Mohawk Solar

Case No. 17-F-0182

1001.22 Exhibit 22

Terrestrial Ecology and Wetlands

Table of Contents

List of Tables

EXHIBIT 22 TERRESTRIAL ECOLOGY AND WETLANDS

(a) Identification and Description of Plant Communities

(1) Land Cover

Plant communities and vegetation occurring within the Facility Site were identified using National Land Cover Data (NLCD) information, which is compiled by the United States Geological Survey (USGS) (Homer et al., 2015), and subsequently verified during field surveys conducted in 2017 and 2018. The Facility Site encompasses approximately 2,361 acres and is largely comprised of open agricultural land. According to NLCD data, cultivated crops and pasture/hay together represent approximately 72% of the Facility Site, while deciduous forest represents approximately 10% and woody wetland approximately 8%. The Facility Site also includes between 1% and 5% of shrub/scrub, emergent wetlands and open space. Table 22-1 summarizes the NLCD land cover types found within the Facility Site.

Table 22-1. Land Cover Classes Found within the Facility Site

Land Cover Class	Acres	Percent Cover (%)
Cultivated Crops	960	40.66
Pasture/Hay	743	31.47
Deciduous Forest	241	10.21
Woody Wetlands	184	7.79
Shrub/Scrub	81	3.43
Emergent Herbaceous Wetlands	75	3.18
Developed, Open Space	35	1.48
Mixed Forest	19	0.80
Developed, Low Intensity	9	0.38
Evergreen Forest	9	0.38
Grassland/Herbaceous	3	0.13
Developed, Medium Intensity	1	0.04
Developed, High Intensity	1	0.04
Total	**2,361**	**100**

Source: NLCD 2011

(2) Ecological Communities

All major ecological communities found within parcels that will host Facility components are common to New York State. Descriptions of the ecological communities and dominant vegetation within the Facility Site are provided below. Detailed descriptions of wetland community types encountered during on-site reconnaissance and wetland delineations is provided in Exhibit 22(j). In addition, the New York Natural Heritage Program (NYNHP) maintains data on rare, threatened, and endangered plant and animal species, as well as significant ecological communities in the State. A site-specific request for documented occurrences was submitted to NYNHP, and a response was received on January 23, 2019 (Appendix 22-A), which indicated that no significant natural communities or state-listed plants are known to occur within or immediately near the Facility Site.

Agricultural Land

As defined in the *Ecological Communities of New York State* (Edinger *et. al.,* 2014), agricultural land includes cropland/row crops, cropland/field crops, and pasture land. As defined by the United States Department of Agriculture (USDA, 2007), and for the purposes of this Application, agricultural land includes harvested cropland, crop failure, cultivated summer fallow, cropland used only for pasture, and idle cropland. Each of these categories consists of variation in vegetation type, intensity of agricultural operations (tillage, seeding, harvesting etc.) and overall land use. The majority of agricultural land within the Facility Site is comprised of pasture and hay land used for livestock grazing and silage production. To a lesser extent, row crops that are planted on tilled soil and then harvested, and cover crops used to stabilize exposed soils/replenish soil nutrients/provide feedstock for livestock, occur within the Facility Site. Vegetation species found on cropland typically include either planted crops such as corn, wheat, soybeans, barley, oats, etc., or pasture crops, including timothy, rye or other perennial grasses. Pastureland is similar in vegetation composition to successional old field but will vary depending on whether it is in use for grazing or silage purposes.

In some locations, emergent wetlands were observed in this ecological community type. Emergent wetlands observed on-site were characterized by the dominance of erect rooted herbaceous wetland plants and evidence of persistent inundation/saturation.

Disturbed/Developed

Disturbed/developed land consists of a combination of several "cultural communities" as defined in the *Ecological Communities of New York State* (Edinger et. al., 2014). Disturbed/developed land occurs throughout the Facility Site, and is characterized by the presence of buildings, parking lots, paved and unpaved roads, lawns, quarries, and transmission line and pipeline rights-of-way. Vegetation in these areas is generally either lacking or highly managed (i.e., mowed lawns or routinely maintained rights-of-way). Volunteer vegetation that naturally re-

stablishes in these areas is generally sparse, and typically comprised of old field, often non-native, herbaceous species such as bull thistle (*Cirsium vulgare*), curly dock (*Rumex crispus*), spotted knapweed (*Centaurea maculosa*), and various upland grasses.

Mixed Deciduous/Coniferous Forestland

Mixed forestland within the Facility Site includes Appalachian oak-hickory forest, and successional northern hardwood forest communities as described in the *Ecological Communities of New York State* (Edinger et al., 2014). These forests occur throughout the Facility Site on hilltops, hillside, and in woodlots interspersed among agricultural fields. Common species in the Appalachian oak-hickory forest include shagbark hickory (*Carya ovata*), red oak (*Quercus rubra*), red maple (*Acer rubrum*), and white oak (*Quercus alba*). Common species in the successional hardwood forest community include quaking aspen (*Populus tremuloides*), black cherry (*Prunus serotina*), red maple, white pine (*Pinus strobus*), white ash (*Fraxinus americana*), green ash (*F. pensylvanica*), and American elm (*Ulmus americana*). This is a broadly defined community, and several seral and regional variants are known (Edinger *et al.* 2014).

Forested Wetlands

Forest wetlands in the Facility Site are dominated by American elm in the overstory, along with green ash, and occasionally red maple. Understory vegetation includes saplings of the above-mentioned species and occasionally shrub species such as silky dogwood (*Cornus amomum*) and Morrow's honeysuckle (*Lonicera morrowii*). Herbaceous species in the forested wetlands include sedges (*Carex* spp.), sensitive fern (*Onoclea sensibilis*), reed canary grass (*Phalaris arundinaceae*), and common rush (*Juncus effusus*).

Successional Shrubland

Successional shrubland occurs on sites that have been previously cleared for farming, logging, development or otherwise disturbed (Edinger et. al., 2014). Species observed within this community type include dogwoods, wild grape (*Vitus* sp.), smooth arrowwood (*Viburnum dentatum var. lucidum*), nannyberry (*Viburnum lentago*), and bush honeysuckles. Other species typically found in this community include, raspberries (*Rubus sp.*), choke-cherry (*Prunus virginiana*), wild plum (*Prunus americana*), sumac and invasive shrubs such as multiflora rose (*Rosa multiflora*) and buckthorns (*Rhamnus sp.*) (Edinger et. al., 2014). In addition, scrub-shrub wetlands were occasionally observed within this ecological community type, as further discussed in Exhibit 22(j).

Successional Old Field

As defined by Edinger *et al.* (2014), a successional old field is a meadow dominated by forbs and grasses that occurs on sites that have been cleared and plowed for farming and/or development. This includes fields that are

mowed at a regular interval (e.g. less than once per year) and promotes the reproduction of characteristic successional old field species, such as goldenrods (*Solidago* spp.), bluegrasses (*Poa pratensis, P. compressa*), timothy (*Phleum pretense*), quackgrass (*Elymus repens*), smooth brome (*Bromus inermis*), New England aster (*Symphyotrichum novae-angliae*), wild strawberry (*Fragaria virginiana*), Queen-Anne's-lace (*Daucus carota*), and several other upland grasses and forbs. Within the Facility Site, this community is located primarily along roadsides and adjacent to active agricultural fields.

(3) Map of Ecological Communities

A map of identified ecological communities in the Facility Site within 500 feet of disturbance of the proposed Facility is provided in Figure 22-1 (Edinger et al., 2014).

(4) Plant Species List

Vascular plant species at the Facility Site were identified during various field studies (i.e., wetland delineations, wildlife surveys, etc.) and through incidental observations. A list of planted species identified is attached as Appendix 22-B; nomenclature follows the New York Flora Atlas (Weldy et al., 2017). A total of 178 unique native and non-native plant species were identified during these field surveys.

(b) Impact to Plant Communities

(1) Permanent and Temporary Impacts

Construction and operation of the Facility will result in impacts to plant communities. These impacts include temporary disturbance due to vegetation clearing for construction, as well as permanent loss of vegetated habitats (mostly agricultural) by conversion access roads, pad-mounted inverters, the collection substation, POI switchyard, and the O&M building. The area underneath the PV panel arrays will generally not be subject to grading or stripping of topsoil. In some areas, existing vegetation will be cleared or mowed to an appropriate height prior to installation of the arrays. As described in Exhibit 12 of this Application, PV panels will be mounted on a racking support system secured by metal piers driven or screwed into the ground. Each metal support pier will have a cross-sectional area of approximately 3 square inches. It is anticipated that some temporary vegetation disturbance due to vehicular activity will occur in areas where PV panel arrays are installed. During operation, vegetation under the panels will be occasionally mowed to prevent interference with the panels and electrical cables. Vegetation communities underneath the PV panel arrays will be maintained as early successional grassland communities, and will remain largely undisturbed during construction and operation of the Facility. However, it is anticipated that the partial shading of the areas underneath panels may result in some changes to these communities as soil temperatures are expected to decrease, and species recruitment will favor more shade-tolerant plants.

Facility-related impacts to vegetation were calculated using temporary and permanent limits of disturbance for the Facility. These limits of disturbance were generated based on the actual proposed locations and grading limits for Facility components, as identified in the Preliminary Design Drawings (Exhibit 11). These limits of disturbance were used to calculate the total impact to vegetation communities that could result from Facility construction and operation, summarized below in Table 22-2.

Table 22-2. Anticipated Temporary and Permanent Impacts to Vegetation Communities Resulting from Facility Construction and Operation

Ecological Community	Area Underneath Panels (maintained by Applicant)[1]	Temporary Impacts Associated with Buried Collection Line, Access Road Construction and Substation[2]	Permanent Impact (Conversion to Built Facilities) (acres)	Total Impact (acres)
Agricultural Land	452.6	173.3	74.8	**700.7**
Successional Old Field	52.9	24.9	18.1	**95.9**
Successional Shrubland	30.6	6.8	3.5	**40.9**
Mixed Deciduous/Coniferous Forest	2.3	9.8	6.3	**18.4**
Disturbed/Developed	0.08	2.4	0.7	**3.2**
Total	**538.5**	**217.2**	**103.4**	**859.1**

[1] Vegetation underneath PV panels will be maintained by occasional mowing to prevent interference with Facility components. Areas of successional shrubland and forest will be converted to an early successional community prior to installation of PV panels.

[2] It is anticipated that all temporary vegetation impact areas within 15 feet of collection lines will be maintained. All temporary vegetation impact areas outside of this distance or otherwise not associated with collection lines would not be maintained, and allowed to return to their pre-disturbance state with time.

[3] Please refer to descriptions below for additional information on anticipated impacts to forest communities.

Construction of the Facility will result in temporary disturbance of up to 173.3 acres of agricultural land, and permanent disturbance of up to 74.8 acres of agricultural land. In addition, 452.6 acres of agricultural land will be converted to an early successional community in the footprint of the PV panel arrays. The majority of this land is used for hay production and pasture. For a detailed description of impacts to agricultural lands, please see Exhibit 22(q). Construction of the Facility will result in the temporary disturbance of 24.9 acres of successional old field, 6.8 acres of successional shrubland, and 2.4 acres of disturbed/developed communities. The Facility will permanently impact 18.1 acres of successional old field, 3.5 acres of successional shrubland, and less than an acre of disturbed/developed communities. In addition, 52.9 acres of successional old field, 30.6 acres of successional shrubland, and less than an acre of disturbed/developed communities will be converted to an early successional community in the footprint of the PV panel arrays. No temporary disturbance or permanent loss of open water vegetation communities, as defined by the ecological communities mapping procedure described in Section (a) are anticipated. See Exhibit 23 Section (b)(4) for a discussion of impacts to surface waters, as defined

by on-site wetland and stream delineations, anticipated as a result of Facility construction and operation. Additional detail on anticipated impacts to forest communities are provided below. Temporary and permanent impacts to vegetation communities will not result in extirpation or significant reduction in any ecological community type. At the end of the Facility lifespan, Facility components will be decommissioned and restored as described in Exhibit 29 of this Application. Following completion of decommissioning and restoration, lands within the Facility Site will be able to return to their previous condition.

Forest clearing impacts associated with the Facility can be characterized as one of three types. The first is permanent loss, where forested areas would be replaced with Facility components (e.g. access roads, substation, etc.). There is expected to be 6.3 acres of forest impacted in this manner. The second is forest conversion, where forests would be cleared and maintained by the Applicant as successional communities for the life of the Facility (e.g., areas within collection line rights-of-way, some small areas at the edge of PV panel arrays). This type of disturbance is anticipated to result in up to 11.0 acres of impact to forests. The third is forest recovery, where forests would be initially cleared, but these cleared areas would not be maintained and would be allowed to naturally reforest following construction (e.g., areas along access road corridors initially cleared for construction). Approximately 1.0 acre of forest will be disturbed in this manner. In areas that will be allowed to reforest, the Applicant will only remove stumps where necessary, will not use herbicides to prevent sprouting, and will not remove trees as part of routine vegetation management during Facility operation. Following post-construction stabilization of soils, ecological succession will restore the forested condition of these areas with time.

(2) Invasive Species Identification

For the purposes of this Application, an "invasive species" is defined as all terrestrial and aquatic species listed on the New York State Department of Environmental Conservation (NYSDEC) list of Prohibited and Regulated Invasive Species, found at: http://www.dec.ny.gov/docs/lands_forests_pdf/islist.pdf. Observations of invasive species within the Facility Site were made during various field surveys conducted in 2016, 2017, and 2018. These observations were made concurrently with field efforts associated with wetland delineations, avian surveys, threatened and endangered species habitat assessments, and field reconnaissance. A total of 11 invasive species have been observed within the Facility Site as described in Appendix 22-C.

In addition, within 6 months of commencing construction-related earthmoving activities, the limits of disturbance will be surveyed to document the presence and area coverage of invasive species. The Pre-Construction Invasive Species Survey methodology will consist of qualified ecologists walking the Study Area and visually estimating cover of NYSDEC-listed Prohibited Invasive Plant Species (NYSDEC 2014). Invasive plant occurrences will be documented using GPS technology and assigned a density code for absolute cover. Species data will be recorded

using a four-letter code corresponding to the first two letters of the scientific name of the genus and the first two letters of the scientific name of the species (e.g., since the scientific name of multiflora rose is *Rosa multiflora*, multiflora rose populations will be labeled "ROMU"). Additional details on the Pre-Construction Invasive Species Survey methodology are provided in Appendix 22-C of this Application.

The survey methods employed the Pre-Construction Invasive Species survey will allow for a post-construction evaluation of the goals established in the Invasive Species Control Plan (discussed below). During post-construction surveys, an appropriately qualified ecologist can return to the Study Area and employ the same methodology used in the pre-construction survey to generate results that will allow for a comparison between pre- and post-construction conditions.

(3) Invasive Species Control Plan

The purpose of the Invasive Species Control Plan (ISCP; Appendix 22-C) is to facilitate the identification, control, and monitoring of invasive vegetation within areas disturbed during construction of the Facility. Best Management Practices outlined in the ISCP that will be implemented to control invasive plant and insect species include measures to educate workers; measures to control the spread of invasive species including construction materials inspection, target species treatment and removal, construction equipment cleaning, and restoration. The ISCP also outlines post-construction monitoring that will take place after the Facility is operational. The goal of the ISCP is to prevent an increase in invasive species coverage caused by the Facility. If post-construction monitoring determines that the goal has not been met, revisions will be made to the ISCP to ensure that control measures are sufficient to prevent further spread of invasive species.

(c) Measures to Avoid or Mitigate Plant Community Impacts

Avoidance, minimization and mitigation of impacts to vegetation have been and will be accomplished primarily through careful site planning. As described and quantified in Section (b)(1) above, the majority of Facility components have been sited in agricultural land, thus avoiding significant impacts to successional grasslands, shrubland, and forested areas. No interior forest clearing or wetland disturbance will occur in areas proposed to host PV panel arrays, and these ecologically valuable communities within the Facility Site will be largely protected from disturbance. Facility access roads will be sited on existing roads, farm lanes, and logging roads wherever possible, and areas of disturbance will be confined to the smallest feasible area.

To protect adjacent undisturbed vegetation and other ecological resources, a comprehensive sediment and erosion control plan will be developed and implemented prior to Facility construction (see the Preliminary SWPPP

in Appendix 21-B). Other mitigation measures to avoid or minimize impacts to vegetation will also include delineating sensitive areas (such as wetlands) where no disturbance or vehicular activities are allowed, educating the construction workforce on respecting and adhering to the physical boundaries of off-limit areas, employing best management practices during construction, and maintaining a clean work area within the designated construction sites. An environmental monitor will conduct inspections of all areas requiring environmental compliance during construction activities, with an emphasis on those activities that are occurring within sensitive areas.

In addition, as previously discussed in Section (a) above, all plant communities identified within the Facility Site are common to New York State. Therefore, no impacts to unique or rare natural communities will result from Facility construction. Following construction activities, temporarily disturbed areas will be seeded (and stabilized with mulch and/or straw if necessary) to reestablish vegetative cover in these areas. Other than in active agricultural fields, native species will be allowed to revegetate all temporarily disturbed areas. Measures to be implemented to control the spread of invasive species coverage throughout the area disturbed by Facility construction is provided in the ISCP, as described above in Section (b).

(d) Vegetation, Wildlife, and Wildlife Habitats

(1) Vegetation

See the plant communities discussion above in Section (a)(2) for a description of the dominant ecological communities found within the Facility Site.

(2) Mammals

Publicly available information regarding the occurrence of mammalian species in the Facility Site is generally not available. Therefore, the occurrence of mammals was documented through observations made during on-site field surveys for other studies such as wetland and stream delineations, including signs of occurrence such as tracks or scat, and evaluation of available habitat. Mammals species expected to be found in the Facility Site include raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), white-tailed deer (*Odocoileus virginianus*), Virginia opossum (*Didephis virginiana*), striped skunk (*Mephitis mephitis*), muskrat (*Ondatra zibethicus*), woodchuck (*Marmota momax*), mink (*Neovison vison*), long-tailed weasel (*Mustela frenata*), red fox (*Vulpes vulpes*), bat species, and a variety of small mammals (mice and shrews). A complete list of mammal species that are likely to occur in the vicinity of the Facility are included in the Wildlife Species List, provided in Appendix 22-B.

