

Stipulation 22– 1001.22 Exhibit 22: Terrestrial Ecology and Wetlands

Exhibit 22 shall comply with the requirements of 1001.22 by containing:

- a) Specific information on the existing plant communities within the Facility site including:
 - 1) Plant community mapping using GIS software and based on Facility-specific field investigations conducted at the proposed locations of Facility components (e.g., ecological cover type assessments, habitat assessments, and wetland delineations) along with roadside observations and aerial photo interpretation for adjacent properties;
 - 2) Detailed description of all ecological communities identified within the parcels that will host the Facility components. Ecological community descriptions will be classified according to Ecological Communities of New York State (Edinger et al., 2014); and
 - 3) A list of plant species observed during Facility-specific field investigations as described in (a)(1) and (a)(2) above, including the date(s) each species was observed.
- b) Proposed temporary and permanent impacts to plant communities shall be calculated and discussed based on specific assumptions associated with the proposed limits of vegetation disturbance areas for each type of Facility component, or the limits of disturbance, as identified in the Preliminary Design Drawings (Exhibit 11).
 - 1) The limits of disturbance shall include all areas of anticipated vegetation clearing and soil disturbance. In addition to identification on Preliminary Design Drawings, the dimensions of these areas shall be listed by component type in tabular format. These impact assumptions will be based on prior industry experience with similar wind power projects.
 - 2) A map will depict vegetative cover types in relation to the proposed limits of vegetation disturbance.
 - 3) A summary impact table will quantify the number of acres that will be temporarily and permanently impacted by the various Facility components (permanent impact calculations will include all tree clearing for construction and operation of the facility), including the estimated acreage of hedgerow removal.
 - 4) A list of all non-native invasive plant species observed during Facility-specific field investigations (within the anticipated limits of disturbance) and maps of any concentrations of non-native invasive plant species will be included.
 - 5) An Invasive Species Prevention and Management Plan that addresses the species listed in 6 New York Code Rules and Regulations (NYCRR) Part 575 will be included in the Application. Specifically, the Invasive Species Prevention and Management Plan will include the following:
 - i) A summary of the survey methods Lighthouse Wind used to identify existing non-native invasive plant and insect species within the Facility site;

- ii) A discussion of best management practices which will be employed to achieve no net increase in invasive species from construction of the Facility, such as the use of plants native to New York (or appropriate crop plants where agricultural lands are involved) to replace vegetation removed during construction;
 - iii) Specific methods Lighthouse Wind will use to ensure that imported fill and fill leaving the Facility site will be free of non-native invasive plant and insect species to the extent practicable;
 - iv) Indication whether fill materials to be placed within the Facility site will be free of non-native invasive plant and insect species or only used within the areas free of non-native invasive plant and insect species infestation;
 - v) Proposed Facility site grading and erosion and sediment control methods that will be used to prevent the introduction, spread or proliferation of non-native invasive plant and insect species to the extent practicable;
 - vi) Details of cleaning procedures for removing non-native invasive plant and insect species from equipment and personnel, and properly disposing of infested materials;
 - vii) Details of procedures for preventing the spread of invasive insects, such as the emerald ash borer, and compliance with the state quarantine on the transport of ash trees, where applicable, from the Facility site;
 - viii) Implementation plans for ensuring that equipment arrives at and departs the Facility site free of non-native invasive plant and insect species;
 - ix) Description of the Best Management Practices or procedures that will be implemented, and the education measures that will be used to educate workers;
 - x) Details of post-construction monitoring and survey measures and procedures for revising the Invasive Species Prevention and Management Plan in the event that the goals of the initial plan are not met within a specified timeframe; and
 - xi) Anticipated methods and procedures used to treat non-native invasive plant and insect species that have been introduced or spread as a result of the construction or operation of the Facility.
- c) A detailed description of the proposed measures that will be implemented to avoid, minimize or where unavoidable, potentially mitigate for any temporary or permanent impacts to existing plant communities, particularly grasslands, wetlands, and interior forests, as a result of the construction and operation of the Facility. An alternatives analysis will be presented in Exhibit 9, which will include a discussion of vegetative clearing under the alternatives analyzed. A table will be provided showing the location of these resources, and the type and location of facility components, with references to the site plan sheets where these items are located.
- d) A characterization of aquatic habitats, vegetation, wildlife and wildlife habitats including:
- 1) Field identification and verification of aquatic habitats, plant communities, and wildlife habitat that could potentially support federal or state listed threatened & endangered (T&E) species, state species of special concern (SSC), and state species of greatest conservation need (SGCN) will be documented during on-site field investigations (e.g., ecological cover type assessments, habitat assessments, and wetland delineations).

