

WETLAND DELINEATION REPORT

Roaring Brook Wind Power Project
Town of Martinsburg
Lewis County, New York

Prepared For: Atlantic Wind, LLC
c/o Iberdrola Renewables
7557 S. State Street, Suite 201
Lowville, NY 13367

Prepared By: Environmental Design & Research,
Landscape Architecture, Planning,
Environmental Services, Engineering and Surveying (EDR)
217 Montgomery Street, Suite 1000
Syracuse, New York 13202

Date: September 23, 2008
Revised November 18, 2008

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	PROJECT DESCRIPTION.....	1
1.2	PURPOSE	1
1.3	RESOURCES	2
1.4	QUALIFICATIONS	2
2.0	PHYSICAL CHARACTERISTICS AND RESOURCES.....	3
2.1	PHYSIOGRAPHY AND SOILS	3
2.2	HYDROLOGY	5
3.0	JURISDICTIONAL AREA MAPPING.....	6
3.1	WATERS OF THE UNITED STATES	6
3.2	NEW YORK STATE FRESHWATER WETLANDS & PROTECTED STREAMS	7
4.0	ON-SITE JURISDICTIONAL AREA DELINEATION	9
4.1	METHODOLOGY	9
5.0	RESULTS.....	11
5.1	WETLANDS.....	18
5.2	STREAMS	20
6.0	CONCLUSIONS	20
7.0	REFERENCES.....	22

LIST OF FIGURES

Figure 1	Project Area
Figure 2	USGS Site Topography
Figure 3	State Mapped Freshwater Wetlands
Figure 4	Surface Waters
Figure 5	National Wetland Inventory
Figure 6	Mapped Soils
Figure 7	Delineated Wetlands

LIST OF TABLES

Table 1	Soil Associations Within the Project Site
Table 2	Dominant Soil Series Within the Project Site
Table 3	State Regulated Wetlands Within the Project Area
Table 4	Streams Within the Project Area
Table 5	Delineated Wetlands and Streams

LIST OF APPENDICES

Appendix A	Figures
Appendix B	Routine Wetland Determination Forms
Appendix C	Photos of Representative Wetland and Stream Communities

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Environmental Design & Research, Landscape Architecture, Planning, Environmental Services, Engineering and Surveying, P.C. (EDR) was retained by Iberdrola Renewables to identify and delineate all wetlands and streams within or adjacent to the footprint of Roaring Brook Wind Farm (the Project). The Project is located within approximately 7,619 acres in the town of Martinsburg, Lewis County, New York (Figures 1 and 2), and approximately 4.7 miles south of State Highway 177. The site includes 68 parcels under lease from 23 different landowners (Project Area) .

The goal of the Project is to develop an approximately 78 megawatt (MW) wind-powered generating facility. The Project is anticipated to include approximately 39 wind turbines, each with a generating capacity of 2.0 MW. Along with turbines, the Project includes the upgrade of 9.2 miles of existing unpaved forest roads, upgrade of a portion of Flat Rock Road, construction of 7.5 miles of new gravel access roads, installation of approximately 12.7 miles of buried electrical collection lines, one permanent free standing 80 meter tall meteorological tower, a collection substation and an operations and maintenance building. Power generated from the site will be delivered via 5.2 miles of buried electrical interconnect line and 3.3 miles of overhead interconnection line to an collection substation adjacent to the National Grid Taylorville-Boonville 115 kV transmission line near Lee Road, in the Town of Martinsburg. The Project Study Area is defined by a corridor that surrounds the proposed Project components and road improvements described above and depicted on Figure 7. A more detailed description of the Project Study Area is described in Section 4.1, below.

1.2 PURPOSE

This wetland delineation report has been prepared in support of the Supplement to the Draft Environmental Impact Statement (SDEIS) currently being prepared by EDR in accordance with the requirements of the New York State Environmental Quality Review Act (SEQRA). Specific tasks performed for this study included a field delineation of all potential state and federal jurisdictional areas proximate to the Project footprint, a subsequent instrument survey of jurisdictional area boundaries utilizing a Global Positioning System (GPS) with sub-meter accuracy, and a detailed description of jurisdictional areas based on hydrology, vegetation, and soils data collected in the field.

This report describes the results of both the delineation and data collection efforts conducted by EDR as well as a description of the wetlands and waterbodies that were identified and delineated. This document is intended to provide all the information necessary for an agency jurisdictional determination, and to support a permit application, which may be submitted to the United States Army Corps of Engineers (Corps) and the New York State Department of Environmental Conservation (NYSDEC).

1.3 RESOURCES

Materials and literature supporting this investigation have been derived from a number of sources including United States Geological Survey (USGS) topographic mapping (Sears Pond and Page, NY 7.5 minute quadrangles), United States Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) mapping, NYSDEC freshwater wetlands mapping, United States Department of Agriculture (USDA) Soil Conservation Service (SCS) (currently the Natural Resources Conservation Service [NRCS]) Lewis County Soil Survey, the NRCS List of Hydric Soils of the State of New York, the NRCS list of New York Soils with potential hydric inclusions, and recent aerial photography.

Vascular plant names follow nomenclature found in Gleason and Cronquist (1991), and wetland indicator status for vegetative species was determined by reference to Reed (1988).

1.4 QUALIFICATIONS

EDR ecologists Diane Enders, Ben Brazell, William Trembath, James Pippin, Sara Stebbins and Brian Schwabenbauer, performed on-site wetland delineations and data inventories.

