Supplemental Wetland Delineation Report

For the

Marble River Wind Farm
Clinton County, New York

Prepared for

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By

TETRA TECH EC, INC.

TABLE OF CONTENTS

FIGURES

TABLES

ATTACHMENTS

1.0 INTRODUCTION

Horizon Wind Energy (Horizon) contracted with Tetra Tech EC, Inc. (Tetra Tech) to delineate wetlands within approximately 91.51 acres of revised project segments associated with its proposed Marble River Wind Farm located in Clinton County, New York. Horizon is proposing to use fewer (74) larger capacity (3.0 megawatt (MW)) wind turbines than were previously permitted in an effort to reduce the overall project footprint size and minimize environmental impacts. As a result, the northeastern portion of the previously permitted project, which contains a high density of delineated wetlands, will be eliminated and new underground electric line transmission routes will be relocated throughout the remaining project areas. Moreover, the overhead electric collection line will be eliminated. Several turbine laydown areas and associated access roads will also be relocated.

Portions of the revised project segments were previously surveyed in 2005, 2006 and 2009 as part of the initial Marble River Wind Farm wetland delineation effort and follow up surveys. Remaining areas not previously surveyed (approximately 48 acres), were field delineated from July 16 through 23, 2010. This report provides a description of the Federal and State freshwater wetlands identified within the 91.51 acres of revised project segments. Included are descriptions of the Site, methods used to determine the presence of wetlands, information reviewed (concerning wetlands and soils), field survey results (relating to delineated wetlands, surface waterbodies, vegetation, soils, and hydrology), a summary of NYSDEC wetlands and adjacent areas and a literature cited section. Attachments include delineated wetland data forms and sketch sheets, surface waterbody data sheets, select Site photographs and an oversized delineated wetlands and surface waterbody map.

2.0 SITE DESCRIPTION

Revised project segments occur throughout the Project area and include approximately 11.92 miles of interconnection line, 4.89 miles of access road and 14.85 acres of turbine laydown area (Figure 1, Project Location Map).

3.0 METHODS

The revised 74 turbine project footprint was compared to all areas previously surveyed for wetlands for the Marble River Wind Farm. Approximately half of the revised layout had been previously surveyed in 2005, 2006 and 2009. The remaining areas were identified and surveyed in July 2010.

3.1 Wetland Field Delineation Methods

Information reviewed prior to field mobilization included USGS 7.5-minute topographic maps, NYSDEC Freshwater Wetland Maps and United States Department of the Interior National Wetland Inventory (NWI) Maps that were

associated with the Project. The survey area for this and previous delineation efforts included, a 200-foot radius around each of the revised turbine locations; 50 feet either side of the new access road centerlines (100-foot total corridor width); and 25 feet either side of the new underground electric collection line centerlines (50-foot total corridor width).

Wetland boundaries were delineated in the field using the Routine Onsite Determination Method as described in the Corps of Engineers Wetlands Delineation Manual (USACE, Environmental Laboratory, 1987) for USACE jurisdictional wetlands and the Routine Delineation Procedure as described in the 1985 New York State Freshwater Wetlands Delineation Manual (Browne *et al.* 1995) for NYSDEC jurisdictional wetlands. The Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (2009), was also employed during the 2010 wetland delineation effort. These methods incorporate a three-parameter approach using vegetation, soils and hydrology to identify the presence of freshwater wetlands. Wetland boundaries were initially identified through visual assessment of vegetation and hydrology. Two representative sample locations (one wetland and one upland) were then selected to verify the wetland boundary by characterizing dominant vegetation, hydric soil indicators, and hydrology at each sample station. Extensions of previously delineated wetland boundaries were recorded using a single wetland sample station. Wetland boundaries and sample stations were identified with pink and blue surveyor flagging, respectively, and corresponding GPS waypoints were recorded using Trimble© GeoXT™ handheld units. This unit generally provides sub-meter accuracy; however, accuracy can range within three to five meters.