This will include a description of avian and bat studies completed in coordination with NYSDEC and USFWS, which are the technical experts with management authority over protected species. The Avian and Bat Study Plan (see Attachment A) has been made available to these agencies and discussed and revised in accordance with their input. The content of the Avian and Bat Study Plan is consistent with NYSDEC guidelines and development and risk assessment has followed the tiered decision-making processes presented in the USFWS Land-based Wind Energy Guidelines and Eagle Conservation Plan Guidance.

USFWS and New York Natural Heritage Program (NYNHP) bat hibernacula location data will be used to determine if any hibernacula are located within the study area. If hibernacula are identified within the project area, or 5 miles from any project component or boundary, the location and distance to the nearest identified hibernacula will be provided separately and confidentially to NYSDEC.

- 2) Final reports describing the results of the completed or on-going avian and bat surveys will include the following:
 - i) Migratory raptor surveys (2 spring and 1 fall: March – May, 2015; August – December, 2015; April - May, 2016).
 - ii) Breeding bird surveys (2 summers: June 2015 and June 2016).
 - iii) Bat acoustic monitoring (1 year: April – October, 2015) No federal or state-listed bats were documented, including NY bat species of special concern, and no occupied habitat was identified. Therefore, no further surveys are anticipated.
 - iv) Wintering grassland raptor surveys (2 winters: January –April 2015 and November 2015 - April 2016).
 - v) General avian/eagle use/habitat surveys (2 years: December 2014 – December 2016).
 - vi) Northern long-eared bat summer presence/absence surveys (1 summer: July 28– August 12, 2015). No federal or state-listed bats were documented, including NY bat species of special concern; therefore, no further surveys are anticipated.
 - vii) Aerial eagle nest survey (2 flights: April 20 and 24, 2016).
 - viii) Avian radar survey (September 1 – November 20, 2015; March 1 – May 30, 2016; July 28 – August 25, 2016).
 - ix) Review of publicly available avian reference sources including the NYS Breeding Bird Atlas and range maps (BBA), US Geological Survey (USGS) Breeding Bird Survey Routes (BBS), eBird, The Nature Conservancy surveys/reports, regional avian data (The Kingbird, Buffalo Ornithological Society data, Audubon Christmas Bird Counts (CBC), Great Lake shoreline migration studies (US FWS), and Hawk Migration Association of North America (HMANA) raptor data sets etc.);
 - x) Shapefiles (.shp) for use in ESRI ArcMap GIS program, depicting all wildlife survey locations, including (separately): breeding bird survey transects; eagle/raptor survey locations; bat acoustic monitoring locations; winter raptor survey locations, and driving routes; radar unit location; and aerial nest survey area. View sheds for eagle and winter raptor observation points, indicating the area visible from each point, will also be provided.

- xi) Shapefiles (.shp) for use in ESRI ArcMap GIS program, depicting the location of all Facility components including (separately): extent of current Facility site; turbines; new and existing access and maintenance roads; electric collection and transmission lines (specified above ground and/or underground); laydown and storage area(s); substation(s); meteorological tower(s); any other temporary or permanent infrastructure constructed in support of the Facility; all areas to be cleared around turbines, access roads, electric lines, and all other Facility components.
 - xii) Large bird flightpath maps will be provided, as well as any concentration areas identified. Bat migration routes will not be evaluated by the studies completed.
- 3) Information on amphibians and reptiles, based on the New York State Amphibian & Reptile Atlas Project (Herp Atlas) and assessments of suitable habitat in the vicinity of the Facility area. Information on reptile and amphibian distribution ranges based on database records obtained from the NYS Natural Heritage Program (NHP) and the US Fish and Wildlife Service (USFWS). Information on any species or habitat observed during field reviews of Facility site. To the extent that vernal pools and their functions may be impacted by construction or facility operation, those impacts will be identified and discussed in the Application. Such impacts may require, in consultation with DEC and DPS, the development and implementation of site specific surveys for reptile and amphibian species under appropriate seasonal conditions in order to quantify the level of impact from Facility components.
- 4) A list of typical terrestrial invertebrates found in the region will be included using data available from the NYSDEC and USFWS. No specific surveys are anticipated; however, Lighthouse Wind will continue to consult with the NYSDEC and USFWS to identify any potential species of concern.
- 5) Identification and depiction of any Significant Coastal Fish and Wildlife Habitat Areas designated by NYS Department of State (NYSDOS) and/or NYSDEC and any unusual habitats or significant natural communities that could support state or federally listed T&E species, SSC, or SGCN.
- e) A list of potentially occurring plant and wildlife species based on available data from the NY NHP, NYSDEC staff, Herp Atlas, BBA, BBS, and CBC. On-site field surveys (*e.g.*, ecological cover type assessments, habitat assessments, and wetland delineations) and/or the availability of suitable habitat, will also be used to identify species that could potentially occur on or in the vicinity of the Facility site at some time during the year. The list will specify whether species were observed, or known to occur on or in the vicinity of the Facility Site.
- f) A summary narrative and associated mapping will be included in the Application to explain and illustrate potential Facility construction and operational impacts to vegetative cover types, wildlife habitats (including a discussion of impacts from habitat fragmentation), wildlife concentration areas, travel corridors, if identified, and terrestrial and aquatic organisms identified during pre-construction field studies in relation to the proposed limits of disturbance. This will include a discussion of potential impacts to plants, animals, and

