

THE STATE OF NEW HAMPSHIRE

BEFORE THE

SITE EVALUATION COMMITTEE

DOCKET NO. 2012-01

**APPLICATION OF ANTRIM WIND ENERGY, LLC
FOR A CERTIFICATE OF SITE AND FACILITY**

FIRST SUPPLEMENTAL PREFILED TESTIMONY OF

JOHN GUARIGLIA

ON BEHALF OF

ANTRIM WIND ENERGY, LLC

October 11, 2012

1 **Background and Qualifications**

2 **Q. Please state your name and business address.**

3 A. My name is John W. Guariglia. My company's corporate headquarters is located
4 at 443 Broadway, Saratoga Springs, New York 12866. My business address is
5 109 South Warren Street, Suite 400, Syracuse, New York 13202.

6 **Q. Please identify your current employer and position, as well as your**
7 **qualifications.**

8 A. I am an Associate Principal with Saratoga Associates, Landscape Architects,
9 Architects, Engineers, and Planners, P.C. ("Saratoga Associates"). My
10 qualifications have not changed from those stated in my prefiled testimony dated
11 January 31, 2012 in this docket.

12

1 **Purpose of Testimony**

2 **Q. What is the purpose of this testimony?**

3 A. My supplemental testimony updates my January 31, 2012 testimony to include
4 information concerning: the 10 mile viewshed data submitted with the Second
5 Supplement to the Antrim Wind Application; the additional visual simulations
6 that the Antrim Wind Energy, LLC Project (“the Project”) conducted at the
7 request of the Appalachian Mountain Club (“AMC”); and to confirm that the
8 inclusion of temporary meteorological towers and the pole for the proposed radar
9 activated lighting system do not change my earlier conclusions that the Project
10 will not have an unreasonable adverse impact on aesthetics. My supplemental
11 prefiled testimony also addresses questions and statements made by other parties
12 in this docket concerning the potential visual and shadow-flicker impact of the
13 Project.

14 **Q. Are you familiar with the Project that is the subject of this proceeding?**

15 A. Yes. Saratoga Associates was retained by Antrim Wind Energy, LLC (“AWE”) in 2011 to assess the potential impact of the Project on the scenic resources of the
16 region. I am the principal author of the report titled “Antrim Wind Energy Project
17 - Visual Impact Analysis” dated January 9, 2012 (“Saratoga VIA”). Saratoga
18 Associates was also retained by AWE to evaluate the Project’s potential to create
19 shadow-flicker on nearby properties. I am also the principal author of the report
20 titled “Antrim Wind Energy Project – Shadow-Flicker Technical Memorandum”
21 dated December 16, 2011 (“Saratoga Shadow Analysis”).
22

1 **Q. Since the submission of two documents identified above, have you developed**
2 **any additional information pertaining to the Project's anticipated aesthetic**
3 **impacts?**

4 **A. Yes. In addition to the two documents referenced above, Saratoga Associates has**
5 **completed the following:**

- 6 • Topography Only and Topography with Vegetation viewshed maps out to 10
7 miles. These maps were submitted with Antrim Wind's Second Supplement to its
8 Application in Appendix 9-A-1 on August 22, 2012. For ease of reference, these
9 maps are also submitted herewith as Attachments JWG-1 and JWG-2,
10 respectively.
- 11 • Photo simulations illustrating potential view of the Antrim Wind Energy Project
12 from Greenfield State Park (Attachments JWG-3A & 3B), Gregg Trail
13 (Attachments JWG-13A & 13B), Pitcher Mountain (Attachments JWG- 6A &
14 6B), and Powder Mill Wildlife Management Area (WMA) (Attachments JWG-
15 4A & 4B).
- 16 • Updated photo simulations from Bald Mountain Trail (Attachments JWG-7A &
17 7B) and Willard Pond (Attachments JWG-8A & 8B) illustrating the potential
18 view of a proposed 90-foot tall tower for a radar activated lighting system for
19 which the Project is seeking approval.
- 20 • Photo simulation from Goodhue Hill (Attachments JWG- 9A & 9B).

21
22

1 **Conclusions concerning additional viewshed analysis**

2 **Q. Please state your conclusions regarding the new maps that demonstrate the**
3 **Project's visibility within a 10-mile radius.**

4 A. Generally, the visibility pattern of the Project is consistent with the 5-mile
5 viewshed maps provided in the Antrim Wind Energy Project - Visual Impact Analysis.
6 Based on topography only, similar to the original 5-mile viewshed maps, there is a
7 greater chance to see more turbines to the north, east and southeast. As illustrated in
8 Attachment JWG-2, potential visibility still remains low throughout the expanded study
9 area because much of the 10-mile study area is highly vegetated.

10 **Q. Please state your conclusions regarding the photo simulations illustrating**
11 **potential views of the Project from Greenfield State Park, Gregg Trail, Pitcher**
12 **Mountain, and Powder Mill WMA.**

13 A. A simulation from Greenfield State Park was created, at the request of
14 AMC, from the southwest shoreline of Otter Lake. *See* Attachment JWG-3B. Based on
15 the vegetated viewshed map, it appears that the greatest possibility for visibility of the
16 Project within the State Park is limited to the southwest shoreline of Otter Lake in the
17 vicinity of the State Park's public beach, the location selected for this photo simulation.
18 From this location the nearest Project turbine is approximately 8.9 miles to the northwest.
19 The photo simulation illustrates that the Project would have limited visibility, as blades
20 from just one turbine may be visible above intervening vegetation. Based on this analysis
21 it is clear that the photo simulation represents the worst-case potential visibility from
22 Greenfield State Park. Given the line-of-sight from the simulated location to the

1 proposed Project, views experienced from the lake itself would become increasingly
2 screened by the vegetation on the opposite shore as the viewer moves further off shore
3 from the beach area. Based on this analysis it is clear that Project visibility is highly
4 limited from shoreline locations within the park. Little to no impact will be experienced
5 from the on-water vantage points.

6 The overlook platform at the end of Gregg Trail provides a panoramic view of the
7 distant landscape to the north and west. As requested by AMC, Saratoga Associates
8 walked the Gregg Trail and prepared a photo simulation illustrating the Project view from
9 the overlook deck at the trail summit. *See* Attachment JWG-13B. From this location the
10 nearest turbine is approximately 8.4 miles to the northwest. Based on this image, the
11 turbines appear small in size and occupy a small amount of the overall view. Distant
12 views in the direction of the Project appear to be fully screened by local landform and
13 vegetation from all other portions of the Gregg Trail.

14 As requested by AMC, Saratoga Associates also hiked the Pitcher Mountain trail
15 from the parking lot to the summit. Distant views are fully screened along the trail by
16 foreground vegetation until the summit is reached. From the summit a 360-degree
17 panorama of the surrounding landscape exists. This panorama is enhanced at the higher
18 elevation of the summit fire tower. The stairs of the fire tower were open at the time of
19 Saratoga Associates visit, however the top of the tower was closed. A photo simulation
20 was created from this location using a photograph taken from ground elevation near the
21 base of the fire tower. *See* Attachments JWG-6A&B. From this location the nearest
22 turbine is approximately 6.4 miles to the southeast. In this simulated view, the turbines

1 appear small in size and occupy a small amount of the 360-degree panorama available
2 from this location. In addition, an existing wind farm is clearly visible to the north from
3 the Pitcher Mountain summit. As such, the introduction of the Antrim project will not be
4 a unique visual condition. Furthermore, because the existing wind farm and the proposed
5 Project are not visible within the same view (i.e. the viewer would need to turn 180
6 degrees to see the other project) from the Pitcher Mountain location, the potential impact
7 caused by a cumulative effect of these views will be minimal.

