VISUAL IMPACT ASSESSMENT

Cohocton Wind Power Project

Town of Cohocton

Steuben County, New York

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INTRODUCTION

Environmental Design & Research, Landscape Architecture, Environmental Services, Engineering and Surveying, P.C. (EDR) was retained by UPC Wind Management, LLC to prepare a Visual Impact Assessment (VIA) for the proposed Cohoton Wind Power Project (the Project) located in the Town of Cohocton, New York. The purpose of this VIA is to: 1) describe the appearance of the visible components of the proposed project, 2) define the visual character of the project study area, 3) inventory and evaluate existing visual resources and viewer groups, 4) evaluate potential project visibility within the study area, 5) identify key views for visual assessment, and 6) assess the visual impacts associated with the proposed action. This VIA was prepared under the direct guidance of a registered landscape architect experienced in the preparation of visual impact assessments. It is also consistent with the policies, procedures, and guidelines contained in established visual impact assessment methodologies (see Literature Cited/References section).

PROJECT DESCRIPTION

Project Site

The proposed project site includes approximately 5,755 acres of leased private land located off of Lyon Road, Pine Hill Road, Kirkwood-Lent Hill Road, Mattice Road, Rynders Road, Edmond Road, and Preston Road in the Town of Cohocton, in Steuben County, New York (Figure 1). The primary grouping of wind turbines is located on Pine Hill and Lent Hill approximately 2.3 miles southwest of the Village of Naples, 5.1 miles north of the Village of Avoca, 1.7 miles east of the Village of Cohocton, and 1.1 miles east of the Hamlet of Atlanta (as measured to the nearest turbine). An additional small grouping of turbines is located southwest of the primary turbine grouping, on Brown Hill. These turbines are approximately 3.2 miles west of the Hamlet of Wallace, 5.3 miles north of the Hamlet of Howard, and 3.1 miles southwest of the Village of Cohocton.

The project site is dominated by open crop fields (primarily hay and corn), located on elevated ridgetops. Forested areas are generally confined to small woodlots, ravines, and steep slopes that descend to adjacent valley bottoms. The site also includes successional old field, hedgerow, successional shrubland, yards, farms, small wetlands, and ponds. A proposed transmission line will descend from the top of Lent Hill to the Cohocton River Valley to the south, cross the valley and follow an unnamed creek valley to the location of the remaining turbines and substation on Brown Hill. The Cohocton River Valley is characterized by broad flat agricultural fields and sizeable wetlands associated with the Cohocton River. The valley also includes Interstate Route 390, NYS Route 415, and the Livonia, Lakeville and Avon Railroad. Existing built features within the site boundaries include roads single-family homes, barns, silos, and other agricultural buildings.

Proposed Project

The proposed project will be an 82-megawatt (MW) wind power facility, consisting of 41 2.0-megawatt (MW) wind turbines and associated support facilities. For the purposes of the VIA, a project layout showing 48 potential turbine locations was evaluated (Figure 2). The specific components of the project are outlined below:

<u>Wind Turbines</u>

The wind turbines proposed for this project are the 2.0 MW G-87 manufactured by Gamesa-Eolica. Each wind turbine consists of three major components; the tower, the nacelle, and the rotor, all of which will be white in color. The height of the tower, or “hub height” (height from foundation to top of tower) will be approximately 256 feet. The nacelle sits atop the tower, and the rotor hub is mounted

to the nacelle. The total turbine height (i.e., height at the highest blade tip position) will be approximately 399 feet. Descriptions of each of the turbine components are provided below.

Tower: The towers used for this project are conical steel structures manufactured in multiple sections. The towers have a base diameter of approximately 15 feet and a top diameter of approximately 8 feet. Each tower will have an access door and an internal safety ladder to access the nacelle.

Nacelle: The main mechanical components of the wind turbine are housed in the nacelle. These components include the drive train, gearbox, generator, and transformer. The nacelle is approximately 30 feet long, 12 feet tall, and 10 feet wide. Attached to the top of some of the nacelles, per specifications of the Federal Aviation Administration (FAA), will be a single, medium intensity aviation warning light. These lights will be flashing red strobes (L-864) and operated only at night. For the purposes of this study, it is assumed that the nacelle will include no lettering, logo, or other exterior marking.

Rotor: A rotor assembly is mounted to the nacelle to operate upwind of the tower. Each rotor consists of three composite blades approximately 139 feet in length (total rotor diameter = 284 feet). The rotor blades are rotated along their axis or "pitched" to enable them to operate efficiently at varying speeds. Also, the rotor can spin at varying speeds (up to 19 revolutions per minute) to operate more efficiently at lower wind speeds.

A computer model illustrating the appearance of the proposed turbine is shown in Appendix A.

Electrical System

The proposed Cohocton Project 34.5 kilovolt (kV) will have an electrical system that consists of four parts. These include 1) a system of buried 34.5 kilovolt (kV) cables that will collect power from each wind turbine, 2) a central collection station within the turbine field on Lent Hill, 3) a 115 kV transmission line that will carry power from the collection station to a point of interconnection with the existing New York State Electric and Gas (NYSEG) 230 kV transmission line on Brown Hill, and 4) a substation that transfers the power from the 115 kV transmission line to the existing 230 kV transmission line and regional power grid. Each of these components is described below.

Collector System: A transformer located in the nacelle will raise the voltage of electricity produced by the turbine generator up to the 34.5 kV voltage level of the collection system. From the transformer, cables located inside the tower will join the collector circuit and turbine communication cables (electrical interconnect) which will run underground (generally along project access roads) and connect the individual turbines to a collection station located off of Kirkwood-Lent Hill Road. Within the project site, approximately 29 miles of cable will be installed. The location of proposed collection lines is indicated in Figure 2. For the purposes of this study, it is assumed that no new overhead lines or above-ground structures will be required as part of the collector system.

Collection Station: The collection station will be located off of Rynders Road, near the intersection with Mclean Road. It is the terminus of the collection system, and will transform the voltage of this system from 34.5 kV to 115 kV. The station will be approximately 160 by 120 feet in size and will include transformers and other electrical equipment. The collection station will be enclosed by chain link fencing. The design of this station has not yet been finalized; consequently, it is not evaluated as part of this VIA.

115 kV Transmission Line: The 115 kV transmission line will connect the collection station on Lent Hill with the proposed substation on Brown Hill (see Figure 2). It will cross the

Cohocton River Valley and be approximately 9.4 miles in length. The line will be carried on treated wood pole structures that range in height from 50 to 70 feet tall. Design of the transmission line was not complete at the time the VIA was prepared. Therefore it is not evaluated in this study.

Substation: The substation will be located off of Preston Road on Brown Hill in the Town of Cohocton, adjacent to the NYSEG 230 kV transmission line. The substation will step up voltage from 115 kV to 230 kV to allow connection with the existing line. The substation will include transformers, breakers, towers, cable carriers, a control house, and related structures. It will be approximately 400 by 250 feet in size, and enclosed within a chain link fence. The design of this station has not yet been finalized; consequently, it is not evaluated as part of this VIA.

Access Roads

The project will require the construction of new or improved access roads to provide access to the proposed turbine sites. The proposed location of project access roads is shown in Figure 2. The total length of access road required to service all proposed wind turbine locations is approximately 13.5 miles, the majority or which will be upgrades to existing farm lanes. The roads will be gravel-surfaced and typically 16 feet in width.

Meteorological Towers

Four, 60-meter (196-foot) tall, meteorological towers will be installed to collect wind data and support performance testing of the project. The towers will be galvanized tubular or lattice steel structures and will include wind monitoring instruments. The location of these towers has not yet been determined; consequently, they are not addressed in this study.

EXISTING VISUAL CHARACTER

Based on established visual assessment methodology (NYSDEC, not dated) the visual study area for the project was defined as the area within a 5-mile radius of each of the proposed turbines, and includes 177 square miles in Steuben County, 5 square miles in Livingston County, 27 square miles in Ontario County, and 4 square miles in Yates County. This visual study area is illustrated in Figure 3.

