not list which species were possible. The NYSDEC's online Environmental Resource Mapper (ERM2) indicated the entire site fell within the potential range of a rare species, but did not specify which species.

ERM conducted a visual pedestrian survey of the site for the presence of the above-listed rare species or their suitable habitat. No Indiana bats, northern long-eared bats, or bog turtles were observed during the survey. Nearly all of the forested areas contained potential roosting and foraging habitat for the listed bat species. Bog turtles are dependent on emergent wetlands with soft, organic substrates and through-flow. No wetlands on this site provided these habitat requirements, so bog turtles are not likely to occur on the site.

[5] http://www.dec.ny.gov/eafmapper/

## 7.0 *CONCLUSION*

ERM identified 6 wetland features, 2 ponds, and 18 streams totaling 5.74 acres of wetlands, 0.56 acres of ponds, and 9,035 linear feet of stream with approximately 5.51 acres of wetlands, 0 acres of ponds, and 7,403 linear feet of stream being federally regulated. None of the wetlands on the site are regulated by NYSDEC under Article 24 of the New York State Environmental Conservation Law, the Freshwater Wetlands Act.

Of the six wetlands identified, three (Wetlands 2, 5, and 6) were considered to be federal jurisdictional wetlands due to their physical connection to TNWs via the Rondout Creek. Of these, none were considered state-regulated wetlands because they were smaller than 12.4 acres in area, and were not mapped on the state freshwater wetlands maps. The remaining three wetlands (Wetlands 1, 3, and 4) were considered to be non-jurisdictional because they were isolated physically, chemically, and biologically from any RPW or TNW.

Of the 20 (18 streams and 2 ponds) waterbodies, 14 were considered to be federally jurisdictional due to their physical, biological, and/or chemical connection to an RPW or TNW. The remaining 6 (Streams 1-4 and Ponds 1 and 2) were considered to be non-jurisdictional because they were isolated physically, chemically, and biologically from any RPW or TNW.

The jurisdictional determinations noted herein are the opinions of ERM wetland scientists, based on data collected in the desktop data review and in the field. These jurisdictional determinations are subject to review and concurrence by the USACE and NYSDEC before they can be considered final.

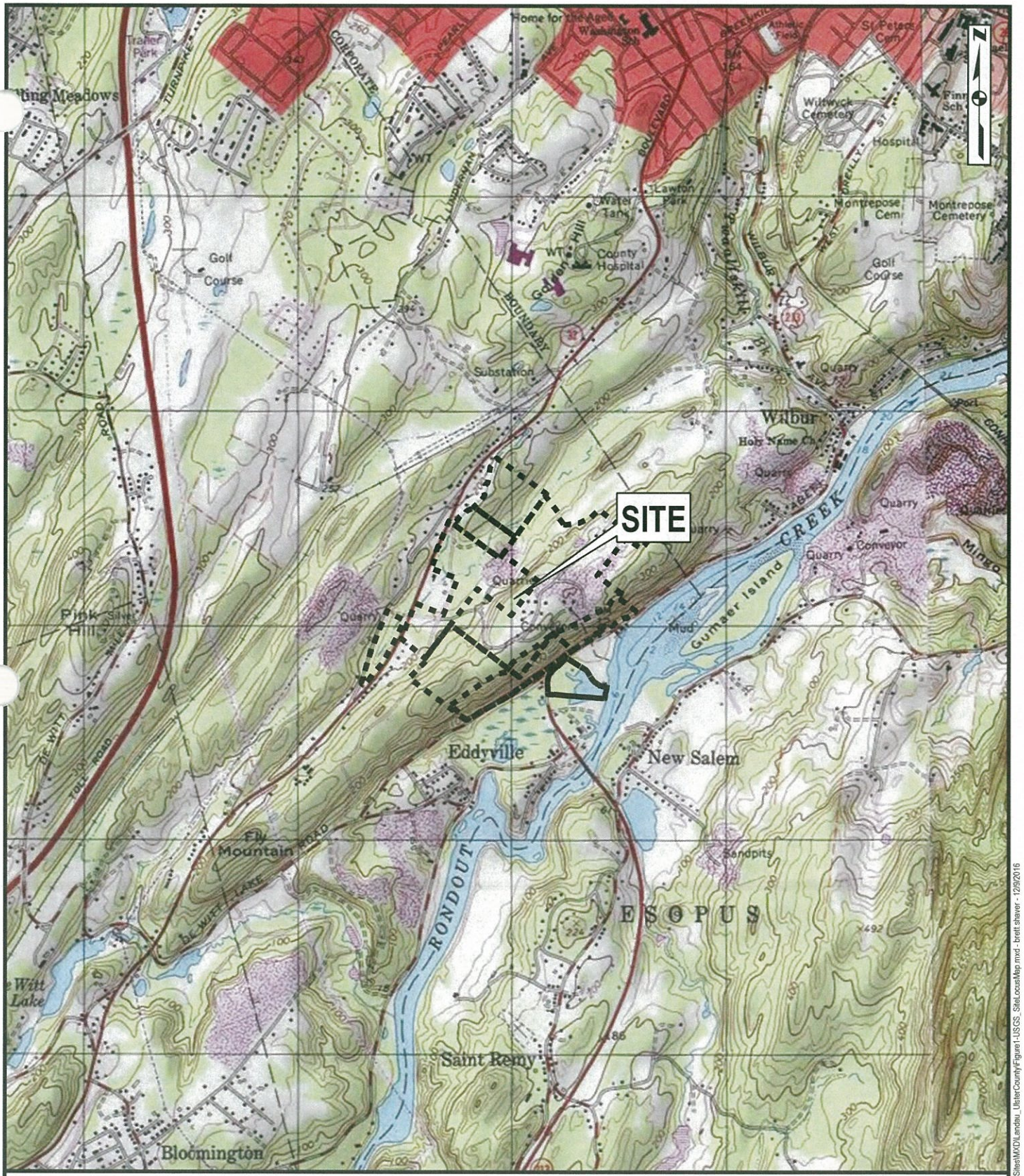
If Cypress Creek Renewables, LLC wishes to implement construction of a solar site within the Landau Solar, LLC Project Area:

- Clearing of vegetation, excavation, filling, or construction activities within the regulated wetlands will require authorization under Nationwide General Permit (NWP) #51 from the USACE in Wetlands 2, 5, and 6 and in Stream 10 or any of its tributaries.

- Assuming USACE and NYSDEC concur with the jurisdictional determinations outlined in this report, Wetlands 1, 3, and 4, Ponds 1 and 2, and Streams 1, 2, 3, and 4 will be considered non-jurisdictional, and no wetland permit will be required for work within their delineated boundaries.

No visible sightings were observed for protected species. However, suitable habitat exists for listed bat species. Additionally, tree removal has the potential to affect the habitat for bats. Based on the information available, additional investigations may be requested by USFWS, NYSDEC, or the Town of Ulster to determine if there will be significant adverse effects to state or federally protected species.

# *Appendix A*
# *Figures*




**Legend**

Approximate Site Boundary

0 0.1 0.2 0.3 0.4 0.5 0.6 Miles

1:24,000

**SOURCE**
USGS scanned topographic quad maps provided by National Geographic Society (© 2016).

**Figure 1** - United States Geological Survey (USGS) Quadrangle Map Depicting the Site Boundaries
Landau Solar, LLC Site
Cypress Creek Renewables, LLC
Town of Ulster, Ulster County, New York

