2.5 Visual Resource Assessment

This section discusses the aesthetic and visual resources in the Project Area and documents an analysis of potential Project impacts on those resources. The information presented here is a summary of more detailed documentation provided in Appendix F, the Visual Resource Assessment (VRA), conducted by Saratoga Associates, Landscape Architects, Architects, Engineers, and Planners, P.C. The VRA procedures used for this study are consistent with methodologies developed or prescribed by a variety of federal and state agencies, specifically including NYSDEC Program Policy "Assessing and Mitigating Visual Impacts" (NYSDEC 2000) (NYSDEC Visual Policy) and SEQRA criteria to minimize impacts on visual resources, and is in common use for environmental impact assessment within the industry.

There are no specific federal rules, regulations, or policies governing the evaluation of visual resources; however, the methodology employed herein is based on standards and procedures used by the U.S. Department of Agriculture (National Forest Service 1974, 1995), U.S. Department of the Interior, Bureau of Land Management (USDOI 1980), U.S. Department of Transportation, Federal Highway Administration (USDOT 1981), New York State Department of Transportation (NYSDOT 1988), and the NYSDEC (July 31, 2000).

The VRA for this Project included, but was not limited to, the following components:

- Define the existing landscape character/visual setting to establish the baseline visual condition from which visual change is evaluated;
- Conduct a visibility analysis (viewshed mapping and field investigations) to define the geographic area surrounding the proposed facility from which portions of the Project might be seen;
- Identify sensitive aesthetic resources to establish priority places from which further analysis of potential visual impact is conducted;
- Select key receptors from which detailed impact analysis is conducted;
- Depict the appearance of the facility upon completion of construction;
- Evaluate the aesthetic effects of the visual change (qualitative analysis) resulting from Project construction, completion and operation; and
- Identify opportunities for effective mitigation.

2.5.1 Existing Conditions

2.5.1.1 Viewshed Area

Consistent with the NYSDEC Visual Policy, the visual study area for the VRA generally extends to a 5-mile radius from the outermost turbines (referred to as the "study area"). Beyond this distance, it is assumed that natural conditions of atmospheric and linear perspective will significantly mitigate most visual impacts. Visual impacts were considered for a few resources of high cultural or scenic importance outside the typical 5-mile radius.

As stated in previous sections of the DEIS and within the VRA report, the Project Area is located in western New York in the Town of Arkwright. The 47 wind turbines are bounded by Straight Road to the north, Creek Road/Farrington Hollow Road to the east, CR 72 to the south, and Miller Road/Park Road to the west. The Project Area is surrounded by rolling hills of agriculture and forested land. With the exception of the City of Dunkirk, and villages of Fredonia, Forestville and Cassadaga, the study area is relatively rural and largely undeveloped. Broad tracts of agricultural land are either actively maintained or brush covered due to inactivity (fallow fields). Mature deciduous woodlands are found throughout the Project Area and typically cover hillsides and hilltops. The hills and hillocks are the dominant landscape element and form the visible horizon from the majority of the Project Area outside the downtown areas of the city and villages.

Landscape character is defined by the basic pattern of landform, land use, vegetation, water features, and human development. This descriptive section offers an overview of the intrinsic visual condition of the study region and establishes the baseline condition from which to evaluate visual change.

Topography and Vegetation – The proposed Project occupies a small portion of the northern edge of the Cattaraugus Highlands, which is a subregion of the Allegheny Plateau. The topography within the Project Area rises quickly from the gently sloping land bordering Lake Erie, to a series of undulating ridge tops with deeply cut generally north-south aligned ravines and valleys. Terrain consists largely of undulating hills, ridges and areas of smaller rounded hillocks, often bisected by ravines.

