



HIGH RIVER ENERGY CENTER

Case No. 17-F-0597

1001.22 Exhibit 22

Terrestrial Ecology and Wetlands

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Exhibit 22: Terrestrial Ecology and Wetlands

This Exhibit will track the requirements of proposed Stipulation 22, dated August 26, 2019, and therefore, the requirements of 16 § NYCRR 1001.22.

The Project has been sited to avoid and/or minimize impacts to terrestrial ecology and wetlands to the maximum extent practicable as detailed in this Exhibit. Temporary, permanent, and conversion impacts to the representative plant communities within the Project Area are not expected to result in the significant loss or extirpation of any representative plant community (see Section 22(b)). Further, no take of listed species will occur as a result of Project development (see Section 22(f)). Of the entire 1,221-acre Project Area, only approximately 16.6 acres of wildlife habitat will be permanently lost due to the placement of Project components. Moreover, 15.1 of the 16.6 acres (93 percent) of wildlife habitat permanently lost reside in active agricultural areas which already provide limited perpetual wildlife habitat due to the regular disturbances and anthropogenic pressures of active farming practices (see Section 22(f)(4)). Additionally, through careful siting of Project components, there are minimal direct impacts to wetlands proposed within the Project Area (see Section 22(m)).

In addition to Project and Study Area studies, the Applicant conducted a Cumulative Impact Analysis to evaluate potential impacts from the Project and all proposed and operating solar energy projects greater than or equal to 5 MW, based upon data provided by NYSDEC, occupying grassland habitat within 100 miles of the Project Area in the State of New York on federally and State-listed threatened or endangered species, particularly grassland birds (Appendix 22-4). The results of this analysis determined that the use of grassland habitat types to solar development is not anticipated to have population-level impacts from the Project, or cumulatively, from the 292 Study Projects identified. Additionally, approximately 1% of available grassland habitat within the 100-mile study radius has the potential to be impacted cumulatively by all of the projects studied (see Section 22(f)(10) and Appendix 22-4). This analysis represents an extremely conservative approach which overestimates impacts due to the lack of information for each of the Study Projects reviewed and the low probability that many of these projects will ultimately be developed.

As noted in Exhibit 2, the Project proposes to install fixed, tracker or a combination of both types of racking systems. As the technology is rapidly evolving for solar panel technology, and market conditions at the time procurement decisions need to be made are unknown at this time, the Applicant is proposing in this Application to evaluate both types of racking systems, with the final

decision to be made and detailed in the Compliance Filing. Only selected elements of the Project would change based upon the combination of array racking system types used, but all changes would be within the component fence line and to the same land uses shown in the Proposed Layout. The location of interior access roads and inverters, depending upon the final locations, could differ from that shown in the Exhibit 11 plans. Land coverage ratios will also be adjusted but they are not expected to be substantial or significant. Again, land uses are the same in all locations.

Accordingly, the drawings, plan and maps required by Exhibit 11 depict a combination of both panel types, fixed and tracker. Approximately 50 % of the panels are fixed and 50% are trackers. As part of the alternative layout evaluation, Exhibit 9 presents a site plan depicting all fixed panels. The impact areas presented in this Exhibit are based upon the drawings included in Exhibit 11. However, as noted above, changes as a result in the final selection of array racking system types would be minimal as all impacts would be located within the same Project fence line.

22(a) Plant Communities

The Project Area is within the Eastern Great Lakes Lowlands ecological region (ecoregion), as defined by the US Geological Service (Geological Service, 2010). This ecoregion includes valleys and lowlands underlain by interbedded limestone, shale, and sandstone rocks that are more erodible than the more resistant rocks composing the adjacent mountainous areas. The topography and soils of the lowlands have also been shaped by glacial lakes and episodic glacial flooding. Limestone-derived soils are fine-textured, deep, and productive. As a result, much of the region was cleared for agriculture or urban development and fewer native forests remain than in surrounding ecoregions (Geological Service, 2010).

More specifically, the Project Area is within the Mohawk Valley ecoregion. This ecoregion separates the Glaciated Low Allegheny Plateau to the south from the Adirondack Mountains to the north. The Mohawk Valley is underlain by limestone and shale that dips to the south away from the Adirondack Mountains. Mohawk Valley soils are loamy, moist Alfisols derived from glacial till that support dairy farming, pasture, and associated forage crops. The Mohawk Valley is irregular and hilly, and the flat Mohawk River floodplain is quite narrow in places (Geological Service, 2010).

The Project Area encompasses approximately 1,221 acres and is composed predominately of agricultural land and grass/pasture/hay. Agricultural areas consist predominately of corn, hay,

and soybeans. Other open fields were maintained for pasture and livestock grazing. Land cover in the Project Area was determined using the National Land Cover Data (NLCD), aerial photography, and onsite observations.

Table 22-1. Land Cover Types within the Project Area

Cover Type	Acreage	Percent of Project Area
Active Agriculture	919	75.3
Disturbed Developed	34.5	2.8
Forestland	215.6	17.7
Open Water	2.1	0.2
Successional Old Field	8.4	0.7
Successional Shrubland	40.9	3.4
Total	1,220.5	100.0

Plant community mapping was compiled from numerous sources, including data collected during on-site field survey work, roadside observation, desktop analysis, and interpretation of aerial orthoimagery. All documented plant communities within the Project Area are common in the State of New York. Descriptions of these plant communities and their dominant plant species are provided below. Note that the cover types on Figure 22-1 include the communities described in *Ecological Communities of New York State* (Edinger et al., 2014) listed below.

Agricultural Land

Active agricultural land in the form of hay fields, pastureland, and cultivated crops is extremely common within the Project Area and covers approximately 919 acres or 75% of the Project Area. Approximately 479 acres of agricultural land will be used for Project components and then restored following the decommissioning of the Project. In *Ecological Communities of New York*, there are multiple types of terrestrial cultural communities within the agricultural land designation, including cropland/row crops (Heritage Rank: unranked cultural), cropland/field crops (unranked cultural), and pastureland (unranked cultural) (Edinger et al., 2014). Most row crops established within the Project Area are corn (*Zea mays*) and soybean (*Glycine max*), both first observed on July 17, 2017, which are utilized as feedstock, livestock feed, or for human consumption. Hay fields are also scattered throughout the Project Area and are utilized as green chop or open

pasture land for roaming livestock. Dominant plants in hayfields and pasture in the Project Area were orchard grass (*Dactylis glomerata*), red clover (*Trifolium pratense*), and timothygrass (*Phleum pratense*), all first observed on July 17, 2017.

Forestland

Forested land covers approximately 215.6 acres, or 17.7 percent, of the total land coverage for the Project Area according to TRC's plant community mapping. Within this cover type are a variety of forested communities with distinguishing characteristics supporting vast assemblages of interacting plant and animal populations. Specific forest communities as defined in *Ecological Communities of New York* found within the Project Area and their descriptions are below.

Beech-maple mesic forest (Heritage Rank: G4 S4 [Apparently secure globally and in New York State]) – Beech-maple mesic forest is common within the Project Area. This community occurs on moist well-drained soils with usually an acidic content. This forest is described as a northern hardwood forest with sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*), both first observed on July 18, 2017, occurring codominant with each other. Common associates occurring in the community to a lesser extent are yellow birch (*Betula alleghaniensis*) and white ash (*Fraxinus americana*), both first observed July 18, 2017, and hophornbeam (*Ostrya virginiana*) and red maple (*Acer rubrum*), both first observed July 19, 2017. Eastern hemlock (*Tsuga canadensis*), first observed July 18, 2017, may occur at very low quantities as well. The shrub layer of this forest includes saplings of the aforementioned tree species and also American hornbeam (*Carpinus caroliniana*), first observed on July 20, 2017, and witch hazel (*Hamamelis virginiana*), first documented observance on May 2, 2019. Saplings of sugar maple and American beech scatter the ground layer along with Christmas fern (*Polystichum acrostichoides*), first documented observance May 2, 2019, and various wood ferns (*Dryopteris* spp.), first observed on July 18, 2017.

Successional northern hardwoods (Heritage Rank: G5 S5 [Demonstrably secure globally and in New York State]) – Successional northern hardwoods are common throughout the Project Area. Most of the Project Areas was likely forested and has been cleared for agriculture. Successional forests can develop either after man-made clearing events or in the wake of destructive natural events (floods, blow-downs during high wind events, forest fires, etc.). After clearing has occurred, and the impacted land begins to revert back to forests, plant species that are well-adapted to establishment after disturbances begin to populate the area. Characteristic trees dominating successional northern hardwoods within the Project Area include eastern cottonwood (*Populus*

deltooides), first observed July 17, 2017, quaking aspen (*Populus tremuloides*), first observed July 20, 2017, gray birch (*Betula populifolia*), first observed July 19, 2017, black cherry (*Prunus serotina*), first observed May 23, 2018, red maple, and white pine (*Pinus strobus*), first observed July 20, 2017. White ash, green ash (*Fraxinus pennsylvanica*), first observed July 17, 2017, and American elm (*Ulmus americana*), first observed April 18, 2019, can be found in this community as well but at lesser numbers.

Appalachian oak-hickory forest (Heritage Rank: G4G5 S4 [Apparently secure globally and in New York State]) – This hardwood forest occurs on ridgetops, upper slopes, and on the south- and west-facing slopes. Soils are well-drained and normally have a sandy-loam or general loam texture. Appalachian oak-hickory forests occur in the Project Area to a lesser extent. Dominant trees in this community include a co-dominance between red oak (*Quercus rubra*), first observed July 17, 2017, and white oak (*Quercus alba*), first observed May 2, 2019. Mixed with these oaks at lower densities are shagbark hickory (*Carya ovata*), first observed July 17, 2017. Red maple, white ash, and eastern hophornbeam also occur as common associates in this forest. The shrub layer of this forest includes saplings of the aforementioned tree species and shrubs such as choke cherry (*Prunus virginiana*), first observed July 20, 2017, red raspberry (*Rubus idaeus*), first observed May 3, 2019, witch hazel, maple-leaf viburnum (*Viburnum acerifolium*), first observed July 18, 2017, and gray dogwood (*Cornus racemosa*), first observed July 17, 2017.

Hemlock-northern hardwood forest (Heritage Rank: G4 S4 [Apparently secure globally and in New York State]) – Hemlock-northern hardwood forest communities are mixed and generally occur on the middle to lower cool slopes of shaded ravines and hillslopes. These communities occur on moist, well-drained loamy soils. Eastern hemlock is predominant within the tree stratum and can range in coverage from pure stands to comprising only 20% of the tree canopy. Along with eastern hemlock, there is an assortment of tree species that can act as a codominant within this community. Relative to the Project Area, American beech, American basswood (*Tilia americana*), first observed on July 19, 2017, and sugar maple have been observed to be codominant tree species. Along with the saplings of the aforementioned canopy trees, witch hazel, maple-leaf viburnum, and a range of raspberries (*Rubus* spp.) populate the shrub layer. Due to the low light environment created by the hemlock dominant tree stratum, the ground layer of this community is generally sparse. However, when present, ground layer herbaceous species include various wood ferns, Christmas fern, trillium species, and common wood-sorrel. When pockets of sunlight do penetrate the upper canopy and reach the ground layer, New York fern (*Thelypteris noveboracensis*), first observed July 19, 2017, can also be found.

Maple-basswood rich mesic forest (Heritage Rank: G4 S3 [Apparently secure globally; vulnerable in New York]) – Maple-basswood rich mesic forests occur on well-drained soils and have a diversity of rich overstory and understory plants that are usually correlated with calcareous or possibly circumneutral bedrock. There is an abundance of American basswood in association with sugar maple and white ash. Common herb species within this community include various wood ferns and sedges (*Carex* spp.), first observed July 17, 2017.

Developed Land

Developed land covers approximately 34.5 acres (2.8%) of the Project Area, according to TRC's plant community mapping. Developed lands represent areas with extreme anthropogenic influence and are characterized by the presence of buildings, roadways, quarries, residential areas, commercial properties, industrial sites, and maintained greenspaces (e.g., mowed lawns, gardens, and parks). Developed land communities in the Project Area include mowed lawn with trees (Heritage Rank: unranked cultural), mowed lawn (Heritage Rank: unranked cultural), mowed roadside/pathway (Heritage Rank: unranked cultural), unpaved road/path (Heritage Rank: unranked cultural), paved road/path (Heritage Rank: unranked cultural), rural structure exterior (Heritage Rank: unranked cultural), interior of a barn/agricultural building (Heritage Rank: unranked cultural), and interior of a non-agricultural building (Heritage Rank: unranked cultural). Vegetation within these areas tend to be sparse when not artificially planted or influenced. However, when present, certain species that thrive in disturbed environments act as pioneer species or become directly or indirectly introduced. Often in developed areas non-native plant species flourish in a community which generally characterizes old-field appearances and functions. Non-native species such as Canada thistle (*Cirsium arvense*), first observed July 17, 2017, multiflora rose (*Rosa multiflora*), first observed July 18, 2017, European buckthorn (*Rhamnus cathartica*), first observed July 20, 2017, Morrow's honeysuckle (*Lonicera morrowii*) and purple loosestrife (*Lythrum salicaria*), both first observed July 17, 2017, and various upland grasses generally populate these developed areas.

Successional Old Field

Successional old fields (Heritage Rank: G5 S5) are relatively uncommon within the Project Area and cover approximately 8.4 acres (0.7%) according to TRC's plant community mapping. This community is defined as a meadow dominated by forbs and grasses that occur on sites that have been cleared or plowed as a result of agriculture or development, and subsequently abandoned. Most old-field communities are irregularly and infrequently mowed. As such, conditions favor the

establishment and spread of representative old-field species. Characteristic herbaceous species include many goldenrods (*Solidago* spp.), timothy grass (*Phleum pratense*), Queen Anne's lace (*Daucus carota*), Virginia strawberry (*Fragaria virginiana*), common dandelion (*Taraxacum officinale*), and chicory (*Cichorium intybus*), all first observed July 17, 2017, in addition to common milkweed (*Asclepias syriaca*), first observed July 20, 2017, and various asters (*Symphotrichum* spp.), first observed May 23, 2018. Shrubs can be present within successional old-field communities but represent less than 50% of the community. Common shrubs found in this community are honeysuckles, various dogwoods, viburnums, and small willows (*Salix* spp.), first observed July 17, 2017. If not maintained by infrequent mowing, this relatively short-lived community succeeds to a successional shrubland, woodland, or forest community.

Wetlands

Wetlands represent 37.5 acres, or 3 percent, of the Project Area, according to TRC's plant community mapping. Specific wetland communities within the Project Area include shallow emergent marshes (Heritage Rank: G5 S5), deep emergent marshes (Heritage Rank: G5 S5), shrub swamps (Heritage Rank: G5 S5), vernal pools (Heritage Rank: G4 S3), and red maple hardwood swamps (Heritage Rank: G5 S4S5 [Demonstrably secure globally, apparently or demonstrably secure in New York State]). A more detailed characterization of the wetland communities can be found in Section 22(j). Note the wetland cover type overlaps with the other plant community types discussed in this section, therefore the total acreages in this section exceed the total Project Area.

Successional Shrubland

Successional shrubland (Heritage Rank: G5 S5) covers approximately 40.9 acres (3.4%) of the Project Area, according to TRC's plant community mapping. This community represents shrublands that have established after a site has been cleared (e.g., for agriculture, logging, or development) or was disturbed as a result of natural events. This community is defined by at least a 50% cover of shrub species (Edinger et al., 2014). Successional shrublands are transitory communities between old-field and successional forest communities. Characteristic shrubs found within the Project Area are gray dogwood, multiflora rose, Allegheny blackberry (*Rubus allegheniensis*), first observed April 24, 2019, choke cherry, nannyberry (*Viburnum lentago*), first observed July 19, 2017, silky dogwood (*Cornus alba*), first observed July 18, 2017, European buckthorn, various shrub willows and Morrow's honeysuckle. Herbaceous species are very diverse in this community but typically represent less than 50% of total vegetative cover. Within

the Project Area, common herbaceous plants within this community are goldenrods, common dandelion, and white bedstraw (*Galium mollugo*), first observed July 17, 2017.

Open Water

Open water communities are somewhat sparse within the Project Area covering approximately 2.1 acres (0.2%) of the Project Area, according to TRC's plant community mapping. Open water areas are characteristic of man-made and natural lacustrine and riverine systems located within the Project Area. Lacustrine systems (i.e., relating to ponds and lakes) within the Project Area include farm ponds/artificial ponds (Heritage Rank: unranked cultural). Specific riverine systems (i.e., relating to confined waterbodies) in the Project Area include intermittent streams (Heritage Rank: G4 S4) and ditch/artificial intermittent streams (Heritage Rank: unranked cultural). Common aquatic vegetation in open water communities was ribbon-leaved pondweed (*Potamogeton epihydus*), first observed July 17, 2017. Although aquatic vegetation grows within some of these communities, emergent wetland vegetation often grows along the periphery of these communities as well. Typical emergent wetland species associated with open water communities within the Project Area include reed canary grass (*Phalaris arundinacea*), rice cut grass (*Leersia oryzoides*), common spike-rush (*Eleocharis palustris*), and field horsetail (*Equisetum arvense*), all first observed July 17, 2017.

22(b) Impacts to Plant Communities

(1) Proposed Temporary and Permanent Impacts

The Limit of Disturbance for the Project is approximately 569 acres, which represents approximately 46.6 percent of the Project Area. The construction and operation of the Project will cause temporary and relatively small permanent impacts to some of the aforementioned ecological communities. Impacts to ecological communities and associated plant communities will occur through vegetation clearing necessary for safe Project-related construction and activities. Areas that are temporarily impacted will be restored to their original condition. Permanent impacts to plant communities will occur in areas designated for permanent operation of the Project. Calculations of specific impacts to these communities within the Project Area are based on disturbance areas assigned to each Project Component as well as the Preliminary Design Drawings in Exhibit 11. These disturbance areas are described in Table 22-1:

Table 22-1. Impact Assumptions

Project Components	Vegetative Clearing Area (acres)	Soil Disturbance Area (acres)	Area of Permanent Impact (acres)
Solar Panel Installations	371.77	16.79	0
Access Roads	26.15	26.15	14.94
Collection Lines	4.72	4.72	0
Collection Substation	1.74	1.74	1.4
Collection Substation/ Switchyard/ Inverters	35.5	35.5	0
Fence	1.85	1.85	0

These impact assumptions were used to calculate temporary and permanent impacts to plant communities resulting from the construction and operation phases of the Project. While the Project layout may ultimately co-locate various components (e.g., electric collection lines and access road), the potential impacts identified for this analysis assume no co-location and are instead presented for each component. As such, impact calculations were completed in a conservative manner, and therefore likely overstate the potential impacts, as the potential for overlap in component impact areas is not assumed in the calculations. This method of impact calculation also alleviates temporal variation of impacts to vegetative communities within the Project Area.

