

Final Work Plan for Bird and Bat Preconstruction Studies at the Hounsfield Wind Farm Project – Town of Hounsfield, Jefferson County, NY

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Prepared for:

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1. Project Description

The project consists of two elements:

- The construction and operation of up to 90 wind turbines, the installation and operation of associated collection lines (below grade and overhead), and related facilities including a docking facility, helipad, living quarters, parking areas and operations and maintenance facilities on Galloo Island (which is subject to review under State Environmental Quality Review Act (SEQRA), 6 NYCRR Part 617) and
- The construction and operation of an approximately 38-mile transmission line (8 miles under Lake Ontario, 30 miles on the mainland), together with interconnection facilities (substations) and other related facilities, linking Galloo Island with the New York State power grid (which is not subject to review under SEQRA). The onshore transmission line will likely be aboveground and will consist of a double-circuited, 115 kV line carried by a single steel monopole. The monopole will be constructed on a concrete caisson foundation. The transmission line will be constructed within a 150 to 200 feet Right-Of-Way (ROW).

The commencement of this project is based on the completion of the SEQRA and Article VII review processes. It is anticipated that these processes will be completed by or around 2009 and that construction will begin in 2009 or 2010.

2. Study Objectives

Surveys for breeding birds and bats, nocturnal migrants and wintering birds have been regularly carried out at proposed wind energy projects in New York State following guidance provided by the New York State Department of Environmental Conservation. Such guidance is now in the process of being formalized (NYDEC 2008). The surveys provide baseline data on the species present, their abundance, and their in-flight characteristics for evaluation of potential mortality or disturbance from the wind energy project. Examples of the scope of such surveys at regional wind projects with similar habitat can be found for the proposed wind projects on Wolfe Island, ON (www.wolfeislandwind.com) and Cape Vincent, NY (www.stlawrencewind.com). These wind project sites are also near large water bodies and involve extensive grasslands.

The goal of the proposed preconstruction avian and bat studies for the Hounsfield Wind Farm project is to provide a comprehensive assessment of the bird and bat activity for the

wind project site so that the potential impact of the wind project on birds and bats can be evaluated by state and federal agencies, and other interest groups. Such studies also provide baseline data for studying actual avian and bat impacts once the project is constructed.

3. Tasks & Methods – Galloo Island

Task 1: Wintering bird surveys

Old Bird, Inc. would conduct diurnal visual surveys for birds focusing on wintering raptors from November 2007-March 2008. Surveys would census the numbers of hawks, eagles, falcons, and owls every 10-14 days as weather permits. Surveys would be conducted by ATV or snowmobile and would cover the perimeter road around the island as well as the two roads that transect the interior of the island. Surveys would occur in the morning and late afternoon, including dusk. Due to the small size of the island and the fact that wintering raptors are frequently on the move, surveys would attempt to cover the perimeter of the island, including all major grassland areas, at a steady pace in order to avoid double counting of birds. The region of the island where each observation occurs would be documented as well as specific information on whether birds are perched or in flight, their flight height, direction of flight, and the sex and age of individuals when possible. These winter surveys would also document other avian species including passerines and waterfowl. Approximate numbers of waterfowl would be estimated during a single aircraft flight at low altitude around the perimeter of the island during each visit. Observations would be made from the right front passenger seat. Estimates would be on the scale of +/- 1000 birds and the location of waterfowl concentrations would be noted.

Task 2: Nocturnal migrant radar survey

Stantec Consulting (formerly Woodlot Alternatives) would conduct a radar study at the project area to document the abundance, flight patterns, and flight altitudes of night-migrating species (birds & bats) using marine radar. The specific radar deployment configuration would depend on survey site characteristics and access logistics, which would be determined after Stantec's first site visit. The location of

the radar equipment on the island would also be determined after Stantec's first site visit, and after consultation with NYDEC and USFWS. Once the radar equipment is deployed on site surveys would be conducted for 45 nights during the Spring 2008 migration season between April 15 and June 1, 2008, and for 60 nights during the Fall 2008 migration season between August 7 and October 7, 2008. Data collection would occur from sunset to sunrise each night and include vertical and horizontal data. The median and mean values for passage rate and flight height would be reported on an hourly, nightly, and seasonal basis along with seasonal flight direction. Qualitative descriptions of the general flight characteristics of radar targets would also be provided. This study should provide a good dataset from which to compare nocturnal migration activity over Galloo Island with more than a dozen similar radar studies using the same equipment that Stantec has carried out at other proposed wind energy projects in New York State.