Physiographic/Visual Setting

Landform and Vegetation

The visual study area is in the Central Appalachian physiographic region of New York State (Reschke, 1990). This area is distinguished by elevated ridges with a rolling character that are dissected by narrow, steep-walled valleys and ravines. These dissected plateaus transition rapidly to relatively flat river valleys. These valleys include the Naples Valley to the north, near the Village of Naples, and the Cohocton River Valley that borders the western edge of the primary turbine grouping and bisects the study area in a generally north-south orientation. The study area's landform tends to run in a northeast to southwest pattern with roadways and watercourses following similar lines of travel. Elevations within the study area range from approximately 680 to 2,385 feet above sea level.

Vegetation in the study area is a roughly 60:40 mix of open agricultural fields and deciduous forests (woodlots and forestland). Open fields include active cropland, pasture, and vineyards, and tend to occur on more level hilltops and within the major valleys. Forest vegetation is primarily deciduous

(oak-hickory and northern hardwoods) with some native conifers (white pine and hemlock) mixed in. Blocks of planted conifers (Norway spruce, Scotch pine, etc.) also occur in the upland portions of the study area. Mature trees typically occur in ravines and on steep ridge slopes (including the slopes of the Cohocton River Valley). They also occur along river banks and in woodlots, hedgerows and wooded wetlands in the more agricultural portions of the study area.

Land Use

Land use within the study area is dominated by undeveloped land (agricultural and wooded), farms, and scattered rural residences. Dairy farming is the primary agricultural activity. Higher density residential and commercial development is concentrated in the villages and small hamlets that occur along State Route 21, 371 and 415, including the Villages of Cohocton and Naples. The villages are generally characterized by a well-defined central business district, surrounded by traditional residential neighborhoods, with some commercial development along the outskirts. Hamlets within the study area, such as Atlanta, North Cohocton, and Wallace are relatively small pockets of development within a primarily rural/agricultural landscape. They are typically located at major crossroads. Outside the village and hamlet areas, commercial/industrial uses within the study area occur within the Cohocton River Valley and along certain portions of state highways in the area. These include automobile dealerships, retail/convenience stores, building material suppliers, small manufacturing operations, gravel pits, and equipment yards. Interstate Route 390, and the Livonia, Lakeville and Avon Railroad run through Cohocton River Valley within the study area.

Water Features

Water features within the visual study area include several significant water bodies that are used for recreational purposes, including fishing, boating and/or swimming. These include the Cohocton River, Twelvemile Creek, Tenmile Creek, Kirkwood Creek, Eelpot Creek, Neils Creek, Castle Creek, Loon Lake, and Smith Pond. However, these water bodies are not major visual components of the landscape, due to their relatively small size and/or occurrence within wooded corridors or valleys (even the Cohocton River, is typically only visible from bridge crossings within the study area). Canandaigua Lake is the major water feature in the larger region. One of New York's Finger Lakes, it is located approximately 2.2 miles north of the visual study area boundary.

Landscape Similarity Zones

Within the visual study area, four distinct landscape similarity zones (LSZ) were defined. Examples of these zones are illustrated in Figure 4 and their general landscape character, use, and potential views to the proposed project are described below.

Zone 1. Upland Agricultural Zone

This landscape similarity zone occurs on hilltops and elevated ridges within the visual study area, and is characterized by open agricultural land with widely dispersed farms and rural residences along a network of county, and local roads. Active agricultural fields (corn, hay, soybeans, small grains, and potatoes), dominate the landscape. Topography ranges from undulating ridgetops in the northern and central portions of the study area, to more gently rolling terrain in the southern portions, west of the Cohocton River Valley. The ridges are oriented in a generally north-south pattern in the northern portion of the study area. In the central portion of the study area, the ridges change to a northeast-southwest orientation with roads, streams, and line-of-sights following a similar orientation. In the southern portion of the study area the topography has an elevated rolling character with less intense ravine formations. Views in the upland agricultural zone are generally open, at times expansive. These views typically include open fields in the foreground, often backed or bordered by trees that define the edges of the steep ridge slopes. Views across broad valleys to other hilltops

are available from many locations. These views include widely scattered homes, barns and silos, with working farm equipment often seen in the fields. Due to the elevation of this zone, the abundance of open fields, and the proposed location of turbines exclusively within this zone, foreground (<0.5 mile), midground (0.5-3.5 miles), and background (>3.5 miles) views of the proposed project will be available from many areas within the upland agricultural zone.

Zone 2. Valley Agricultural Zone

This zone includes most of the Cohocton River Valley and Naples Valley. It is characterized by large flat crop fields with thinly scattered farms and residences located along the road system. This zone also includes most of the major roads within the study area, including Interstate Route 390 and State Routes 415, 21, and 371. These roads generally parallel the orientation of the major valley and offer open views of the valleys and surrounding hills. The Cohocton River meanders through the majority of this area and is characterized by a gentle gradient, numerous oxbows and extensive shoreline wetlands. The river banks are lined with mature trees and understory brush in most places, so views to and from the river are generally limited to locations where roads parallel or cross the channel. The dominant activity in this area is farming and local travel along Route 415, 21, and 371. The Cohocton River is used for fishing, but views of the proposed project will generally be limited from the river due to its shoreline vegetation. Because of the abundance of open farm land, where views of the project are available from this zone, they will often be open, panoramic views that are observed from a lower elevation than the project site. Therefore, the proposed facilities will be viewed along the ridge that defines the eastern horizon in most of this zone.

Zone 3. Village/Hamlet Zone

This landscape similarity zone includes the villages and larger hamlets in the study area. It is characterized by moderate to high-density residential and limited commercial development. Vegetation and landform may contribute to visual character in this zone, but buildings (typically 1-3 stories tall) and other man-made features dominate the landscape. These features can be highly variable in their size and architectural style. However, they are typically arranged along an organized street pattern that tends to screen outward views and focus views along the main streets and crossroads. In some areas, street and yard trees also help to enclose and screen views within this zone. Examples of this zone of the study area include the Villages of Cohocton and Naples, and the Hamlets of Atlanta and North Cohocton. Views of the proposed project are generally limited from this zone due to the screening provided by buildings and adjacent forested slopes. However, views are more likely from the edges of the village/hamlet zone, where housing and vegetation density decrease, and along street corridors that are oriented toward the project site.

Zone 4. Forestland Zone

This zone is characterized by the dominance of forest vegetation (native deciduous/mixed forest and mature conifer plantations) and generally steep topography. The forestland zone occurs throughout the visual study area, primarily in the steep valleys and wooded ravines, that occur between the dissected upland ridges. Small streams and unpaved roads often run through these valleys. Also included in this zone are the wooded slopes of the Cohocton River Valley as well as some large woodlots that occur either on the ridge tops or within the major river valleys. Views within this zone are generally restricted to areas where small clearings, and road cuts provide breaks in the tree canopy. Where long distance views are available, they are typically of short duration, limited distance, and/or tightly framed by trees and adjacent slopes. Land use in this zone includes, low-density residential and recreational use (hunting, fishing, etc.). Examples of this zone include areas along local roads such as County Routes 9 and 6, Avery Hollow Road, Newcomb Hollow Road, and Potter Hill Road. These forested areas are typically private lands with limited public access.

However, forested public lands, such as the High Tor Wildlife Management Area are also included within this zone.

Viewer/User Groups

Three categories of viewer/user groups were identified within the visual study area. These include the following:

Local Residents

Local residents include those who live and work within the visual study area. They generally view the landscape from their yards, homes, local roads and places of employment. Except when involved in local travel, residents are likely to be stationary, and have frequent or prolonged views of the landscape. Local residents may view the landscape from ground level or elevated viewpoints (typically upper floors/stories of homes). Residents' sensitivity to visual quality is variable, and may be tempered by the aesthetic character/setting of their neighborhood or work place. For example, residents with a view of existing commercial and industrial facilities may be less sensitive to landscape changes than those with a view of open farmland. It is assumed, however, that all residents are familiar with the local landscape and may be very sensitive to changes in particular views that are important to them.

Through Travelers/Commuters

Commuters and travelers passing through the area view the landscape from motor vehicles on their way to work or other destinations. Commuters and through travelers are typically moving, have a relatively narrow field of view, and are destination oriented. Drivers on major roads in the area (Interstate Route 390, State Routes 21, 53, 371, and 415) will generally be focused on the road and traffic conditions, but do have the opportunity to observe roadside scenery. Passengers in moving vehicles will have greater opportunities for prolonged off-road views than will drivers, and accordingly, may have greater perception of changes in the visual environment. Because most of the major roads in the study area traverse open valley areas, views to adjacent slopes and ridgetops are available in most locations. However, these landscape features also serve to block more distant views from these roads.