Construction of the Project will result in a temporary disturbance of approximately 35 acres of vegetation associated with hayfields and pastures. Agricultural areas with pre-existing pastureland or hayfield communities will be temporarily impacted by the installation of the solar arrays, as a similar grassland community will be planted below the arrays. Temporary impacts to agricultural land will occur from the siting of an underground collection line and the clearing of vegetation needed for various components during the construction phase of the Project. Temporarily disturbed active agricultural areas will be stripped of topsoil, which will be set aside prior to construction. The topsoil will then be replaced upon completion of the construction phase

of the Project. Agricultural areas underneath and in the immediate vicinity of the solar panels will be maintained as grasses and forbs that require periodic mowing. Agricultural areas with row crops will be converted for the useful life of the Project due to the installation of the solar arrays, since the plant community that will be maintained beneath the arrays will be different from the pre-existing row crops. Agricultural land that is used for Project Components will be restored and agricultural activities can be resumed following decommissioning of the Project. A total of approximately 457.5 acres of agricultural land will be employed for Project Components for the useful life of the Project.

The clearing of forested cover types within the Project Area is unavoidable due to the size and location of forest communities within the Project Area. Permanent impacts occur where forestland will be directly replaced with Project Components. There will be approximately 1 acre of permanent impact to forests within the Project Area.

There will be no temporary impacts to forests within the Project Area. Forest conversion impacts will occur within the Project Area where forests are initially cleared for Project construction and then maintained as successional old-field or shrubland communities for the life of the Project, due to clearance constraints. Forest conversion is anticipated to occur in approximately 29 acres of forestland in the Project Area. The Applicant plans to remove stumps of forest species only where the placement of components is intended to occur or where required by landowner agreements.

In general, forest fragmentation occurs where forest areas are divided into smaller, isolated patches of forest. This process can result from the creation of natural open areas, farmland expanses, creation of road corridors, or the establishment of developed areas. The proposed Project layout will result in 152.02 acres of peripheral forest area, defined as forest within 300 feet of the forest edge, created through the addition of access roads and developed areas within existing forest patches. The creation of peripheral forest can result in edge effects which affect animal and plant populations or community structures that occur at the boundary of fragmented habitats. These effects are most evident in species that exhibit edge-sensitivity. Presently, forest patches within the Project Area are small and isolated in the surrounding agricultural matrix, providing sub-optimal habitat for edge-sensitive species, and given the landscape context of the Project (i.e., primarily agricultural) it is unlikely that edge-sensitive species are presently using the forested areas therein. The creation of peripheral forest in this landscape is not likely to result in additional edge effects which may alter species behavior or community assemblages within the Project Area. Physical barriers resulting from this action are minor enough that they are unlikely

to alter the bird communities present or significantly change their behaviors. For more information on habitat fragmentation and edge effects caused by the Project, please refer to the subheading *Impacts to Wildlife and Wildlife Habitat*, within Section 22(f) of this Exhibit.

The construction of the Project will also result in the temporary disturbance of approximately 0.01 acre of successional shrubland communities, 0.02 acre of successional old-field communities, and 0.6 acres of developed land communities. Temporary impacts will occur from the initial clearing and disturbance of these cover types for purposes of construction access, the siting of Project components, and the burying of underground collection lines. Once the Project becomes operational, these areas will return to their preexisting condition. Permanent loss will occur to approximately 0.17 acre of successional shrubland communities and 0.03 acre of developed land communities. Permanent loss of these cover types will occur from the siting of Project components.

No impacts are anticipated to open-water vegetation communities within the Project Area. A description of impacts to all surface waters within the Project Area is included in Exhibit 23.

Temporary, permanent, and conversion impacts to the representative plant communities within the Project Area are not expected to result in the significant loss or extirpation of any representative plant community. Temporary, permanent, and conversion impact acreages for each representative community in the Project Area are provided in **Error! Reference source not found.** below. See Figure 22-2 for a depiction of the extent of impacts to plant communities. Temporary and permanent impacts to wetlands are discussed in Section 22(m) of this Exhibit.

Table 22-3. Vegetation Impact Calculations

Cover Type/Habitat	Temporary Impact (Acres)	Permanent Loss (Acres)	Conversion (Acres)
Forestland	0.00	1.00	29.1
Successional Shrubland	0.01	0.17	4.1
Successional Old Field	0.002	0.00	0.02
Open Water	0	0	0
Agricultural Land	35.10	15.10 (Useful Life of Project Only)	450.9 (Useful Life of Project Only)

Table 22-3. Vegetation Impact Calculations

Cover Type/Habitat	Temporary Impact (Acres)	Permanent Loss (Acres)	Conversion (Acres)
Developed Land	0.60	0.03	0.40
Total	35.71	16.3	484.52

(2) Vegetation Management Plans for Construction and Operation

As part of the Application, and in preparation for construction, an Invasive Species Management and Control Plan (ISMCP) was prepared to describe the survey methods that were used to identify invasive species populations present on-site, as well as control methods moving forward with the Project. The ISMCP is further detailed in Section 22(p) of this Exhibit. Control and management methods for high priority invasive species in the Project Area are further addressed in Appendix 22-7.

Prior to the start of construction, crews will be educated regarding the contents of the ISMCP to ensure that their activities on-site comply with best management practices (BMPs) outlined in the Plan. To prevent introduction and spread of listed species, management actions can be grouped into four main categories: material inspection, targeted species treatment and removal, sanitation, and restoration. Within each category, specific actions or combinations thereof can be taken depending on characteristics of a specific species and its density within the target area.

Following the construction phase of the Project, the Applicant will restore temporarily disturbed areas. The area around and between solar arrays will be planted with a solar farm grass seed mix comprised of grasses that are indigenous to the area. These grasses will mature to a height of approximately 2 to 2.5 feet. The re-established groundcover between solar arrays will require periodic maintenance in the form of mowing. Trees and shrubs will be planted around the solar arrays to create a visual buffer. Periodic pruning of these trees and shrubs will be necessary to keep branches from growing over the solar arrays. See Appendix 11-1 for a detailed Landscaping Plan of the Project Area. See Exhibit 5 for additional information on proposed vegetation management practices. Section 5(j) explains vegetation management practices during the initial operation period and ongoing operation.

22(c) Avoidance and Mitigation Measures for Plant Community Impacts

(1) Avoidance and Minimization of Plant Community Impacts

Avoidance efforts have been undertaken for the Project. The preliminary design of the Project presented in this Application includes avoidance of unnecessary impacts to grasslands, interior forests, wetlands, shrublands, and young successional forests. As a result, impacts to these landscape features (and vegetation communities) will be marginal. Project Components were sited in order to confine disturbances to the smallest area possible. Work areas have been adjusted to utilize open fields wherever possible.

Linear Project Components such as access roads and collector lines, have been co-located to avoid and minimize impacts to plant communities. Solar panels have been proposed in areas already disturbed by agriculture to the maximum extent practicable.

A comprehensive erosion and sediment control plan will be developed and utilized to protect adjacent resources during the construction and associated remediation phases of this Project. See Section 23(c)(1) of Exhibit 23 for details and a summary of the Preliminary Stormwater Pollution Prevention Plan (SWPPP), available as Appendix 23-3.

Avoidance, minimization, and mitigation of impacts to vegetative communities will also occur by complying with guidance from on-site environmental monitors, maintaining clean work sites, employing BMPs during construction, operation, and maintenance, and by demarcating areas highly susceptible to adverse disturbances. These confined areas will be deemed inaccessible to construction equipment and any other disturbance activity.

As discussed in Section 22(b), the Applicant will implement BMPs in accordance with the ISMCP (Appendix 22-7) to prevent the introduction or spreading of invasive species within the Project Area.

(2) Post-construction Vegetation Restoration

Following the construction phase of the Project, restoration of temporarily disturbed areas will take place. Temporarily disturbed areas (other than impacted agricultural areas) will be seeded with typical native species mixes. These seeded areas will be further stabilized with mulch and left to reestablish preexisting vegetation. As discussed in Section 22(b)(2) of this Exhibit, the area around and between the solar arrays will be planted with a solar farm grass seed mix comprised of grasses that are native or indigenous to the area. This grass seed mix will provide favorable

wildlife habitat to grassland species. Trees and shrubs will be planted in select areas around the solar arrays to create a visual buffer. Plantings of native species found to be beneficial to pollinators, such as black cherry, downy shadbush (*Amelanchier arorea*), red chokeberry (*Aronia arbutifolia*), common witch hazel, common snowberry (*Symphoricarpos*), and highbush blueberry (*Vaccinium corymbosum*) will be included in the proposed landscape buffer.

(3) Summary Impact Table

A summary impact table quantifying anticipated temporary and permanent impacts associated with the various facility components in relation to Project Area vegetation cover types is provided as Table 22-4 below.

Table 22-4. Summary Impact Table

Project Components	Agricultural Land			Successional Old Field			Successional Scrubland			Forestland		
	Temporary Impacts (acres)	Permanent Loss (acres)	Conversion (acres)	Temporary Impacts (acres)	Permanent Loss (acres)	Conversion (acres)	Temporary Impacts (acres)	Permanent Loss (acres)	Conversion (acres)	Temporary Impacts (acres)	Permanent Loss (acres)	Conversion (acres)
Solar Panel Installations	0	0	359.97	0.001	0	0	2.01	0	0.5	0	0	9.25 (0 acres of interior forest) ¹
Access Roads	0	13.74	9.91	0	0	0	0	0.17	0.23	0	1.01	1.05 (0 acres of interior forest)
Collection Lines	3.77	0	0	0.0003	0	0	0.05	0	0	0	0	0.33 (0 acres of interior forest)
Collection Substation/ Switchyard/ Inverters	0	1.39	0.34	0	0	0	0	0.003	0	0	0.006 (0 acres of interior forest)	0
Staging/ Laydown Area	35.31	0	0.17	0	0	0	0	0	0	0	0	0
Fence	0	0	1.57	0	0	0	0	0.001	0	0	0.07 (0 acres of interior forest)	0

Note: Project Components may overlap, therefore the values in this table overestimate the impacts to each community type

1. Additional forestland conversion will occur outside of Project Components, to prevent shading. Approximately 18.38 acres of forestland, including 0.01 acres of interior forest, will be converted to prevent shading.

22(d) Characterization of Vegetation, Wildlife, and Wildlife Habitats

As stated in Section 22(a) of this Exhibit, there are multiple ecological communities within the Project Area. TRC biologists documented specific plant species and general plant communities during on-site field survey work conducted in the summer of 2017, the spring and summer of 2018, and spring of 2019. During the documentation of plant communities and plant species, TRC biologists adhered to nomenclature and designations put forth in both the New York Flora Atlas (Weldy et al., 2019) and the Ecological Communities of New York (Edinger et al., 2014). During the field effort, TRC biologists conducted a species inventory and general plant community survey for the Project Area, identifying discernable plant species while walking through impact survey areas and established plant communities. Appendix 22-1 (Plant and Wildlife Inventory List) includes a compiled list of plant species observed at the Project Area. A list and description of plant communities identified on site are in Section 22(a) of this Exhibit. Wetlands are addressed separately in Sections 22(i) through Section 22(o).

(1) Suitable Habitat Assessment

Through reference to online resources associated with the USFWS Environmental Conservation Online System (USFWS, n.d.), NYSDEC Environmental Resource Mapper (NYSDEC, n.d.), and the *U.S. National Wilderness Preservation System Map* (Ronald, 2012), there are no known significant natural communities or habitats of special concern located within the Project Area. As such, the Applicant does not anticipate impacts to any federal or state-listed significant natural community, habitat of special concern, U.S. National Wilderness Area, or USFWS-Critical Wildlife Habitat. On-site survey work conducted by TRC biologists confirmed there were no unusual habitats or significant natural communities located within the Project Area.

(2) Draft Survey Reports for NYSDEC

Survey reports identified in this Exhibit have been included with this Application for NYSDEC review. Specifically, the Application includes reports for the Applicant's breeding bird surveys (Appendix 22-2), winter raptor surveys (Appendix 22-3), wetland and stream delineations (Appendix 22-5) and other relevant survey information as noted in this exhibit.

(3) Wildlife Surveys

Avian

On-site observations, field surveys, and inquiries into existing data sources were conducted to create a complete list of bird species present within the Project Area. Sources of publicly available information are listed below along with general discussions of the databases queried.

Grassland Breeding Bird Survey

A preconstruction monitoring survey of grassland bird species was required by the NYSDEC and was conducted during the 2018 breeding season by the engineering services company, Tetra Tech. The objective of the grassland breeding bird survey was to determine the presence and site use of federally and state-listed threatened/endangered, rare, and special concern grassland bird species within the proposed Project Area. No state or federally listed threatened or endangered species were observed to be present, breeding, or nesting on site. No additional studies are recommended as the Project is not expected to negatively affect endangered or threatened grassland nesting species.

Bird species for which the presence and site use were surveyed for include:

- northern harrier (*Circus hudsonius*)
- upland sandpiper (*Bartramia longicauda*)
- short-eared owl (*Asio flammeus*)
- Henslow's sparrow (*Ammodramus henslowii*)
- sedge wren (*Cistothorus platensis*)
- grasshopper sparrow (*Ammodramus savannarum*) first observed on May 23, 2018
- vesper sparrow (*Pooecetes gramineus*) first observed on June 20, 2018
- horned lark (*Eremophila alpestris*)

Additional grassland bird species the subject of the survey included:

- American kestrel (*Falco sparverius*)
- bobolink (*Dolichonyx oryzivorus*) first observed on May 23, 2018
- eastern meadowlark (*Sturnella magna*) first observed on May 23, 2018
- golden-winged warbler (*Vermivora chrysoptera*)

- savannah sparrow (*Passerculus sandwichensis*) first observed on May 23, 2018

The survey methodology followed the NYSDEC *Draft Survey Protocol for State-listed Breeding Grassland Bird Species* (NYSDEC, 2015a). A work plan for the survey was submitted to the NYSDEC in June 2018 and approved with the agency's comments incorporated. A total of 708 acres of potential grassland habitat, primarily composed of pasture and hayfields, was determined to be present at the Project Area based on a habitat assessment. After applying obstruction buffers, a total of 593 acres of potential habitat remained, requiring 19 survey points. After an initial visit to the Project Area prior to the start of the surveys, five of the survey points were removed due to being located in recently planted agricultural fields (row crops), resulting in a total of 14 survey points available for survey.

Each survey point consisted of a 100-meter radius plot centered on the observation point with a minimum distance of 250 meters (m) between observation points. In conformance with the NYSDEC survey protocol, nine weekly surveys were performed at the Project Area between May 23 and July 18, 2018 and three additional evening surveys specifically for Henslow's sparrow between June 18 and June 28, 2018.

Experienced field biologists conducted weekly point count surveys starting at one-half hour before sunrise until no later than 10:30 AM, per NYSDEC survey protocol. Additional evening surveys were also conducted for Henslow's sparrow starting one hour before sunset and lasting until two hours after sunset. Surveys were not conducted during inclement weather, including precipitation, fog, or strong winds (i.e., greater than 10 to 12 miles per hour). Each survey was conducted for 5 minutes at each location. All birds observed within 100 m of the survey point were recorded, and birds observed beyond 100 m from the survey point and during meander surveys (i.e., while traveling between points within the Project Area) were recorded.

Biologists observed a total of 1,879 individuals representing five grassland bird species (bobolink, savannah sparrow, grasshopper sparrow, eastern meadowlark, and vesper sparrow) at the Project Area. This included grassland birds observed at the survey points, outside of the 100m radius circular plot, and birds observed during the meander surveys. Bobolinks (n = 1,501) were the most commonly observed grassland bird species comprising 79.9 percent of all grassland birds observed. Mean use was highest for bobolinks (8.12 birds/100-meter radius plot/5 minutes), followed by savannah sparrows (1.19 birds/100-meter radius plot/5 minutes), and grasshopper sparrows (0.19 birds/100-meter radius plot/5 minutes). Bobolinks and savannah sparrows were

the most numerous grassland species observed and these species can be expected where grassland habitat is present. Neither species is listed as threatened or endangered nor are they species of special concern in need of conservation. There were no raptors observed at the Project Area during the grassland breeding bird surveys.

The grasshopper sparrow is a state-listed species of special concern and a total of 31 grasshopper sparrows were observed at the Project Area. Twenty-one of the grasshopper sparrow observations were singing individuals. However, once the grasslands fields were mowed for hay, grasshopper sparrows were no longer observed actively singing at the survey point. One vesper sparrow, a state-listed species of special concern, was observed. The individual was a singing male, observed on June 20, 2019 near survey point 2. The species exhibited behaviors consistent with probable breeding, however no species was identified actively nesting within the Project Area during surveys, therefore breeding was not confirmed.

Species of special concern are those identified as worthy of attention and consideration within the state due to a welfare concern or risk of endangerment, however do not require special protections granted to those species which are threatened or endangered. No state or federally listed threatened or endangered species were observed to be present, breeding, or nesting on site.

A detailed description of the grassland breeding bird survey results, including incidental observations, can be found in Appendix 22-2.

Wintering Raptor Surveys

TRC conducted a preconstruction monitoring survey of wintering grassland raptors required by the NYSDEC. The objective of the wintering grassland raptor survey was to determine the presence and site use of state-listed threatened/endangered grassland raptors within the proposed Project Area. Target species were short-eared owl and northern harrier. Northern harriers were observed on three occasions.

The survey methodology followed the *NYSDEC Draft Survey Protocol for State-listed Wintering Raptor Species* (NYSDEC, 2015b). The NYSDEC provided comments on the protocol on December 5, 2018, and the survey protocol was revised accordingly. Surveys were performed using both rotating stationary survey points and weekly driving surveys along roads in areas of grassland habitat. Stationary survey points were situated in or near grassland habitat within the Project Area with clear visibility in all or most directions. Stationary survey points were no further

than 1,000 m apart when multiple stationary survey points were needed to cover an area of grassland habitat. Five stationary survey points were located throughout the Project Area, covering habitats that may be used by short-eared owls and/or northern harriers for foraging or roosting. Stationary survey point locations were adjusted in the field if necessary, based upon visibility and accessibility. The driving route utilized roads at the Project Area that bordered grassland habitat. Short-duration (approximately five minutes) survey points along this route were performed at every location where habitat could be observed from the road, and safety was not compromised.

Surveys were performed in the winter of 2018–2019, and were conducted between November 15, 2018, and March 31, 2019.

Stationary surveys were conducted at each of the five stationary survey locations at least once every two weeks, with a survey occurring at the Project Area every week. Driving surveys took place every week from December 7, 2018 through March 31, 2019. Stationary surveys were conducted for a total of 73.5 hours, and 16.3 total hours were spent conducting daytime driving surveys.

