Baron Winds Project

Case No. 15-F-0122

1001.23 Exhibit 23

Water Resources and Aquatic Ecology

TABLE OF CONTENTS

EXHIBIT 23 WATER RESOURCES AND AQUATIC ECOLOGY

This Exhibit includes a review of the groundwater, surface water, and aquatic ecology impacts of the Facility consisting of the identification and mapping of existing conditions, an impact analysis, and proposed impact avoidance, minimization and mitigation measures.

(a) Groundwater

(1) Hydrologic Information

The average depth to groundwater ranges from the ground surface to greater than 6 feet throughout the Facility Area, with high water tables most common in low-lying areas in and adjacent to wetlands. Depth to bedrock ranges from 1 foot to greater than 6 feet, with the large majority of the Facility Area having soil depths greater than 6 feet (Soil Survey Staff, 2017). These depths were confirmed by the Preliminary Geotechnical Assessment (Appendix KK). Maps showing depth to bedrock and depth to water table throughout the Facility Site, based on the Soil Survey of Steuben County, New York, are provided in Figure 23-1.

(2) Groundwater Aquifers and Recharge Areas

The northern portion of the Facility Area overlays part of one primary aquifer, a designation applied by the U.S. Geological Survey (USGS) and New York State Department of Environmental Conservation (NYSDEC) to aquifers that are highly productive and utilized by major municipal water supply systems (NYSDEC, 2011). Part of this primary aquifer overlaps the Valley Fill Aquifer Critical Environmental Area (CEA), which was designated by the Town of Wayland due to its use as a primary source of drinking water (NYSDEC, undated). The location of the groundwater aquifer in relation to the Facility is depicted in Figure 23-2.

The Facility Area also overlays parts (in some cases, very small parts) of seven unconsolidated aquifers mapped by the NYSDEC Division of Water, Bureau of Water Resources Management (NYSDEC, 2008). The U.S. Environmental Protection Agency (USEPA) maintains data on sole source aquifers, which are those that supply at least 50% of the drinking water in a given area. Cattaraugus Creek Sole Source Aquifer is the nearest sole-source aquifer, located over 44 miles west of the Facility Area (USEPA, 2011). Therefore, it is anticipated that the Facility will not result in impacts to sole-source aquifers.

According to the Preliminary Geotechnical Assessment (Appendix KK), groundwater recharge areas are typically present at local topographic highs, and groundwater discharge zones are typically present at local topographic

lows within a groundwater sub-basin; however, groundwater flow direction and velocity are influenced by subsurface permeability architecture and/or fractures. Variability in subsurface permeability architecture can be created by thickness and type of overburden, zones of secondary porosity in the bedrock (i.e., fractures), and topography of bedrock surface, among others. The direction of groundwater flow is depicted in Figure 23-2.

To identify existing water wells in the Facility Area, a Freedom of Information Law (FOIL) request letter was sent to the NYSDEC on April 20, 2016 and to Steuben County on April 28, 2016. These letters requested any information pertaining to groundwater wells (including location, construction logs, depths, and descriptions of encountered bedrock) within the Facility Area. An email response was received from Steuben County on May 9, 2016 indicating that the County does not have any records pertaining to water wells or public intakes. An email response was received from the NYSDEC on May 12, 2016, which provided copies of 48 well completion reports for wells found in the vicinity of the Facility. Information regarding yield and depth to water table for each well to the extent included in the well completion reports is provided in Table 23-1. In addition, the records are included in Appendix DDD, and the locations of the wells identified in NYSDEC records are shown in Figure 23-2. (Note that only those wells with coordinates included in the well completion reports are identified in Figure 23-2). The Applicant also sent a FOIL request to the New York State Department of Health (NYSDOH) on November 15, 2017 to request information pertaining to groundwater wells (including location, construction logs, depths, and descriptions of encountered bedrock) within the Facility Site. The Applicant will provide the NYSDOH's response to NYSDPS once available.

Table 23-1. Water Well Records from NYSDEC

NYSDEC Well Number	Depth to Groundwater (ft)	Yield Test Average Discharge (Gallons per Minute)	NYSDEC Well Number	Depth to Groundwater (ft)	Yield Test Average Discharge (Gallons per Minute)
SB1050	70	10	SB2435	30	5
SB1117	11	25	SB2443	43	10
SB1166	147		SB2444	20	5
SB1192	190		SB2448	35	12
SB1207	195	15	SB2529		
SB1242			SB2578	28	10
SB1265	245		SB2582	40	20
SB1324		1	SB2650	50	9
SB1408			SB2681	50	8
SB1439	6		SB2684	110	20
SB1515	60	6	SB2718	90	20
SB1658	25	20	SB2765	35	20

NYSDEC Well Number	Depth to Groundwater (ft)	Yield Test Average Discharge (Gallons per Minute)	NYSDEC Well Number	Depth to Groundwater (ft)	Yield Test Average Discharge (Gallons per Minute)
SB1706	47	20	SB2785	20	8
SB1812	35	20	SB2809		30
SB1852	20	20	SB2882		10
SB2114	60	9	SB2888	40	7
SB2123	25	8	SB2904	0	14
SB2231		10	SB3014	3	15
SB2284	125	10	SB3021		
SB2325	25	8	SB3035	100	15
SB2342		10	SB3036	140	15
SB2367	90	10	SB3107	131	10
SB2405	105	20	SB3279	130	10
SB2418	6	15	SB3326	45	9

The NYSDEC well completion reports showed that depth to water table at private wells varies throughout the Facility Area. Depths to groundwater as shallow as 0 feet and as deep as 245 feet were reported. Yields of private wells varied as well, with wells producing average yields between 1 and 30 gallons per minute (gpm).

Private wells were also identified by sending a well survey to all residences/businesses located within a 2,000-foot radius of the proposed Facility. The Applicant's consultant, Environmental Design & Research, Landscape Architecture, Engineering, & Environmental Services, D.P.C. (EDR), sent out letters with a well survey questionnaire to the owners of 659 unique tax parcels. The letters included information describing the Facility, the Article 10 process, and a link to the Applicant's website. The questionnaire included questions such as: whether the parcel had well(s); the size and yield of the well; the well's depth to groundwater; sampling and testing history of the well; and location in relation to buildings on the parcel. Included with the questionnaire was an EDR-addressed envelope to facilitate return of the surveys.

