

**STATE OF NEW HAMPSHIRE
BEFORE THE SITE EVALUATION COMMITTEE**

Docket No. SEC 2015-02

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

**SUPPLEMENTAL PRE-FILED DIRECT TESTIMONY OF
DAVID RAPHAEL
ON BEHALF OF ANTRIM WIND ENERGY, LLC**

1 **I. RESPONSE TO TERRAINK VISUAL ASSESSMENT AND PRE-FILED**

2 **TESTIMONY OF KELLIE CONNELLY**

3 **Q. Have you read the Terraink Visual Impact Assessment and Pre-Filed Testimony**
4 **of Kellie Connelly?**

5 A: Yes, I have.

6 **Q: What is your reaction to the materials submitted by Ms. Connelly and**
7 **Terraink?**

8 A: I have done a comprehensive review of the Terraink VIA, together with all
9 attachments to it and the Pre-Filed Testimony of Ms. Connelly. My overall reaction to the report
10 and testimony is that the methodology is fatally flawed in numerous respects, and this leads to an
11 unambiguously flawed analysis of the six resources where Ms. Connelly has found there to be an
12 unreasonable aesthetic impact. In my opinion, the report is completely unreliable. In my
13 testimony below I will address A) how the Terraink VIA and Ms. Connelly's testimony fail to
14 address necessary SEC criteria; B) the numerous fatal flaws in Terraink's methodology; and C)
15 how those flaws and other problems with Terraink's analysis led to faulty conclusions with
16 respect to the 6 resources identified.

17 **A. SEC Criteria**

18 **Q. With respect to what the Committee must consider in making a finding as to**
19 **whether an energy facility will have unreasonable adverse effects on aesthetics, does Ms.**
20 **Connelly's VIA or Pre-Filed Testimony provide the necessary information to the**
21 **Committee to make that determination?**

22 A: No. Simply because a wind energy facility may have some level of adverse
23 effect on aesthetics does not lead to the conclusion that those effects are **unreasonably adverse**.

1 Nowhere in the Terraink report or Ms. Connelly’s Pre-Filed Testimony does she provide any
2 rational basis for determining how she concludes that adverse effects rise to the level of being
3 “unreasonable.” The SEC rules clearly state what the Committee must consider when making a
4 determination as to whether there will be an unreasonable adverse effect on aesthetics. Terraink
5 and Ms. Connelly have not tied their conclusions to these considerations.

6 In fact, in the areas where the Terraink study does address components that the SEC must
7 consider, they incorrectly apply the SEC rules. Specifically, Terraink:

- 8 • failed to understand “the existing character of the area of potential visual impact” (Site
9 301.14(a)(1)) as a result of the lack of time in the field at both the resources they
10 evaluated and other comparable resources in the viewshed that don't have any visibility;
- 11 • inflated “the significance of affected scenic resources” (Site 301.14(a)(2)) through a
12 poorly designed methodology;
- 13 • misunderstood “the extent, nature and duration of public uses of affected scenic resource”
14 (Site 301.14(a)(3)) by not doing sufficient analysis on site as suggested by BLM
15 methodology and disregarding the basic fact that the amount of use of a resource matters;
- 16 • misrepresented the “scope and scale of the change in the landscape visible from affected
17 scenic resource” (Site 301.14(a)(4)) by relying too heavily on one static photo to analyze
18 the resources;
- 19 • failed to understand “the extent to which the proposed facility would be a dominant and
20 prominent feature within a natural or cultural landscape of high scenic quality” (Site
21 301.14(a)(6)) because she relied on and misused the concept of Contrast, instead of
22 analyzing visual factors that specifically address prominence and dominance; and

1 • dismissed “the effectiveness of the measures proposed by the applicant to avoid,
2 minimize, or mitigate unreasonable adverse effects on aesthetics,” (Site 301.14(a)(7)) due
3 to Ms. Connelly’s lack of understanding and disregard for the value of mitigation, and
4 despite the clear recognition of the value of land conservation as acceptable mitigation
5 for aesthetic impacts.