Dominant vegetation in each strata (tree, shrub, and herbaceous) was identified using an appropriate regional field guide and assigned a wetland indicator status obtained from Reed, 1988. Cover classes for wetlands were based on the National Wetland Inventory classification hierarchy (Cowardin *et al*. 1979). Cover classes were assigned by determining the most abundant cover class in the wetland. A wetland was assigned multiple cover classes if more than one class comprised at least 30 percent aerial coverage. The plant communities encountered at each wetland and corresponding upland sample location were categorized according to the classification of New York State ecological communities as described in Edinger et al., 2002. Soil profiles were examined using a hand auger or spade shovel at depths no less than 18 inches unless the auger or spade was refused, typically due to shallow bedrock. Soil characteristics were recorded in standard soil log format using a Munsell Soil Color Chart (Kollmorgen Corporation, 2000). A visual assessment of primary and secondary wetland hydrology indicators was also conducted. Sketch maps and site photographs were recorded concurrent with sample station data. Sample station data sheets (including sketch maps), and wetland photographs recorded during the field efforts are provided in Attachments 1 and 3, respectively.

Nomenclature for delineated wetlands consists of an alphanumeric coding. Wetlands delineated within 200 feet of a Wind Turbine Generator (WTG) were identified as WTG wetlands. Wetlands delineated within the 100-foot right-of-way of an access road or the 50 foot right-of-way of an underground electric collection line were identified as AR and IC wetlands, respectively. WTG wetlands were further identified by the turbine number they were associated with (*i.e.,* a wetland within 200 feet of Turbine 33 would be identified as WTG33), while a consecutive numbering system was employed for the AR and IC wetlands.

3.2 Surface Waterbody Field Delineation Methods

Surface waterbodies identified within the survey area were flagged with orange or blue surveyor flagging and corresponding GPS waypoints were recorded. For streams greater than five feet in width both banks were delineated. For streams less than five feet in width only the centerline of the water course was delineated. Waterbodies were photo-documented and their characteristics, including width, depth, substrate and bankside vegetation, were recorded on stream datasheets. Wetland drainage patterns were noted on sketch maps but not recorded on stream sheets unless a distinct bed and bank were observed. Waterbody nomenclature was similar to that established for wetlands with the addition of "-ST" suffix to indicate the presence of a stream versus a wetland. Copies of stream data sheets and stream photographs recorded during the field effort are provided in Attachments 2 and 3, respectively.

3.3 Wetland and Surface Waterbody Field Review Methods

A limited roadside review of potential wetlands and surface waterbodies was conducted along the western edge of Patnode Road for a length of approximately 0.5 mile. Wetlands in this area were identified through a visual assessment of vegetation and hydrology from the road. GPS waypoints were recorded along the roadside at the approximate northern and southern boundaries of the reviewed features. Limited wetland and surface water data was collected on respective data sheets and the features were photo documented. Wetland and surface waterbody data sheets and select photographs for these features are provided in Attachments 1, 2 and 3, respectively. The boundaries of these features were extended westward across the revised project segments using desktop techniques; which included review of aerial photography, NYSDEC and NWI wetland maps, and the USDA NRCS Soil Survey. Formal delineations of these features will be conducted when appropriate access is secured.

4.0 INFORMATION REVIEW

4.1 Mapped Wetlands

State and NWI data regarding mapped wetlands were reviewed for the revised project segments. In several locations, both NYSDEC and NWI mapped wetlands coincide. Maps of the NYSDEC and NWI wetlands associated with the revised project segments are provided as Figures 2 and 3, respectively.