EDR received responses to the surveys identifying a total of 118 private wells. Based on the private well survey responses, the depths of the private wells range from 3 feet to 300 feet below grade with an average depth of approximately 116 feet below grade (the depths of 18 wells were unknown or not available). Reported depths to groundwater for private wells installed in bedrock range from 3 feet to 241 feet below grade with an average depth of approximately 62 feet below grade, while depths to groundwater for private wells installed in sand and gravel range from 5 feet to 100 feet below grade with an average depth of approximately 58 feet below grade. According to the responses, private wells located with 2,000 feet of the Facility are primarily used for residences. Groundwater

yields reported in this survey range from 1 gpm to 1,000 gpm with averages yields of approximately 50 gpm. The responses are included in Appendix DDD and wells are depicted in Figure 23-2.

Residence and community groundwater wells are generally assumed to be set deeper than the proposed wind turbine foundations and associated underground electrical transmission lines within fractured bedrock or granular till soil. Additionally, turbines are set back from residential structures more than 1,000 feet. Therefore, based on the data reviewed and the planned setback distances, it is unlikely construction of the proposed turbines will have an impact on shallow aquifer or residential water well groundwater quality or quantity.

To ensure construction and operation of the Facility does not adversely affect nearby groundwater wells, the Applicant will conduct pre- and post-construction baseline testing of water wells located within 100 feet of Facility components to determine any surficial impacts to groundwater drinking wells. With respect to Facility turbines, pre- and post-construction baseline testing of water wells located within approximately 1,000 feet of Facility turbines will be conducted to determine any surficial impacts to groundwater drinking wells. Any adverse impacts identified based on this testing will be mitigated in accordance with Section (b)(5) below.

(3) Groundwater Impacts

The Facility is not anticipated to result in any significant impacts to groundwater quality or quantity, or drinking water supplies. However, there is potential for short-term, minor adverse impacts to groundwater during construction. Additional detail regarding groundwater impacts is provided below.

Many of the proposed turbines will be located in higher elevation uplands, generally above and outside of the aquifer footprints located in the valleys. One exception is in the northeastern portion of the Facility Area, where a large area is underlain by the Upper Cohocton aquifer. This is labeled as a “Primary Aquifer Region” in a GIS dataset maintained by the NYSDEC Division of Water, Bureau of Water Resources Management entitled *Unconsolidated Aquifers at 1:250,000* (NYSDEC, 2008). However, most of this area is not identified as a primary aquifer based on a GIS dataset entitled *Primary Aquifers – 1:24,000* (NYSDEC, 2011). No turbines are located within the area identified by NYSDEC as a primary aquifer (see Figure 23-2 for locations of mapped aquifers in the Facility Area). Soil bores were collected during the Preliminary Geotechnical Assessment at 10 locations, seven of which occurred at proposed turbine locations and three borings in the vicinity of the Facility Area that are representative of the Facility Area, to depths ranging between 22 feet and 40 feet. Only one bore location was observed to have standing water at the completion of soil sampling, which was encountered at 29 feet below ground surface.

Despite the presence of mapped aquifers in the Facility Area, the Facility is not anticipated to result in any significant impacts to groundwater quality or quantity, drinking water supplies, or aquifer protection zones. Excavations for foundations, roadways, and underground collection lines are expected to be relatively shallow, and are not anticipated to intercept groundwater within the surrounding aquifers. In the unlikely event groundwater is encountered during excavation, one of the mitigation measures described in Section (b)(5) below will be implemented to prevent impacts to aquifers.

One possible source of groundwater impacts is the introduction of pollutants from the accidental discharge of petroleum or other chemicals used during construction, operation or maintenance. Such discharges could result from minor leaks from fuel and hydraulic systems, as well as more substantial spills during refueling or from mechanical failures and other accidents. However, the Applicant has developed a set of avoidance, minimization, and mitigation measures outlined in the Facility's Preliminary Spill Prevention, Control and Countermeasures (SPCC) Plan that minimize the potential for such discharges. See Section (b)(5) below for a discussion of the SPCC Plan and other mitigation measures.

The Facility will add only small areas of impervious surface, which will be dispersed throughout the Facility, and will have a negligible effect on groundwater recharge. However, construction of the proposed Facility could result in certain localized impacts to groundwater, and the use of that water by adjacent landowners. These impacts could include:

- Minor localized disruption of groundwater flows down-gradient of proposed turbine foundations;
- Minor modification to surface runoff or stream-flow, thereby affecting groundwater recharge characteristics;
- Minor degradation of groundwater quality from accidental spills and installation of concrete foundations;
- Impacts to groundwater recharge areas (wetlands); and
- Groundwater migration along collection line trenches.

During construction, groundwater may be encountered in shallow excavations in areas of poorly drained soils and/or shallow bedrock. Additionally, ponding of surface water and/or precipitation may occur in open excavations and in low-lying areas. It is anticipated that groundwater and/or surface water that accumulates in shallow excavations of the upland areas can generally be controlled using conventional sump and pump methods. During these construction-related dewatering activities, sediment laden water will be sufficiently filtered in upland locations and not discharged into wetlands or streams. Water velocity dissipation will be provided at all discharge points.

Dewatering activities will not cause erosion in receiving channels or adversely impact water resources. However, exact areas of dewatering cannot be known at the time of this Application.

The determination of long-term dewatering (if necessary) will be addressed during final geotechnical investigations to be conducted at each turbine location following Certification. See Section (b)(5) below for additional information on dewatering methods.

The greatest potential for impacts to groundwater across the Facility is the installation of turbine foundations. Because of geologic conditions in the Facility Area, however, excavation to bedrock depths will probably be unnecessary. Moreover, based on existing bedrock conditions and the results of the Preliminary Geotechnical Assessment (Appendix KK), it is anticipated that any bedrock encountered in shallow excavations will be rip-able using typical excavation equipment (if required) and/or can easily be broken up using a pneumatic hammer. Due to the depth of bedrock and the weathered and very poor rock quality conditions observed during preliminary geotechnical investigations, no blasting will be required, and no assessment of the potential impacts of blasting is necessary (see Exhibit 21(i) for additional information). Impacts associated with conventional excavation methods will be managed by utilizing best management practices [BMPs] appropriate for the Facility SPCC Plan, Stormwater Pollution Prevention Plan [SWPPP], etc.).