Field Method

Marine surveillance radar, similar to that described by Cooper et al. in *An improved marine radar system for studies of bird migration (1991)*, will be used during field data collection. The Furuno radar systems utilized by Stantec have a peak power output of 12 kilowatts (kW) and have the ability to track small animals, including birds, bats, and even insects, based on settings selected for the radar functions. It cannot, however, readily distinguish between different types of animals being detected. Consequently, all animals observed on the radar screen are identified as "targets." The radar has an "echo trail" function which captures past echoes of flight trails, enabling determination of flight direction. During all operations, the radar's echo trail is set to 30 seconds. The radar is equipped with a 2 m (6.5') waveguide antenna. The antenna has a vertical beam height of 20° (10° above and below horizontal), and the front end of the antenna is inclined approximately 5° to increase the proportion of the beam directed into the sky. Objects on the ground detected by the radar cause returns on the radar screen (echoes) that appear as blotches called ground clutter. Large amounts of ground clutter reduce the ability of the radar to track birds and bats flying over those areas. However, vegetation and hilltops near the radar can be used to reduce or eliminate ground clutter by "hiding" clutter-causing objects from the radar. These nearby features also cause ground clutter, but their proximity to the radar antenna generally limits the ground clutter to the center of the radar screen. The presence or reduction of potential clutter producing objects is carefully considered during site selection and radar station configuration.

Radar surveys are conducted from sunset to sunrise during the seasonal migration period. Because the anti-rain function of the radar system must be turned down to

detect small songbirds and bats, surveys cannot be conducted during periods of inclement weather. Therefore, surveys are planned largely for nights without rain. However, in order to characterize migration patterns during nights without optimal conditions, some nights with weather forecasts including occasional showers are sampled. The radar is operated in two modes throughout the night. In surveillance mode, the antenna spins horizontally to survey the airspace around the radar and detects targets moving through the area. By analyzing the echo trail, the flight direction of targets can be determined. In vertical mode, the radar unit is tilted 90° to vertically survey the airspace above the radar. In vertical mode, target echoes do not provide directional data, but do provide information on the altitude of targets passing through the vertical, 20° radar beam. Both modes of operation are used during each hour of sampling. The radar is operated at a range of 1.4 km (0.75 nautical miles) for a total detection distance of 2.8 km. At this range, the echoes of small birds can be easily detected, observed, and tracked. At greater ranges, larger birds can be detected but the echoes of small birds are reduced in size and restricted to a smaller portion of the radar screen, thus limiting the ability to observe the movement pattern of individual targets.

Radar Data Collection

The radar display is connected to video recording software of a computer, enabling digital archiving of the radar data for subsequent analysis. Approximately 25 minutes of video samples are recorded during each hour of radar surveys, based on a random schedule for each night. These included 15 one-minute horizontal samples and 10 one-minute vertical samples. This sampling schedule allowed for randomization of sample collection and prevents double-counting of targets due to the 30-second echo trail used to determine the flight path vector. During each hour, additional information is also recorded, including weather conditions and ceilometer observations.

Weather conditions that are monitored include wind speed and direction (ground and aloft), temperature, percent cloud cover, precipitation, and cloud ceiling height. Because cloud ceiling height is difficult to measure in the field, data from the weather station at the nearby Watertown Airport, NY will be used. Weather data from the project area will be obtained using a weather station located at the radar site as well as data obtained from one of the on-site meteorological measurement towers (met tower). Ceilometer observations involve directing a one-million candlepower spotlight with an infrared filter vertically into the sky. The ceilometer beam is observed using night vision goggles for 5 minutes to document and characterize low-flying (i.e., within 100 meters) targets. The ceilometer is held in-hand so that any birds, bats, or insects passing through it can be tracked for several seconds, if needed; surveys are conducted from the radar survey site. Observations from each ceilometer observation period are recorded, including the number of birds, bats, and insects observed. This information is used during data analysis to help characterize activity of insects, birds, and bats. To provide additional information for data analysis, temperature, relative humidity, and dew point are recorded for the duration of the survey period at 10-

minute intervals by data loggers (HOBO Pro v2 U23-001, Onset Computer Corporation) placed in appropriate locations. The mean, maximum, and minimum temperature, relative humidity, and dew point are calculated for each night.

