HECATE ENERGY COLUMBIA COUNTY 1 LLC

SHEPHERD'S RUN SOLAR PROJECT

Matter No. 24-00103

§ 900-2.14 Exhibit 13

Water Resources and Aquatic Ecology

Contents

Tables

Figures

Appendices

Acronym List

AJD	Approved Jurisdictional Determination
CCDOH	Columbia County Department of Health
CFR	Code of Federal Regulations
CWA	Clean Water Act
ECL	Environmental Conservation Law
EPA	United States Environmental Protection Agency
FOIL	Freedom of Information Law
HDD	horizontal directional drilling
HUC	hydrologic unit map
IPaC	Information for Planning and Consultation
ISMCP	Invasive Species Management and Control Plan
NRCS	Natural Resources Conservation Service
NRI	Natural Resources Inventory
NWI	National Wetland Inventory
NYCRR	New York Codes, Rules, and Regulations
NYNHP	New York Natural Heritage Program
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSEG	New York State Electric and Gas
ORES	New York State Office of Renewable Energy Siting
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine scrub shrub

PUB	palustrine unconsolidated bottom
SPC	Spill Control, Containment, and Prevention Plan
SPDES	State Pollution Discharge Elimination System
SSA	sole source aquifer
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WOTUS	Waters of the United States

Glossary of Terms

Applicant	Refers to Hecate Energy Columbia County 1 LLC, the entity seeking a siting permit for the Project from the Office of Renewable Energy Siting (ORES) under Article VIII of the New York State Public Service Law.[1]
Point of Interconnection	Refers to the Craryville 115 kilovolt (kV) substation owned by New York State Electric and Gas (NYSEG) on the Craryville-Klinekill and Churchtown-Craryville 115 kV transmission lines.
Project	Refers to the proposed Shepherd's Run Solar Project, a utility scale solar project that will be comprised of solar arrays, inverters, access driveways, electrical collection lines, collection substation, construction staging areas, fencing and plantings, located on private land in the Town of Copake, Columbia County, New York.
Project Area	Refers to those privately-owned parcels under option to lease, purchase, easement or other real property interests with the Applicant in which all Project components will be sited.
Project Footprint or Limit of Disturbance	Refers to the limit of temporary and permanent disturbance caused by the construction and operation of all components of the Project. This includes all areas to be used for project components, maintained areas and areas outside of the Project fence to be used as landscaping.
Study Area	Refers to the area evaluated for specific resource identification and/or resource impact assessment. The size of this area is appropriate for the target resource and takes into account the project setting, the significance of resource or impact being identified or evaluated, and the specific survey distances included in Title 19 of NYCRR Part 900. As appropriate, the Study Area for each type of survey or resource impact assessment is provided in the respective sections within the Application.

[1] Any references to Executive Law Section 94-c in this Application refer to former New York State Executive Law Section 94-c, now New York State Public Service Law Article VIII.

Exhibit 13: Water Resources and Aquatic Ecology

This exhibit addresses the requirements specified in 19 New York Codes, Rules and Regulations (NYCRR) § 900-2.14.

13(a) Groundwater

(1) Hydrologic Character

As described in Exhibit 10, a preliminary geotechnical investigation was conducted within the Project Area (see Appendix 10-1: *Geotechnical Recommendation Report* of this Application). During the geotechnical investigation, groundwater was identified at depths as shallow as four feet below ground surface at Boring B-05 and as deep as 19 feet at Boring B-04. The remaining investigation locations did not encounter any groundwater, indicating the groundwater table may be as shallow as four feet in isolated locations but is generally greater than 19 feet deep. Depth to high groundwater is shown on Figure 10-3: *Bedrock* of Exhibit 10: *Geology, Seismology, and Soils* of this Application. Groundwater conditions within the area are ephemeral and fluctuate due to seasonal and climate conditions. While groundwater is affected by precipitation and snowmelt, no specific groundwater recharge areas were identified within the Project Area as a part of the geotechnical investigation. Based on the geotechnical report, the Project Area in the north (borings B-01 through B-05) is generally underlain by stiff, sandy clays from 0 to 2 feet and stiff/ dense gravelly sands from 2 to 20 feet. Meanwhile, in the south (borings B-SS-01 and B-06 through B-15) the Project Area is generally underlain by stiff, silty clays from 0 to 4 feet, clayey silt from 4 to 13 feet and bedrock from 13 to 20 feet (Mott-MacDonald, 2021).

Additional hydrologic information for the Project Area including depths to high groundwater based on the Web Soil Survey of Columbia County and the Project's preliminary geotechnical investigation (See Appendix 10-1: *Preliminary Geotechnical Recommendation Report* of this Application) can be found in Figure 10-3 of Exhibit 10. During the geotechnical investigation, groundwater was observed at depths ranging from approximately 4 to 19 feet below the ground surface (Mott-MacDonald, 2021; see Appendix 10-1).

Based on topography of the Project Area, groundwater and surface waters flow to the southwest. Groundwater conditions vary seasonally and groundwater level variability is indicated in some surface water features in the Project Area. Surface water features are largely avoided as described in Section (b)(5) below and Exhibit 14: *Wetlands*, Section 14(e) of this Application. A summary of groundwater depths observed at the Project Area during the

geotechnical investigation can be found in Exhibit 10: Geology, Seismology and Soils.

At the depths estimated by the NRCS soil survey, and as encountered by the geotechnical survey, most construction is not expected to affect groundwater on site. Posts will be embedded to depths between 6 feet and 12 feet. Temporary dewatering may be required during construction if perched groundwater or inundation is encountered.

According to the mapped geology, Project component locations are underlain by metamorphic bedrock. The primary bedrock unit in this region is known as the Waloomsac Formation (Mott-MacDonald, 2021), which is comprised mainly of dark gray or graphitic quartz phyllite and schist (USGS, n.d.). Water well data for 14 wells in the vicinity of the Project Area, obtained from the New York State Department of Environmental Conservation (NYSDEC), shows that depth to bedrock depth ranges from 16 to 79 feet below ground surface (NYSDEC, 2014). Based on the results of the Project's preliminary geotechnical investigation, bedrock throughout the site is generally well below the surface, with the shallowest and only bedrock encountered at soil boring location B-14, which was at a depth of approximately 8 feet below the existing surface (Mott-MacDonald, 2021).