Tourists/Recreational Users

Tourists and vacationers come to the area for the purpose of experiencing its cultural, scenic, or recreational resources. These viewers include sight-seers and visitors to area lakes and wineries. They may view the landscape on their way to a destination or from the destination itself. Some, such as weekend and seasonal home owners, may spend extended time in the area. Tourists' and vacationers' sensitivity to visual quality and landscape character will be variable (depending on their reason for visiting the area), although this group is generally considered to have relatively high sensitivity to aesthetic quality and landscape character. Recreational users include local and seasonal residents involved in outdoor recreational activities at parks and recreational facilities, and in undeveloped natural settings such as forests, fields and water bodies. This group includes those involved in competitive sports, snowmobilers, bicyclists, joggers, recreational boaters, hunters, fishermen, and those involved in more passive recreational activities (e.g., picnicking or walking). Visual quality/scenery may or may not be an important part of the recreational experience for these viewers. However, recreational users will often have continuous views of landscape features over relatively long periods of time. Passive recreational activities generally do not require as much concentration as more active recreational activities, and tend to be more focused on the enjoyment of scenery. Those engaged in passive activities, therefore have the opportunity to observe the surrounding area for a prolonged period of time and may be particularly sensitive to visual change.

Within the visual study area, tourists and recreational users will be concentrated in and around the Village of Naples and Canandaigua Lake, and will be traveling the major roads in the area. Most of these viewers will only view the surrounding landscape from ground-level or water-level vantage points.

Visually Sensitive Resources

The visual study area includes several sites that the New York State Department of Environmental Conservation (NYSDEC) Visual Policy (DEP-00-2) considers scenic resources of statewide significance (NYSDEC, 2000). These include the following:

Sites listed on the National or State Register of Historic Places

The study area includes a total of four sites that are currently listed on the State and National Register of Historic Places (NYSOPRHP Website). These sites include the following:

- Ephraim Cleveland House – 201 North Main Street, Naples
- Morgan Hook and Ladder Company – 18-20 Mill Street, Naples
- Naples Memorial Town Hall – intersection of North Main (State Route 21) and Monier Streets, Naples
- Larrowe House – South Main Street (State Route 415), Cohocton

The Phase 1A Cultural Resources Survey conducted for the project also indicated that up to 76 additional structures/sites within the visual study area may be eligible for listing on the State and National Register (Kudrle and Carrington-Carter, 2006). The majority of these are located in the villages and hamlets within 5 miles of the project.

Register-listed historic sites that occur outside, but adjacent to, the visual study area include the following:

- Narcissa Prentiss House Historic Site – 7225 Mill Pond Road, Prattsburgh
- Daniel Hubbard Farm Historic Site – 86 South Main Street, Avoca

State Parks: NONE IN THE STUDY AREA

Urban Cultural Parks: NONE IN THE STUDY AREA

State Forest Preserve: NONE IN THE STUDY AREA

National Wildlife Refuges: NONE IN THE STUDY AREA

State Wildlife Management Areas:

High Tor Fish and Wildlife Management Area - This 6,100-acre wildlife management area (WMA) is located in Ontario and Yates County on State Route 245. The WMA consists of three individual parcels, the largest of which straddles the northern study area boundary. This 3,400-acre parcel, east of the Village of Naples, is predominately steep wooded terrain. Approximately two thirds of this portion of the WMA is located within the study area boundary. The second parcel, which borders the south end of Canandaigua Lake, includes 1,700-acres of marsh, along with portions of Naples Creek and the West River. The third parcel of the High Tor WMA is located east of the southern end of Canandaigua Lake and is known as South Hill. It is a 1,000-acre area of steep hillsides and overgrown fields and offers scenic views to the Naples Creek and West River Valleys. Hunting,

fishing, trapping, hiking, cross-country skiing, boating, and camping (by permit) are allowed in the WMA.

National Natural Landmarks*:* NONE IN THE STUDY AREA

National Park System Lands: NONE IN THE STUDY AREA

Wild, Scenic and Recreational Rivers: NONE IN THE STUDY AREA

Designated Scenic Areas of Statewide Significance: NONE IN THE STUDY AREA

Designated Scenic Sites/Overlooks*:*

One scenic overlook is occurs along the north-bound lanes of Interstate Route 390, near Flint Road in the Town of Cohocton. The site includes parking and picnicking facilities, and provides expansive views of the Cohocton River Valley and the wooded hills that surround it. The primary view is to the north, toward the Village of Cohocton.

State or Federal Designated Trails:

The nearest designated trail is a spur of the Finger Lakes Trail, known as the Bristol Hills Trail. This trail runs north from the Village of Prattsburgh to Italy Hill State Forest, then west to the High Tor WMA, and then northwest through Naples to the Ontario County Park west of the Village of Bristol Springs. Where the trail runs through the South Hill parcel of the High Tor WMA it is located approximately 3.5 miles from the nearest proposed turbine.

Adirondack Park Lands and Scenic Vistas: NONE IN THE STUDY AREA

State Nature and Historic Preserve Areas: NONE IN THE STUDY AREA

Palisades Park Land: NONE IN THE STUDY AREA

Bond Act Properties (Exceptional Scenic Beauty, Open Space):

Memorial Town Hall (Old Town Hall), along with being listed on the State and National Register of Historic Places, is also a 1986 Environmental Quality Bond Act property. It is located in Naples, at the intersection of North Main and Monier Streets.

Beyond the scenic resources of statewide significance listed above, the visual study area also includes areas that are regionally or locally significant/sensitive. These include local parks and recreation facilities, public open space, population centers, and heavily used transportation corridors. The most significant of these are listed below:

Recreational Areas:

The study area includes several areas that offer opportunities for local recreation, including fishing, boating, swimming, and/or field sports. These include the following:

- Pine Hill ATV Park – Pine Hill Road, Cohocton
- Reservoir Creek Golf Course – Cohocton Street, Naples
- Cohocton River – Adjacent to State Routes 21, 371, and 415, Wayland and Cohocton
- Atlanta/North Cohocton Community Park – County Route 39, Cohocton
- Loon Lake – Cohocton Loon-Lake Road (County Route 121), Wayland

- Smith Pond – Smith Pond Road, Avoca

The most significant regional recreational resource is Canandaigua Lake, which lies just outside the visual study area to the north (7.2 miles from the nearest proposed turbine). The lake is a popular destination for fishermen and boaters and includes seasonal/vacation homes along its shorelines. Several vineyards/wineries that are popular tourist destination also occur along Canandaigua Lake.

Areas of Intensive Land Use:

Several communities within the study area are considered visually sensitive due to the concentration of residential development in these areas and intensity of land use they receive. These include the following:

- Village of Cohocton
- Hamlet of Atlanta
- Hamlet of North Cohocton
- Hamlet of Wallace
- Village of Naples
- Hamlet of Ingleside

Transportation Corridors

The visual study area includes several highways that could be considered visually sensitive due to the number of drivers that travel these roads on a daily basis. According to the New York State Department of Transportation (NYSDOT) website, 2004 traffic counts indicate the following average annual daily traffic on these roads:

- Interstate Route 390, from Exit 3 (State Routes 15 and 21) in the Town of Wayland to Exit (State Route 415) in the Town of Avoca, averaged 30,850 vehicles per day.

- Interstate Highway 86/State Route 17, from Exit 34 (Hornell) to Exit 35 (Howard) averaged 14,700 vehicles per day.

- State Route 21, from the junction of State Route 53 in the Village of Naples, through the Ontario-Steuben County Line, Hamlet of North Cohocton, to the Wayland Town Line, averaged 25,700 vehicles per day.

- State Route 21, from the State Route 415 junction at the Wayland Town Line, to the Hamlet of Haskinville, averaged 10,100 vehicles per day.

- State Route 53, from the south side of the Village of Naples, through the Ontario-Steuben County Line, Hamlet of Ingleside, to the junction of County Route 7 in the Town of Prattsburg, averaged 5,000 vehicles per day.