All survey points were visited bi-weekly, for a total of 10 stationary surveys per survey site at the Project Area over the course of the survey period; with the exception of HR-1 (nine total surveys) and HR-5 (five total surveys). Survey dates were targeted to take advantage of the best weather conditions during each week. Stationary surveys were initiated one hour before sunset and concluded when it was too dark to see flying birds, up to one hour after sunset.

Daytime driving surveys were conducted once a week prior to stationary surveys. This was done at the request of the NYSDEC to be more inclusive of temporal and geographic coverage of survey sites. Surveyors followed a set route around grassland areas visible from the road. Short observations of approximately five minutes were made at every location of grassland habitat that was visible from the road, where safety was not compromised. Surveys were completed with two surveyors: one person driving and the other making observations. Where raptors were noted between intended stopping locations, the driver pulled over as needed to confirm identification.

No short-eared owls were observed during the study. Red-tailed hawks were the most commonly observed raptor using the Project Area during both stationary and driving surveys and were present throughout the Project Area. Four observations of state-listed threatened or endangered species were made during surveys. No species whose breeding period overlapped with the

survey period were observed exhibiting breeding behavior. State-listed threatened species (northern harrier and bald eagle) and State-listed species of special concern (Cooper's hawk and sharp-shinned hawk) were observed in the Project Area. Overall, raptor use of the Project Area was concentrated to the eastern half.

Only three northern harriers were observed during the entirety of the winter raptor surveys at the Project Area (two confirmed sightings; one 70% confidence sighting). Two were during stationary surveys (HR-1 and HR-3), and one during a daytime driving survey. The first confirmed observation during a stationary survey (HR-1) was on December 6, 2018 at 3:26 PM. The second observation (daytime driving survey; 70% confidence on identification) was on December 7, 2018 at 1:05 PM. The final confirmed observation (HR-3) was on March 15, 2019 at 6:25 PM.

Only one observation of a bald eagle (*Haliaeetus leucocephalus*) during the entirety of the winter raptor surveys was made during a stationary survey at HR-4, on November 26, 2018 at 3:55 PM.

No short-eared owls were observed during winter raptor surveys at the Project Area.

Two state-listed species of special concern were observed in the Project Area including Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*).

Five Cooper's hawks were observed during stationary surveys in the eastern portions of the Project Area at sites HR-1, HR-2, and HR-4, and one during a daytime driving survey. Cooper's hawks were observed throughout the duration of the survey period and account for 9.4% of observations overall. An adult individual of unknown sex was observed at site HR-4 on November 16, 2018 at 15:45 for five minutes and was seen perching and then flying to the ground out of sight. On January 7, 2018 an adult individual of unknown sex was seen at 15:51 and observed for 16 minutes perching in a tree and subsequently flying out of sight in a southwest direction at site HR-1 (located in the northwestern region of the Project Area). A third observation was made at site HR-4 on February 13, 2019 at 16:28. An individual of unknown sex or age class was seen flying overhead for one minute in a northwestern direction. The final Cooper's hawk observed during a stationary survey was seen at site HR-2 (located in the northeastern region of the Project Area) on March 29, 2019 at 18:43. An individual of unknown sex or age class was seen perched in a tree for one minute before flying out of sight (direction of flight path was not seen by the observer). The sole observation of a Cooper's hawk made during a daytime driving survey occurred on March 29, 2019 at 17:41. An individual of unknown sex or age class was seen perching in a tree for 14 minutes near stationary survey site HR-2. One sharp-shinned hawk (New

York State species of special concern) was observed at the Project Area during a daytime driving survey on February 7, 2019 at 13:25. The individual was observed just west of stationary site HR-2, in the northeastern portion of the Project Area. A juvenile individual of unknown sex was observed for 13 minutes to be perching in a forest edge area.

The most common raptor species observed at the Project Area was the red-tailed hawk (*Buteo jamaicensis*), first observed on November 23, 2019. This species comprised approximately 61 percent and 77 percent of total raptor observations during the stationary and driving surveys, respectively. For a more detailed description of the wintering grassland raptor survey, including a list of incidental bird observations, please refer to Appendix 22-3.

Grassland Habitat

Based on the grassland breeding bird survey, there are approximately 593 acres of potential grassland habitat at the Project Area; however, not all of this potential grassland habitat meets the requisite needs for the target species from the bird surveys. The Project Area may provide habitat for northern harrier at some point during the year; however, the mowing of the hayfields and pastures would discourage them from using the Project Area as they require vegetation greater than 60 cm in height for breeding habitat (Morgan and Burger, 2008). While grasshopper sparrows were observed on site, the Project Area may not provide suitable breeding habitat for them. Grasshopper sparrows require relatively large (i.e., 125 to 247 acres) fields with low vegetation density and more than 20 percent bare soil for breeding habitat (Morgan and Burger, 2008). Although there was one sighting of a vesper sparrow at the Project Area, it is unlikely that there is sufficient habitat to support them during the breeding season due to their preference for low vegetation density and height. They are often found in recently planted crop fields because of a preference for areas with exposed soil (Morgan and Burger, 2008). Eastern meadowlarks were a commonly sighted species in the Project Area which, due to their generalist habitat preferences, may contain suitable breeding habitat. However, this species does prefer moderately tall (20-40 cm) vegetation. Due to the active practice of mowing for hay, this species is likely already being displaced for at least part of the breeding season (Morgan and Burger, 2008). None of the grassland breeding bird survey points were characterized by low vegetation density and only two points had more than 20 percent bare soil. Consultation with the New York Natural Heritage Program (NYNHP) indicated that there were no records of any rare or state-listed species at the Project Area, or in the immediate vicinity. Although behavior consistent with

probable breeding was observed for all special concern species, none were observed to be nesting or actively breeding within the Project Area.

Terrestrial Invertebrates

The Project Area encompasses a variety of habitat types and, as such, a vast multitude of terrestrial invertebrates are likely to utilize habitats within the Project Area. Terrestrial invertebrates are a diverse group of animals residing on dry land that neither possess nor develop a backbone. These include a variety of arthropods, including insects (e.g., beetles, bugs, ants, bees, butterflies, moths, cockroaches, mantis, stick insects, dragonflies, mosquitoes, fleas, crickets, grasshoppers, fireflies, cicadas, and flies), arachnids (e.g., various spider species, ticks, and mites), and myriapods (e.g., millipedes and centipedes) amongst many others. Worms are another form of terrestrial invertebrate, which typically have a long cylindrical body and no limbs. Terrestrial species include earthworms and nematodes, which are very common invertebrates that live in the topsoil. Mollusks are another vast group of invertebrates. Of this immense group, a portion of mollusks are terrestrial and include snails and slugs. Invertebrates are often the keystone components to the health of habitats and ecosystems and support more familiar vertebrate species. Most of the terrestrial invertebrates' importance is due to the variety of services and functions this animal group provides. Some important services include pollination, decomposition, nutrient cycling, and the promotion of soil fertility for plant growth. Terrestrial invertebrates are also a vital food source for many larger species within ecosystems due to their population abundance. Terrestrial invertebrates common to Upstate New York are presumed present within the Project Area.

Active Agriculture

Active agriculture provides marginal habitat due to the increased anthropogenic disturbance in these areas. Although agricultural areas may be too frequently disturbed for nesting and breeding, some birds use these areas for foraging and as a stop-over during migration. Characteristic birds of active agriculture include grasshopper sparrow, bobolink, and mourning dove (*Zenaida macroura*), which were observed during the Tetra Tech field surveys. Additionally, various mammals may eat agricultural crops as a supplement to natural food sources. The agricultural row crops at the Project Area may provide suitable feeding habitat for the wildlife observed in these areas. According to the CDL and on-site observations, corn is the primary agricultural row crop at the Project Site (89 acres or 7.3 percent of the Project Area), followed by alfalfa (*Medicago sativa*) (30.5 acres or 2.5 percent of the Project Area), first observed on July 16, 2017, and

soybean (25.8 acres or 2.1 percent of the Project Area). Non-alfalfa hay is found within 732.7 acres or 60 percent of the Project Area. The largest contiguous area of active agriculture was approximately 342.5 acres, or 28 percent, of the Project Area. Birds identified in pastures and hayfields at the Project Area are noted in the grassland breeding bird survey and the wintering grassland raptor survey described above and in Appendix 22-2 and Appendix 22-3, respectively.

Forestland

Forest communities within the Project Area provide habitat for forest specialist species, however only those species which do not require large forest expanses. Forest patches within the Project Area were previously fragmented due to conversion to agriculture and therefore not consistent with forest habitat used by interior forest obligates, further interior forest species were not observed during surveys conducted on site (see below). Forests contain many characteristics and components that can be utilized to the benefit of individual organisms. Some features include decreased anthropogenic disturbance levels, lower light levels, relatively protected nesting sites, increased shelter structure, dry shelter sites, concealment/camouflage, variable food sources, and even higher moisture levels. Representative mammals that are believed to use forest communities within the Project Area and vicinity include the following:

- American mink (*Neovison vison*)
- coyote (*Canis latrans*)
- eastern chipmunk (*Tamias striatus*)
- eastern cottontail (*Sylvilagus floridanus*)
- eastern gray squirrel (*Sciurus carolinensis*)
- eastern raccoon (*Procyon lotor lotor*)
- fisher (*Martes pennanti*)
- gray fox (*Urocyon cinereoargenteus*)
- long-tailed weasel (*Mustela frenata*)
- North American porcupine (*Erethizon dorsata*)
- red fox (*Vulpes vulpes*)
- red squirrel (*Tamiasciurus hudsonicus*)
- southern flying squirrel (*Glaucomys volans*)
- striped skunk (*Mephitis mephitis*)
- various mice (*Mus* spp.)
- various moles (*Condylura* spp., *Scalopus* spp., *Parascalops* spp.)

- various shrews (*Blarina* spp., *Cryptotis* spp., *Sorex* spp.)
- Virginia opossum (*Didelphis virginiana*)
- white-tailed deer (*Odocoileus virginianus*)

Many of the species observed are adapted to increasingly fragmented habitats and are considered generalists which may inhabit a wide range of habitat types, including agricultural, residential, and urban landscapes.

Reptiles and amphibians are believed to inhabit forest communities within the Project Area, based on observations of frogs and salamanders in forested wetlands and vernal pools on site. However, reptile and amphibian populations are presumed to be relatively small owing to the limited amount of requisite open water habitat within the Project Area. Other species assumed present at the Project Area include the following:

- Allegheny dusky salamander (*Desmognathus ochrophaeus*)
- Eastern American toad (*Anaxyrus americanus*)
- eastern milk snake (*Lampropeltis triangulum*)
- gray tree frog (*Hyla versicolor*)
- northern two-lined salamander (*Eurycea bislineata*)
- spotted salamander (*Ambystoma maculatum*)
- Jefferson salamander (*Ambystoma jeffersonianum*)
- spring peeper (*Pseudacris crucifer*)
- wood frog (*Rana sylvatica*)

Bird species observed within the Project Area during field surveys or presumed to use the forest communities within the Project Area include the following:

- American redstart (*Setophaga ruticilla*)
- black-and-white warbler (*Mniotilta varia*)
- black-throated blue warbler (*Setophaga caerulescens*)
- black-throated green warbler (*Setophaga virens*)
- blue jay (*Cyanocitta cristata*)
- brown creeper (*Certhia americana*)
- common raven (*Corvus corax*)
- hooded warbler (*Setophaga citrina*)

- ovenbird (*Seiurus aurocapilla*)
- red-eyed vireo (*Vireo olivaceus*)
- scarlet tanager (*Piranga olivacea*)
- veery (*Catharus fuscescens*)
- wood thrush (*Hylocichla mustelina*)

Of the species observed, none are considered interior forest specialists, and many are in fact habitat generalists, adapted to using fragmented and human-altered landscapes. Project development will pose minimal impacts to these species based on existing levels of forest fragmentation and the limited extent of forest clearing anticipated.

Forests at the Project Area include many tree species, with only a few areas clearly dominated by any one or two species. Trees in the upland include sugar maple, American beech, eastern hemlock, white ash, and eastern white pine (*Pinus strobus*). The Nature Conservancy (TNC) has defined matrix forest blocks as large contiguous areas capable of supporting species that require interior forest conditions (Anderson and Bernstein, 2003). Forest patches at the Project Area range from 7 to 65 acres. None of the forests at the Project Area are part of a TNC matrix forest blocks or serve as a corridor to a TNC matrix forest block. There is little connectivity between these forest patches across the Project Area due to the habitat fragmentation from agricultural conversion. Approximately 182.1 acres, or 84.44 percent of the forestland at the Project Area, can be classified as edge forest, which is defined as forestland within 300 feet of the forest's edge along agricultural land and roads.

Successional Shrubland

Successional shrublands are highly dynamic habitats as the impacted area progresses in successional (seral) stages after a disturbance. The variability present in these environments creates valuable wildlife habitat due to the influx of different wildlife species which are adapted to the different plants which grow during the different seral stages (NRCS, 2007). In many early successional communities, annual plants produce an abundance of seeds, which are consumed by granivorous birds and small mammals. A variable assortment of plant species provide highly nutritious forage material for herbivore and browser species. Additionally, the low and oftentimes dense herbaceous and shrub vegetation provides cover for birds and small mammals that prefer open habitats but are heavily preyed upon. A lack of a closed canopy also allows light and heat

to penetrate to the ground and is an essential habitat feature for reptiles that depend on heat sources outside their body for temperature regulation.

Mammals that are believed to utilize successional shrubland communities within the Project Area include:

- coyote
- eastern chipmunk
- eastern cottontail
- eastern gray squirrel
- eastern raccoon
- gray fox
- long-tailed weasel
- red fox
- striped skunk
- various mice
- various shrews
- various moles
- Virginia opossum
- white-tailed deer
- woodchuck (*Marmota monax*)

Reptiles and amphibians believed to populate successional shrubland communities within the Project Area include:

- common garter snake
- eastern American toad
- eastern milk snake
- northern dusky salamander
- northern two-lined salamander
- spring peeper
- northern leopard frog (*Lithobates pipiens*)
- northern water snake (*Nerodia sipedon*)

Bird species that utilize successional shrubland identified by Tetra Tech during field surveys included:

- American goldfinch (*Carduelis tristis*)
- common yellowthroat (*Geothlypis trichas*)
- song sparrow (*Melospiza melodia*)

The successional shrublands at the Project Area provide a variety of berries for wildlife. The location of some of the successional shrublands in relation to open fields means they provide some wildlife protection from predators. Invasive shrubs such as multiflora rose, European buckthorn, and Morrow's honeysuckle may dominate the successional shrublands over time. If left unmanaged, the successional shrublands may advance into successional hardwood forests. Due to the limited extent of successional shrubland within the Project Area, it does not provide sufficient habitat for all of the mammal, bird, reptile, and amphibian species mentioned above. While each of the species may use successional shrubland, none use this habitat type exclusively.

Successional Old Field

The open grassland habitats of successional old fields contain a vast array of grass, sedge, and rush species amongst many other herbaceous plant species. These diverse open areas provide habitat for many species that prefer open grassland settings. As with successional shrublands, the variable assortment of plant species provide highly nutritious forage material for herbivore and browser species. Successional old-field habitats typically have a high diversity and abundance of flowering forbs, which provide food for pollinators such as bees, flies, and butterflies.

Mammals believed to utilize grassland communities within the Project Area include:

- white-tailed deer
- coyote
- eastern cottontail
- gray fox
- long-tailed weasel
- red fox
- striped skunk
- various mice
- various shrews

- various moles
- woodchuck

Reptiles and amphibians believed to populate successional old-field communities within the Project Area include:

- common garter snake
- eastern American toad
- northern leopard frog
- spring peeper

Bird species that utilize successional old fields identified during field surveys include:

- American goldfinch
- bobolink
- savannah sparrow
- red-winged blackbird (*Agelaius phoeniceus*)
- eastern kingbird (*Tyrannus tyrannus*)

There are areas of successional old field at the Project Area large enough to likely support some, but not all, of the species listed above. Bobolinks and savannah sparrows were observed in successional old fields during the grassland breeding bird survey. The high forb content of the successional old fields will likely not provide optimal habitat for some birds that favor grassland habitats, such as northern harrier. Most of the successional old field habitat at the Project Area is adjacent to active agriculture and roads and is, therefore, subject to disturbance. It is likely that most of the successional old-field habitat at the Project Area is abandoned agricultural land. If left unmanaged, the successional old-field habitat will turn into successional shrubland over time.

Open Water

The open water habitats of ponds and wetlands within the Project Area support a diverse assemblage of semi-aquatic and aquatic species. Open water habitats are very important to surrounding communities as they provide increased nutrient production, facilitate waste and debris decomposition, are high in biodiversity, and provide water supply to terrestrial, aquatic, and semi-aquatic species (Keddy, 2010). These habitats can support populations of waterfowl,

amphibians, terrestrial and aquatic invertebrates, and semi-aquatic mammals as well as provide water supply and foraging opportunities to terrestrial species.

Mammals believed to utilize open water communities within the Project Area include:

- American beaver (*Castor canadensis*)
- American mink
- eastern raccoon
- muskrat (*Ondatra zibethicus*)

Reptiles and amphibians believed to populate open water communities within the Project Area include:

- American bullfrog (*Lithobates catesbeianus*)
- common snapping turtle (*Chelydra serpentina*)
- green frog (*Rana clamitans melanota*)
- northern leopard frog
- northern water snake
- painted turtle (*Chrysemys picta*)
- pickerel frog (*Lithobates palustris*)
- spring peeper

Waterfowl and wading bird species specific to the open water communities within the Project Area include:

- Canada goose (*Branta Canadensis*)
- wood duck (*Aix sponsa*)
- mallard (*Anas platyrhynchos*)
- blue-winged teal (*Anas discors*)
- great blue heron (*Ardea herodias*)
- green heron (*Butorides virescens*)
- belted kingfisher (*Megaceryle alcyon*)
- Louisiana waterthrush (*Parkesia motacilla*)
- common merganser (*Mergus mergansers*)
- hooded merganser (*Lophodytes cucullatus*)

Open water habitats also provide suitable habitat for aquatic insects that act as prey items for many fish species. Other aquatic invertebrates found in these habitats include clams, mussels, and crayfish, which also support species of higher trophic levels.

22(e) Plant and Wildlife Species Inventory

This Application includes master species lists of both plants and wildlife, including species documented during field surveys (e.g., ecological cover type assessments, habitat assessments, bird surveys, and wetland delineations) and based on data available from state and nationwide publicly available databases. Existing data from the following sources were used to compile this inventory of plant and wildlife species known to occur, or reasonably likely to occur, at the Project Area at some point during the year: NYNHP; NYSDEC; USFWS; local bird/wildlife experts; Herp Atlas; Breeding Bird Atlas; USGS Breeding Bird Surveys; Christmas Bird Counts; Hawk Migration Association of North America; eBird; and The Nature Conservancy surveys/reports. These sources were supplemented with reasonably-available public information, including those identified in paragraph (d) above, and/or not already listed in this paragraph. TRC biologists documented a total of 229 native and invasive plant species through this effort and created a plant list based on this field effort, which is included in this Application. See Appendix 22-1 for the master plant and wildlife species list.