Construction activities have the potential to impact localized groundwater flow paths in areas where excavation occurs below the water table. In these instances, water is anticipated to flow around the disturbance and resume its original flow direction downgradient of the disturbance. Groundwater that infiltrates into the excavation may require removal by pumping, which could have a minimal, short-term effect on the elevation of the water table. However, this water will be pumped to the surface, discharged to the ground surface through a velocity dissipating device, and allowed to infiltrate back into the water table with negligible loss of volume due to evaporation. In addition, excavation is not anticipated to occur below the water table for the Facility. Therefore, any effect will be very localized and temporary.

Installation of the concrete foundations could cause a temporary, localized increase in pH of groundwater during the curing process. This effect will not extend beyond the immediate area of the foundation and will not adversely affect groundwater quality. In the event a perched groundwater condition is encountered at a turbine site, temporary construction dewatering methods will be employed, as described above. Turbine foundations are typically designed to resist hydrostatic forces, when required, eliminating the need to install permanent drainage systems.

As previously noted, soil borings have been conducted to determine groundwater levels at a subset of turbine locations (see Preliminary Geotechnical Assessment, attached as Appendix KK). Nine of the 10 borings were found to be completely dry, and the remaining boring had a groundwater depth at 29 feet below ground surface. This result suggests that groundwater is not anticipated to be encountered at turbine locations. Should shallow/perched groundwater be encountered, related potential construction impacts are anticipated to be addressed through relatively common engineering measures and construction techniques, including dewatering (See Section (b)(5) below for details on dewatering methods), which will avoid and minimize the potential for groundwater to cause erosion and sedimentation.

In addition to impacts to groundwater due to turbine foundation installation, minor impacts could result from the installation of buried interconnect lines which may facilitate groundwater migration along trench backfill in areas of shallow groundwater. Due to the decompaction of soils within the trench of the buried interconnect, water could collect in the trench and migrate through the trench to areas of lower elevation, where it will naturally infiltrate back into the water table with negligible loss of volume.

Sources of water that would be used for concrete mixing include Smith Ponds, Mud Lake, the Hornell Reservoirs, and ponds near the Facility Site. Details associated with the design and layout of facilities for withdrawal and transport of source water will be provided post-Certification once the Applicant engages a Balance of Plant (BOP) contractor.

(b) Surface Waters

(1) Surface Waters Map

A map showing locations of all surface waters, including intermittent streams (to the extent such streams are identified in publicly available data), within and adjacent to the Facility Site, is provided in Figure 23-3. Data sources used to generate this map include publicly available data from Steuben County, NYSDEC, the Environmental Systems Research Institute (ESRI), and the USGS, along with stream data collected during on-site wetland and stream delineations. Wetland and stream delineations identified all surface waters (ponds; ephemeral, intermittent, and perennial streams; and wetlands) within a 200-foot wide corridor centered on proposed access roads, turbines, electrical interconnects, buried electrical collection lines, and all proposed construction work areas. Stream mapping outside of these areas are based on NYSDEC mapping and stream classifications.

(2) Description of Surface Waters

The Facility Area is located in a topographically high position at the boundaries between three watersheds. The majority of the Facility (approximately 71%), including the entire eastern portion, lies within the Chemung watershed (USGS Hydrologic Unit 02050105) within the Chemung River Drainage Basin. The northwestern portion of the Facility Area (approximately 7%) drains into the Upper Genesee watershed (USGS Hydrologic Unit 04130002) within the Genesee River Drainage Basin, while the southwestern portion of the Facility Area (approximately 22%) drains into the Tioga watershed (USGS Hydrologic Unit 02050104) within the Chemung River Drainage Basin. The Chemung River Basin drains approximately 1,740 square miles of New York State, and is a significant tributary of the Susquehanna River. There are approximately 2,940 miles of rivers and streams, and 90 significant lakes and ponds in the Chemung River Basin. The Genesee River Basin drains approximately 2,480 square miles, the majority of which is in New York State, and includes most of Livingston and Allegany Counties, large parts of Monroe, Genesee and Wyoming Counties, and portions of Orleans, Ontario, Steuben and Cattaraugus Counties.

Under Article 15 of the New York Environmental Conservation Law (Protection of Waters), the NYSDEC has regulatory jurisdiction over any activity that disturbs the bed or banks of protected streams. Any stream, or particular portion of a stream, that has been assigned by the NYSDEC any of the following classifications or standards is considered a protected stream: AA, AA(t), A, A(t), B, B(t) or C(t) (6 NYCRR Part 701). 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 usage of Class B waters is primary and secondary contact recreation and fishing. The best usage of Class C waters is fishing and non-contact activities. Class D waters represent the lowest classification standard. Streams designated (t) indicate that they support trout, and also include those more specifically designated (ts), which support trout spawning. A list of NYSDEC mapped streams that cross a portion of the Facility is provided below in Table 23-2. Protected streams within the Facility Site are Class A and Class C(ts), and include Neils Creek and Carrington Creek tributaries. There are no mapped Class AA, B, or D streams that cross the Facility Site.

Table 23-2. NYSDEC Mapped Streams that Cross Facility Limits of Clearing

Stream Name[1]	NYSDEC Class	Water Index Number[2]
Reynolds Creek	C	Pa 3-58 (portion 3)
Reynolds Creek (tributaries)	C	--
Reynolds Creek (tributaries)	C	--
Cohocton River (tributaries)	C	Pa 3-58 (portion 3)
Neils Creek	C(TS)	Pa 3-58-38
Neils Creek (tributaries)	C	--

Stream Name[1]	NYSDEC Class	Water Index Number[2]
Neils Creek (tributaries)	C	Pa 3-58-38
Neils Creek (tributaries)	C	Pa 3-58-38
Neils Creek (tributaries)	C	--
Neils Creek (tributaries)	C	--
Neils Creek (tributaries)	C	Pa 3-58-38
Neils Creek (tributaries)	C	Pa 3-58-38
Neils Creek (tributaries)	C	--
Neils Creek (tributaries)	C	Pa 3-58-38
Carrington Creek (tributaries)	A	Pa 3-57-5-49
Carrington Creek (tributaries)	A	Pa 3-57-5-49
Carrington Creek (tributaries)	A	Pa 3-57-5-49
Big Creek (tributaries)	C	Pa 3-57-5-48
Big Creek (tributaries)	C	Pa 3-57-5-48

[1] Based on streams from the Water Quality Classifications – NYS GIS layer (downloaded from https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1118) that intersected Facility buffered areas as defined in the Preliminary Scoping Statement (PSS).