In addition, a site-specific request for data on state-listed animals was submitted to NYNHP, and a response was received January 23, 2019. The response indicated that northern long-eared bat (NLEB; *Myotis septentrionalis*) hibernaculum has been documented within 4.25 miles of the Project Site, and individuals may travel 5 miles from documented locations.

(3) Birds

The occurrence of birds in the Facility Site was determined using a variety of data collection methods and publicly available resources, including the results of on-site avian surveys conducted by Western Ecosystems Technology, Inc. (WEST) and observations made by EDR during other field studies. A review of methods and data provided by each source is provided below. All avian species identified during this review are included in the Wildlife Species List, provided in Appendix 22-B.

(i) Site-specific Surveys

In order to determine the type and number of bird species present within the Facility, work plans for pre-construction monitoring surveys for avian species were developed by WEST in accordance with guidance provided by the NYSDEC. All work plans were reviewed and approved by NYSDEC, and established the methodology for the following surveys:

- Winter Raptor Survey conducted from November 2017 to March 2018 (Appendix D)
- Breeding Bird Surveys conducted from May to July 2018 (Appendix E)

The Winter Raptor Survey was conducted to identify and document raptor species that utilize habitat within the Facility Site during the winter season for foraging and roosting. The survey specifically targeted the New York State listed short-eared owl (*Asio flammeus*; Endangered), and the northern harrier (*Circus hudsonius*; Threatened). Surveys were conducted in agricultural hay and pasture fields throughout the Facility Site between November 2017 and March 2018. During the course of the winter raptor survey, both short-eared owls and northern harriers were observed using habitat in portions of the Facility Site. In addition, bald eagles (*Haliaeetus leucocephalus*) were observed flying over the Facility Site but were not observed using habitat within the Facility Site for foraging, roosting, or nesting. Observed short-eared owl activity was limited to two separate fields, while northern harrier activity was more dispersed throughout the area. Section (f)(5)(iii) of this Exhibit contains more information on observed short-eared owl and northern harrier activity within the Facility Site, as well as measures undertaken by the Applicant to provide a net conservation benefit to offset potential impacts to these species.

The Breeding Bird Survey was conducted to identify and document avian species that utilize habitat within the Facility Site during the spring and summer for breeding. Surveys were conducted between May and July 2018 along transects designed to capture the diversity of habitats that occur in areas where Facility components are proposed to be sited. In total, 91 unique species were observed during the breeding bird survey, with red winged blackbird (*Agelaius phoeniceus*), song sparrow (*Melospiza melodia*), bobolink (*Dolichonyx oryzivorous*), European starling (*Sturnus vulgaris*), and savannah sparrow (*Passerculus sandwichensis*) comprising 51.8% percent of all observations. New York State-listed avian species observed during the Breeding Bird Survey included northern harrier, upland sandpiper (*Bartramia longicauda*; Threatened), and pied-billed grebe (*Podilymbus podiceps*; Threatened). Both the northern harrier and upland sandpiper were observed exhibiting likely breeding behavior within the Facility Site. The observations of pied-billed grebe were only auditory in nature, and emanated from a small pond that is not in an area to be disturbed by Facility construction. Furthermore, it is not anticipated that Facility construction will result in disturbance to any suitable pied-billed habitat, and impacts to this species are not anticipated. Section (f)(5)(iii) of this Exhibit contains more information on observed breeding-season activity of the northern harrier and upland sandpiper, as well as measures undertaken by the Applicant to provide a net conservation benefit to offset potential impacts to these species.

(ii) Public Data Sources

Information on birds that may occur at the Facility Site was obtained from a number of publicly available sources. A description of sources and a summary of the data obtained from each source is provided below.

New York State Breeding Bird Atlas

The New York State Breeding Bird Atlas (BBA) is a comprehensive, statewide survey that indicates the distribution of breeding birds in the State within 5-kilometer by 5-kilometer survey blocks across the state (NYSDEC, 2007b). Surveys were conducted by volunteers, and the most recent data was collected between 2000 and 2005. The Facility Area is located within or immediately adjacent to four survey blocks (5275C, 5275D, 5274A, 5274B). These blocks were queried for bird species occurrence data, and a total of 100 species were listed as having been observed within these survey blocks. Three State-listed threatened species were identified including Henslow's sparrow (*Ammodramus henslowii*), northern harrier, and upland sandpiper. Two species of special concern, the horned lark (*Eremophila alpestris*) and the vesper sparrow (*Pooecetes gramineus*), were also identified within these survey blocks. Common species identified include American goldfinch (*Spinus tristis*), American robin (*Turdus migratorius*), brown-headed cowbird (*Molothrus ater*), common grackle (*Quiscalus quiscula*), eastern kingbird (*Tyrannus tyrannus*), gray catbird (*Dumetella*

carolinensis), northern cardinal (*Cardinalis cardinalis*), and red-winged blackbird. A complete list of avian species that are likely to occur in the vicinity of the Facility are included in the Wildlife Species List, provided in Appendix 22-B.

North American Breeding Bird Survey

The North American Breeding Bird Survey (BBS), overseen by the Patuxent Wildlife Research Center of the USGS, is a long-term, large-scale, international avian monitoring program that tracks the status and trends of North American bird populations. Each survey route is 24.5 miles long, with 3-minute point counts conducted at 0.5-mile intervals. During the point counts, every bird seen or heard within a 0.25-mile radius is recorded. No BBS routes are located within the Facility Site. The closest route, the Duanesburg route (026), is approximately 11 miles southeast of the Facility Site. The next closest route, the Clinton route (080), is approximately 26 miles northwest of the Facility Site. Due to the distance of these routes to the Facility Site, data from the BBS is not applicable to the Facility Site, and therefore is not included in this Application.

Audubon Christmas Bird Count

The Christmas Bird Count (CBC), which was created by the National Audubon Society in 1900, is the longest-running citizen science project in the country. The primary objective of the CBC is to monitor the status and distribution of wintering bird populations across the Western Hemisphere. Counts take place on a single day within a 15-mile (24 kilometer) diameter count circle, and all bird species and individuals observed are recorded by volunteers. The Facility Site is located within the Fort Plain CBC circle. Data from the 2018 CBC is not yet available, but data from the 2017 CBC identifies 58 species within the 15-mile circle with 78 hours of surveys by 15 participants. The most abundant species include Canada goose (*Branta canadensis*), rock pigeon (*Columba livia*), American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), European starling (*Sturnus vulgaris*), and house sparrow (*Passer domesticus*). One State-listed endangered species, the short-eared owl, and two State-listed threatened species, the bald eagle and northern harrier, were identified within the CBC circle. State-listed species of special concern that were identified include the horned lark, northern goshawk (*Accipiter gentilis*), and Cooper's hawk (*Accipiter cooperii*). A complete list of avian species that are likely to occur in the vicinity of the Facility are included in the Wildlife Species List, provided in Appendix 22-B.

eBird

The eBird database, managed by Cornell University's Lab of Ornithology, is an on-line database of bird observations collected by citizen scientists around the world, and vetted by regional experts. Data are used to document bird distribution, abundance, habitat use, and trends within a simple, scientific framework to

help inform bird research worldwide. The main limitation of eBird data is the concentration of data on publicly-accessible lands such as state and national parks, national forest lands, and known birding hotspots. While no such locations are located within the Facility Site, the nearest eBird hotspot is the West Ames Road Horse Farm, approximately 1 mile to the south. Two other eBird hotspots are within 2 miles of the Facility Site – Erie Canal Lock 15, Fort Plain, and Erie Canal Lock 14, Canajoharie. The West Ames Road hotspot reports 86 species, Erie Canal Lock 14 reports 39 species, and Erie Canal Lock 15 reports 13 species. Common species reported in 2018 include European starling, red-tailed hawk (*Buteo jamaicensis*), Canada goose, rock pigeon, red-winged blackbird, American crow, and killdeer (*Charadrius vociferus*). A complete list of avian species that are likely to occur in the vicinity of the Facility are included in the Wildlife Species List, provided in Appendix 22-B.

Hawk Migration Association of North America

The Hawk Migration Association of America (HMANA) is a nonprofit organization that collects hawk migration data from almost 200 affiliated raptor monitoring sites throughout the U.S., Canada, and Mexico, including the Fish Road Hawkwatch, located approximately 15 miles southwest of the Facility in Middlefield, New York. The Fish Road Hawkwatch is operated by the Delaware-Otsego Audubon Society, and fall raptor migration data were last collected in March of 2010. A total of 71 raptors were recorded over 49.75 observation hours. The most abundant species was the red-tailed hawk (30 observations), followed by turkey vulture (12; *Cathartes aura*), golden eagle (11; *Aquila chrysaetos*) and bald eagle (7).

(4) Amphibians and Reptiles

The New York State Amphibians & Reptile Atlas Facility (Herp Atlas) was a survey conducted over 10 years (1990-1999), that was designed to document the geographic distribution of New York State's herpetofauna (NYSDEC, 2007a). The USGS 7.5 minute topographic quadrangle is the unit of measurement for data collection for the Herp Atlas. Data from this survey were queried for the Fort Plain, Canajoharie, Sprout Brook, and Sharon Springs USGS 7.5 minute quadrangles, which encapsulate the Facility Area. A total of 14 amphibian species and 10 reptile species were identified within these quadrangles, including snapping turtle (*Chelydra serpentine*), wood turtle (*Glyptemys insculpta*), milk snake (*Lampropeltis triangulum*), and spotted salamander (*Ambystoma maculatum*). A complete list of amphibian and reptile species that are likely to occur in the vicinity of the Facility are included in the Wildlife Species List, provided in Appendix 22-B.

A number of amphibian species that may occur within the Facility Site rely on ephemeral water sources (vernal pools) for egg-laying and in early life stages. As such, a survey for vernal pools was conducted by EDR in 2017 and 2018 in conjunction with the on-site wetland delineation efforts. Typical characteristics used to identify vernal

pools included hydrological isolation (no permanent inlets or outlets of flowing surface water that could allow for fish to access the pool), the presence of standing water that was likely ephemeral, sparse or no vegetation growing within pool areas, water-stained leaves observed in a depression, evidence of moss trim lines/buttressing/watermarks on nearby trees, connectivity to adjacent upland forested habitat, and the presence of amphibian indicator species in or near the pools. No vernal pools were identified within the Facility Site.

(5) Terrestrial Invertebrates

Publicly available data on terrestrial invertebrate species are generally not available for upstate New York. However, NYNHP does track several invertebrate groups, although not all invertebrate groups are monitored (NYNHP, undated). A site-specific request for data on rare wildlife species was submitted most recently to NYNHP on December 21, 2018. The NYNHP provided a response January 23, 2019, which did not identify any rare, threatened, and endangered invertebrates within the Facility Site (Appendix 22-A).

Based on the size of the Facility Site and on-site observation of habitat types available, a wide range of terrestrial invertebrates are likely to occur. These include a variety of insects such as butterflies, dragonflies and damselflies, ants, bees, beetles, mosquitoes, fleas, crickets, ladybirds, fireflies, cicadas, flies, and grasshoppers. Arachnids including spiders, ticks, and mites are common throughout the Facility Site. Worms including earthworms and nematodes are common invertebrates that live in the soil. Invertebrates are important components of ecological communities within the Facility Site because they provide a variety of ecosystems services and functions, including pollination, providing prey for birds, bats, and rodents, expediting nutrient cycling, and aerating the soil. Terrestrial invertebrate species that were observed during on-site surveys are included in the Wildlife Species List, attached as Appendix 22-B.

(6) Wildlife Habitat

As stated above, a request for data on occurrence of significant natural communities was submitted to NYNHP most recently on December 21, 2018. In its response, the NYNHP did not identify any significant natural communities within the Facility Site. In addition, the USFWS's Information for Planning and Consultation (IPaC) database was accessed on December 12, 2018 for information relative to the proposed Facility. Results from the IPaC database reviews specifically indicate "there are no critical habitats within your project location under this offices jurisdiction" (see Appendix 22-A for results provided by the NYNHP and USFWS databases). Furthermore, no calcareous shoreline outcrops or karst features were identified within the Facility Site.

The Applicant conducted research to determine the presence of documented wildlife travel corridors and concentration areas within or adjacent to the proposed Facility, and none were identified. In addition, no Important Bird Areas (IBA), which are identified by the National Audubon Society as places that provide important bird habitat, are located nearby the Facility or within Montgomery County. Smaller scale travel corridors that are used for local movement between various resources likely exist within the Facility Site (e.g. deer trails, areas between wetlands and uplands that reptiles and amphibians cross in order to access breeding grounds, etc.).

The various plant communities that occur within the Facility Site as described in Section (a) above each provide habitat for different wildlife species. A discussion of habitat that is provided by each of the types of ecological communities is provided under the corresponding headings below. Ecological communities with similar habitat requirements are grouped together for discussion purposes.

Agricultural Land

Cropland communities within the Facility Site consists of active agricultural areas of row crops, hayfields, and pasture. Active fields of row crop typically provide marginal habitat for many wildlife species, as these habitats are often too disturbed for nesting and breeding to be successful. A number of grassland bird species may utilize habitats in hay and pasture fields for foraging and breeding, depending on the level of disturbance. Within the Facility Site, these include sensitive species such as upland sandpiper, eastern meadowlark (*Sturnella magna),* bobolink, grasshopper sparrow (*Ammodramus savannarum*), and horned lark. Flocks of Canada geese (*Branta canadensis*) and other waterfowl often use agricultural fields as stopover sites during migration. During the winter, agricultural fields within some portions of the Facility Site are used by sensitive raptor species such as the northern harrier and short-eared owl for foraging and roosting habitat depending on snow and vegetative cover conditions. Additionally, a number of mammal species, including white-tailed deer and black bear, forage in agricultural fields.

Mixed Deciduous/Coniferous Forest

As discussed in Section (a) of this Exhibit, only approximately 10% of the Facility Site is comprised of forested land. Due to the largely agricultural nature of the Facility Site and surrounding area, forest patches are generally small (< 50 acres) and heavily fragmented across the landscape. Furthermore, many of the larger patches of forest exhibit a high degree of disturbance due to private logging, recreational use, and cattle activity in some areas. Consequently, the Facility Site does not contain significant (if any) areas of interior forest habitat. Despite this, a number of wildlife species likely use forested habitats within the Facility Site. Avian species such as the red-eyed vireo (*Vireo olivaceus*), downy woodpecker (*Picoides pubescens*), and hairy woodpecker (*Leuconotopicus villosus*) were commonly observed in forested habitat. In addition, sensitive species including the wood thrush (*Hylocichla mustelina*), and Cooper's hawk were infrequently observed in, or flying nearby, forested areas.

Mammals that may utilize forests in the Facility Site include black bear, porcupine, and white-tailed deer. Various species of bats may also use forest habitats within the Facility Site for roosting and foraging. Common amphibians such as gray treefrog (*Hyla versicolor*), and a variety of salamanders likely utilize forested habitats within the Facility Site.

Forested Wetland

Forest wetlands in the Facility Site are uncommon, but were observed in some areas along forested riparian corridors and in large wetland complexes in the eastern portion of the Facility Site. Forested wetlands provide habitat for species that prefer moist conditions, including a wide range of amphibians. Forested wetlands are also preferred habitat for a number of avian species, including belted kingfisher (*Megaceryle alcyon*) and wood duck (*Aix sponsa*). No sensitive avian species were observed using forested wetland within the Facility Site.

Successional Shrubland

Successional shrublands can contain diverse vegetative structure, with a range of herbaceous and shrub species. These conditions may provide seasonal food, such as annual plant seeds or woody browse during the winter period, and may provide cover for a variety of wildlife species. Typical shrubland mammals include the white-tailed deer, gray fox, eastern cottontail, striped skunk, various rodents (e.g., jumping mice), and other small terrestrial mammals. Typical bird species inhabiting shrublands include the common yellowthroat (*Geothlypis trichas*), yellow warbler (*Setophaga petechia*), and the eastern towhee (*Pipilo erythrophthalmus*). Sensitive avian species observed in this habitat included blue-winged warbler (*Vermivora cyanoptera*) and brown thrasher (*Toxostoma rufum*). A number of reptiles and amphibians rely upon shrublands, including the Eastern garter snake (*Thamnophis sirtalis*), milksnake (*Lampropeltis triangulum*), Eastern American toad (*Lithobates catesbianus*), and spring peeper (*Gyrinophilus porphyriticus*).

Successional Old Field

Successional old field communities in the Facility Site provide habitat for species that prefer open successional grasslands. Bird species that utilize successional old field habitats include eastern meadowlark, savannah sparrow, red-winged blackbird, eastern kingbird, and eastern bluebird (*Sialia sialis*). One sensitive species, bobolink (*Dolichonyx oryzivorus*), was observed in successional old field habitats within the Facility Site. Successional old fields also provide habitat for game species such as woodcock (*Scolopax minor*) and white-tailed deer. A variety of moles, mice, and shrews typically use successional old field communities, which provides foraging opportunities for species of concern such as American kestrel (*Falco sparverius*), northern harrier, and

short-eared owl (in winter months). Successional old field habitats typically have a high diversity and abundance of flowering forbs, which attract bees, butterflies, and other insects, and may attract foraging bats.

Non-forested Wetlands and Streams

Non-forested wetland habitats include open water, shrub-scrub wetland, deep emergent marsh, and shallow emergent marsh communities. These wetland sites support diverse communities of vegetation that provide habitat for numerous species, some of which may also use terrestrial habitat types in the Facility Site. Common waterbirds such as mallard (*Anas platyrhynchos*), great blue heron (*Ardea herodia*), belted kingfisher, and Canada goose would be expected to use emergent wetland habitat found within the Facility. American bittern (*Botaurus lentiginosus*) and pied-billed grebe (*Podilymbus podiceps*) are two species of concern that rely on emergent wetlands.