ERM

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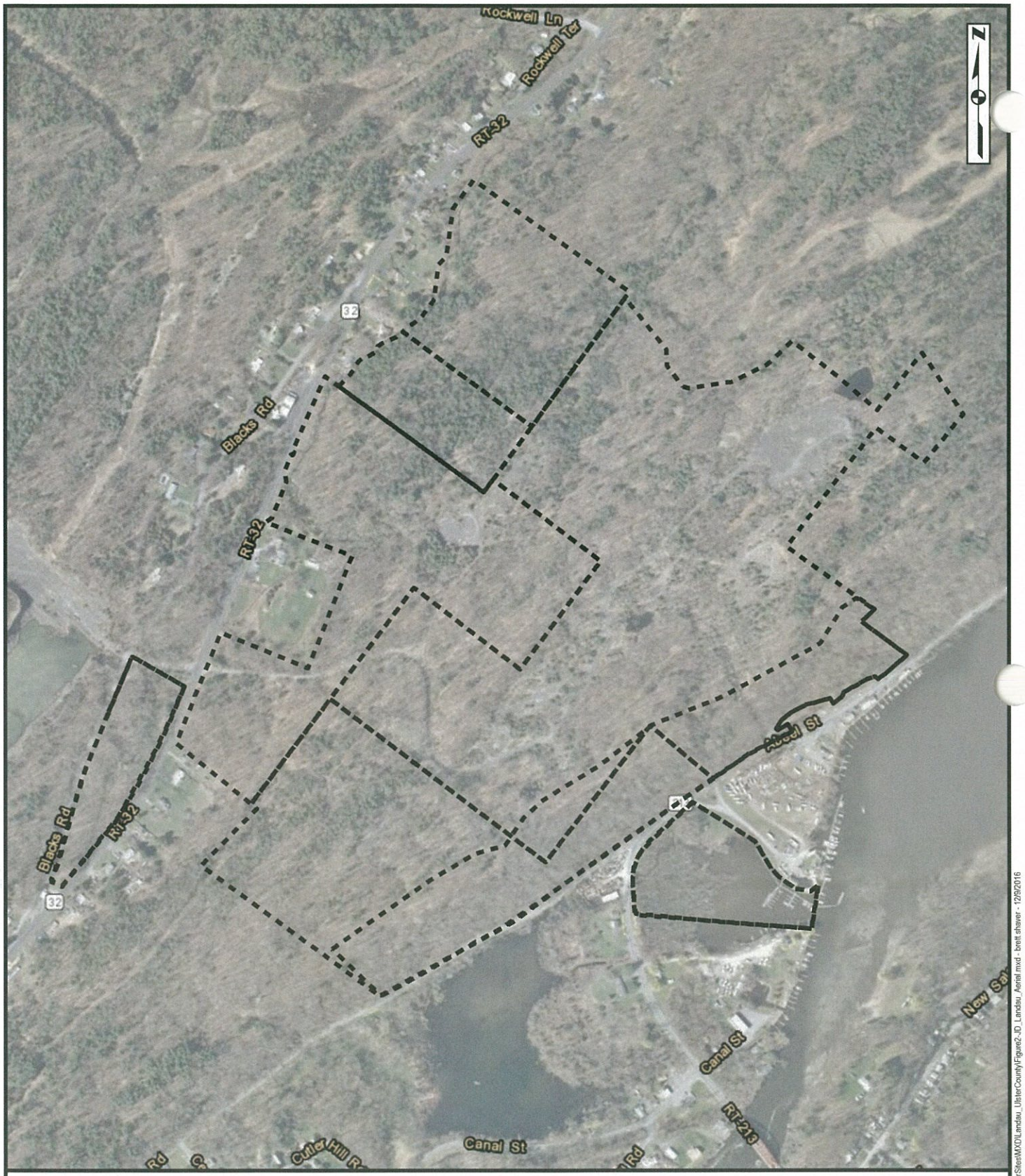


Legend

Approximate Site Boundary

0 200 400 600 800 Feet

1:7,700

Figure 2 -Aerial Photograph
Depicting the Extent of the Site
Landau Solar, LLC Site
Cypress Creek Renewables, LLC
Town of Ulster, Ulster County, New York