[2] Based on streams from the Water Inventory/Priority Waterbodies List (WI/PWL) GIS layer (downloaded from `http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1117) that intersected Facility buffered areas as defined in the PSS. Not all streams from the Water Quality Classifications layer coincided with streams from the WI/PWL layer, and were not assigned a Water Index Number.

As indicated, Table 23-2 above provides a list of all NYSDEC-mapped streams that cross a portion of the Facility. Please also note that the NYSDEC conducted a site visit to review the boundaries of delineated wetlands and streams, and subsequently issued a Freshwater Wetlands Determination, which also addresses the jurisdictional status of streams. Based on the information in the Freshwater Wetlands Determination, which is included with the Wetland Delineation Report (see Appendix BBB), the Applicant identified a total of 10 crossings of NYSDEC-protected streams. Please see (b)(4) below for a detailed discussion of potential impacts to streams, and (b)(5) for a discussion of avoidance and minimization measures.

With respect to fish species, an email request was submitted to the NYSDEC on June 3, 2016 for data on fish communities in streams associated with the Facility Area. A response from the NYSDEC was received on July 7, 2016, which contained a spreadsheet of results from a statewide database query (see Appendix LL for the wildlife inventory, which includes the fish species identified by the NYSDEC). These data provide information on fish species that have been caught or identified in the streams of interest. The data were compared to the State and federal databases of threatened and endangered species, which indicated that these streams contain no documented federally-listed threatened or endangered species. In addition, according to the data received from the NYSDEC, there are no occurrences of State-listed endangered, threatened, or special concern fish species in these streams.

On-site wetland/stream delineations were conducted in the fall of 2016 and spring of 2017 (and wetland approximations took place in June 2016) during which data were collected on streams that exist within the Facility Site. These efforts were specific to areas near where disturbance could occur during construction and operation,

and therefore do not cover the entirety of parcels defining the Facility. For a full description of stream and wetland delineation results and methods, see the Wetland Delineation Report included in Appendix BBB. Forty-one stream segments were identified during the delineations, including streams with perennial, intermittent, and ephemeral flow regimes. Included in the delineations are portions of the mapped streams listed above in Table 23-2, as well as unmapped streams, which are either intermittent, perennial, or ephemeral tributaries of the mapped streams. Most streams were located in forests, and generally had gentle to moderate gradients. The majority of streams appear to be intermittent, with a rocky substrate, well-defined banks, and average water depths between 2 and 12 inches.

Because most of the proposed components of the Facility are located high on ridges (e.g., turbines and the access roads that service them), the majority of the streams delineated on-site are high in the watershed, and are unlikely to support fisheries or diverse aquatic invertebrate communities. Aquatic plants were nonexistent in many of the streams on the Facility Site. However, a few larger streams do exist in the lower elevation/valley settings within the Facility Site. The smaller streams are all tributaries to larger streams, and the larger streams support more diverse aquatic life.

Data were retrieved from Version 45 of the NYSDEC Statewide Fisheries Database via a site-specific request submitted to the NYSDEC Region 8 office to characterize the fish communities present within the Facility Site. The following streams crossing or proximate to the Facility were queried for lists of species documented to live in those streams: Neils Creek, Big Creek, Carrington Creek, Reynolds Creek, Castle Creek, Page Brook, and Mill Creek. Taking a conservative approach, this query included streams that were in the vicinity of the Facility in at least one location, but do not actually cross the Facility Site in the final layout (Castle Creek, Page Brook, and Mill Creek). Data returned from the search include records of fish species caught or identified in the streams of interest. As stated previously, much of the Facility is high in the watershed, and the streams within the Facility Site are generally smaller than the streams where fish species were documented to occur. However, to conservatively represent all species that could possibly occur, all fish species documented in these streams by the NYSDEC Statewide Fisheries Database are included in the Wildlife Inventory (Appendix LL). A total of 22 unique fish species were identified. These include larger fish valued by anglers such as brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), creek chub (*Semotilus atromaculatus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and rainbow trout (*Oncorhynchus mykiss*). Smaller fish preyed upon by these larger fish are supported by these streams as well, including pumpkinseed (*Lepomis gibbosus*), cutlip minnow (*Exoglossum maxilluingua*), and a variety of darters (*Etheostoma* spp.) and dace (*Rhinichthys* spp.). See Exhibit 22(f)(5) for additional information on threatened, endangered, and otherwise protected species within the Facility Site.

The NYSDEC maintains a list of the *Common Aquatic Invasive Species of New York*, which includes fish, clam, mussel, insect, plant, and algae species, known habitat distributions of these species and recommended boat-cleaning methods to prevent their spread (NYSDEC, 2016). Of the 22 invasive species included on the list, only nine might occur in the vicinity of the Facility Site based on known distributions and habitat requirements, including curly-leaf pond weed (*Potamogeton crispus*), Eurasian watermilfoil (*Myriophyllum spicatum*), water chestnut (*Trapa natans*), Asian clam (*Corbicula fluminea*), zebra mussel (*Dreissena polymorpha*), quagga mussel (*Dreissena bugensis*), fishhook waterflea (*Cercopagis pengoi*), spiny waterflea (*Bythotrephes longimanus*), and starry stonewort (*Nitellopsis obtusa*). None of the species on the list were observed during wetland delineations or other field investigations, including a terrestrial plant invasive species survey; however, a comprehensive aquatic species inventory was not conducted. Most of the habitat within the Facility Site is in the upper portion of the watershed and does not consist of water bodies large enough to support these species, and there are no lakes within the Facility Site.