Dominant tree species within the study area are representative of the northern hardwood zone found throughout much of the Western New York Region. Species include beech, maple, ash, elm, and hemlock. In addition to these deciduous climax species, isolated plantings of red and white pine are scattered throughout the study area. Coinciding with the mix of open field and woodlots is a significant amount of secondary growth edge habitat. For the most part, this secondary growth takes the form of hedgerows, wood borders, and old fields. Beyond the Project Area, the landscape remains primarily rural agriculture, with the exceptions of the City of Dunkirk, and the villages of Fredonia, Cassadaga and Forestville, which each feature greater housing and business density, as well as tree-lined streets. The zones of highest vegetation density within the Project area are the Boutwell Hill State Forest and Canadaway Creek Wildlife Management Area (WMA), which is mostly dominated by northern hardwood tree species.

Water Features – Water features are not a major component of the visual landscape in the vicinity of the proposed wind farm. The most prominent water resources within the study area include Canadaway Creek, Conewango Creek West Branch, Walnut Creek, and the Fredonia Reservoir. Additional notable resources within the study area, include, but are not limited to, Upper Cassadaga Lake, Black Pond, Pickett Brook, Hyde Creek, and West Mud Lake. Numerous private farm ponds, scattered wetlands, and small streams are also found in the

study area. The largest water feature in the area, Lake Eerie, is approximately 5.5 miles from the nearest turbine.

Transportation – The primary transportation route through the study area is Route 83, which runs east to west, originating in the Project Area from the Town of Villenova and terminating upon intersection with New York State Route 60 (Route 60). This road bisects the Project Area and the proposed turbines will be present on either side of Route 83.

Another major transportation route in the Project Area is Center Road, a two-lane road that runs north to south. Proposed wind turbines will be located to the east and west of Center Road. Center Road intersects with four major routes, U.S. Route 20, New York State Routes 39 and 83, and County Route 72 and crosses through the Hamlet of Griswold and Canadaway Creek WMA.

County Route 72 is an east to west route in the southern portion of the Project Area that runs through a portion of Canadaway Creek WMA. The overwhelming majority of proposed wind turbines will be located to the north of County Route 72, with only seven turbines to the south, in the southeastern-most section of the Town of Arkwright.

Population Centers – Population centers are comprised of Community Centers and Rural Residential Areas. Community Centers within the study area consists of the City of Dunkirk, and the villages of Fredonia, Forestville, and Cassadaga. Rural residential areas consists of homes and agricultural support buildings that are either clustered at crossroad hamlets (varying in size), such as Sheridan, Black Corners, and Balcom Corners, or are very sparsely located on individual properties.

2.5.1.2 Sensitive Resources

An inventory of visually sensitive resources was undertaken as part of the VRA. Because it is not practical to evaluate every conceivable location where the proposed Project might be visible, it is accepted visual assessment practice to limit detailed evaluation of aesthetic impact to locations generally considered by society, through regulatory designation or policy, to be of cultural and/or aesthetic importance. In rural areas where few resources of statewide significance are likely to be found, it is common practice to expand inventory criteria to include places of local sensitivity or high intensity of use. As discussed in the VRA, resources may fall under three categories: 1) Resources of Statewide Significance; 2) Resources of Local Interest; 3) Other Places for Analysis; and 4) Selected Resources Beyond 5-Miles. These four categories are outlined below.

Resources of Statewide Significance – The NYSDEC Visual Policy requires that all aesthetic resources of statewide significance be identified along with any potential adverse effects on those resources resulting from the proposed Project. Aesthetic resources of statewide significance may be derived from one or more of the following categories:

- A property on or eligible for inclusion in the National or State Register of Historic Places [16 U.S.C. § 470a et seq., Parks, Recreation, and Historic Preservation Law Section 14.07];
- State Parks [Parks, Recreation, and Historic Preservation Law Section 3.09];
- Urban Cultural Parks [Parks, Recreation, and Historic Preservation Law Section 35.15];
- The State Forest Preserve [NYS Constitution Article XIV], Adirondack and Catskill Parks;
- National Wildlife Refuges [16 U.S.C. 668dd], State Game Refuges, and State Wildlife Management Areas [ECL 11-2105];
- National Natural Landmarks [36 CFR Part 62];
- The National Park System, Recreation Areas, Seashores, and Forests [16 U.S.C. 1c];
- Rivers designated as National or State Wild, Scenic, or Recreational [16 U.S.C. Chapter 28, ECL 15-2701 et seq.];
- A site, area, lake, reservoir, or highway designated or eligible for designation as scenic [ECL Article 49 or NYSDOT equivalent and Adirondack Park Agency], designated State Highway Roadside;
- Scenic Areas of Statewide Significance [of Article 42 of Executive Law];
- A state or federally designated trail, or one proposed for designation [16 U.S.C. Chapter 27 or equivalent];
- Adirondack Park Scenic Vistas [Adirondack Park Land Use and Development Map];
- State Nature and Historic Preserve Areas [Section 4 of Article XIV of the State Constitution];
- Palisades Park [Palisades Interstate Park Commission]; and
- Bond Act Properties purchased under Exceptional Scenic Beauty or Open Space category.

Potentially affected resources of Statewide Significance, which are open to the public, include resources such as the Dunkirk Post Office, Fredonia Commons Historic District, Fredonia Post Office, Fredonia Grange, Boutwell Hill State Forest, and Canadaway Creek WMA.

Resources of Local Interest - Places of local sensitivity or high intensity of use (based on local context) were also inventoried, even though they may not meet the broader statewide threshold. Aesthetic resources of local interest were generally derived from the following general categories:

- Recreation areas including playgrounds, athletic fields, boat launches, fishing access, campgrounds, picnic areas, ski centers, and other recreational facilities/attractions;
- Areas devoted to the conservation or the preservation of natural environmental features (e.g., reforestation areas/forest preserves, wildlife management areas, open space preserves);
- Architectural structures and sites of traditional importance as designated by a governmental agency;

- Parkways, highways, or scenic overlooks and vistas designated as such by a governmental agency;
- Important urban landscape including visual corridors, monuments, sculptures, landscape plantings, and urban green space;
- Important architectural elements and structures representing community style and neighborhood character;
- An interstate highway or other high volume (relative to local conditions) road of regional importance;
- A passenger railroad or other mass transit route; and
- A residential area greater than 50 contiguous acres and with a density of more than one dwelling unit per acre.

Other Places for Analysis – Given the rural character of much of the study area, the inventory of aesthetic resources has been further expanded to be conservatively over-inclusive. In several cases, locations not rising to the threshold of statewide significance or local interest have been included to represent visibility along sparsely populated rural roadways; most selected based on field observation of open vistas. Although possibly of interest to local residents, such locations are not considered representative of any aesthetically significant place.

Selected Resources Beyond 5-Miles – Considering the scale of the proposed Project and recognizing the proposed wind turbines will, at times, be visible at distances greater than 5 miles, site-specific consideration is given to additional recreational resources of high scenic importance that are located beyond the typical 5-mile radius. The following resources were identified during the research completed for the VRA:

- Lake Eerie State Park (Brockton, NY);
- Historic Dunkirk Lighthouse (City of Dunkirk);
- Lake Eerie Waterfront (City of Dunkirk);
- Seaway Trail (stretches for 454 miles along Lake Eerie, Lake Ontario, the Niagara River, and the St. Lawrence Seaway);
- New York State Underwater Blueway Trail (Lake Eerie); and
- NYS Boat Ramp (Cassadaga Lake).

2.5.2 Anticipated Impacts

2.5.2.1 Construction

Construction of the proposed wind turbines will require use of large mobile cranes and other large construction vehicles. Turbine components will be delivered in sections via large semi-trucks. The construction period for each turbine is expected to be quite short; therefore, construction related visual impacts will be brief and are not expected to result in adverse prolonged visual impact to area residents or visitors.