8 Based on the completed viewshed analysis, Project views are possible from the
9 southeastern portion of Powder Mill Pond. As requested by AMC, Saratoga Associates
10 paddled on Powder Mill Pond to identify and photograph potential Project views. A
11 photo simulation was created from this location. *See* Attachment JWG-4B. From this
12 location the nearest turbine is approximately 7.3 miles to the northwest. Based on this
13 image, the turbines appear small in size and occupy a relatively small amount of the
14 overall view available from this location. Potential visibility of the Project will diminish
15 the closer the viewer is to the western shoreline, as vegetation will provide screening.
16 Views farther north on the pond will be similarly screened by shoreline vegetation.

17 **Q. Please state your conclusions regarding the updated photo simulations from**
18 **Bald Mountain Trail and Willard Pond illustrating the view of the proposed tower**
19 **for the radar activated lighting system.**

20 A. Antrim Wind has made a commitment that once the Federal Aviation
21 Administration approves the use of radar-activated lights, the system will be incorporated
22 into the Project. When this technology is installed, an additional tower with a radar

1 antenna will be required and will be placed nearby wind turbine #10. In order to
2 illustrate how this new tower may appear, Saratoga Associates revised two previously
3 completed simulations. Please refer to Attachments JWG-7B and JWG-8B.

4 Both of these vantage points were updated to include a 30-meter high monopole
5 tower that will be used to support the radar activated lighting system antenna. This tower
6 is visible at both locations and clearly adds an additional vertical element on the
7 ridgeline. However, due to its slender profile and its location in close proximity to
8 turbine #10, this structure will be a minor component of the Project.

9 **Q. Does AWE's commitment to utilize the radar activated lighting system alter**
10 **your previous conclusions in any way with regard to the Project's visual impacts?**

11 A. In general, no. As stated in the VIA, the potential visual impact from intermittent
12 lighting on 6 of 10 turbines is from the flashing of red lights. This light color is required
13 by FAA in order to limit the lights' contrast with the night sky and it does not result in
14 perceptible atmospheric illumination (skyglow), thus limiting potential nighttime impact.
15 However, with the commitment to utilize radar activated lighting, AWE has taken
16 additional steps to mitigate potential nighttime impacts and this will further reduce the
17 collective potential visual impacts of the Project. Specifically, once this technology is
18 installed and operational, it will virtually eliminate nighttime lighting from the Project.
19 Thus, my previous conclusions that the Project will not result in an undue adverse impact
20 is further supported by this change.

1 **Q. If there is a potential visual impact to a receptor such as Willard Pond, why**
2 **have you concluded that the Project would not have an unreasonable adverse**
3 **impact?**

4 A. Generally, there is limited potential visibility of the Project within the 5-mile
5 study area, therefore limiting the potential for visual impact. The Project will have some
6 impacts on a limited number of resources, however given the relatively small affected
7 viewshed area, the collective impact on the study area will be low. Taking into account
8 the entire study area, the Project will not result in an unreasonable adverse impact to the
9 aesthetics of the Antrim region.

10 **Q. Does any of the additional visual analysis discussed above change your**
11 **original conclusions concerning the Project's potential impacts on aesthetics.**

12 A. No, it does not.

13 **Q. Have you reviewed the locations and characteristics of the Project's proposed**
14 **temporary meteorological ("met") towers?**

15 A. Yes, I have.

16 **Q. Please state your opinion concerning the potential impacts of the proposed**
17 **temporary met towers on aesthetics.**

18 A. The met towers will have limited or no visual impact within the study area.
19 Although these towers are 60 meters tall, they are only 6"-10" wide. Unless a viewer is
20 in close proximity to the towers, these slender towers will be increasingly difficult to see
21 with distance. In addition, the gray color of the towers can, under certain weather
22 conditions, blend into the background sky minimizing visual contrast, further limiting

1 potential visibility. One of the towers AWE is seeking certification of has been installed
2 since November 2009 and has had very limited visual impact on the area. It should be
3 noted that these towers are temporary structures, and therefore will not have any
4 permanent impacts.

5 **Comments on Ms. Vissering's Visual Impact Analysis**

6 **Q. Have you reviewed the report titled "Visual Impact Assessment - Antrim**
7 **Wind Project (Docket No. 2011002)", July 30, 2012 prepared by Jean Vissering**
8 **Landscape Architecture ("Vissering VIA")?**

9 A. Yes.

10 **Q. What are the key conclusions of the Vissering VIA with respect to the**
11 **Project's potential impact on the scenic resources of the region?**

12 A. The Vissering VIA concludes that the Project "would result in unreasonable
13 adverse effects on the scenic quality of the surrounding area." (Vissering VIA at 18).
14 The Vissering VIA also concludes that the Project "will be highly visible and
15 dominating from numerous sensitive vantage points." *Id.*

16 **Q. Do you agree with Ms. Vissering's findings?**

17 A. No, I do not.

18 **Q. Please explain the basis for your disagreement with Ms. Vissering's findings.**

19 A. There are several reasons for my opinion. These include:

- 20 • The Vissering VIA places emphasis on a limited number of places where the
21 Project would be visible and ignores the vast majority of the study area where the
22 Project will not be visible.

- 1 • The Vissering VIA categorizes views as being "minimal", "moderate" or
- 2 "significant" without objective basis.
- 3 • The Vissering VIA draws its conclusions on Project visibility from receptors that
- 4 have not been fully evaluated.

5 **Q. Please explain why you believe the Vissering VIA places undue emphasis on**
6 **a limited number of places where the Project would be visible?**

7 A. Both the Saratoga VIA and Vissering VIA agree that there would be no visibility
8 of the Project from 95% of the study area (Saratoga VIA at 22) (Vissering VIA at 17)
9 based on the viewshed analysis. These reports also agree that although the Saratoga
10 VIA identified 50 visually sensitive resources within a five-mile study radius having
11 potential visibility above intervening landform, visibility from most of these receptors
12 would be substantially screened by intervening vegetation and impacts are likely to be
13 minor. (Vissering VIA at 4).

14 In drawing conclusions, the Vissering VIA largely ignores the results of the
15 Saratoga VIA and relies on potential views from 11 assorted vantage points. The
16 Vissering VIA says "[w]hile unreasonably adverse impacts are unlikely to result from
17 significant impacts from a single setting, when significant impacts to scenic resources
18 occur from numerous vantage points impacts are likely to have unreasonable adverse
19 effects." (Vissering VIA at 16-17). Although it admits that impact would be non-
20 existent or minor from dozens of visual resources identified and evaluated in the
21 Saratoga VIA, the Vissering VIA concludes that combined Project visibility from a
22 subset of the selected 11 vantage points results in the entire Project having an

1 unreasonable adverse impact. I believe it is inappropriate to rely upon the potential
2 views from a few select locations to support the statement in the Vissering VIA that
3 “numerous vantage points” are affected, and the conclusion that the Project has
4 unreasonable adverse effects on aesthetics.