Bedrock was not encountered in any of the geotechnical investigation soil borings, which ranged from 13 to 20 feet in depth. No blasting is anticipated to be required based on the lack of encountered bedrock and character of the material as reflected in the *Geotechnical Recommendations Report* (provided as Appendix 10-1 to Exhibit 10 of this Application).

(2) Private Well Survey Results and Groundwater Aquifers and Groundwater Recharge Areas

In February 2021, the Applicant conducted a private well survey of all residences (both participating and non-participating) within a study area that included all residences within 1,000 feet of the Project Area. This effort involved a direct mailing questionnaire to 197 residences. The questionnaire included an inquiry into water well location, depth and characteristics of the well, approximate well yield, and water quality. Figure 13-1 shows the location of identified active groundwater supply wells within 1,000 feet of proposed Project components based on the results of the survey, in addition to groundwater aquifers. No groundwater recharge areas are located within the Project Area, therefore none are depicted on Figure 13-1. The questionnaire is provided in Appendix 13-2. *Private Well Survey.* Of the 197 well surveys mailed, 52 responses (~26%) were received as of the filing of this application. Based upon the results of the survey, there are 25 private groundwater wells within 1,000 feet of the Project Area, as illustrated in Figure 13-1. Of the 25 private groundwater wells identified by

landowners, 1 well was categorized as not currently in use or abandoned because public water is now available or is in use.

Based on the results within each response, the depths of private wells ranged from approximately 25 feet to 500 feet below grade. Among survey responses in which landowners indicated the presence of a well on their property, about 76% indicated that water quality was good and clear, while 11% of surveys indicated that water quality was poor due to cloudy conditions. All respondents reported hard water conditions in their well water. Landowners primarily utilized well water for a combination of household uses, as well as outdoor activities such as gardening. The Project components have been sited in a manner that will avoid or minimize impacts to private wells. Further, construction activities are relatively shallow, and activities that would impact groundwater flows are not proposed. Therefore, private well impacts are not anticipated to occur due to Project construction or operation.

To identify existing public groundwater wells within the Project Area, a Freedom of Information Law (FOIL) (Public Officers Law, Article 6 Sections 84-90) request was sent to the New York State Department of Health (NYSDOH), New York State Department of Environmental Conservation (NYSDEC), and the Columbia County Department of Health (CCDOH) on May 6, 2021, to identify the locations of existing water wells and data on wells within the two-mile Study Area. This request was for any information pertaining to groundwater wells (including location construction logs, depth, and descriptions of encountered bedrock) within the Study Area (Appendix 13-1).

A response was received from the NYSDOH on July 19, 2021. The response indicated that there are 12 wells within the Study Area which have been included on Figure 13-1. Based on the results of this consultation all 12 wells identified are ground water systems. Of these 12 groundwater systems there are 8 non-community water systems serving a population range of 25-70; 3 community water systems serving a population range of 40 to 2500; and 1 non-public water system which serves a population of 48.

According to the NYSDEC, CCDOH, NYSDOH, and private well survey responses, there are no wells within 100 feet of proposed access roads or the collection system. In summary, according to the above water well sources, there is only one well located within the Project Area. The well is located on the southern portion of the Project Area where project components are not proposed.

Primary Aquifers

Primary aquifers are defined by the United States Geological Survey (USGS) as "highly productive aquifers presently utilized as sources of water supply by major municipal water supply systems" (NYSDEC, 1990). The nearest primary aquifer is located approximately 55 miles southwest in Fishkill, NY. Principal aquifers, according to NYSDEC, are "aquifers known to be highly productive, or whose geology suggests abundant potential water supply, but which are not intensively used as sources of water supply by major municipal systems at the present time" (NYSDEC, 1990). The Project Area does not overlay any NYSDEC-listed primary aquifers, but it does overlay a principal aquifer, which is shown in Figure 13-1.

Sole Source Aquifers and Recharge Areas

Under the Sole Source Aquifer Program authorized by Section 1424(e) of the Safe Drinking Water Act of 1974, the Environmental Protection Agency (EPA) defines a sole source aquifer as one that supplies at least 50% of the drinking water consumed in an area overlying the aquifer. EPA guidelines further require that these areas have no reasonable alternative drinking water sources that could physically, legally, and economically supply all those that depend on the aquifer for drinking water. According to the EPA, the Schenectady-Niskayuna sole source aquifer (SSA) (ID: SSA27) is the nearest SSA to the project, situated approximately 40 miles northwest of the Project Area (EPA, 2020). No specific groundwater recharge areas were identified within the Project Area as a part of the geotechnical investigation.

The Applicant proposes to utilize trenchless technologies, including horizontal directional drilling (HDD), in eight locations. This construction method will be used where the Project electrical collection lines would cross selected public roadways or certain wetland or stream resources (see HDD crossings in Appendix 5-1: *Civil Design Drawings* of Exhibit 5: *Design Drawings* of this Application). Based on the results of the private well survey, there are no private water supply wells located within 500 feet of proposed HDD locations.

During HDD activities, bore depths at proposed locations will be determined on a case-by-case basis depending on soil types, bedrock composition, and the presence of sensitive resources (e.g., water supply wells, surface water resources). Drilling pressure will be monitored continuously for any increase, resulting from tight turns or loss of pressure, which might indicate presence of a seep. Entry and exit bore pits will be enclosed by erosion and sediment control measures to prevent slurry from leaving the designated bore site. The Applicant has prepared an *Inadvertent Return Plan* for Horizontal Directional Drilling (HDD), included as Appendix 10-2 of Exhibit 10 of this Application).

Solar panels are distributed evenly throughout the Project Footprint. Based on the results of

the private well survey, there are no private water supply wells located within 200 feet of proposed solar pile-driving locations. There are no water supply intakes within 200 feet of solar pile-driving locations.