2.5.2.2 Operational Impacts

2.5.2.2.1 Visual Character

The Project is comprised of 47, 80-meter (262-foot) towers with a total height of 125 meters (410 feet) when the rotor blade is at its highest point. The addition of 47 clearly man-made thin tapered structures distributed throughout the landscape will create a visual disruption of the agricultural landscape. The well-defined vertical form of the turbines that may be visible across this plain introduced a contrasting and distinct perpendicular element into the landscape. Views will commonly include multiple turbines at varying distances from the viewer. It is anticipated that the turbines will most commonly be viewed in an off-axis manner creating the appearance of a random arrangement.

Generally, the neutral off-white color of the proposed turbine tower, nacelle, and blades will be viewed against the background sky. Under these conditions the turbines would be highly compatible with the hue, saturation and brightness of the background sky and distant elements of the natural landscape. Color contrast will decrease with increasing distance and/or periods of increased atmospheric haze or precipitation. The proposed turbines will be the tallest visible elements on the horizon and will be disproportionate to other elements commonly visible on the regional landscape.

2.5.2.2.2 Visibility Analysis

The first step in identifying potentially affected visual resources is to determine whether or not the proposed Project would likely be visible from a given location. Viewshed maps are prepared for this purpose. Viewshed mapping identifies the geographic area within which there is a relatively high probability that some portion of the proposed Project would be visible.

As discussed in the VRA, two viewshed maps were prepared showing the potential visibility of the turbines (blade tip of each turbine in up-right position) (provided in Figures 1 and 2 in Appendix F). One viewshed map was prepared defining the area within which there would be no visibility of the Project because of the screening effect caused by intervening topography. A digital elevation model (DEM) of the study area was obtained through the United States Geologic Survey model the Project area topography. This treeless condition analysis is used to identify the maximum potential geographic area within which further investigation is appropriate. A second map was prepared illustrating the probable screening effect of existing mature vegetation. Vegetative data was extracted from the National Land Cover Data Set 2001. This vegetated condition viewshed acceptably identifies the geographic area within which one would expect to be substantially screened by intervening forest vegetation. A viewshed map was also created to assist in evaluating potential nighttime visibility. The vegetated viewshed map was created using the same methodology as the daytime viewshed maps. However, the map was created using the approximate height (275 feet) of the FAA required lights as the control point for 21 turbines.

Table 2.5-1. Project Visibility

Number of Turbines	% of Study Area with Visibility a/
1-5	4.2 %
6-10	3.5%
11-15	3.7%
16-20	3.9%
21-30	5.7%
31-40	2.2%
41-47	1.4%

a/ based on vegetated viewshed map.

Viewshed maps indicate that one or more of the proposed 47 turbines will be theoretically visible from approximately 25 percent of the 5-mile radius study area. Approximately 75 percent of the study area will likely have no visibility of any wind turbines due to intervening landform or vegetation. Table 2.5-1 shows the number of turbines visible from portions of the study area. Visibility is common in the agricultural uplands from cleared lands with down slope vistas in the direction of turbine groupings.

While the viewshed map indicates some visibility from the City of Dunkirk, Villages of Fredonia and Forestville, as well as hamlets such as Black Corners and Griswold, field confirmation determined the prevalence of mature street trees and site landscaping combined with one and two story residential and commercial structures. Views will be partially screened by intervening vegetation and localized structures, although filtered or framed views are likely through foreground vegetation and buildings were found from isolated locations. Direct views are more prevalent on the outskirts of these community centers where localized residential and commercial structures, street trees and site landscaping are likely to provide a visual barrier.

Open views, and in some cases panoramic views of the Project will be available from many roadways where roadside vegetation is lacking. Visibility may occur along roadways including NYS Thruway I-90, US Route 20, NYS Routes 39, 60 and 83, CR 72, and local roads such as Farrington Hollow Road, Fredonia-Stockton Road and Prospect Road. Many of these views may be long distance and fleeting.

No views (or limited views) will occur on the backside of many hills and within ravines found throughout the study area. Where topography is oriented toward the turbines, dense forest cover commonly prevents distant views.