Ms. Enders is an ecologist and regulatory specialist with 11 years of experience in wetland delineations, state and federal wetland permitting, ecological surveys, environmental impact analysis, New York State Environmental Quality Review Act (SEQRA) and National Environmental Policy Act (NEPA) compliance, and environmental construction monitoring. She has served as senior project manager on a variety of natural resource inventory, impact evaluation and regulatory compliance projects in the Northeast.

Mr. Brazell is an environmental scientist experienced in wetland delineations, ecological surveys, environmental impact analysis, SEQRA compliance, state and federal wetland permitting, and stream and wetland mitigation design and monitoring. He has acted as project manager of a variety of natural resource inventory, impact evaluation, and regulatory

compliance projects in New York State and has served as a project scientist and project manager on a variety of stream mitigation/design, natural resource inventory, impact evaluation, and regulatory compliance projects in North Carolina.

Mr. Trembath is an ecologist and environmental scientist with over 18 years experience in the environmental field. His professional expertise includes environmental impact analyses and monitoring, wetland delineations, federal and state permitting, SEQRA compliance, hazardous waste operations, industrial health and safety, emergency response, and wildlife damage management.

Mr. Pippin is an environmental scientist with over 13 years of experience in the environmental field. He received a bachelor's degree in Natural Resources Management from the University of Maryland at College Park. His professional experience includes wetland delineations, local, state, and federal permitting, wetland mitigation monitoring, GPS mapping, and geographic information systems (GIS) data analysis.

Ms. Stebbins is an ecologist and environmental analyst with 10 years of experience in the environmental field. She received a bachelor's degree in forest biology and a master's degree in forest resource management from SUNY College of Environmental Science & Forestry. Her professional expertise includes rare plant surveys, floristic inventories, environmental impact analysis, habitat assessments, wetland delineations, and GIS analysis.

Mr. Schwabenbauer is an environmental analyst with over 5 years of experience in the environmental field. He received a bachelor's degree in environmental studies from Hobart College, and is currently pursuing a master's degree in environmental policy from SUNY College of Environmental Science and Forestry. His professional expertise includes GPS surveying and mapping, GIS analysis, wetland delineations, and SEQR compliance.

2.0 PHYSICAL CHARACTERISTICS AND RESOURCES

2.1 PHYSIOGRAPHY AND SOILS

The Project Area is located within the Central Tug Hill physiographic region of New York State (Reschke, 1990). It is situated on the Tug Hill Plateau, and is characterized by level to undulating topography. Elevations in the Project Area range from 1125 to 2024 feet amsl. The portion of the Project Area where the generating site is located ranges from 1862 to

2024 feet amsl. According to the Lewis County Soil Survey (1960), slopes within the generating site generally range from 0 to 15%. Encompassing portions of the Tug Hill Plateau, the escarpment to the east, and portions of the Black River Valley, the electrical collection line includes a wider array of topographical features. Elevations in the electrical interconnect site range from 1125 to 1920 feet amsl, while slopes generally range from 0 to 25% (USDA Soil Conservation Service, 1960).

When conducting the Lewis County Soil Survey (1960), soils scientists made detailed and reconnaissance-level soil surveys, depending on location. The detailed soil survey covered the central part of the county, and generated typical soil series and mapping unit data (Figure 6). Detailed soil mapping was not done for a large portion of the central Tug Hill Plateau, including much of the Project area. The reconnaissance soil survey covered the eastern (Adirondack) and southwestern (Tug Hill) portions of Lewis County. At the time the fieldwork was being conducted in the early 1950s, this area was considered remote and inaccessible, “the least known area of the state.” The reconnaissance-level soil surveys generated soil association maps instead of the more specific mapping units.

Mapped soil associations in the Project Site include Worth-Empeyville-Westbury, Empeyville-Westbury-Worth, Westbury-Tughill-Empeyville, Empeyville-Worth, and Peat/Muck. Stony loams and stony silt loams dominate these soil associations. Table 1 lists the soil associations found within the Project Site and their characteristics.

1. Soil Associations Within the Project Site¹

Soil Association	Main Characteristics
Worth-Empeyville-Westbury (WE)	<ul style="list-style-type: none"> • Moderately stony soils with acid fragipan • Soils in association: Empeyville (20-40%), Worth (40-60%), Westbury (15-25%), and Tughill (10-15%)
Empeyville-Westbury-Worth (EB)	<ul style="list-style-type: none"> • Very stony soils with acid fragipan • Soils in association: Empeyville (40-60%), Worth (15-20%), Westbury (15-30%), and Tughill (10-20%)
Westbury-Tughill-Empeyville (BU)	<ul style="list-style-type: none"> • Very stony soils with acid fragipan • Soils in association: Empeyville (15-20%), Worth (10-20%), Westbury (30-45%), and Tughill (25-35%)
Empeyville-Worth (EW)	<ul style="list-style-type: none"> • Moderately stony soils with acid fragipan • Soils in association: Empeyville (40-65%), Worth (15-25%), Westbury (10-20%), and Tughill (5-15%)

1. Soil Associations Within the Project Site¹

Soil Association	Main Characteristics
Peat and Muck (P)	<ul style="list-style-type: none"> • Undifferentiated organic peat and muck • Cover of swamp vegetation or forest

¹Information gathered from the Soil Survey of Lewis County, New York (USDA, 1960).

Although the soil series are not mapped within these associations, the Lewis County Soil Survey (1960) provides rough estimates of the percentage of different soil series within each association. Table 2 summarizes the characteristics of the dominant soil series found within the Project Site.