Open water areas in the Facility Site provide habitat for a variety of aquatic vertebrates and invertebrates. Streams provide habitat for aquatic insects that provide food for fish, such as mayflies, stoneflies, and caddisflies. Other aquatic invertebrates that could be found in these habitats include clams, mussels, and crayfish. Shallow open water bodies provide foraging habitat for bats, including species that are listed as either species of concern in New York State or species of greatest conservation need (SGCN). Frogs, toads, and salamanders may use isolated ponds within the Facility Site as egg-laying sites, many of which use terrestrial habitats as adults. Turtles likely use slow moving streams and other open waters within the Facility Site for foraging and basking. Some species of mammals use open water communities as well, including beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and mink (*Neovision vision*). See Exhibit 23 of this Application for further discussion regarding water resources and aquatic ecology.

(7) Special Status Species

Based on surveys conducted on-site, a review of publicly available sources, and a characterization of wildlife habitats within the Facility Site, a list of special status species and their potential to occur within the Facility Site is provided below in Table 22-3

Table 22-3. New York State Special Status Species Occurring or Potentially Occurring within the Facility Site

Species	NYS Status[1]	USFWS Status	SGCN Status[2]	Ecological Habitat Requirements[3] and On-site Observation Notes	Source[4]	Observed on-site?
Peregrine Falcon *Falco peregrinus*	E	N/A	SGCN	Nests in cliff and urban communities with tall structures such as bridges or buildings. Wintering and migrating birds utilize urban and open areas. The species was documented during the Fort Plain Christmas Bird Count circle during the last 10 years.	CBC	No
Upland Sandpiper *Bartramia longicauda*	T	N/A	SGCN - HP	Optimal breeding habitat contains a mixture of short grass areas for feeding and courtship, interspersed with taller grasses and forbs for nesting and brood cover. This species has been documented at the Facility Site by the NHP and was observed on-site during breeding bird surveys.	NHP, W	Yes
Short-eared Owl *Asio flammeus*	E	N/A	SGCN-HP	Found in cropland and successional old field communities. Habitat occurs within the Facility Site. This species was observed on-site during winter raptor surveys.	W	Yes
Northern Long-eared Bat *Myotis septentrionalis*	T	T	SGCN-HP	Found in multiple forest communities, including hemlock-northern hardwood and beech-maple mesic forests. Overwinters in caves where temperature and moisture remain even. Summer roost habitat consists of trees with cracked or exfoliating bark, and summer foraging habitat consists of forest understories. Suitable habitat is present within the Facility Site.	FWS, NHP	No
Henslow's Sparrow *Ammodramus henslowii*	T	N/A	SGCN-HP	Found in cropland, grassland, sedge meadow, and successional old field communities. Small patches of suitable habitat occur within the Facility Site. Not observed during on-site surveys, but identified during surveys associated with the Breeding Bird Atlas (2000-2005) as occurring within the vicinity of the Facility Site.	BBA	No
Pied-billed Grebe *Podilymbus podiceps*	T	N/A	SGCN	Found in emergent marshes and shrub swamp communities with open water. Nests in aquatic/emergent vegetation, which is limited in the Facility Site.	W	Yes
Northern Harrier *Circus hudsonius*	T	N/A	SGCN	Found in a wide range of open habitats including grassland, cropland, emergent marsh, and successional old field communities. Suitable habitat for this species occurs within the Facility Site. Observed during on-site breeding bird and winter raptor surveys.	W, BBA	Yes
Bald Eagle *Haliaeetus leucocephalus*	T	N/A	SGCN	Found near open water in a wide range of forested habitats including hemlock-northern hardwood forest and beech-maple mesic forest communities. Preferentially roosts and nests in conifers or large, mature deciduous trees. Observed during winter raptor surveys. No active nests have been identified within the Facility Site.	W, BBA	Yes
Grasshopper Sparrow *Ammodramus savannarum*	SSC	N/A	SGCN-HP	Found in cropland and successional old field communities. In New York, the species is predominantly found in hayfields. Suitable habitat occurs within the Facility Site. This bird was observed on-site during breeding bird surveys.	W	Yes
Wood Turtle *Glyptemys insculpta*	SSC	N/A	SGCN-HP	Found in a wide range of habitats throughout the year, including hemlock-northern hardwood forest and floodplain communities. Frequently found in clean, fast-flowing streams with a rocky or sandy bottom. Suitable habitat occurs within the Facility Site. Not observed during on-site surveys, however, the species was recorded in the vicinity of the Facility Site during the NYS Amphibian and Reptile Atlas Project.	HA	No
Snapping Turtle *Chelydra serpentine*	N/A	N/A	SGCN	Can be found in almost every freshwater habitat within their range, but seem to prefer slow-moving, shallow waters with muddy substrates. There are no records of the species occurring within the Facility Site.	HA	No

Species	NYS Status[1]	USFWS Status	SGCN Status[2]	Ecological Habitat Requirements[3] and On-site Observation Notes	Source[4]	Observed on-site?
Red-shouldered Hawk *Buteo lineatus*	SSC	N/A	SGCN	Found in moist forest habitats including floodplain, maple swamp, and shrub swamp communities. Suitable habitat for this species occurs within the Facility Site. The species was documented during the Fort Plain Christmas Bird Count circle during the last 10 years.	CBC	No
Eastern Small-footed Myotis *Myotis leibii*	SSC	N/A	SGCN	Found in a variety of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Also found in cliff and talus slope communities. Hibernates in caves, mines, and deep rock crevices. Suitable habitat for this species occurs within the Facility Site. There are no records of the species occurring within the Facility Site.	NYNE	No
Cooper's Hawk *Accipiter cooperii*	SSC	N/A	N/A	Found in a wide range of forested habitats, including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat for this species occurs within the Facility Site. The species was observed during breeding bird and winter raptor surveys.	W	Yes
Sharp-shinned Hawk *Accipiter striatus*	SSC	N/A	N/A	Found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat for this species is present within the Facility Site. The species was observed during breeding bird surveys.	W	Yes
Bobolink *Dolichonyx oryzivorus*	N/A	N/A	SGCN-HP	Found in grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. The species was observed during on-site breeding bird surveys.	W	Yes
Eastern Meadowlark *Sturnella magna*	N/A	N/A	SGCN-HP	Found in grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. This species was observed during on-site surveys.	W	Yes
American Kestrel *Falco sparverius*	N/A	N/A	SGCN	Found in open habitats including grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. The species was observed on-site during breeding bird surveys.	W	Yes
Ruffed Grouse *Bonasa umbellus*	N/A	N/A	SGCN	Found in interior forest habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Limited suitable habitat is present within the Facility Site. The species was not observed during onsite surveys; however, it was identified during surveys associated with the NYS Breeding Bird Atlas (2000-2005) and within the Fort Plain Christmas Bird Count circle within the last 10 years.	BBA, CBC	No
Wood Thrush *Hylocichla mustelina*	N/A	N/A	SGCN	Found in forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat is present within the Facility Site. The species was observed during on-site surveys for breeding birds.	W	Yes
Scarlet Tanager *Piranga olivacea*	N/A	N/A	SGCN	Found in forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat is present within the Facility Site. The species was not observed during onsite surveys; however, it was identified during surveys associated with the NYS Breeding Bird Atlas (2000-2005)	BBA	No
Horned Lark *Eremophila alpestris*	SSC	N/A	SGCN - HP	Found in open agricultural lands, and breeds on unplowed fields early in the year. This species was observed on-site during breeding bird surveys.	W	Yes
Brown Thrasher *Toxostoma rufum*	N/A	N/A	SGCN - HP	Often nest in thickets, hedgerows, forest edges, and overgrown clearings in deciduous forest. Suitable habitat is present within the Facility Site. This species was observed on-site during breeding bird surveys.	W	Yes
Blue-Winged Warbler *Vermivora cyanoptera*	N/A	N/A	SGCN	Breed in shrublands, thickets, and forest edges. During migration they rest and forage in open woodlands or shrublands. Suitable habitat is present within the Facility Site. This species was observed on-site during breeding bird surveys.	W	Yes

Species	NYS Status[1]	USFWS Status	SGCN Status[2]	Ecological Habitat Requirements[3] and On-site Observation Notes	Source[4]	Observed on-site?
American Woodcock *Scolopax minor*	N/A	N/A	SGCN	Breeding habitat includes young, shrubby, deciduous forests, and old fields. They display in forest openings and old fields in the spring time. This species was observed on-site during breeding bird surveys.	W, BBA	Yes
Greater Yellowlegs *Tringa melanoleuca*	N/A	N/A	SGCN	Breeding habitat is diverse, including mudflats, marshes, lake and pond edges, wet meadows, and flooded agricultural fields. Observed in the Facility Area by WEST during breeding bird surveys.	W	Yes
Sedge Wren *Cistothorus platensis*	T	N/A	SGCN-HP	Nests in dense tall sedges and grasses in wet meadows, hayfields, and marshes. Avoid cattails. There is limited suitable habitat within the Facility Site. There are no records of the species occurring within the Facility Site; however, this species was identified as occurring in Montgomery County by NYSDEC's New York Nature Explorer.	NYNE	No
Black-billed Cuckoo *Coccyzus erthropthalmus*	N/A	N/A	SGCN	Breeding habitat includes large, dense woodlands and thickets. Observed in the Facility Area by WEST during winter and/or breeding bird surveys.	W	Yes
Louisiana Waterthrush *Parkesia motacilla*	N/A	N/A	SGCN	Breeding habitat occurs along clear, perennial streams in mature deciduous or mixed forest, usually in hilly environments. The species was not observed during onsite surveys; however, it was identified during surveys associated with the NYS Breeding Bird Atlas (2000-2005).	BBA	No
Black-throated Blue Warbler *Setophaga caerulescens*	N/A	N/A	SGCN	Breeding habitat includes mature deciduous and mixed forests with a thick understory of shrubs. There is limited habitat within the Facility Site. The species was not observed during onsite surveys; however, it was identified during surveys associated with the NYS Breeding Bird Atlas (2000-2005).	BBA	No
Rusty Blackbird *Euphagus carolinus*	N/A	N/A	SGCN-HP	Breeding habitat includes wet forests, including areas with fens, bogs, and beaver ponds. The species was not observed during onsite surveys; however, it was identified within the Fort Plain Christmas Bird Count circle within the last 10 years.	CBC	No
Vesper Sparrow *Pooecetes gramineus*	SSC	N/A	SGCN-HP	Breeding habitat includes open areas with short, scarce grass and scattered shrubs including, old fields, pastures, and hayfields. The species was not observed during onsite surveys; however, it was identified during surveys associated with the NYS Breeding Bird Atlas (2000-2005).	BBA	No

[1] E = endangered; T = threatened; SSC = species of special concern.

[2] SGCN Status refers to the species' status under the Comprehensive State Wildlife Strategy. SGCN = Species of Greatest Conservation Need, SGCN-HP = High Priority Species of Greatest Conservation.

[3] Source: NYNHP Animal Guides. Available online at http://acris.nynhp.org/animals.php. All About Birds by The Cornell Lab of Ornithology. Available at https://www.allaboutbirds.org/

[4] Source: W = observed on-site by WEST biologists, EDR = observed by EDR biologists, NHP = New York Natural Heritage Program site-specific request for data, FWS = US Fish & Wildlife Service IPaC resource list for federally-listed species, BBA = NYS Breeding Bird Atlas, HA = NYS Herp Atlas, BBS = USGS Breeding Bird Survey, NYNE = NYSDEC's New York Nature Explorer, CBC = Fort Plain Christmas Bird Count, ASM = American Society of Mammalogists, AFNY = Atlas of Fishes of New York

(e) Species List

A Plant Species Inventory and a Wildlife Species Inventory is included in Appendix 22-B, both of which are based on existing data available from the NHP, NYSDEC staff, USFWS, Herp Atlas, BBA, HMANA, CBC, eBird, and The Nature Conservancy surveys/reports, as well as on-site survey results, and/or the availability of suitable habitat, and identify species that may occur in the Facility Site at some time during the year.

(f) Impacts to Vegetation, Wildlife, Wildlife Habitats, and Wildlife Travel Corridors

(1) Summary

Impacts to vegetation due to construction and operation are addressed above in Section (b)(1) and shown in Figure 22-1. A total of up to approximately 217.2 acres (9% of the Facility Site) of vegetation will experience temporary disturbance as a result of Facility construction. In addition, 538.5 acres (23% of the Facility Site) will be area underneath PV panel arrays, and will be maintained as an early successional community for the life of the Facility. Maintained early successional areas under PV panel arrays are expected to retain considerable habitat value for many wildlife species including pollinators and other invertebrates, small mammals, reptiles and amphibians, and many avian species. A total of up to 103.4 acres (4% of the Facility Site) of vegetation will be permanently lost through conversion to Facility components. No plant community will be extirpated or significantly reduced as a result of construction or operation of the Facility. Temporary and permanent disturbance to vegetation, including habitat fragmentation, will result in indirect impacts to wildlife species. Impacts to wildlife through habitat loss and displacement are also expected to result from construction and operation of the Facility. The Applicant has taken measures to avoid, minimize, and mitigate for impacts to vegetation, wildlife, and wildlife habitats to the extent practicable, which are discussed in detail in Exhibit 22(g) below. Impacts to wildlife are expected to be minimal and will not have significant effects on any of the species that occur within the Facility.

(2) Construction-Related Impacts to Wildlife and Wildlife Habitats

Construction-related impacts to wildlife are anticipated to be limited to incidental injury and mortality due to construction activity and vehicular movement, habitat disturbance/loss associated with clearing and earth-moving activities, and displacement of wildlife due to increased noise and human activities. Each of these potential impacts is described below.

(i) Incidental Injury or Mortality

Direct impacts from construction may include incidental injury or mortality due to construction equipment. Potential mortality is expected to be low as equipment used in solar energy facility construction generally moves at slow rates or is stationary for long periods (e.g., earth moving equipment, pier driving equipment).

In addition, much of the land within the Facility Site is routinely subject to active machinery due to farming activities. Incidental injury and mortality should be limited to sedentary/slow-moving species such as small mammals, reptiles, amphibians, and invertebrates that are unable to move out of the area being disturbed by construction. More mobile species and mature individuals should be able to vacate areas disturbed by construction. Vehicle-related mortality may increase temporarily due to the increased traffic during construction; however, as traffic decreases upon the completion of construction, so will the potential for wildlife-vehicle collisions.

The highest risk of direct mortality to birds from construction is the potential destruction of a nest during initial vegetation clearing. However, significant adverse impacts to grassland-nesting bird species are not anticipated as the Applicant will conduct construction activities in these habitats outside of the breeding season to the extent practicable. Significant adverse impacts to forest-nesting birds during construction of the Facility Area are not expected, as the Applicant will conduct any tree clearing outside the breeding season to the extent possible and will implement measures to avoid and mitigate potential impacts to birds that could result from tree clearing activities during the breeding season.

To avoid potential incidental injury or mortality impacts to northern long-eared bats, clearing of trees and shrubs greater than 3 inches diameter at breast height (dbh) is anticipated to be restricted to the period between November 1 and March 31, when the bats are hibernating off-site. If work is required outside this winter clearing period, the Applicant will follow the USFWS 4d rule and the NYSDEC guidance. No part of the Facility Site is within 0.25 mile of a NLEB hibernacula, or within 1.5 miles of a documented NLEB summer occurrence. In addition, no documented roost trees occur within the Facility Site. Consequently, snag and cavity trees will remain uncut unless their removal is necessary for protection of human life and property.

(ii) Habitat Disturbance and Loss Due to Clearing and Earth-moving Activities

Facility components have been sited to minimize impacts to wildlife habitat. This includes preferentially siting PV panel arrays in agricultural fields to avoid impacts to forestland, successional shrubland, and wetland communities. In addition, underground collection lines will parallel existing logging and farm roads wherever possible, reducing the amount of temporary habitat loss. It is anticipated that 248.1 acres of agricultural land (cropland, hay, and pasture), 16.1 acres of forest, 10.3 acres of successional shrubland, and 43 acres of successional old field habitat will be directly impacted by construction-related disturbance. From these totals, 173.3 acres of agricultural land, 1.0 acre of forest, 6.8 acres of successional shrub land, and 24.9 acres of successional old field will be allowed to return to their previous condition following completion of construction activities. On a landscape scale, there is an abundance of these habitats in the nearby landscape.

As described in Section b(1) of this Exhibit, the area underneath the PV panel arrays will generally not be subject to grading or stripping of topsoil. In some areas, existing vegetation will be cleared or mowed to an appropriate height prior to installation of the arrays. These areas will be maintained as an early successional grassland community for the life of the Facility. Maintained early successional areas under PV panel arrays are expected to retain considerable habitat value for many wildlife species including pollinators and other invertebrates, small mammals, reptiles and amphibians, and many avian species. Areas directly under PV panel arrays total 538.5 acres, with 452.6 acres (84%) currently in agricultural land, 52.9 acres (9%) in successional old field, 30.6 acres (6%) in successional shrubland, 2.3 acres (0.4%) in forestland, and 0.08 acre (<0.1%) in disturbed develop land.

Changes in vegetation could influence the behavior of wildlife species by changing the quality of habitat for foraging, nesting, or roosting. It is anticipated that the majority of wildlife present in the Facility Site would return to areas that were temporarily disturbed following the completion of construction activity. Significant adverse impacts on bat and bird populations are not expected during the construction of the Facility. Furthermore, to avoid potential disturbance impacts to northern long-eared bats (and other bat species that utilize forested habitat), clearing of trees and shrubs greater than 3 inches diameter at breast height (dbh) is anticipated to be restricted to the period between November 1 and March 31, when the bats are hibernating off-site. If work is required outside this winter clearing period, the Applicant will follow the USFWS 4d rule and the NYSDEC guidance. No part of the Facility Site is within 0.25 mile of a NLEB hibernacula, or within 1.5 miles of a documented NLEB summer occurrence. In addition, no documented roost trees occur within the Facility Site. Consequently, snag and cavity trees will remain uncut unless their removal is necessary for protection of human life and property.

(iii) Displacement of Wildlife

Some wildlife displacement may occur due to increased noise and human activity as an indirect impact of Facility construction. The significance of this impact will vary by species and the seasonal timing of construction activities. These impacts are not expected to be significant because a sizeable amount of suitable habitat will remain undisturbed by Facility construction within and adjacent to the Facility Site. Furthermore, the majority of land proposed to host Facility components is subject to frequent mechanical disturbance such farming activities and logging, as well as snowmobiles in the winter. Consequently, it is anticipated that many of the wildlife species within the Facility Site are accustomed to disturbances such as those that will occur during Facility construction. Outside of localized displacement due to construction

disturbance in the immediate vicinity of PV panel arrays, access roads, etc., no significant displacement impacts on wildlife species are anticipated during construction.