Birds

USGS Breeding Bird Survey

The U.S. Geologic Survey (USGS) North American Breeding Bird Survey (BBS) is conducted by the Patuxent Wildlife Research Center of the USGS. This survey is an international avian monitoring program that is designed to track the status and trends of North American bird populations over a large scale and long timeframe. Each survey route is approximately 24.5 miles long. During the survey, 3-minute point counts are conducted at 0.5-mile intervals. During the point counts, every bird seen or heard within a 0.25-mile radius is recorded (Pardieck et al., 2015).

The Duanesburg survey route is approximately 11 miles south of the Project Area and encompasses similar ecological communities present on-site. A total of 118 species have been documented during the lifetime of this survey route. Most birds documented have been common species found within the forests, forest edge, shrublands, old fields, and wetlands throughout New York State. None of the species documented are federally- or state-listed threatened,

endangered, or special concern species. The most common species documented on this survey route include the following:

- red-winged blackbird (*Agelaius phoeniceus*)
- European starling (*Sturnus vulgaris*)
- American robin (*Turdus migratorius*)
- American goldfinch (*Spinus tristis*)
- common grackle (*Quiscalus quiscula*)
- American crow (*Corvus brachyrhynchos*)
- house sparrow (*Passer domesticus*)
- bobolink (*Dolichonyx oryzivorus*)
- song sparrow (*Melospiza melodia*)
- barn swallow (*Hirundo rustica*)
- common yellowthroat (*Geothlypis trichas*)
- yellow warbler (*Setophaga petechia*)
- rock pigeon (*Columa livia*)

All of these birds were observed at the Project Area during field surveys. These species are common and widely distributed throughout their respective ranges. Additionally, many of the species listed are habitat generalists which are adapted to changing and increasingly human-altered landscapes. Project development is not expected to impact any species at the population level, or significantly impact local populations in proximity to the Project Area.

New York State Breeding Bird Atlas

The New York State Breeding Bird Atlas (BBA) statewide survey resource was used to identify any bird species which breed within the Project Area. Survey point counts are conducted by volunteers in a 5 square kilometer survey block across New York State (McGowan and Corwin, 2008). The Project Area is located within a total of four New York State BBA blocks. A BBA dataset provided a detailed distribution of bird species located within these specific survey blocks inside the Project Area. A total of 105 species were observed to occur within the aforementioned survey blocks (See Appendix 22-1 for a complete list of species). Many common avian species were documented through multiple data sets, however, species documented solely from the BBA include the following:

- blue-headed vireo (*Vireo solitarius*)
- blue-winged teal (*Anas discolor*)
- Canada warbler (*Cardellina canadensis*)
- common gallinule (*Gallinula galeata*)
- common nighthawk (*Chordeiles minor*)
- grasshopper sparrow (*Ammodramus savannarum*)
- prairie warbler (*Setophaga discolor*)
- red-headed woodpecker (*Melanerpes erythrocephalus*)

One state-listed species of special concern, common nighthawk (*Chordeiles minor*), was documented during the New York State BBA surveys. This species was not observed in the Project Area during any of the surveys conducted by the Applicant.

Audubon Christmas Bird Count

In order to gain understanding on year-round and wintering avian inhabitants of the Project Area, data from the Audubon Christmas Bird Count (CBC) was obtained. The CBC provides a summary of avian species that inhabit regions during the early winter months. The primary objective of the CBC is to monitor the status and distribution of wintering bird populations in the Western Hemisphere. Counts occur in a single day during a three-week period around Christmas. A 15-mile diameter search area is created in a locale area and all bird species and individuals observed in this predetermined search area are documented. The closest and most similar predetermined CBC zone is the Fort Plain search area (Audubon Count Code: NYFP). This search area is approximately 24 miles west from the Project Area. Within the Fort Plain search area, on December 30, 2017, a total of 58 different types of avian species were reported. One state-listed endangered species, short-eared owl, was identified during the CBC. No federally-listed endangered or threatened species, or state-listed threatened or special concern species were identified. Species documented solely from the CBC include the following:

- American Tree Sparrow (*Spizella arborea*)
- common Goldeneye (*Bucephala clangula*)
- common Merganser (*Mergus merganser*)
- lapland Longspur (*Calcarius lapponicus*)
- northern Shrike (*Lanius borealis*)
- short-eared Owl (*Asio flammeus*)

- snow Bunting (*Plectrophenax nivalis*)
- snow Goose (*Chen caerulescens*)
- white-crowned Sparrow (*Zonotrichia leucophrys*)

The Cornell Lab of Ornithology eBird

In order to gain information on public observations within the Project Area, citizen science data from eBird was obtained for Montgomery County. Managed by the Cornell Lab of Ornithology, eBird is the world's largest citizen science project related to biodiversity. Birders submit when, where, and how they went birding and complete a checklist of all birds seen or heard. No federally-listed threatened or endangered species were documented on eBird in Montgomery County. State-listed endangered species documented included short-eared owl. State-listed threatened species documented included bald eagle, northern harrier, and upland sandpiper. State-listed species of special concern documented included Cooper's hawk, northern goshawk (*Accipiter gentilis*), red-shouldered hawk (*Accipiter gentilis*), sharp-shinned hawk, horned lark, common nighthawk, grasshopper sparrow, vesper sparrow, golden-winged warbler, and red-headed woodpecker (*Melanerpes erythrocephalus*). Species documented solely from the eBird data included the following:

- ring-billed gull (*Larus delawarensis*)
- broad-winged hawk (*Buteo platypterus*)
- snowy owl (*Bubo scandiacus*)
- blackburnian warbler (*Setophaga fusca*)
- pine warbler (*Setophaga pinus*)

Hawk Migration Association of North America (HMANA)

There are no HMANA sites within 15 miles of the Project Area. The closest is Helderberg Escarpment Hawkwatch in Voorheesville, NY approximately 17.5 miles to the southeast of the site. There are two years of data at this site (2015 and 2016). One bald eagle, one northern harrier, and three sharp-shinned hawks were identified on September 11, 2015, while six bald eagles, one northern harrier, four sharp-shinned hawks, and four Cooper's hawks were identified between September 9 and 15, 2016. There were no other federally- or state-listed species identified during these surveys.

A complete list of avian species that were observed or presumed to occur within the Project Area is located in the master wildlife inventory list attached in Appendix 22-1.

Bats

Refer to Section 22(f)(2) for information on correspondence with the USFWS and NYNHP indicating no known bat hibernacula and maternity roost trees at the Project Area. Research on the extent of the current distribution of common bat species ranges in the New York is undeveloped. Based on publicly available information at the time of this study, DEC lists no known summer occurrence of northern long-eared bats in Montgomery County and no known occurrences during winter or summer in the Town of Florida as of June 2018. Based on the knowledge of habitat requirements for tree-roosting bat species, forested habitat within the Project Area contains structural elements which may provide suitable roosting and foraging habitat for the following species, however given the lack of known recent occurrences within proximity to the Project, it is unlikely that these species occur:

- northern long-eared bat (*Myotis septentrionalis*)
- little brown bat (*Myotis lucifugus*)
- eastern pipistrelle (Tri-colored bat) (*Perimyotis subflavus*)
- big brown bat (*Eptesicus fuscus*)
- eastern small-footed bat (*Myotis leibii*)
- eastern red bat (*Lasiurus borealis*)
- silver-haired bat (*Lasionycteris noctivagans*)
- hoary bat (*Lasiurus cinereus*)

The northern long-eared bat is a federally and New York State-listed threatened species. Based upon initial review and consultation with the NYNHP, the Project is not located within 0.25 miles of a known occupied hibernaculum or within 150 feet of a known, occupied maternity roost tree (see Appendix 22-8). There is potential, however limited, roosting and foraging habitat for the northern long-eared bat within the vicinity of the Project Area based on field surveys. Tree species observed included eastern hemlock, red maple, American elm, sugar maple, white ash, eastern white pine, northern red oak and eastern hophornbeam. There are various trees on the Project Site that contain exfoliating bark, hollows, or furrows and crevices which could be suitable for summer roosting habitats for bat species. While the Project is primarily open agricultural fields, there are forested patches and forested riparian corridors which could be used as foraging,

travelling, and roosting habitat. Based on the factors considered herein, the Project may affect potential habitat, but is not likely to adversely affect the northern long-eared bat given the limited potential for the species to occur. Further, any incidental take that may occur is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Potential, however limited, suitable roosting and/or foraging habitat within the Project Area, including forested riparian areas, forest edges, wetlands, open water, vernal pools, and open fields is present for the remaining species listed above. Table 22-12 further describes this habitat. The distribution is not widely known for many of these species, and given the limited habitat resources available, it is unlikely that these species occur within the Project Area.

Riparian areas will not be impacted as a result of Project development. further minimizing impacts to potential habitat for northern long-eared bats and other bat species which may utilize riparian corridors for foraging or travel.

Amphibians and Reptiles

Access to common amphibian and reptile species ranges in the State of New York is provided through use of the publicly available Amphibian and Reptile Atlas Project (Herp Atlas Project) provided by the NYSDEC (2017). The Herp Atlas Project was a 10-year survey that was designed to display the geographic distribution of select New York State herpetofauna. This research effort displayed results of approximately 70 species of amphibians and reptiles in New York State. The unit of measurement for collecting Herp Atlas Project data is the USGS 7.5-minute topographic quadrangle. Based on the Amphibian and Reptile Atlas Project distribution maps provided by the NYSDEC, a range of reptile and amphibian species have been identified as occurring within the Amsterdam & Pattersonville USGS 7.5-minute topographic quadrangles encompassing the Project Area. Based on reviewing data associated with the Project Area, amphibian and reptile species potentially occurring within the Project Area or the Amsterdam & Pattersonville USGS 7.5-minute topographic quadrangles are shown in Table 22-5 below.

Table 22-5. Amphibians and Reptiles Potentially Occurring within the Project Area

Scientific Name	Common Name	7.5-Minute Quadrangle
Amphibians		
<i>Necturus maculosus</i>	Common mudpuppy	Pattersonville
<i>Ambystoma maculatum</i>	Spotted salamander	Amsterdam & Pattersonville

Table 22-5. Amphibians and Reptiles Potentially Occurring within the Project Area

Scientific Name	Common Name	7.5-Minute Quadrangle
<i>Desmognathus ochrophaeus</i>	Allegheny dusky salamander	Pattersonville
<i>Plethodon c. cinereus</i>	Northern red-back salamander	Amsterdam & Pattersonville
<i>Eurycea bislineata</i>	Northern two-lined salamander	Pattersonville
<i>Bufo a. americanus</i>	American toad	Amsterdam & Pattersonville
<i>Hyla versicolor</i>	Gray treefrog	Amsterdam
<i>Pseudacris crucifer</i>	Northern Spring Peeper	Amsterdam & Pattersonville
<i>Lithobates (Rana) catesbeiana</i>	American bullfrog	Pattersonville
<i>Lithobates (Rana) clamitans</i>	Green frog	Amsterdam & Pattersonville
<i>Lithobates (Rana) sylvatica</i>	Wood frog	Amsterdam & Pattersonville
<i>Lithobates (Rana) pipiens</i>	Northern leopard frog	Amsterdam & Pattersonville
<i>Lithobates (Rana) palustris</i>	Pickerel frog	Amsterdam & Pattersonville
Reptiles		
<i>Chelydra s. serpentina</i>	Common snapping turtle	Pattersonville
<i>Glyptemys insculpta</i>	Wood turtle	Pattersonville
<i>Trachemys scripta elegans</i>	Red-eared slider	Amsterdam
<i>Chrysemys picta</i>	Painted turtle	Pattersonville
<i>Nerodia s. sipedon</i>	Northern water snake	Pattersonville
<i>Thamnophis sirtalis</i>	Common garter snake	Amsterdam & Pattersonville
<i>Heterodon platirhinos</i>	Eastern hognose snake	Pattersonville

An amphibian’s lifecycle is dependent on water. As such, amphibian habitat preferences are assumed to incorporate wetland and waterbody features and any adjacent upland areas. Some of the wetlands and waterbodies delineated within the Project Area provide good habitat for the listed amphibian species. Wetlands that were forested and/or associated with forested upland areas within the Project Area were noted as having less disturbances. Reduced disturbance levels in habitats tend to be beneficial to most amphibian species as many are very vulnerable to compromised homeostasis and are known to be good indicators of environmental stress (Blaustein, 1994; Blaustein and Bancroft, 2007). Wetland and waterbody areas that were not encompassed by forest tended to be surrounded by active agriculture lands or were areas that

were cleared and mowed periodically. Periodic plowing, clearing, and mowing disturbances are believed to moderate the presence of amphibians in these areas.

Reptiles are a very diverse class of fauna and include very mixed habitat preferences specific to their life cycles. It is presumed that representative reptiles can be found throughout the Project Area and in a myriad of microhabitats. Specifically, turtle and snake species are known to use a variety of habitats in New York, including emergent, scrub-shrub, forested, and open water wetlands; and upland areas, including woodlands, old fields, scrublands, meadows, and residential areas. Snakes tend to traverse and utilize a multitude of habitats. Semi-aquatic turtles, which could occur in the Project Area, are believed to prefer slow-moving, open water wetlands with vegetated banks and a benthic zone of soft soil. Upland areas with little to no canopy cover are also sought after as the turtles can bask and absorb thermal energy from the vantage point of fallen logs or rocks. A select number of delineated wetlands and waterbodies within the Project Area were deemed habitable for turtles.

A vernal pool survey was performed from April 17 to May 2, 2019. Thirteen features associated with amphibian breeding were identified and mapped. These include five vernal pools, six potential vernal pools, and two amphibian breeding areas. For the purpose of this survey, vernal pools are defined as any woodland pool or non-manmade water filled depression that hosts egg masses of indicator species. Indicator species in the Project Area and surrounding region include the following obligate vernal pool breeding amphibians: spotted salamander, blue spotted salamander, Jefferson salamander, and wood frog. These species require vernal pool habitat or similar features in order to reproduce. Potential vernal pools are woodland depressions that exhibit physical characteristics of vernal pools but lack indicator species egg masses. These features may be actual vernal pools observed at a time when water levels are not conducive to amphibian breeding. Amphibian breeding areas are areas of anthropogenic origin such as ditches, tire ruts, and skidder tracks that contain amphibian egg masses. These features are not considered vernal pools although they can support indicator species. More information about the vernal pool at the Project Area can be found in Section 22(I).

A complete list of amphibian and reptile species that were observed or presumed to occur within the Project Area is located in the master wildlife inventory list attached as Appendix 22-1.

Mammals

Access to common mammal species ranges in the Northeastern United States is underdeveloped and not readily available to the public. However, observations of mammals were documented during the various on-site field studies conducted as part of this Application. Field observations encompassed the visual siting of specific species and discovery of signs of presence, including tracks, scat, and general habitat manipulation. Documentation and evaluation of available habitat for local mammals were also noted. Mammalian species known or presumed to occur within the Project Area based on observation of individuals and signs include:

- white-tailed deer
- eastern gray squirrel
- eastern cottontail
- eastern chipmunk
- eastern raccoon

Additional mammals with potential to occur within the Project Area based on habitat suitability include:

- fisher
- North American porcupine
- coyote
- American mink
- red fox
- long-tailed weasel
- Virginia opossum
- striped skunk
- northern flying squirrel (*Glaucomys sabrinus*)
- various shrews (*Blarina* spp., *Cryptotis* spp., *Sorex* spp.)
- various moles (*Condylura* spp., *Scalopus* spp., *Parascalops* spp.)

NYSDEC Hunting and Trapping Records

NYSDEC keeps records of all white-tailed deer and black bear (*Ursus americanus*) harvested during each season. In 2018, 909 adult buck white-tailed deer (over 1.5 years old) and a total of 1,654 white-tailed deer were harvested in Montgomery County (NYSDEC, 2018a). There were

two black bears harvested in Montgomery County during 2018 (NYSDEC, 2018b). Records are also kept for total fisher, North American river otter (*Lontra canadensis*), bobcat (*Lynx rufus*), and American marten (*Martes americana*) that are trapped for their pelts. During the 2018-2019 season, 12 fishers were trapped in Montgomery County, but no North American river otter, bobcat, or American marten were trapped (NYSDEC, 2019).

A complete list of mammal species that were observed or presumed to occur within the Project Area is located in the master wildlife inventory list attached as Appendix 22-1.

Terrestrial Invertebrates

Numerous terrestrial invertebrates are likely to utilize habitats within the Project Area. Terrestrial invertebrates are a diverse group of animals residing on dry land that neither possess nor develop a backbone. These include a variety of arthropods, including insects (e.g., beetles, bugs, ants, bees, butterflies, moths, cockroaches, mantis, stick insects, dragonflies, mosquitoes, fleas, crickets, grasshoppers, fireflies, cicadas, and flies), arachnids (e.g., various spider species, ticks, and mites), and myriapods (e.g., millipedes and centipedes), among many others. Worms are another form of terrestrial invertebrate which typically have a long cylindrical tube-like body and no limbs. Terrestrial species include earthworms and nematodes, which are very common invertebrates that live in the topsoil. Mollusks are another vast group of invertebrates. Of this immense group, a portion of mollusks are terrestrial and include snails and slugs.

An analysis of the Project's construction, operation, post-construction, and maintenance impacts on vegetation cover types is included in Section 22(b). An analysis of the Project's impacts on wildlife and wildlife habitats is included in Section 22(f).

22(f) Vegetation, Wildlife, and Wildlife Habitat Impacts from Construction and Operation

Impacts to vegetative cover types due to construction, operation, post-construction restoration, and maintenance are addressed above in Section (b)(2). Approximately 35.4 acres of vegetation will be temporarily impacted. Concurrently, approximately 16.6 acres will be permanently lost due to the siting of Project components. Although the siting of Project components will result in the loss of plant community acreages, no specific plant community will be significantly reduced in population or completely eradicated as a result of the Project. The Applicant has taken measures to avoid, minimize, and mitigate for vegetation impacts to the maximum extent practicable.

(1) Avian Analysis

Grassland Breeding Bird Survey

A discussion of the extent, methodology, and results of the grassland breeding bird survey can be found in Section 22(d)(2) above. A summary of the results from the grassland breeding bird survey is in Table 22-6 below. For a detailed description of the grassland breeding bird survey, including figures showing survey locations, methods, and results, please refer to Appendix 22-2.