Table 2. Dominant Soil Series Within the Project Site¹

Soil Series	Main Characteristics
Empeyville Series	<ul style="list-style-type: none"> • Moderately well drained to somewhat poorly drained • Formed in glacial till derived from Oswego sandstone, with some shale and igneous rock • Undulating relief • Strongly developed fragipan below 18 inches
Tughill Series	<ul style="list-style-type: none"> • Very poorly drained • Formed in glacial till derived mainly from Oswego and Pulaski sandstones • Flat to depressed relief
Westbury Series	<ul style="list-style-type: none"> • Poorly drained to somewhat poorly drained • Formed in glacial till derived mainly from Oswego and Pulaski sandstones, with some shale • Level to gently sloping relief
Worth Series	<ul style="list-style-type: none"> • Well drained • Formed in glacial till derived mainly from sandstones • Undulating to steep relief • Very firm fragipan below 18 inches

¹Information gathered from the Soil Survey of Lewis County, New York (USDA, 1960).

2.2 HYDROLOGY

The Project area is divided amongst the Black River and Oneida Lake drainage basins (USGS Hydrologic Units 04150101 and 04140202, respectively). The project area contains the headwaters of Roaring Brook, which is joined by Atwater Creek and several unnamed tributaries as it flows east through the electrical interconnect site and ultimately flows into the Black River (located approximately 10 miles to the east of the Project area in the Black River Valley). Whetstone Gulf, Edick Creek, an unnamed tributary of Edick Creek and an unnamed tributary of Mulligan Creek also occur within the electrical interconnect site and are

tributaries to the Black River. The watershed of the Black River is approximately 1,920 square miles in size, including the northern portion of the generating site (Roaring Brook watershed) and almost the entire interconnect site. The North Branch of Fish Creek and its unnamed tributaries flow through the southern portion of the generating site and eventually into Oneida Lake located approximately 45 miles to the south. Oneida Lake has a watershed of approximately 1,470 square miles.

According to NYSDEC freshwater wetlands and streams mapping and USGS topographic mapping, the Project area contains a number of surface water features ranging from small streams and forested wetlands to larger waterways and marshes (Figure 4). Stream morphology for most of the streams on site, both named and unnamed, can be described as low-gradient drainage channels associated with floodplains within undulating upland terrain. Although stream banks are not as apparent in the flatter areas, many of these streams are less than 20 feet wide and predominantly perennial. Some of the streams have well-defined stream banks on drainages flowing from higher terrain, although the majority of waterways occur within floodplain corridors of larger wetland systems, and are less well defined. Streambed substrate is typically pebble/cobble and silt/mud with significant aquatic vegetation. The smaller streams are typically 4-6 inches in depth and larger streams up to a maximum depth of 12 inches.

3.0 JURISDICTIONAL AREA MAPPING

3.1 WATERS OF THE UNITED STATES

Waters of the United States as defined by the Corps, include all lakes, ponds, streams, (intermittent and perennial), and wetlands. Wetlands, as referenced in this narrative, are defined in Section 404 of the *Clean Water Act* as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support a relevance of vegetation typically adapted for life in saturated soil conditions” (EPA, 2001). Jurisdictional wetlands are defined by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (Environmental Laboratory, 1987). However, as a result of the *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* Supreme Court case (No. 99-1178; January 9, 2001), it has been determined that the Corps does not have jurisdictional authority over waters that are “nonnavigable, isolated, and intrastate”

(EPA, 2001). Ultimately, the jurisdictional status of all on-site waters will be determined during a field visit with a Buffalo District Corps representative.

National Wetland Inventory (NWI) mapping covers approximately one third of the Project area. Review of the portion that is covered by the NWI mapping indicates that there are numerous federally-mapped wetlands located within and adjacent to the Project Site. The federally mapped wetlands that are available are presented in Figure 5. The NWI maps indicate that forested wetlands are the dominant wetland type on-site. Broad-leaved forested wetlands and needle leaved evergreen wetlands dominate. Less common (on area covered by available data) are emergent wetlands with beaver activity and open water systems.

3.2 NEW YORK STATE FRESHWATER WETLANDS & PROTECTED STREAMS

The Freshwater Wetlands Act (Article 24 and Title 23 of Article 71 of the Environmental Conservation Law) gives the NYSDEC jurisdiction over state-protected wetlands and adjacent areas (100-foot upland buffer). The Freshwater Wetlands Act requires the NYSDEC to map all state-protected wetlands (typically over 12.4 acres in size) to allow landowners and other interested parties a means to determine where state jurisdictional wetlands exist. Review of NYSDEC mapping indicates that there are a large number of wetlands located in the vicinity of the Project area that are regulated under Article 24 of the Environmental Conservation Law. The state-regulated wetlands are identified in Table 3 and Figure 3.

Table 3. State Regulated Wetlands Within the Project Area¹

Wetland	Class ¹	Total Size (Acres)	Size Within Project Area (Acres)	Location
P-1	II	449.18	16.98	Generating Site
P-4	II	19.63	19.63	Electrical Interconnect Site
P-8	II	290.63	283.46	Generating Site
P-9	II	49.60	38.66	Generating Site
P-10	II	287.96	152.67	Generating Site & Electrical Interconnect Site
P-11	II	96.11	12.05	Electrical Interconnect Site
P-12	II	16.29	13.04	Electrical Interconnect Site
P-13	III	11.65	7.86	Electrical Interconnect Site
P-14	III	12.25	11.81	Electrical Interconnect Site