(3) Operation-Related Impacts to Wildlife and Wildlife Habitats

Operation-related impacts to wildlife include direct habitat loss, some habitat degradation through fragmentation, and disturbance/displacement due to presence of PV panel arrays.

(i) Habitat Loss

538.5 acres (23% of the 2,361 acre-Facility Site) will be underneath PV panel arrays and maintained as early successional habitat for the life of the Facility. Maintained early successional areas under PV panel arrays are expected to provide considerable habitat value for many wildlife species including pollinators and other invertebrates, small mammals, reptiles and amphibians, and many avian species. However, certain wildlife species such as grassland raptors may no longer use these habitats. In addition, approximately 11.0 acres of forest are expected to be converted to a successional community (old field, shrubland, or saplings) for the life of the Facility. This will result in an increase in habitat for early-successional species, many of which are in decline. Given the relatively small area of lost or converted natural communities, and the abundance of such communities on the adjacent/nearby landscape, habitat loss/conversion resulting from Facility operation is not considered significant. Operation of the Facility will not result in additional habitat loss beyond areas disturbed by construction.

(ii) Habitat Fragmentation

Habitat fragmentation resulting from the operating Facility may affect the movement, breeding, and/or roosting behavior of various species across the landscape. Fragmentation can occur at a variety of scales and patterns and may affect species differently depending on their habitat requirements. The potential effects of habitat fragmentation depend in part on previous land use, the original extent of intact forested habitat, how much habitat will be impacted during and after construction, and the behavioral sensitivity of potentially affected taxa. The relative impacts of habitat removal or conversion also depend on the configuration of impacted areas, the current level of habitat degradation or disturbance, and types and levels of activity (e.g., traffic volume, noise levels, visual disturbances) to occur in the affected areas. It is anticipated that the majority of fragmentation impacts resulting from the operating Facility will be due to the presence of PV panel arrays in grassland and early successional habitats.

Fragmentation Impacts to Birds

Sensitivity to habitat fragmentation varies by species, with forest interior species showing the highest degree of sensitivity (Bannerman 1998). As discussed in Section (a)(1) of this Exhibit, approximately 453 acres (19%) of the Facility Site is comprised of forested land. Of this total, only 18.4 acres (4%) of forest will be cleared for Facility construction. In addition, as discussed in Section (d)(6) of this Exhibit, forested areas within the Facility Site are generally small (< 50 acres), and exhibit a high degree of fragmentation across the landscape. Many of the larger patches of forest exhibit a high degree of disturbance due to private logging, recreational use, and cattle activity in some areas. Consequently, the Facility Site does not contain significant (if any) areas of interior forest habitat, and fragmentation impacts to forest interior species are not anticipated.

With respect to grassland avian species that utilize agricultural (cropland, pasture and hay fields) and successional old fields, the operating Facility will result in 92.9 acres of permanent loss due to conversion to built facilities such as access roads, pad-mounted inverters, and the substation in these habitats. In addition, 505.5 acres of these habitats will fall within the footprint of PV panel arrays, which will be maintained as early successional habitat for the life of the Facility. Maintained early successional areas under PV panel arrays are expected to retain considerable habitat value for many wildlife species including pollinators and other invertebrates, small mammals, reptiles and amphibians, and many avian species.

As discussed throughout both Exhibit 4 and Exhibit 22 of this Application, the Facility is sited in an agricultural landscape that extends throughout Montgomery County and into neighboring counties to the north, south, east, and west. This landscape contains an extensive network of agricultural land including row crops, hay fields, pasture, in addition to successional old field habitat. Given the extent of available agricultural and successional old field habitat adjacent to the Facility Site and within this broader landscape, the impact to these habitats from the Facility (described above) are unlikely to represent significant fragmentation impacts at the landscape or regional level. An analysis of the cumulative impacts to grassland habitat resulting from construction and operation of the Facility is provided below in Section (f)(6) of this Exhibit.

At the local level (within the Facility Site), the operating Facility may result in fragmentation and displacement impacts to avian grassland habitat. This includes habitat for sensitive species such as the northern harrier, short-eared owl, and upland sandpiper, all of which have been observed using portions of the Facility Site for foraging (short-eared owl, northern harrier) and breeding (northern harrier and upland sandpiper) purposes. The Applicant identified potential impacts to these State-listed species as a concern early in the

development process, and has developed a Net Conservation Benefit Plan (NCBP) (Appendix 22-F) in consultation with NYSDEC to provide a net conservation benefit to short-eared owl, northern harrier, and upland sandpiper. Additional detailed discussion on potential impacts to threatened and endangered species, and measures undertaken by the Applicant to avoid, minimize, and mitigate for such impacts is provided below in Section (f)(5)(3) of this Exhibit.

Fragmentation Impacts to Bats

Forested fragmentation effects on bats are not well understood and effects may be different between species based upon each species' ecology (e.g., preferred prey, foraging areas, roosting needs, and flight morphology). To the extent practicable, tree clearing for the Facility will take place during the winter when bats are hibernating or have migrated south, and minimization measures to avoid direct take of bats will be implemented for all tree clearing that occurs outside of this time period. Indirect impacts to bats may occur as a result of habitat loss, however, given the already fragmented nature of forest within the Facility Site, and the small percentage of forested habitat loss, it is unlikely that habitat fragmentation will have a significant impact on any bat species. Suitable roosting areas for some species may be lost as a result of Facility construction; however, the creation of open areas and forest edge may actually benefit some species (such as little brown bat and big brown bat) by increasing foraging opportunities. Overall, it is unlikely that habitat fragmentation resulting from the Facility will have a significant impact on any bat species.

(iii) Disturbance/Displacement of Wildlife

Habitat alteration and disturbance resulting from Facility operation may render some areas within the Facility Site unsuitable or less suitable for nesting, foraging, roosting, or other wildlife use. The Facility is sited in an agricultural landscape which is subject to frequent disturbances associated with farming activities such as tilling, plowing, harvesting, haying, and cattle grazing. PV panel arrays have been preferentially sited in these areas to avoid the need to clear significant areas of forest or impact other valuable wildlife habitat including wetlands. Given that the area underneath the PV panel arrays will be maintained as early successional habitat for the life of the Facility, it is also likely that some more generalist grassland avian species will successfully utilize these areas. Nonetheless, the presence of PV panel arrays in fields within the Facility Site will likely render these habitats unsuitable for certain species that would otherwise utilize these areas for foraging, roosting, and breeding habitat. This may be particularly the case for avian species; especially those that generally require large, open grassland areas to hunt for insects or small mammals, and establish breeding territories.

Wildlife Impacts Literature Review

There is currently very little (if any) published research on the impact of utility-scale PV solar facilities on wildlife in the eastern United States. However, some studies that examine potential impacts to avian species have been conducted at operational PV solar facilities in other regions of the United States. The literature review provided below examines potential direct and indirect impacts to avian communities based on studies largely conducted at solar generating facilities in the arid western United States. To the extent that these studies may inform potential impacts to avian species in the eastern United States, this information is presented below. Detailed discussion on potential impacts to Threatened and Endangered species, and measures undertaken by the Applicant to avoid, minimize, and mitigate for such impacts are provided below in Section (f)(5)(3) of this Exhibit.

Direct Effects on Avian Species

The National Fish and Wildlife Forensics Laboratory (NFWFL) published a study in 2014 (Kagen et al. 2014), which assessed three distinct types of utility-scale solar facilities in a desert environment. Over two years, avian mortality was documented at all three facilities, with a PV facility incurring a total of 61 deaths, a parabolic mirror facility incurring 31 deaths, and a solar flux facility incurring 141 deaths. Focusing on the PV facility, 19 of the 61 deaths resulted from impact trauma, 15 from predation trauma, 22 were undeterminable, and five showed no evident cause of death. Eighteen of the 61 deaths at the PV facility involved resident species, while 38 were migrants. In addition, aquatic feeders and waterfowl represented the group of birds with the highest number of deaths (27) at the PV facility. It should be noted that many of the 15 bird deaths attributed to predation were presumed to have first collided with the facility, and thus rendered vulnerable to predation (Kagen et al. 2014). Due to the opportunistic and unstandardized nature of data collection for the NFWFL study, the data are not suitable for statistical analysis (Kagen et al. 2014), and a mortality rate per unit time was not calculated.

However, an avian mortality rate was generated in another recent study (Walston et al. 2016), which evaluated data from post-construction annual systematic surveys conducted at three utility-scale solar facilities in arid southern California, one of which was a 250 megawatt (MW) PV facility. At the PV facility, a mortality rate estimate of 0.5 birds/MW/year was calculated based on bird fatalities that were known to be attributable to that facility.

With regard to the PV facility evaluated in the NFWFL study, Kagen et al. (2014) suggest that the facility may have been attractive to some bird species due to its location in a relatively homogeneous desert environment and its possible appearance as a large expanse of open water when viewed from above (the

lake effect hypothesis). This hypothesis is supported by an over-representation of birds which rely heavily on aquatic habitats in the mortality data from the PV facility. In addition, there is growing evidence that polarized light which reflects off glass surfaces (including PV panels) may be attractive to avian species, and in some cases, the insects on which they feed (Horvath et al. 2009, 2010). However, no empirical research has been conducted to evaluate the attraction of utility-scale solar facilities on migrating or foraging birds, and existing post-construction mortality data from other PV facilities is too limited to statistically test the lake effect hypothesis (Walston et al. 2015). It should also be noted that an actual source of open water was also present at the PV facility evaluated in the NFWFL study. The presence of this water body in an arid environment would likely have compounded the potential attractiveness of that PV facility to avian species.

The solar facilities evaluated in both the Kagen et al. (2014) and Walston et al. (2016) studies were located in the desert southwestern United States, which is not comparable to avian habitat in much of the eastern and midwestern regions of the country. Most operating and proposed solar facilities in the eastern and midwestern United States are located in significantly more heterogeneous and biodiverse areas than those evaluated in the above-mentioned studies (SEIA, 2016). In addition, waterbodies such as ponds, rivers, lakes, and wetlands generally occur with a much greater frequency throughout the landscape of the eastern and midwestern United States when compared to the desert southwest. Consequently, it is anticipated that the potential attractiveness of a PV facility to waterfowl and other aquatic-feeding species (i.e., the lake effect) in the eastern and midwestern United States would be significantly less than at the PV facilities evaluated by Kagen et al. (2014) and Walston et al. (2016). Furthermore, PV solar facilities in the eastern and midwestern United States are often sited largely in agricultural areas and avoid forested areas, wetlands, and other sensitive areas that may provide more attractive habitat for many bird species. The Applicant is unaware of any study conducted to date that assesses the direct impacts of utility-scale PV facilities on avian species in the eastern or midwestern United States.

Excluding habitat loss and house cat predation, collisions with buildings and windows comprise the largest estimated source of anthropogenic avian mortality annually (Erickson et al., 2005). Panes of glass are particularly hazardous to birds due to their transparent or reflective nature (Klem, 2009). The solar panels at a PV facility are generally constructed using panes of glass on the surface of each panel. However, the glass surfaces on PV facilities differ from those of windows on homes and buildings in multiple ways. First, the glass on each PV panel rests directly on top of the generating components, and therefore does not have the same transparency properties as would a residential window, where an observer can see through the glass to features on the other side of the window. Additionally, the glass used for PV facilities generally

produces less glare and is less reflective than most window glass (SunPower, 2009), reducing the potential for a "mirror" effect that can also mimic transparency and deceive birds. Another difference between residential and commercial windows and the glass surfaces at PV facilities is the angle of the glass panes. Windows on homes and buildings are almost always oriented at approximately 90 degrees relative to the ground surface, while PV panels tend to be significantly more acute, typically within the range of 20 to 60 degrees. Finally, the height of the PV panels at the majority of ground-based PV solar facilities does not exceed 10-15 feet, which is often lower than most of the homes, buildings, and vegetation in the surrounding area. Consequently, most PV solar facilities are not prominent features of the landscape with respect to height, and would be less likely to result in avian collisions than other taller structures.

Indirect Effects on Avian Species

With regards to the indirect effects of utility-scale solar facilities on avian species, very little peer-reviewed research in the United States has been conducted to date (Smith and Dwyer, 2016). DeVault et al. (2014) found that PV solar facilities can potentially alter avian communities, concluding that species diversity was lower at PV solar facilities than in adjacent grasslands at five airports located across the United States. Conversely, at the same five locations, bird densities at the PV Facilities were more than twice those of adjacent grasslands. However, these results were species-specific, and driven largely by habitat generalists such as the American robin (*Turdus migratorius*), house finch (*Carpodacus mexicanus*), and mourning dove (*Zenaida macroura*). More specialized grassland birds including multiple sparrow species, northern harrier, and western meadowlark (*Sturnella neglecta*) were less prevalent at the PV solar facilities than in adjacent grassland. The results from DeVault et al. (2014) lend credence to the suggestion made by Smith and Dwyer (2016) that site-specific factors such as pre-construction conditions, available adjacent habitat, and the size of the facility can greatly influence the extent to which a PV solar facility will alter local avian communities.

Avian abundance and activity at local and regional scales varies by the distribution of habitat and other landscape features such as elevation (Flather and Sauer, 1996; Buler et al. 2007; Betts et al. 2010). Consequently, the location of PV solar facilities relative to avian habitats such as migratory flyways, wetlands, shrublands, and grasslands could influence the extent of impacts on avian species. As stated above, utility-scale PV solar facilities in the eastern and midwestern United States are often sited in agricultural areas. Consequently, the most frequent change in land use associated with these facilities is the conversion of land out of agricultural production. Generally, agricultural land provides habitat for a relatively small number of avian species. In addition, agricultural vegetation is often monotypic, thereby restricting foraging and cover opportunities. These areas are typically subject to frequent human activity and

disturbances, including plowing, planting, harvesting, etc. Conversion of active agricultural cropland into a PV solar facility is therefore not anticipated to significantly impact most avian communities.

Furthermore, based on the findings of a recent, highly publicized study, the conversion of land out of active agriculture may be beneficial to avian populations. A team of researchers in the Netherlands found that the neonicotinoid insecticides that are used extensively in agriculture throughout the world (including the U.S.) are toxic to insect pollinators and indirectly detrimental to avian populations due to the mortality or contamination of the insects that make up their diet (Hallmann et al., 2014). Due to the fact that neonicotinoids are water soluble and have a long half-life in soil, their effects often spread beyond the boundaries of the fields on which they are applied, thus damaging surrounding ecosystems. Annual avian mortality in the United States resulting from pesticide usage has been estimated to be between 67 and 72 million (Erickson et al. 2005, Sovacool, 2013). By converting land out of agriculture to host PV solar facilities, the application of neonicotinoid insecticides may be prevented, which would be beneficial to local avian populations.

(iv) Impacts to Wildlife Travel Corridors and Concentration Areas

The proposed Facility is not anticipated to have any significant impacts to wildlife travel corridors or concentration areas.

(4) Impacts to Wildlife from Application of Biocides

The Applicant does not intend to use biocides (pesticides and herbicides) during the construction and operation of the Facility. Vegetation management will performed using mechanical methods such as mowing. This includes the areas underneath the PV panel arrays, which will maintained as early successional communities. Therefore, impacts to wildlife from the application of biocides are not anticipated.

(5) Summary Table of Impacts to Wildlife Habitat

A summary impact table quantifying anticipated temporary and permanent impacts to wildlife habitats and vegetation cover types associated with the construction and operation of the Facility is provided in Table 22-4.

Table 22-4. Impacts to Wildlife Habitat

Wildlife Habitat	Area Underneath Panels (maintained by Applicant)[2]	Temporary Impacts Associated with Buried Collection Line, Access Road Construction and Substation[3]	Permanent Impact (Conversion to Built Facilities) (acres)	Total Impact (acres)
Agricultural Land[1]	452.6	173.3	74.8	**700.7**
Successional Old Field[1]	52.9	24.9	18.1	**95.9**
Successional Shrubland	30.6	6.8	3.5	**40.9**
Mixed Deciduous/Coniferous Forest	2.3	9.8	6.3	**18.4**
Total	**538.4**	**214.8**	**102.7**	**855.9**

[1] Agricultural land and successional old field contains areas of grassland habitat within the Facility Site

[2] Vegetation underneath PV panels will be maintained by occasional mowing to prevent interference with Facility components. Areas of successional shrubland and forest will be converted to an early successional community prior to installation of PV panels.

[3] It is anticipated that all temporary vegetation impact areas within 15 feet of collection lines will be maintained. All temporary vegetation impact areas outside of this distance or otherwise not associated with collection lines would not be maintained, and allowed to return to their pre-disturbance state with time.

(6) Information Regarding Threatened, Endangered, and Special Concern Species

The Applicant compiled a list of federally and state-listed species that could occur in the Facility Site based on site-specific correspondence and database queries from USFWS, NYNHP, BBA, CBC, NYNE, NYSDEC state and regional offices, and direct observations made on-site. The USFWS maintains an online Information for Planning and Consultation database (IPaC)) where users can request site-specific information for known occurrences of federally-listed threatened, endangered, and candidate species listed under the Endangered Species Act. The NYNHP monitors a database of threatened, endangered, and special concern plant and animal species that occur throughout the state, as well as ecological communities that are unique or of special ecological significance. The Applicant requested site-specific data from these sources to determine the presence of threatened, endangered, candidate, or special concern species that may occur in the Facility Site (see Appendix 22-A). See Table 22-2 in Section (d)(7) above for a list of all special status species identified, a brief description of the ecological requirements of each species, the source whereby each species is known to occur within the vicinity of the Facility Site, and whether the species was observed during on-site surveys.

From the above sources, it was determined that one federally-listed species could occur within vicinity of the Facility Site, the northern long-eared bat. This species is a federally-listed threatened mammal that is also State-listed as threatened and a High Priority SGCN.

New York State-listed species identified by the sources above and/or identified during on-site surveys include five bird species: Northern harrier (Threatened), short-eared owl (Endangered), upland sandpiper (Threatened), pied-

billed grebe (Threatened), bald eagle (Threatened), sedge wren (Threatened), and Henslow's sparrow (Threatened).