4.1.1 NYSDEC Mapped Wetlands

The NYSDEC Freshwater Wetlands Act (1975) rank wetlands in one of four classes ranging from Class I, which provide the most benefits, to Class IV, which provide the fewest benefits. Benefits derived from wetlands may include flood and storm control, wildlife habitat, protection of subsurface water resources, recreation, pollution treatment, erosion control, education, open space and sources of nutrients. Class I and Class IV wetlands were not identified within the revised project segments. Based on the State wetland maps, 29.14 acres of NYSDEC mapped wetlands, from 42 separate NYSDEC mapped wetland polygons occur within the revised project segments. Table 4.1 provides the number of NYSDEC mapped wetlands polygons and associated acreage identified within the survey area by class.

4.1.2 NWI Mapped Wetlands

The NWI inventory maps wetlands by cover class. Based on the NWI wetland maps, 6.54 acres of NWI mapped wetlands, from 35 mapped wetland polygons occur within the revised project segments. Table 4.2 provides the number of polygons and acreage of the federally mapped wetlands identified within the survey area by cover class.

4.2 Soils

A review of the USDA NRCS Soil Survey Geographic Database for Clinton County, New York was conducted to determine what soils were present within the revised project segments. A soils map was generated from the METADATA files corresponding to the survey area and is provided as Figure 4 (plates 1 through 8). Thirty-four (34) mapped soil units were identified within the revised project segments of the Marble River Wind Farm. Five (5) of the 34 mapped soil units were identified as wetland soils (hydric soils and soils with hydric inclusions). Descriptions of these five hydric soil units (Lv, Ly, Ry, Sb and Se) follow.

Lyonmounten loam (Lv) - This is a very deep, poorly drained, loamy soil formed in low lime, glacial till on uplands. Slope ranges from 0 to 3 percent. The available water capacity is high. Permeability is moderate in the mineral surface, and moderate or moderately slow in the subsoil and substratum. Capability unit is 4w un drained (3w drained). This unit is on the New York listing for farmland of state-wide importance. Lyonmounten is listed as a hydric soil in Clinton County.

Lyonmounten loam, very stony (Ly) - This is a very deep, poorly drained, loamy soil. It formed in low lime, glacial till in depressional areas on Uplands. Slope ranges from 0 to 8 percent, but is dominantly 0 to 3 percent. Large stones cover up to 3 percent of the ground surface. The available water capacity is high. Permeability is moderate in the mineral surface, and moderate or moderately slow in the subsoil and substratum. Capability unit is 6s. Lyonmounten is recognized as a hydric soil in Clinton County.

Runeberg mucky loam (Ry) - This very deep, very poorly drained, loamy soil formed in medium to high lime, glacial till. The available water capacity is moderate to high. Permeability is moderate in the mineral surface, moderately slow in the subsoil, and moderately slow or slow in the substratum. Capability unit is 5w undrained (4w drained). Runeberg is recognized as a hydric soil in the Clinton County area.

Sabattis mucky fine sandy loam, very bouldery (Sb) - This very deep, very poorly drained soil formed in low lime, glacial till. It has a thin organic surface overlying loamy till. The available water capacity is high. Permeability is moderately slow to moderately rapid in the organic surface, moderate or moderately rapid in the subsoil, and moderately slow in the substratum. Capability unit is 5w. Sabattis is recognized as a hydric soil in Clinton County.

Saprists and Aquents, ponded (Se) - This unit consists of very deep, very poorly drained, organic and mineral soil formed in depressions on lake plains and uplands. This unit is also refered to as freshwater marsh. Available water capacity is high. Permeability is moderately slow to moderately rapid in the surface, and ranges from very slow to rapid below. Capability unit is 8. Saprists and Aquents are recognized as a hydric soil type in Clinton County.

5.0 DELINEATION RESULTS

Seventy-nine (79) wetlands (75 field delineated and 4 field reviewed) and 20 surface waterbodies (17 field delineated and three field reviewed) were identified within the survey area. Portions of one field delineated wetland (IC7013A/B) and one field delineated surface waterbody (IC7008-ST) were also field reviewed. Twenty four (24) of the 79 wetland crossings and six of the 20 surface waterbody crossings are associated with the permitted project footprint (Project). Details regarding these permitted crossings were provided in the October 2007 *Wetland Delineation Report for the Marble River Wind Farm* submitted with the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Army Corps of Engineers (USACE) joint permit application dated November 2007.