(3) Drinking Water Supply Intakes

A FOIL request on the location of downstream surface drinking water intake sites was submitted to Steuben County Department of Public Health on April 28, 2016. The inquiry requested data on public surface drinking water intake sites within 1 mile of the proposed Facility or, if there are no such intake sites, the nearest intakes downstream of the Facility Area. Because the proposed Facility would be located within three watersheds, the Applicant requested data for the Chemung, Tioga, and Upper Genesee watersheds. On May 9, 2016, a County staff person replied that the County does not have any records pertaining to public intakes. Water is supplied to the Hornell Water Treatment Plant from three reservoirs owned and operated by the Hornell Water Department. The reservoirs are located approximately 1 mile west of the Facility Site. The Applicant will take all measures practicable to avoid, minimize, and mitigate impacts to surface waters, as outlined in Section (b)(5) below.

(4) Impacts to Surface Waters

During the earlier stages of development of the project, the Applicant considered installing up to 120 turbines at the Facility Site. The decision to reduce the number of turbines installed from 120 to 76 significantly reduced potential impacts to surface waters. Moreover, with only one exception, the Applicant has sited wind turbine foundations, the O&M building and the collection substation, to avoid or minimize temporary and permanent impacts to surface waters (one turbine is sited such that minimal impact [less than 50 linear feet of permanent impact] will occur to a stream). In addition, large temporary construction areas (e.g., laydown yards) will avoid surface water. The Applicant also has attempted to avoid impacts to surface waters associated with the Facility by locating access roads and collection lines to minimize the number stream crossings. Where stream crossings

cannot be avoided, the number and overall impacts will be minimized by utilizing existing crossings and narrow crossing locations to the extent practicable. As described in Exhibit 22, the construction of the Facility will only have minimal impacts to surface waters including temporary impacts to 0.03 acre of open water wetlands and will cause no permanent loss to these wetlands. In addition, impacts due to construction of the Facility will be limited to 770 linear feet of temporary impacts and 218 linear feet of permanent impacts to streams. The details of these impacts are described below.

During construction, potential direct or indirect impacts to surface waters may occur due to the installation of access roads and wind turbine foundations, the upgrade of local public roads, the installation of above ground or buried electrical interconnects, the development and use of temporary workspaces around the turbine sites and temporary workspaces around the substation. Direct impacts include 1) an increase in water temperature and conversion of cover type due to clearing of vegetation, 2) siltation and sedimentation due to earthwork, such as excavating and grading activities, 3) disturbance of stream banks and/or substrates resulting from buried cable installation, and 4) the direct placement of fill in surface waters to accommodate road crossings. Indirect impacts to surface waters may result from sedimentation and erosion caused by construction activities (e.g., removal of vegetation and soil disturbance).

Clearing of trees and other woody vegetation around stream and riverbanks could increase the temperature of those waters. Water temperature governs most of the physical, chemical, and biological processes that occur in streams. Temperature determines the types of organisms that can live in streams and rivers. All aquatic organisms, including zooplankton, phytoplankton, fish, and insects have a range of temperatures they can live within. Above or below that range, the organisms can become stressed and the number of individuals of the species will decrease (USGS, 2016). Temperature in streams also influences the water chemistry, including dissolved oxygen levels and chemical reactions. Twenty-three stream segments occur within the limits of clearing for the Facility. Of those segments, only nine (less than 1,000 linear feet) are within forested areas. In addition, vegetation clearing along streambanks will be minimized to the extent practicable. While there may be localized increase in stream temperature, there will not be forest clearing along the length of the entire stream. Impacts are anticipated to be localized and minor.

Potential temporary and permanent impacts to streams and open waters that could result from Facility construction and operation have been calculated using disturbance assumptions presented in Exhibit 22(b). The Facility is anticipated to result in up to approximately 770 linear feet of temporary disturbance to perennial, ephemeral, and intermittent streams and up to approximately 218 linear feet of permanent disturbance to perennial, intermittent,

and ephemeral streams. As stated above, impacts have already been minimized substantially due to changes in the Facility layout. Table 23-3 provides a summary of the potential impacts to streams.

Table 23-3. Impacts to Streams

Stream Delineation ID	Temporary Stream Impact (square feet)	Temporary Stream Impact (Linear feet)	Permanent Stream Impact (square feet)	Permanent Stream Impact (linear feet)	Facilities Crossing Resource[1]	Crossing/Avoidance Methodology
R	237	30	--	--	BI	Trench
SS	905	41	--	--	BI	Trench
NYSDEC Protected Stream M	--	--	--	--	BI	HDD
NYSDEC Protected Stream 3C	--	--	--	--	BI	HDD
3G	309	54	--	--	BI	Trench
3I	399	35	--	--	BI	Trench
NYSDEC Protected Stream M	--	--	--	--	BI	HDD
NYSDEC Protected Stream 4S	--	--	--	--	BI	HDD
LL	418	42	--	--	BI	Trench
3D	23	10	144	59	BI, AR	
ZZ	92	26	--	--	BI	Trench
XX	156	38	--	--	BI	Trench
4M	59	22	387	43	WT	
3U	736	41	404	22	BI, AR	
EE	429	39	--	--	BI	Trench
HH	56	15	--	--	BI	Trench
NYSDEC Protected Stream E	--	--	--	--	OI	Matt and span, span and drive around, or avoid
NYSDEC Protected Stream B	--	--	--	--	OI	Matt and span, span and drive around, or avoid
4A	--	--	--	--	OI	Matt and span, span and drive around, or avoid
NYSDEC Protected Stream U	--	--	--	--	OI	Matt and span, span and drive around, or avoid

Stream Delineation ID	Temporary Stream Impact (square feet)	Temporary Stream Impact (Linear feet)	Permanent Stream Impact (square feet)	Permanent Stream Impact (linear feet)	Facilities Crossing Resource[1]	Crossing/Avoidance Methodology
NYSDEC Protected Stream 3Z	--	--	--	--	OI	Matt and span, span and drive around, or avoid
Stream 3Z	--	--	--	--	--	Matt and span, span and drive around, or avoid
4F	--	--	--	--	OI	Matt and span, span and drive around, or avoid
4C	95	20	680	94	BI, AR	
4D	595	165	--	--	BI	Trench
TT	939	173	--	--	BI	Trench
4L	--	--	--	--	BI	HDD
AA	67	19	--	--	BI	Trench
NYSDEC Protected Stream W	--	--	--	--	BI	HDD
NYS Protected Stream 4R	--	--	--	--	BI	HDD
Totals	5,515	770	1,615	218		