Wetland	Class ¹	Total Size (Acres)	Size Within Project Area (Acres)	Location
P-18	II	205.21	164.99	Generating Site & Electrical Interconnect Site
P-19	II	333.53	327.63	Generating Site
P-20	III	19.65	19.65	Generating Site
P-21	II	1040.19	35.42	Generating Site
P-22	II	179.58	116.51	Generating Site
P-23	III	26.44	25.60	Generating Site
P-24	II	116.30	29.95	Generating Site
P-26	III	57.78	13.49	Generating Site
P-27	III	80.43	79.95	Generating Site
P-28	II	31.97	27.26	Generating Site
SP-21	III	20.15	9.60	Generating Site
SP-22	III	34.56	8.01	Generating Site
SP-38	IV	29.32	29.32	Generating Site
SP-39	II	434.37	122.91	Generating Site
SP-41	III	51.39	51.39	Generating Site
SP-42	IV	20.64	20.64	Generating Site
SP-43	II	22.00	22.00	Generating Site
SP-44	II	359.53	6.02	Generating Site

¹ Refer to Figure 3 for a map of state regulated wetlands.

² NYS classification system. Four separate classes that rank wetlands according to their ability to provide functions and values (Class I having the highest rank, descending through Class IV).

Under Article 15 of the Environmental Conservation Law (Protection of Waters), the New York State Department of Environmental Conservation (NYSDEC) has regulatory jurisdiction over any activity that disturbs the bed or banks of protected streams. In addition, small lakes and ponds with a surface area of 10 acres or less, located within the course of a stream, are considered to be part of a stream and are subject to regulation under the stream protection category of Article 15. Based on available NYSDEC stream classification mapping, there are 12 protected streams and tributaries within the Project Area, including Atwater Creek, Edick Creek, North Branch of Fish Creek and Roaring Brook (Table 4). Protected stream means any stream, or particular portion of a stream, that has been assigned by the NYSDEC any of the following classifications or standards: AA, AA(t), A, A(t), B, B(t) or C(t) (6 NYCRR Part 701). A classification of AA or A indicates that the best use of the stream is as a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The best usages of Class B waters are primary and

secondary contact recreation and fishing. The best usage of Class C waters is fishing. Streams designated (t) indicate that they support trout, and also include those more specifically designated (ts) which support trout spawning. On-site streams are classified by the NYSDEC as Class C, Class C(T), and Class C(TS) waters. Class C waters are not subject to regulation under the stream protection category of the Environmental Conservation Law, Article 15 (Protection of Waters). However, streams and small water bodies located in the course of a stream that are designated as C(T) or higher (i.e., C(TS), B, or A) are collectively referred to as "protected streams," and are subject to the stream protection provisions of the Protection of Waters regulations. These streams, along with all other perennial and intermittent streams in the study area, are also protected by the Corps of Engineers under Section 404 of the Clean Water Act. There are no streams regulated by Section 10 of the Rivers and Harbors Act of 1899 (navigable waters) within the generating site.

Table 4. Streams Within the Project Area

Name	Class	Status
Atwater Creek	C	Unprotected
Atwater Creek	AA	Protected
Edick Creek	C(T)	Protected
North Branch of Fish Creek	C(T)	Protected
Roaring Brook	C	Unprotected
Roaring Brook	C(T)	Protected
Unnamed Tributaries of Atwater Creek	C	Unprotected
Unnamed Tributary of Atwater Creek	AA	Protected
Unnamed Tributary of Edick Creek	C(T)	Protected
Unnamed Tributary of Mulligan Creek	C(TS)	Protected
Unnamed Tributaries of North Branch of Fish Creek	C(t)	Protected
Unnamed Tributaries of Roaring Brook	C	Unprotected
Unnamed Tributaries of Roaring Brook	C(T)	Protected

4.0 ON-SITE JURISDICTIONAL AREA DELINEATION

4.1 METHODOLOGY

EDR personnel performed identification and delineation of wetlands and streams within the project footprint of the proposed wind power project during the autumn 2007 and the spring and summer 2008 growing seasons. The survey team applied the wetland survey methodology to the collective Project Study Area: within 100 feet either side of the centerline

of a proposed access road, 200 feet from a proposed turbine coordinate, 100 feet either side of the buried and overhead collection lines, 50 feet either side of the centerline of Flat Rock Road (between Carey Road and the western side of project area) and within the footprint of the building and grading limits of a proposed building or substation. Wetland delineations and wetland reconnaissance level investigation were also performed within the vicinity of various project alternatives. However, these wetlands are not described herein.

The determination of wetland boundaries was made by EDR personnel according to the three-parameter methodology presented in the Corps Wetland Delineation Manual (hereafter referred to as the 1987 Manual) (Environmental Laboratory, 1987). In the vicinity of mapped NYSDEC Freshwater Wetlands, determinations of wetland boundaries were made also in accordance with the methodologies defined in the New York State Freshwater Wetlands Delineation Manual (NYSDEC, 1995). A modified routine sampling procedure was chosen for the field investigation. Attention was also given to the identification of potential hydrologic connections between wetlands areas that could influence their jurisdictional status.

Wetland boundaries were defined in the field with sequentially-numbered pink surveyor's flagging, which was subsequently mapped using a Trimble Pathfinder® Pro XR GPS unit with reported sub-meter accuracy. Data was collected from one or more sample plots in each delineated wetland (depending on the size of the delineated area), and was recorded on Corps *Routine Wetland Determination* forms (Appendix B). The data collected for each of the wetlands delineated by EDR personnel included vegetation, hydrology indicators, and soils characteristics. This methodology was applied to all wetlands delineated on the Project Site.