Radar Data Analysis

Video samples are analyzed using a proprietary digital analysis software tool developed by Stantec. For horizontal samples, targets (either birds or bats) are differentiated from insects based on their flight speed. After adjustment for wind speed and direction, targets traveling faster than approximately 6 m (20') per second are identified as a bird or bat target. The software tool records the time, location, and flight vector for each target traveling fast enough to be a bird or bat within each horizontal sample, and these results are output to a spreadsheet. For vertical samples, the software tool records the entry point of targets passing through the vertical radar beam, the time, and flight altitude above the radar location, and then subsequently outputs the data to a spreadsheet. These datasets are then used to calculate passage rate (reported as targets per kilometer of migratory front per hour), flight direction, and flight altitude of targets. Mean and median target flight directions (± 1 circular standard deviation) are summarized using software designed specifically to analyze directional data (Oriana2© Kovach Computing Services). The statistics used for this analysis are based on those used by Batschelet (1965), because they take into account the circular nature of the data. Nightly wind direction is also summarized using similar methods and data, which is collected from the radar site weather station as well as the nearest met tower to the radar to obtain weather conditions at the ground level and aloft. . Flight altitude data are summarized using linear statistics. Mean and median flight altitudes (± 1 standard error [SE]) are calculated by hour, night, and overall season. The percent of targets flying below the approximate maximum height of the proposed wind turbines with blades is also calculated hourly, for each night, and for the entire survey period.

Task 3: Bat acoustic survey

North East Ecological Services (NEES; Scott Reynolds) would conduct bat call surveys from at least June 15 through October 31, 2008 (20 weeks). These surveys would be conducted using six Anabat II bat call detectors deployed on each of two 60 m meteorological towers within the project area. Three detectors would be positioned at 20 m and three at 60 m on each tower. NEES would maintain and service the detectors periodically. Bat call data would be digitally recorded and analyzed for species or species-group identification where possible. Calls would be identified to species based on call identification software and manual classification by NEES. Additional species resolution on the NEES bat call data focusing on Indiana Bat would tentatively be carried out by Eric Britzke.

Each acoustic call heard would be recorded by the monitoring equipment and stored for subsequent analysis. The following data will be collected and recorded for each acoustic call:

Date – Month/Day/Year

Time – Hour/Minute/Second

Height – the detector height that recorded the call (turbine, canopy, or ground)

Species – The species or species group identified through call analysis

Researcher – person conducting the acoustic analysis

For each night of observation, the following information would be collected:

Number – Number of individual calls heard

For the overall survey, the following analysis would be conducted:

Activity Level: the average activity level (in calls/night)

Peak Migratory Activity: the seven-day period of peak migratory activity

Biodiversity Index: the total number of species detected, including indices of species richness and evenness.

Spatial Distribution: the percent of activity detected at each height

Task 4: Avian acoustic survey

Old Bird, Inc. would conduct an avian nocturnal flight call survey from April 15-October 31, 2008 from one location on Galloo Island. The location of the avian acoustic set up has yet to be determined, and would be provided to DEC after the survey point is selected through visits to the project site. This acoustic survey would gather information on the species composition, quantity of calling, and relative loudness of calls to supplement the radar target data acquired by Stantec. The survey protocol would be similar to acoustic studies carried out by Old Bird at the Ecogen wind project near Prattsburgh, NY and the concurrent NYSERDA study at the Maple Ridge wind project. The nightly and hourly data from this station would be compared

with nightly and hourly data from other acoustic stations operating on the mainland during 2008.

Task 5: Breeding bat mist-netting and acoustic surveys

North East Ecological Services (NEES; Scott Reynolds and three field techs) would conduct mist-netting activities at various sites on the island for four nights with good netting conditions about the third week of June 2008. The goal would be to survey six woodland sites with nets and two marshland sites acoustically. This is estimated to be about one monitoring site for every 100 acres of woodland/marshland on the island. The location of these sites would be determined after Scott Reynolds visits the site, and after consultation with NYDEC and USFWS.