No drinking water intakes were identified within 500 feet of HDD operations. Therefore, no water supply intakes will be affected by HDD operations.

Blasting is not anticipated as part of the Project; therefore, there would be no impact on active water supply wells or water supply intakes located within 1,000 feet of the Project due to blasting.

(3) Impacts on Groundwater Quality and Quantity

Permanent impacts to groundwater resources are not anticipated to result from the construction and/or operation of the Project. The potential for minor and or temporary impacts to local water resources will be minimized through the use of best management practices (BMPs), including measures outlined in the *Stormwater Pollution Prevention Plan (SWPPP)* (Appendix 13-3 of this Application). Construction of most Project components, including installation of buried electrical collection lines, will typically involve relatively shallow excavations and should not intercept and/or affect groundwater supplies. Solar arrays were sited to avoid known locations of private wells, thereby minimizing the potential for impacts.

The Project will add a relatively small amount of impervious surface (9.8 acres of built facilities), resulting from inverter pads and at the substation/point-of-interconnection facilities. Beneath the solar arrays and within the overall majority of the Project Site will be pervious land cover (herbaceous/grass) that will allow for similar or improved infiltration of stormwater runoff as occurs under existing site conditions.

During construction, temporary impacts to groundwater could potentially occur through the introduction of pollutants from inadvertent discharges of petroleum or other chemicals used during the construction, operation, or maintenance phases of the Project. These discharges could result from mechanical failures and through spills during the refueling of equipment. To avoid impacts to groundwater from such inadvertent events, the Applicant will implement avoidance and minimization measures outlined in the Project's *Spill Prevention, Control and Countermeasure Plan (SPC)* (included as Appendix 13-4 of this Application). Operation of the Project will have a relatively low demand for groundwater.

Publicly available mapping from the USGS delineates an east-west band of carbonate rocks with karst potential across New York State (NYS). This band diminishes just west of Columbia

County, where the Project Area is located (Kappel et al., 2020). There is a smaller north-west band of limestone located three miles to the east (Mott-MacDonald, 2021). However, the preliminary geotechnical investigation did not identify any karst features within the Project Area. Therefore, impacts related to karst topography are not anticipated. The potential presence of karst topography can be a concern with ground disturbance because these systems are very vulnerable to groundwater pollution. Karst is a distinctive topography that develops in rock capable of being dissolved by surface water or groundwater. This landform is often associated with carbonate rocks (limestone and dolomite) although it can occur in the presence of other highly soluble rocks such as evaporates (gypsum and rock salt). Karst systems have relatively rapid rates of water flow and lack a natural filtration system, which makes them particularly susceptible to groundwater pollution. Ground subsidence (i.e., sinkholes) is a potential geologic hazard associated with karst terrain or where underground mining has occurred. Such hazards are not anticipated to affect the Project or the Project Site.

Little information is readily available about known groundwater contamination in the area surrounding the Project Area. According to the NYSDEC Environmental Site Remediation Database, there are 26 identified environmental remediation sites in Columbia County, primarily clustered around the City of Hudson and Town of Greenport along the Hudson River (NYSDEC, 2021a). The nearest environmental remediation site to the Project is approximately 15 miles to the northwest (Moran Site). Based on topography, the groundwater flow from the Moran Site would be west, away from the Project Area.

Based upon the distance of these remediation sites from the Project and available information concerning groundwater flow direction, groundwater contamination associated with these sites, if any, will not impact groundwater in the Project Footprint as a result of the construction and operation of the Project.

13(b) Surface Water

A wetland and stream delineation effort was conducted in the Project Area by TRC and Tetra Tech, Inc (Tetra Tech) on behalf of the Applicant. Tetra Tech completed the initial delineation from September 16 to 27, 2019, on a portion of the Project Area. Additional land was added to the Project Area and TRC performed a delineation on the added land and confirmed Tetra Tech's boundaries in the previously delineated areas on July 16,17, 21, 22, and 24, 2020. The results from these survey efforts are detailed in *Appendix 14-1. Wetland and Stream Delineation Report*.

TRC and Tetra Tech identified and delineated a total of 18 wetlands (156.26 acres) in the Project Area, including 13 wetlands (42.06 acres) with portions of PEM characteristics, seven wetlands

(99.91 acres) with portions of PSS characteristics, six wetlands (12.16 acres) with portions of PFO characteristics, and one wetland (0.12 acres) with portions of PUB characteristics. TRC and Tetra Tech also identified and delineated at total of 13 streams (27,312 linear feet) in the Project Area, five streams were perennial, three were intermittent, four were ephemeral, and one stream (S-NSD-4) exhibited both perennial and intermittent flow types.

The United States Army Corps of Engineers (USACE) has not completed a jurisdictional determination at the time of this Application, however, the Applicant requested an approved jurisdictional determination (AJD) in April 2023 on 8 field-delineated wetlands identifying that do not have physical or hydrologic connection to Waters of the United States (WOTUS). The USACE responded in July 2023 that all AJDs were paused. No additional response has been received from USACE.

The Office's jurisdictional determination for purposes of 19 NYCRR § 900-1.3(e) identified ten wetlands and nine streams within the Project Area as NYS regulated waterbodies. See Table 13-1 below for a summary of the acreage and linear feet of NYS-regulated wetlands, streams, and their respective adjacent areas within the Project Area.

Table 13-1. NYS-Regulated Waterbodies and Adjacent Areas in the Project Area

Water Body or Adjacent Area	Acreage or Linear Feet in Project Area
NYS-regulated wetlands	145.81acres
NYS-regulated wetland adjacent areas	78.91 acres
NYS-regulated streams	20,212.64 linear feet
NYS-regulated stream adjacent areas	48.84 acres

(1) Surface Water Map

Figures 13-2 and 13-3 depict mapped and delineated wetlands and waterbodies on and within 100 feet of any areas of disturbance. This information was generated from publicly available data from NYSDEC, ESRI, USGS, National Wetland Inventory (NWI) (see Figure 13-2) and stream and wetland data collected during on-site wetland delineations (see Figure 13-3) (as provided in Appendix 14-1).