The wetland vegetative community data collection process focused on dominant plant species in four categories: trees (>3" diameter at breast height), saplings/shrubs (<3.0" diameter at breast height and >3.2' tall), herbs (<3.2' tall), and woody vines. Dominance was measured by visually estimating those species having the largest relative basal area (trees), greatest height (saplings/shrubs), greatest number of stems (woody vines), and greatest percentage of aerial coverage (herbaceous) by species. Dominant species for each stratum in the plant community were identified for all wetland delineations on the Project Site. The dominant species from each category are defined as those plants with the highest ranking which, when cumulatively totaled, exceeds 50 percent of the total dominance measure for that category, plus any additional plant species comprising 20 percent or more of the total

dominance measure for the category. The species were rank ordered for each category by decreasing value of percent cover.

Project Study Area soils data was collected by EDR personnel using a soil auger. Information concerning soil series, subgroup, drainage classification, texture, and matrix and mottle color was obtained for each delineated wetland. This information was used to determine whether the soils displayed hydric characteristics. Hydric soils are those that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil layer. Hydric soils are poorly drained, and their presence is indicative of the likely occurrence of wetlands (Environmental Laboratory, 1987). Hydric soils were determined in the field through observation of composition, color, and morphology. Soil colors were determined using *Munsell Soil Charts* (Kollmorgen Corp., 1988).

The 1987 Manual lists the following indicators as evidence of wetland hydrology (in order of decreasing reliability): (1) visual observation of inundation, (2) visual observation of soil saturation, (3) water marks, (4) drift lines, (5) sediment deposits, and (6) drainage patterns. Hydrologic characteristics (inundation and soil saturation) were visually assessed to a depth of 12 inches. The hydrology indicators described above are considered "primary indicators," and any one of these indicators is sufficient evidence that wetland hydrology is present when combined with a hydrophytic plant community and hydric soils. In addition, "secondary indicators" used by EDR personnel included: (1) oxidized root channels in the upper 12 inches of soil, (2) water-stained leaves, (3) local soil survey data, and (4) morphological plant adaptations. Any two of these indicates the presence of wetland hydrology.

Photographs were taken of each wetland delineated within the proposed Project Site. Photographs representative of the delineated wetlands are included in Appendix C.

5.0 RESULTS

EDR personnel delineated a total of one hundred seventeen (117) wetlands and streams within the Project Study Area and its immediate vicinity. Information pertaining to individual on-site wetlands is summarized in Table 5. In general, jurisdictional areas delineated on the Project Site exist as one of the following broad types: 1) emergent wetland, 2) wet meadow; 3) scrub-shrub wetland and 4) forested wetland. All on-site delineated wetlands are depicted

in Figure 7 (sheets 1-43, as indicated in Table 5), and descriptions of each community types are presented below.

As described in Section 4.1, wetland delineations were performed only in areas that occur within the vicinity or footprint of proposed Project components. There are numerous large, complex wetland systems within the Project Site that were not delineated, or had just a tiny periphery of the entire system delineated. As described in Section 3.2, many of these large wetland systems are protected by the NYSDEC. Correspondence from the NYSDEC Natural Heritage Program, dated November 3, 2008, indicates that the Project Area contains four wetland and stream communities considered significant from a statewide perspective: shallow emergent marsh, shrub swamp, marsh headwater stream, and rocky headwater stream. None of these communities are inherently rare within the state. However, the on-site occurrences are considered high quality examples of more common community types due to their large size, diversity, remote location, and undisturbed condition within an intact landscape.

It should be noted that the community types listed below in Table 5 (and described in detail in Section 5.1) apply specifically to delineated wetlands, and do not represent the full range of wetlands community types present on-site. Many of the larger on-site wetlands exist as a mosaic of different wetland communities. Sedge meadow and deep emergent marsh are two examples of wetland communities found on-site that were not encountered in the survey area. Many of the deepwater communities on-site have been created and maintained through the activity of beaver (*Castor canadensis*), which create ponds by damming streams and flooding adjacent areas. Beaver dams were observed on-site in excess of five feet in height.

Table 5. Delineated Wetlands and Streams

EDR Wetland/Stream ID	Total Acres Delineated	Community Type¹	State Jurisdiction	NYSDEC Wetland ID²	Stream Class	Stream Name	Reference Sheet #
A	5.010	EM/Stream	Yes	P-8	C(t)	Roaring Brook	10
B	0.313	SS/EM/Stream	Yes	P-8	C(t)	Roaring Brook	10
C	1.485	FO/SS	Yes	P-8			10
D	0.044	EM	No				5
F	0.324	EM/Stream	No		C(t)	Unnamed Trib to Edick Creek	5
G	0.025	EM/Stream	No		C(t)	Unnamed Trib to Edick Creek	5
H	0.081	EM	No				5
I	0.011	EM	No				8
J	0.542	EM	No				8
L	0.267	EM	Yes	SP-38			6
M	0.047	EM	No				6
N	0.169	EM	No				6
O	0.160	EM	No				6
Q	0.254	EM	Yes	P-19			10
R	0.046	FO	No				10
S	0.049	FO	No				10
T	0.724	EM	Yes	P-8			10
V	3.146	FO	No				10
W	0.101	EM	No				10
X	0.082	EM	No				10
Y	0.986	EM/SS	Yes	P-19			12
Z	0.089	EM	Yes	P-19			12
2A	0.491	EM	Yes	P-19			12
2B	0.695	FO/EM	Yes	P-28			12