5 Moreover, determining what constitutes an unreasonable adverse impact is more
6 than a simple numbers game. While the Vissering VIA's categorization of impact,
7 sensitivity of receptors and degree of impact are important factors, many additional
8 factors must be considered to determine the overall reasonableness of the impact.
9 Examples of additional questions that should be considered in further understanding
10 the resource, and defining or determining impact are the following:

- 11 • How is the resource used by an individual? Those participating in active types of
12 recreation (e.g. snowmobiling, running, hiking, cross-country skiing) may be
13 focused on their activity and therefore may not be affected by views of the
14 turbines. Most of the resources from which Ms. Vissering believes there may be a
15 “significant” impact are generally used by individuals participating in various
16 activities that would cause them to be moving about – not remaining stationary –
17 or focused on their activity, both of which could limit prolonged views of the
18 Project. Thus, the duration of time one may be viewing the Project site would be
19 reduced, therefore limiting the potential visual impact.
- 20 • When is the resource used? Recreational oriented resources may not be used
21 year-round (e.g. swimming, boating, fishing, hiking) or may be limited to the time
22 of day (e.g. hiking, swimming). For instance, if a resource (e.g. Willard Pond) is

1 limited to daytime activities and access is not available during winter months it
2 would receive fewer visitors during the course of a year. Therefore the potential
3 viewing of the Project is further reduced, limiting potential impact. Also visibility
4 of the required FAA lighting would not be viewed by visitors if nighttime
5 activities are not allowed or unavailable. None of the resources identified by Ms.
6 Vissering as having “significant” impacts are public campgrounds or other
7 resource types that would have views of the Project during the course of an entire
8 year or time of day.

- 9 • How many and how much of the turbine is visible? Being able to view the tower,
10 nacelle and blades may have a different impact on viewers when compared to
11 only seeing tips of the turbine blades. Ms. Vissering’s analysis did not address
12 how many turbines or elements of turbines that might be visible from any viewing
13 locations.
- 14 • How often is the resource visited/numbers of users? Resources used by a large
15 number of individuals may be considered more visually sensitive than those
16 receiving fewer visitors. The number of annual visitors to the resources that Ms.
17 Vissering believes will have a “significant” impact from the Project appears to be
18 low. While specific visitation numbers from Willard Pond and Bald Mountain are
19 not available, the number of visitations to each site is likely to be limited and may
20 be far less than the number of visitations to sites such as State Parks and other
21 resources designated as having State or National significance.

1 **Q. Why do you believe the categorization of visual impact is without objective**
2 **basis?**

3 A. The Vissering VIA ranks visual impact for select vantage points on a scale
4 ranging from “minimal” to “significant” "depending on the change or contrast
5 introduced to the existing condition". (Vissering VIA at 5). However, a methodology
6 for “scoring” such change is not provided in the VIA. Without a clearly defined and
7 objective criteria for quantifying the degree of visual impact, the conclusions of the
8 Vissering VIA cannot be independently repeated or verified.

9 **Q. Does the Saratoga VIA establish a degree of potential impact for each**
10 **receptor?**

11 A. No. The Saratoga VIA evaluates the potential visibility of the proposed Project
12 and objectively describes the difference between the visual characteristics of the
13 landscape setting with and without the proposed Project in place. The purpose of the
14 Saratoga VIA is to identify potential visual and aesthetic impacts and to provide an
15 objective assessment of the visual character of the Project, using standard accepted
16 methodologies of visual assessment, from which agency decision-makers can render a
17 supportable determination of visual significance.

18 **Q. Is it appropriate for a visual assessment to quantify visual impact?**

19 A. No. Establishing a degree of impact, such as rating impact on a scale of 1-10 or
20 categorizing impact as being low, moderate or high cannot be done objectively
21 considering the differing perspectives of individual viewers. While the Saratoga VIA
22 includes both quantitative (how much is seen and from what locations) and qualitative

(how it will likely be perceived by viewer groups) it stops short of quantifying a "degree of impact". Claiming a visual impact as either significant or not significant without a well-defined and repeatable methodology simply represents a personal opinion that is subject to interpretation by those who judge the quality of a view or degree of impact differently.

Q. Why do you believe the Vissering VIA conclusion that certain vantage points are highly sensitive is subjective and does not consider all relevant factors?

A. The Vissering VIA concludes:

- Project views from Willard Pond would be significant "because of the existing condition which is entirely natural with no development currently visible from the pond", and "because this is a wildlife sanctuary and Audubon Preserve, there is an expectation that one will experience a natural setting". (Vissering VIA at 6).
- Views from Bald Mountain would be significant "because of Bald Mountain's location within the [dePierrefeu - Willard Pond Wildlife] [S]anctuary and therefore would have the expectation of a natural setting" (Vissering VIA at 6).

In drawing these conclusions, the Vissering VIA makes a personal judgment based on perceived quality of the view without consideration of the overall importance of the receptor, as well as other factors identified above. While the Vissering VIA places high emphasis on the undeveloped nature of Willard Pond and adjacent Bald Hill, the VIA does not draw a distinction between the importance of the privately owned wildlife sanctuary and a publicly designated recreation area, such as a State Park or Wildlife Management Area. While a privately owned wildlife

1 sanctuary is certainly an aesthetic resource of some importance, it is not likely to be
2 considered as prominent, nor as heavily used as a resource of statewide significance
3 such as a State Park or Wildlife Management Area. Resources of statewide
4 significance are of greater aesthetic significance by virtue of their preservation by a
5 governmental agency for benefit of the State's citizens.

6 The most directly impacted State Park within the Project Area is the Greenfield
7 State Park approximately eight (8) miles southeast of the nearest turbine. The most
8 directly affected Wildlife Management Area within the Project region is the Powder
9 Mill Pond WMA that is approximately seven (7) miles southeast of the nearest
10 turbine. Viewshed analysis illustrates that Project visibility is limited to a very small
11 portion of these resources of statewide significance. *See Attachments JWG-1 and*
12 *JWG-2. Photo simulations are provided to illustrate the degree of potential visibility.*
13 *See Attachments JWG-3 and JWG-4.*

14 It is also noteworthy that the Vissering VIA acknowledges that "many find wind
15 turbines to be visually appealing, this author [Ms. Vissering] included" (Vissering
16 VIA at 17). However, the VIA does not factor this contrasting perspective into the
17 determination of visual significance or the adversity of any impact. Lastly, Ms.
18 Vissering's analysis does not take into account the support this Project has from the
19 residents of Antrim, which arguably demonstrates that many within the community
20 consider the Project to be beneficial, notwithstanding its potential visual impacts.

21 **Q. Why do you believe conclusions are drawn based on Project visibility from**
22 **receptors that are not fully evaluated?**

1 A. In drawing the conclusions outlined in the Vissering VIA, it appears that many
2 rely only on viewshed mapping and select data provided in the Saratoga VIA. For
3 example, while visibility may be expected from some of the ponds and lakes within
4 the study area, it does not take into consideration the affect of distance and how much
5 of the turbine may be visible. For example, Attachment JWG-5 demonstrates that of
6 the four turbines potentially visible from Spoonwood Pond and Nubausit Lake, only
7 one presents the viewer with the potential to see anything other than blades (i.e. tower
8 and/or nacelle). As a result, it is anticipated that the level of potential impact would
9 be reduced at this location.

10 The Vissering VIA did not provide photo simulations for each location to
11 illustrate degree and character of potential visibility, and specific vantage points.
12 Without this type of information, it is not possible to know exactly what, if any,
13 visual impact might occur.

14 **Q. Was a detailed analysis identified for each resource in the Saratoga**
15 **Associates VIA?**

16 A. Table 2 in the Saratoga Associates' VIA submitted with the Application, and the
17 table submitted in Appendix 9-A-1 of the Second Supplement to Application, identify
18 each receptor and the factors affecting visibility (i.e. landscape unit, viewer group,
19 distance, and view duration). A description of each potential factor is presented in the
20 VIA so that the reader can understand how each of these factors may affect potential
21 visibility and impact. In addition to this and the completed simulations, the created

1 viewshed maps show how many turbines will be visible at any given point within the
2 study area.