6 **B. Methodology Flaws:**

7 **Q: Briefly summarize why you think the Terraink VIA methodology is not**
8 **reliable.**

9 A. Terraink has developed a new process for performing Visual Assessments. It is
10 the first time this methodology has been used. Terraink’s methodology is based on BLM
11 methodology; however, Terraink makes significant alterations to many aspects of the BLM
12 methodology without explanation for these alterations. These revisions amount to the creation of
13 a new visual assessment approach that has never been used anywhere else, and that Terraink now
14 asks the SEC to adopt for the first time. Yet, the changes Terraink has made depart dramatically
15 from the BLM methodology and industry standards in several critical respects. In turn, many
16 essential concepts are misused, misapplied or misunderstood, leading to erroneous and unreliable
17 results. This new methodology also fails to provide a consistent, objective, repeatable, and
18 logical approach to assessing visual impacts.

19 There are 7 key areas where the Terraink methodology is flawed and leads to erroneous
20 results:

21 1. Terraink did not perform a thorough and independent “identification of all scenic
22 resources within the area of potential visual impact as required by SEC rules (Site 301.05
23 (b) (5)). Consequently, resources are improperly included in the visual assessment. By

1 skipping this essential first step, Terraink did not gain the detailed knowledge of the
2 region required for a professional, objective visual assessment. Thus all the analysis that
3 follows is compromised.

4 2. Terraink did not spend sufficient time at each resource to correctly evaluate the visual
5 impact and the impact to the typical user. As demonstrated by field notes, Terraink spent
6 minimal time in the Project area and particularly at key resources. Regardless of the time
7 constraint that Terraink may have been under, the failure of the Terraink evaluation team
8 to spend proper time assessing the resources means they lacked the necessary context,
9 and understanding of that context, to do a proper review.

10 3. Panel Raters did not visit the sites they were rating. The BLM methodology states
11 explicitly that site visits are an essential component of visual assessments.¹ Terraink's
12 departure from this core BLM requirement strongly undercuts the accuracy and validity
13 of the rating panel's work.

14 4. Terraink's application of the BLM Scenic Quality chart does not follow BLM protocols
15 and as such, creates skewed, unreliable results. Scenic Quality cannot be captured by
16 static photos. The BLM recommends that "[a]ll participants should have an
17 understanding of the visual resource inventory system and be familiar with the areas to be
18 evaluated. Evaluate each SQRU by observing the area from several important viewpoints.
19 Scores should reflect the evaluator's overall impression of the area." *BLM Manual H-*
20 *8410-1 - Visual Resource Inventory*, pg. 4. Relying solely on a single static photo

¹ *BLM Manual 8431 - Visual Resource Contrast Rating*, pg. 3. "The actual rating should be completed in the field from the KOP(s). It can be done as a team effort or individually, depending on the sensitivity and impacts of the project and the availability of personnel (see Manual Section 8431.12). If done as a team, it is best to do the ratings individually and then compare ratings. A simulation should be available to show scale, relative placement of disturbing features, and other important information necessary to complete an objective rating."

1 overemphasizes the effect the project will have overall on the resource, and creates biased
2 results.

3 5. Terraink's Sensitivity Analysis is not consistent with BLM's methodology. BLM uses
4 sensitivity as a qualitative assessment. Terraink alters the BLM approach by trying to
5 transpose a qualitative analysis to a quantitative approach without providing any well-
6 defined terms or thresholds. This new methodology is poorly designed and produces
7 internally inconsistent, unreliable results. (BLM Form 8400-6 pg. 2)

8 6. Terraink applies Contrast Rating in a manner that is not consistent with BLM
9 methodology and not consistent with a modern approach to wind turbine siting. Wind
10 turbines will always exhibit contrast with their surroundings. BLM recognizes this and
11 has developed guidelines for proper analysis of wind and other renewable energy
12 facilities. Terraink excludes these updated, sensible and appropriate guidelines for
13 understanding visual effect of wind turbines.