EDR Wetland/Stream ID	Total Acres Delineated	Community Type¹	State Jurisdiction	NYSDEC Wetland ID²	Stream Class	Stream Name	Reference Sheet #
2C	0.764	EM	Yes	P-19			12
2E	0.071	EM/Stream	Yes	P-28	C(t)	Unnamed Trib to North Branch of Fish Creek	12
2G	0.288	EM/SS/FO/Stream	Yes	P-10	C(t)	Unnamed Trib to Roaring Brook	17
2H	0.272	EM/FO	No				12
2I	0.232	SS/FO/Stream	Yes	P-10	C(t)	Unnamed Trib to Roaring Brook	17
2J	0.177	FO	No				12
2K	0.946	FO	Yes	P-10			17
2L	0.045	EM/SS	Yes	P-10 and P-18			17
2M	0.350	EM/Stream	Yes	P-10	C(t)	Unnamed Trib to Roaring Brook	17
2N	0.415	SS	No				17
2O	0.020	EM	Yes	P-18			16
2P	0.011	EM	No				16
2Q	0.018	EM	No				16
2R	0.057	EM	Yes	P-19			12
2S	0.094	FO	Yes	P-19			12
2T	0.037	EM	No				15
2V	0.799	EM	Yes	P-27			15
2W	0.339	EM/SS	Yes	P-27			15
2X	0.495	EM/Stream	Yes	P-27	C(t)	Unnamed Trib to North Branch of Fish Creek	15
2Y	0.306	SS	No				15
2Z	3.682	EM/SS/FO/Stream	Yes	P-22	C(t)	North Branch of Fish Creek	14
3A	0.285	EM	Yes	P-22			14
3B	2.680	FO	No				14

EDR Wetland/Stream ID	Total Acres Delineated	Community Type ¹	State Jurisdiction	NYSDEC Wetland ID ²	Stream Class	Stream Name	Reference Sheet #
3D	0.289	EM/FO	No				8
3E	0.167	EM/FO	No				8
3F	0.874	EM/SS/Stream	Yes	SP-39	C(ts)	Unnamed Trib to Mulligan Creek	8
3G	0.064	EM/SS	No				8
3H	11.219	EM/SS/FO/Stream	Yes	SP-39	C(ts)	Unnamed Trib to Mulligan Creek	8
3I	0.023	EM	No				8
3J	0.074	EM	No				15
3K	0.930	SS/FO	No				9
3L	0.226	EM	No				6
3N	0.238	FO	Yes	SP-38			6
3O	8.646	FO	Yes	SP-38			6
3P/3Q	2.371	EM/FO	No				5
3R	1.315	EM/WM	Yes	P-19			9
3U	0.036	EM	No				7
3W	0.029	EM	No				7
3X	1.837	FO/SS	Yes	P-8			7
3Y	1.907	FO	No				1
4D	2.797	EM	No				15
4E	3.006	EM/SS	Yes	P-26			15
4G	0.145	FO	No				13
4I	0.187	FO	No				13
4J	0.102	FO	No				13
4K	0.151	FO	No				13
4M	0.745	FO/Open Water	Yes	SP-39 and SP-43			11
4N	8.516	FO	Yes	P-23 and SP-43			14

EDR Wetland/Stream ID	Total Acres Delineated	Community Type ¹	State Jurisdiction	NYSDEC Wetland ID ²	Stream Class	Stream Name	Reference Sheet #
4O	0.699	EM/FO	Yes	P-28			13
4P	0.219	EM	Yes	P-28			12
4Q	0.364	EM/Open Water	Yes	P-28			12
4S	1.666	EM	Yes	P-26			15
6C	0.097	Stream	No		C	Unnamed Trib to Roaring Brook	27
6D	0.320	Stream	No		C	Unnamed Trib to Roaring Brook	27
6E	0.573	WM/Stream	No		C	Unnamed Trib to Atwater Creek	25
6F	0.408	EM/FO	No				27
6G	0.269	EM	No				26
6K	4.492	EM	No				26
6L	0.181	EM/Pond	No				25
6M	0.051	EM	No				27
6N	0.166	Stream	No		AA	Unnamed Trib to Atwater Creek	25
6O	1.263	EM/Stream	No			Unmapped Stream	24
6P	0.144	FO	No				24
6R	0.422	EM/Stream	No			Unmapped Stream	24
6S	0.198	EM/WM	No				24
7J	0.066	Stream	No		C(t)	Roaring Brook	19
7K	0.306	SS	No				20
7L	0.025	EM/SS/Stream	No		C	Unnamed Trib to Roaring Brook	20
7M	0.475	EM/SS	No				20
7N	0.233	SS	No				20
7O	0.227	EM/SS/Stream	No				21
7P	0.291	SS/Stream	No		C	Unnamed Trib to	21

EDR Wetland/Stream ID	Total Acres Delineated	Community Type ¹	State Jurisdiction	NYSDEC Wetland ID ²	Stream Class	Stream Name	Reference Sheet #
						Roaring Brook	
7Q	0.791	EM/SS	Yes	P-14			21
7R	0.153	SS	No				21
7S	0.135	SS	No				22
7T	0.062	EM	No				22
7U	0.497	SS	No				22
7V	0.822	EM/SS/Stream	No		AA	Atwater Creek	22
7W	0.111	FO	No				23
7X	0.186	FO	No				23
7Y	0.066	EM/Stream	No			Unmapped Stream	23
8A	1.140	EM/Stream	Yes	P-11		Unmapped Stream	18
8B	5.001	WM/SS/Stream	Yes	P-11	C(t)	Roaring Brook	18
8C	2.656	SS	No				19
8D	0.210	Stream	No		C(t)	Roaring Brook	19
FR1	0.095	SS	No				4
FR2	0.099	SS	No				4
FR3N	0.192	EM	Yes	P-1			3
FR3S	0.271	EM/SS	Yes	P-10			3
FR4	0.172	WM	No				3
FR5	0.038	SS/Stream	Yes	P-1		Unmapped Stream	3
FR6	0.246	SS	No				2
FR7	0.098	SS	No				2

¹ Wetland community types noted are based upon the Cowardin et al classification system: EM = emergent marsh; WM = wet meadow; SS = scrub shrub; FO = forested.