[1]BI = buried interconnect, OI = overhead interconnect, AR = access road, WT = wind turbine

As indicated above in Table 23-3, it is anticipated that there will be a total of 10 stream crossings of NYSDEC-protected streams, which are regulated under Article 15 of the New York Environmental Conservation Law. Of these 10 crossings, six are associated with buried interconnect, while the remaining four are associated with overhead interconnect. Theses streams crossings are all associated with tributaries to Seely Creek, Neils Creek, and the Cohocton River. Stream crossings will be conducted in accordance with all applicable laws and regulations. BMPs and other guidelines for Article 15 stream crossings will be developed in consultation with the NYSDEC and the New York State Department of Public Service (NYSDPS). See Section (b)(5) below for further discussion of avoidance, minimization, and mitigation of impacts to surface waters.

Table 23-4 summarizes impacts to wetlands containing open waters resulting from Facility construction and operation. For the purposes of this calculation, temporary and permanent impacts to delineated wetlands with open water features were used, even if disturbance would only occur in the vegetated part of the open water wetland and not within the open water portion itself. Therefore, acreage provided in Table 23-4 represents a

conservative estimate of open water impacts. These impacts are also accounted for in Exhibit 22(m). Construction and operation is anticipated to result in up to 0.03 acre of temporary disturbance to open waters and surrounding wetlands and no permanent loss to open water habitats and the wetlands that surround them.

Table 23-4. Impacts to Wetlands Containing Open Waters

Wetland ID	Type[1]	NYSDEC Wetland ID	Temporary Impact (square feet)	Permanent Impact (square feet)	Facilities Crossing Wetland[2]
3C	OW	-	1,436	0.0	BI
Total Square Feet			1,436	0.0	
Total Acres			0.03	0.0	

[1]OW = open water.
[2]Includes facilities that cause temporary or permanent impacts. BI = buried interconnect.

Surface water sources most vulnerable to sedimentation are those with steep uplands adjacent to work areas. The Facility has been designed to avoid steep slopes to the maximum extent practicable, but some construction in areas of steep slopes is unavoidable. Construction of the Facility could result in some siltation and sedimentation in streams adjacent to steep uplands. However, these impacts are anticipated to be minor because the Applicant will take measures to avoid and minimize siltation (see Section (b)(5) below), including developing and implementing a SWPPP (see Section (c)(1) below). In addition, the use of horizontal directional drilling (HDD) will minimize impacts to stream reaches, and typical BMPs will be implemented (e.g., appropriate drilling setbacks from surface waters, use of erosion and sediment control measures, etc.). Final specifications associated with HDD installation will be prepared by the BOP contractor in accordance with all relevant environmental permitting conditions. A map of anticipated locations of HDD in relation to surface water resources is found in Figure 23-4.

Facility construction or operation is not anticipated to impact drinking water. As previously noted, the nearest surface water drinking intake to the Facility is located approximately 1 mile west of the Facility Site. The measures that the Applicant will take to avoid, minimize, and mitigate impacts to surface waters (described below in Section (b)(5)) will ensure that drinking water sourced at surface intake sites is not degraded by Facility construction or operation. As previously noted, the Applicant has also drafted a Preliminary SPCC Plan to minimize the potential for unintended releases of petroleum and other hazardous chemicals during Facility construction and operation. Proper implementation of the SPCC Plan will avoid, minimize, and mitigate the potential for contamination of both surface water and groundwater, thereby protecting drinking water supplies.

(5) Measures to Avoid or Mitigate Surface and Ground Water Impacts

Direct impacts to surface waters have been minimized by significantly reducing the size of the Facility, designing the Facility layout to avoid surface water impacts where practicable, and implementing other measures such as

utilizing existing or narrow crossing locations whenever possible. See Appendix EEE for photos of typical existing access that has been utilized in wetlands and uplands. The Applicant intends to upgrade under-maintained/undersized crossings. This will have a long-term beneficial effect on water quality because it will help keep farm equipment or other vehicles out of surface waters. Equipment restrictions, herbicide use restrictions, and erosion and sediment control measures will also be utilized to reduce adverse impacts to water quality, surface water hydrology, and aquatic organisms. In addition, clearing of vegetation along stream banks will be kept to a minimum.

Specific to NYSDEC-protected streams, as previously indicated of the 10 crossings, six are associated with buried interconnect, while the remaining four are associated with overhead interconnect. All six buried interconnect crossings will be installed through horizontal directional drill (HDD), and all four overhead crossings will be spanned and mats will be used to cross the streams where needed. Therefore, no impacts will occur to state-protected streams. Please see the Wetland and Stream Impact Drawings for a detailed depiction of each crossing, and see also Figure 23-4 for an identification of HDD crossing locations.

The Applicant will provide final engineering plans to the NYSDEC and NYSDPS regarding each proposed crossing prior to the Siting Board's determination of whether to issue an Article 10 Certificate to the Facility. Stream crossing methods will take into consideration and meet all NYSDEC stream crossing guidelines. Where crossings of surface waters are required, BMPs will be utilized, as required by the NYSDEC. Specific mitigation measures for protecting surface water resources will include the following:

- *No Equipment Access Areas:* Except where crossed by permitted access roads or through non-jurisdictional use of temporary matting, streams will be designated "No Equipment Access," thus prohibiting the use of motorized equipment in these areas.
- *Restricted Activities Area:* A buffer zone of 100 feet, referred to as a "Restricted Activities Area," will be established where Facility construction traverses streams, wetlands and other bodies of water. Restrictions will include:
    - No deposition of slash within or adjacent to a waterbody;
    - No accumulation of construction debris within the area;
    - Herbicide restrictions within 100 feet of a stream or wetland (or as required per manufacturer's instructions);
    - No degradation of stream banks;
    - No equipment washing or refueling within the area;

- No storage of any petroleum or chemical material; and
- No disposal of excess concrete or concrete wash water.