ERM

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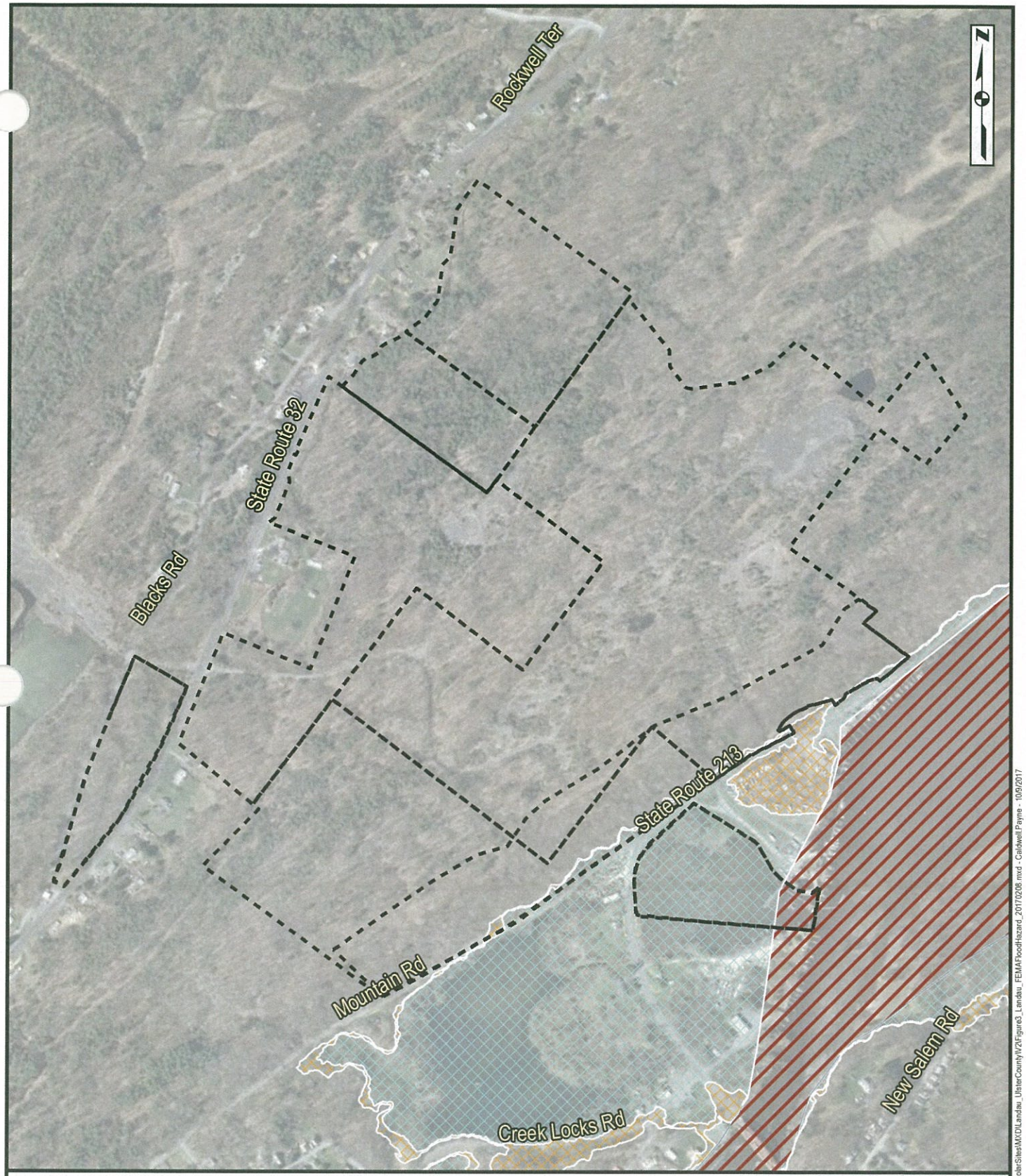


Figure 3 - Federal Emergency Management Agency (FEMA) Flood Hazard Map
Landau Solar, LLC Site
Cypress Creek Renewables, LLC
Town of Ulster, Ulster County, New York

ERM

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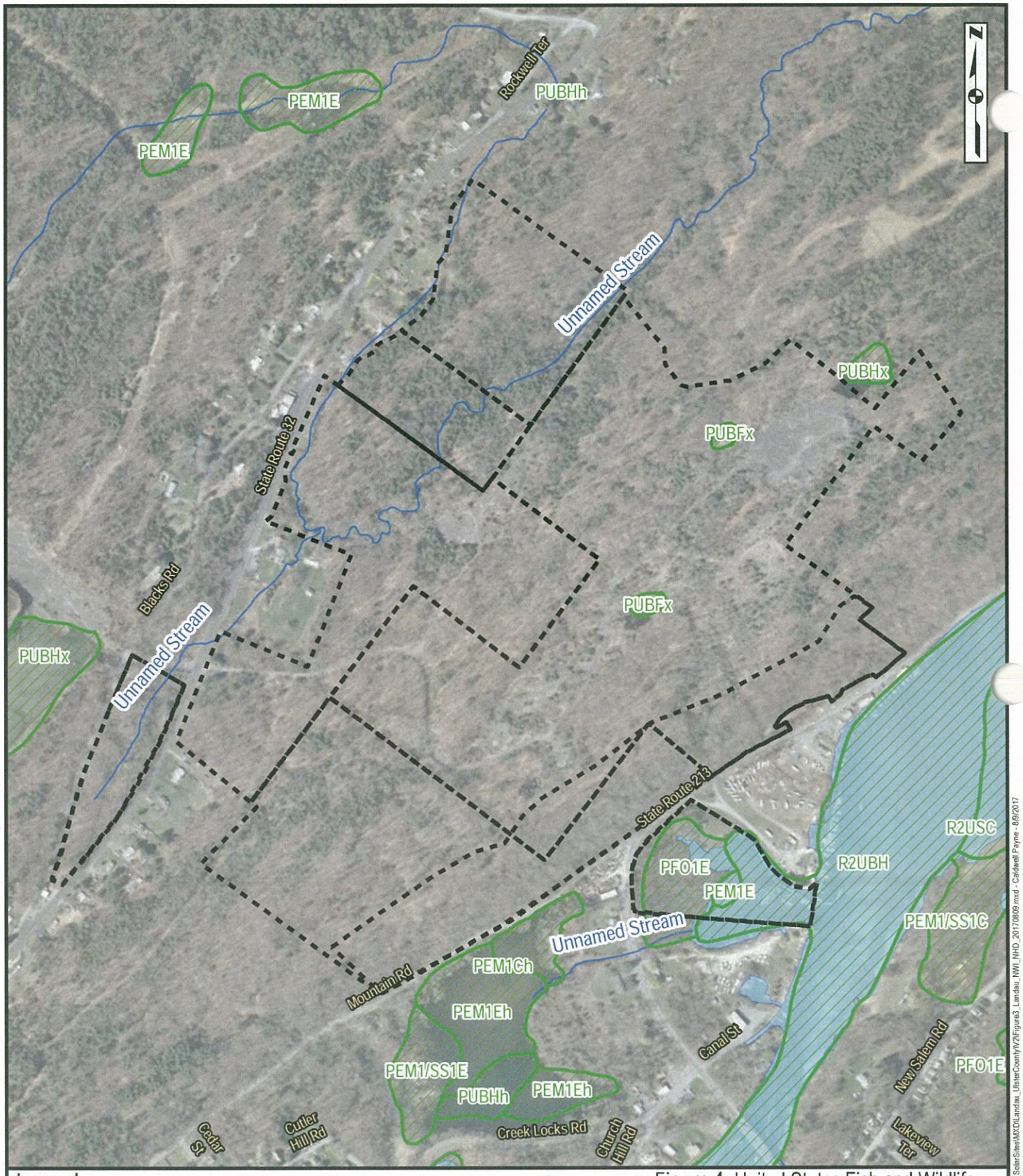