Review of the NWI mapping during the preliminary desktop analysis indicated that there are eight federally mapped riverine features within the Project Area.

Table 13-2 below depicts all NYSDEC mapped streams and their classifications within the Project Boundary.

Table 13-2. NYSDEC Mapped Streams within the Project Area and 100 feet of Disturbance

Stream Name and NYSDEC Regulatory ID Number	NYS Major Drainage Basin	USGS Sub-basin HUC 8 and Name	NYSDEC Classification and Standard*	Cumulative Linear Feet within Project Area
Taghkanic Creek (863-418)	Lower Hudson	Middle Hudson sub-basin (HUC 02020006)	C(TS)	9,227.81
863-455	Lower Hudson	Middle Hudson sub-basin (HUC 02020006)	C(T)	83.74
863-456	Lower Hudson	Middle Hudson sub-basin (HUC 02020006)	C	2,488.38
863-457	Lower Hudson	Middle Hudson sub-basin (HUC 02020006)	C(TS)	1,471.17
863-458	Lower Hudson	Middle Hudson sub-basin (HUC 02020006)	C(T)	3,166.34
863-460	Lower Hudson	Middle Hudson sub-basin (HUC 02020006)	C(T)	3,138.85

*A classification of AA or A indicates that the best use of the stream is as a source of water supply for drinking, culinary or food processing purposes, primary and secondary contact recreation, and fishing. The best usages of Class B waters are primary and secondary contact recreation and fishing. The best usage of Class C waters is fishing. Waters with a classification of D are generally suitable for fishing and non-contact recreation. Waters with classifications A, B, and C may also have a standard of (T), indicating that it may support a trout population, or (TS), indicating that it may support trout spawning (TS)

(2) Surface Water Delineation Survey Reports

A total of one area of palustrine unconsolidated bottom (PUB) wetland and 13 streams were delineated within the Project Area (see Table 13-3 below). Stream classification was dependent on a temporal description of the usual level of flow regimes of each stream. Wetland and stream delineations occurred on September 16 to 27, 2019; July 16, 17, 21, 22, and 24, 2020; and April 21, 2021. Tables 13-3 and 13-4 below describe all delineated PUB wetlands and streams within the Project Area and within 100 feet of disturbance. Please see Exhibit 14:

Wetlands generally for more information on wetland and stream delineations within the Project Area. Table 13-3 below includes all delineated PUB wetland areas within the Project Area.

Table 13-3. Delineated PUB Wetlands within the Project Area and 100 feet of Disturbance

Wetland Field Designation	Field Delineated Cover Type Classification and Acreage				Total Wetland Acreage within Project Area	NWI Cover Type	NYSDEC Wetland ID	NYSDEC Wetland Class	Potential Jurisdiction	Associated Buffer
	PEM	PSS	PFO	PUB						
W-NSD-2	21.47	1.13	-	0.12	22.72	PEM1E	H-19	I	USACE/ NYSDEC	100 feet

Table 13-4 below includes all delineated streams within the Project Area. Ambient water quality standards and guidance values for the identified streams, as associated with NYSDEC stream classification and standard, are available for reference in Appendix 13-5 of this Exhibit and at the following website: https://www.dec.ny.gov/docs/water_pdf/togs111.pdf.

Table 13-4. Delineated Streams within the Project Area and 100 feet of Disturbance

Stream Field Designation	Flow Regime Classification	Linear Feet within Project Area	NYSDEC Stream Name and Regulation ID Number	NYSDEC Classification and Standard*	State Protected Stream
S-NSD-4	Intermittent/ Perennial	3,285	863-458	Class C(T)	Yes
S-NSD-5	Perennial	238	-	Class C(T)	Yes
S-A	Perennial	10,587	Taghkanic Creek 863-418	Class C(TS)	Yes
S-B	Perennial	2,178	-	-	No
S-C	Perennial	3,685	863-460	Class C(T)	Yes
S-E	Ephemeral	1,232	-	-	No
S-F	Perennial	307	863-458	Class C(T)	Yes
S-G	Intermittent	3,603	863-457; 863-456	Class C(TS); Class C	Yes

Stream Field Designation	Flow Regime Classification	Linear Feet within Project Area	NYSDEC Stream Name and Regulation ID Number	NYSDEC Classification and Standard*	State Protected Stream
S-H	Ephemeral	363	-	-	No
S-I	Ephemeral	668	863-457	Class C(TS)	Yes
S-J	Ephemeral	727	-	-	No
S-K	Intermittent	384	863-455	Class C(T)	Yes
S-L	Intermittent	55	863-458	Class C(T)	Yes
Total Stream Length Delineated:		**27,312**			

*Refer to Appendix 13-5 for NYSDEC ambient water quality standards and guidance values, as associated with NYSDEC stream classification and standard.

(3) Surface Water Characteristics

The Project Area is located within the Lower Hudson River basin, specifically in the Middle Hudson sub-basin (HUC 02020006). Based on data available on the NYSDEC Hudson Valley Natural Resource Mapper, the local watersheds of the Project are the Claverack Creek (HUC 02022000605) and Headwaters to the Taghkanic Creek (HUC 020200060504) (NYSDEC, 2021c).

The Lower Hudson River major drainage basin of New York includes 8,861 miles of rivers and streams, such as Rondout/Wallkill Rivers, Stockport/Kinderhook Creeks, Catskill Creek, Esopus Creek, and Croton River, and it makes up about 40 percent of the larger Hudson/Mohawk River basin. Several significant reservoir are also found in this major drainage basin, such as the Ashokan Reservoir, Rondout Reservoir, New Croton Reservoir, Alcove Reservoir, Cross River Reservoir, and Muscoot/Upper New Croton Reservoir.