14 7. The end product of Terraink's visual investigation is assembled in a table on page 56
15 (table 6) and yet it is not clear how the combination of HIGH, MED, LOW adds up to the
16 purported visual impact presented as the overall conclusion. This is a serious flaw in the
17 analysis and undermines all objectivity and transparency in this never-before-used
18 process.

19 **Q: Please elaborate on each of the points listed above. To start, you state that**
20 **Terraink did not perform a thorough and independent analysis to identify resources of**
21 **scenic significance. Why is this step important and how did it affect their conclusions?**

22 A: A visual assessment must start with a thorough inventory of resources of scenic
23 significance. Failure to perform this essential step has caused the erroneous inclusion of

1 resources in Terraink’s analysis. The lack of rigor in performing a full inventory of the 10-mile
2 study area means that Terraink does not have the necessary familiarity with the region as a whole
3 to understand the use and value of the resources that they evaluated.

4 Specifically, Terraink did not provide any rationale for including the “supplemental
5 sensitive resources” other than stating they were “identified during the SEC site tour” (Terraink
6 VIA, p 32). It is not consistent with professional standards to judge resources as sensitive
7 without performing a full inventory and providing a rationale for their inclusion. Professionals
8 need to conduct their own objective inventory as a basis for identifying sensitive resources.

9 As a consequence of employing this ad hoc approach to resource identification, several
10 resources were improperly included. For example, two of these supplemental resources and the
11 location from which Terraink evaluated one of the previous SEC identified resources are private
12 property, do not have public access and therefore should not be included in the visual assessment,
13 according to Site 102.45: “Scenic resources means resources to which the public has a legal right
14 of access.”

- 15 • White Birch Point is private property and has no public access as evidenced by the
16 trespassing complaint received following the SEC site visit in February, which Ms.
17 Connelly participated in.
- 18 • Liberty Farm Road again takes in views from private residences that should not form a
19 part of a visual analysis under SEC guidelines.
- 20 • The viewpoint for Terraink’s analysis of Black Pond is taken from a private camp uphill
21 from Black Pond. This camp is private property. If Black Pond should be included in a
22 visual assessment then the photo-simulation should have been from a public access point
23 or from the pond itself. I do not believe that Black Pond should be considered a sensitive

1 resource and Terraink provides no objective research or information to demonstrate that it
2 should be included.

3 These three resources should not have been categorized as scenic resources for this review
4 because they do not meet SEC guidelines. Including resources that are not considered sensitive
5 or scenic has biased the results and compromises the conclusions of the visual assessment.

6 **Q: You state that Terraink did not spend sufficient time at each resource to**
7 **correctly evaluate the visual impact and the impact to the typical user. Please describe how**
8 **the lack of sufficient time spent in the region and at scenic resources in the project area led**
9 **to faulty conclusions.**

10 A: First, I appreciate the fact that Terraink was operating under time constraints imposed
11 by this siting process. Nevertheless, Terraink’s failure to spend adequate time at resources –
12 something that certainly could still have occurred notwithstanding those constraints – is a
13 material weakness in their visual assessment.

14 Ms. Connelly made one site visit on Feb 22, 2016, the SEC site tour, and then visited the
15 region again on March 19-20, with EDR staff, but without the other panel raters. Based on Ms.
16 Connelly’s response during the Technical Session and as evidenced in Terraink’s field notes,
17 Terraink spent minimal time at most of the 11 documented locations. Terraink did not hike the
18 entirety of trails at the sensitive resources, did not experience the resources from multiple angles
19 and viewpoints, did not gain an understanding of how the sites are used over multiple seasons
20 and did not experience different weather conditions and user activities. Setting aside the
21 question of seasonality, there is no question that Terraink could have and should have spent
22 sufficient time at the resources to get a better understanding of the resource as a whole and
23 within its full context.