Figure 4 -United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) and National Hydrological Database (NHD) Streams Map

Landau Solar, LLC Site Cypress Creek Renewables, LLC Town of Ulster, Ulster County, New York

ERM

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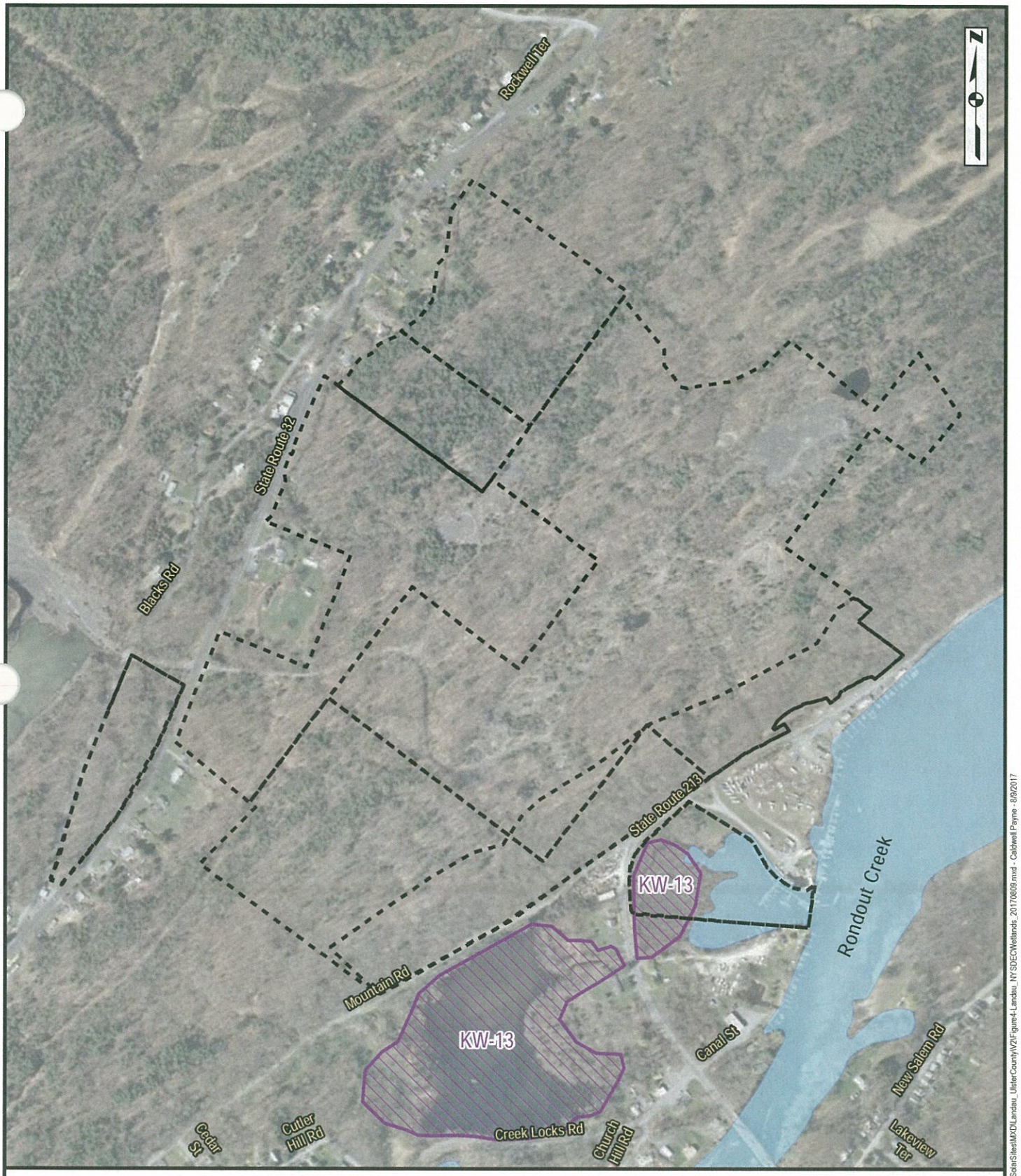