Taghkanic Creek is located within the Project Area and flows to the south of the Project. Taghkanic Creek is a tributary to Claverack Creek, eventually flowing into the Hudson River. Most of the aquatic features within the Project Area receive surface water from precipitation events, runoff from the surrounding upland hillslopes, or are fed by drain tiles. The Project Area receives, on average, 43.05 inches of precipitation annually based on information for the Town of Copake, New York (U.S. Climate Data, 2020). In addition to direct precipitation, on-site

hydrology originates from agricultural runoff and subsurface flow. Multiple tributaries flow from various directions off the hillslopes into Taghkanic Creek, which then flows west. Copake Lake is located approximately one mile south of the Project Area and drains into Taghkanic Creek, offsite. The U.S. EPA classifies the upper Taghkanic Creek and tributaries as good condition with no listed impairments.

NYSDEC assigns ratings to all waters in the state pursuant to Article 15 of the Environmental Conservation Law (ECL) and its implementing regulations (6 NYCRR Parts 800-941). Ratings are given to waterbodies based on their best use. Ratings include AA, A, B, C, and D. Class AA or A waters are the highest quality and are best used as a source for drinking water, swimming, fishing, and other recreation activities. Class B waters are best used for primary and secondary contact fishing and other recreation activities. Class C waters are best used for fishing and non-contact related activities. Class D waters are the poorest quality standard and can be used for fishing, however, will not support propagation of fish species. Classes A, B, and C can also have a standard of (T) or (TS). Standard (T) indicates waters that may support a trout population. Standard (TS) indicates waters that may support trout spawning events.

All waterbodies and small waterbodies located in the course of a waterbody with a classification of AA, A, B, or C with a standard of (T) or (TS) are collectively referred to as “protected waterbodies.” Protected waterbodies are subject to the provisions of the Protection of Waters regulations and special requirements apply to sustain (T) and (TS) waters.

During on site delineations, 9 of the streams delineated generally coincided with mapped NYSDEC classified streams. Out of these 9 NYSDEC mapped streams, one is mapped as Class C streams, six are mapped as protected Class C(T) streams, three are mapped as protected Class C(TS) streams, and one stream (S-G) is mapped as both a Class C stream and Class C(TS) stream. Four of the streams delineated are not mapped or classified by the NYSDEC (Table 13-4).

During on site delineations, waterbodies were classified by flow regime. Perennial streams tend to flow all year, except during severe drought conditions. Perennial streams can flow below the water table and receive groundwater flow sources from springs or groundwater seepages on slopes. Intermittent streams flow only during certain times of the year from alternating springs, snow melts, or from runoff from seasonal precipitation events. Intermittent streams can flow above or below the water table. Ephemeral streams flow sporadically and are entirely dependent on transient precipitation from storm events or from periodic snow

melts. These streams tend to flow above the water table and are often found as drainage features adjacent to, or within, the headwaters of a more major stream system.

Out of the 13 streams total onsite (regardless of jurisdictional determination), six streams were perennial, four were intermittent, four were ephemeral, and one stream (S-NSD-4) exhibited both perennial and intermittent flow types.

Based on NYSDEC's nuisance and invasive species list and data from the New York Invasive species iMap Invasives Resource Mapper, two aquatic invasive species have been documented within the vicinity of the Project in the Taghkanic Creek watershed (NYSDEC, 2021c; NY iMap Invasives, 2021). Rudd (*Scardinius erythrophthalmus)* was observed on July 4, 1988 within the Project Area. Water chestnut (*Trapa natans*) was observed on Copake Lake in 2002, just over a mile from the Project Area. Copake Lake is connected to Taghkanic Creek by a stream that flows from the lake and joins Taghkanic Creek about ¾ of a mile downstream of the Project Area. Construction and operation of the Project avoids disturbance of Taghkanic Creek and therefore would not have any impact on the abundance or distribution of these species.

(4) Downstream Drinking Water Supply Intakes

The only downstream drinking water supply intake is located over 15 miles downstream from the Project in Taghkanic on Taghkanic Creek to supply the City of Hudson (Columbia Land Conservancy, 2018). Water is withdrawn from Taghkanic Creek and pumped to the Churchtown Reservoir.

Sections 13(b)(5) and (6) below outline steps that will be taken to avoid, minimize, and mitigate any potential impacts to surface waters, which will protect drinking water supply intakes.

(5) Avoidance of Impacts on NYS Protected Waters

Pursuant to 19 NYCRR § 900-1.3(f), ORES determined that there are nine NYS protected streams within the approximately 723-acre Project Area, See Appendix 14-3. *ORES Jurisdictional Determination* of Exhibit 14. Project components will be sited to avoid temporary or permanent impacts to waterbodies to the maximum extent practicable. In select locations, the Applicant is proposing the use of trenchless crossing methods for buried electrical collection lines, including HDD, to avoid impacts to wetlands and streams.

Due to existing hydrological and vegetative conditions at stream S-E, open trenching has been designated as the preferred construction measure for electrical collection lines. This stream is not a state protected waterbody. If stream water is flowing in the stream during construction,

BMPs to maintain stream flow (i.e., coffer dam/pump around techniques) will be utilized both upstream and downstream of the stream crossing locations. While short-term, minor stream impacts (i.e., increase in turbidity levels and sediment deposition downstream) are possible with the open trenching stream crossing method, the impacts will be localized and temporary. Furthermore, dredged and fill material will only consist of onsite sediments, so there is not a concern that foreign sediment will be present within the stream channel. Overall, these impacts will be temporary, and stormwater and erosion control measures will be implemented, as appropriate, as outlined in the SWPPP. See Table 13-5 below for a summary of impacts to streams within the Project Area as a result of the Project.

Table 13-5. Impacts to Streams Crossed by Project Components

Stream Field ID	Bank Width (feet)	Temporary Impacts[1] (linear ft)	Permanent Impacts[2] (linear ft)	State Class & Standard	Facilities Crossing Resource	Crossing/Avoidance Methodology
S-E[3]	1-2 ft.	10.19	33.96	-	Collection Lines, Fence Line, Access Road	N/A
S-G[4]	3-6 ft.	-	2.18	-	Fence Line	N/A

[1]Temporary impacts include electrical collection trenches and workspaces; approximately 5 feet wide per individual feeder line and approximately 9 feet wide with 2 lines (as lines are 4 feet apart so there is 1 foot of overlap for each lines easement); 15-footwide temporary fencing workspace
[2]Permanent impacts include road installation (including culverts); 30-foot-wide corridor across streams; fencing – 1-foot-wide permanent impact
[3]Stream S-E is not jurisdictional to the State or the USACE as it is classified as an ephemeral stream.
[4]The section of Stream S-E that will be crossed by the fence line is a Class C stream and is not a State-jurisdictional stream.