- State Route 371, from the junction of State Route 21 in the Hamlet of North Cohocton, to the junction of State Route 415 in the Village of Cohocton, averaged 1,950 vehicles per day.

- State Route 415, from the junction of State Routes 15 and 21 in the Town of Wayland, through the Village of Cohocton and Hamlet of Wallace, to County Route 6 in the Hamlet of Bloomerville, averaged 8,300 vehicles per day.

The locations of visually sensitive resources within the visual study area are illustrated in Figure 5.

VISUAL IMPACT ASSESSMENT METHODOLOGY

The Visual Impact Assessment (VIA) procedures used for this study are consistent with methodologies developed by the U.S. Department of the Interior, Bureau of Land Management (1980), U.S. Department of Agriculture, National Forest Service (1974), the U.S. Department of Transportation, Federal Highway Administration (1981), U.S. Army Corps of Engineers (Smardon, et al., 1988) and the NYS Department of Environmental Conservation (not dated). The specific techniques used to assess potential project visibility and visual impacts are described in the following section.

Project Visibility

An analysis of project visibility was undertaken to identify those locations within the study area where there is potential for the proposed wind turbines to be seen from ground-level vantage points. This analysis included identifying potentially visible areas on viewshed maps, preparing technical cross sections, and verifying visibility in the field. The methodology employed for each of these assessment techniques is described below.

Viewshed Analysis

Viewshed maps for the study area were prepared using USGS digital elevation model (DEM) data (7.5-minute series) and ESRI ArcView® software with the Spatial Analyst extension. Two 5-mile radius viewsheds were mapped, one to illustrate “worst case” daytime visibility (based on a maximum blade tip height of 400 feet above existing grade) and the other to illustrate potential visibility of turbine lights (based upon the nacelle height of 262 feet above existing grade). A third viewshed analysis (also based on blade tip height) was run using an 8-mile radius to evaluate potential project visibility at sensitive sites outside the study area boundary. The viewshed analysis was based upon the location of all turbines, as indicated in the proposed project layout (see Figure 2). The ArcView program defines the viewshed (using topography only) by reading every cell of the DEM data and assigning a value based upon visibility from observation points throughout the 5-mile study area. The resulting viewshed maps define the maximum area from which the completed facility could potentially be seen within the study area during both daytime and nighttime hours (ignoring the screening effects of existing vegetation and structures). Because the screening provided by vegetation and structures is not considered in this analysis, the viewsheds represent a "worst case" assessment of potential project visibility. In addition, because characteristics of the proposed turbines that influence visibility (color, narrow profile, distance from viewer, etc.) are not taken consideration, even where these screening features are lacking, being within the viewshed does not necessarily equate to actual project visibility.

Cross Section Analysis

To illustrate the screening effect of vegetation within the study area, four representative line-of-sight cross sections (each approximately 6-miles long) were cut through the study area. Cross section locations were chosen so as to include visually sensitive areas (e.g., villages, historic sites, and water bodies) and various roads and local landmarks. The cross sections are based on forest vegetation and topography as mapped on the 7.5-minute USGS quadrangle maps and digital aerial photographs. For the purposes of this analysis, a uniform 40-foot tree height was assumed. A 10 fold vertical exaggeration was used to increase the accuracy of the analysis.

Field Verification

Actual visibility of the proposed project was evaluated in the field on November 11, 2005 and December 8, 2005. On November 11, 2005, a single 15-foot by 6-foot helium-filled balloon was tethered at the approximate location of proposed Turbine 46 on Brown Hill, and raised to a height of approximately 410 feet above the existing grade, thus slightly exceeding the maximum finished elevation of the turbine blade tip when oriented straight up (i.e., at the 12 o'clock position). The purpose of this exercise was to provide a locational and scale reference to verify visibility of the Brown Hill turbines and to obtain photographs for subsequent use in the development of visual simulations. Clear skies and bright sunshine, resulted in good visibility throughout most of the day. Calm winds resulted in relatively stationary balloon heights throughout the day.

Visibility of the primary turbine array on Pine Hill and Lent Hill was evaluated in the field on December 8, 2005. Three 5-foot by 6-foot helium-filled balloons were tethered at the approximate location of proposed Turbines 3, 22, and 41, and raised to a height of approximately 410 feet above the existing grade. The purpose of this exercise was to provide a locational and scale reference for verification of turbine visibility and to obtain photographs for subsequent use in the development of visual simulations. Clear skies and bright sunshine, resulted in good visibility throughout the day. Calm winds resulted in relatively stationary balloon heights throughout the day.

While the balloons were in the sky, field crews drove public roads and visited public vantage points within the 5-mile radius (213 square mile) study area to document points from which the balloons could or could not be seen. Photos were taken from 184 representative viewpoints within the study area. All photos were obtained using Nikon (D70 and D100) or Canon (350D and 20D) digital SLR cameras. All cameras utilized a focal length between 28 and 35 mm (equivalent to between 45 and 55 mm on a standard 35 mm camera). This focal length most closely approximates normal human eyesight relative to scale. Viewpoint locations were determined using hand-held global positioning system (GPS) units and high resolution aerial photographs (digital ortho quarter quadrangles). The time and location of each photo were documented on all electronic equipment (cameras, GPS units, etc.) and noted on field maps and data sheets (see Appendix B and C).

Project Visual Impact

Beyond evaluating potential project visibility, the VIA also examined the visual impact of the proposed wind turbines on the aesthetic resources and viewers within the project study area. This assessment involved creating computer models of the proposed turbine and turbine layout, selecting representative viewpoints within the study area, and preparing computer-assisted visual simulations of the proposed project. These simulations were then evaluated by an in-house panel of landscape architects to determine the type and extent of visual impact resulting from project construction. Details of the visual impact assessment procedures are described below.

Viewpoint Selection

From the photo documentation conducted during field verification, EDR selected a total of 10 viewpoints for development of visual simulations, These viewpoints were selected to illustrate typical views of the proposed project that will be available to representative viewer/user groups, from the major landscape similarity zones and sensitive sites within the study area. The selected viewpoints also include a variety of viewer distances and lighting conditions to illustrate the range of visual change that will occur with the project in place. Location of the selected viewpoints is indicated in Figure 8. Locational details and the criteria for selection of each simulation viewpoint are described below:

Viewpoint 11 - View from County Route 70 near the Hamlet of Howard, looking northwest. Typical view of the upland agricultural LSZ in the southern portion of the study area.

Viewpoint 57 - View from State Route 415 between County Route 9 and Hopkins Road, near the Hamlet of Wallace, looking north. One of the few open views from Route 415 and a concentration of residential development in the southern portion of the study area.

Viewpoint 68 - View from Wraight Road in the Town of Prattsburgh. Typical view of the upland agricultural LSZ in the eastern portion of the study area.

Viewpoint 74 - View from the scenic overlook on Interstate Route 390 near the Village of Cohocton, looking northeast. Panoramic view of the valley agricultural LSZ available to travelers and tourists in the central portion of the study area.

Viewpoint 94 - View from State Route 371 in the Village of Cohocton, looking northeast. Open view toward the project site from a heavily used road on the edge of the village/hamlet LSZ in the central portion of the study area.

Viewpoint 110 - View from Kirkwood-Lent Hill Road looking northwest. Typical view of the upland agricultural LSZ from within the proposed project area.

Viewpoint 130 - View from Gay Road, looking southwest. Typical view of the upland agricultural LSZ in the northern portion of the study area.

Viewpoint 154 - View from North Main Street (State Route 21) in the Town of Naples, looking southwest. One of the few open views of the project site from within the village/hamlet LSZ.

Viewpoint 160 - View from County Route 39 in the Hamlet of Atlanta, looking southeast. Typical view of the valley agricultural LSZ in the western portion of the study area.

Viewpoint 178 - View from County Route 38, looking southeast. Typical view of the valley agricultural LSZ in the northern portion of the study area.

Visual Simulations

To show anticipated visual changes associated with the proposed project, high-resolution computer-enhanced image processing was used to create realistic photographic simulations of the completed project from each of the 10 selected viewpoints. The photographic simulations were developed by constructing a three-dimensional computer model in 3D StudioMax®, based on turbine specifications and survey coordinates of the proposed facilities provided by the project developer. For the purposes of this analysis, it was assumed that all new turbines would be Gamesa Eolica G87 machines. The computer model used in this VIA is shown in Appendix A.