3 **Q. Is there any other information in the Vissering VIA about which you have**
4 **concerns?**

5 A. Yes. Although Vissering VIA Figure 2B is accurate in the placement and scale of
6 turbines and the proposed meteorological tower, the illustration of clearing and grading
7 appears to be inaccurate and significantly exaggerates the degree of road and building
8 pad clearing visible from Goodhue Hill. Attachment JWG-9 is a photo simulation
9 prepared by Saratoga Associates from this location. Our analysis illustrates that a small
10 area of tree clearing and visible ground plane will occur upslope of the third turbine
11 visible from the left side of the page. The simulation contained in the Vissering VIA
12 significantly exaggerates the size of this clearing. Figure 2B of the Vissering VIA also
13 shows a clearing at the base of the first turbine visible from the left side of the page that
14 will not actually be visible from this vantage point.

15 **Comments on Mr. Blocks' testimony**

16 **Q. Mr. Block has stated that "In the real world, the eyes see objects in three**
17 **dimensions.....". Can you respond to this comment?**

18 A. There is no question that the human eye can see in greater detail, especially when
19 compared to a two -dimensional image. In fact, the Saratoga Associates' VIA stated the
20 following, "The photo simulations present an accurate depiction of the appearance of
21 proposed turbines suitable for general understanding of the degree and character of
22 Project visibility. However, these images are a two-dimensional representation of a

1 three-dimensional landscape. The human eye is capable of recognizing a greater level of
2 detail than can be illustrated in a two-dimensional image. Agency decision-makers and
3 interested parties may benefit from viewing the photo simulations in the field from any or
4 all of the simulated vantage points. In this manner, observers can directly compare the
5 level of detail visible in the base photograph with actual field observed conditions.”

6 **Q. Do you agree with Mr. Block’s statement that the simulations contained in**
7 **the VIA underestimate the visual impact and that the use of animated simulations**
8 **would be more beneficial?**

9 A. No. For the reasons discussed elsewhere in this testimony, the simulations in
10 Saratoga Associates’ VIA present an accurate depiction of the appearance of proposed
11 turbines suitable for general understanding of the degree and character of Project
12 visibility.

13 **Q. Mr. Block made a reference that the reliance on only photographic**
14 **simulations to convey potential visibility or impact was not appropriate. Do you**
15 **agree?**

16 A. No. A considerable degree of effort went into presenting and assessing the
17 potential visibility of the Project so that the SEC can render a decision on potential visual
18 impacts. Relying solely on the photographic simulations to render an opinion is not
19 typical. The simulations developed by Saratoga Associates are only part of the
20 information that should be used in determining potential impact; all of the information
21 presented in VIA, as well as the site visit conducted by the SEC in April 2012, should be
22 reviewed and considered.

1 **Q. Mr. Block stated that reliance on traditional 50mm frames has been shown to**
2 **be inaccurate. Do you agree with Mr. Block’s position that 50mm frames present**
3 **inaccurate visual information?**

4 A. No. In my experience, it is typical to utilize 50mm photographs in order to create
5 simulations contained in a VIA. While Mr. Block cites a recently published book to
6 support his position, other references indicate a contrary position. For example, the
7 publication *Environmental Impacts on Wind Energy Projects*, National Academy of
8 Science (2007) indicates that using 50mm photographs as the basis for visual simulations
9 is appropriate. On page 353 (Appendix D) of this document, it states the following,
10 *“Photographs should be taken with a 50-mm lens or digital equivalent that creates a*
11 *38.6° angle of view, which most closely matches human visual perception. Shorter focal*
12 *lengths tend to flatten out topography and the vertical impression of the turbines, while*
13 *longer focal lengths tend to exaggerate these features.”*

14 However, it should be noted that Saratoga Associates’ VIA does not simply and
15 totally rely upon 50 mm photographs; Saratoga Associates did create one panorama
16 simulation in order to provide a wider field of view so that the reader could further
17 understand the context of the landscape seen from the vantage point.

18 There are a few basic logistical reasons why panoramas are typically not created
19 during the completion of VIA. First, creating panoramas from every simulated receptor
20 becomes problematic during printing (they could be up to 5 feet in length) and it is
21 therefore easier for those reviewing the simulations to print at 11”x17” using a 50mm

1 image versus a panorama simulation. Also, viewing such an exhibit on a computer screen
2 may distort the apparent size of the turbines.

3 **Q. In reviewing the Shadow-Flicker report, Mr. Block questions that there will**
4 **be no shadow-flicker beyond 10 rotor diameters. Could you please respond to this?**

5 A. As stated in the shadow-flicker report, shadow-flicker is defined as:
6 *“Rotating blades of wind turbines will result in shadows moving across nearby structures*
7 *and the surrounding landscape. When the repeating change of light intensity falls across*
8 *a narrow opening, such as a window, it can cause a flicker effect within the structure*
9 *(hereafter referred to as “receptors”), as the shadow appears to flick on and off. This*
10 *effect is known as shadow-flicker and only occurs within a structure.”*

11 Beyond ten turbine diameters, the intensity of the blade shadow is considered
12 negligible and at such a distance there will be virtually no, or limited, distinct chopping
13 of the sunlight. This is not to say that *shadows* may not extend further, however they will
14 not be intense or focused enough to cause shadow-flicker. The 10x rotor diameter is used
15 throughout the U.S. and other countries, and has been identified in many guidance
16 documents. One such document that has been identified in Saratoga Associates shadow-
17 flicker technical memorandum is the *Planning for Renewable Energy – A Companion*
18 *Guide to PPS22 Queen’s Printer and Controller of Her Majesty’s Stationery Office*
19 *(2004)*. The document states *“Flicker effects have been proven to occur within ten rotor*
20 *diameter of a turbine.”*

1 **Q. Mr. Block has questioned the use of the typical shadow pattern from Turbine**
2 **1 (Figure 1 – Typical Shadow Pattern). Could you please comment on the intent of**
3 **this exhibit?**

4 A. I believe Mr. Block has misinterpreted the use and explanation of Figure 1 – Typical
5 Shadow Pattern contained in *Antrim Wind Energy Project – Shadow-Flicker Technical*
6 *Memorandum*. Potential shadows and resulting shadow-flicker is an east-west
7 phenomenon. There will be little shadow or shadow-flicker to the north and south of the
8 turbine. This is a result of the sun’s elevation as seen on the horizon, but the sun will be
9 low enough in the morning and evening to cast shadows. In the morning as the sun rises
10 in the east, it will cause shadows to be cast towards the west. In the evening, the opposite
11 is true as the sun sets in the west, it will cause shadows from the turbine to extend to the
12 east. In addition, when the sun is to the south, it will be high enough to only cause
13 shadows a very short distance from the turbine. To make it easier for those reading the
14 shadow-flicker technical memorandum to understand this, the typical shadow-pattern
15 exhibit from a selected turbine was created. It is simply an exhibit to show the pattern
16 (typically referred to as a “butterfly pattern”) of the shadow cast by an individual turbine.
17 This exhibit is based on all the criteria outlined in the shadow-report, but no analysis is
18 generated from the typical shadow exhibit.