1 By comparison, LandWorks spent many days, spanning 4 seasons, at the critical
2 resources to gain a full and complete understanding of how the resources are used and
3 experienced.

4 Specifically, Terraink’s cursory analysis generated incorrect conclusions at Willard Pond.
5 Willard Pond is a recreational resource and must be understood during seasons of use, which are
6 primarily Spring, Summer and Fall. Trying to imagine how Willard Pond is used by visiting the
7 site in the winter has led Terraink to mistaken assumptions about how users recreate around the
8 pond and what impact turbines will have on a user’s experience. LandWorks experienced the
9 pond in multiple seasons, and observed a range of uses and users from the shore and the pond
10 itself. Based on LandWorks’ considerable time spent experiencing this resource in its entirety
11 and contemplating how a user’s experience will be potentially impacted by the Project, it became
12 evident that from much of the pond a paddler, for example, will be attracted to the beauty of the
13 shore, and their view will be pulled in many different directions with limited or no visibility of
14 the Project at all. In other words, the focus of and basis for the user’s experience will not be
15 determined by having wind turbines in view.

16 Terraink’s limited time on Bald Mountain also creates an incorrect impression of the
17 visual impact of the proposed Project. During the technical session, Ms. Connelly stated her
18 field notes describe the resources that she visited herself. Based on a review of her notes, it
19 appears that the only viewpoint that Ms. Connelly visited on Bald Mountain was the place from
20 which the visual simulation was taken (VP#27) and the other two rating panelists visited none of
21 them. Field notes from EDR, Terraink’s subconsultant, clearly demonstrate that from six
22 additional viewpoints on Bald Mountain (VP 23, 24, 25, 26, 28, 29) there is no visibility of the
23 Project at all. These six additional viewpoints contain several far more prominent scenic views,

1 including the first open views a hiker would encounter (VP 23 & 24) with views towards Willard
2 Pond, the second open viewpoint with Mount Monadnock as the prominent view (VP #25 & 26),
3 the actual summit of Bald Mountain (VP #28) and an open view on a spur trail (VP #29). The
4 lack of time and experience in the broader context of the resource by any Terraink staff or
5 consultants gave Terraink a narrow, incomplete and inaccurate view of Bald Mountain as a
6 resource. This lack of resource familiarity and experience was amplified by the incredibly
7 limited information that was provided to the rating panelists, which I will discuss in greater detail
8 later in my testimony.

9 These two specific examples at Willard Pond and Bald Mountain are good illustrations of
10 Terraink's lack of thorough analysis at all the resources evaluated.

11 A perfunctory analysis of key resources and a cursory examination of the region has lead
12 Terraink to arrive at conclusions that are not backed up by fact or user experience. Terraink did
13 not spend the necessary time to understand the Project in the region and its relationship to the
14 sensitive resources. Nor did this approach provide the opportunity to understand how users
15 would experience and enjoy the resource.

16 **Q: You state that one fatal flaw of Terraink's methodology is that it relies on a**
17 **panel of 3 raters, yet 2 of the raters did not visit the sites at all. Why is on-site analysis so**
18 **important and why is this a fatal flaw?**

19 A: BLM methodology is explicit that rating a site should be done in person.² First-hand
20 experience of a resource is an essential element of gaining a proper understanding of that
21 resource. Before performing a visual assessment, a rater must have an understanding of the
22 region, the landscape context and information about how the resource is used and experienced by

² *BLM Manual 8431 - Visual Resource Contrast Rating*, pg. 3, and *BLM Manual H-8410-1 - Visual Resource Inventory*, pg. 4

1 people. Ms. Connelly herself acknowledged at the technical session that it is important to visit
2 and experience a resource to evaluate it.