5.1 Wetlands

Seventy-nine (79) wetland polygons comprising 10.99 acres were field delineated or field reviewed within the Marble River Wind Farm revised project segments. The distribution of delineated wetlands within the revised project segments includes 10.2 acres within the turbine location areas, 1.0 acre within access roads, and 8.97 acres within underground electric collection lines. Delineated wetlands and their associated project components are provided in Table 5.1. Wetland locations are depicted on Figure 5 (plates 1 through 7) and on a duplicate oversized figure, provided as Attachment 4.

Predominant wetland covertypes encountered within the revised project segments included palustrine deciduous forest (PFO1), palustrine scrub shrub (PSS), and palustrine emergent (PEM) as defined by Cowardin and others (1979). Acreages of delineated wetland polygons by covertype are provided in Table 5.2. Specific community characteristics of all wetland covertypes encountered during field efforts are summarized in Section 5.5.

5.2 NYSDEC Wetlands and Adjacent Areas

Delineated wetlands that were located within the boundaries of NYSDEC mapped wetland polygons were designated as NYSDEC wetlands. A 100-foot adjacent area was generated for each wetland identified as a NYSDEC wetland. Adjacent areas from more than one wetland were joined to prevent an over estimate of adjacent areas acreage.

Fifty-two (52) of the 79 wetlands that are intersected by the survey area were identified as NYSDEC wetlands (8.79 acres total). A list of each state regulated wetland delineated in the field and their acreages within the survey area, by component are provided in Table 5.3. Wetland acreages, summarized by Cowardin covertypes, are presented in Table 5.4.

Eighteen (18.34) acres of NYSDEC adjacent area also occurs within the revised project segments. The acreages of the state regulated adjacent areas that occur within the survey area, and their wetland associations, are provided in Table 5.5.

5.3 Surface Waterbodies

Twenty (20) surface waterbody polygons, totaling 1,586.7 linear feet, were identified within the survey area for this field delineation effort. The surface waterbodies consist of ten streams (three perennial, five intermittent and two ephemeral), eight roadside drains, swails or culverts (four intermittent and four ephemeral), and two wetland or field drainages (both intermittent). Three surface waterbodies are located within access roads, two surface waterbodies are located within a combination of access roads and underground electric collection lines and 15 surface waterbodies are crossed by underground electric collection lines.

Table 5.6 lists each surface waterbody identified in the survey area for this delineation effort, its NYSDEC classification and location. Surface waterbody polygons are depicted on the Delineated Wetlands and Surface Waterbodies Map (Figure 5, plates 1 through 7) and on a duplicate oversized figure, provided as Attachment 4.

Under the Environmental Conservation Law (Article 15), New York regulates surface freshwater resources as best usage classifications (6 NYCRR Part 701) or as Wild, Scenic and Recreation Rivers (6 NYCRR Part 666). Wild, Scenic and Recreation Rivers were not identified within the revised project segments. State water quality classifications of watercourses within the survey area fall into two

categories, Class C and Class D streams. Classification C waters support fisheries and are suitable for non-contact activities and Classification D waters are suitable for fishing and contact recreation. Class C Waters may also have a standard of (T), indicating that it may support a trout population. Seven of the surface waterbodies identified within the revised project segments are Classification D waters and one is Classification C (T) water. The remaining 12 surface waterbodies are not classified.