19 As requested by Mr. Block, we have created the same exhibit for turbines 2 and 3
20 (*see* Attachments JWG-11 and JWG-12). These attachments also illustrate the same
21 general butterfly pattern as shown for turbine 1.

1 In addition, the shadow-flicker map contained in the *Shadow-Flicker Technical*
2 *Memorandum* (Figure 2 – Shadow-Flicker Analysis Topography Only) shows the
3 cumulative potential shadow-flicker for the Project and as a result, potential shadow-
4 flicker may be determined at any given point in the study area.

5 **Q. Mr. Block refers to a movie that shows shadow-flicker affecting homes at a**
6 **distance of 7,000 feet. Do you know what film is being referenced and have you seen**
7 **it?**

8 A. Mr. Block is referring to the Laura Israel anti-wind documentary “Windfall,” which I
9 have seen.

10 **Q. Could you comment on the film as it relates to Mr. Block’s statement?**

11 A. The reference to the movie by Mr. Block is based on a resident in the Tug Hill
12 region of New York. Without additional corroboration, an individual in the film states
13 that shadow-flicker is observed at a possible distance of 7,000 feet (it appears that he is
14 guessing at the distance) and does not state the precise turbine that may be causing any
15 potential issues (the film shows a number of turbines within view, some of which appear
16 to be closer). Without fully knowing the location of the residential dwelling, previous
17 studies performed as part of that particular project, and the actual impact (shadow-flicker
18 at this residence was not filmed) this statement cannot be verified. In addition, as
19 mentioned previously, shadow-flicker outside 10x rotor diameter should not be a
20 concern.

21 **Other Issues**

1 **Q. Please address the question of whether the Project's clearing and grading be**
2 **visible?**

3 A. Visibility of clearing and grading will be somewhat visible but difficult to discern
4 from most vantage points. To illustrate the degree of potential clearing and grading
5 visibility, Saratoga Associates constructed a vegetation clearing overlay as part of the 3D
6 model used in the preparation of photo simulations (refer to Saratoga VIA Section 3.4.3).
7 This overlay was based on a clearing and grading plan provided by the Project sponsor.
8 The 3D overlay was created using the GroundWiz Planter plug-in for 3D Studio Max
9 software. A forest canopy was added to the 3D model within 1/4 to 1/2 mile of the
10 turbine area. Modeled trees within the clearing and grading area were then "cut" from the
11 model forest. A rendering of the forest overlay was then generated from sample camera
12 locations and saved to Adobe Photoshop format for post-production editing.
13 Attachments JWG-7B and JWG-8B are also provided to illustrate the degree of road and
14 turbine pad clearing visible from Bald Mountain and Willard Pond respectively. From
15 these locations visibility of the clearing and grading areas is nearly undetectable and
16 limited to minor alteration of the tree line.

17 **Q. Please address parties' criticisms that no residential properties were**
18 **evaluated during the VIA process.**

19 A. The basis of visual assessments is to evaluate resources of *public* importance and
20 those available to the general public. Typically, these resources are State or Federally
21 owned lands, however, our VIA also included locations of public interest. Although
22 important to private property owners, their land is not accessible to the general public.

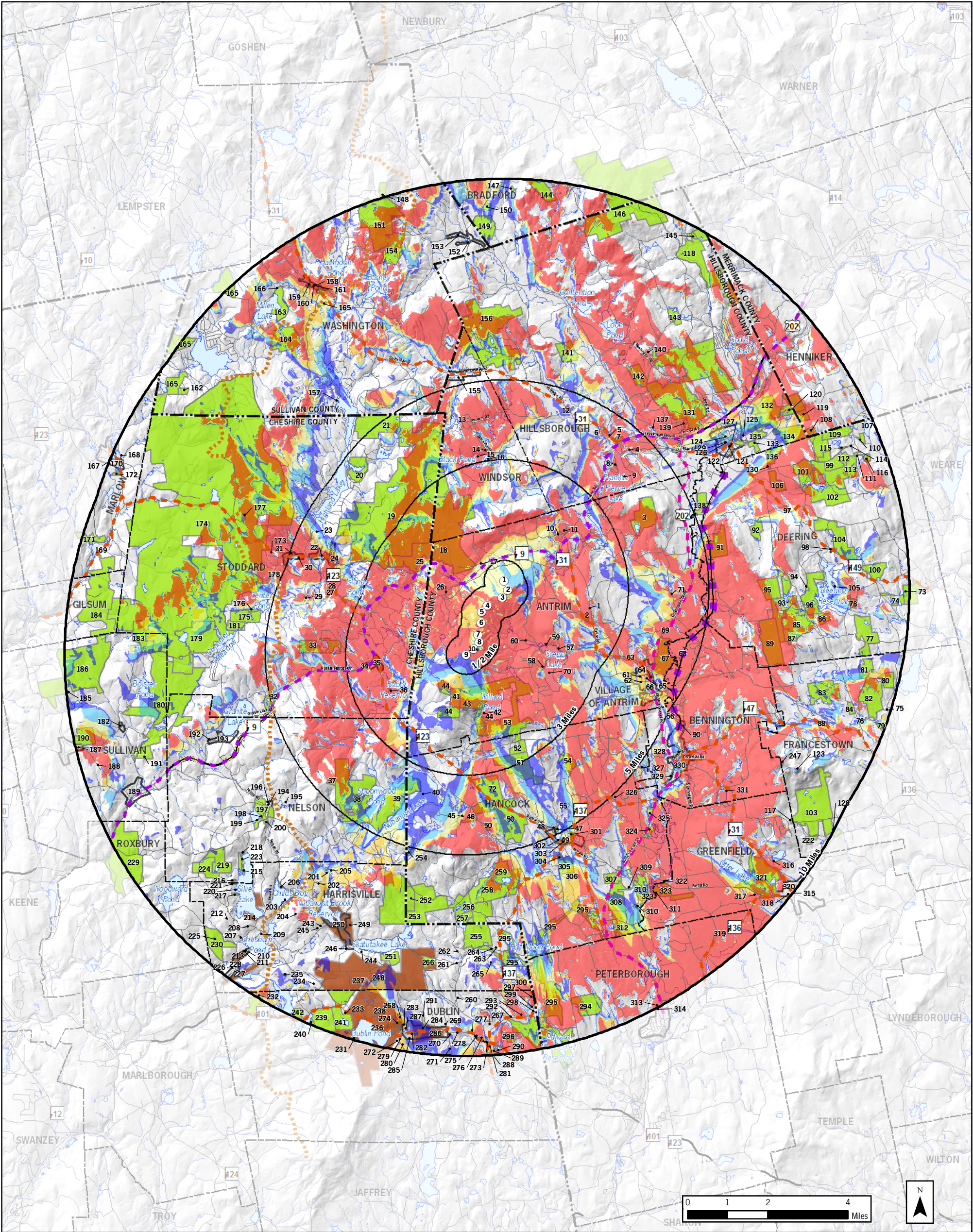
1 There are several reasons why privately held properties (i.e. residential properties) are not
2 analyzed. First, by analyzing one property or a group of privately owned properties it
3 may appear that an emphasis should be placed on one person's property as opposed to
4 another's when there is no reason to do so. Also, analyzing several hundred homes is
5 logistically challenging and unreasonable because permission must be obtained from each
6 landowner to access the property. This would be an enormous burden for an applicant.
7 Lastly, it should be recognized that potential visibility within the study area of any
8 structure/location, whether it is privately or publicly owned, can be readily determined
9 from examining the viewshed maps. Thus, there is no reason to conduct visual
10 simulations from any particular private property.