Table 22-6. Number of Observations and Locations of Grassland Birds Observed During Breeding Bird Surveys, High River Energy Center, Spring–Summer 2018

Grassland Species	Scientific Name	Hayfield Total (6 points)	Closed Field Total (1 point)	Wet Meadow Total (5 points)	Total Observed ¹	Percent Composition
Bobolink	<i>Dolichonyx oryzivorus</i>	672	11	390	1,073	85.7
Savannah Sparrow	<i>Passerculus sandwichensis</i>	85	3	49	137	10.9
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	25	0	0	25	2.0
Vesper Sparrow	<i>Pooecetes gramineus</i>	0	0	0	0	0.0
Eastern Meadowlark	<i>Sturnella magna</i>	9	2	6	17	1.4
TOTAL		791	16	445	1,252	100.0

1. Includes observations between points.

For a detailed description of the grassland breeding bird survey, including figures showing survey locations, methods, and results, please refer to Appendix 22-2.

Wintering Grassland Raptor Survey

A discussion of the extent, methodology, and results of the grassland breeding bird survey are in Section 22(d)(2). A summary of the results from the grassland breeding bird survey is in Tables 22-7 and Table 22-8 below. For a more detailed description of the wintering grassland raptor survey, please refer to Appendix 22-3.

Table 22-7. Frequency of Raptor and Owl Observations During Stationary Surveys as Part of the Wintering Grassland Raptor Survey

Grassland Species	Scientific Name	Total	Percent Composition
Red-tailed Hawk	<i>Buteo jamaicensis</i>	14	63.6
Cooper's Hawk	<i>Accipiter cooperii</i>	4	18.1
Northern Harrier	<i>Circus cyaneus</i>	2	9.1
Bald Eagle	<i>Haliaeetus leucocephalus</i>	1	4.6
Great Horned Owl	<i>Bubo virginianus</i>	1	4.6
Total Observations		22	100.0

Table 22-8. Frequency of Raptor and Owl Observations During Driving Surveys as Part of the Wintering Grassland Raptor Survey

Grassland Species	Scientific Name	Total	Percent Composition
Red-tailed Hawk	<i>Buteo jamaicensis</i>	24	77.5
American Kestrel	<i>Falco sparverius</i>	3	9.7
Rough-legged Hawk	<i>Buteo lagopus</i>	1	3.2
Cooper's Hawk	<i>Accipiter cooperii</i>	1	3.2
Sharp-shinned Hawk	<i>Accipiter striatus</i>	1	3.2
Northern Harrier	<i>Circus cyaneus</i>	1	3.2
Total Observations		31	100.0

There was no raptor use during the grassland breeding bird survey as no northern harrier, American kestrel, or short-eared owls were observed. Wintering grassland raptor surveys indicated that the Project Area is most used by red-tailed hawks. Overall, raptor use was concentrated in the eastern half of the Project Area while the state-listed threatened species (northern harrier and bald eagle) and species of special concern (Cooper's hawk and sharp-shinned hawk) were observed in the northeastern portions of the Project area.

Bat surveys were deemed unnecessary for the Project as the Project Area is not located within 0.25 miles of a known occupied hibernaculum or within 150 feet of a known, occupied maternity roost tree (see Appendix 22-8) and therefore bat analyses were not conducted.

(2) Bat Hibernacula and Maternity Roosts

Information on bat hibernacula and maternity roosts was presented in Section (d)(2). Consultation with the USFWS and NYNHP was conducted to determine the presence of state and federally listed bat species. According to the USFWS's IPaC system, there is potential for the northern long-eared bat to occur within the Project Area. The northern long-eared bat often roosts underneath bark, in cavities, or in crevices of live and dead trees (USFWS, 2013). There is potential, however limited, roosting habitat for the northern long-eared bat within the vicinity of the Project Area based on field surveys. Tree species observed included eastern hemlock, red maple, American elm, sugar maple, white ash, eastern white pine, northern red oak, and eastern hophornbeam. There are various trees on the Project Site that contain exfoliating bark, hollows, or furrows and crevices which could be suitable for summer roosting habitats for bat species. While the Project is primarily open agricultural fields, there are forested patches and forested riparian corridors which could be used as foraging, travelling, and roosting habitat. Based upon initial review and consultation with the NYNHP, the Project is not located within 0.25 miles of a known occupied hibernaculum or within 150 feet of a known, occupied maternity roost tree (see Appendix 22-8). Database information from the NYSDEC confirmed there were no occupied hibernacula for the northern long-eared bat within the vicinity of the Project Area. Based on the factors considered herein, the Project may affect potential habitat, but is not likely to adversely affect the northern long-eared bat. Further, any incidental take that may occur is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Bats that may be present in the Project Area are listed in Section 22(e). No bat species were observed within the Project Area.

(3) Amphibian and Reptile Habitat

Amphibians and reptiles observed or that have the potential to occur within the Project Area are listed in Section 22 (d)(2). During the vernal pool surveys a total of 13 features associated with amphibian breeding were identified and mapped within the Project Area. These include five vernal pools, six potential vernal pools, and two amphibian breeding areas. A portion of the array and fence will be located within the two amphibian breeding areas. These areas are man-made ditches where wood frog egg masses were observed. Amphibian breeding areas are not considered vernal pools although they can support indicator species. These areas are not considered significant breeding habitat for vernal pool species, as they can dry up before metamorphosis is completed. Therefore, no impacts to vernal pool or vernal pool species are expected as a result of the construction or operation of the Project.

(4) Construction-related Impacts to Wildlife

Direct and indirect impacts to wildlife will occur as a result of Project construction. Impacts are anticipated to be restricted to incidental injury and mortality due to various operations, displacement due to increased human activity during construction, and habitat disturbance and/or loss (including the loss of travel corridors) as a result of clearing, earth-moving, and the siting of Project components. Each listed impact is addressed in more detail below.

Incidental Injury and Mortality

Although calculating the incidental injury and/or mortality of wildlife individuals is inherently difficult, it is understood that construction activities could generate injury or mortality to local wildlife in isolated random occurrences. It is presumed that injury and mortality will be inflicted more directly upon sedentary species (e.g., small or young mammals, reptiles, invertebrates, and amphibians). Species which are more mobile have a better ability to vacate construction areas prior to the onset of disturbance.

Mortality events due to vehicular activity is presumed to increase due to increased traffic from construction operations within the Project Area. Upon the completion of construction, traffic is expected to return to more standard patterns and frequencies so mortality events due to vehicular traffic will reduce to pre-construction levels.

Wildlife Displacement

Project construction may cause both temporary and permanent wildlife displacement. The extent of displacement will vary between species and will fluctuate depending on the nature and seasonal timing of construction activities. Displacement impacts, such as noise or simply human presence, may affect breeding, nesting, denning, and other routine use (e.g., travel, foraging, communication, and territorial marking). If construction begins before the initiation of breeding, nesting, denning, or other routine activities, then the associated wildlife will generally avoid the impact area and navigate through, or re-establish in, adjacent habitat. If construction occurs while the area is in use by a wildlife individual, then the species that are accustomed to similar land clearing disturbances are expected to relocate and utilize similar habitats in close proximity to the construction impact area. Species unable to relocate may become at risk to incidental injury or mortality. Displacement impacts as a result of the Project will be relatively minor due to the availability of habitat within close proximity for many local wildlife species. These animals will remain within or adjacent to the Project Area.

Habitat Disturbance and Loss

Approximately 35 acres of wildlife habitat will be temporarily impacted during construction of the Project. However, only approximately 16.6 acres of potential wildlife habitat will be permanently lost due to the placement of Project components. Moreover, 15.10 of the 16.3 acres of potential wildlife habitat permanently impacted, along with all 35.1 acres temporarily impacted, are currently active agricultural areas that are regularly disturbed and which provide limited perpetual habitat for wildlife due to these regular disturbances and anthropogenic pressures of active farming practices.

Specifically, it is anticipated that approximately 0.01 acre of successional scrubland, 0.002 acre of successional old fields, and 35.1 acres of active agricultural lands will be temporarily disturbed during construction. No temporary disturbance will occur within forestland. Concurrently, approximately one acre of forestland, 0.17 acres of successional scrubland, and 15.10 acres of active agricultural lands will be permanently impacted due to the Project. No permanent impacts will occur within successional old fields. Note, disturbed/developed areas were excluded from these calculations as wildlife habitat in these areas are presumably present but more marginal in nature where wildlife has adapted to survive in a disturbed setting. The Project avoids direct impacts to open-water habitats. See Exhibit 23 for a detailed discussion on impacts to surface

waters defined by on-site wetland and waterbody delineations conducted within the Project component impact areas.

In areas where the siting of Project components requires placement in forestland, successional shrubland, or successional old field, impacts will occur in areas where there is an abundance of available habitat directly adjacent to the impact area. As such, overall impacts to the habitat for wildlife individuals or species in the Project Area will be minor. Construction-related impacts will not be significant enough to adversely affect local populations of any resident or migratory wildlife species.

The USFWS Field Office in Cortland, New York was contacted for the most recent breeding, wintering, and habitat data for federally listed and protected species. The USFWS indicated the potential presence of the northern long-eared bat. While the USFWS indicated the potential presence of northern long-eared bat, the Project is not likely to adversely affect that species and complies with the final 4(d) rule. The NYSDEC was contacted to obtain the most recent breeding, wintering, and habitat data for State-listed species. The NYSDEC database has no records of State-listed species within the vicinity of the Project Area. Correspondence with the USFWS and NYSDEC is included in Appendix 22-8.

(5) Operation and Maintenance Related Impacts to Wildlife

Once construction has been completed and the Project is operational, there will be few, if any, impacts to wildlife. The solar panels and substation are stationary so will not impact wildlife due to their operation. Vehicles will visit the site infrequently and will stay on the access roads; therefore, there will be little opportunity to impact wildlife by driving on the site. Routine maintenance, including mowing the grass, will occur 2-3 times a year at most. Most wildlife which will be within the fenceline are mobile enough to avoid being impacted due to that activity.

(6) Assessment of Herbicide Application

As noted in the Appendix 22-7, the ISMCP, and Appendix 5-4, Preliminary Operations and Maintenance Plan, the use of herbicides may be necessary for vegetation not effectively removed by mechanical means. Short-term impacts from herbicide application can occur from physical contact and direct toxicity with non-target plant species (Briggs, 1992). Herbicide application will be performed by spot treatment at targeted concentrations of invasive plant species to minimize the risk of spraying non-target plant species. Herbicides have a minimal short-term effect on

animals as herbicides target plant processes and are not acutely toxic to wildlife (Tatum, 2004). The long-term effect of herbicide application is potential change to the vegetation community structure from large-scale, non-selective spraying. Herbicide application at the Project, however, will not be performed by broad-scale, non-selective spraying, therefore, long-term impacts resulting in large-scale changes to vegetation community structure are not anticipated. If herbicide application is required in aquatic resources, the Applicant will follow the NYSDEC's *Recommendations Regarding the Use of Aquatic Herbicides in Fish-Bearing Waters of the State* (2015d). The Applicant will use EPA and NYSDEC registered and approved herbicides. Herbicide application will be performed by someone with a Commercial Pesticide Use Applicator's License from the NYSDEC. All herbicide application will comply with state and federal regulations.

(7) Literature and Impact Analysis for Grassland Bird Species

There are relatively few studies quantifying the effects of utility scale solar projects on biodiversity, including birds. The currently available peer-reviewed publications on renewable energy, including solar, are insufficient to thoroughly assess the impact of utility scale solar projects on wildlife populations (Lovich and Ennen, 2011). The two types of direct impacts to birds from utility scale solar projects occur in the form of burning and collisions (Walston Jr. et al., 2016). Mortality studies are inherently lacking with specific reference to utility-scale ground-mounted solar. Of studies which investigated direct impacts to birds from solar facilities, all were conducted on facilities in the southwestern United States and therefore are only moderately applicable to projects in the northeast, which contain significantly different habitat, species assemblages, and associated population trends.

A study of avian mortality at a 10 MW heliostat solar power plant in California (California Solar One) recorded 70 bird fatalities representing 26 species over a period of 40 weeks (McCrary et al. 1986). Grassland bird species with collision fatalities recorded in this study included horned lark and savannah sparrow. The estimated avian mortality rate was 1.9–2.2 birds/week, which had a minimal impact on the local bird population (McCrary et al., 1986). It is important to note that this study was of a heliostat solar field with a concentrating tower (i.e. “thermal solar”) and did not use PV technology. PV technology, unlike heliostat solar fields, does not involve the concentration of solar rays which creates a high-heat area surrounding the tower, or light reflections which can attract birds and insect prey. PV technology is comparatively safer than thermal solar for birds (National Audubon Society, 2017).

A study of three utility-scale solar energy facilities in Southern California, including California Solar One, found that the one PV solar facility in the study had a mortality rate of 0.5 birds/MW/year from direct impacts attributed to the solar facility (Walston Jr. et al., 2016). The avian mortality rate from direct impacts at the PV solar facility was less than the avian mortality rate from direct impacts at the two heliostat solar facilities in the study (10.24 and 3.96 birds/MW/year) (Walston Jr. et al. 2016). The difference in bird mortality rate from direct impacts between PV and heliostat solar facilities could have been due to decreased risk of burning at the PV solar facility. The study by Walston Jr. et al. (2016) estimated bird mortality from solar facilities in comparison to other sources of bird mortality. The table from their study is shown in Table 22-9 below.

Table 22-9. Estimated annual avian mortality from anthropogenic sources in the U.S.

Mortality Source	Estimated Annual Mortality	Percent of Overall Mortality
Buildings and Windows	365–988 million	73–75%
Roadway Vehicles	89–340 million	20–25%
Fossil Fuel Power Plants	14.5 million	1–3%
Communication Towers	4.5–6.8 million	<1%
Wind Energy Developments	140,000–573,000	<1%
Utility Scale Solar Energy Developments	37,800–138,600	<1%

The avian mortality at utility scale solar energy facilities accounts for fewer than 1% of avian mortality and is insignificant when compared to other anthropogenic sources. Solar facilities primarily affect birds at the local scale and not at the population level (Sánchez-Zapata et al., 2016), however, even effects to local populations are minimal at PV solar facilities (Walston Jr. et al. 2016).

The Project is located on the edge of the Mohawk Valley Grassland Focus Area as defined by the NYSDEC Grassland Landowner Incentive Program, which promotes habitat protection for grassland birds. Grassland birds are declining in New York State due to the loss of agricultural lands such as pastures and hay fields. The NYSDEC commissioned a study of breeding grassland birds across New York State that used BBA data to identify regions (i.e., focus areas) with

significant remaining grassland bird populations (Morgan and Burger, 2008). As a result, the NYSDEC created a grassland landowner incentive program to protect grassland bird habitat on private lands within these focus areas.

The grassland bird study commissioned by the NYSDEC identified the following as species with the highest priority for conservation:

- northern harrier;
- upland sandpiper;
- short-eared owl;
- sedge wren;
- Henslow's sparrow;
- grasshopper sparrow;
- bobolink; and
- loggerhead shrike (*Lanius ludovicianus*).

The report also identified "high priority species for conservation" including:

- horned lark;
- vesper sparrow;
- eastern meadowlark; and
- savannah sparrow.

The principal bird species targeted for conservation within the Mohawk Grassland Focus Area are northern harrier, upland sandpiper, and wintering short-eared owl. Of the highest priority species identified by NYSDEC, northern harrier, grasshopper sparrow, and bobolink have been observed within the vicinity of the Project Area (see Section 22(d)(1), Appendix 22-2 and Appendix 22-3). The grassland breeding bird survey documented bobolink, savannah sparrow, eastern meadowlark, and grasshopper sparrow within the Project Area (see Section 22(d)(1), Section 22(f)(1), and Appendix 22-2). Northern harrier was observed during winter raptor surveys (see Section 22(d)(1), Section 22(f)(1), and Appendix 22-3).

Grassland birds in New York State are typically found in cultivated crops, pastures, and old fields. While species-specific requirements for grassland birds vary, the habitat provided by row crop cover is generally considered marginal for species such as bobolink, grasshopper sparrow, and savannah sparrow (Morgan and Burger, 2008). Agricultural operations provide reduced foraging

opportunities, provide lower vertical structure and horizontal cover, are often monotypic in floristic diversity, and generally experience increased disturbance associated with human activity. Bobolinks prefer fields of at least 25-acres of medium to low vegetation density with at least 8 years since the last plowing and reseeding (Bollinger and Gavin, 1992; Morgan and Burger, 2008). Vegetation in bobolink habitat typically has a mix of medium-height grasses and a high forb component with plants such as red clover (*Trifolium pratense*) and dandelion (Morgan and Burger, 2008; NYSDEC, 2015c). Savannah sparrows prefer open grasslands with medium vegetation density at least 12–25 acres in area (Bollinger and Gavin, 1992; Morgan and Burger, 2008). Grasshopper sparrows prefers open grasslands with low vegetation density at least 123–247 acres in area (Bollinger and Gavin, 1992; Morgan and Burger, 2008). A key feature of grasshopper sparrow habitat is little to no litter and large areas of evenly distributed bare soil (Morgan and Burger, 2008; NYSDEC, 2015c). Savannah sparrows prefer open grasslands with medium vegetation density of at least 12 -25 acres in area (Bollinger and Gavin, 1992; Morgan and Burger, 2008). Habitat assessments within the Project Area identified 593 acres of potential habitat for the species listed above. No grassland patches exhibited low density vegetation, and most received some management (e.g., mowing) during the grassland breeding bird Study period. While some components required by these species were present in grasslands throughout the Project Area, conditions would be most consistent with sub-optimal or low-quality breeding habitat.

The suite of grassland birds identified within the Project Area, and those with the potential to occur, are primarily widely distributed throughout the New York, with recent and multiple records in counties where grassland habitat exists. A review of the literature surrounding these species indicates that while trends are declining state-wide for many grassland birds, many are also adapting to changing habitat at the landscape scale. To date, there has been only one peer-reviewed study of the indirect effects of ground-mounted solar systems and birds (DeVault et al., 2014). This study found that bird density was greater at solar systems when compared with managed grassland at nearby airfields. The same study found several grassland species using solar systems including eastern meadowlark, grasshopper sparrow, and savannah sparrow (DeVault et al., 2014). Several grassland bird species in fact may benefit from the conversion of agriculture to more structurally diverse vegetation typically seeded beneath and between solar panels. Following construction, solar energy facilities typically use grass seed mixes to establish a stabilized vegetative ground cover. These grass seed mixes are comprised of grasses that are native and/or indigenous to the area and are considered favorable for wildlife habitat and sustainable growth. Additionally, the effects of climate change have been identified as a

preeminent threat to continental bird populations (National Audubon Society, 2014). Increasing the capacity to generate energy from renewable sources will indirectly benefit birds through climate change mitigation.

(8) Summary Impact Table

A summary table that quantifies anticipated temporary and permanent impacts to wildlife habitats due to the Project construction and operation is provided in Table 22-10 below.