The next step in this process involved utilizing aerial photographs and GPS data collected in the field to create an AutoCAD 2004® drawing. The two dimensional AutoCAD data was then imported into 3D Studio Max 5.0® and three-dimensional components (cameras, modeled turbines, etc.) were added. These data were superimposed over photographs from each of the viewpoints, and minor camera changes (height, roll, precise lens setting) made to align all known reference points within the view. This process ensures that project elements are shown in proportion, perspective, and

proper relation to the existing landscape elements in the view. Consequently, the alignment, elevations, dimensions and locations of the proposed turbines will be accurate and true in their relationship to other landscape elements in the photo.

At this point, a “wire frame” model of the facility and known reference points is shown on each of the photographs. The proposed exterior color/finish of the turbines was then added to the model and the appropriate sun angle was simulated based on the specific date, time and location (latitude and longitude) at which each photo was taken. This information allows the computer to accurately illustrate highlights, shading and shadows for each individual turbine shown in the view. All simulations show the turbines with rotors oriented toward the northwest, which is generally the prevailing wind direction in the area. The effects of distance (hazing, bluing, loss of detail) were not added to any of the simulations.

Panel Evaluation

An in-house panel of three landscape architects was asked to rate the proposed project in terms of its contrast with existing components of the landscape. Each of the panel members have experience in visual impact assessment and have visited operating wind power projects in New York State. Digital color prints (11 x 17-inch) of the before and after photos from each selected viewpoint were evaluated by the panel. Using a rating form developed by EDR (see Appendix D), the project's contrast with existing vegetation, landform, land use, water resources, and user activity was then rated on a scale of 1 (completely compatible) to 5 (strong contrast). For each viewpoint, these scores were added and averaged to provide an overall contrast rating. Each panel member's overall score for each viewpoint was then added and averaged to get a final composite rating for each viewpoint. In addition, rating panel comments on each viewpoint, and on nighttime photos from the Fenner (New York) Wind Power Project, were used to evaluate the project's potential visual impact.

VISUAL IMPACT ASSESSMENT RESULTS

Project Visibility

Viewshed analysis (Figure 6) indicates that the proposed project has the potential to be visible in approximately 71% of the study area (disregarding the screening effect of vegetation and structures). Potential visibility extends over the ridgetop terrain in the central portion of the study area and includes slopes facing the project on the opposite side of the Cohocton River Valley and above the Village of Naples. Most of the visually sensitive sites in the study area fall within the viewshed, including the Villages of Cohocton and Naples, the Hamlets of Wallace, North Cohocton, Atlanta, and Ingleside, the scenic overlook on Route 390, and the Register-listed historic sites and heavily-traveled state highways. Only those areas that are in deep valleys or on the backside of hills will be fully screened from view by topography alone. These include most of the High Tor WMA, Route 17/86, Smith Pond, half of Loon Lake, Tenmile Creek (and adjacent County Route 7), and West Creek. In most areas where potential visibility is indicated, the viewshed analysis suggests that views to multiple turbines could be available. Areas of potential nighttime visibility cover approximately 65% of the study area, and generally occur in the same areas where potential daytime visibility is indicated.

Review of the 8-mile viewshed map indicates that potential project visibility decreases significantly outside the 5-mile radius study area. Within the 5 to 8 mile ring, the proposed project will be fully screened by topography alone in 63% of the area. These screened areas include large valley areas and the backsides of hills. Sensitive receptors/sites in these areas such as the Villages of Prattsburgh and Avoca, the Hamlets of Howard Beachville, South Dansville, Big Creek, Greenville, and Middlesex (Yates County), the Fivemile Creek Valley, State Route 53, and Interstate Routes 390 and 86, will not have views of the proposed project. Visually sensitive sites that occur within the

extended viewshed include the Village of Wayland, Canandaigua Lake, and much of the High Tor WMA. Areas of actual visibility are anticipated to be much more limited than indicated by the viewshed analysis, due to the slender profile of the turbines (especially the blade, which make up the top 139 feet of the turbine), the effects of distance, and screening from trees and structures, which are not considered in the viewshed analysis.

Cross section analysis (Figure 7) revealed that along selected lines of sight, vegetation and structures will significantly decrease potential project visibility, when compared to the results of the viewshed analysis. The screening effect of topography on the southern (Brown Hill) turbine cluster is illustrated in section A-A', which shows Loon Lake and County Route 92 as being screened from view by Potter Hill. Section B-B' also illustrates how topography will screen views from the Village of Cohocton and various valley roads, including Hinckle Hollow Road, Ryan Hollow Road, Newcomb Hollow Road, Avery Hollow Road, Cayward Road, and Mattice Road. All of the sections indicate that vegetation and/or topography will screen views from most area streams, including the Cohocton River, Neils Creek, Reservoir Creek, and Kirkwood Creek. Buildings will at least partially screen ground-level views from villages and hamlets such as Naples (section C-C'), and Atlanta (section D-D'). In regard to other visually sensitive sites, the sections suggest that views of the turbines are likely to be available from the Naples Valley, Reservoir Creek Golf Course, Interstate Route 390, State Routes 415, 21, and 371, many of the local hilltop roads, and the upper floors of some homes in the villages and hamlets.

Field review indicated that actual project visibility, (as indicated by visibility of the helium-filled balloons raised at four proposed turbine sites) is likely to be much more limited than suggested by viewshed mapping and cross section analysis. This is due to the fact that screening provided by buildings and trees within the study area is more extensive and effective than assumed in the previous analyses (e.g., vegetation is more extensive than indicated on the USGS maps, and often taller than 40 feet in height). The result is that certain sites/areas where "potential" visibility was indicated by viewshed mapping and cross section analysis, were actually well screened from views of the proposed project. Field review confirmed a lack of visibility from areas west of the Village of Prattsburgh (northwest portion of the study area) and northwest of the Village of Naples. The balloons could not be seen from the Villages of Cohocton or Avoca, the Hamlet of Ingleside, or most of the Hamlet of North Cohocton, where ground-level views were typically blocked by buildings and street/yard trees. In the rural/agricultural portions of the study area, hedgerows and trees not indicated on the USGS maps also blocked/interrupted views of the balloons in many areas. Views were available from several sensitive sites, including the scenic overlook on Route 390, sections of Routes 21, 371, and 415, and the Atlanta-North Cohocton Community Park. However, the balloons could not be seen from any of the Register-listed historic sites, most of Route 415, the Twelvemile Creek Valley (including County Route 9), or the High Tor WMA (which is solidly wooded within the study area).

Analysis of Existing and Proposed Views

To illustrate anticipated visual changes associated with the proposed project, photographic simulations of the completed project from each of the 10 viewpoints indicated in Figure 8 were used to evaluate project visibility and appearance. Rating panel review of these images, along with photos of the existing view, allowed for comparison of the aesthetic character of each view with and without the proposed project in place. Results of this evaluation are presented below.

Viewpoint 11 (Figure 9)

Existing View

This view is from County Route 70 near the Hamlet of Howard, looking northwest. This viewpoint is approximately 4.3 miles from the nearest turbine that would be visible in the view. The open, large-scale view is a classic rural landscape that includes homes, farms, woodlots, and fields. Strong horizontal lines are created by the gently rolling hills, hedgerows, field edges, and cloud patterns. Lighting conditions reinforce this by creating strong contrast between the dark foreground and the well-lit background and bright sky. The lighting also accentuates the prominence of structures in the view and illuminates the midground field, which holds the viewer's attention. The background ridge is effective in blocking views of more distant landscape features, and provides a sense of being elevated relative to the surrounding landscape.

Proposed Project

With the proposed project in place the four Brown Hill turbines can be seen above the background ridge. At this distance, and under these lighting/sky conditions, the turbines do not appear out of scale with their surroundings and blend well with the sky. Although their vertical line contrasts with the strong horizontals in the landscape, their line and color are consistent with other man-made features in the view, and do not appear out of place in a working agricultural landscape. Although the turbines would be more visible under different lighting conditions, their limited number and their clustered organization limit their visual impact from this viewpoint.