Figure 5 -New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetlands Map
Landau Solar, LLC Site
Cypress Creek Renewables, LLC
Town of Ulster, Ulster County, New York

ERM

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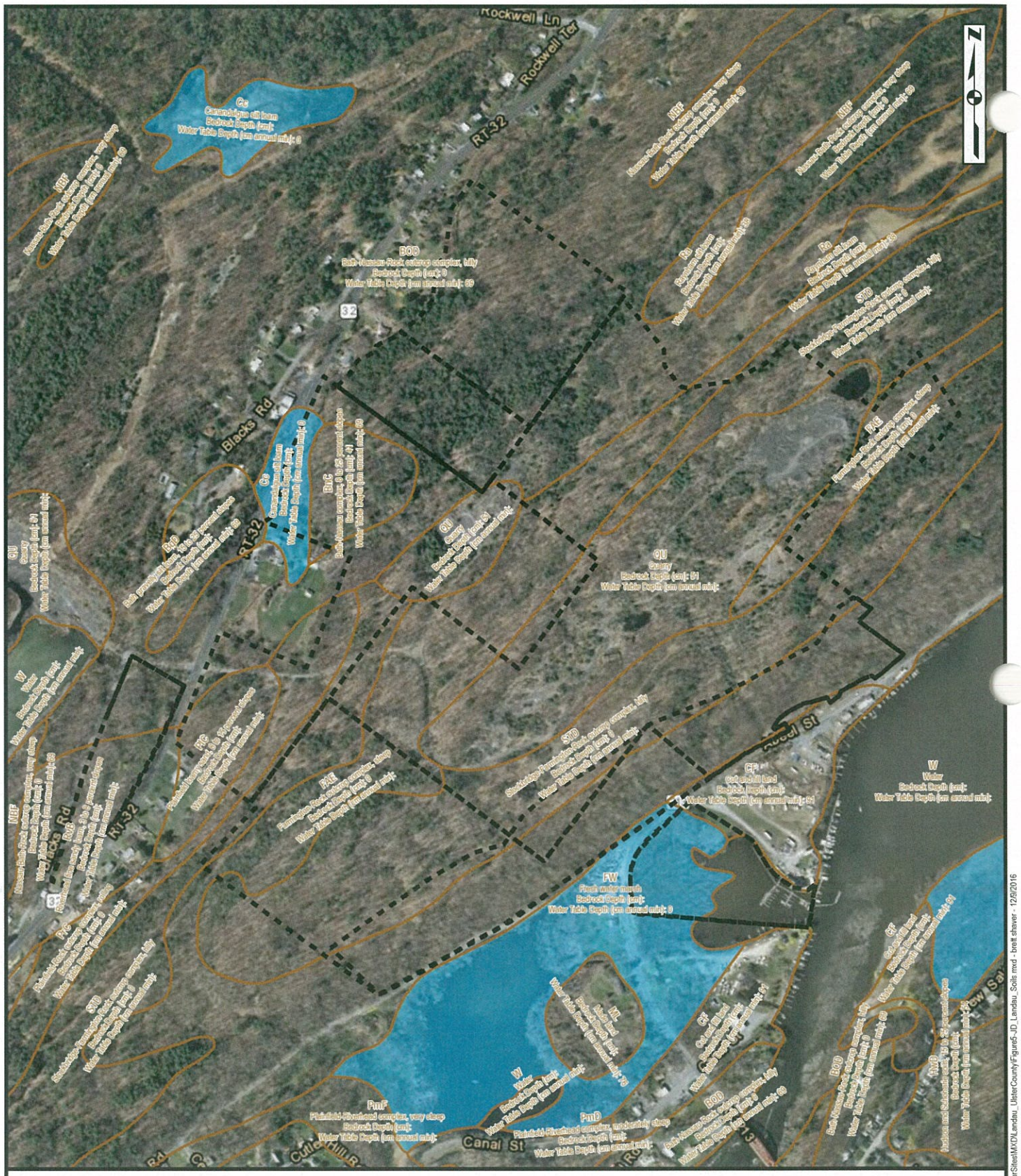