The area most directly affected by views of the Project will be where there is significant amount of cleared or agricultural land within immediate proximity of the Project. The visual impact is also more notable from other higher-elevation hamlets within the Project area, including Shumla, Laona, Hamlet, and Balcom. The rural areas along US Route 20, NYS Route 83, CR 72, Farrington Hollow Road, Prospect Road, Fredonia-Stockton Road, and other roads in these areas will experience a high degree of visibility. Residents and visitors will regularly encounter proximate views of one or more turbines within the foreground and near-middle-ground distances (e.g., ½ to 1 ½ miles); the distance where the visual contrast of the turbines will be greatest. Within such close proximity, turbines frequently appear and disappear behind intervening foreground landforms and vegetation as viewers move about the Project area.

2.5.2.2.3 Impacts to Visually Sensitive Resources

As listed in Table 5 in the VRA (Appendix F), of the original 77 inventoried visual resources, 12 would likely be screened from the proposed Project by either intervening landform or vegetation/structures and are thus eliminated from further study. Table 6 in the VRA summarizes factors affecting visual impact (landscape unit, viewer group, distance zone and duration/frequency/circumstances of view) for each visual resource determined to have a potential view of the proposed Project.

Resources of Statewide Significance. The viewshed analysis and field investigations determined that several visual resources of Statewide Significance would be affected by the Project.

The four well-maintained historic resources, located in the Village of Fredonia, include the Fredonia Grange, Fredonia Commons Historic District, Fredonia Post Office, and the Dunkirk Post Office will likely experience a variety of views ranging from open views to filtered or limited views through trees and/or structures. Open views will also be potentially experienced at the Boutwell Hill State Forest and Overland Trail, and Canadaway Creek, both situated in the Town of Arkwright.

Resources of Local Interest. Due to the number, scale and distribution of proposed turbines, some portion of the Project will be visible from places of local interest that do not necessarily meet the broader statewide threshold for visual significance. Most commonly affected are roadside views along various county and local roadways.

Views were found along portions of several county and town roads at varying distance. Most residential neighborhoods in the villages and hamlets where the prevalence of mature street trees and site landscaping combined with one and two story structures may substantially limit or screen distant views.

Most tourists and seasonal residents would have high sensitivity to the visual quality and landscape character, regardless of the frequency or duration of their exposure to the proposed Project. This group may view the proposed facility while traveling local roadways and visiting local points of interest including wineries.

Other Resources. Visibility of turbines will be experienced at locations not rising to the threshold of statewide significance or local interest. For the most part, these locations consist of roads in the Towns of Arkwright, Charlotte, Hanover, Pomfret, Sheridan, and Villenova. Many views along these roadways may be long distance. Although they may be potentially of interested to local residents, such locations are not considered representative of an aesthetically significant place and are not typically heavily weighted or reviewed in terms of aesthetic impact.

2.5.2.2.4 Affected Viewers

The Towns of Arkwright, Hanover, Sheridan, Charlotte, Stockton, Villenova, Pomfret, Cherry Creek and Dunkirk are each quite rural and have small populations. The population of the Town of Arkwright, which will house all of the 47 proposed wind turbines, is 1,226 and the population density of the Town is only 31 people per square mile, which is relatively small when compared to the population density of Chautauqua County.

Highways within the study area are moderately traveled. The stretch of I-90 that goes through the study area has the highest average annual daily traffic volume of any roads in the study area, followed by the NYS Route 60. While the proposed Project will be frequently visible to local residents and travelers, the total number of potentially affected permanent year-round viewers within the study area is relatively small when compared to other regions of New York State.

The impact to those residents and tourists active in other parts of the study area will vary. The sensitivity of individuals to visual quality is variable; but to many, visual quality is an important and integral part of their outdoor experience. The presence of wind turbines may diminish the aesthetic experience for those that believe that the rural landscape should be preserved for agricultural, rural residential, open space and similar uses. Such viewers will likely have high sensitivity to the visual quality and landscape character, regardless of the frequency of duration of their exposure to the proposed Project. For those with strong utilitarian beliefs, the presence of the proposed Project may have little aesthetic impact on their recreational experience.