Viewpoint 57 (Figure 10)

Existing View

This view is from State Route 415, between County Route 9 and Hopkins Road, near the Hamlet of Wallace, looking north. This viewpoint is approximately 3.0 miles from the nearest turbine that would be visible in the view and is one of the few open views of the project from Route 415. Open views toward the project site are afforded by the Twelvemile Creek Valley which extends away from the viewer to the north (i.e., toward the project site). The foreground is dominated by a trailer park, which is located on the level floor of the valley. The residential setting lacks spatial definition and a sense of privacy. In addition, overhead utility poles are scattered throughout the valley area, and add to a sense of visual clutter in the foreground. The valley is surrounded by steep wooded slopes that rise dramatically on three sides, and dominate the midground. The background includes a mix of woodlots and open fields on a hilltop at the head of the valley. The hilltop and wooded ridges are generally dark brown in color, and contrast strongly with the white snow and light colored structures in the valley. They enclose the view and also serve to block views of more distant landscape features.

Proposed Project

With the proposed project in place, portions of six wind turbines can be seen projecting above the hill at the head of the valley. The turbines are clearly visible against the clear blue sky, and contrast with the dark color and fine texture of the forested hillsides. However, the side slopes reduce the visual dominance of the turbines, which become an interesting focal point at the head of the valley. At this distance, the turbines do not present significant scale contrast, and their line, color, and man-made form are consistent with other built facilities in the view (utility poles, homes, and accessory buildings).

Viewpoint 68 (Figure 11)

Existing View

This view is from Wraight Road in the Town of Prattsburgh, looking west. This viewpoint is approximately 3.3 miles from the nearest turbine that would be visible in the view. This elevated viewpoint provides expansive, long-distance views across a rural agricultural landscape. An unpaved road and open agricultural field dominate the foreground, while a cluster of rural buildings (homes and barn) and trees extend across the midground. The road and adjacent overhead lines lead the viewer's eye to the center of the view and focus attention on the background. The background includes distant hills and ridgetops that are a mix of woodlots and open fields. Bands of trees, field edges, and the relatively flat horizon create strong horizontal lines in the landscape. The rolling form of the background ridge and the hazing of background features accentuates the feeling of distance in this view.

Proposed Project

With the proposed project in place numerous turbines can be seen along the background ridge in the center and right hand side of the view. The highest density of turbines, and the most visible, appear behind the barn on the right and draw the viewer's eye away from the road terminus in the center of the view. At this distance the turbines are well separated from the residential and agricultural land use in the foreground, and do not appear out of scale with other built features in the view (building, utility poles). However, their obvious distance from the viewer and height above the background trees reinforces their large size. This serves to compress the view and reduce its feeling of expansiveness. The turbines' light color and slender profile minimizes their visual prominence. Their vertical line is consistent with other vertical lines in the view (buildings, utility poles, trees) and their spacing does not overpower the view. In addition, the turbines do not appear out of character in a working agricultural landscape. To some viewers the turbines will add an element of interest to a view that currently lacks a strong visual focal point.

Viewpoint 74 (Figure 12)

Existing View

This view is from Interstate Route 390, near the Village of Cohocton, looking northeast. This viewpoint is approximately 2.4 miles from the nearest turbine that would be visible in the view. The view shown in this photo is not the primary view from this scenic overlook. The more interesting and expansive view is to the north looking up the Cohocton River Valley (see Photo 74A at end of Appendix B). In this view, planted trees and a naturally wooded slope screen views of an open agricultural field on the valley floor. Wooded hillsides with residential homes and yards along their lower flanks form a backdrop and block more distant views in this direction. The hills have a rolling, undulating landform and dark color that contrast with the level, light colored field and lawn areas in the midground and foreground.

Proposed Project

With the proposed project in place, the upper portions of a few turbines are visible between the background hills. At this distance, and with the significant screening provided by the wooded hills, the turbines do not appear out of scale with their surroundings. Their clustered arrangement and white color also serve to reduce their visual prominence. Although their color and form contrast with the wooded hills, the undulating topography remains the strongly dominant feature in the view. Overall, they appear as minor additions to the landscape, and while perhaps being of interest to viewers, do not become focal points or overwhelm the view.

Viewpoint 94 (Figure 13)

Existing View

This view is from State Route 371, at the northern edge of the Village of Cohocton, looking northweast. This viewpoint is approximately 2.0 miles from the nearest turbine that would be visible in the view. This is the only location that the proposed turbines will clearly visible from the Village. The existing view is a curving highway corridor that is surrounded by a mix of agricultural fields, barns, utility lines, road signs, houses, and gravel piles. The road runs through a valley (as evidence by a bridge crossing in the midground), with wooded hills/ridges defining the valley walls on both sides. The tops of the ridges are relatively flat, creating a strong horizontal line with the sky. Under these late afternoon lighting conditions, the land features are quite dark, while the sky is still fairly bright.

Proposed Project

With the proposed project in place, several brightly illuminated turbines are clearly visible along the ridgetop. Under these lighting conditions, the turbines are catching the sun while the ridges are in strong shadow. This creates a strong color contrast and draws the viewers eye to the turbines. The turbines appear tall, and their vertical form and man-made character contrast with the strong horizontal lines and wooded, undeveloped appearance of the ridges. However, the valley features still dominate the view and in some ways, the turbines are an appealing distraction from some of the unsightly elements in the foreground view.

Viewpoint 110 (Figure 14)

Existing View

This view is from County Route 35 (Kirkwood-Lent Hill Road), looking northwest. This viewpoint is approximately 1,110 feet from the nearest turbine that would be visible in the view. This view, featuring elevated agricultural fields bounded by wooded slopes, is typical of the large-scale, open views available within the project area on Pine Hill and Lent Hill. In this largely undeveloped, rural view, an open snow-covered field dominates the foreground. A band of trees extends across the midground with an additional field and large residential structure occurring behind it. The tops of distant ridges/hills are visible beyond this in the background. The gently undulating character of the landform is visible in the midground and background. The ridgetops, field edges, and cloud patterns all create strong horizontal lines in the landscape. Background hazing accentuates the feeling of distance in the view.

Proposed Project

With the proposed project in place a single foreground turbine becomes the dominant feature in the view. Portions of six additional turbines are also visible on the midground ridge. The line, texture, form, and especially scale of the foreground turbine is in striking contrast to the surrounding landscape. The midground turbines are more in scale, but still present's significant contrast in line, color, and form due to the lack of other significant man-made features in the view. The expansiveness of the existing view is reduced by the presence of the large turbines. However, the relatively wide spacing reduces their visual dominance, and their appearance will add interest to a view that currently lacks the strong visual focal point.

Viewpoint 130 (Figure 15)

Existing View

This view is from Gay Road, looking southwest. This viewpoint is approximately 1.0 mile from the nearest turbine that would be visible in the view. Another typical view of the surrounding upland agricultural LSZ that dominates the elevated portions of the study area. In this open, large-scale view, a fallow field in the foreground descends into a wooded midground valley. A wooded slope rises up on the opposite side of the valley, and is topped by a mix of open fields and woodlots. The background ridge and foreground field are relatively flat and create strong horizontal lines in the landscape. Brown to black colors dominant the foreground and midground, while the background is dominated by the white color of the snow-covered open fields and sky.

Proposed Project

With the proposed project in place, turbines can be seen at various distances along the background ridge. The closest of these are fully visible (from base to blade tip), while the lower portions of the more distant turbines are screened by vegetation and topography. Under these backlit lighting conditions, the turbines are in shadow and stand out from the sky. Under different lighting conditions, their white color would blend much better with the background fields and sky. The turbines' line, form, and scale contrast with the largely wooded/undeveloped landscape. The remote character of the view is changed into more of a working landscape. However, the turbines' wide spacing follows the gently undulations of the background ridge and the farthest turbines actually increase the perceived distance of the view. The turbines become focal points, and for some viewers, will add an element of visual interest to the view.