Figure 6 -United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soils Map

Landau Solar, LLC Site
Cypress Creek Renewables, LLC
Town of Ulster, Ulster County, New York

ERM

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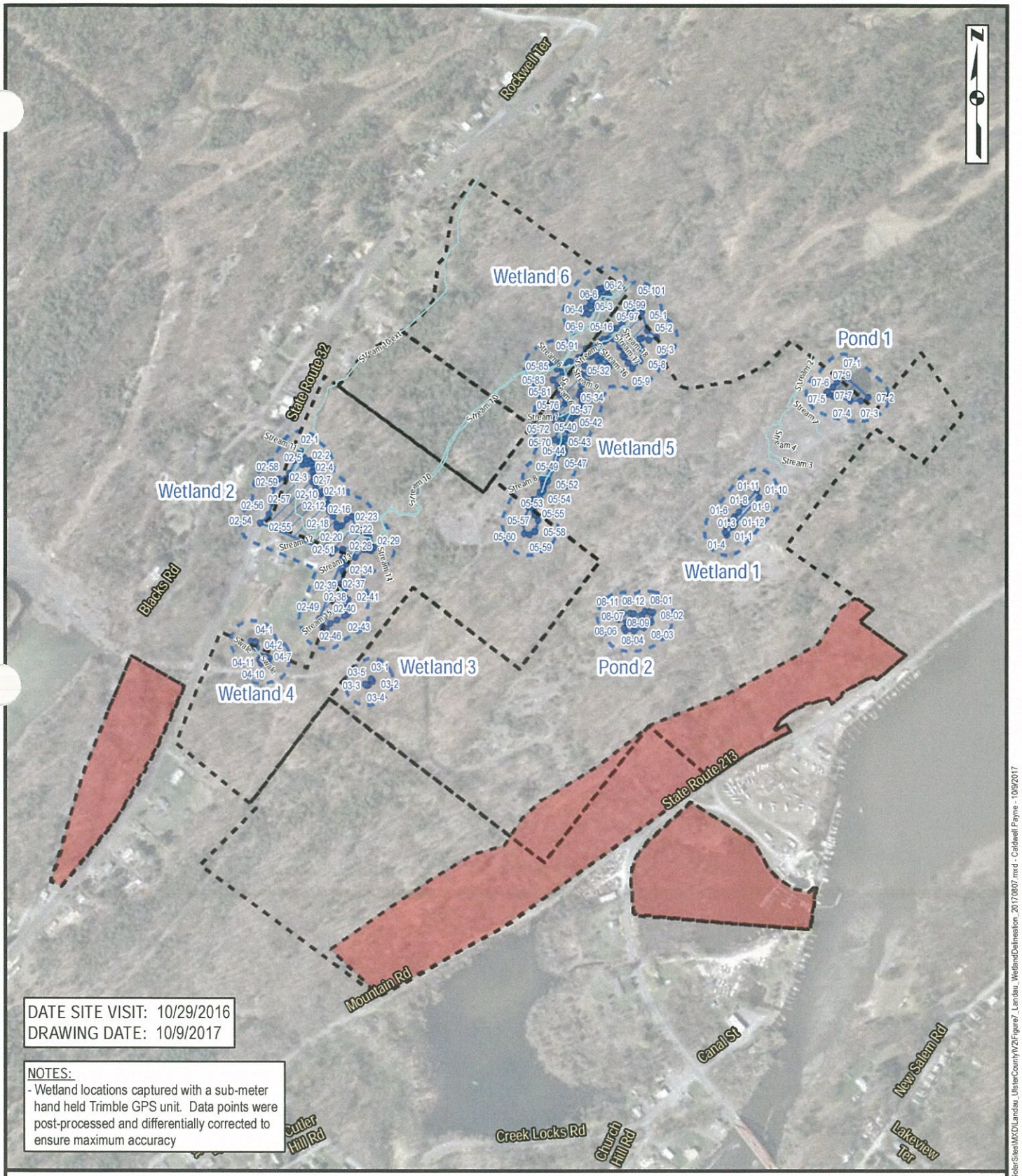