5.4 Soils

Multiple soil profiles were examined for hydric soil indicators during the wetland boundary determination, but soil data were recorded only for paired wetland sample stations along delineated wetland boundaries and single wetland sample stations for extensions of previously field delineated wetlands. Generally wetland soil profiles included low chroma horizons that ranged from a dark gray to very dark brown. Occasionally a gray to grayish brown clay layer was also encountered. Soil textures varied and included silt loam, sandy loam, and clay loam. Encounters of pure clay textures were rare. Upland soils varied but generally consisted of a brown to dark brown silt or sandy loam.

5.5 Vegetation

Wetlands delineated within the revised project segments consisted of palustrine systems. Vegetative species composition of these wetlands was used to differentiate them into plant communities defined by Edinger et al.'s *Ecological Communities of New York State* (2002). Red maple-hardwood swamp, shrub swamp and shallow emergent marsh communities occurred most frequently at the Site. Less common wetland communities included black spruce-tamarack bog. Despite being classified as upland community types, balsam flat, pastureland, successional old field, and northern successional hardwood communities were also used to describe wetlands found within the survey area. For several delineated wetlands, these upland community descriptions provided the closest match to vegetation composition characterized at field sample stations within the delineated wetland boundaries. Acreages of these communities within the survey area are presented in Table 5.7.

Plant species encountered during this supplemental effort reflect those detailed previously in the October 2007 Marble River Wind Farm Delineation Report. Lists of plants species found in wetlands and adjacent uplands during previous delineation field efforts are provided in the 2007 Wetland Delineation Report.

5.6 Hydrology

Primary indicators of wetland hydrology predominantly consisted of saturated soils and high water tables. Secondary indicators of wetland hydrology included drainage patternd in wetlands. The most common hydrological regimes associated with wetlands in the survey area are saturated and seasonally flooded regimes. In

the saturated wetlands, the surface of the wetland soil expands or rises as it gets wetter, thus they are not considered flooded.

6.0 REFERENCES

Browne, S., Crocoll, S., Goetke, D., Heaslip, N., Kerpez, T., Kogut, K., Sanford, S., and Spada, D., 1995. *New York State Freshwater Wetlands Delineation Manual*. New York State Department of Environment and Conservation, July 1995. 35 pp plus appendices.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe, 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U. S. Department of the Interior, Fish and Wildlife Service FWS/OBS-79/31. Washington, D.C. 131pp.

Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, A. M. Olivero, 2002. *Draft Ecological Communities of New York State, Second Edition.* New York State Department of Environmental Conservation, New York Natural Heritage Program. Internet address: http://www.dec.state.ny.us/website/dfwmr/heritage/EcolComm.htm. Accessed on: 12/12/05.

Kollmorgen Corporation, 2000. *Munsell Soil Color Charts.* Macbeth Division of Kollmorgen Corp., Baltimore, MD.

NYSDEC, 1999. New York State Regulatory Freshwater Wetlands for Clinton County outside the Adirondack Park. Online Linkage: http://cugir.mannlib.cornell.edu/lsite/CUGIR_DATA/019fwa.tar.gz.

Tetra Tech EC, Inc., 2007. Wetland Delineation Report for the Marble River Wind Farm, Clinton County, New York. October 2007.

U.S. Army Corps of Engineers (USACE), Environmental Laboratory, 1987. *Corps of Engineers Wetland Delineation Manual*. Department of the Army. Technical Report. Y-87-1. U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. 99 pp. plus appendices.

U.S. Army Corps of Engineers, Engineering Research and Development Center, 2009. Interm Regional Suppliment to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. ERDC/EL TR-09-19, October 2009.

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), 2005. Soil Survey Geographic (SSURGO)

database for Clinton County, New York. Online Linkage: http://SoilDataMart.nrcs.usda.gov/.

FIGURES

TABLES

ATTACHMENT 1

WETLAND DATA FORMS AND SKETCH SHEETS

ATTACHMENT 2

SURFACE WATERBODY DATA SHEETS

ATTACHMENT 3
SELECT SITE PHOTOGRAPHS

ATTACHMENT 4

DUPLICATE OVERSIZED FIGURE