- *Sediment and Siltation Control*: A soil erosion and sedimentation control plan will be developed and implemented as required by the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity. See Section (c)(1) below. Silt fences, hay bales, and temporary siltation basins will be installed and maintained throughout Facility construction. Exposed soil will be seeded and/or mulched to assure that erosion and siltation is kept to a minimum along wetland boundaries. Specific control measures will be identified in the Facility's SWPPP, and the location of these features will be indicated on construction drawings and reviewed by the contractor and other appropriate parties prior to construction. These features will be inspected on a regular basis to assure that they function properly throughout the period of construction, and until completion of all restoration work.
- *Work Period Restriction for Stream Crossings*: Construction in streams protected under Article 15 will comply with work period restrictions established by NYSDEC to protect fish spawning and migration. The work periods restriction is from October 1 to April 30 for streams with trout and from March 15 to June 15 for other protected streams (NYSDEC, 2005). However, site-specific consultation with NYSDEC stream biologists may result in less restrictive no-work periods. For example, in the Final Environmental Impact Statement (FEIS) for the Arkwright Summit Wind Farm, NYSDEC indicated that in-stream work could take place outside of the seasonal work restriction window, as determined on a case-by-case basis (EDR, 2016). Seasonal restrictions on in-stream work during Facility construction will be established in consultation with NYSDEC.

Excavations for foundations, roadways, and underground collection lines are expected to be relatively shallow, and are not anticipated to intercept groundwater within the surrounding aquifers. Therefore, The Facility is not expected to have adverse impacts on public or private water wells. To ensure construction and operation of the Facility does not adversely affect nearby groundwater wells, the Applicant will conduct pre- and post-construction baseline testing of water wells located within 100 feet of all Facility components to determine any surficial impacts to groundwater drinking wells. With respect to Facility turbines, in particular, pre- and post-construction baseline testing of water wells located within approximately 1,000 feet of Facility turbines will be conducted to determine any surficial impacts to groundwater drinking wells. In addition, if a resident feels that their well water has been adversely impacted by Facility construction or operation, they may file a formal complaint, which will be responded to by the Applicant through the Complaint Resolution Plan (see Appendix T).

If shallow groundwater is encountered during construction activities such as foundation excavation, dewatering will likely occur. If dewatering is required, a temporary pit (or sediment trap) will be constructed in upland areas (i.e., not within streams or wetlands) to trap and filter water prior to discharging it to a stable discharge area.

Dewatering will involve pumping accumulated water to a device (e.g., sediment filter bag, silt fence barrier), decreasing discharge velocity, and trapping suspended sediment prior to outletting the water to undisturbed ground. The stable outlet must be capable of filtering further sediment and withstanding the velocity of the discharge water to prevent erosion. Typical details are included in Exhibit 11.

(c) Stormwater

(1) Stormwater Pollution Prevention Plan

Prior to construction, the Applicant will seek coverage under the NYSDEC State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity effective on January 29, 2015 (modified July 15, 2015) by submitting a Notice of Intent form to NYSDEC (see http://www.dec.ny.gov/docs/water_pdf/gp015002.pdf). This authorization is subject to review by NYSDEC, and is independent of the Article 10 process. A Preliminary SWPPP, which has been prepared consistent with the SPDES General Permit, is attached as Appendix II. The Preliminary SWPPP includes a discussion of pre-construction requirements, which include ensuring that there is at least one person on-site daily to inspect the site's erosion and sediment control practices when soil disturbing activities are being performed. Requirements during construction are also described in the Preliminary SWPPP, which addresses, among other things: the maximum allowable level of soil disturbance (5 acres unless permission from NYSDEC is otherwise obtained); the specific construction sequence that must be followed; specifications for construction site inspection; authorized and non-authorized non-stormwater discharges; measures for maintaining surface water quality; chemical and oil management; and post-construction maintenance requirements. The Preliminary SWPPP also discusses use of appropriate erosion and sediment controls and stabilization practices during construction, and management of post-construction stormwater quality and quantity. The Applicant anticipates that submission and approval of a final SWPPP will be a condition of the Article 10 Certificate.

(2) Post-Construction Erosion and Sediment Control Practices

The Preliminary SWPPP described in Section (c)(1) above includes information on permanent, post-construction erosion and sediment control measures that will be used during operation of the Facility. Green infrastructure practices, such as using dry swales, vegetative filters and level spreaders, were selected to provide both stormwater quality and quantity controls. Dry swales will treat stormwater for sections of the access roads that drain to swales/ditches along the road edge. These dry swales will discharge to level spreaders that will convey stormwater in a sheet flow fashion and will allow for a natural distribution of stormwater runoff. Most of the Facility

will benefit from vegetative filters. Runoff from the access roads will sheet flow across these filters, reducing the volume of stormwater from the Facility Site.

Following Certification of the Facility, it is anticipated stormwater discharges will be calculated by professional engineers using hydrologic models (e.g., Hydraflow Hydrographs Extension for AutoCAD Civil 3D software) based upon measurable watershed characteristics. Stormwater runoff rates discharged from the site under existing conditions (pre-construction) will provide the basis for evaluation and comparison to proposed conditions (post-construction). Design points of interest will be established where stormwater runoff exits the site (e.g., where proposed Facility access roads intersect with existing public roads/roadside ditches). These design points will provide fixed locations at which existing and proposed stormwater quantities can be compared. The areas draining to these design points will be delineated using land survey information and proposed grading plans, and a hydrologic analysis of each of the drainage areas will be conducted to model their discharges (typically for the 1, 2, 10, 25, 50 and 100-year storm events). Because final engineering will not be completed until the Facility has been certified and a turbine model has been selected, the final SWPPP cannot be included in the Application. Following Certification of the Facility, the Applicant will conduct the detailed engineering necessary to prepare a final SWPPP, in accordance with the SPDES General Permit.

(d) Chemical and Petroleum Bulk Storage

(1) Spill Prevention and Control Measures

During Facility construction, BMPs will be implemented to prevent and contain spills. These measures will be used to reduce the risk of spills and other accidental exposures that may result in impacts to stormwater quality. The following list identifies some of the BMPs that will be implemented during all phases of construction to prevent spills, as feasible:

- Construction Material Storage – Including storing materials consistent with the manufacturer's recommendations, proper labeling of containers, keeping an inventory of all Safety Data Sheets (SDS) for each chemical at each storage location, and storing chemicals that are not compatible in separate areas so that they do not mix in the event of a spill.
- Leak and Integrity Inspections – Including daily visual inspection of aboveground tanks (if any) and any areas where fuels, lubricants or other chemicals are stored in significant quantities, temporarily patching any identified leaks in tanks immediately, and replacement of any leaking tanks or containers.