Table 22-10. Impacts to Wildlife Habitat

Wildlife Habitat	Conversion (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Total Impact (acres)
Agricultural Land	450.9	35.10	15.10	501.1
Successional Old Field	0.02	0.002	0	0.022
Successional Shrubland	4.10	0.01	0.17	4.28
Forestland	29.10	0	1.00	30.1
Total	484.12	35.112	16.27	535.50

(9) Impacts to Wildlife and Wildlife Habitat

Operation-related impacts, or impacts that can occur to vegetation, wildlife, and wildlife habitat while the solar facility is functioning, include direct habitat loss, habitat degradation through forest fragmentation, disturbances due to solar array operation, and specific mortality as a result of solar array collisions.

Habitat Loss

A direct and permanent loss of approximately 16.27 acres of wildlife habitat will occur as a result of the Project. Total habitat loss represents 1.33 percent of the total 1,221 acres included in the Project Area. Of this percentage, approximately 6.15 percent of the loss is to forestland, 1.0 percent is to successional shrublands, while the vast majority, 92.8 percent, is to active agriculture. Approximately 29.1 acres of forest land will also be converted into successional communities, which are of value to several wildlife species within the Project Area. As stated previously, active agriculture supports a limited wildlife habitat value, and revegetation following construction may improve habitat conditions for grassland species. In comparison to the Study

Area, only 0.09 percent of habitat loss (including habitat conversion) will occur as a result of the Project and is not considered a significant loss to the local setting.

Habitat Degradation (Forest Fragmentation)

As stated previously, forest fragmentation occurs when large tracts of forestland are divided into smaller patches due to canopy removal or the overall clearing of forestland. The potential effects of forest habitat fragmentation depend in part on previous land use, the original extent of intact forested habitat, the extent of habitat that will be impacted during and after construction, and the behavioral sensitivity of potentially affected species or species groups, which include both residents and migrants. Impacts to species as a result of forest fragmentation may vary temporally and may have short-term or long-term effects depending on the species.

Fragmentation creates edge effects in areas that were previously continuous forest habitat. Edge effects are changes which occur in species populations or community structure at the periphery of two habitats. Areas with small habitat fragments exhibit edge effects which may extend throughout the range. Edge effects vary somewhat with distance from forest edge, depending on the type of effect and species of vegetation or wildlife (USDA NRCS, 2012). However, within the State of New York, 300 feet is frequently used as a general range for the edge effect disturbance line, which is the distance into a forest patch where the edge effect disappears and interior forest conditions are proposed to begin generally (USDA NRCS, 2012).

Forested area comprises approximately 17.7 percent of land cover within the Project Area. Forestland within the Project Area has been previously cleared for agriculture, resulting in small, non-contiguous fragments. Approximately 182.1 acres, or 84.4 percent of the forestland at the Project Area, can be classified as edge forest. It is expected that clearing for all Project Components (access roads, collection lines, and laydown areas) associated with the Project may remove up to 30.1 forested acres, reducing the amount of forest land from 215 to 184.9 acres within the Project Area. This would be a relatively minor reduction, amounting to a loss of 14 percent of forestland within the Project Area. Also as a result of the placement of Project Components, there will be an assumed net loss of 0.01 acres of interior forest. Interior forest is defined as core forest areas containing a specific ecology and community structure occurring at least 300 feet from the forest edge. Concurrently, forest clearing would result in 8.51 acres of interior forest converted to peripheral forest. Despite a slight reduction in forested area within the Project Area, existing forest patches have been previously fragmented due to conversion to agriculture. These patches are not consistent with conditions which would be expected in intact

interior forest and are not likely supporting species assemblages containing rare, interior, of forest specialist species. Changes to forested conditions resulting from Project construction are unlikely to alter species behaviors or diversity following initial disturbances associated with construction activity.

Amphibians and Reptiles

Immediate disturbances during the construction phase of the Project may cause disruption of amphibians and reptiles at the Project Area. Travel between habitats that may be used by amphibians and reptiles may be disrupted. Amphibians and reptiles are less mobile than other species, therefore, injury and mortality are more likely to result from the construction of the Project than to other, more mobile taxa. However, as no wetlands will be impacted by the Project, there will be no direct impact to the preferred habitat of amphibians. Further, no species of concern have been identified within the Project Area.

Game Species

Immediate disturbances during the construction phase of the Project will cause disruption of local game species (e.g., white-tailed deer, ruffed grouse, and turkey). However, other than the nests sites (eggs) and infant fawns, these species are very mobile. Consequently, injury and mortality are not expected as a result of immediate disturbance. After the construction phase of the Project is completed, game species generally will adapt to the cleared areas and perimeter fencing. The perimeter fencing will inhibit travel and foraging of larger game species such as whitetail deer; therefore, it is presumed they will search for new foraging habitat elsewhere within the Project Area and nearby vicinity.

(10) Impacts to State and Federally Listed Species

A “take” of state or federally listed threatened and/or endangered species will not be caused by the construction or operation of the Project. Correspondence with NYSDEC confirmed there were no data sets for threatened and/or endangered species at the Project Area. Post-construction monitoring will not be necessary, because there will be no take to state- or federally listed threatened and/or endangered species. Refer to section 22(o)(2) for further discussion on impacts to state and federally listed species.

(11) Cumulative Impact Analysis for Grassland Habitat

A cumulative impact analysis for grassland habitat was performed at the request of NYSDEC to evaluate possible impacts from the construction, operation, and maintenance of the Project on federally and State-listed threatened or endangered species, particularly grassland birds, in combination with the impacts of proposed and operating solar energy projects within a 100-mile Grassland Study Area. The cumulative impact analysis is included in Appendix 22-4 and summarized below. The results of this conservative analysis indicate that the grassland habitat within the boundaries of the 187 Study Projects accounts for less than 1 percent of available grassland habitat within the entire Grassland Study Area.

An analysis was conducted utilizing a database containing mapped solar facilities (existing or proposed) which was provided by NYSDEC to locate facilities with a generating capacity greater than or equal to 5 MW occupying grassland habitat within 100 miles of the Project Area in the boundary of New York. A desktop review was conducted to determine grassland bird use within the Grassland Study Area using both publicly available information regarding the Study Projects and publicly accessible records of bird occurrence at the county level. Spatial analysis was performed to determine the extent of grassland habitat among Study Projects and within the broader Grassland Study Area. Cumulative impacts were estimated by evaluating the overall loss of habitat relative to the percent of habitat available. A review of the NYSDEC database returned 187 Study Projects. Study Projects were identified in 26 of the 32 counties within the Grassland Study Area. Ulster County contained the highest concentration of Study Projects with 23 projects identified, followed by Orange County (18 projects identified) and Albany (18 projects identified). Montgomery county, where the Project is located, contains 14 additional proposed or existing projects Study Project locations are depicted in Figure 2 of the report.

Study Projects, including the Project, encompass a total of 41,093 acres within the Grassland Study Area. Of the 187 Study Projects, 29 have already been constructed and account for 2,365 acres of development. It should be noted that none of the proposed Study Projects in the database provided information regarding the total impact resulting from construction within their respective project area boundaries, therefore the total area reported is likely an overestimation.

Study Projects within Oneida County comprised the largest amount of acreage among Study Projects, with total area of 14,193 acres across nine projects comprising 34.5 percent of the area of development within the Grassland Study Area and 1.7 percent of total area within the County.

Study Projects in Montgomery County, where the Project is located, have a total area of 7,899 acres across 15 projects accounting for 19.2 percent of the total area of development within the Grassland Study Area and 3.1 percent of land area in the County.

Several target grassland species were identified within the Project Area during the grassland breeding bird and winter raptor surveys. Species observed included bobolink, savannah sparrow, grasshopper sparrow, vesper sparrow, eastern meadowlark, and northern harrier. Three harriers (State Threatened) and one bald eagle (State Endangered) were observed during the winter grassland raptor survey. One individual sharp-shinned hawk (Special Concern) and one Cooper's hawk (Special Concern) were also observed during winter raptor surveys conducted within the Project Area.

A review of the NYNHP and eBird databases was performed to determine the most recent occurrence of grassland birds within each of the 25 counties where Study Projects were identified (see Tables 2 and 3 of the report). Numerous species were widely distributed and had recent records among the counties, and all have been recently observed (within last 10 years) in Montgomery County except for Henslow's sparrow and sedge wren. Few species were less recently recorded or limited in distribution, including:

- Barn Owl; observed in 13 counties; no records in Montgomery County
- Henslow's Sparrow; observed in 12 counties; last observed in Montgomery County in 2011
- Sedge Wren; observed in 15 counties; last observed in Montgomery County during BBA in 2000-2005
- Upland Sandpiper; observed in 21 counties; last observed in Montgomery County in 2019

Recent records for the remaining species indicate widespread distribution within the Grassland Study Area. Although only the most recent record is reported, many of these species (with the exception of those listed above) were also documented in each of these counties during the most recent Breeding Bird Atlas, conducted from 2000-2005, indicating a persisting population over the previous 15-20 years (NYS BBA, 2008).

Together, the 187 Projects comprise 41,093.2 acres of proposed development within the 14,924,026-acre Grassland Study Area (0.9% of total area; see report Table 6). Grassland habitat within the boundaries of the Study Projects total 18,733 acres, which covers 45.6% of the

proposed area of development among the projects. Grassland habitat among Study Projects accounts for approximately 1.01% of available grassland habitat within Grassland Study Area, and less than 0.15% of total land area (see report Table 6). The total limits of disturbance were unavailable for most of the Study Projects, and as a result the extent of permanent impacts to grassland habitat within the Grassland Study Area could not be quantified, therefore these results likely reflect an overestimation.

The Grassland Study Area covers over 14 million acres in New York. The proposed Study Projects' development, while overstated in this analysis, represents an insignificant cumulative impact to grassland bird populations both locally and regionally. Provided that all of the 187 Study Projects are developed, these facilities will affect less than 1% of available grassland habitat. This analysis represents an extremely conservative approach which certainly overestimates impacts due to the lack of information available regarding the specific limits of disturbance for each of the Study Projects reviewed and the probability that the proposed projects included will ultimately be developed. Further, substantive research indicates that the conversion from active row crop production to solar facilities could improve habitat quality for avian species reliant upon grassland habitat. Revegetation and seeding efforts following construction create conditions similar to the preferred habitat for species including savannah sparrow, bobolink, and other grassland obligates, providing increased structural and floristic diversity (Walston Jr. et al. 2016, N.A.S. 2017).

22(g) Avoidance and Minimization of Impacts to Vegetation, Wildlife, and Wildlife Habitat

Discussion on mitigating the impact to plant communities within the Project Area can be reviewed in Section 22(c)(1).

To the maximum extent practicable, the Project components have been intentionally sited within active agricultural fields. This effort was done largely to reduce impacts to natural communities and wildlife habitat. Active agricultural areas provide limited wildlife habitat due to recurrent disturbances in the form of clearing, mowing, plowing, and harvesting by the landowner, as well as the general monotypic environment offered. As such, construction of the Project in these areas will minimize the species and habitats impacted by the Project. Furthermore, agricultural land used for Project Components can be restored for agricultural use as part of Project's Decommissioning Plan (see Exhibit 29).

As mentioned in Section 22(f)(9), there is no anticipated take to state- or federally-listed species at the Project Area during construction or operation. Therefore, mitigation for state- and federally-listed species is not necessary.

(1) Potential Deer Crossing Impacts

Approximately 479.3 acres (39%) of the Project Area will be enclosed by fencing. Fencing will consist of 2" diamond mesh chain link and will be 8 feet in height with a 6-inch clearance from the bottom of the fence to grade to allow for small animal access. This fencing will go through active agriculture, forestland, successional shrubland, and successional old field communities. Fencing will limit the movement of some wildlife species, particularly mammals that utilize two adjacent communities, such as forests and grasslands/agriculture. Larger mammals such as white-tailed deer, eastern cottontail, red fox, coyote, gray fox, bobcat, and striped skunk may be affected by the perimeter fencing. The access to foraging habitat may be reduced by the perimeter fencing. Proper siting of fencing will minimize the impact on wildlife travel corridors. Existing corridors have been preserved where possible to allow for wildlife and agricultural access. Fencing will be erected around individual solar arrays with sufficient spacing to allow for uninhibited travel between arrays. Specifically, primarily forested corridors connecting non-contiguous forest patches are preserved which cross-cut the Project from east to west, and an additional corridor will provide access from the center of the site to agricultural fields located north and northeast of the Project. There is additional agricultural land and grassland in the vicinity of the Project Area that will be unaffected by the perimeter fence. It is anticipated that wildlife species unable to access foraging habitat due to the perimeter fencing will find new foraging habitat elsewhere within the vicinity of the Project Area.

Due to the Project's proximity to the New York State Thruway, additional consideration was given to fencing adjacent to the Thruway. Project fencing will be located more than 200 feet from the Thruway boundary, with the closest distance between the fence and the Thruway property boundary being 209 feet. The Applicant has consulted with the New York State Thruway Authority regarding potential effects of the proposed fencing and no response has been received as of the filing of this Application.

22(h) Avian and Bat impacts from Wind Powered Facilities

Specific impacts to avian and bat species related to wind powered facilities is not applicable to this Project.

22(i) Map Depicting Wetland Boundaries

(1) Wetland Mapping

Wetland surveys were conducted to identify wetlands and streams within the Project Area and within 500 feet of areas to be disturbed by construction of the Project. Surveys were performed in accordance with the *USACE 1987 Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0) (USACE, 2012), the *New York State Freshwater Wetlands Delineation Manual* (Browne et al., 1995), and the DPS Staff interpretation date May 31, 2018, concerning the delineation of all federal, state, and locally regulated wetlands present at the Project Area and within 500 feet of areas to be disturbed by construction, including the interconnections; and predicted presence and extent of wetlands on the remainder of the Project Area properties and adjacent properties within 500 feet of areas to be disturbed by construction. TRC conducted on-site wetland surveys for approximately 1,221 acres of leased private lands within the Project Area, and this area is referred to as the Wetland Delineation Survey Area throughout this Exhibit. All current wetland and waterbody delineations took place in the summer of 2017, the spring and summer of 2018, and spring of 2019. See Figure 22-2 depicting TRC delineated wetlands within the Wetland Delineation Survey Area.

(2) Predicted Wetlands

Wetland estimation only occurred for areas within 500 feet of areas to be disturbed by construction of the Project. In order to approximate wetland boundaries out to 500 feet from Project components (beyond the delineated portion), TRC conducted desktop analysis incorporating the interpretation of aerial imagery signatures, on-site observations, soils mapping, analysis of topography, and existing databases of wetland mapping maintained by the USFWS National Wetland Inventory (NWI) and NYSDEC. Within this Exhibit, wetlands identified past the established Wetland Delineation Survey Area are referred to as “predicted wetlands.” See Figure 22-2 depicting predicted wetlands within the Wetland Delineation Survey Area and subsequent 500-foot area from Project components.

(3) Wetland Boundaries

The boundaries of wetlands were recorded with a Trimble Geo 7000 XH GPS unit with reported sub-meter accuracy or a Juniper Geode GPS/GLONASS Sub-meter Receiver. See Appendix 22-

5, Wetland and Waterbody Delineation Report, for a detailed description of the determination of wetland boundaries for the Project. Wetlands identified within the established Wetland Delineation Survey Area are referred to as “delineated wetlands.”

(4) Jurisdictional Wetlands

None of the wetlands delineated inside the Project Area were associated with currently mapped NYSDEC freshwater wetlands, therefore, none of the wetlands in the Project Area fall under state jurisdiction pursuant to Article 24 of the NYS Environmental Conservation Law (ECL).

(5) Wetland Shapefiles

See Appendix 22-5, Wetland and Waterbody Delineation Report, for a detailed description of the delineated wetlands including potential jurisdictional status. See Figure 22-2 depicting the TRC delineated and predicted wetlands within the Wetland Delineation Survey Area and subsequent 500-foot area from Project Components. See Figure 22-3 for the extent of the NYSDEC mapped wetlands. Shapefiles of the delineated wetlands will be provided to the NYSDEC and NYSDPS.

22(j) Characterization of Wetlands within the Project Area

A description of wetland and stream cover types delineated within the aforementioned Wetland Delineation Survey Area associated with the Project Site described in detail below. Each wetland or waterbody was assigned cover types based on the Cowardin classification system (Federal Geographic Data Committee, 2013). In some instances, a delineated wetland or stream contained multiple cover types due to its larger size and/or a more complex community character. Boundaries were demarcated and data plots were taken from each specific cover type within a wetland or waterbody. This method was done in order to establish a more complete depiction of specific waterbodies and wetlands and a more informative approach to any potential future mitigation efforts.

Palustrine Emergent wetlands (PEM) – A total of 27 wetlands delineated within the Project Area contain characteristics representative of the emergent wetland classification. Emergent wetlands are dominated by an herbaceous layer of hydrophytic (water-tolerant) plant species. Emergent wetlands typically contain deep, nutrient rich soils that remain heavily saturated or even inundated throughout the year.

Emergent wetlands encountered in the Wetland Delineation Survey Area were typically dominated by soft rush (*Juncus effusus*), narrow-leaf cattail (*Typha angustifolia*), broad-leaf cattail (*Typha latifolia*), sensitive fern (*Onoclea sensibilis*), all first observed July 17, 2017, jewelweed (*Impatiens capensis*), first observed July 18, 2017, reed canary grass, and purple loosestrife. Evidence of wetland hydrology for these wetlands included high water table, saturation, aquatic fauna, drainage patterns, geomorphic position, and FAC-neutral test. Hydric soil indicators adhered to descriptions and guidelines outlined in Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.1 (NRCS, 2017). Although hydric soils indications were variable, emergent wetlands within the Wetland Delineation Survey Area typically displayed black to dark brown (10YR 2/1 – 10YR 3/2) silty loam and clay loam soils. Variations of characteristics in the soil matrices generally demonstrated Depleted Matrix (F3) and Redox Dark Surface (F6) hydric soil indicators.

Palustrine Scrub-shrub wetlands (PSS) – A total of 13 wetlands delineated within the Project Area contained characteristics representative of a scrub-shrub wetland community. Scrub-shrub wetlands are dominated by woody shrub vegetation that stand less than 20 feet tall. Shrub species dominating the wetland could include true shrubs, a mixture of young trees and shrubs, or trees that are small or stunted due to stressors from explicit environmental conditions.