² On August 21, 2008, EDR ecologist Diane Enders and NYSDEC regional biologists Mark Craig and Mark Wiggins (Region 6) performed a site visit to confirm the boundaries of NYSDEC Freshwater Wetlands.

5.1 WETLANDS

Wetland areas delineated within the Project Study Area consisted of four types: Emergent, Wet Meadow, Scrub-Shrub, and Forested wetlands.

Emergent wetland – The majority of delineated Project Site wetlands are emergent. These wetlands are characterized by persistent and/or deep inundation, often containing soils that remain inundated throughout the year. Emergent marshes on-site are dominated by herbaceous species such as common rush (*Juncus effusus*), bulrushes (*Scirpus cyperinus* and *Scirpus atrovirens*), sedges (*Carex crinita* and *Carex stricta*), spotted jewelweed (*Impatiens capensis*), Joe pye-weed (*Eupatorium maculatum*), and ferns (*Onoclea sensibilis*, *Osmunda cinnamomea*, *Osmunda regalis*). The silt/silt loam textured soils are shallow for the most part with a rock layer that varies in depth within 16 inches. The soils are saturated at 2-3 inches and characterized by a low chroma value of 10 YR 2/1 on average. Evidence of water marks (inundation), water-stained leaves, oxidized root channels, and morphological plant adaptations (hummocks) occur throughout these wetlands. There were 72 wetlands within the Project Study Area that displayed characteristics of an emergent wetland. Wetland G is an example of an emergent wetland community in the Project Study Area. Joe pye-weed, flat topped aster, boneset, fringed sedge and spotted jewelweed dominate the wetland vegetative community.

Wet Meadow – Wet meadows are usually found in poorly drained, low-lying depressional areas. These wetlands may resemble grasslands and are typically drier than other marshes, except during periods of seasonal high water. They generally lack standing water for most of the year, though snow melt, stormwater runoff, and/or a high water table allows the soil to remain saturated for a significant portion of the growing season. These wetlands are dominated by herbaceous species, with some areas having high vegetative diversity, while others are almost monotypical (i.e. dense stands of reed canary grass). Prevalent hydrophytic vegetation found in wet meadows on-site include rushes (*Juncus sp.*), sedges (*Carex crinita* and *Carex stricta*), spotted jewelweed (*Impatiens capensis*), reed canary grass, Joe pye-weed, boneset (*Eupatorium perfoliatum*), sensitive fern (*Onoclea sensibilis*), and tear thumb (*Polygonum sagittatum*). Wet meadow soils on-site consist of low chroma (10YR 3/2 with mottling 10YR 6/6) silt loams and clays, and hydrologic indicators include water marks, drainage patterns in the wetland, oxidized root channels, water stained leaves, and hummocky microtopography. There were five wetlands within the Project Study Area that displayed characteristics of a wet meadow. Wetland FR4 is an example of a wet

meadow wetland community in the Project Study Area. Joe pye-weed, spotted jewelweed, aster and spirea dominate the wetland vegetative community.

Scrub-shrub wetland – Scrub/shrub wetlands within the study area are characterized by dense stands of shrub species less than 20 feet tall, including meadowsweet (*Spiraea alba*), willow (*Salix spp.*), speckled alder (*Alnus rugosa*), winterberry (*Ilex verticillata*), and mountain holly (*Nemopanthus mucronata*). Herbaceous vegetation in these areas is typically dominated by spotted jewelweed, sedges (*Carex spp.*), goldenrods (*Solidago spp.*), beggar's-ticks (*Bidens spp.*), purplestem aster (*Symphotrichum puniceum*), and umbellate aster (*Doellingeria umbellata*). The soils are saturated at 0 inches with a silt loam texture and characterized by a low chroma value of 10 YR 2/1. Hydrology is characterized by moist to saturated conditions. Evidence of water-stained leaves, oxidized root channels, and morphological plant adaptations (hummocks) occur throughout these wetlands. There were 35 wetlands within the Project Study Area that displayed characteristics of a scrub-shrub wetland. An example of a scrub-shrub wetland community characteristic of the Project Study Area is wetland FRI. This wetland is characterized by a shrub layer, which consists of silky dogwood (*Cornus amomum*) and speckled alder, and the ground cover includes spotted jewelweed and sensitive fern.

Forested wetland – Forested wetland communities are dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbs. The forested wetlands on the Project Site include a mix of trees such as balsam fir (*Abies balsamea*), black spruce (*Picea mariana*), yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*); and shrub species such as speckled alder and winterberry. The herbaceous layer in these wetlands is dominated by sphagnum moss, sensitive and cinnamon ferns, and sedges (*Carex spp.*). The soils are typical of the Site with a rather significant organic layer followed by an A horizon with a dark low chroma value of 10YR 2/1 and a silt loam texture. At variable depths, 3-6 inches, a rock layer prevented further soil profile investigation. Indicators of wetland hydrology include saturated soils, watermarks, water-stained leaves, oxidized root channels, and morphological plant adaptations (hummocks and root buttressing). There were portions of 33 wetlands within the Project Study Area that displayed characteristics of a forested wetland. An example of a forested wetland community characteristic of the Project Study Area is wetland 3D. This wetland is characterized by an overstory of mature red maple and yellow birch and ground cover dominated by cinnamon fern. Soils displayed a low chroma matrix color.