habitats that may result from the application of biocides, if any, during site preparation, construction, maintenance, or operations. A summary impact table will also be included that quantifies anticipated temporary and permanent impacts associated with various Facility components in relation to wildlife habitats, identified concentration areas or travel corridors, and vegetative cover types, particularly grasslands and interior forests, if affected. Information regarding the presence of T&E species, SSC, , and SGCN, and the Facility's potential to impact such species or their habitats will also be discussed. Documented T&E species, SSC, and SGCN will be based on database records obtained from the NYS NHP, other known records documented by NYSDEC (to be provided to the Lighthouse Wind by NYSDEC), the USFWS, and Lighthouse Wind avian and bat surveys.

If the studies discussed above and other information provided by NYSDEC indicate that the Facility is likely to result in a take of Threatened or Endangered Species,¹ including the adverse modification of habitat on which a listed species depends, Lighthouse Wind will submit the information required under 6 NYCRR § 182.11 for an Incidental Take Permit (ITP), which would include an avoidance, minimization and mitigation plan that demonstrates a net conservation benefit, as defined in Part 182.

Further, Lighthouse Wind will consult with the NYS Department of Agriculture & Markets and the Cornell Cooperative Extension on potential effects of the Facility on orchard and field crop pollination as a result of Facility operation. Specific studies or field surveys on insect populations are not proposed. Impacts to vegetation will be addressed in part (b) of Exhibit 22.

- g) A detailed description of the impact avoidance and minimization efforts used in developing the Facility will be included. The Facility design, construction controls, and Facility operational measures that can be reasonably implemented to avoid, minimize, or mitigate impacts to wildlife and wildlife habitat within the Facility site will also be described. This will include a discussion of measures to avoid or minimize direct impacts to individuals of listed and protected species through appropriate cut-in speed curtailment regimes, and indirect impacts associated with habitat fragmentation. Measures to avoid, minimize or mitigate impacts to vegetation will be addressed in Exhibit 22, as stated in (c). In addition, a detailed alternatives analysis will be addressed in Exhibit 9, which will include discussion and comparison of known, estimated, and expected impacts to wildlife and habitat at alternative sites and the proposed Facility location.
- h) Avian and bat impact analysis and monitoring program descriptions including:
 - 1) An evaluation and assessment of direct and indirect Facility-related impacts to avian and bat species, particularly state and federally listed T&E species and their habitats, wildlife concentration areas, and migration corridors, if identified, based on the results of site-specific studies described in (d)(2), which were conducted in accordance with a work plan agreed upon with the NYSDEC and USFWS. Such discussion will include the extent of and expected impacts to wildlife from grassland and forest fragmentation, and

¹ References to a "take" or "incidental take" adopt the NYSDEC's definitions of those terms, as they are set forth in NY ECL § 11-0535 and 6 NYCRR Part 182.

cumulative impacts to wildlife and their habitats resulting from the construction and operation of the Facility. The respective DEC Regional Wildlife Office(s) will be contacted to obtain the most recent nesting, wintering, and habitat data for listed species. A comparative analysis of various pre- and post-construction wildlife studies completed at other operational wind farms will be conducted and included in Exhibit 22. Assessed avian and bat usage of the project site will be compared with other proposed and existing wind projects in the vicinity of the project for which data is publicly available.