Scrub-shrub wetlands encountered in the Wetland Delineation Survey Area were typically dominated by European buckthorn, silky dogwood, and willow species. Herbaceous vegetation in these areas were dominated by sensitive fern, spotted touch-me-not, and various sedges. Evidence of wetland hydrology for these wetlands included saturation, a high water table, hydrogen sulfide odor, moss trim line, drainage patterns, geomorphic position, micro-topographic relief, and the FAC-neutral test. Scrub-shrub wetlands within the Wetland Delineation Survey Area typically displayed black to dark gray (10YR 2/1 – 10YR 4/2) silty loam soils. Variations of characteristics in the soil matrices generally demonstrated Depleted Matrix (F3), Redox Dark Surface (F6), and Hydrogen Sulfide (A4) hydric soil indicators.

Palustrine Forested wetlands (PFO) – A total of 12 wetlands delineated within the Project Area contained characteristics representative of forested wetland. Forested wetlands are sometimes referred to as swamps and are dominated by tree species 20 feet or taller with an understory of shrub and herbaceous species. Understory vegetation presence readily varies, as the upper canopy of tree species may block sufficient light for extensive vegetative growth in the understory. Coniferous swamps, lowland hardwood swamps, and floodplain forests are common types of

forested wetlands. Soils in forested wetlands are typically inundated or saturated early spring into summer. Some forested wetlands may dry up entirely, which reveal water stain marks along the trunks of exposed tree species and shallow, buttressed root systems indicative of periods of heavy inundation events.

Forested wetlands encountered in the Wetland Delineation Survey Area were typically dominated by tree species of eastern green ash, red maple, eastern cottonwood, and black willow (*Salix nigra*), first observed July 17, 2107. Understory vegetation typically included saplings of the aforementioned species or shrub species, such as silky dogwood and European buckthorn. Herbaceous species included sensitive fern, spotted touch-me-not, American hogpeanut (*Amphicarpaea bracteata*), first observed July 19, 2017 and New York fern. Evidence of wetland hydrology for these wetlands included saturation, a high water table, drift deposits, aquatic fauna, drainage patterns, geomorphic position, geomorphic position, and the FAC-neutral test. Forested wetlands within the Project Area typically displayed black to dark brown (2.5YR 5/2 – 10YR 5/2) silty clay loam soils. Variations of characteristics in the soil matrices generally demonstrated Depleted Matrix (F3), Redox Dark Surface (F6), Redox depressions (F8) hydric soil indicators.

Palustrine Unconsolidated Bottom (PUB) – A total of seven wetlands delineated within the Wetland Delineation Survey Area contained characteristics representative of unconsolidated bottom wetlands. Unconsolidated bottom wetlands are characterized by surface water and have less than 30 percent vegetative cover and at least 25 percent cover of particles less than stones. As these are bodies of standing water, evidence of wetland hydrology was decisively present with standing water ranging from approximately 2–4 feet in depth. Evidence of wetland hydrology included surface water, high water table, saturation, algal mat or crust, inundation visible on aerial imagery, aquatic fauna, geomorphic position, and FAC-neutral test. Dominant herbaceous species included ribbon-leaved pondweed, narrow-leaf cattail, and common bladderwort (*Utricularia macrorhiza*), first observed July 17, 2017. Unconsolidated bottom wetlands had gray (2.5Y 6/1) gravely silt soils. Variations in the soil matrices demonstrated Depleted Matrix (F3) hydric soil indicators.

Palustrine Aquatic Bottom (PAB) – One wetland delineated within the Wetland Delineation Survey Area contained characteristics representative of aquatic bottom wetlands. Aquatic bottom wetlands are characterized by surface water and have at least 30 percent vegetative cover. Vegetation consists of submerged or floating-leaved rooted vascular plants and free-floating vascular plants. Evidence of wetland hydrology included surface water, high water table,

saturation, aquatic fauna, and FAC-neutral test. Dominant herbaceous species included broadleaf cattail, reed canary grass, and common bladderwort. The aquatic bottom wetland within the Project Area displayed gray (2.5YR 6/1) silty clay soils. Variations of characteristics in the soil matrices generally demonstrated Depleted Matrix (F3) hydric soil indicators.

Streams (RUP, RIN, REPH) – A total of 49 streams were delineated within the Project Area. Classification of streams were dependent on a temporal description of their usual level of flow regimes. Perennial streams (RUP) tend to flow all year, except during severe drought conditions. Perennial streams can flow below the water table and receive groundwater flow sources from springs or groundwater seepages on slopes. Intermittent streams (RIN) flow only during certain times of the year from alternating springs, snow melts, or from runoff from seasonal precipitation events. Intermittent streams can flow above or below the water table. Ephemeral streams (REPH) flow sporadically and are entirely dependent on transient precipitation from storm events or from periodic snow melts. These streams tend to flow above the water table and are often found as drainage features adjacent to, or within, the headwaters of a more major stream system.

Streams encountered in the Project Area were mostly ephemeral in nature and occurred in agricultural communities along moderate gradients (2–4 percent). They generally contained channel substrates of silt, clay, cobble, and gravel with probed stream depths in the range of <1–6 inches. Most streams were determined to be only utilized as drainage features and lacked substantial features to permit the prevalence of aquatic ecologies. Thirteen streams within the Project Area are classified as Class C by NYSDEC and may support fish populations.

Further characterization of the wetlands and streams can be found in Appendix 22-5.

22(k) Qualitative and Descriptive Wetland Function Assessment

Recognizing the limitations of wetland assessment in only the aspect of numerical weightings and averaging, stresses the need for a qualitative description of the physical, chemical, biological, and geological characteristics of wetlands in order to identify and measure exhibited functions and values. For many audiences, such a measurement can be highly subjective. In the past, efforts to utilize best professional judgments to interpret functions and values would often be unorganized, unpredictable, and legally difficult to defend and document (USACE, 1995). In response, the USACE developed a supplement to the *Highway Methodology Workbook entitled Functions and Values: A Descriptive Approach* (Supplement). This assessment example was created in order to collect and describe the functions and values assessment of wetlands in a

measurable and un-biased perspective. It is for these reasons that the Applicant elects to utilize elements of the USACE, Highway Methodology, and processes outlined in the Supplement, to conduct a qualitative assessment of the physical characteristics of the wetlands and identify the functions and values which they exhibit.

The functions and values of wetlands are the favorable roles that a wetland provides to its surrounding environment and also towards the benefit of human society. Functions and values are a result of specific biological, chemical, and physical characteristics within the wetland and any complex relationships maintained by the wetland within its watershed, local environment, and the general public.

Assessing a specific wetland's function and value is needed to determine the overall effects an impact or alteration may have on a wetland feature. Ultimately, such a measurement aids in establishing the appropriate type and amount of mitigation after impacts to a wetland occur. More recently, the assessment of the functions and values for wetlands have been used to consider wetland features for their value and functional significance, to better ensure that wetlands with specific and higher functions or values receive proper vindication. Toward that end, a wetland functions and values assessment was undertaken for the Project Area. A comprehensive description of the functions and values of all wetlands delineated follows.

The thirteen functions and values that are considered by the USACE through their Supplement are listed below. The list includes eight functions and five values. Although the functions and values listed are not the only wetland functions and values possible, they do represent the current working suite provided by the USACE for regulatory consideration and do match well with the wetland benefits depicted within ECL Article 24. As such, they are thought to provide an objective and meaningful representation of the wetland resources associated with the Project. Based on processes outlined in the Supplement, a spreadsheet was created to include several basic considerations ("qualifiers") that help identify the functions and values provided by wetlands. These considerations are numerous, but include observed vegetation conditions, hydrologic conditions, size, adjacent area conditions, and the availability of public access. To see the aforementioned spreadsheet and receive more detail on the functions and values assessment, see Appendix 22-6. Each wetland's functions and values were evaluated based on data collected during field delineation meeting specific conditions. All wetlands identified within the Wetland Delineation Survey Area were entered into the spreadsheet. Various wetland characteristics were

identified for each wetland. Based on these data, the functions and values provided by each wetland were determined.

Wetland Functions

Wetland functions are the properties or process of a wetland ecosystem which aid in promoting a homeostatic natural environment while in the absence of human interference. A wetland's specific function results from both organic and inorganic components, including physical, geologic, hydrologic, chemical and biological systems. These components include all processes necessary for the self-maintenance of the wetland ecosystem such as, but not limited to, ground water recharge, primary production, nutrient cycling, and sediment retention. Wetland functions relate to the ecological significance of wetland properties without regard to subjective human values. The eight functions defined by the Supplement including short descriptions defining each function are as follows:

1. Flood-flow Alteration - This function applies to the effectiveness of the wetland in reducing flood damage by containing an enhanced ability to store floodwaters for an extended period of time following heavy precipitation events.
2. Groundwater Recharge/Discharge - This function defines the potential for a wetland to act as a source of groundwater recharge and/or discharge. Recharge describes the potential for the wetland to contribute water to an underlying aquifer. Discharge relates to the potential for the wetland to act as a source of groundwater transfer to the surface i.e., springs and hillside seeps.
3. Sediment/Pollutant Retention - This function describes the ability of a wetland to hinder the degradation of water qualities downstream. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens based off of its geomorphic position, connectivity, soil thickness, and other physical characteristics.
4. Fish and Shellfish Habitat - This function defines a wetland's ability to contain or influence suitable habitats for fish and shellfish species.
5. Sediment/Shoreline Stabilization - This function defines a wetland's ability to effectively stabilize streambanks and shorelines against future erosion events.
6. Production (Nutrient) Export - This function relates to a wetland's ability to produce food or usable products for organisms, including humans, within the trophic levels associated with the watershed.

7. Nutrient Removal/Retention/Transformation - This function relates to the wetland containing the ability to prevent excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.
8. Wildlife Habitat - This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and their periphery. Resident and migrating species were considered along with the potential for any state or federally listed species occurring within then target wetland.

Wetlands within the Wetland Delineation Survey Area displayed multiple functions based on their specific site characteristics. All delineated wetlands were determined to have the ability to provide some function of groundwater recharge/discharge, flood-flow alterations, nutrient removal/retention/transformation, and wildlife habitat. The primary functions and displayed by wetlands within the Wetland Delineation Survey Area include:

- Sediment/Toxicant/Pollutant Retention (43 wetlands)
- Fish and Shellfish Habitat (24 wetlands)
- Sediment/Shoreline Stabilization (33 wetlands)
- Production Export (23 wetlands)

Wetland Values

Values are the societal benefits stemming from one or more of the aforementioned functions associated with a wetland. Most wetlands have corresponding public value to an assessable degree. The value of a particular wetland function, or a combination of functions, is based on the interpretative judgment of the significance attributed to the wetlands through the various functions it provides. The five values defined by the Supplement and adopted for use in this assessment, including short descriptions defining each value, are documented below.

1. Recreation - This value indicates if the wetland is effective in providing, or assisting in the establishment of, recreational opportunities such as boating, fishing, hunting, and other leisurely pursuits. Recreation in this capacity includes both consumptive and non-consumptive activities. Consumptive activities consume or diminish the plants, animals, or other resources that are naturally located in the wetland, whereas non-consumptive activities do not.

2. Education/Scientific - This value considers the effectiveness of the wetland as a site for public education or as a location for scientific research.
3. Uniqueness/Heritage - This value applies to wetlands that contain a singular or rare quality. Special qualities may include such things as the wetland's history and the presence of archaeological sites, historical events which may have taken place at the wetland, or unique plants, animals, or geologic features located within, or supported by, the wetland feature.
4. Visual Quality/Aesthetics - This value relates to the visual and aesthetic qualities of the wetland.
5. Threatened or Endangered Species Habitat - This value relates to the effectiveness of the wetland or associated waterbodies to specifically support threatened or endangered species.

Values were found to occur in a limited number of wetlands due to the Study Area not being accessible to the public.

To receive more detail on the functions and values assessment please see Appendix 22-6 of this Application.

(1) Vernal Pools

Vernal pools in the Project Area were predominantly associated with delineated wetlands. Two of the five vernal pools were located inside PFO coertype wetlands, one inside PSS coertype, one inside PEM coertype, and one outside of delineated wetlands. The largest vernal pools (VP-WSB-12 and VP-WSB-13) were associated with PFO wetland W-WB-11. Both pools had 70% or greater canopy closure dominated by red maple and green ash. Egg masses found included spotted salamander and wood frog. Wetland W-WSB-5 contained vernal pool VP-WSB-8. This medium sized wetland complex contained PEM, PFO, and PSS coertypes and directly abuts stream S-ARS-12. VP-WSB-8 is located inside the PSS coertype portion of this wetland, one spotted salamander egg mass was observed at the time of the survey. PEM wetland W-WSB-6 contained VP-WSB-10. This vernal pool still experienced 90% canopy closure from upland trees rooted outside of the wetland. Spotted salamander and Jefferson salamander egg masses were found here. Vernal pool VP-WSB-7 was not located inside a wetland as this isolated depression did not meet the vegetation or soil criteria to constitute a wetland. One Jefferson Salamander egg mass was observed at the time of the survey.

22(l) Off-Site Wetlands Hydrological and Ecological Influence Analysis

As described previously, wetlands outside of the Wetland Delineation Survey Area associated with Project infrastructure were approximated within at least 500 feet of Project components using interpretation of aerial imagery, review of wetland mapping databases maintained by the NWI and NYSDEC, reference to on-site observations, and an analysis of publicly available topographic contour mapping. The approximation of wetlands within at least 500 feet of Project Components was utilized to determine hydrological connections to offsite wetlands, including state mapped wetlands protected by NYSDEC which may be in close proximity to Project components. Sixteen approximated wetlands were identified. Seven of these wetlands were extensions of filed-delineated wetlands within the Project Area. Eleven of the approximated wetlands within 500 feet of Project Components are presumed to be hydrologically connected to wetlands identified within the Wetland Delineation Survey Area. As such, these specific approximated wetlands would likely be considered federally jurisdictional by the USACE. Five of the approximated wetlands appear to be isolated. Jurisdiction over federally regulated wetlands will ultimately be determined by the USACE.

Through desktop analysis it appears that no approximated wetlands within 500 feet of Project Components have potential hydrological connections to any state wetlands.

22(m) Temporary and Permanent Wetland Impacts

Through careful siting of Project components, of the entire 37.5 acres of wetlands delineated, only 0.12 acre of temporary impacts and 0.06 acre of permanent wetland impacts are proposed within the Project Area. Additionally, there are no impacts to NYSDEC wetlands or their 100-foot adjacent area. Only those wetlands that will be impacted are shown in Table 22-11 below.

Table 22-11. Temporary and Permanent Wetland Impacts

Wetland ID	Cover Class	NYSDEC Wetland ID	Preliminary Design Drawing Page	Temporary Impact (square feet)	Permanent Loss (square feet)	Permanent Conversion	Temporary 100-ft Adjacent Area Impact	Permanent 100-ft Adjacent Area Impact	Crossing Method
W-ARS-07	PSS	-	C-053	551.69	2,889.38	-	-	-	Access Road
W-WSB-03	PSS	-	C-051	4,081.66	0	3,700.68	-	-	Laydown Area, Fence

Impacts to wetland W-ARS-07 area associated with the improvement of an existing farm lane through the installation of a culvert and riprap for an access road crossing of a stream. By using this existing farm lane, a new wetland crossing will not be required to access array Area 4 as noted on preliminary design drawing sheet C-053 included in Appendix 11-1. The culvert and riprap will permanently impact 2,889.38 square feet (0.066 acre) of the wetland. Wetland W-WSB-03 is located within a proposed laydown area. This previously disturbed area is located within an active agricultural field. The wetland may be temporarily matted during utilization of the laydown area, resulting in 4,082 square feet (0.09 acre) of temporary impacts to the wetland. These impacts will only occur if it is necessary to utilize this space within the laydown area. The Project fence also traverses the wetland, and will result in approximately 3,700 square feet of permanent conversion from PSS to PEM wetland.

Three wetlands, W-ARS-10, W-AJF-08, and W-WSB-08, lie within the Project's fenced area but no Project Components will impact these wetlands. Solar panels will be located within one wetland, W-WSB-03. Posts supporting the panels will be installed within the wetland, however, due to the limited size of the posts (0.2 square feet), the impacts to the wetland and considered negligible.

22(n) Avoidance and Mitigation of Impacts on Wetlands and Adjacent Areas

The Project layout design process used information from the wetland and waterbody delineation to place components where they would avoid and/or minimize impacts to wetlands and waterbodies wherever possible. The current Project layout avoids impacts to wetlands and waterbodies by locating Project solar array structures outside of delineated features wherever practicable and routing access roads and collection lines around delineated features where practicable. Where linear wetlands and streams are encountered and must be bisected by Project components (access roads and collection lines) the narrowest and/or previously disturbed portions of the wetlands will be utilized for the site of impact. Where beneficial and cost effective, the Applicant is anticipating the utilization of Horizontal Directional Drilling (HDD) to avoid impacts to stream channels during the placement of buried collection line.

(1) NYSDEC Regulated Adjacent Areas

As previously discussed, the delineated wetlands within the Project Area are not associated with currently mapped NYSDEC freshwater wetlands or their 100-foot adjacent areas.

(2) Off-site Mitigation (if necessary)

As explained above, although attempts were made to avoid and minimize wetland and waterbody impacts where practicable, there will still be unavoidable minimal impacts to these features as a result of the Project. All wetland and stream impacts will occur in wetlands regulated by the USACE only. The Applicant will propose compensatory mitigation, if necessary, to the USACE which will be determined in consultation with NYSDEC and USACE. The mitigation effort to be conducted by the Applicant will establish a “no net loss” of wetlands. Forms of mitigation available to the Applicant include the purchase of credits from an approved in-lieu-fee program, the creation of an on-site compensatory mitigation area, the restoration or enhancement of wetlands in the impacted watershed, or some combination of these options. Correspondence with USACE and NYSDEC agencies will be utilized to assist in the decision-making process as to which mitigation strategy is best suited for the Project based off local and regional constraints.

22(o) Identification of State and Federally-listed Species Subject to Potential Impacts

(1) Minimization and Mitigation of Impacts

Discussion on mitigating the impact to plant communities within the Project Area can be reviewed in Section 22(c), Avoidance and Mitigation Measures for Vegetation Impacts. Construction-related impacts to fish and wildlife will be limited to incidental injury and mortality due to construction activity. These activities include use of heavy machinery, vehicular traffic, and minimal silt and sedimentation events as a result of construction occurring within or adjacent to aquatic ecosystems. Also, habitat disturbance and loss will occur due to vegetation clearing, earth moving activities, and the placement of Project Components. Displacement events will also occur due to increased noise, vibration, and human presence during construction in previously undisturbed areas. The mitigation of these construction related impacts will be accomplished through continued careful site design, best management practices, and construction monitoring. Site design practices avoid sensitive habitats by siting solar arrays primarily in agricultural fields, minimizing construction disturbances to the extent practicable, adhering to designated construction limits, and avoiding off-limit sensitive areas.