The NYSDEC also keeps records on species of special concern (SSC). These species are not listed, but their conservation needs do "warrant attention and consideration" (NYSDEC, 2017a). A total of eight state-listed species of concern were identified through site-specific correspondence with the above sources, direct observation on-site, or review of other sources used to prepare the Wildlife Inventory as discussed in Section (e)(2). These species include grasshopper sparrow, wood turtle, red-shouldered hawk, eastern small-footed myotis, Cooper's hawk, Sharp-shinned hawk, horned lark, and vesper sparrow.

New York State maintains a Comprehensive State Wildlife Strategy that includes a list of Species of Greatest Conservation Concern (SGCN) (NYSDEC, 2017b). This list describes species that are rare or declining. Species listed as High Priority Species of Greatest Conservation Need (SGCN-HP) are in need of timely management intervention to avoid reaching critical population levels in New York, specifically needing conservation actions within the next ten years. Species of Greatest Conservation Need (SGCN) are species that are experiencing some level of population decline and need conservation actions to maintain stable populations or sustain recovery. However, the need for conservation action is not as imperative as for those in the High Priority category. Many of the species listed as threatened, endangered, or of special concern are also identified as SGCN or SGCN-HP. There are 15 SGCN or SGCN-HP species that have been observed within or near the Facility Site that are not also listed as threatened, endangered, or of special concern.

(i) Impacts to Special Status Plants and Significant Ecological Communities

No threatened, endangered, candidate, or rare plant species and no significant ecological communities were identified by either the USFWS or the NYNHP. In addition, no special status plants or significant ecological communities were observed on-site during ecological surveys. Therefore, Facility construction and operation are not expected to result in adverse impacts to protected plants or to significant ecological communities.

(ii) Impacts to Special Status Birds

As noted in Section (d)(7) above, a number of New York State special status species have been identified as occurring or having the potential to occur at the Facility Site. Potential impacts to these species resulting from Facility construction and operation are discussed below.

Henslow's Sparrow

Based on BBA (2000-2005) records, Henslow's sparrow (threatened) has been documented within the vicinity of the Facility Site. Henslow's sparrow is a grassland species that typically prefers grassy fields and meadows with scattered bushes and herbaceous plants, as is typically found in weedy hayfields and pastures or successional old fields (NYNHP, 2017c). The Facility is expected to displace some areas of this habitat during construction and operation. However, no Henslow's sparrows were documented during on-site pre-construction surveys, including during evening surveys specifically conducted to detect potential occurrence of this species. Therefore, no direct or indirect impacts to Henslow's sparrow are expected to result from Facility construction or operation.

Bald Eagle

Correspondence with the NYNHP identified records of bald eagle (threatened) within one mile of the Facility Site. Additionally, bald eagles were observed flying over the Facility Site during pre-construction winter raptor surveys for the Facility. No bald eagle observations were made during the pre-construction breeding bird survey and no nests (active or inactive) were observed within the Facility Site Bald eagles are typically found near large bodies of water (such as rivers, reservoirs, estuaries, and lakes) that support a healthy population of fish and waterfowl, their primary food source. This species will also feed on small mammals, snakes, and carrion. Generally, bald eagles tend to avoid areas with human activities and require a good food base, perching areas, and nesting sites. They will perch in either deciduous or coniferous trees. Large, heavy nests are usually built near water in tall pine, spruce, fir, cottonwood, oak, poplar, or beech trees. During the winter, roosts sites may be farther from food sources. This may be due to the need for more sheltered, warmer area. Feeding areas during the winter months usually have a high concentration of fish, waterfowl, and open water (NYNHP, 2015a).

The most suitable habitat for bald eagles in the vicinity of the Facility is the Mohawk River Valley, which is located approximately 1-mile to the northeast. In addition, there is some potential for bald eagles to perch in trees along Canajoharie Creek, approximately 0.25 mile west of the Facility Site. Suitable foraging habitat within the Facility Site is limited, and more suitable foraging habitat (large lakes and rivers) is found outside of the Facility Site. Indirect impacts to potential bald eagle foraging areas are expected to be minimal as Facility components will be sited in upland areas and there will be no loss of open water wetlands. Construction and operation of the Facility is not anticipated to result in impacts to the bald eagle.

Pied-Billed Grebe

Two auditory observations of pied-billed grebe (threatened) were made from within the Facility Site during pre-construction breeding bird surveys. The pied-billed grebe is a small waterbird, that is found in quiet marshes, marshy shorelines of ponds, shallow lakes and slow moving streams with sedgy banks or adjacent marshes. Pied-billed grebes avoid dense emergent vegetation and require water depths of 25 to 50 centimeters for nesting. As a breeding species, the pied-billed grebe occurs statewide, with concentrations on the Lake Ontario Plain and St. Lawrence Valley. It is more sparsely distributed in the Adirondacks, Catskills, Allegheny uplands, and on Long Island. Ecological communities associated with this species include shallow and deep emergent marshes, shrub swamps, backwater slough, impounded marshes, and marshy headwater streams (NYNHP, 2015e). The two auditory pied-billed grebe observations emanated from a small farm pond located approximately 0.25 miles north of Breeding Bird Survey Transect T7. This area is not within the limits of disturbance of the Facility. Furthermore, the Facility has been sited to avoid impacts to marshes, ponds, or any other form of open-water wetland. Consequently, impacts to the pied-billed grebe are not anticipated.

Northern Harrier

Observations of northern harrier (threatened) were made within Facility Site during both pre-construction wintering raptor and breeding bird surveys. This species was observed foraging in open fields during the winter and breeding season. In addition, likely breeding activity was observed from a pair of northern harriers in one location during the breeding bird survey. Northern harriers primarily occupy large, open wetlands and grasslands, and will nest in a variety of habitats including fields, grasslands, meadows, marshlands, and other open habitats with little or no woody vegetation. As discussed in Section (f)(3) of this Exhibit, construction and operation of the Facility may result in fragmentation and displacement impacts to habitat for sensitive species including foraging and breeding habitat for the northern harrier. The Applicant identified these potential impacts as a concern early in the development process, and has developed a NCBP (Appendix 22-F) in consultation with NYSDEC to provide a net conservation benefit to New York State-listed grassland species (including northern harrier) potentially impacted by the Facility. Additional discussion on the measures undertaken by the Applicant to avoid, minimize, and mitigate for such impacts is provided below in Exhibit 22(g).

Short-eared Owl

Observations of short-eared owl (endangered) were made within the Facility Site during pre-construction wintering raptor surveys. Short-eared owls were observed foraging in open fields in two general locations within the Facility Site. Short-eared owls prefer open areas such as grasslands, including hayfields, fallow

farm lands, and pastures. In New York, an increase in short-eared owl observations has been noted during the winter, as northern populations migrate south in search of food. Ecological communities associated with this species include cropland, dwarf shrub bog, high and low salt marsh, and successional old field (NYNHP, 2015g). As discussed in Section (f)(3) of this Exhibit, construction and operation of the Facility may result in fragmentation and displacement impacts to habitat for sensitive species including winter foraging and roosting habitat for the short-eared owl. The Applicant identified these potential impacts as a concern early in the development process, and has developed a NCBP (Appendix 22-F) in consultation with NYSDEC to provide a net conservation benefit to New York State-listed grassland species (including short-eared owl) potentially impacted by the Facility. Additional discussion on the measures undertaken by the Applicant to avoid, minimize, and mitigate for such impacts is provided below in Exhibit 22(g).

Upland Sandpiper

Two observations of upland sandpiper (threatened) were made during pre-construction breeding bird surveys. One auditory observation was made from within the Facility Site, and a second visual observation was made from within a parcel that was subsequently excluded from the Facility Site. Preferred habitat for the upland sandpiper includes large areas of short grass for feeding and courtship interspersed with, or adjacent to, taller grasses for nesting and brood cover. Typical nesting cover includes idle cropland, pasture, highway edges, hayfields, untilled crops such as clover, alfalfa or blueberries, and mowed grass (Ailes 1976, Carter 1992, Pierson et al. 1996). The upland sandpiper observation made from within the Facility Site did not include any obvious breeding behaviors, however the presence of suitable habitat within the Facility Site raises the possibility that this species utilizes habitat for breeding or foraging within the Facility Site. As discussed in Section (f0(3) of this Exhibit, construction and operation of the Facility may result in fragmentation and displacement impacts to habitat for sensitive species including habitat for the upland sandpiper. The Applicant identified these potential impacts as a concern early in the development process, and has developed a NCBP (Appendix 22-F) in consultation with NYSDEC to provide a net conservation benefit to New York State-listed grassland species (including upland sandpiper) potentially impacted by the Facility. Additional discussion on the measures undertaken by the Applicant to avoid, minimize, and mitigate for such impacts is provided below in Exhibit 22(g).

Sedge Wren

Based a query of NYSDEC's New York Nature Explorer database, sedge wren (threatened) has the potential to occur within the Facility Site. However, this species was not identified in BBA records or during on-site surveys. Sedge wrens are found in moist meadows with scattered low bushes, grass and sedge bogs as well as coastal brackish marshes. They are known to breed in habitats with dispersed small shrubs

and little to no standing water, building nests in dense, tall grass and sedge clumps, 2 to 12 inches above the ground.

Ecological communities associated with the sedge wren include inland salt marsh, dwarf shrub bog, shallow emergent marsh and successional old field. In New York State, the sedge wren occurs on the Great Lakes and St. Lawrence plains (NYNHP 2015). While the Facility Site contains areas of early successional grassland and abandoned old field, very few of these areas contain vegetation and hydrological characteristics to be suitable sedge wren habitat. Combined with the lack of on-site observations and BBA records, impacts to the sedge wren are not anticipated from construction and operation of the Facility.

State Species of Concern

Four state species of special concern were documented during pre-construction surveys within the Facility Site (Cooper's hawk, sharp-shinned hawk, horned lark, and grasshopper sparrow). Cooper's hawk and sharp-shinned hawk are both species that preferentially utilize forests and forest edges for breeding and hunting. As discussed in Section (a)(1) of this Exhibit, approximately 453 acres (19%) of the Facility Site is comprised of forested land. Of this total, 18.4 acres (4%) of forest will be cleared for Facility construction. In addition, the existing landscape of the Facility Site is dominated by agricultural land, and contains only a patchwork of highly fragmented forested habitat. Therefore, forest fragmentation or displacement impacts to forest bird species, including the Cooper's Hawk and sharp-shinned hawk, are not anticipated.

With respect to the horned lark and grasshopper sparrow, both species utilize early successional grassland habitat such as hay fields, pasture land, and abandoned fields for breeding and foraging habitat. As discussed in Section (f)(3) of this Exhibit, construction and operation of the Facility may result in fragmentation and displacement impacts to certain grassland bird species including northern harrier and short-eared owl. However, unlike such grassland raptor species which fly over fields to hunt for small mammals among the vegetation, both the horned lark and grasshopper sparrow forage low in the vegetation for seeds and invertebrates. Consequently, it is anticipated that these species will be able to access the maintained early successional communities underneath and around the PV panel arrays for foraging and possibly breeding activity. In addition, both the horned lark and grasshopper sparrow are much smaller birds than raptors species, and would not be subject to the same physical limitations of reaching areas underneath the PV panel arrays.

It should also be noted that the Facility's NCBP (Appendix 22-F) includes the establishment of up to 151 acres of grassland habitat to provide a net conservation benefit for New York State-listed (threatened and

endangered) avian grassland species anticipated to be impacted by the Facility. These grassland areas will be managed for up to 30 years following Facility construction. It is anticipated that both the horned lark and grasshopper sparrow will utilize and benefit from the habitat established in these grassland mitigation areas. Additional information on the NCBP is provided in Exhibit 22(g)(3) below.

(iii) Impacts to Special Status Mammals

Special status bat species that may occur in the Facility Site based on their known range and consultation with the NYNHP and USFWS include the state- and federally-threatened northern long-eared bat (*Myotis septentrionalis;* NLEB), and eastern small-footed bat (*Myotis leibii*), which is listed as a state species of special concern. These species hibernate during winter and can be found in forested areas throughout the northeast during spring, summer, and fall. Forested habitats within the Facility Site could provide foraging habitat for NLEB and eastern small-footed bat (and roosting habitat for NLEB). Roosting habitat for the eastern small-footed bat (rocky outcrops and talus slopes) was not observed within the Facility Site. Potential impacts to these bat species could include loss of foraging habitat (and roosting habitat for NLEB) associated with tree removal, or direct mortality due to tree clearing.

To avoid potential impacts to northern long-eared bats, clearing of trees and shrubs greater than 3 inches diameter at breast height (dbh) is anticipated to be restricted to the period between November 1 and March 31, when the bats are hibernating off-site. If work is required outside this winter clearing period, the Applicant will follow the USFWS 4d rule and the NYSDEC guidance. No part of the Facility Site is within 0.25 mile of a NLEB hibernacula, or within 1.5 miles of a documented NLEB summer occurrence. In addition, no documented roost trees occur within the Facility Site. Consequently, snag and cavity trees will remain uncut unless their removal is necessary for protection of human life and property.

(iv) Impacts to Special Status Amphibians and Reptiles

No special status amphibian species were identified by NYNHP as occurring within the Facility Site. One New York State-listed threatened species, timber rattlesnake, is the only special status reptile species that may occur at the Facility site. In the Northeast, timber rattlesnakes inhabit deciduous and mixed-deciduous forests with rugged terrain, where rocky outcroppings, steep ledges, and rock slides occur (NYNHP, 2017b). The Facility Site does not contain habitat suitable for the timber rattlesnake, and impacts to this species are not anticipated.

Based on the New York State Amphibian and Reptile Atlas Project (NYS Herp Atlas) database, one special concern reptile species, wood turtle, could potentially occur in the Facility Site. This species was not observed incidentally during surveys conducted on-site for other resources (e.g. wetland/steam delineations). Wood turtles prefer slow-moving water with vegetated banks and soft bottoms and bask on fallen logs or rocks in the water. Many of the wetlands in the Facility Site are not ideal turtle habitat, either because they are too disturbed, too shaded, or lack areas with open water. However, some suitable habitat is present primarily in the wetlands with an open water component. If present, direct or indirect impacts to the wood turtle are not anticipated, because construction/operation activities will not occur along riparian areas with suitable habitat for this species. Please see Exhibit 23 Sections (b)(5) and (e)(2) for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms, respectively.

(v) Impacts to Special Status Invertebrates

No special status invertebrates, or habitat potentially supporting special status invertebrates were identified by NYNHP or any other source as occurring within the Facility Site. Therefore, no impacts to special status invertebrate species are anticipated as a result of Facility construction or operation. See Exhibit 23 Sections (b)(5) and (e)(2) for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms.

(vi) Impacts to Species of Greatest Conservation Need

Seven avian species (bobolink, eastern meadowlark, brown thrasher, American kestrel, American woodcock, wood thrush, and blue-winged warbler) with SGCN-HP or SGCN status (but not state-listed) were observed during on-site surveys. With the exception of wood thrush, these species utilize early successional grassland and successional shrubland habitats. Although Facility construction and operation could have an adverse impact through habitat displacement and fragmentation on individuals of these species, suitable habitat is abundant within, and adjacent to the Facility Site, and will be available during and after construction. It should also be noted that the Facility's NCBP (Appendix 22-F) includes the establishment of up to 151 acres of managed grassland habitat to provide a net conservation benefit for New York State-listed (threatened and endangered) avian grassland species potentially adversely impacted by the Facility. These grassland areas will be managed for up to 30 years following Facility construction. It is anticipated that species including bobolink, eastern meadowlark, and American Kestrel will utilize and benefit from the habitat established in these grassland mitigation areas. Additional information on the NCBP is provided in Exhibit 22(g)(3) below.

Impacts to wood thrush are unlikely to occur during construction, as these are forest species and tree clearing will primarily be conducted during winter when these species have migrated south. None of these seven species are listed as threatened, endangered, or of special concern, and all have population numbers statewide that are more stable than species listed under one of these protection statuses. Therefore, it is not anticipated that Facility construction or operation will have a significant effect on regional, statewide or range-wide populations of these species.

Silver-haired bat, eastern red bat, hoary bat, little brown bat, and eastern pipistrelle are five species of mammals with SGCN or SGCN-HP status that are likely to occur within the vicinity of the Facility Site. Direct mortality due to Facility construction is expected to be unlikely. The Facility Site does not contain large patches of undisturbed forest, and tree clearing will take place between November 1 and March 31 to the extent possible, which is outside of the breeding and activity periods for these species. Operational impacts from the Facility on these species are not anticipated. These species are not listed as threatened, endangered, or of special concern, and have population numbers statewide that are more stable than species listed under one of these protection statuses. Therefore, it is not anticipated that Facility construction or operation will have a significant effect on statewide or range-wide populations.