11 **Q. Please address the concern that trees with no leaves will not provide**
12 **screening of the Project.**

13 A. While to a lesser degree than during leaf-on seasons, a deciduous forest during
14 leaf-off season provides substantial visual screening. This screening is further enhanced
15 by coniferous trees or a coniferous stands that may exist within a predominantly
16 deciduous forest. Regardless of forest composition, the presence of dense forest cover
17 always provides significantly greater visual screening than a bare earth scenario. For
18 example, in Mr. Block's Exhibit RB1, photographs were obtained from 95 Mountain
19 Road and 355 Mountain Road (*See* Attachment JWG-10). In both cases, deciduous trees
20 without leaves fully and/or partially screen the existing turbine(s).

21 **Q. Do you have anything further to add to this testimony?**

22 A. No, not at this time.



Antrim Wind Energy Project

Figure JWG-1 - Topographic Viewshed Map

Turbine locations reflect September 8, 2011 data

- KEY**

 - ③ Proposed Wind Turbine
 - Road Class**
 - Local Road
 - Highway
 - Divided Highway
 - Community Center Area
 - National Register of Historic Places
 - Recreational Area
 - Town Boundary
 - County Boundary
- Hiking Trail
 - Federal Highway
 - State Highway
 - Scenic Highway
 - Rail-Trail

Number of Turbines Visible

1 - 2	7 - 8
3 - 4	9 - 10
5 - 6	

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File Location: B:\2011\11039\Maps\Views\11111\Topographic Viewshed 10 Miles.mxd

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Existing Condition

FIGURE JWG-3A

Photo Simulation
Greenfield State Park
Town of Greenfield





Proposed Condition

FIGURE JWG-3B

Photo Simulation
Greenfield State Park
Town of Greenfield





Existing Condition

FIGURE JWG-4A

Photo Simulation
Powder Mill WMA
Town of Greenfield



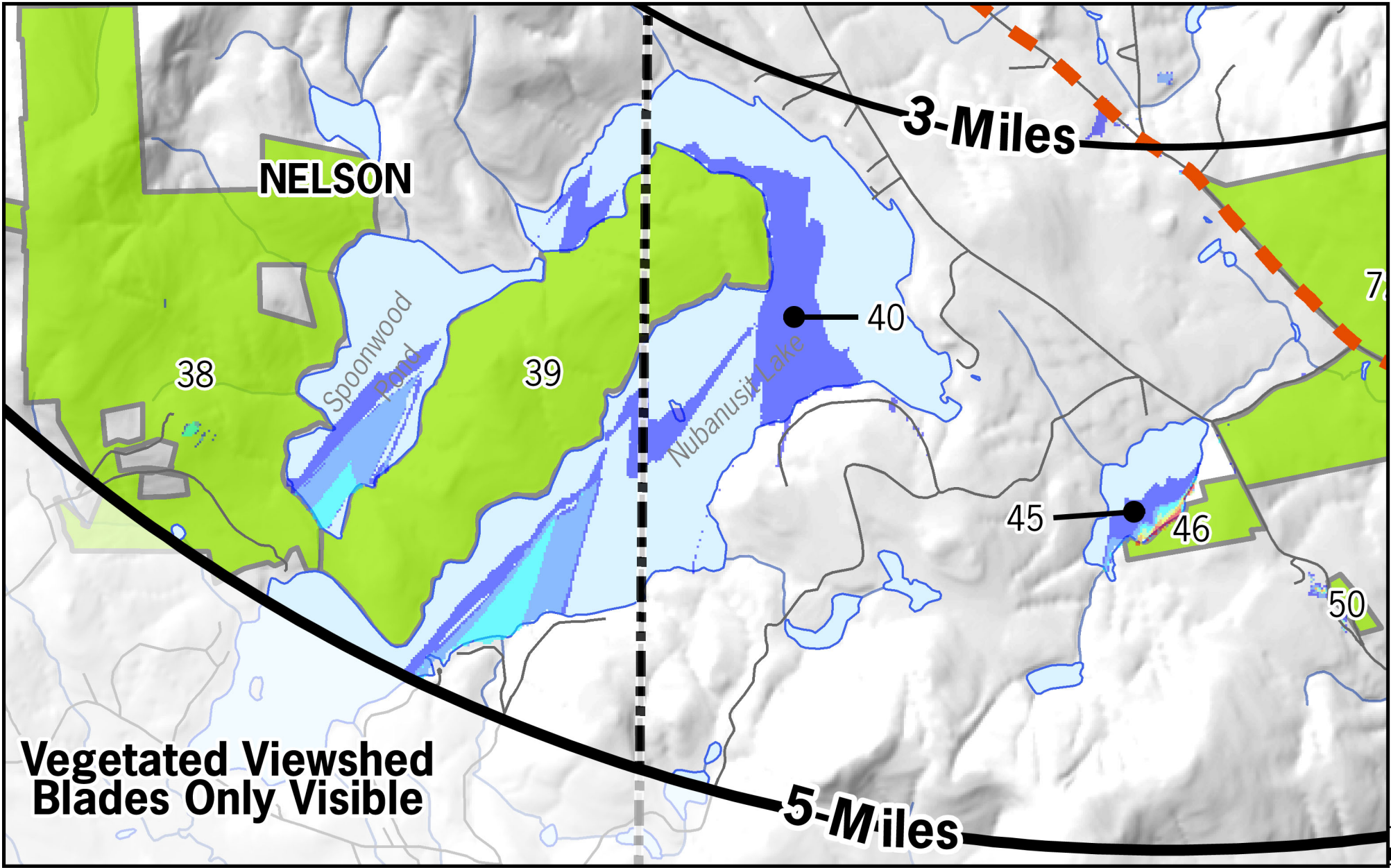
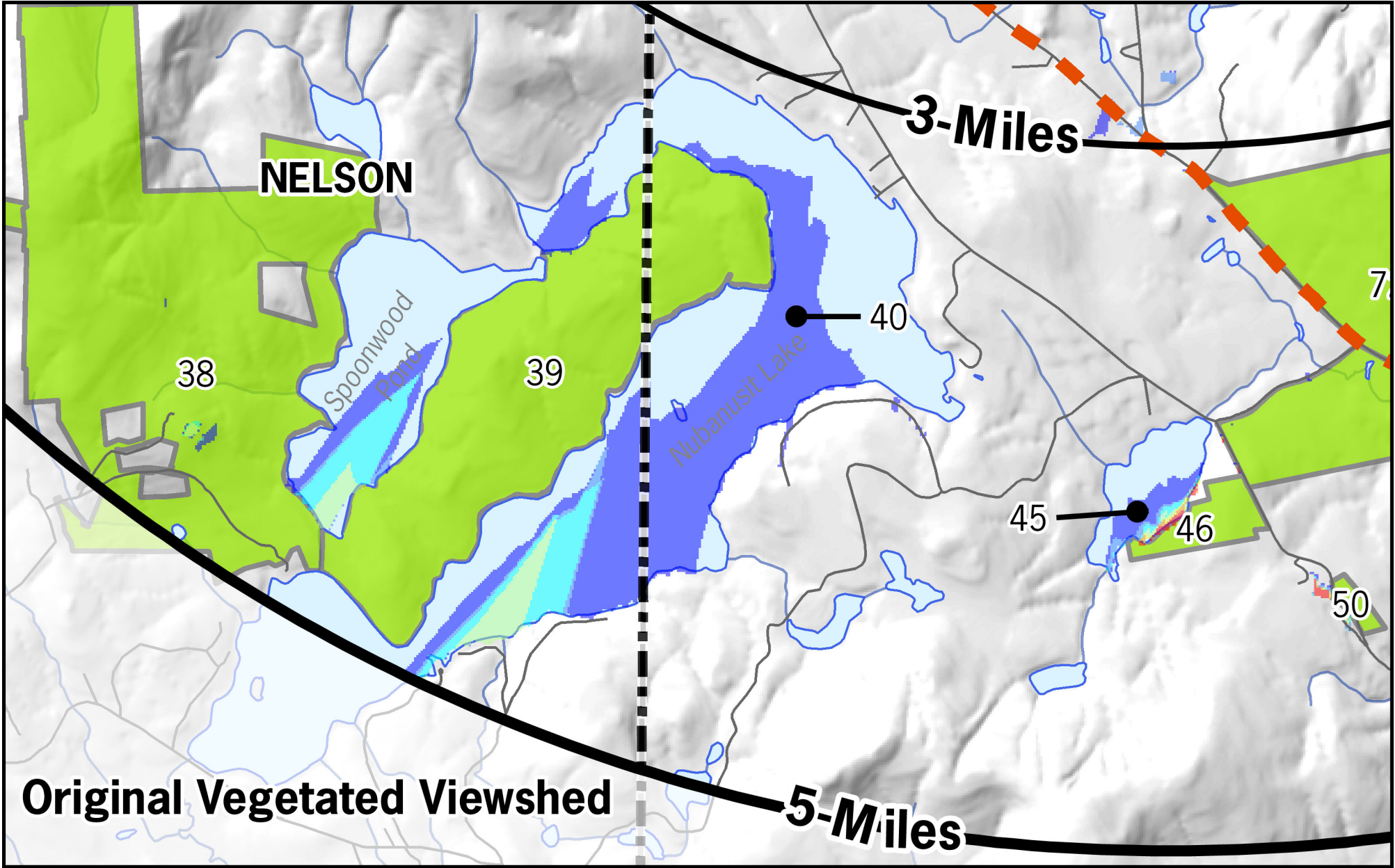