- 2) A proposed post-construction monitoring program to assess direct and indirect impacts of the Facility on avian and bat species and their habitats in a manner consistent with the NYSDEC's Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects (Guidelines), revised June 2016. The Application will also include a statement that the post-construction monitoring program, including specifics on methodology, study duration, search frequency, search areas, number and location of turbines to be searched, data collection and analysis, and carcass collection, will be developed based on NYSDEC's 2016 Guidelines, discussions with and input from NYSDEC and USFWS, and the results of the completed avian and bat studies. Exact details of these components of post-construction monitoring will be determined on a site-specific basis through discussions between DEC, USFWS, and the Applicant, and be in place prior to the start of project operation; and
 - 3) An outline of the bird and bat impact avoidance and minimization techniques, potential monitoring and adaptive management responses, and operational adjustments (i.e. appropriate curtailment regimes) to be implemented at the Facility. If take of a listed species is likely, these measures will include the components of an Incidental Take Permit (see 6 NYCRR §182.11 for an itemization of the components) and be developed in consultation with NYSDEC. A post-construction plan will be required, and will specify operational adjustments and mitigation measures sufficient to ensure the Applicant complies with the substantive requirements of 6 NYCRR Part 182. Preliminary details regarding these measures will be included in the Application, for purposes of evaluating potential project impacts, and Applicant's proposed avoidance, minimization and mitigation measures. Final plans and copies of any Incidental Take Permits will be submitted to the Siting Board as compliance filings.
- i) Maps and shapefiles depicting field-delineated and approximate wetland boundaries within 500 feet of proposed Facility components shall be included in the Application. The shapefiles shall include identification of all project components and proposed limits of site disturbance. On-site field delineations will consist of boundary flagging within a 200-foot wide corridor centered on linear Facility components (*e.g.*, access roads, buried electrical interconnect, overhead generator lead line) and within a 200-foot radius of turbines and other components such as permanent meteorological towers, operations and maintenance (O&M) building, substations and proposed laydown yards and storage areas. The 200-foot field study corridor will allow for identification of all impacts to wetland resources within areas to be disturbed during Facility construction. Provision of wetland delineations will include analysis of wetlands that are not currently mapped but that meet State criteria for jurisdiction. The Application will also include these impacts in the proposal for mitigation. Aerial photo

interpretation, existing databases (including hydric soil information available through the United States Department of Agriculture (USDA)), and estimation based on observations made during the on-site studies will be used to extend field delineated wetland boundaries out to 500 feet for mapping purposes. This delineation protocol shall apply to all wetlands and vernal pools within the study corridors noted above. The determination of wetland boundaries during on-site field delineations will be made by following the three-parameter methodology described in the U.S. Army Corps of Engineers (Corps) *Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North central and Northeastern Region*. Vernal pools shall be delineated in accordance with pages 125-26 of the *Regional Supplement*. Wetland boundaries will be defined in the field by sequentially numbered pink surveyor's flagging marked "wetland delineation," which will be located using Global Positioning System (GPS) technology with reported sub-meter accuracy. The Application or its exhibits will be updated with final wetland delineations, determinations, and the resulting impact calculations, following field visits by NYSDEC and the Corps.

- j) A description of the characteristics and Cowardin classification of each field delineated wetland, a summary of the field data collected regarding vegetation, soils, and hydrology and copies of all Routine Wetland Determination Data Forms will all be compiled into a Wetland and Stream Delineation Report and appended to the Application.
- k) Qualitative assessment scores for each delineated wetland in order to assess functions and values of delineated wetlands based on a methodology similar to *The Highway Methodology Workbook Supplement, Wetlands Functions and Values: A Descriptive Approach* published by the U.S. Army Corps of Engineers New England District in 1999. The functions/values evaluated using this method will include:
 - 1. Groundwater recharge/discharge
 - 2. Floodflow alteration
 - 3. Fish and shellfish habitat
 - 4. Sediment/toxicant/pathogen retention
 - 5. Nutrient removal
 - 6. Production export
 - 7. Sediment/shoreline stabilization
 - 8. Wildlife habitat
 - 9. Recreation
 - 10. Educational/scientific value
 - 11. Uniqueness/heritage
 - 12. Visual quality/aesthetics
 - 13. Threatened or endangered species habitat
- l) A description of the hydrologic connectivity of all delineated wetlands within the Facility site including a summary of the anticipated state or federal jurisdictions, or both, of each delineated wetland. Assessments of potential state wetlands jurisdiction shall include "unmapped wetlands" that meet the NYSDEC's 12.4-acre size threshold (including any wetlands separated by <50 meters which function as a unit in providing wetland benefits,