In order to reduce impacts to aquatic resources as a result of construction-related siltation and sedimentation events, the Applicant will utilize an approved sediment and erosion control plan and implement a SWPPP for the construction phase of the Project. The sediment and erosion control plan and Preliminary SWPPP are described in more detail in Exhibit 23. Also, the

Preliminary SWPPP is attached as Appendix 23-3, and a Spill Prevention, Containment, and Counter Measures (SPCC) Plan will be developed for implementation within the Project Area to mitigate any potential spill of hazardous chemicals during the construction and operation phases of the Project. Further detail of the SPCC plan is provided in Exhibit 23 of this Application. A final SPCC plan will be submitted in a compliance filing or filed with the Secretary.

Through initial impact analysis and careful site design, as explained above in Sections 22(d)(3) and 22(f)(9) permanent habitat loss and forest fragmentation have been avoided or minimized, to the maximum extent practicable. As stated previously, a majority of access roads, collection lines, and solar arrays will be sited in agricultural fields in order to minimize impacts to natural communities, including forest fragmentation. Restoration of the agricultural fields will take place following the decommissioning of the Project.

(2) Impacts to State and Federally Listed Species

Based on Project-specific information received from NYNHP, NYSDEC, USFWS, and direct on-site observations, a list was compiled of state- and federally-listed species and species of greatest conservation need (SGCN) that are believed to occur, or have the potential to occur, within the Project Area. Site-specific information requests to state and federal agencies were made in order to determine the presence of rare, threatened, endangered, and special concern species (see Appendix 22-8). Similarly, a list of species encountered during on-site survey work was documented by field staff. Any species that was visually identified on site that was on the aforementioned state or federal registry was also included in the list of state and federally listed species occurring within the Project Area. Information from the USGS BBS, NY BBA, Audubon Christmas Bird Count, Herp Atlas, and eBird was used to find state and federally listed species, species of special concern (SSC), and SGCN. A summary impact table containing information on all listed species identified through the above-mentioned procedures was also compiled (see Table 22-12). The list contains a brief description of the specific habitat requirements for each identified species, the approximated source whereby each species is known to potentially occur within the vicinity of the Project, and if each species was directly observed on site. Seven listed species were observed on site, however findings through this review indicate limited potential for additional species to occur. Habitat for many species is not present within the Project Area. Where habitat for remaining non-listed species observed on-site exists, efforts will be made to avoid siting Project components to reduce impacts.

The solar arrays will be installed to minimize the potential for avian and bat collisions. It is not anticipated there would be any avian or bat mortality from collisions with the solar panels. Studies regarding collision-related mortality are extremely limited, and to date no studies have been conducted on solar facilities in the eastern United States. Studies conducted on similar facilities (e.g., ground-mounted photovoltaic solar arrays) have indicated that mortality events are rare (~0.5 birds/MW/year) and substantially lower than other sources of mortality from human development (see Section 22(f)(7)), representing less than 1 percent of avian mortalities from anthropogenic sources annually. Post-construction monitoring will be unnecessary as impacts have been minimized through careful siting. As previously mentioned in Section 22(f)(4) and 22(f)(10), there will be no take of threatened or endangered species during construction or operation; therefore, post-construction monitoring for these species is not necessary.

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
American Black Duck (<i>Anas rubripes</i>)	-	-	SGCN-HP	This species prefers marshes, ponds, rivers, and lakes. This species breeds in freshwater wetlands such as freshwater marshes and forested wetlands. Suitable habitat for this species occurs within the Project Area.	C, F	No
American Kestrel (<i>Falco sparverius</i>)	-	-	SGCN	This species prefers open areas, such as successional old fields, forest edges, scrublands, pastures and hay fields. Suitable habitat for this species occurs within the Project Area.	C, D, E, F	No
American Woodcock (<i>Scolopax minor</i>)	-	-	SGCN	This species prefers moist successional shrublands near successional forests, scrub-shrub wetlands, and along rivers. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	-	-	SGCN	This species prefers undisturbed areas near large lakes, reservoirs, marshes, swamps, or stretches along rivers where they can breed and forage for fish. Suitable habitat doesn't exist at the site, as waterbodies are not large enough to support prey fish populations.	C, D, E, F	Yes

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)	-	-	SGCN	This species prefers thickets, successional old field, orchards, and along forest edges. Nests in shrublands and forest edges. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Black-throated Blue Warbler (<i>Dendroica caerulescens</i>)	-	-	SGCN	This species prefers large, undisturbed tracts of hardwood and mixed deciduous-coniferous forests with a dense understory. This species typically occurs in forests greater than 250 acres. Suitable habitat for this species does not occur within the Project Area, because the forested areas are too small.	C, F	No
Blue-winged Teal (<i>Anas discors</i>)	-	-	SGCN	This species prefers freshwater habitats such as ponds and marshes surrounded by grassland or successional old fields. Suitable habitat for this species occurs within the Project Area.	C, F	No
Blue-winged Warbler (<i>Vermivora pinus</i>)	-	-	SGCN	This species prefers brushy hillsides, overgrown pastures, and stream and woodland edges. Breeds in dry uplands in low shrublands. Suitable habitat for this species occurs within the Project Area.	C, D, F	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Bobolink (<i>Dolichonyx oryzivorus</i>)	-	-	SGCN-HP	This species prefers grasslands, including pastures, successional old fields, and meadows. Suitable habitat for this species occurs within the Project Area.	C, D, F	Yes
Brown Thrasher (<i>Toxostoma rufum</i>)	-	-	SGCN-HP	This species prefers successional shrublands, dense regenerating woods, and forest edges. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Canada Warbler (<i>Wilsonia canadensis</i>)	-	-	SGCN-HP	This species prefers forest undergrowth and shady thickets. Breeding occurs in mixed hardwoods of extensive forests and streamside thickets and nesting occurs near moist habitat. Suitable habitat for this species occurs within the Project Area.	D, F	No
Common Goldeneye (<i>Bucephala clangula</i>)	-	-	SGCN	This species prefers freshwater habitats such as ponds, lakes, rivers, and forested wetlands. Nests in tree cavities in mature boreal forests. Suitable habitat for this species may occur within the Project Area, although there are no boreal forests.	E, F	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Common Nighthawk (<i>Chordeiles minor</i>)	-	SSC	SGCN-HP	This species prefers open or semi-open areas such as forest clearings, grasslands, and suburbs. Suitable habitat for this species occurs within the Project Area.	D, F	No
Cooper's Hawk (<i>Accipiter cooperii</i>)	-	SSC	-	This species prefers to reside in deciduous, mixed, and coniferous forests. Suitable habitat for this species occurs within the Project Area.	C, E, F	Yes
Eastern Meadowlark (<i>Sturnella magna</i>)	-	-	SGCN-HP	This species prefers farm fields, pastures, grasslands, and wet fields. Suitable habitat for this species occurs within the Project Area.	C, D, F	Yes
Eastern Pipistrelle (Tri-colored bat) (<i>Perimyotis subflavus</i>)	-	-	SGCN-HP	This species prefers woodlands and riparian forests and can also be found foraging in early successional and open habitats. They roost in or below the canopy of live or dying trees. Suitable summer habitat occurs within the forested portions of the Project Area, in addition to the open habitat.	I	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Eastern Red Bat <i>(Lasiurus borealis)</i>	-	-	SGCN	This is a migratory bat species that often resides in forested areas and does not overwinter in caves. They roost in tree foliage of a variety of deciduous tree species. Roosts are often on edge habitat of streams, open fields, and forest canopy gaps. They forage over open water, pastures, and forest edges. Suitable summer habitat occurs within the forested portions of the Project Area, in addition to open habitat.	I	No
Eastern small-footed bat <i>(Myotis leibii)</i>	-	SSC	SGCN	This species uses rock crevices and talus features as day-roosts in the summer season and hibernacula include natural caves and mines. They have been found foraging in deciduous forests and over ponds and streams in the summer. While rock roosting habitat isn't prevalent within the Project Area, potential suitable summer foraging habitat can be found in the forested and ponded portions of the Project Site.	I	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Golden-winged Warbler (<i>Vermivora chrysoptera</i>)	-	SSC	SGCN-HP	This species prefers open woodlands, wet thickets, and successional shrublands. A mosaic of shrubby, open areas and mature forests are important for this species. Suitable habitat for this species occurs within the Project Area.	C, D	No
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)	-	SSC	SGCN-HP	This species prefers open fields and prairie including active hay fields, successional old field, and minimally in successional shrublands. Suitable habitat for this species occurs within the Project Area.	C, D, F	Yes
Hoary Bat <i>Lasiurus cinereus</i>	-	-	SGCN	This migratory species prefers to roost in deciduous and coniferous trees among the foliage and forages over open areas or large open bodies of water. Suitable summer habitat occurs within the Project Area.	I	No
Horned Lark (<i>Eremophila alpestris</i>)	-	SSC	SGCN-HP	This species prefers open habitats with sparse vegetation such as prairies and heavily grazed pastures. Suitable habitat for this species does not occur within the Project Area.	C, D, E, F	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Little Brown Bat <i>Myotis lucifugus</i>	-	-	SGCN-HP	This species are habitat generalists, found in mixed, deciduous, and coniferous forests, roosting in buildings or trees, under rocks or wood piles.. They forage over wetlands and open water. Suitable summer roost and foraging habitat within the forested portions and ponds of the Project Area.	I	No
Louisiana Waterthrush (<i>Seiurus motacilla</i>)	-	-	SGCN	This species prefers gravel-bottomed streams flowing through deciduous forests in ravines. Suitable habitat for this species may occur within the Project Area, although there are no steep ravines within the Project Area.	C, D, F	No
Northern Goshawk (<i>Accipiter gentilis</i>)	-	SSC	SGCN	This species prefers larger tracts of wild forest. Across much of their range they live mainly in coniferous forests, but may occur in deciduous hardwood forest as well. Suitable habitat for this species occurs within the Project Area.	D, E, F	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Northern Harrier (<i>Circus cyaneus</i>)	-	THR	SGCN	This species prefers freshwater marshes, wet grasslands, lightly grazed pastures, successional old field, and croplands. Suitable habitat for this species occurs within the Project Area.	A, D, E, F	Yes
Northern Long-Eared Bat (<i>Myotis septentrionalis</i>)	THR	THR	SGCN-HP	This species utilizes tree cavities or loose bark of trees for roosting, foraging and raising young. They prefer mature interior forests and are clutter specialists. While the majority of the Project is open land, there are forested patches that could provide potential suitable summer roosting and foraging habitat. Additionally, these forested patches can provide travel corridors to larger patches of forest in the surrounding areas.	B, I	No
Northern Pintail (<i>Anas acuta</i>)	-	-	SGCN	This species prefers freshwater marshes and nests in pastures, hay fields, croplands, and successional old field.	D, F	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Prairie Warbler (<i>Setophaga discolor</i>)	-	-	SGCN	This species prefers successional shrubland, successional old field, brush piles, and pastures. Breeds in dry old field and clearing, edges of forest, and sandy pine barrens. Suitable habitat for this species occurs within the Project Area.	D, F	No
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	-	SSC	SGCN	This species prefers open deciduous forests, forest edges, groves, and orchards. Suitable habitat for this species occurs within the Project Area.	D, F	No
Ruffed Grouse (<i>Bonasa umbellus</i>)	-	-	SGCN	This species prefers a mix of mature forests, successional forests, and successional shrublands. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Scarlet Tanager (<i>Piranga olivacea</i>)	-	-	SGCN	This species prefers expansive deciduous and mixed forest canopies. Suitable habitat for this species occurs within the Project Area.	C, D, F	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Sedge Wren (<i>Cistothorus platensis</i>)	-	THR	SGCN	This species prefers shallow marshes, wet meadows, grasslands, and hayfields. Suitable habitat for this species occurs within the Project Area.	D	No
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	-	SSC	-	This forest-dwelling raptor prefers to reside in deciduous forests, thickets, forest edges, and mixed woodlands. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Short-eared Owl (<i>Asio flammeus</i>)	-	THR	SGCN-HP	This species prefers open areas grasslands, prairies, marshes, and meadows. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Silver-haired bat (<i>Lasionycteris noctivagans</i>)	-	-	SGCN	This migratory species prefers temperate, northern hardwoods with ponds or streams nearby. They typically forage along in forests, forest edges, open water, and other riparian areas. Suitable summer habitat occurs within the forested portions of the Project Area.	I	No

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Snapping Turtle (<i>Cheylydra serpentina</i>)	-	-	SGCN	This species prefers open water habitats such as deep freshwater marshes, ponds, lakes and river. Suitable habitat for this species occurs within the Project Area.	G	No
Upland Sandpiper (<i>Bartramia longicauda</i>)	-	THR	SGCN-HP	This species prefers prairies, grasslands, and successional old field. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
Wood Turtle (<i>Clemmys insculpta</i>)	-	SSC	SGCN-HP	This species prefers woodlands, meadows and forest edges surrounding clear flowing streams and rivers. Suitable habitat for this species occurs within the Project Area.	G	No
Vesper Sparrow (<i>Pooecetes gramineus</i>)	-	SSC	SGCN	This species responds quickly to changes in habitat and often occupies abandoned old farm fields and successional shrublands as they return to forest. Suitable habitat for this species occurs within the Project Area.	C, D, F	Yes

Table 22-12. State & Federally Listed Species Occurring or Likely to Occur within the Project Area

Species Name	Federal Status ¹	NYS Status ²	SGCN Listing ³	Habitat Preference ⁴	Source of Potential Presence ⁵	Observed On site
Wood Thrush (<i>Hylocichla mustelina</i>)	-	-	SGCN	This species prefers deciduous and mixed forests with large trees, moderate understory, shade, and abundant leaf litter. Suitable habitat for this species occurs within the Project Area.	C, D, F	No
<p>1- 'Federal Status' refers to the species listing as federally endangered (END) OR threatened (THR).</p> <p>2 - 'NYS Status' refers to the species listing as a state-listed endangered (END), threatened (THR), or species of special concern (SSC).</p> <p>3- 'SGCN Listing' refers to the species state listed as a Species of Greatest Conservation Need – High Priority (SGCN-HP), Species of Greatest Conservation Need (SGCN), or a Species of Potential Conservation Need (SPCN).</p> <p>4- References for habitat preference were Audubon.org, Allaboutbirds.org, NYNHP, and NYSDEC SWAP</p> <p>5- "Source of Potential Presence" refers to the source of information indication the potential presence of the species at the Project Area:</p> <p>A: Species identified by NYNHP as occurring within 10 miles of the Project Area</p> <p>B: Species identified by USFWS online database (IPaC)</p> <p>C: Species identified in the USGS Breeding Bird Survey</p> <p>D: Species identified in the NYS BBA</p> <p>E: Species identified in the Audubon CBC</p> <p>F: Species identified in eBird</p> <p>G Species identified in the Herp Atlas</p> <p>H: Species identified in the NYSDEC Statewide Fisheries Database</p> <p>I: Species distribution range in the NYSDEC SWAP</p>						

22(p) Invasive Species Management and Control Plan

Outside of a direct and physical impact to local vegetation communities through construction, the disturbance of naturally occurring ecologies can occur through the introduction of non-native species. While all species compete in the environment to survive, non-native or invasive species, appear to have specific traits or specific combinations of traits that allow them to outcompete native species. As invasive species spread, native species begin to reduce in population as suitable habitat and nutrient resources become more limited. During the plant species survey, a total of 13 invasive plant species were observed within the Project Area. These species are included in the *New York State Prohibited and Regulated Invasive Plants* (NYSDEC, 2014) and below, as follows:

- Black locust (*Robinia pseudocacia*), first observed May 2, 2019
- Canada thistle
- Common buckthorn (*Rhamnus cathartica*), first observed July 20, 2017
- Common reed (*Phragmites australis*), first observed July 17, 2017
- Garlic mustard (*Alliaria petiolata*), first observed May 2, 2019
- Glossy buckthorn (*Frangula alnus*), first observed July 17, 2017
- Japanese Knotweed (*Polygonum cuspidatum*), first observed July 17, 2017
- Morrow's honeysuckle
- Multiflora rose
- Purple loosestrife
- Reed canary-grass
- Spotted Knapweed (*Centaurea stoebe* spp. *micranthos*), first observed July 19, 2017
- Wild Parsnip (*Pastinaca sativa*), first observed July 17, 2017

As part of the Application and in preparation for construction, an ISMCP was prepared to describe the survey methods utilized to identify invasive species populations currently present on-site (Appendix 22-7). This management plan also includes proposed control procedures of current and introduced invasive populations, including locating and identifying target species, establishing a removal protocol, inspecting construction materials (including fill) and equipment, cleaning equipment, and site restoration. The ISMCP also discusses in detail the monitoring methods which will take place during the construction phase of the Project. As part of the on-site monitoring effort, management guidelines will be established and strictly adhered to. This will be done in order to ensure that all Project workers are informed of the threat of spreading invasive species

and be educated on the BMPs, which will be implemented during construction and restoration of the Project.

The Applicant anticipates that post-construction monitoring will occur over a five-year period, with monitoring events being conducted in years one, three, and five following the completion of construction and restoration. Should new occurrences of invasive species become established, the ISMCP contains a treatment plan to control the introduction and spread of invasive species. Due to invasive species outcompeting native species, invasive populations may naturally increase in distribution and density over time. However, the general goal for the ISMCP is to prevent an increase in invasive species population size or density as a direct or indirect result of the Project. Should the ISMCP fail due to an unforeseen circumstance, a revised management plan will be written with new guidelines and/or protocols in order to create an adaptable and responsive management framework.

22(q) Temporary and Permanent Impacts on Agricultural Resources

According to Table 22-1, cultivated crops and grass/pasture/hay are the dominant land cover types at the Project Area with 763.2 acres (62.5 percent of the Project Area) for grass/pasture/hay and 114.8 acres (9.4 percent of the Project Area) for cultivated crops. Agricultural land at the Project Area is within a New York State Certified Agricultural District – Montgomery County District 3. A more detailed discussion on the agricultural use of the Project Area can be found in Exhibit 4. A map depicting areas of prime farmland, prime farmland if drained, and farmland of statewide importance can be found in Exhibit 4.

As mentioned in Section 22(b)(1), temporary impacts to agricultural land will occur primarily from burying an underground collection line and clearing vegetation. Impacts in agricultural land for the economic life of the Project include siting the solar arrays, collection substation, and switchyard and associated fencing and access roads. A total of approximately 442.42 acres of agricultural land will be employed for nonagricultural use due to the siting of Project components during the useful economic life of the project (30+ years).

The New York State Department of Agriculture and Markets (NYSDAM) has issued *Guidelines for Agricultural Mitigation for Solar Energy Projects* (2018). In order to minimize and/or mitigate impacts to agricultural resources, Project construction and operation will comply with these guidelines to the maximum extent practicable. If these guidelines cannot be met, then the

Applicant with consult with the NYSDAM to discuss acceptable alternatives. Documentation of the Project's consistency with these guidelines is included in Exhibit 21 at Section 21(u).

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