5.2 STREAMS

As indicated in Table 5, 30 of the delineated areas within the Project Study Area are streams. Fourteen of the delineated jurisdictional wetlands within the Project Study Area are associated with streams, such as wetlands A and B which comprise a sedge meadow-stream system. All 30 delineated systems were flagged as perennial. Of which, 17 delineated streams are part of a protected stream as designated by NYSDEC, which include Roaring Brook, Edick Creek, North Branch of Fish Creek and Atwater Creek and their associated tributaries. On-site streams are mostly lower-gradient streams that meander through wetlands and broad undulating settings. Most streams on the Project Site are perennial, with a pebble/cobble and silt/mud substrate, and aquatic vegetation. Water depths within the majority of perennial streams are typically 2 to 6 inches in riffles, with pool depths of 0.5 to 2 feet.

6.0 CONCLUSIONS

A total of one hundred seventeen (117) wetlands and streams (totaling 82 delineated acres) were delineated by EDR personnel in areas within or immediately adjacent to the Roaring Brook Wind Project Study Area. These wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The delineated areas include forested, scrub-shrub, wet meadows and emergent wetlands, as well as streams and open water areas. The primary functions provided by these wetlands appear to include maintaining surface water flows, recharging groundwater supplies, storm water detention, flood protection and abatement, water quality improvement, wildlife habitat, and nutrient production and cycling. Several of the larger forested wetlands provide habitat for forest-nesting songbirds while the open emergent wetlands offer habitat to migrating waterfowl. The functions of many of the delineated wetlands are portions of much larger systems, which may provide significant functions and values. Within the Project site, the highest-value wetlands are the larger, more diverse wetlands regulated by NYSDEC.

On August 21, 2008, EDR ecologist Diane Enders and NYSDEC regional biologists Mark Craig and Mark Wiggins (Region 6) performed a site visit to confirm the boundaries of NYSDEC Freshwater Wetlands. Of the one hundred seventeen (117) wetlands and streams delineated on-site, 17 are protected streams and 44 are part of the 15 larger state-regulated wetlands within the study area as designated by NYSDEC.

In accordance with Corps Regulatory Guidance Letter 08-02 dated June 26, 2008, EDR sent a request for a preliminary jurisdictional determination the Corps on September 23, 2008. October 24, 2008, EDR ecologist Diane Enders and Corps biologist Margaret Crawford conducted a site visit related to the preliminary jurisdictional determination. Wetlands described within this report are a subject of the preliminary jurisdictional determination and the project sponsor has 'set aside' questions relating to Clean Water Act jurisdiction by the Corps, as described the subject regulatory guidance letter.

7.0 REFERENCES

Benyus, Janine M. 1989. *The Field Guide to Wildlife Habitats of the Eastern United States*. Simon & Schuster Inc., New York, NY.

Brown, S., S. Crocoll, D. Goetke, N. Heaslip, T. Kerpez, K. Kogut, S. Sanford, and D. Spada. 1995. *New York State Freshwater Wetlands Delineation Manual*. New York State Department of Environmental Conservation, Albany, NY.

Cowardin, L.M., V. Carter, F.C. Goblet and E.T. LaRoae. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, OBS-79/31, Washington, D.C.

Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. U.S. Army Corps of Engineers: Waterways Experiment Station; Vicksburg, MS.

Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. D. Van Nostrand Co., New York, NY.

Grimm, William Carey. 1993. *The Illustrated Book of Wildflowers and Shrubs: The Comprehensive Field Guide to More Than 1300 Plants of Eastern North America*. Stackpole Books. Mechanicsburg, PA.

Kollmorgen Corporation. 1988. *Munsell Soil Color Charts*. Macbeth Division of Kollmorgen Corporation, Baltimore, MD.

Natural Resources Conservation Service. 1989. *New York Soils With Potential Hydric Inclusions*.

Natural Resources Conservation Service. 1995. *Hydric Soils of New York*. Revised December 15, 1995.

Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown and Co., Boston, MA.

Reed, P.B., Jr. 1986. *Wetland Plants of the State of New York*. U.S. Fish & Wildlife Service, St. Petersburg, FL.

Reed, P.B., Jr. 1988. *National List of Plant Species That Occur in Wetlands: Northeast (Region 1)*. U.S. Fish & Wildlife Botanical Report, No. 88 (24). St. Petersburg, FL.

Reschke, C. 1990. *Ecological Communities of New York State*. New York Natural Heritage Program, New York State Department of Environmental Conservation, Latham, NY.

Tiner, Ralph W. 1999. *Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification and Mapping*. Lewis Publishers, New York, NY.

USDA NRCS 1960. *Soil Survey of Lewis County, New York*. USDA Soil Conservation Service in Cooperation with Cornell University Agricultural Experiment Station, Washington, D.C.

United States Environmental Protection Agency (EPA). 2001. Interagency Memorandum from Gary S. Guzy (General Counsel for the U.S. Environmental Protection Agency) and Robert M. Anderson (Chief Counsel for the U.S. Army Corps of Engineers). Memorandum Subject: *Supreme Court Ruling Concerning CWA Jurisdiction over Isolated Waters*.

APPENDIX A
FIGURES

APPENDIX B

ROUTINE WETLAND DETERMINATION FORMS

APPENDIX C

PHOTOS OF REPRESENTATIVE WETLAND COMMUNITIES