3 Terraink raters were not provided with any of this information and, in fact, could not
4 have been informed properly given the lack of adequate time spent at these resources, as just
5 discussed in the previous question. Raters were completely divorced from the site and overall
6 resource and had to rely almost exclusively on speculation to make decisions about Scenic
7 Quality and the Sensitivity of a resource. Conclusions about Contrast for an entire resource were
8 made solely on a single fixed frame, static photo that provides no scale or perspective about the
9 environment in which the view is experienced. This is an egregious departure from BLM
10 methodology and undermines any sort of objectivity that a panel is meant to provide.

11 **Q: How does Terraink depart from proper BLM methodology regarding Scenic**
12 **Quality and what effect does that have on the results of their visual analysis?**

13 A: One of the most significant reasons Terraink’s application of the BLM Scenic Quality
14 chart is unreliable is that it is based purely on a static photo from a single location looking
15 toward the Project site as a means of analyzing effects on the resource as a whole. There is
16 simply no way using a static photo can substitute for employing the standard BLM protocols
17 discussed above.

18 The Scenic Quality rating used by Terraink, which originates directly from the BLM, is
19 the only evidence-based assessment used in the VIA that has been reliably practiced by others in
20 the profession. The BLM scenic quality evaluation is a “measure of the visual appeal of a tract
21 of land” (BLM Manual H-8410-1, pg. 3) and is determined by evaluating seven key factors. The
22 Manual states that each of these factors is ranked “on a comparative basis with similar features
23 within the physiographic province.” (pg. 3) It is also recommended that an interdisciplinary

1 team conduct the evaluations under the most critical conditions (i.e., the highest user period or
2 season of use). Each evaluator should be familiar with the VRM system and have an
3 understanding of the resource to be evaluated. They must also observe the resource from several
4 important vantage points so that the scores reflect an overall impression of the area. (Manual pg.
5 4) Terraink's Scenic Quality evaluation does not follow **ANY** of these standard BLM protocols.
6 The results of the panel ratings are therefore distorted and undermined by imprecise procedures –
7 the result of not employing a specific or established methodology.

8 Below are 3 examples, of many, where use of a static photo as the sole basis for visual
9 assessment leads to an incorrect conclusion:

10 1. The photo Terraink uses for the Bald Mountain Trail viewpoint is not representative of
11 the typical view from this particular location, and should not be used as the sole
12 determining factor in the overall scenic quality of the entire resource. One must scramble
13 down rocks and look to the left in order to get this view. The primary view from this
14 section of the Bald Mountain Trail is looking over Willard Pond toward Goodhue Hill.
15 From this primary view, the Project is not visible. There are also several other attractive
16 viewpoints along the trail that have no visibility of the Project. The reviewers may have
17 concluded, based on the information provided, that all 7 viewpoints on the Bald
18 Mountain Trail had views similar to this one chosen simulation location. In reality, those
19 six other locations have no Project visibility at all and are more accessible and provide
20 different and in some instances, more dramatic views. Had the reviewers conducted their
21 assessment at the site in accordance with the established BLM protocol, they would have
22 readily understood the problem of just using one, non-representative viewpoint. If BLM
23 methodology had been properly followed and critical information about the 6 other more

1 accessible views with no Project visibility had been made available to and considered by
2 the rating panelists, the panel would have generated a lower score that more accurately
3 reflects the potential effect of the Project on this resource.

4 2. The selected photo for Meadow Marsh does not account for the true nature of the viewer
5 surroundings. This is another example of the importance of context, and how failing to
6 adhere to accepted methods leads to erroneous conclusions. Based on the selected
7 viewpoint and visual simulation given to the raters, there is no understanding that this is a
8 short 0.5 mile “trail” that actually follows a maintained road. It is not a “remote” natural
9 resource, which the raters incorrectly assumed based merely on the photo simulation.
10 Had a photo been provided looking in the opposite direction, or if the reviewers had
11 actually experienced the resource, it would have placed this view in its proper context.
12 Gregg Lake Road, power lines, the public beach area and parking lot, and other cultural
13 features are all visible and audible from this resource. If BLM methodology had been
14 properly followed and this critical information had been available to and considered by
15 the rating panelists, the panel would have generated a lower score that more accurately
16 reflects the potential effect of the Project on this resource.