Figure 7 -Wetland Delineation Map
Landau Solar, LLC Site
Cypress Creek Renewables, LLC
Town of Ulster,
Ulster County, New York

ERM

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# *Appendix B*
# *Photographic Log*

Stream 1

Across Stream Photo

Downstream Photo

Upstream Photo

sla001-Stream 1

Stream 2

Across Stream Photo

Downstream Photo

Upstream Photo

sla002- Stream 2

# Stream 3

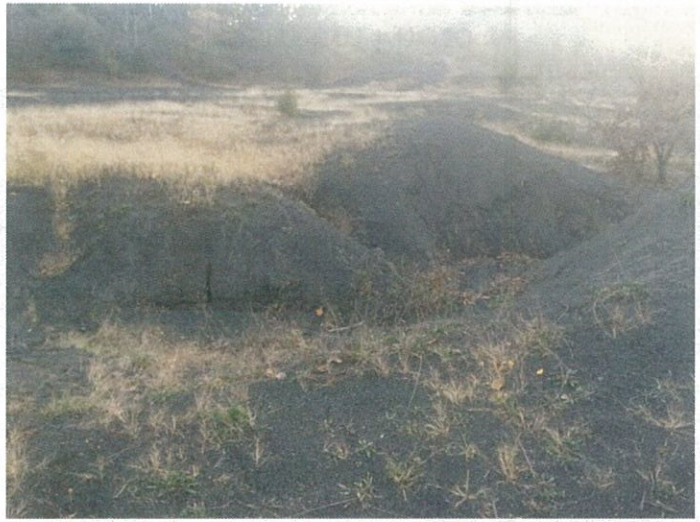
Across Stream Photo

Downstream Photo

Upstream Photo

sla003- Stream 3

# Stream 4



Across Stream Photo

Downstream Photo

Upstream Photo

sla004- Stream 4

# Stream 5

Across Stream Photo

Downstream Photo

Upstream Photo

# Stream 6

Across Stream Photo

Downstream Photo

Upstream Photo

sla006- Stream 6

# Stream 7

Across Stream Photo

Downstream Photo

Upstream Photo

sla007- Stream 7

# Stream 8

Across Stream Photo

Downstream Photo

Upstream Photo

sla008- Stream 8

Stream 9

Across Stream Photo

Downstream Photo

Upstream Photo

sla009- Stream 9

# Stream 10

Across Stream Photo

Downstream Photo

Upstream Photo

Sla010- Stream 10

Stream 10A

Across Stream Photo

Downstream Photo

Upstream Photo

sla010A- Stream 10A

# Stream 11

Across Stream Photo

Downstream Photo

Upstream Photo

Sla011- Stream 11

# Stream 12

Across Stream Photo

Downstream Photo

Upstream Photo

# Stream 13

Across Stream Photo

Downstream Photo

Upstream Photo

sla013- Stream 13

# Stream 14

Across Stream Photo

Downstream Photo

Upstream Photo

sla014- Stream 14

# Stream 15

Across Stream Photo

Downstream Photo

Upstream Photo

Sla015- Stream 15

Stream 16

Across Stream Photo

Downstream Photo

Upstream Photo

sla016- Stream 16

# Stream 17

Across Stream Photo

Downstream Photo

Upstream Photo

sla017- Stream 17

# Stream 18

Across Stream Photo

Photo Unavailable

Downstream Photo

Upstream Photo

Ponds 1 and 2

Pond 001

Pond 002

wla001- Wetland 1

Wetland 1

Wetland Data Point

Upland Data Point

wla001- Wetland 1

# Wetland 2

Wetland Data Point

Upland Data Point

wla002- Wetland 2

# Wetland 3

Wetland Data Point

Upland Data Point

wla003- Wetland 3

# Wetland 4

Wetland Data Point

Upland Data Point

wla004- Wetland 4