(6) Minimization of Impacts on NYS Protected Waters

Through careful routing and siting of project components, the Applicant has avoided and minimized impacts to NYS protected waters with the Project design and layout. Impacts to wetlands and streams have been largely avoided to the maximum extent practicable through the siting of components away from wetlands and waterbodies. In select locations, the Applicant is proposing the use of trenchless crossing methods for buried electrical collection lines, including HDD, to avoid impacts to wetlands and streams and to reduce ground disturbance and the need to clear trees.

With regards to construction activities, the *Stormwater Pollution Prevention Plan (SWPPP)* (see Appendix 13-3) describes specific erosion control practices to be utilized on site during construction to minimize any impacts to NYS protected waters. Certain construction activities

have the potential to result in direct and/or indirect impacts to surface waters. These activities include the installation of access roads and the installation of buried electrical collection lines. Impacts related to the construction of access road and electrical collection line crossings will be minimized by using HDD boring for underground collection line crossings and by crossing at narrow wetland and waterbody locations where feasible. In addition, implementation of the BMPs in the SPC Plan and SWPPP will avoid or minimize sedimentation and pollution related impacts to the maximum extent practicable. Indirect impacts to surface waters can result from the removal of existing vegetation buffers or changes in the volume and quality of surface water runoff. These types of impacts can affect surface water quality. Removal of woody vegetation that shades surface waters can cause a temporary or permanent change in the water temperature, which can influence both water quality and aquatic habitat. Surface water runoff that carries sediment or pollutants also can affect water quality and aquatic habitats.

The Applicant evaluated potential temporary and permanent impacts to surface waters resulting from the construction and operation of the Project based on the Project design as shown in Appendix 5-1: *Civil Design Drawings* of Exhibit 5: *Design Drawings* of this Application. See Table 13-5 above for details on stream impacts due to the Project. Construction of the Project is anticipated to result in approximately 10.19 linear feet of temporary disturbance and 36.14 linear feet of permanent disturbance in non-state protected streams. The Project will not result in temporary or permanent impacts to state protected streams. Stream impacts are illustrated on Figure 13-4. *Delineated Wetland and Stream Impacts* of this Exhibit. See Sections 13(b)(6)(i) through (vii) below for details.

(i) Solar Panel Racking or Perimeter Fence Locations in Relation to NYS Protected Waterbodies

No solar panel racking or perimeter fence has been designed to span any NYS protected waterbodies within the Project Area.

(ii) Excavation, Grading or Fill Placement in Relation to NYS Protected Waterbodies

No grading or fill placement will occur in NYS protected waterbodies.

(iii) NYS Protected Waterbody Crossings

No above ground stream crossings are proposed. All stream crossings will be achieved using HDD boring to pass underground electrical collector line under resources.

(iv) Tree Clearing Minimization on Banks of NYS Protected Waterbodies

A 1-Percent Annual Exceedance Flood Zone exists within the Project Area (associated with Taghkanic Creek), as shown in Figure 3-7. As per the Federal Emergency Management Administration (FEMA) National Flood Map Web Service, the FEMA Q3 National Flood Data Set displayed on Figure 3-7: Specially Designated Areas was derived (scanned/digitized) from paper Flood Insurance Rate Maps (FIRMs) dated 1985. FEMA notes that the Q3 data be "considered as an advisory tool for general hazard awareness, education, and floodplain management. The flood hazard maps displayed on the FEMA National Flood Map Web Service are not the legal document to be used when making a single site flood hazard determination" (FEMA 2020). Columbia County, in coordination with FEMA, is undergoing an effort to develop a DFIRM Database (digital data) as well as update the FIRMs countywide. However, these data is not yet available. To determine areas of potential inundation during 100-year storm events, the Applicant prepared a flood hazard analysis of an approximately 31 square mile watershed area for Taghkanic Creek utilizing HEC-HMS and HEC-RAS computer software. Based upon this preliminary analysis, approximately 23.5 acres of the Project Footprint could experience varying levels of inundation during 100-year storm events. Refer to Exhibit 6: *Public Health, Safety, and Security* and Exhibit 3: *Location of Facilities and Surrounding Land Use* of this Application for additional detail regarding flood-prone areas located in the Project Footprint.

Throughout the entire Project Area, there will be no tree clearing within 50 feet of a NYS protected stream. The Project has been designed outside of the floodplain of Taghkanic Creek, avoiding the need for any tree clearing to occur within the floodplain or creek banks.

(v) Slope and Erosion Considerations in Relation to NYS Protected Waterbodies

There are two areas of steep slope (greater than 35 percent) within the Project Area, see Figure 10-1 *Existing Slopes*, of Exhibit 10 *Geology, Seismology and Soils*. These areas of steep slope will be avoided as much as practicable. There are no areas of steep slope within 50 feet of NYS protected waters. Areas of steep slope outside of this area will be graded to allow for placement of solar panels, as well as minimization of potential erosion.

(vi) Surface Grading in Relation to NYS Protected Waterbodies

No surface grading will occur within 50 feet of NYS protected waters.

(vii) Stabilizing Vegetation Placement in Relation to NYS Protected Waterbodies

There will be no surface grading to occur within 50 feet of NYS protected waters, therefore, this section is not applicable.

(7) Stream Restoration and Mitigation Plan

There will be no impacts to NYS protected streams due to construction or operation of the Project. Accordingly, pursuant to 19 NYCRR §§ 900-2.14(b)(7) and 900-10.2(f)(3), a mitigation plan is not required and therefore, is not proposed as part of this Application.