17 3. The viewpoint for Loverens Mill Cedar Swamp is also not representative of the resource
18 and cannot provide for an accurate Scenic Quality rating. This natural area contains a 3-
19 mile trail that travels through mixed forest, follows along the North Branch River, passes
20 over a boardwalk, and leads to the nearly 50 acre boreal, cedar swamp. Its Scenic
21 Quality is far more diverse and appealing than what the photo implies, and the reviewers
22 grossly underscore its value due to the drastic limitations of the single photo simulation.

1 Basing the entire Scenic Quality analysis for a given resource on a single photo is a fatal
2 flaw in the Terraink methodology. It causes Terraink and the rating panel to grossly over-state
3 (and in once case under-state) Scenic Quality.

4 **Q: Please explain how Terraink’s use of Sensitivity Analysis violates BLM**
5 **methodology and why this skews the results of the VIA?**

6 A: There are several methodological flaws in Terraink’s Sensitivity Analysis Approach.
7 Firstly, Terraink is deliberately selective in its use of BLM terms – it misuses some elements of
8 this component of the BLM methodology, excessively weights some elements, and omits other
9 elements entirely. Secondly, Terraink uses “user groups” incorrectly. Thirdly, Terraink misuses
10 “special areas” in their visual assessment. Lastly, Terraink forces Sensitivity into a poorly
11 designed quantitative approach that puts too much weight on user groups. As clearly prescribed
12 by the BLM, Sensitivity Analysis is meant to be a qualitative analysis.³

13 The BLM methodology for determining sensitivity level has been established and tested
14 for over 20 years, including its application on wind power projects. It is defined as “a measure
15 of public concern for scenic quality” and is described in qualitative terms of high, medium, or
16 low. (BLM Manual H-8410-1 pg. 4) BLM has identified 6 factors for understanding sensitivity
17 level, which include: 1) type of users, 2) amount of use, 3) public concern/interest, 4) adjacent
18 land uses, 5) special areas, and 6) other factors. The instructions on BLM form 8400-6 indicate
19 that this is a “judgmental process” that requires a review and opinion of the relationship between
20 factors. There is no systematic, numerical scoring system, but a rating of low, moderate, and
21 high for each factor, and then a judgment must be made as to the overall sensitivity level.

³ “This is a judgmental process which requires a careful analysis of all the above factors. Review the ratings given to each factor and analyze the relationship between factors. A high rating in any one factor does not necessarily mean that the over-all sensitivity level rating should be high.” BLM Form 8400-6 pg. 2.

1 Terraink has invented a table that randomly borrows some of the six terms used by BLM
2 in sensitivity analysis, but Terraink misuses these terms, weights them arbitrarily and does not
3 explain how they fit into a reasonable method for determining sensitivity. Specific examples are
4 provided in the testimony that follows with respect to the approach to user groups (BLM factor
5 #1) and special areas (BLM factor #5).

6 With respect to “user groups”, Terraink’s approach results in serious methodological
7 problems. BLM refers to different user groups in its definition, but does not suggest that
8 different user groups receive a separate numerical weighting. The definition of user groups is to
9 help think about how the resource is used and who experiences it. Perhaps this was Terraink’s
10 attempt to factor in the amount of use each resource gets. However, the only way to do that
11 would be with visitor logs or rigorous controlled surveys. Absent those tools, the best way to get
12 a sense of the number and experience of users at a resource is to spend time observing and
13 experiencing the resource over a number of days, across a few seasons, as LandWorks did.