- Fuel and Hazardous Materials Handling – Including storing fuels and lubricants only at designated laydown yards and in appropriate service vehicles and handling waste materials and construction debris in a manner that does not contaminate groundwater or stormwater.
- Spill Response Materials on Hand – Keeping equipment/materials, including absorbent and barrier materials, shovels, tank patch kits, 55-gallon drums, and personal protective equipment, on hand at the construction laydown yards.
- Refueling and Maintenance Areas – Refueling construction vehicles and equipment only in designated refueling areas, to be located at a minimum of 100 feet from any wetlands or surface waters. Routine maintenance will be performed in the laydown yard.
- Restricted Activities Areas – Establishing restricted activities areas within a 100-foot zone around wetlands. No accumulation of construction debris, no equipment washing, and no storage of any petroleum or chemical material will be allowed in these areas.
- Spill Response – All spills determined to be reportable will be immediately reported in accordance with applicable regulations by calling the NYSDEC Spill Hotline, the National Response Center and/or other agencies, as appropriate.

Spill prevention and control measures for Facility operation are described in the Preliminary SPCC Plan, attached as Appendix FFF. These measures will be implemented to minimize the potential for unintended releases of petroleum and other hazardous chemicals. The Plan contains information about nearby water bodies, procedures for loading, unloading, and transferring oil, discharge or drainage controls, procedures in the event of discharge discovery, a discharge response procedure, a list of spill response equipment to be maintained on-site (including a fire extinguisher, shovel, tank patch kit, and oil-absorbent materials), methods of disposal of contaminated materials in the event of a discharge, and spill reporting information. As described in the Preliminary SPCC Plan, any personnel handling oil will be trained on discharge prevention procedures. Any spills will be reported in accordance with State and/or federal regulations, and the BOP contractor will, at a minimum, be required to adhere to the SPCC Plan.

(2) Compliance with New York State Chemical and Petroleum Bulk Storage Regulations

It is not anticipated the Facility will require the 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, antifreeze, etc.). If the Applicant elects to store petroleum or chemicals in tanks in quantities that exceed applicable regulatory thresholds, it will submit the necessary registration application(s) to NYSDEC and will comply

with all applicable requirements set forth in the petroleum and chemical bulk storage regulations. See 6 NYCRR Part 613 (petroleum bulk storage); 6 NYCRR Parts 596-599 (chemical bulk storage).

(3) Compliance with Local Laws for Storage of Chemicals or Petroleum

It is not anticipated the Facility will require the on-site storage or disposal of large volumes of any substances subject to regulation under local laws. If the Applicant's plans change, it will comply with all applicable chemical and petroleum storage requirements.

(e) Aquatic Species and Invasive Species

(1) Impact to Biological Aquatic Resources

With respect to potential impacts to wetlands, see Exhibit 22(m). With respect to impacts to surface waters, see Tables 23-3 and 23-4, above. Generally speaking, impacts to surface waters result in impacts to biological aquatic resources that require aquatic habitats. However, only a small fraction of the available aquatic habitat that exists within the Facility Site will be impacted by Facility construction or operation. Moreover, as discussed in Section (b)(2) above, no endangered, threatened or special concern aquatic species were identified in surface waters on the Facility Site.

None of the species included in the *Common Aquatic Invasive Species of New York* (NYSDEC, 2016) list were observed during on-site delineations or field investigations. However, a comprehensive inventory of aquatic invasive species was not conducted. Aquatic invasive species can be spread by ships, boats, barges, aquaculture, and aquatic recreation, and connected waterways. The majority of surface waterbodies within the Facility Site are headwater streams high in the watershed where typical activities known to spread aquatic invasive species are infrequent. Also, most aquatic invasive species are introduced to lakes, then travel to streams and rivers. Given the absence of lakes in the Facility Site, there is limited potential for the introduction of aquatic invasive species. As a result, the construction and operation of the Facility is not anticipated to have adverse impacts to native aquatic species. A discussion of aquatic invasive species is provided in Section (b)(2) above.

(2) Measures to Avoid or Mitigate Impacts to Aquatic Species

Measures to avoid and mitigate impacts to surface waters during construction are addressed in Section (b)(5) above. These measures protect aquatic species by protecting the water quality in the habitats where they occur.

They also offer direct protection through ensuring avoidance of protected streams during the times of the year when fish are likely to be migrating and spawning.

Surface water impacts during Facility operation will be limited to those associated with permanent changes attributable to installation of Facility components. Impacts to surface waters are discussed in more detail in Section (b)(4). In particular, aquatic species will be required to habituate to the minor permanent loss of habitat resulting from placement of Facility components in surface waters. This loss of habitat has been largely avoided through careful siting and design. The majority of the Facility will be located high in the watershed, away from larger streams and rivers which comprise the majority of aquatic habitat in the region. In addition. smaller waterbodies, like the headwater streams found throughout the Facility Site, do not have as many aquatic invasive species when compared to larger waterbodies. Since none of the common pathways for invasive species introduction (commercial shipping vessels, recreational watercraft, aquaria release, and bait) will not be utilized during the construction or operation of the Facility, the risk of spreading invasive species is low. Due to the low risk of spreading invasive species, there are no anticipated impacts to aquatic resources from invasive species. Where permanent access roads cross streams, special crossing techniques will be used in accordance with regulatory requirements and NYSDEC guidance. These measures will collectively ensure assure compliance with applicable water quality standards (6 NYCRR Part 703).

(3) Construction and Operation Impacts to Surface Waters and Biological Aquatic Resources

See Section (b)(4) and (e)(1) above for a discussion of construction and operation impacts to surface waters and biological aquatic resources.

(f) Cooling Water

The proposed Facility does not involve the use of cooling water, and as such, the requirements of this section are not applicable to this Facility. Therefore, information related to cooling water systems, intake, and discharge are not included in this Application.

REFERENCES

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