2.5.2.2.5 Photo Simulations

To demonstrate how the actual turbines will appear within the study area from a variety of distances and locations, representative photo simulations were prepared from a number of locations. Table 7 in the VRA provides a listing of key receptors that were selected for photo simulations. The specific location of these simulations was chosen for their relevance to the factors affecting visual impact (viewer/user groups, landscape units, distance zones and duration/frequency and circumstances of view). Because the visibility of wind turbines will most commonly affect local residents from rural homes and during daily travel along local roads, and most open vistas of the Project typically occur in isolated locations along rural roadways, views selected for photo simulation favor such views even though the number of viewers will not be large. The appearance of the turbines is based on the specifications of Vestas V90 1.8MW turbines with an 80-meter (263 ft.) hub height and 90-meter (295 ft.) diameter blades. The blade tip height (blade in upright position) used in the simulations was 410 feet. The detailed photo simulation methodology and corresponding photo simulation figures can be found in the VRA in Appendix F.

2.5.2.2.6 FAA Lighting Plan Visibility

According to the Federal Aviation Administration (FAA), daytime lighting of wind turbines, in general, is not necessary; however, illumination at night is required. The FAA requires lighting of perimeter turbines, as well as interior turbines with a maximum gap between lit turbines of no more than ½ mile (2,640 feet). Based on these guidelines and the evaluated 47-turbine layout, approximately 21 of the proposed turbines may be illuminated at night for aviation safety. These are federally mandated safety features and cannot be omitted of reduced.

A viewshed map (See Figure 3 in the VRA) was created to assist in evaluating potential nighttime visibility. The vegetated viewshed map was created using the same viewshed analysis methodology; however, the map was created using the approximate height (275 feet) of the FAA required lights as the control point for 21 turbines. The viewshed map clearly indicates that one or more of the 21 proposed lights will be theoretically visible from approximately 22 percent of the 5-mile study area. Views of the lit proposed turbines will be possible from sections of the Villages of Fredonia and Forestville, City of Dunkirk, and Hamlets such as Arkwright, Black Corners and Griswold. However, visibility will be most evident in the agricultural uplands from cleared lands with down-slope vistas in the direction of the proposed Project, and participating Project properties with lit turbines. In addition, views of the lit turbines are prominent from a number of roadway segments in the study area, including the NYS Thruway, US Route 20, NYS Routes 39, 83, 60 and 23, County Route 72, Prospect Road, Pope Hill Road, Round Top Road, Farrington Hollow Road, and Fredonia-Stockton Road.

While red flashing aviation obstruction lighting on communications towers is commonly visible nighttime elements almost everywhere, the concentration of lights within the turbine area would be somewhat unique. While aviation obstruction lighting is generally directed upward, is relatively low intensity, and will not create atmospheric illumination (sky glow), 21 red lights flashing in unison in the distance from any given location will be conspicuous and somewhat discordant with the current dark nighttime conditions. The magnitude of this impact will depend on how many lighted turbines are visible at a specific location and existing ambient lighting conditions present within the view. Local residents outdoors in the rural nighttime setting will likely be more affected by this condition than would motorists traveling thorough the area after dark.

2.5.2.2.7 Assessment of Shadow Flicker

Wind turbines can cause a flickering effect when the rotating turbine blades cast shadows that move rapidly across the ground and nearby structures. This can cause a disturbance within structures when the repeating pattern of light and shadow falls across the windows of buildings; particularly when occupants are trying to read or watch television. The effect, known as shadow flicker, is most conspicuous when windows face a rotating wind turbine and when the sun is low in the sky (e.g., shortly after sunrise or shortly before sunset). Because of constantly changing

solar aspect and azimuth, shadows will be cast on specific days of the year and will pass a stationary receptor relatively quickly. Flicker will not be an everyday event or be of extended duration when it does occur. For receptors (i.e. residential dwellings) located to the west of a turbine, a residence is more likely to fall within the shadow zone shortly after sunrise when affected residents are typically asleep with shades drawn. For receptors located to the east of a turbine, a residence is more likely to fall within the shadow zone shortly before sunset.