Table 22-5. Summary of Temporary and Permanent Impacts for New York State Special Status Species that Have the Potential to Occur Within the Facility Site

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality
State Endangered Species							
Peregrine Falcon *Falco peregrinus*	none	none	none	none	none	none	unlikely
Short-eared owl* *Asio flammeus*	potential	potential	none	potential	potential	potential	unlikely
State Threatened Species							
Northern Long-Eared Bat *Myotis septentrionalis*	none	none	none	unlikely	unlikely	none	unlikely
Northern Harrier* *Circus hudsonius*	potential	potential	none	potential	potential	potential	unlikely
Henslow's Sparrow *Ammodramus henslowii*	none	none	none	none	none	none	unlikely
Bald Eagle* *Haliaeetus leucocephalus*	none	none	none	none	none	none	unlikely
Pied-billed Grebe* *Podilymbus podiceps*	none	none	none	none	none	none	unlikely
Upland Sandpiper* *Bartramia longicauda*	potential	potential	none	potential	potential	potential	unlikely
State Species of Species Concern							
Horned Lark* *Eremophila alpestris*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Grasshopper Sparrow* *Ammodramus savannarum*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Wood Turtle *Glyptemys insculpta*	none	none	none	none	none	none	unlikely
Snapping Turtle *Chelydra serpentine*	none	none	none	none	none	none	unlikely

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality
Red-shouldered Hawk *Buteo lineatus*	none	unlikely	none	none	none	none	unlikely
Eastern Small-footed *Myotis Myotis leibii*	none	none	none	unlikely	unlikely	none	unlikely
Cooper's Hawk* *Accipiter cooperii*	none	unlikely	none	none	none	none	unlikely
Northern Goshawk *Accipiter gentilis*	none	none	none	none	none	none	unlikely
Sharp-shinned Hawk* *Accipiter striatus*	none	unlikely	none	none	none	none	unlikely
Vesper Sparrow *Pooecetes gramineus*	none	none	none	none	none	none	unlikely
High Priority Species of Greatest Conservation Need							
Bobolink* *Dolichonyx oryzivorus*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Eastern Meadowlark* *Sturnella magna*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Rusty Blackbird *Euphagus carolinus*	none	none	none	none	none	none	unlikely
Brown Thrasher* *Toxostoma rufum*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Species of Greatest Conservation Need							
American Kestrel* *Falco sparverius*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Ruffed Grouse *Bonasa umbellus*	none	none	none	none	none	none	unlikely
Wood Thrush* *Hylocichla mustelina*	unlikely	unlikely	none	none	none	none	unlikely
Scarlet Tanager *Piranga olivacea*	unlikely	unlikely	none	none	none	none	unlikely

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality
Black-throated Blue Warbler *Setophaga caerulescens*	none	none	none	none	none	none	unlikely
Louisiana Waterthrush *Parkesia motacilla*	none	none	none	none	none	none	unlikely
Black-billed Cuckoo *Coccyzus erthropthalmus*	none	none	none	none	none	none	unlikely
Greater Yellowlegs* *Tringa melanoleuca*	none	none	none	none	none	none	unlikely
Sedge Wren *Cistothorus platensis*	none	none	none	none	none	none	unlikely
American Woodcock* *Scolopax minor*	potential	potential	none	unlikely	unlikely	unlikely	unlikely
Blue-winged Warbler* *Vermivora cyanoptera*	potential	potential	none	unlikely	unlikely	unlikely	unlikely

* Indicates that the species was observed on-site

(7) Cumulative Impacts to Wildlife Species

As discussed in Sections (f)(2) and (f)(3) above, the primary impact to wildlife associated with the Facility is anticipated to be the displacement and fragmentation of grassland and other early successional habitat due to the construction and operation of the Facility in agricultural and successional old fields. It is anticipated that many wildlife species including invertebrates, small mammals, reptiles and amphibians, and some bird species will successfully utilize the early successional habitats maintained underneath the PV panel arrays. Other species that utilize these habitats for foraging and breeding may be displaced from these areas due to foraging and breeding habitat requirements. However, such habitat is abundant on the landscape at the regional level.

In order to assess potential cumulative impacts on wildlife habitat resulting from the Facility, the Applicant conducted research on other proposed and operating PV solar projects "nearby" the Facility. For the purposes of this analysis, "nearby" is defined as all operating or proposed solar energy project that are located within 100 miles of the Facility, including those in other counties, states or provinces. This analysis included solar projects for which a PSS has been submitted to NYSDPS, posted on the docket, or a case number assigned under Article 10 of the Public Service Law (PSL). This also included solar projects that have completed or are currently undergoing the State Environmental Quality Review (SEQR) process, for which there is a publicly available Draft Environmental Impact Statement (DEIS) or Final Environmental Impact Statement (FEIS) document, as of the date of the submission of this Application.

The 100-mile search area utilized for this analysis completely encompasses the Mohawk River Valley Grassland Focus Area (MRVGFA), which is one of eight such Grassland Focus Areas in New York State established by NYSDEC through the Grassland Landowner Incentive Program (LIP). The MRVGFA is considered as a part of this cumulative impacts analysis. The goal of the LIP is to encourage private landowner participation in habitat management and protection by providing technical advice and financial incentives for the protection of at-risk wildlife and habitats; specifically grassland birds and their habitat (NYSDEC, 2013). Each grassland focus area was delineated using data from the 2000-2004 BBA. The general approach was to include all BBA blocks with high richness or breeding grassland birds, as well as contiguous blocks also supporting grassland species. The focus area boundaries were smoothed in an inclusive manner, such that some areas of low grassland bird richness were included in the focus areas (Morgan and Burger, 2008). The MRVGFA includes portions of Onondaga, Madison, Oneida, Herkimer, Schoharie, Montgomery, and Otsego Counties. The MRVGFA encapsulates the western half of Montgomery County, and includes the Facility Site.

Based on the above-described criteria, the Applicant identified five proposed PV solar projects nearby the Facility, totaling approximately 330 MW of generating capacity. No projects that have completed or are currently undergoing the SEQR process, for which there is a publicly available DEIS or FEIS document were identified within 100 miles of the Facility. A summary of identified nearby PV solar projects is included in Table 22-6.

Table 22-6. Potential Habitat Impacts Resulting from PV Solar Projects Identified Nearby the Facility

Project Name	Proposed Generating Capacity (MW)	State Permitting Process	Current Permitting Phase	Town	County	Distance to Mohawk Solar (miles)	Within MRVGFA (Yes/No)	Approximate PV Panel Area[1]	Agricultural Land within PV Panel Array Footprint (Acres)	Successional Old Field within PV Panel Array Footprint (Acres)	Forestland within PV Panel Array Footprint (Acres)	Successional Shrubland within PV Panel Array Footprint (Acres)
Coeymans Solar	40	Article 10	Stipulations	Town of Coeymans	Albany	47	No	238	194.91	-	36.7	1.57
Greene County Solar	50	Article 10	Stipulations	Town of Coxsackie	Greene	55	No	395	373.1	1.2	6.4	9
East Point Energy Center	50	Article 10	Stipulations	Town of Sharon	Schoharie	6	Yes	350	215.8[2]	21.8[2]	103[2]	-
High River Energy Center	90	Article 10	Stipulations	Town of Florida	Montgomery	23	No	550	412.5[2]	4.4[2]	93.5[2]	22[2]
Flint Mine Solar	100	Article 10	Stipulations	Town of Coxsackie Town of Athens	Greene	55	No	600	96[2]	132[2]	234[2]	72[2]
							Total	**2,133**	**1,292.3**	**159.4**	**473.6**	**104.6**

[1] As identified in the PSS for each respective project.
[2] Values extrapolated based on land cover data provided for larger project area.

The identified nearby projects are currently under development and seeking a Certificate of Environmental Compatibility and Public Need under Article 10 of the PSL. Of the identified projects, three have a generating capacity of between 25 and 50 MW, and two projects have a generating capacity of greater than 50 MW. In addition, one project (East Point Energy Center) is located within the MRVGFA. Publicly available documents for each of these projects were reviewed to determine the anticipated size (area of PV panel arrays) and the anticipated quantity of grassland habitat that may be impacted by the development of each respective project. The PSS for each of the identified Article 10 projects includes information on the anticipated area of PV panel arrays. In addition, two of the projects (Greene County Solar and Coeymans Solar) include an analysis of the ecological communities within the proposed PV panel arrays. Three of the Article 10 projects (Flint Mine Solar, High River Energy Center, East Point Energy Center) do not include an analysis of the ecological communities within the proposed PV panel arrays, but instead provide an analysis of the ecological communities within a larger project site that will host the project. For these projects, the ecological communities likely to be impacted by PV panels arrays were extrapolated based on the proportional area of ecological communities within the larger project site. It should be noted that these extrapolations do not therefore take into account avoidance and minimization (e.g. avoidance of forest clearing) that may be employed when siting PV panel arrays within the larger project site. The results of this analysis are included in Table 22-6.

With regard to the potential for the identified nearby projects to impact grassland habitat, there is not currently enough public information to determine in a consistent manor the quality and extent of grassland habitat within each respective project site. For example, agricultural land is the largest ecological community by area within the PV panel arrays for four out of the five nearby projects. However, agricultural fields used for hay and pasture generally provide some habitat value for grassland species, while fields continuously used for row crops such as corn and soybeans do not generally provide a high degree of habitat value. Despite this, for the purpose of this analysis, it was assumed that all agricultural land potentially impacted by the nearby projects represents potential grassland habitat. In addition, successional old field was also assumed to represent potential grassland habitat.

As shown in Table 22-6, assuming the identified nearby projects are constructed, approximately 1,452 acres of potential grassland habitat (agricultural land and successional old field) would be disturbed by PV panel arrays. Of this total, approximately 238 acres of potential grassland habitat disturbance would occur within the MRVGFA. When the potential disturbance to these habitats from the proposed Facility is included, the total potential grassland habitat disturbance is approximately 2,050 acres, with 836 acres occurring within the MRVGFA.

In order to compare the potential cumulative grassland habitat impact resulting from the Facility and nearby projects to the extent of available grassland habitat nearby the Facility, NLCD data from within 100 miles of the Facility were examined. The following NLCD land cover classes were considered as potential grassland habitat: Pasture/Hay, Cultivated Crops, Grassland/Herbaceous, and Emergent Herbaceous Wetlands. The results of this analysis are provided in Table 22-7.

Table 22-7. Land Cover within 100 miles of the Facility[1]

Land Cover Class	Acres	Percent Cover
Deciduous Forest	7,117,135	41.1
Pasture/Hay[2]	2,106,210	12.2
Evergreen Forest	1,993,650	11.5
Mixed Forest	1,572,466	9.1
Woody Wetlands	1,001,330	5.8
Cultivated Crops[2]	958,067	5.5
Developed, Open Space	632,624	3.7
Open Water	631,544	3.6
Shrub Scrub	573,146	3.3
Developed, Low Intensity	272,870	1.6
Grassland/Herbaceous[2]	142,174	0.8
Emergent Herbaceous Wetlands[2]	125,898	0.7
Developed, Medium Intensity	121,673	0.7
Developed, High Intensity	44,770	0.3
Barren Land	29,293	0.2
Total	**17,322,851**	**100.0**

[1] Source: NLCD 2011
[2] Identified as potential grassland habitat

Based on NLCD data, approximately 3,332,349 acres of potential grassland habitat occurs nearby the Facility. The 2,050 acres of potential cumulative grassland habitat disturbance resulting from the Facility and potential nearby projects represents 0.06% of this total. Given this, it is not anticipated that potential cumulative grassland habitat impacts such as loss and displacement resulting from the Facility and other nearby projects will be significant. As discussed in Exhibit 22(f)(3)(ii), the placement of components such as PV panel arrays in fields of grassland habitat may result in habitat fragmentation impacts. Such impacts may extend beyond the footprint of the components themselves (e.g. to the edge of a given field in which components are placed). However, given the extremely small extent of potential cumulative loss or displacement to grassland habitat nearby the Facility (0.06%), it is not anticipated that cumulative habitat fragmentation impacts will be significant.

With respect to the MRVGFA, the total size of the focus area is approximately 1,059,291 acres. As discussed above, approximately 836 acres of potential cumulative grassland habitat disturbance is anticipated to occur within the MRVGFA due to the Facility and nearby projects. This represents 0.08% of the total area within the MRVGFA, and potential cumulative grassland habitat loss, displacement, or fragmentation impacts within the MRVGFA are not anticipated to be significant.

(g) Measures to Avoid or Mitigate Impacts to Vegetation, Wildlife and Wildlife Habitats

(1) Plant Communities

With respect to measures to avoid or mitigate impacts to plant communities (including vegetation), please see Exhibit 22(c).

(2) Wildlife and Wildlife Habitat

Minimization of impacts related to construction and operation of the Facility were accomplished through careful site design (e.g., utilizing existing roads, avoiding sensitive habitat, and minimizing disturbance to the extent practicable), adherence to designated construction limits, and avoidance of wetlands.

Minimization of impacts related to habitat loss and fragmentation was accomplished through careful site design. Facility access roads and collection lines have been sited along existing farm roads and the edges of agricultural fields where practicable to minimize impacts to, and fragmentation of, wildlife habitat. Cleared forest land along Facility access roads and at the periphery of some PV panel arrays will be allowed to regenerate in areas that are not required for Facility maintenance, which will provide habitat for early successional species over the short term and will eventually support forest species in the long term.

(3) Special Status Species

Construction and operation of the Facility may result in habitat take (adverse modification) to three state-listed species; northern harrier, short-eared owl, and upland sandpiper. Consequently, the Applicant as developed a NCBP (Appendix 22-F) to offset these impacts and provide a net conservation benefit to these species.

The Applicant has consulted extensively with NYSDEC staff in developing the NCBP. This includes the process of identifying areas of habitat occupied by state-listed species, quantifying areas of occupied habitat that will be impacted (habitat take), and determining a mitigation strategy that will provide a net conservation benefit for these species. Sections 2.2 and 2.3 of NCBP provide a detailed description of NYSDEC consultation, as well as the

methods used to determine occupied habitat and habitat take. The NCBP is included as Appendix 22-F to this Application.

Within the Facility Site, a combined total of 551 acres of habitat was identifying as occupied by norther harrier, short-eared owl, and upland sandpiper. Of this, it is anticipated that 346 acres will be likely impacted as habitat take by the placement of Facility components such as PV panel arrays and access roads in these areas. Habitat take will potentially occur as the result of both the disturbance associated with the Facility components themselves, and from the local fragmentation of the fields in which Facility components are sited.

In order to mitigate for the habitat impacts to northern harrier, short-eared owl, and upland sandpiper, and to provide a net conservation benefit to these species, the Applicant has identified several potential mitigation areas where suitable grassland habitat will be protected and maintained to achieve a net conservation benefit. In addition, the Applicant may pursue other mitigation measures to supplement these efforts.

In order to determine the area necessary for inclusion in the mitigation program, a methodology presented by NYSDEC staff on March 21, 2019 was utilized. This methodology included the use of mitigation to impact ratios of 1:1 for short-eared owl wintering habitat (which overlaps the area in which upland sandpiper was identified) and 3:1 for northern harrier breeding habitat, which results in a total of 604 acres of equivalent habitat that needs to be mitigated for.

In addition, NYSDEC staff indicated that the total mitigation acreage can be divided by the number of successional "lifecycles" that could be attained during the assumed life of the Facility (30 years). As defined by the NYSDEC during the March 21, 2019 meeting, these successional "lifecycles" represent 6-year periods during which grassland habitat is considered suitable for use by the listed avian species. At the end of a 6-year period that includes initial vegetation management and additional vegetation management 3-5 years later, a given patch of grassland habitat typically begins to transition to successional old field and/or shrubland due to gradual woody vegetation encroachment that occurs over time. In order to "reset" a habitat patch and initiate another 6-year successional "lifecycle", vegetation management is needed to restore the area to grassland conditions.

By implementing multiple cycles of habitat creation and management, a net conservation benefit can be achieved over time. In the case of the proposed Facility, up to five 6-year "lifecycles" could occur (the first does not count toward the net conservation benefit) during the life of the Facility. In other words, the total mitigation acreage needed to offset Facility-related impacts can be achieved by protecting and managing a smaller area or subset of land, but for the life of the Facility. By managing these areas at appropriate intervals (i.e., successional "lifecycles"),

a net conservation benefit can be realized over time. Based on these assumptions, the recommended mitigation to impact ratios were applied to calculate a total mitigation acreage of 151 acres needed over the 30-year Facility lifespan. Additional details on this methodology are provided in NCBP (Appendix 22-F).

Mitigation of impacts to occupied habitat for listed grassland bird species can typically be accomplished by establishing a long-term land use preservation agreement and implementing a management regime that maintains the mitigation areas as suitable grassland habitat for winter foraging and/or breeding season activities. Therefore, to fully mitigate for take of 346 acres of occupied habitat, the Applicant proposes the preservation and management at least 151 acres total acres of suitable grassland habitat over the life of the Facility (assumed to be 30 years). All of the proposed mitigation areas are located on lands within the Facility Site. It is anticipated that mitigation-specific leases will be developed between the Applicant and the corresponding landowners. These leases will include provisions for allowable and restricted uses within the mitigation areas, as well as the duration of the mitigation program. Additional details on the identification and suitability of proposed habitat mitigation areas are provided in the NCBP (Appendix 22-F).

Based on these NYSDEC recommendations regarding appropriate land management practices and additional discussions with NYSDEC staff about the specific habitat requirements of the listed species, the Applicant proposes a mitigation area management regime that will include the following steps for the first 6-year successional "lifecycle": (1) a baseline assessment of existing conditions at the mitigation areas in 2020; (2) preliminary mowing and other necessary vegetation management for at least 151 acres of existing field/shrubland areas in late summer 2021 to create/retain grassland habitat conditions; (3) prohibition of mechanized disturbance within these managed areas during the wintering and nesting seasons; and (4) additional maintenance mowing of specific portions of the mitigation areas in the late summer 3-5 years after preliminary mowing (i.e., in summer 2024, 2025, and/or 2026) to maintain and enhance grassland habitat during the first 6-year successional "lifecycle". Additional details on proposed management practices at the habitat mitigation areas are provided in the NCBP (Appendix 22-F).

The Applicant will also implement a mitigation monitoring program, which includes: (1) functional objectives for mitigation and corresponding measurement methods; (2) performance standards that will be used to evaluate mitigation success for each measurement method; and (3) monitoring and reporting activities, including corrective actions that will be taken if performance standards are not met. Before any management activities are initiated at a habitat mitigation area, a baseline assessment will be performed to evaluate habitat conditions and possible use by the target species. The data collected during this baseline assessment will allow for future comparison of field conditions, vegetation characteristics, and avian use once management and monitoring activities have begun. Following the baseline assessment, annual mitigation monitoring will be performed for five years to ensure that

the mitigation areas are providing suitable habitat conditions that match the goals discussed previously. Annual monitoring will include an assessment of habitat conditions, photographic documentation of the area, surveys for the target species, and preparation of a monitoring report. Additional details on the proposed monitoring program at the habitat mitigation areas are provided in the NCBP (Appendix 22-F).

It should be noted that while the NCBP and associated grassland habitat mitigation program is designed to provide a net conservation benefit to the northern harrier, short-eared owl, and upland sandpiper, it is anticipated that other grassland species will befit from the establishment of habitat mitigation areas. This includes SSC such as grasshopper sparrow, horned lark, and vesper sparrow, and SGCN such as bobolink, eastern meadowlark, and American kestrel.