13(c) Stormwater

(1) SWPPP and SPDES Permit

A SWPPP, included as Appendix 13-3, has been prepared in accordance with the applicable State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and the NYS Standards and Specifications for Erosion and Sediment Control (NYSDEC, 2016). Prior to commencement of construction activities, the Applicant will submit to NYSDEC a Notice of Intent for Stormwater Discharges from Construction Activity and will seek coverage under the SPDES General Permit issued in January 2020 and effective on January 29, 2020, as modified (GP-0-20-001). This authorization is subject to review by NYSDEC and is independent of the ORES permitting process. The SWPPP has been prepared in accordance with the NYS Standards and Specifications for Erosion and Sediment Control (NYSDEC, 2016) and the New York State Stormwater Management Design Manual (NYSDEC, 2015).

The SWPPP describes in general terms the sediment control practices that will be implemented during construction activities, and the stormwater management practices that will be used to reduce pollutants in stormwater discharges after Project construction has been completed. The SWPPP includes:

- Anticipated stormwater management practices, including temporary and permanent erosion and sediment control measures (vegetative and structural);
- Anticipated construction activities, including a preliminary construction phasing schedule and preliminary definition of disturbance areas;
- Site waste management and spill control measures;
- Proposed site inspection and maintenance measures, including construction site inspection and construction site record keeping; and

- Conditions that will allow for the termination of the permit coverage.

The total estimated land disturbance area reflected in the SWPPP is approximately 215 acres (the total limit of disturbance, which includes both the permanent development area plus temporary workspace for theProject Footprint). The goal of the measures outlined in the SWPPP are to maintain existing drainage patterns as much as possible, control increases in the rate of stormwater runoff so as not to adversely alter downstream conditions, and minimize stormwater quality impacts. Typical erosion and drainage practices anticipated to be used during construction of the Project include perimeter silt fencing, storage of the minimal necessarychemicals in central location(s) with appropriate controls and containment, storm pipe, silt fence, temporary check dams, dry swales used for access roads steeper than 10% slope, slope protection, inlet/outlet protection, timber mats, vegetation protection, stabilized construction entrances, and vegetation filter strips. Due to the minimal grading required, the risk of erosion and sedimentation is expected to be limited. Temporary measures will remainin place until areas are permanently stabilized. Once construction is complete and restoration verified, a Notice of Termination will be filed with NYSDEC for the General Permit coverage.

The Applicant intends to request written authorization from the NYSDEC to allow the disturbance of greater than 5 acres at one time. Accordingly, construction-phase SWPPP inspections will be required at least twice every 7 calendar days.

(2) Preliminary Post-Construction Stormwater Management Practices Plan

This Project will have a negligible hydrologic effect on the existing overall watershed and sub-watersheds. In fact, by converting the land from row crop to meadow, the Project will create a substantial benefit in reducing peak discharge rates across all design storm events. The Applicant will utilize post-construction stormwater management practices prepared in accordance with the New York State Design Manual (NYSDEC, 2016). Specifically, the ground surface will be restored mainly to pervious surface conditions. The earth-grading work associated with the Project will be performed with the intention of retaining the current general surface drainage patterns. The Applicant proposes to use pervious limited use gravel drives for site access. Although the proposed access roads and substation area will be gravel, they will be considered impervious with respect to water quality volume calculations, so stormwater management will be required for these areas.

The proposed gravel roads that are less than 10% grade are designed to capture runoff and promote infiltration with a minimum design infiltration rate of 0.5 inches per hour. For

access roads steeper than 10%, dry swales with check dams will be installed along these proposed gravel access roads because the grade of the gravel road is generally too great to allow for effective water quality and quantity mitigation within the gravel section. These swales are designed to capture runoff and promote infiltration with a minimum design infiltration rate of 0.5 inches per hour.

The proposed dry swales are considered a green infrastructure technique, which can provide water quality, quantity, and runoff reduction treatment through infiltration, evapotranspiration, and/or reuse. The dry swales are vegetated channels explicitly designed and constructed to capture and treat stormwater runoff within dry cells formed by check dams. Pollutants carried by surface runoff can degrade the water quality of downstream receiving waters. Runoff percolates through the soil layer, which filters out sediment particles.

The dry swales will be sized to completely capture and infiltrate runoff from the proposed Project gravel drives up to and including the 100-year storm event. The proposed drives will be pitched to a roadside vegetated ditch. The downstream end of the ditch will have the permeable soil layer in the bottom for the length required to provide the necessary water quality and quantity treatment volume. A stone lined emergency overflow weir will be provided at the downstream end of each swale. Therefore, runoff from these new impervious areas will be treated for water quality and runoff reduction, as well as reducing downstream flow rates for the 1-year, 10-year, and 100-year storm events.

The substation area will also be covered by gravel. Water quality for runoff from the proposed substation area will be treated by a 50-foot-wide vegetated filter strip. Runoff will sheet flow from the gravel pad to the filter strip where vegetation will remove pollutants prior to downstream discharge off-site. There will potentially be greater than a 75-foot length of the stone pad draining to the filter strip, but the surface is relatively flat gravel (instead of asphalt) and the strip will be able to accommodate the contributing area. In addition, the area downstream of the filter strip will also be vegetated.

The Project is not located within a regulated, traditional land use control of a Municipal Separate Storm Sewer System (MS4) area. Therefore, the Project is not subject to the requirements or regulations of MS4s.

13(d) Chemical and Petroleum Bulk Storage

(1) Spill Prevention and Control Measures

A *Spill Prevention, Control and Countermeasures (SPC)* plan is provided as Appendix 13-4.

The SPC Plan describes the procedures, methods, and equipment to be used during Project construction to prevent discharges from occurring and impacting navigable waters. Along with describing the countermeasures anticipated for the Project, the SPC Plan establishes inspection, reporting, training, and recordkeeping requirements for the aboveground oil storage, primarily located in the main substation transformers.