Shadow flicker will only occur when certain conditions coincide:

- Daylight hours (sunrise to sunset) – shadow flicker does not occur at night;
- Sunshine – flicker will not occur on foggy or overcast days when daylight is not sufficiently bright to cast shadows;
- Receptor is within 10 rotor diameters of the turbine – beyond this distance, a person should not perceive a wind turbine to be chopping through sunlight, but rather as an object with the sun behind it;
- Windows face the turbine – turbine shadows can only enter a structure through unshaded windows; and
- Turbine is rotating – no flicker will occur when the turbine is not in operation.

A shadow-flicker analysis was conducted using *WindPRO 2.4 Basis* software (WindPro), and associated shadow module. In addition to turbine specifications, receptor (i.e., dwellings) locations, additional variables used for shadow calculations include (these are discussed in greater detail within the VRA):

- Sunshine probabilities (percentage of time from sunrise to sunset with sunshine) – The WindPro model calculates shadow frequency based on monthly sunshine probabilities.

- Operational Time/Rotor Orientation – The WindPro model assumes there will be no shadow flicker during calm winds (when the blades are not turning). Moreover, the orientation of the rotor (e.g., determined by wind direction) affects the size of a shadow cast area. To more accurately calculate the amount of time a shadow will be over a specific location (based on rotor orientation), the WindPro model considers typical wind direction.

A total of 211 potential residential receptors were identified within the shadow-flicker study area of 3,000 feet around each turbine. These were identified through field investigations and aerial photo interpretation. Table 2.5-2 presents the results of the 211 studied shadow receptors located within 10 rotor diameters of the wind turbines, based on topography only.

Table 2.5-2. Potential Shadow Flicker Impacts

Number of Receptors	% of Receptors	Shadow Flicker (hrs/per year)
38	18%	0-2
91	43.1%	2-10
55	26.1%	10-20
15	7.1%	20-30
5	2.4%	30-40
7	3.3%	40+

Of the 12 receptors that exceed 30 hours, only two receptors have a view of the proposed Project. It should also be noted that both of the receptors that will experience greater than 30 hours of shadow flicker per year are a Project participants. In addition, over half (58.3 percent) of the 211 receptors will not have visibility of the Project. It is anticipated that those receptors without a view of the Project will not be impacted by the shadow caused by the turbines.

There are no regulations or guidelines within the United States that establish an acceptable degree of shadow flicker impact on a potential receptor. Based on the limited number of hours any structure will be impacted, shadow flicker is not expected to create an adverse impact on most nearby residential dwellings. For residences where shadow flicker is greatest, this impact might be considered an annoyance by some, and unnoticed by others.

2.5.3 Mitigation Measures

2.5.3.1 Construction

Because construction-related impacts to visual resources are anticipated to be minor and temporary, no mitigation is required. The Applicant will ensure work areas are confined to the Project Site and are well maintained.

2.5.3.2 Operation

Although the visual mitigation options are limited given the nature of the Project and its siting criteria, the following mitigation measures are proposed for the Project. Following the NYSDEC Visual Policy, the following mitigation measures are contained within the VRA.

In terms of professional design mitigative measures, the Applicant is limited in selection of turbine styles to the designs presently offered by wind turbine manufacturers. Wind turbine design is largely driven by aerodynamic efficiency, which is essential to wind farm operations. To minimize visual complexity, tubular style towers will be used instead of lattice frame towers to simplify visual form. In addition, proposed turbines will not be used for commercial advertising, or include conspicuous lettering or corporate logos identifying the Project owner or equipment manufacturer. The color of the blades, nacelle, and tower will be a neutral off-white. While the FAA mandates this color for aviation safety, this color is well suited to minimize visual contrast with the background sky. Wind turbine towers will be painted metal structures and blades will be painted fiberglass composite. Where specifications permit, non-specular paint will be used on all outside surfaces to minimize reflected glare.