(h) Avian and Bat Impacts from Wind-powered Facilities

The requirements of 1001.22(h) are specifically intended for wind power facilities. The Applicant is proposing a solar powered facility, therefore, the requirements set forth in 1001.22(h) do not apply.

(i) Map Showing Delineated Wetland Boundaries

(i) Wetland Boundaries and Mapping

Wetland delineations at the Facility Site were conducted through on-site field investigations out to 500 feet from the area to be disturbed by the construction of the Facility (Study Area). Delineations were conducted per the three-parameter methodology described in the U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual, and the appropriate Regional Supplement to the Corps of Engineers Wetland Delineation Manual. Additionally, freshwater wetlands regulated under Article 24 of the New York Environmental Conservation Law (ECL) were determined according to methods described in the NYSDEC Freshwater Wetlands Delineation Manual (1995).

All wetland boundaries were defined in the field by sequentially numbered pink surveyor's flagging marked and locations were recorded using GPS technology with reported sub-meter accuracy. Wetlands were mapped accordingly and are shown on Figure 22-2 and within the Wetland Delineation Report (Appendix 22-G).

As documented in Appendix 22-G, EDR delineated 63 wetlands within the Study Area, totaling approximately 165.1 acres. In addition, EDR delineated 16 streams, totaling approximately 21,518 linear feet (4.07 miles). See Table 4 of the Wetland Delineation Report for additional information. Please note that in most cases delineated wetlands and streams extend beyond the boundaries of the delineated study area and are thus larger than the acreage documented.

Locations of field delineated wetlands resources beyond the Study Area are included in Figure 22-2. As described below and in the Appendix 22-G, wetlands and streams were categorized as one or more of the following community types: emergent wetland (PEM), scrub-shrub wetland (PSS), forested wetland (PFO), water (POW), riverine upper perennial (R3), riverine intermittent (R4) and riverine ephemeral (R6). Many wetlands identified contained more than one community type, and in many cases a delineated area included both wetlands and streams.

(ii) Jurisdictional Determination

A site visit with NYSDEC Region 4 Biologist Georgette Walters was conducted on November 6, 2018 to review delineated wetland and stream boundaries and determine the extent of state jurisdiction pursuant to Article 15 and Article 24 of the ECL. During the site visit, it was requested that additional data be collected and evaluated at two locations. The first was an active hay field south of Dygert Road, and the second was adjacent to previously delineated Wetland R in a hayfield south of Marshville Road. Based on the data collected at these locations, it was determined that wetland conditions were not present at first location. At the second location, wetland conditions were observed, and the boundary of Wetland R has been revised to incorporate the additional wetland area. Data forms collected at these locations are included in Appendix B of the Wetland Delineation Report. Based on the on-site jurisdictional determination and consultation, NYSDEC subsequently issued their Freshwater Wetlands Determination, which identifies NYSDEC jurisdiction of 11 wetlands (see Appendix 22-H). The NYSDEC jurisdictional wetlands are shown in Figure 22-2. In addition, on May 2, 2019, NYSDEC provided a letter stating that there are no delineated resources subject to Article 15 jurisdiction within the Study Area (see Appendix 22-H).

The Applicant has provided a draft copy of the Wetland Delineation Report and delineated wetland boundaries to the U.S. Army Corps of Engineers in order to schedule a Jurisdiction Determination (JD) site visit.

(iii) NYSDEC-Regulated Wetlands and Streams

Review of NYSDEC Freshwater Wetlands mapping indicates that there is one Class 1 and one Class II state-regulated wetland that overlap the Study Area. The majority of wetland C-18 (Class I) is located between County Road 80 and Fredericks Street, and 66.9 acres of the 217.3-acre wetland are located within the Study Area. Work at wetland C-18 includes the installation of collection lines and access roads. Wetland SS-1 (Class II) is located between County Road 86 and County Road 85, and 30.1 acres of the 55.0-acre wetland is located within the Study Area.

As discussed in Exhibit 22(h)(ii) the Freshwater Jurisdictional Determination issued by NYSDEC for the Facility identified 11 delineated wetlands that will fall under NYSDEC jurisdiction. The NYSDEC jurisdictional delineated wetlands are shown in Figure 22-2.

NYSDEC stream mapping indicates that portions of five streams occur within the Study Area. All of these streams have a state classification of C. The best use of Class C waters is fishing, and these waters are expected to maintain water quality suitable for fish, shellfish, and wildlife propagation and survival. See Exhibit 23 for additional information. On May 2, 2019, NYSDEC provided a letter stating that there are no delineated resources subject to Article 15 jurisdiction within the Study Area (see Appendix 22-H).

(iv) Mapping and Preliminary Design Drawings

All wetlands and streams are presented within the maps located in Appendix A of the Wetland Delineation Report. Additionally, these wetland and stream resources are shown on the Preliminary Design Drawings included with Exhibit 11.

(j) Description of Wetlands

During on-site delineations of wetlands and streams, data were collected from one or more sample plots at delineated wetlands (depending on the size and diversity of ecological communities of the delineated area), and recorded on U.S. Army Corps of Engineers (USACE) Routine Wetland Determination forms, which are included in the Wetland Delineation Report for the Mohawk Solar Project (Appendix 22-G). Data collected for each of the wetlands included dominant vegetation, hydrology indicators, and soil characteristics. Data collected for streams included information on channel width (mean high water mark), water depth, substrate material, bank condition and gradient. Additional detail on wetland delineation and data collection methods is described in the Wetland Delineation Report. Also included in the Wetland Delineation Report is a table of all of the wetlands delineated within the Delineation Study Area, which indicates wetland acreage within the Delineation Study Area, wetland community type, and whether they are expected to fall under State or federal jurisdiction (or both). Descriptions of vegetation, soils, and hydrology within each wetland community type identified within the Delineation Study Area are presented below.

Forested wetland (PFO) – Of the delineated wetlands within the Study Area, seven contained forested wetland communities totaling of 42.4 acres. These communities are dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbaceous species. Forest wetlands in the Study Area are dominated by American elm in the overstory, along with green ash, and occasionally red maple. Understory vegetation includes saplings of the above-mentioned species and occasionally shrub species such as silky dogwood and Morrow's honeysuckle. Herbaceous species in the forested wetlands include sedges (*Carex* spp.), sensitive fern, reed canary grass, and

common rush. Evidence of wetland hydrology observed in these wetlands at the time of delineation include surface water, high water table, soil saturation, drainage patterns, and microtopographic relief (See Photos 1 to 4 in Appendix C of the Wetland Delineation Report).

Scrub-shrub wetlands (PSS) – Nine wetland features delineated within the Study Area contained scrub-shrub vegetation totaling 48.3 acres. Scrub-shrub wetlands are characterized by dense stands of shrub species and small trees less than 20 feet tall. Plant species typically encountered in the scrub-shrub wetlands delineated within the Study Area include willows (*Salix* spp.), honeysuckle species (*Lonicera* spp.), silky dogwood, and gray dogwood (*Cornus racemosa*). Herbaceous vegetation in these areas include spotted joe pye weed (*Eutrochium maculatum),* common boneset (*Eupatorium perfoliatum*), various sedges, and sensitive fern. Evidence of wetland hydrology observed in scrub-shrub wetlands at the time of delineation consisted of indicators such as surface water, high water table, soil saturation, and geomorphic position. Hydric soil indicators included soils with a dark surface (10YR 3/1) and prominent redox concentrations (7.5YR 5/6). (see Photos 5 to 8 in Appendix C of the Wetland Delineation Report).

Emergent wetlands (PEM) – This community type characterizes the majority of the wetlands found within the Study Area. A total of 47 delineated areas contained emergent wetland communities totaling 45.0 acres site wide. These wetland areas are dominated by herbaceous vegetation including common rush, goldenrod species (*Solidago* spp.), reed canary grass, sensitive fern, and numerous sedge species. Evidence of wetland soils included low chroma matrix with dark brown to black colors (10YR 2/2) and high chroma mottles (7.5YR 5/6) throughout the matrices with prominent redox concentrations. Wetland hydrology indicators found within these areas at the time of delineation included standing surface water, high water table, soil saturation, drainage patterns, and geomorphic position (see Photos 9 to 12 in Appendix C of the Wetland Delineation Report).

Open Water (OW) – 9 open water areas were delineated in the Study Area totaling 3.6 acres. Most of these open water features were either small farm ponds or man-made impoundments typically found in farm settings, adjacent to houses and barns or within wetlands. These ponds occurred in a variety of settings, including open fields, scrub-shrub, and forested environments, and typically have well-defined banks and a fringe of emergent wetland vegetation. Although not verified, water depths of such ponds are typically in excess of 3 feet deep (see Photos 13 and 14 in Appendix C of the Wetland Delineation Report).

Streams – A total of 16 streams were delineated within the Study Area. These streams are mostly located within agricultural fields and hedgerows, and generally have a gentle to moderate gradient (0-5%). The majority of the delineated streams appeared to be intermittent or ephemeral channels. Most of the streams are less than 5 feet wide with shrub/scrub and pasture buffers. The delineated stream channels are generally characterized by rocky substrate

and well-defined, abrupt steep banks, and flow during the wet season (winter to spring). Water depths within channels with stream flow averaged 2-5 inches (see Photos 14 to 18 Appendix C of the Wetland Delineation Report).

(k) Wetland Functional Assessment

A functions and values assessment was conducted following the general methodology described in the *Wetlands Functions and Values: Descriptive Approach* described in the September 1999 supplement to *The Highway Methodology Workbook* (Supplement) by the New England Division of the USACE (USACE, 1995)

Wetland functions are ecosystem properties that result from the biologic, geologic, hydrologic, chemical and/or physical processes that take place within a wetland. These functions include:

1. Groundwater Recharge/Discharge
2. Floodflow Alteration
3. Fish and Shellfish Habitat
4. Sediment/Pollutant Retention
5. Nutrient Removal/Retention/Transformation
6. Production (Nutrient) Export
7. Sediment/Shoreline Stabilization
8. Wildlife Habitat

Wetland values are the perceived benefits for society that can be derived from the ecosystem functions and/or other characteristics of a wetland. Values attributed to wetlands in the Supplement include the following:

1. Recreation
2. Education/Scientific Value
3. Uniqueness/Heritage
4. Visual Quality/Aesthetics
5. Threatened or Endangered Species Habitat

Based on the "Considerations/Qualifiers" outlined in the Supplement, EDR developed a spreadsheet that includes several basic considerations that help identify the primary functions and values provided by wetlands. These considerations include observed vegetation conditions, hydrologic conditions, size, adjacent area conditions, and the availability of public access. Specific conditions within each of these consideration areas were also defined to allow each wetland's functions and values to be evaluated based on data collected during field delineation. Wetlands

delineated within the Facility Site were entered into the spreadsheet and wetland characteristics were identified for each. Data regarding these wetland characteristics and associated functions and values were collected during the wetland delineations surveys conducted in October and November 2017. The spreadsheet containing results of the qualitative assessment is included in Appendix D of the Wetland Delineation Report (Appendix 22-G of this Application).

Due to the private ownership of all properties within the Study Area, none of the delineated wetlands provide any substantial social values such as recreation, education/scientific value, or visual/aesthetic value for the general public. Uniqueness/heritage value is usually applied to wetlands which provide a special value in the context of the overall landscape, contain cultural features, or represent a rare wetland or habitat type within the local area. None of the delineated wetlands within the Study Area were noted as having any unique or rare characteristics that might be considered for this value.

Habitat for known endangered or threatened species is generally not present within the delineated wetland features. However, potential summer roosting habitat for northern long-eared bat (*Myotis septentrionalis*) and potential foraging habitat for northern harrier may occur in some delineated wetlands. The Facility has been designed to avoid impacts to wetlands to the greatest extent possible, and the Facility will address any potential impacts to these species in subsequent permitting submittals.

(l) Offsite Wetlands Analysis

Analysis suggests that the majority of the delineated wetlands and all delineated streams are likely to be hydrologically connected to Waters of the US (WOUS) and considered to be jurisdictional by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. In addition, the Applicant has identified the approximate boundaries of wetlands and streams that extend beyond the Study Area or the Facility Site utilizing aerial imagery interpretation, 2-foot topographic contours, and field confirmation. These “Predicted Wetland” boundaries are shown on Figure 22-2. Based on the analysis of offsite wetlands, it is not anticipated that disturbances associated with construction and operation of the Facility will hydrologically or ecologically impact offsite wetland resources, including Significant Coastal Fish and Wildlife Areas, or public lands.

(m) Wetland Impacts

During construction, temporary and permanent direct or indirect impacts to wetlands and surface waters may occur as a result of the installation of access roads and buried electrical collection lines. Direct impacts, including clearing of vegetation, earthwork (excavating and grading activities), and the direct placement of fill in wetlands and surface waters, are typically associated with the development of access roads. The construction of access roads is anticipated

to result in permanent filling (loss of wetland/surface water acreage), permanent forest conversion (forested wetlands only), and temporary impacts to wetlands. The installation of buried collection lines will temporarily disturb streams and wetlands during construction as a result of clearing (brushhogging, or similar clearing method requiring no removal of rooted woody plants). In addition, soil disturbance and permanent forest conversion from burial of the electrical collection lines may occur. Indirect impacts to wetlands and surface waters may result from sedimentation and erosion caused by adjacent construction activities (e.g., removal of vegetation and soil disturbance). This indirect impact may occur at wetlands adjacent to work areas where no direct wetland impacts are anticipated, including areas adjacent to access roads, buried electrical collection routes, staging area(s), or the substations.

Based on the limits of disturbance as determined through preparation of the preliminary design drawings, construction of the Facility is anticipated to result in an impact to a total of 0.86 acres of wetland. Of this total, 0.63 acre will be a temporary impact, and 0.23 acre will be a permanent impact. Within areas of temporary impacts, along buried collection line corridors, 0.16 acre of permanent forested wetland conversion will occur.

Impacts to NYSDEC Jurisdictional wetlands will include 0.34 acre of temporary impacts and 0.18 acre of permanent impacts. Within areas of temporary impacts, along buried collection line corridors, 0.09 ace of permanent wetland forest conversion will occur. Impacts to NYSDEC Jurisdictional 100-foot Adjacent Area will include 4.22 acres of temporary impact and 1.93 acres of permanent impact.

All impacts are depicted on the Wetland and Stream Impact Drawings (Figure 22-3). Temporary and permanent impacts to each wetland are summarized below in Table 22-8. Table 22-8 also identifies the type of impact, measures that will be taken to reduce impact, and reasons the impact could not reasonably be avoided, for each wetland that will be impacted.

Table 22-8. Wetland Impacts

Wetland Delineation ID	Wetland Type[1]	NYSDEC Jurisdictional Wetland	Temporary Impact (acres)	Permanent Impact (acres)	Permanent Forest Conversion (acres)	Temporary Regulated 100-foot Adjacent Area Impact (acres)	Permanent Regulated 100-foot Adjacent Area Impact (acres)	Facilities Crossing Resource
Wetland 3A	PEM	No	0.000	-	-	-	-	AR
Wetland 3B	POW	No	0.000	-	-	-	-	BI
Wetland 3C	PEM	No	0.092	-	-	-	-	VM
Wetland 3D	PEM	No	0.008	-	-	-	-	BI
Wetland 3E	PEM	No	0.004	0.008	-	-	-	AR, BI
Wetland 3F	PEM	No	0.003	0.000	-	-	-	AR

Wetland Delineation ID	Wetland Type[1]	NYSDEC Jurisdictional Wetland	Temporary Impact (acres)	Permanent Impact (acres)	Permanent Forest Conversion (acres)	Temporary Regulated 100-foot Adjacent Area Impact (acres)	Permanent Regulated 100-foot Adjacent Area Impact (acres)	Facilities Crossing Resource
Wetland 3L	PSS	Yes	-	-	-	0.177	-	BI
Wetland 3O	PEM	No	0.006	0.015	-	-	-	AR, BI
Wetland BF-AA	PFO	No	0.033	-	0.033	-	-	BI
Wetland DD	PEM	Yes	-	-	-	0.415	0.244	AR,BI
Wetland EE	PEM	Yes	-	-	-	0.197	0.084	AR
Wetland GG	PEM	No	0.006	-	-	-	-	VM
Wetland H	PEM	Yes	-	-	-	0.002	-	PV
Wetland I	PEM	Yes	-	-	-	0.069	-	BI
Wetland K	PEM	No	0.031	-	-	-	-	BI
Wetland MM	PEM	No	0.001	-	-	-	-	BI
Wetland OO	PSS	Yes	0.010	0.020	-	0.591	0.836	AR, BI
Wetland OO	PFO	Yes	0.094	0.072	0.094	-	-	AR, BI
Wetland PP	POW	No	0.001	-		-	-	AR, BI
Wetland PP	PFO	No	0.035	0.018	0.035	-	-	AR, BI
Wetland QQ	PSS	No	0.012	0.007	-	-	-	AR
Wetland RR	PSS	No	0.047	-	-	-	-	AR
Wetland T	PSS	Yes	0.234	0.090	-	2.771	0.771	AR, BI
Wetland Y	PEM	Yes	-	-	-	0.001	-	BI
Wetland Z	PEM	No	0.011	-	-	-	-	BI
		Total	**0.63**	**0.23**	**0.16**	**4.22**	**1.93**	

[1] PEM = palustrine emergent marsh, PSS = palustrine scrub shrub, PFO = palustrine forested, POW = open water.
[2] BI = buried interconnect, AR = access road.

(n) Measures to Avoid/Mitigate Wetland Impacts

Avoidance and Minimization

In order to avoid wetland impacts to the greatest extent practicable, the Applicant conducted a field-based reconnaissance level investigation of wetlands and other resources within the preliminary Facility Area in November 2016. Wetland and stream resources within the Facility Site were preliminarily identified using aerial imagery interpretation and topographic contours, and subsequently confirmed during a site visit. The results of this survey were used to inform Facility design, and the revised Facility layout achieves this by locating PV panel arrays entirely outside of wetlands, routing access roads and collection lines around wetlands where practicable, and utilizing existing crossings. As a result, further changes were made to the Facility layout to minimize wetland impacts, reducing wetland

impacts to 0.86 acre, and permanent impacts to less than 0.25 acre. Where avoidance was not practicable due to practical constraints (topography or land ownership) or conflicts with other sensitive resources (such as sensitive archeological resources), narrow portions of the wetlands were chosen for crossing locations of collection lines and access roads.