Viewpoint 154 (Figure 16)

Existing View

This view is from North Main Street (State Route 21) in the Town of Naples, looking southwest. This viewpoint is approximately 3.0 miles from the nearest turbine that would be visible in the view. The view is typical of a downtown village setting. It is a small-scale view dominated by Main Street and the commercial buildings and automobiles that line it. Although strong backlighting makes it difficult to perceive details, buildings are a mix of styles and façade materials, but have a consistent height and traditional character. Overhead utility lines, poles, and street lights are also significant foreground features. Trees at the outskirts of the downtown area can be seen in the midground, while a wooded hill rises above the trees in the background.

Proposed Project

With the proposed project in place, portions of three turbines can be seen rising above the hilltop in the background. The turbines appear out of place in a traditional small town/village setting. They contrast in line and form with the background hill, and under these lighting conditions, appear dark against the sky. They also now compete with the foreground features for viewer attention. They become a focal point along the open view corridor provided by the road. However, at this distance, their scale contrast is modest, and their line and form are not inconsistent with the overhead utilities that already break the skyline. To some viewers the turbines will represent a visual intrusion, while others may view this as an interesting/attractive addition to the background landscape.

Viewpoint 160 (Figure 17)

Existing View

This view is from County Route 39, near the Atlanta/North Cohocton Community Park between the Hamlets of North Cohocton and Atlanta, looking southeast. This viewpoint is located in the Cohocton River Valley, approximately 2.2 miles from the nearest turbine that would be visible in the view. It is typical of the open, large-scale views available in the valley agricultural LSZ. In this view, a large, open agricultural field dominates the foreground and provides expansive views to the valley walls and wooded ridgetops that define the background. Widely spaced homes and agricultural buildings line the far edge of the field in the midground. The snow-covered field displays strong color contrast with the dark brown of the surrounding wooded hillsides. The flat agricultural field and relatively level ridgetop, create strong horizontal lines in the landscape.

Proposed Project

With the proposed project in place, several turbines are visible along the ridgetop. Some of these are visible almost in their entirety, while only the blade tips of others can be seen. The turbines' vertical line contrasts with the strong horizontals in this view, and under these lighting conditions, the turbines appear dark against the sky. They are also large relative to the trees on the ridge and the midground structures in this view. However, their distance from the viewer, slender profile, wide spacing, and significant screening, reduces their visual impact. In addition, the turbines do not appear out of place in a working agricultural landscape, and could be viewed as a point of interest from the nearby town park.

Viewpoint 178 (Figure 18)

Existing View

This view is from County Route 38, looking southeast. This viewpoint is approximately 3.0 miles from the nearest turbine that would be visible in the view and is another example of the valley agricultural LSZ. The level valley floor is dominated by an open agricultural field that provides large-scale, open views to the steep wooded ridges that line the valley walls. Homes within the valley are widely scattered along the midground field edge, but roads and other man-made features are not evident in this view. More distant open fields on the side and top of the background ridge break the solid dark color of the ridge slope and suggest that agricultural land use is also occurring out of view on the ridgetop. The level foreground field and gently undulating ridgetop create strong horizontal lines in the landscape. The color of the sky and darkness of the land features indicate that the photo was taken near sunset.

Proposed Project

With the proposed project in place, numerous turbines are seen projecting above the background ridge. Some are almost fully exposed, while others are mostly screened. Under these lighting conditions the turbines are clearly visible against the sky. Their vertical line and man-made form contrast with the wooded character and horizontal line of the ridge. They appear large relative to the trees on the ridgetop, but at this distance their scale contrast is not overwhelming. Their spacing, narrow profile, and the way they recede into the background also tends to reduce their visual impact. The turbines become focal points in the view, but the ridge itself remains the dominant landscape feature. The turbines appear compatible in the working agricultural landscape, and to some viewers will be an interesting and attractive addition to the view.

Visual Impact Assessment Rating

An in-house panel of three registered landscape architects (LA) evaluated the visual impact of the proposed project, as described in the Methodology section of this report. Utilizing 11 x 17-inch digital color prints of the selected representative viewpoints described above, the rating panel members evaluated the before and after views, assigning each view quantitative visual contrast ratings on a scale of 1 (completely compatible) to 5 (strong contrast). Each panel member's ratings were averaged to get an overall score for each viewpoint, and these scores were then compiled as a composite average for each viewpoint. Copies of the completed rating forms are included in Appendix D, and the results of this process are summarized in Table 1.

Table 1. Visual Contrast Rating

Viewpoint #	Individual Overall Scores[1]			Composite Score
	LA 1	LA 2	LA 3	
VP 11	1.00	2.25	1.00	1.42
VP 57	1.50	2.75	2.75	2.33
VP 68	1.50	2.00	1.75	1.75
VP 74	1.13	1.63	1.00	1.25
VP 94	2.13	2.00	1.25	1.79
VP 110	3.25	3.00	3.75	3.3
VP 130	2.88	2.25	2.75	2.63
VP 154	1.00	3.75	1.00	1.92
VP 160	1.75	2.25	1.50	1.83
VP 178	1.63	2.63	1.50	1.92
Average	**1.78**	**2.45**	**1.83**	**2.02**

[1]On a scale of 1 (completely compatible) to 5 (strong visual contrast).

As this table indicates, individual contrast ratings ranged from 1.0 (completely compatible) to 3.75 (moderate to high visual contrast). Composite scores (i.e., the average of individual rating panel members) ranged from 1.25 to 3.3, and seven viewpoints (70%) received scores of less than 2.0. Scores in this range generally indicate a low level of visual contrast. The lowest contrast ratings (under 2.0) were received by Viewpoints 11, 68, 74, 94, 154, 160, and 178. Simulations from all of these viewpoints were characterized by more distant views (over 2.0 miles), and most occurred in working agricultural landscapes. These conditions tend to decrease turbine visibility and/or contrast with the existing landscape.

The highest individual and composite contrast ratings were received by Viewpoint 110. This was the only viewpoint that received a composite rating above the midpoint (3.0) on the 1 to 5 scale. In the case of Viewpoint 110, impact related to the proximity of one of the turbines to the viewer (less than 0.5 mile), which heightens the project's contrast with the landscape in color, line, texture, form, and especially scale. Viewpoint 130, which received the next highest contrast rating, also featured turbines in an undeveloped setting that were relatively close to the viewer (1.0 mile). In such views, the turbines become focal points, and alter the perceived land use in the view. In Viewpoint 57 and 154, although the turbines are more distant (3.0 miles), moderate to strong contrast with residential land use and viewer activity was noted by some of the rating panel members.

It is interesting to note that Viewpoint 154 from the Village of Naples elicited very different reactions from individual rating panel members. This is reflected in the range of individual scores seen in Table 1 (1.0 to 3.75). In their comments on this simulation, one panel member indicated that addition of the turbines changed the small town character of this view (toward a more industrial feel) and refocused the viewer's attention away from the village core, toward the turbines. However, the other two panel members indicated that the turbines had little to no adverse impact, and in fact had a

pleasing sculptural quality. This individual variability was also seen (but to a lesser extent) with Viewpoints 11 and 178. One panel member (LA 2) generally (but not always) gave the images a higher contrast rating than the other two panel members. The other two panel members (LA 1 and LA 3) were more consistent in their scoring, but still reacted differently to individual simulations (see rating forms in Appendix D). This reflects individual variability in perception/acceptance of the turbines. A generally positive viewer reaction to wind turbines, with some strong individual variability (based on viewer preference and/or landscape setting), has been observed by EDR on the currently operating projects in New York State (Madison, Fenner, and Maple Ridge). Similar results have been documented in public opinion surveys regarding constructed wind power projects in other locations (Bishop and Proctor, 1994; Gipe, 2003). Based on rating panel results, this reaction will likely also be seen on the Cohocton Wind Power Project.

The panel's reaction to the actual nighttime photos from the Fenner Wind Power Project (Figure 19), indicate that nighttime visual impact could be significant from certain viewpoints. The contrast of the aviation warning lights with the night sky is strong in most dark, rural settings, and their presence suggests a more commercial/industrial land use. Viewer attention is drawn by the flashing of the lights, and any positive reaction that wind turbines engender (due to their graceful form, association with clean energy, etc.) is lost at night. While perhaps not disturbing (or even strongly perceptible) from roads and other public viewpoints, turbine lighting may be perceived negatively by area residents who will be able to view these lights from their homes and yards.