As indicated in the visual assessment, on-site lighting impacts must also be considered. Due to the height of the proposed turbines, the FAA requires red flashing aviation obstruction lighting be placed atop the nacelle on approximately 21 of the 47 turbines to assure safe flight navigation in the vicinity of the Project. This federally mandated safety feature cannot be omitted or reduced. If appropriate, alternative approved FAA lighting options will be evaluated to determine if they can minimize the visual impact within the study area.

Roads will be designed to generally follow topographic contours to minimize cut and fill and will be located in agricultural lands to the greatest extent possible to minimize vegetative cuts. The Applicant will also maximize to the extent possible the subsurface routing of electrical interconnects used to transmit power from turbine locations to the Project substation. Ancillary facilities (substation, O&M yard) will be located, as feasible, away from major transportation corridors in order to minimize the perceived visual impact from those parts of the project, which are often regarded as the most “industrial” aspects.

Potential screening mitigation measures were considered. Since the proposed Project includes 47 wind turbines that will be visible over a wide viewshed area, traditional treatments such as fences, earthen berms and vegetative screening cannot be applied in an effective manner to screen these major structures. Perimeter screen plantings will be used to minimize visibility of the proposed substation and O&M buildings from the public right-of-way. In terms of mitigative actions taken by potentially impacted residents, window shades may be utilized by residences in the event shadows cast by the turbines become a nuisance.

The proposed Project is located in the Town of Arkwright because of several reasons, including: favorable elevation and exposure of the Project Area, which is well suited for receiving prevailing winds; reliable winds that meet the necessary criteria for a commercially viable wind energy project; and the relatively low population of the Project Area. By their very nature, modern wind energy projects are large and highly visible facilities. The need to position wind turbines in areas of higher elevation cannot be readily avoided. Given the necessary scale of wind energy turbines and the number of turbines required for a sustainable project, there is no opportunity to substantially relocate the wind energy project or any of its components to other sites in the Arkwright area where it would be significantly less visible. Due to these constraints, mitigative measures are relatively constructed to include maintaining a minimum setback distance between the proposed turbines and residential structures in order to maximize screening benefits of existing woodland vegetation, where such exists. Turbine placement will be largely dictated by Project boundaries, environmental constraints, proximity to residential structures, and the positioning of adjacent wind turbines; however, particularly in response to impacts to specific high value resources, some repositioning of turbines may take place to reduce or eliminate impacts.

Reducing the profile and/or downsizing was considered in the mitigations program. However, this would not be practicable for the Project to be sustainable. The proposed Project includes

wind energy-generating turbines in sufficient number to produce up to 79.9 MW of electricity. The profile of the wind turbines is dictated by operational efficiency. Because wind turbine power extraction is a function of the cube of wind speed (relatively large increases in power from small increases in wind speed), the height of a tower plays an important role in overall energy production. Reducing the height of the turbines to a meaningful degree would substantially reduce the amount of energy produced rendering the development of the wind energy project impractical or would require constructing a greater number of smaller units to be economically viable.

Project maintenance is an important assessment to visual impacts mitigation. How a landscape and structures in the landscape are maintained have aesthetic implications to the long-term visual character of a project. The Applicant places a high priority on facility maintenance, not only for operational purposes, but for aesthetic appearance as well. Recognizing that its public image will be directly linked to the outward appearance of its facilities and desiring to be a welcomed member of the community, the Applicant will implement a strict policy of maintenance, including materials and practices that ensure a clean and well-maintained appearance over the full life of the facility.

At the time of Project decommissioning, idled turbines could represent a significant and unnecessary visual impact to the local area. The Applicant will maintain a well-funded decommissioning plan to ensure that these structures can be dismantled and removed from the Project Area upon termination of power generation at the site.