Proposed Condition

FIGURE JWG-4B

Photo Simulation
Powder Mill WMA
Town of Greenfield





Antrim Wind Energy Project

Vegetated Viewshed*

Comparison of Viewsheds

Turbine locations reflect September 8, 2011 data

* Assumes uniform forest height of 40' (12.192 m) in forested areas.

KEY

③ Proposed Wind Turbine

Road Class

- Local Road
- Highway
- Divided Highway
- Federal Highway
- State Highway
- Scenic Highway
- Rail-Trail

- Community Center Area
- Recreational Area
- Town Boundary
- County Boundary

Number of Turbines Visible

1	5
2	6
3	7 or more
4	

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File Location: B:\2011\11039\Maps\Viewsheds\120825\ComparisonOfViewsheds.mxd

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Attachment JWG-5

Figure JWG-5
August 2012



Existing Condition

FIGURE JWG-6A

Photo Simulation
Pitcher Mountain Overlook
Town of Stoddard





Proposed Condition

FIGURE JWG-6B

Photo Simulation
Pitcher Mountain Overlook
Town of Stoddard





Existing Condition

FIGURE JWG-7A



Photo Simulation
VP# 43 - Summit of Bald Mountain
Town of Antrim



Photo Simulations should be viewed in full color and 11"x17" format .

Supplemental Simulations
August 2012



Proposed Condition

FIGURE JWG-7B



Photo Simulation
VP# 43 - Summit of Bald Mountain
Town of Antrim



Existing Condition

FIGURE JWG-8A



Photo Simulation
VP# 44 - dePirrefeu-Willard Pond Wildlife Sanctuary
Town of Antrim



Proposed Condition

FIGURE JWG-8B



Photo Simulation
VP# 44 - dePirrefeu-Willard Pond Wildlife Sanctuary
Town of Antrim



Existing Condition (Photo provided by JVLA)

FIGURE JWG-9A

Photo Simulation
Goodhue Hill
Town of Antrim





Proposed Condition

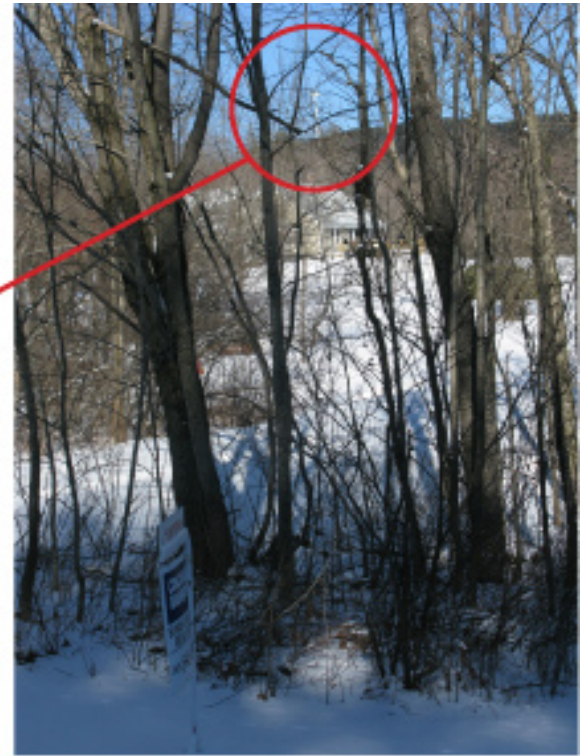
FIGURE JWG-9B



Photo Simulation
Goodhue Hill
Town of Antrim

Blades, nacelle and tower partially screened by deciduous vegetation without leaves.

TURBINE



TURBINE

Blades and nacelle partially screened by deciduous vegetation without leaves.

Tower screened by deciduous vegetation without leaves.

Note:

Both images were provided in Exhibit RB1 (Mr. Richard Block).

FIGURE JWG-10

Screening From Deciduous Trees Without Leaves

Antrim Wind Energy Project

Typical Shadow Pattern for Turbine 2

Figure JWG-11
August 2012

KEY

② Proposed Wind Turbine

Shadow Hours Per Year

- Less than 2
- 2 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- Greater than 40