CONCLUSIONS

The VIA for the Cohocton Wind Power Project allows the following conclusions to be drawn:

1. Viewshed, mapping, cross section analysis, and field verification indicate that the project will be visible from numerous areas within the visual study area, particularly in open agricultural areas on the ridgetops and in the Cohocton River Valley and Naples Valley. Areas generally screened by vegetation, structures, and/or topography include narrow wooded valleys and stream corridors, the back sides of hills, and the interior portions of hamlets and villages. In most valley locations where individual turbines are visible, significant portions of the overall project will be screened from view by vegetation and topography. Open, hilltop vantage points will offer the best opportunities for full views of the proposed project. Most of the area between 5 and 8 miles from the turbines will be fully screened from view, with the exception of Canandaigua Lake, open areas around the Village of Wayland, and elevated areas northwest of the village of Naples. Significant visual effects of wind power projects are generally concentrated within 3.5 miles (6 kilometers) of the project site (Eyre, 1995). EDR's observations on existing wind power projects (Madison, Fenner, and Maple Ridge Wind Power Projects) indicate that under favorable conditions, views of the wind turbines will be available from certain viewpoints well over 10 miles from the project site. However, visual impact at these distances is typically minimal.

2. Several visually sensitive resources and areas of intense land use will be impacted by the project. These include the Village of Naples, the Hamlets of Atlanta and North Cohocton, the northern outskirts of the Village of Cohocton, and most of the heavily used roads that traverse the study area (including Routes 390, 21, and 371). Other sensitive sites where views will be available include the scenic overlook on Route 390, the Atlanta-North Cohocton Community Park, Reservoir Creek Golf Course, vineyards in the Naples Valley, and Canandaigua Lake. At other sites, including the High Tor WMA, Loon Lake, the Cohocton River, all of the Register-listed historic sites, the Villages of Cohocton and Avoca, and most of Route 415, the project will either not be visible or will be significantly screened by foreground vegetation and structures.

3. Simulations of the proposed project, and the in-house panel's visit to existing wind power projects in New York, indicate that the visibility and visual impact of the wind turbines will be

highly variable, based on landscape setting, extent of natural screening, presence of other man-made features in the view, viewer sensitivity, and distance of the viewer from the project.

4. Evaluation by the in-house panel of landscape architects indicates that the project's overall contrast with the visual/aesthetic character of the area will generally be low. However, based on the panel's scoring and comments, this may not be the case where turbines are in proximity to the viewer (i.e., under 0.5 mile), or appear out of context/character with the landscape. Based on experience with currently operating wind power projects elsewhere, public reaction to the project is likely to be generally positive, but highly variable based on proximity to the turbines, the affected landscape, and personal attitude of the viewer regarding wind power. As Stanton (1996) notes, although a wind power project is a man-made facility, what it represents "may be seen as a positive addition" to the landscape.

5. Based upon the nighttime photos/observations of existing wind power projects, the panel felt that the red flashing lights have the potential to create a significant nighttime effect. The potential significance of this impact depends on how many turbines are visible, what other sources of lighting are present in the view, the extent of screening provided by structures and trees, and nighttime viewer activity/sensitivity. However, it was felt that night lighting could be distracting and have an adverse impact on rural residents that currently experience dark nighttime skies. It should be noted that nighttime visibility/visual impact may be reduced on this project due to 1) new FAA guidelines that result in fewer aviation warning lights then required on earlier projects, 2) the steep ridge slopes that large screen portions of the project from many valley locations, and 3) the concentration of residences in villages, hamlets, and along highways where existing lights already compromise dark skies and compete for the viewer's attention. Panel members also felt that new FAA guidelines requiring the synchronization of flashing lights would help to reduce adverse visual impact.

6. Mitigation options are limited, given the nature of the project and its siting criteria (high elevation, open fields). However, in accordance with DEC Program Policy (NYSDEC, 2000), various mitigation measures were considered. These included the following:

   A. Screening. Due do the height of individual turbines and the geographic extent of the proposed project, screening with earthen berms, fences, or planted vegetation will generally not be effective in reducing project visibility or visual impact. However, if adequate natural screening of the proposed substation site is lacking, a planting plan should be developed and implemented to minimize visibility and visual impact associated with this component of the project.

   B. Relocation. Again, because of the extent of the project, the number of individual turbines, and the large number of viewpoints from which the project can be seen, turbine relocation will generally not significantly alter the visual impact of a wind power project.

   C. Camouflage. The white or off-white color of wind turbines generally minimizes contrast with the sky under most conditions. Consequently it is recommended that this color be utilized on the Cohocton project. The size and movement of the turbines prevents more extensive camouflage from being a viable mitigation alternative (i.e., they cannot be made to look like anything else). Neilson (1996) notes that efforts to camouflage or hide wind farms generally fail, while Stanton (1996) feels that such efforts are inappropriate. She believes that wind turbine siting "is about honestly portraying a form in direct relation to its function and our culture; by compromising this relationship, a negative image of attempted camouflage can occur."

D. Low Profile. A significant reduction in turbine height is not possible without significantly decreasing power generation. To off-set this decrease, additional turbines would be necessary. There is not adequate land under lease to accommodate a significant number of additional turbines, and a higher number of shorter turbines would not necessarily decrease project visual impact. In fact, several studies have concluded that people tend to prefer fewer larger turbines to a greater number of smaller ones (Thayer and Freeman, 1987; van de Wardt and Staats, 1988). The visual impact of the electrical collection system is being minimized by placing the lines underground rather than on overhead poles.

E. Downsizing. Reducing the number of turbines could reduce visual impact from certain viewpoints, but from most locations within the study area, unless this reduction were drastic, the visual impact of the project would change only marginally. A dramatic reduction in turbine number (e.g., reduction by 50%) would make the project economically unviable.

F. Alternate Technologies. Alternate technologies for power generation would have different, and perhaps more significant, visual impacts than wind power. Alternative utility-scale wind power technologies, that would significantly reduce visual impacts, do not currently exist.

G. Nonspecular Materials. Non-reflective paints and finishes will be used on the wind turbines to minimize reflected glare. Galvanized substation components will rapidly weather to a non-reflective gray color.

H. Lighting. Turbine lighting will be kept to the minimum allowable by the FAA. New FAA guidelines (FAA, 2005) do not require daytime lighting, and allow nighttime lighting of perimeter turbines only, at a maximum spacing of 0.5 mile. Medium or low intensity pulsing red lights should be used at night, rather than white or red strobes, or steady burning red lights. Upwardly directed lighting fixtures should be utilized to minimize nighttime visual impacts on nearby residents. Lighting at the substation should be kept to a minimum, and should be turned on only as needed, either by switch or motion detector.

I. Maintenance. The turbines and turbine sites will be maintained to ensure that they are clean, attractive, and operating efficiently. Research and anecdotal reports indicate that viewers find wind turbines more appealing when the rotors are turning (Stanton 1996). In addition, the project developer will establish a decommissioning fund to ensure that if the project goes out of service and is not repowered/redeveloped, all visual above-ground components will be removed.

J. Offsets. Correction of an existing aesthetic problem within the viewshed is a viable mitigation strategy for wind power projects that result in significant adverse visual impact. However, results of this VIA do not suggest that such mitigation measures are warranted for the Cohocton Wind Power Project.

In addition to the mitigation measures described above, other measures that will reduce or mitigate visual impact have been incorporated into the project design. These include the following:

- Compliance with all required set-backs from roads and residences.
- All turbines will have uniform design, speed, color, height and rotor diameter.
- Towers will include no exterior ladders or catwalks.
- The project operations and maintenance building (although not yet designed) will reflect the vernacular architecture of the area (i.e., resemble an agricultural structure).

- Minimizing new road construction by utilizing existing farm lanes whenever possible.

- Prohibiting the placement of any advertising devices on the turbines.

- Providing a parking/viewing location, with an informational kiosk to enhance public understanding and appreciation of the project Stanton (1996) believes that accessibility of a wind farm can positively affect how the public perceives the project.

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Figures

Appendix A

Computer Models of Proposed Wind Turbine

Appendix B

Photo Log – See enclosed CD

Appendix C

Field Notes – See enclosed CD

Appendix D

VIA Rating Forms – See enclosed CD