Task 6: Breeding Bird Survey

Old Bird, Inc. would conduct a breeding bird survey during May – July 2008 in accordance with USFWS Breeding Bird Survey techniques, including point count surveys and breeding bird atlas-style documentation. Surveys would document the presence of all breeding birds heard or visually identified. The field surveys would include five 2-day breeding bird surveys of the project area: one in late May, three in June, and one in early July. During each visit, two surveyors would carry out 10-minute point counts at ~50% of the proposed turbine sites and four met tower sites (~80 sites) during the hour before sunrise and the three hours after sunrise (~20 point counts per day). All proposed turbine sites would have two point counts carried out during the 2008 breeding season (June-July). In addition, a habitat-based, approximately 1 km x 1 km, breeding bird atlas of Galloo Island would be produced. This would incorporate point count data as well as diurnal/crepuscular surveys in each block targeting wetlands, shoreline, and other habitat not represented by the point counts. Special attention would be given to documenting presence and activity of the New York State threatened species, Upland Sandpiper and Northern Harrier, which have previously been documented on Galloo Island during the breeding season. Audio playback would be used to evoke calls of secretive marshland bird species (rails, bitterns, moorhen).

Task 7: Diurnal Bird Movement Surveys

Old Bird, Inc. would carry out diurnal bird movement surveys during all diurnal field survey components of the study. This would include the winter bird survey and the breeding bird survey. In addition, supplemental observations would be added so that surveys of bird movements would be performed throughout the year. This would include weekly observations from March 15 – November 15, 2008. Observations would target the following species groups:

- Waterfowl (ducks, geese, swans, cormorants, loons, grebes, etc.)
- Waterbirds (herons, bitterns, terns, gulls, shorebirds, etc.)
- Passerines
- Raptors

Observations of waterfowl and waterbirds would be focused on documenting any transit of such species across the island. These latter targeted observations would involve five fixed observation locations and occur once every week from mid-March – mid June. One location would study any transit of waterfowl and waterbirds between the large wetland with standing water near the north end of the island and the protected bay on the northern shore. This site would have four half-hour observations periods each study day -- one covering each crepuscular period and two spaced during the middle of the day. Four other locations across the length of the island would have two half-hour observations each study day.

Special attention would also be given to any overflights of waterfowl and waterbirds (notably terns and cormorants) from the nesting colonies on Little Galloo Island. These latter observations would involve a fixed observation location on the southeastern shore of Galloo Island and would involve six half-hour observation periods on one day of every week from mid-June through mid-August. The half-hour periods would be spaced to provide coverage during different periods of the day. All targeted observation days would be timed to correspond with good weather conditions.

In addition, one day of observation per week from mid-August through November would target diurnal movements of fall migrants including raptors, waterfowl, and passerines. Targeted diurnal bird movement surveys would add 32 weekly observations covering the spring migration, summer, and fall migration periods. These data would supplement additional bird movement observations recorded during the wintering bird and breeding bird surveys. These surveys would occur from the five fixed observation locations used in the spring diurnal movements study.

All diurnal movement studies would document the location, species, flight height, flight direction, time of day, and weather conditions.

Task 8: Bird and bat study reports

Reports presenting and summarizing the data obtained for each survey described above would be produced within about one month after each study season. Final reports for each task would be incorporated as appendices in the risk assessment report for the project. Each report will include study methods, summarized data, and discussion and conclusion sections describing the results.

4. Tasks & Methods – transmission line

The tasks undertaken to evaluate avian impact from the Hounsfield Wind Farm Project's transmission line would include breeding bird surveys at marsh and grassland habitats along the line's route. The location and number of these surveys would be determined after feedback on the route by the New York Natural Heritage Program and consultation from NYDEC and USFWS. The methodology would involve 10-minute point counts. Audio playback would be used to evoke calls of secretive marshland bird species (rails, bitterns, moorhen).

5. Schedule (2007-2008)

Task #	Activity	Dates
1	Winter bird surveys	Late November 2007 – March 15, 2008
2	Radar study of nocturnal migrants (including ceilometer and night vision observations)	April 15-June 1; August 7 - October 7
3	Acoustic monitoring (bats)	June 15-October 31
4	Acoustic monitoring (birds)	April 15-October 31
5	Bat mist-netting & acoustic surveys	~June 15-21
6	Breeding bird survey	Late May-early July
7	Targeted diurnal bird movement study	March 15-November 15
8	Progress reports	Winter raptor/bird survey ~ April 15 Spring radar acoustic studies ~ August 15 Winter/Spring diurnal bird movements ~ June 15 Breeding Bird Survey ~ August 15 Summer diurnal bird movements ~ September 1 Fall radar/acoustic studies ~ November Fall diurnal bird movements ~ November
8	Final report	~ November 2008