pursuant to 6 NYCRR 664.7(b)) or otherwise meet state criteria for jurisdiction (*e.g.*, wetlands determined to be of Unusual Local Importance, pursuant to 6 NYCRR 664.7(c)). A summary of off-site wetlands adjacent to the Facility site that may be hydrologically or ecologically influenced by development of the Facility, including Significant Coastal Fish and Wildlife Habitat Areas designated by NYSDOS, and public lands, such as Hartland Swamp Wildlife Management Area, to determine their general characteristics and relationship, if any, to the delineated wetlands within the Facility site.

- m) An identification and quantification of temporary and permanent impacts to wetlands (and any state-regulated adjacent areas within 100-feet) based on the proposed footprint of all Facility components and associated impact assumptions. Such impacts will be presented in a table that identifies the type of impact and associated crossing methodology for each impacted wetland, clearly discerning between federal and state wetland (and 100-foot adjacent area) impacts. This table will include reference to a site plan map showing location, and wetlands mapping will be made available at scale of at least 1:50. This assessment will also include a description of applicable permanent forested wetlands conversion, if any, which would occur as a result of the construction of the Facility. Calculation of impacts to both wetland and 100-foot adjacent areas of state-regulated wetlands will include type of impact, including but not limited to permanent or temporary fill and forest conversion and be provided in the table format with associated delineation and DEC code. Present summary information in a table listing each wetland; nature, type and extent of impact; and reference to site plan map sheet showing this location. Applicant will include an outline of measures to avoid, minimize, or mitigate impacts to wetlands, as discussed in greater detail in (n).
- n) A general discussion of measures considered, and indication of methods to be implemented to avoid wetland impacts including stream crossing methodology and a description of Facility construction and operation in relation to the standards established by ECL Article 15.
 - 1) Where impacts are unavoidable, the anticipated mitigation measures to be implemented to offset impacts to wetlands (and any state-regulated 100-foot adjacent areas) will be discussed, including the use of reasonable alternative stream and wetland crossing methods.
 - 2) Pursuant to 6 NYCRR 663.5(g), mitigation for impacts to state-regulated wetlands and adjacent areas must meet the following provisions:
 - i) the mitigation must occur on or in the immediate vicinity of the Facility Site;
 - ii) the area affected by the proposed mitigation must be regulated by the Freshwater Wetlands Act and 6 NYCRR Part 663 after mitigation measures are completed; and
 - iii) the mitigation must provide substantially the same or more benefits than will be lost through the proposed activity.
 - 3) The application's discussion of avoidance and minimization must be updated upon final verification of wetland boundaries and jurisdictional determinations. Final impact calculations to the 100-foot adjacent area of state-regulated wetlands and associated mitigation will be based on verified delineation boundaries.

- 4) Alternative analysis will be based on the final verified delineation boundaries.
 - 5) This section of the Application will also describe the anticipated Environmental Compliance and Monitoring Program to be implemented during Facility construction to adhere to various permit conditions and protect wetlands, streams, and other waterbodies. The Facility's Environmental Compliance and Monitoring Program will include an Environmental Monitor(s) during construction and restoration activities on the Facility site. The duties of the monitor will be described in this Exhibit of the Application.
- o) An identification of State and Federal Threatened & Endangered species documented within or adjacent (adjoining non-participating parcels) to the Facility site, as described in Stipulation 22(f) above, and a Threatened & Endangered Species Mitigation Plan, if needed.
 - p) An Invasive Species Prevention and Management plan as described in Stipulation 22(b) above.
 - q) A quantification and analysis of temporary and permanent impacts to agricultural land based on the proposed footprint of all Facility components and associated impact assumptions. A discussion of potential mitigation, if any, following the most recent edition of New York State Department of Agriculture and Markets guidelines will also be included. This information will also be referenced in Exhibit 4 (Land Use).
 - r) Shape files, containing all components as described above and in NYSDEC 2016 *Guidelines*, shall be submitted to NYSDEC and NYS DPS as soon as possible before Lighthouse Wind submits its Article 10 application.

**Stipulation 22 – 1001.22 Exhibit 22: Terrestrial Ecology and
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Attachment A – Avian and Bat Study Plan**