 Major Road

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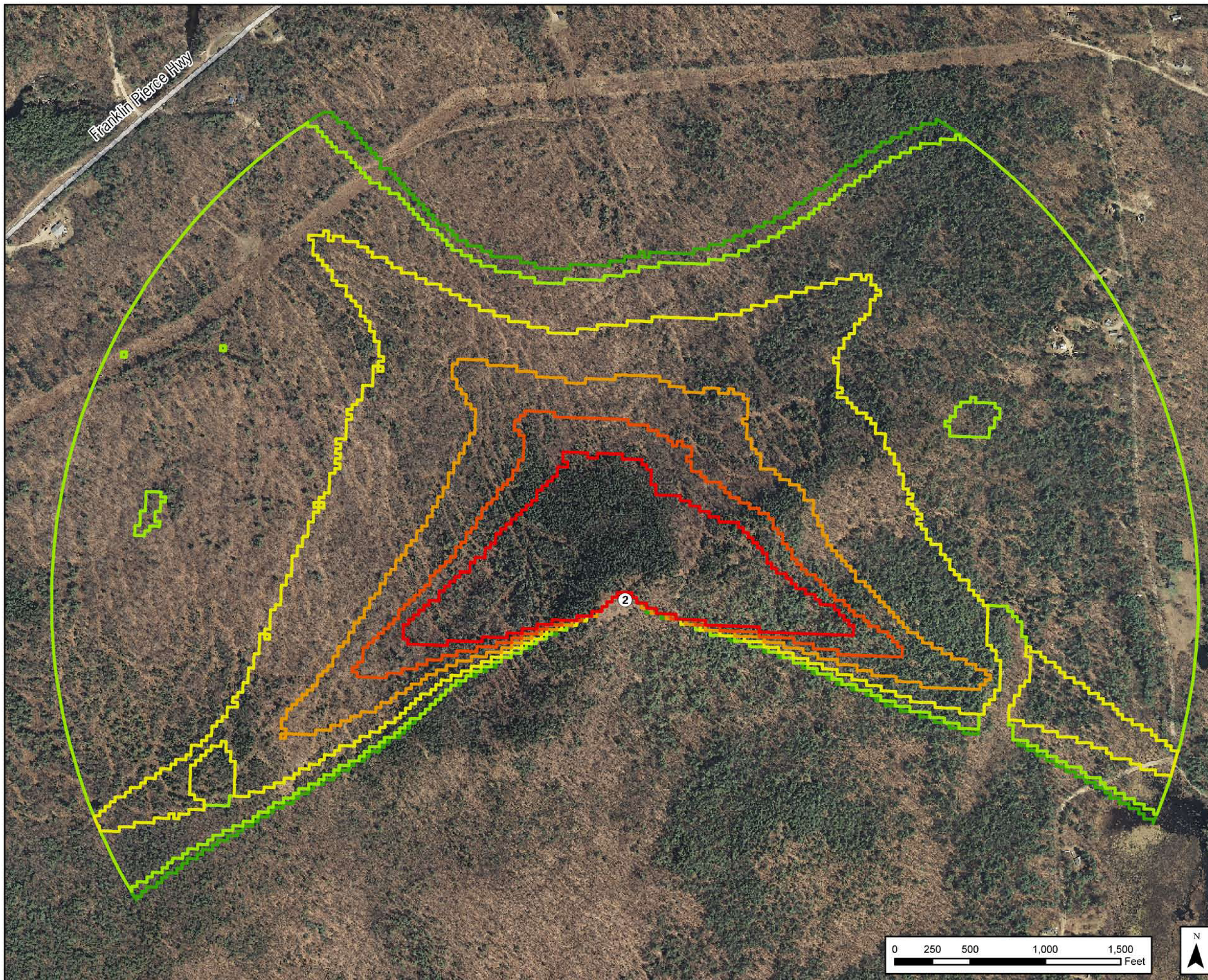
Analysis is based on real scenario within 10x rotor diameter.
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File Location: B:\2011\11039\Maps\ShadowFlicker120827\TypShadowDurationWTG2.mxd

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Antrim Wind Energy Project

Typical Shadow Pattern for Turbine 3

Figure JWG-12
August 2012

KEY

③ Proposed Wind Turbine

Shadow Hours Per Year

- Less than 2
- 2 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- Greater than 40

Major Road

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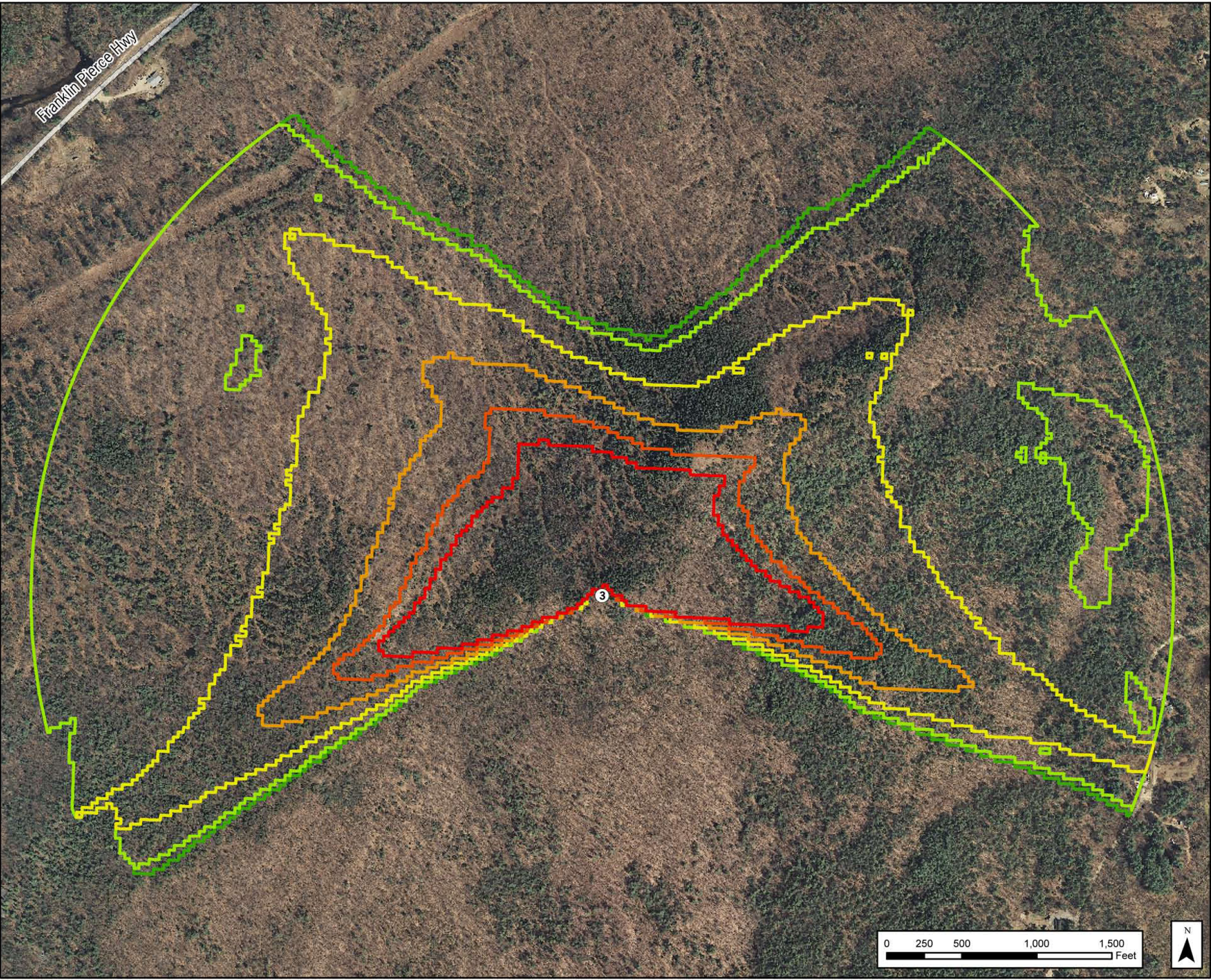
Analysis is based on real scenario within 10x rotor diameter.
This map is computer generated using data acquired by Saratoga Associates from various sources and is intended only for reference, conceptual planning and presentation purposes. This map is not intended for and should not be used to establish boundaries, property lines, location of objects or to provide any other information typically needed for construction or any other purpose when engineered plans or land surveys are required.

File Location: B:\2011\11039\Maps\ShadowFlicker120827\TypShadowDurationWTG3.mxd

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Existing Condition

FIGURE JWG-13A

Photo Simulation

Gregg Trail Overlook

Town of Greenfield



Proposed Condition

FIGURE JWG-13B



Photo Simulation
Gregg Trail Overlook
Town of Greenfield