As noted above, a number of changes were made to the Facility throughout the design process in order to avoid and minimize wetland impacts. For example, all PV panels arrays have been designed to completely avoid delineated wetlands. Access roads, substation boundaries and collection lines were shifted multiple times to avoid and minimize wetland impacts. In addition, jack and bore crossings will be utilized in 10 locations where buried collection lines cross wetlands or streams. The locations of these crossings are shown on Figure 22-3. See Exhibit 9(b) for further details regarding avoidance and minimization of wetlands through Facility design.

A number of site-specific actions are proposed that will minimize indirect impacts to wetlands that could not be avoided. Indirect impacts that could result from construction include siltation and degradation of downstream water quality. These impacts are not anticipated as a result of this Facility, because the Applicant will take appropriate measures to prevent these impacts, including implementing a SWPPP. Specific minimization measures for indirect impacts to wetlands include:

- *No Equipment Access Areas:* Except where crossed by permitted access roads or through use of temporary matting, wetlands 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 "Restricted Activities Area," will be established where Facility construction traverses 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;
    - No equipment washing or refueling within the area;
    - No storage of any petroleum or chemical material; and
    - No disposal of excess concrete or concrete washwater.

- *Sediment and Siltation Control*: A soil erosion and sedimentation control plan will be developed and implemented as part of the SPDES General Permit for the Facility. 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 are identified in the Facility's Preliminary 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.

Mitigation

Based on the Facility layout presented in this Application, a total of 0.23 acre of wetland will be lost as a result of Facility construction and operation, which will be offset through compensatory mitigation. Impacts to NYSDEC jurisdictional wetlands will result in 0.18 acre of permanent loss, and 0.09 acre of permanent forest conversion. In addition, impacts to NYSDEC jurisdictional 100 foot adjacent areas will result in 1.93 acres of loss. It is anticipated that impacts to NYSDEC jurisdictional resources will be mitigated through an on-site compensatory mitigation program implemented by the Applicant. The Applicant is currently in negotiations with one or more landowner to establish an appropriate wetland mitigation site. It is anticipated that the wetland mitigation site will be contiguous with an existing NYSDEC jurisdictional wetland, and will possess the necessary topographic, hydrological, and soils characteristics to allow for the successful establishment of a compensatory wetland area. Once a suitable is selected, a Wetland Mitigation Plan will be developed that will contain the following information:

1. A description of the wetland mitigation site, including information on soils, vegetation, topography, and proximity to NYSDEC-regulated wetlands.
2. Details on the proposed mitigation action, including the area of wetland creation, enhancement, or restoration, as well as vegetative cover types that will be established.
3. A preliminary site plan showing existing and proposed contours and vegetative plantings.
4. A wetland mitigation monitoring program to ensure the success of the mitigation action and establish corrective actions if required.

In addition, compensatory mitigation to offset impacts to federally regulated wetlands will be required as part of the federal wetland permitting process under the Nationwide Permit Program. To accomplish this, the Applicant will work with the USACE to determine appropriate mitigation measures, which could include on-site wetland enhancement or restoration, or the purchase of wetland mitigation credits under an In-Lieu Fee Program (ILFP) approved by the U.S. Army Corps of Engineers.

(o) State and Federal Endangered or Threatened Species

Please see the discussion of state and federal threatened and endangered species documented within or adjacent to the Facility Site, along with potential impacts to such species, in Exhibit 22(f). Measures to mitigate impacts specifically

to state-threatened and endangered species that are found within the Facility Site are discussed in Exhibit 22(g)(3); and further detailed in the NCBP (Appendix 22-F).

(p) Invasive Species Prevention and Management Plan

Please see Exhibit 22(b) above for a discussion of invasive species prevention and management. Additionally, an Invasive Species Control Plan (ISCP) is provided in Appendix 22-C.

(q) Agricultural Impacts

Based on NCLD cover types and a review of aerial imagery, there is a total of 1,703 acres of agricultural land within the Facility Site. According to the USDA National Agricultural Statistics Service (NASS) Cropland Data Layer (USDA, 2018), the top four dominant agricultural uses within the Facility Site include hay (approximately 62%), row crops (approximately 28%), pasture (approximately 5%), and trees (approximately 5%). Additionally, approximately 2,635 acres (99%) of the Facility Site are enrolled in a New York State Certified Agricultural District. Exhibit 4 of this Application includes a more detailed discussion of current agricultural use and productivity within the Facility Site, including information gained from interaction with the NYSDAM and local farmers, and information on any anticipated cumulative impacts of the Facility on agricultural land during the life of the Facility. A map of the Facility Site showing locations of prime farmland, prime farmland if drained, unique farmland, and farmland of state and local importance, is provided in Exhibit 21 (Figure 21-2).

Exhibit 4 of this Application includes a quantification and analysis of temporary and permanent impacts to agricultural land based on the proposed footprint of all Facility components and associated limits of disturbance during construction. The Facility is anticipated to remove agricultural land from production. Of the approximately 700 acres of total land use conversion to built facilities (see Exhibit 4, Table 4-4), approximately 75% (524 acres) is used as active agricultural lands while approximately 22% (155 acres) is currently vacant land. These areas will be restored to a state similar to preconstruction conditions after the life of the facility (see Exhibit 29 Site Restoration and Decommissioning).

A number of minimization and mitigation measures will be implemented to offset these impacts. See Exhibit 4(i) for a complete list of measures that will be implemented to minimize and mitigate impacts to agricultural land. The NYSDAM has promulgated a guidance document that applies to solar power projects sited on agricultural lands. The April 2018 *Guidelines for Agricultural Mitigation for Solar Power Projects* include construction requirements, restoration requirements, and post-construction monitoring and remediation requirements. To minimize and/or mitigate impacts to active agricultural land and farming operations, Facility construction will generally comply with NYSDAM agricultural protection guidelines to the maximum extent practicable. The Applicant will consult with NYS Department of Agriculture

and Markets (NYSDAM) and the Cornell Cooperative Extension during construction if deviation from the Guidelines is necessary.

Specific to agricultural land impacted by the Facility, the Applicant will provide a monitoring and remediation period of no less than two years immediately following the completion of initial restoration. The two-year period will allow for the effects of climatic cycles such as frost action, precipitation, and growing seasons to occur, from which various monitoring determinations can be made. The monitoring and remediation phase will be used to identify any remaining agricultural impacts associated with construction that need mitigation and to implement the follow-up restoration. General conditions to be monitored include topsoil thickness, relative content of rock and large stones, trench settling, crop production, drainage, and repair of severed fences. Impacts will be identified by the environmental monitor through on-site monitoring of all agricultural areas impacted by construction and through contact with respective farmland operators and NYSDAM.

Where Facility components are proposed in active agricultural fields, damage to drainage tile lines will be avoided by determining the location of any subsurface drainage tiles through consultation with the landowner and/or review of public records. Any drainage tiles damaged during construction will immediately be identified, documented, and repaired.

With respect to potential impacts to orchard and field crop pollination, the Applicant has not identified any orchards within the Facility Site, and impacts or orchard pollination are not anticipated. With respect to field crop pollination, the land directly under and adjacent to the PV panels will be maintained as early successional habitat which is expected to retain considerable habitat value for many wildlife species including pollinators and other invertebrates.

For an analysis of trends in farmland use, availability, productivity, price, and conversion within 5-miles of the Facility over the last 20 years, please see Exhibit 4(q) of this Application.

REFERENCES

Ailes, I.W. 1976. Ecology of the Upland Sandpiper in Central Wisconsin. MS thesis, Univ. of Wisconsin, Stevens Point, WI. 55p.

Bannerman, S. 1998. Extension Note 21. Biodiversityand Interior Habitats: The Need to Minimize Edge Effects. Part 6 of 7. British Columbia Ministry of Forests Forest Science Program. Available at: https://www.for.gov.bc.ca/hfd/pubs/docs/en/en21.pdf. Accessed March 2019.

Betts, M.G., J.C. Hagar, J.W. Rivers, J.D. Alexander, K. McGarigal, and B.C. McComb. 2010. *Thresholds in forest bird occurrence as a function of the amount of early-seral broadleaf forest at landscape scales*. Ecological Applications 20(8): 2116-2130.

Buler, J.J., F.R. Moore, and S. Woltmann. 2007. *A Multi-Scale Examination of Stopover Habitat Use by Birds.* Ecology 88(7): 1789-1802. Available at: https://aquila.usm.edu/fac_pubs/8501. Accessed April 2019.

Carter, J.W. 1992. Upland sandpiper. Pp. 235-252 in Schneider, K. J. and D. M. Pence (eds.) Migratory Nongame Birds of Management Concern in the Northeast. 1992 U.S. Fish and Wildlife Service, Newton Corner, MA. 400p.

DeVault, T.L., T.W. Seamans, J.A. Schmidt, J.L. Belant, B.F. Blackwell, N. Mooers, L.A. Tyson, and L. VanPelt. 2014. *Bird use of solar photovoltaic installations at US airports: Implications for aviation safety*. Landscape and Urban Planning 122: 122-128. doi: 10.1016/j.landurbplan.2013.11.017.

eBird. 2019. eBird: An online database of bird distribution and abundance. eBird, Ithaca, New York. Species Lists for the West Ames Road Horse Farm, Erie Canal Lock 15, and Erie Canal Lock 15 hotspots. Available at: https://ebird.org/hotspots. Accessed March 2019.

Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State*. Second Edition: A Revised and Expanded Edition of Carol Reschke's *Ecological Communities of New York State* (1990). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

Erickson, W.P., G.D. Johnson, and D.P. Young Jr. 2005. *A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions.* USDA Forest Service Gen. Tech. Rep. PSW-GTR-191. Available at: https://www.fs.fed.us/psw/publications/documents/psw_gtr191/psw_gtr191_1029-1042_erickson.pdf. Accessed April 2019.

Flather, C.H., and J.R. Sauer. 1996. *Using landscape ecology to test hypotheses about large-scale abundance patterns in migratory birds.* Ecology 77(1): 28-35.

Hallmann, C.A., R.P.B. Foppen, C.A. van Turnhout, H. deKroon, and E. Jongejans. 2014. *Declines in insectivorous birds are associated with high neonicotinoid concentrations*. Nature 511: 341-343.

Hawk Migration Association of America (HMANA). 2010. HawkCount Raptor Migration Database. Raptor Monitoring Data for the Fish Road Hawkwatch site. Available at: http://www.hawkcount.org/sitesel.php. Accessed March 2019.

Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. *Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information*. Photogrammetric Engineering and Remote Sensing 81(5): 345-354.

Horváth, G., G. Kriska, P. Malik, and B. Robertson. 2009. *Polarized light pollution: a new kind of ecological photopollution*. Frontiers in Ecology and the Environment. 7: 317-325. doi:10.1890/080129

Horváth, G., M. Blaho, A. Egri, G. Kriska, I. Seres, and B. Robertson. 2010. *Reducing the Maladaptive Attractiveness of Solar Panels to Polarotactic Insects.* Conservation Biology 24:1644-1653. doi:10.1111/j.1523-1739.2010.01518.x

Kagan, R.A., T.C. Viner, P.W. Trail, and E.O. Espinoza. 2014. *Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis.* National Fish and Wildlife Forensics Laboratory (NFWFL). Available at: https://alternativeenergy.procon.org/sourcefiles/avian-mortality-solar-energy-ivanpah-apr-2014.pdf. Accessed April 2019.

Klem, D., C.J. Farmer, N. Delacretaz, Y. Gelb, and P.G. Saenger. 2009. *Architectural and Landscape Risk Factors Associated with Bird–glass Collisions in an Urban Environment*. The Wilson Journal of Ornithology 121(1): 126-134.

Morgan, M. and M. Burger. 2008. A plan for conserving grassland birds in New York: A report to the New York State Department of Environmental Conservation under contract #C005137. Audubon New York, Ithaca, New York. Available at: http://ny.audubon.org/sites/g/files/amh406/f/conservation_plan_for_grassland_birds_in_ny.compressed.pdf Accessed April 2019.

National Audubon Society. 2017. *Christmas Bird Count (CBC) – Online Database.* Species Data for the Fort Plain CBC circle. Available at: http://netapp.audubon.org/cbcobservation/. Accessed March 2019.

New York Natural Heritage Program (NYNHP). Undated. *New York Natural Heritage Program (Overview).* Available at: http://www.dec.ny.gov/animals/29338.html. Accessed January 2019.

NYNHP. 2015a. Online Conservation Guide for *Haliaeetus leucocephalus*. Available from: http://acris.nynhp.org/guide.php?id=6811. Accessed April 2019.

NYNHP. 2015e. Online Conservation Guide for *Podilymbus podiceps*. Available from: http://acris.nynhp.org/guide.php?id=6723. Accessed April 2019.

NYNHP. 2015f. Online Conservation Guide for 2015f. Online Conservation Guide for *Cistothorus platensis*. Available from: http://acris.nynhp.org/guide.php?id=7006. Accessed April 2019.

NYNHP. 2015g. Online Conservation Guide for *Asio flammeus*. Available from: http://acris.nynhp.org/guide.php?id=6949. Accessed April 2019.

NYNHP 2015h. Online Conservation Guide for *Crotalus horridus*. Available from: http://acris.nynhp.org/guide.php?id=7536. Accessed April 2019.

NYNHP. 2017c. Online Conservation Guide for *Ammodramus henslowii*. Available from: http://acris.nynhp.org/guide.php?id=7106. Accessed April 2019.

New York State Department of Agriculture and Markets (NYSDAM). 2018. *Guidelines for Agricultural Mitigation for Solar Power Projects*. Available at: https://www.agriculture.ny.gov/ap/agservices/Solar_Energy_Guidelines.pdf. Accessed April 2019.

New York State Department of Environmental Conservation (NYSDEC). 2007a. *New York State Amphibian and Reptile Atlas Data*. Bureau of Wildlife, Albany NY. November 20, 2007.

NYSDEC. 2007b. *The Second New York State Breeding Bird Atlas Project (2000-2005) - Online Database (Finalized March 2007).* Available at: http://www.dec.ny.gov/animals/7312.html. Accessed March 2019.

NYSDEC. 2013. Landowner Incentive Program: Grassland Protection and Management Pre-application and Instructions. Available at: http://www.dec.ny.gov/docs/wildlife_pdf/lipgrasslandrfa12.pdf. Accessed April 2019.

NYSDEC. 2014. *6 NYCRR Part 575 Prohibited and Regulated Invasive Species*. September 10, 2014. Available at: http://www.dec.ny.gov/docs/lands_forests_pdf/islist.pdf. Accessed March 2019.

NYSDEC. 2015a. *New York State Species of Greatest Conservation Need*. Available at: https://www.dec.ny.gov/docs/wildlife_pdf/sgnc2015list.pdf. Accessed March 2019.

NYSDEC. 2015b. *List of Endangered, Threatened, and Special Concern Fish and Wildlife Species of New York State.* Available at: http://www.dec.ny.gov/animals/7494.html. Accessed March 2019.

NYSDEC. 2016. *Protection of Northern Long-eared Bats*. Available at http://www.dec.ny.gov/animals/106090.html Accessed March 2019.

Pierson, E.C., J E. Pierson and P.D. Vickery. 1996. *A Birders Guide to Maine*. Down East Books, Camden ME.

Smith, J.A., and J.F. Dwyer. 2016. *Avian interactions with renewable energy infrastructure: An update*. The Condor: Ornithological Applications 118: 411–423.

Solar Energy Industries Association (SEIA). 2016. SEIA Annual Report. Available at: https://www.seia.org/research-resources/2016-annual-report. Accessed April 2019.

Sovacool, B.K. 2013. *The avian benefits of wind energy: A 2009 update*. Renewable Energy 49: 19-24.

SunPower Corporation (SunPower). 2009. *SunPower Solar Module Glare and Reflectance*. Technical Notification T09014. Available at: https://www.kerncounty.com/planning/pdfs/eirs/recurrent_desert/Appendix_B-Solar_Module_Glare_Tech_Memo.pdf. Accessed April 2019.

U.S. Army Corps of Engineers (USACE). 1995. *The Highway Methodology Workbook Supplement. Wetland Functions and Values: A Descriptive Approach*. U.S. Army Corps of Engineers, New England Division. NENEP-360-1-30a. 32 pp.

United States Department of Agriculture (USDA). 2009. *2007 Census of Agriculture: United States Summary and State Data, Volume 1*. National Agricultural Statistics Service. AC-07-A-51. Issued February 2009; updated December 2009.

USDA. 2018. *Cropland Data Layer – National Download*. National Agricultural Statistics Service. Available at: https://www.nass.usda.gov/Research_and_Science/Cropland/Release/. Accessed March 2019.

United States Fish and Wildlife Service (USFWS). 2016. *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat*. Federal Register Vol. 81 (6):1900-1922. January 14, 2016. Available at: https://www.govinfo.gov/content/pkg/FR-2016-01-14/pdf/2016-00617.pdf. Accessed March 2019.

United States Geological Survey (USGS). 2018. *North American Breeding Bird Survey*. Species List for the Duanesburg (026) and Clinton (080) routes. 1966-2017. Available online at: https://www.pwrc.usgs.gov/BBS/PublicDataInterface/index.cfm. Accessed March 2019.

Walston, L.J., Jr., K.E. Rollins, K.P. Smith, K.E. LaGory, K. Sinclair, C. Turchi, T. Wendelin, and H. Souder. 2015. *A Review of Avian Monitoring and Mitigation Information at Existing Utility-Scale Solar Facilities*. ANL/EVS-15/2, prepared for the U.S. Department of Energy, SunShot Initiative, Argonne National Laboratory, Argonne, Ill.

Walston, L.J., K.E. Rollins, K.E. LaGory, K.P. Smith, and S.A. Meyers. 2016. *A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States.* Renewable Energy 92:405-414. Available at: https://doi.org/10.1016/j.renene.2016.02.041. Accessed April 2019.

Weldy, T., D. Werier, and A. Nelson. 2017. *New York Flora Atlas*. [S.M. Landry and K.N. Campbell (original application development), USF Water Institute. University of South Florida]. Albany, New York.