On a typical solar project, spill containment is included at the substation transformers. The volume of oil in the large power transformers located at the substations is expected to trigger the requirement for an SPC and spill containment plan. The only other large storage on site is at the location of the inverter-transformers. The quantities of oil in these smaller medium voltage transformers are typically insufficient to trigger spill containment requirements. Due to the large physical space between the substation and inverter- transformers, a spill or fire at one would not cause a spill or fire at another. As such, the inverter-transformers are considered to be separate sites and analyzed separately for purposes of an SPC. This is typical practice for wind and solar projects, including projects which have previously been approved in New York and other locations.

The SPC Plan is organized to follow the requirements of 40 Code of Federal Regulations (CFR) § 112.7. This includes details regarding identification of responsible parties, a description of the Project and locations of material storage, protection measures that will be in place to prevent a potential release, and procedures to be implemented in the unanticipated event of a release. Inspections, training, and other procedures will also be specifically identified such that appropriate compliance records can be maintained.

(2) Storage or Disposal of Regulated Substances

It is not anticipated that the Project will require on-site storage or disposal of large volumes of any substances subject to regulation under the State of New York's chemical and petroleum bulk storage programs (e.g., fuel oil, petroleum, etc.). During construction and operation, small quantities of fuel and solvents will be on site for vehicles and cleaning. All fuel will be stored within the fuel tanks of the vehiclesor in centralized temporary storage location. No separate permanent fuel storage is anticipated. If solvents or paints are required for maintenance, they will be in containers of less than 10 gallons and stored inside the substation control enclosures.

(3) Storage of Hazardous Substances Compliance with Local Law Storage Regulations

As previously stated in Sections 13(d)(2), it is not anticipated that the Project will require on-site storage or disposal of large volumes of any substances subject to regulation. However, if

construction, operational, or maintenance activities require petroleum or other hazardous chemicals to be stored on-site, those substances will be stored in a manner such that the applicable, substantive provisions of local laws and guidelines will be followed.

13(e) Aquatic Species and Invasive Species

(1) Biological Aquatic Resource Impacts

According to the computer-generated United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Report, one federally listed aquatic species, **BEGIN CONFIDENTIAL INFORMATION <** [redacted] **> END CONFIDENTIAL INFORMATION**

TRC received consultation from New York Natural Heritage Program (NYNHP) regarding listed species within the Project Area on December 23, 2020, which stated NYNHP has no record of state-listed threatened or endangered species, or significant natural communities within the Project Area or in its immediate vicinity. **BEGIN CONFIDENTIAL INFORMATION <** [redacted] **> END CONFIDENTIAL INFORMATION** (Exhibit 11 Appendix 11-1; Exhibit 12 Appendix 12-1). Please see Ex 11. *Terrestrial Ecology*, Section 11(d)(1)(i) and Ex12: *NYS Threatened and Endangered Species*, Section 12(a) for more information.

TRC conducted habitat surveys for **BEGIN CONFIDENTIAL INFORMATION <** [redacted] **> END CONFIDENTIAL INFORMATION** can be found in Section 12(a) of Exhibit 12: *Terrestrial Ecology* of this application.

As previously stated, based on data from the New York Invasive Species iMap Invasives Resource Mapper, two aquatic invasive species have been documented within the vicinity of the Project (NY iMap Invasives, 2021). Rudd was observed on July 4, 1988, within the Project

Area. Water chestnut was observed on Copake Lake in 2002, just over a mile from the Project Area. Copake Lake is connected to Taghkanic Creek by a stream that flows from the lake and joins Taghkanic Creek about ¾ of a mile downstream of the Project Area. Project construction and operations will have no impact on this species, or further its spread into other bodies of water. Additionally, the Project Area does not contain habitat for freshwater mussels, thus they will not be impacted.

(2) Avoidance, Minimization, or Mitigation Measures for Biological Aquatic Resources

No aquatic species are expected to be impacted during construction or operation of the Project. The majority of aquatic resources within the Project Area will not be impacted during construction and operation, with only six streams being crossed using HDD boring and one non-state jurisdictional ephemeral stream having trees cleared from their banks. Construction methods have been developed and BMPs will be followed to minimize the amount and duration of disturbance within these areas. Additionally, a project-specific *Invasive Species Control and Management Plan (ISMCP)* has been prepared to prevent the spread of invasive species during construction and to control invasive populations following construction and during operation of the Project. See Appendix 13-6 for the Project ISMCP.

13(f) Water Quality Certification

(1) Water Quality Certification Request

Section 401 of the Clean Water Act (CWA) requires applicants to obtain a Water Quality Certification before commencing construction, should the Project have the potential to discharge into a navigable water of the United States and require a federal license or permit. The Water Quality Certification indicates that the proposed activity will be in compliance with water quality standards set forth in 6 NYCRR § 608.9. Construction and operation of the Project shall at all times be in conformance with New York State Water Quality Standards (6 NYCRR § 608.9) necessary and appropriate for compliance with Section 401 Water Quality Certification.

If it is determined that the Project will include regulated activities within WOTUS, the Applicant will apply for and obtain a Water Quality Certification prior to beginning construction.

(2) Related Federal Permit Applications

If it is determined that the Project will include regulated activities within WOTUS, a Section 404 CWA Permit will also be obtained from the USACE and will be submitted along with the Water Quality Certification as described in Section 13(f)(1) above.

(3) Compliance with 6 NYCRR Section 608.9

If necessary, the Applicant will seek a Water Quality Certificate required by Section 401 of the Federal Water Pollution Control Act. The Applicant will comply with Sections 301-303, 306 and 307 of the Federal Pollution Control Act, as implemented through NYSDEC regulations, to the extent applicable. No in-water construction will commence until any required Water Quality Certification is obtained.

(4) Pertinent Contact Information Related to Water Quality Certification

The Project is located within the New York District of the USACE. The Upstate NY Field Office, which covers Columbia County, is located at 1 Buffington Street, Watervliet Arsenal, Watervliet, NY 12189-4000.

(5) Plan for Request

The Applicant's plan for making a request to the NYSDEC for any required Water Quality Certification is described in Sections 13(f)(3) and (f)(4) of this Exhibit.

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