14 An additional methodological flaw with their use of “user groups” is that Terraink uses
15 two categories that overlap: “recreational users” and “local users.” As Terraink admits,
16 “recreational users” is “a broad category including local residents.” (Terraink VIA, p23). So a
17 recreational user is both a local and a recreational user, but local users are also counted as their
18 own user group. How is a rater meant to disentangle this overlap? In fact, the methodology
19 provides no guidance whatsoever for doing so.

20 The flaws with the user group approach relied on by Terraink are compounded by
21 selecting “commuters” as a viable user group for all of these resources, which is not the case for
22 any of these resources.

1 “Special areas” is another category that Terraink misuses in their assessment. The BLM
2 defines special areas as areas within BLM lands that are “Natural Areas, Wilderness Areas or
3 Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and
4 Areas of Critical Environmental Concern (ACEC).” These special areas have specific
5 management objectives, some of which may require special consideration for the “protection of
6 visual values.” (BLM Manual H-8410 pg. 4) Terraink does not provide a clear distinction for
7 special areas in their approach, i.e. State Park vs. local park, or National Scenic Trail vs. local
8 trail. Special area seems to be referring to every resource that is being assessed, which suggests
9 that they are all elevated in their importance and all require special consideration. While the SEC
10 rules may not employ the commonly used distinction of whether a resource is of local, state or
11 national significance, Site 301.14(a)2 clearly states that the SEC must consider the “significance
12 of the affected scenic resource.” A relatively little used local resource should not rise to the
13 same level of significance as a highly used tourist destination such as the grand views in the
14 White Mountain National Forest from peaks in the Presidential Range. Terraink’s blanket
15 misuse of this component of the BLM methodology results in an overstatement of the
16 significance of all the resources they evaluated.

17 In summary, when one compares Terraink’s use of Sensitivity Analysis to BLM’s clearly
18 prescribed six factors for understanding sensitivity level of a given resource, one finds it
19 seriously lacking - only user groups, adjacent lands, and special areas are factored into their
20 sensitivity level analysis, and these terms are not used in a fashion consistent with BLM
21 methodology. Furthermore, there is nothing in Terraink’s own methodology that would permit a
22 third party to understand how Terraink used these designations, or allow someone to repeat
23 Terraink’s work. Terraink does not account for other critical factors that other agencies such as

1 BLM do, such as amount of use and public concern. Types of users are erroneously divided into
2 3 separate groups that are weighted equally, even though there is clear overlap, and one of those
3 groups is not found at any of the resources. Lastly, BLM uses sensitivity analysis as a qualitative
4 measure to inform subsequent steps in the assessment. It is not meant to be used in a
5 quantifiable manner. Terraink makes a misguided attempt to quantify the process. The result is
6 an inaccurate and unreliable analysis that says little about the sensitivity of the resource.

7 In conclusion, the methodology used by Terraink to determine sensitivity level departs
8 significantly from BLM and is seriously flawed, yielding unreliable conclusions.

9 **Q: How does Terraink’s application of Contrast Rating in their VIA diverge from**
10 **BLM methodology and what impact does that divergence have on their results.**

11 A: The BLM defines its contrast rating system as “...a systematic process used to
12 analyze the potential visual impact of a proposed project and activities... It is not intended to be
13 the only means of resolving these impacts. It should be used as a guide, tempered by common
14 sense, to ensure that every attempt is made to minimize potential visual impacts... This
15 assessment process provides a means for determining visual impacts and for identifying
16 measures to mitigate these impacts.” (BLM Manual 8431 pg. 2) Terraink’s methodology relies
17 on the level of contrast as conclusive with respect to the level of aesthetic impact, which is not
18 the intent of the BLM methodology and, in fact, is directly contrary to the BLM methodology.

19 In Terraink’s assessment, the contrast rating is the final step in the raters’ analysis of the
20 project. The rater first evaluates the existing conditions and the sensitivity, and then draws
21 conclusion about how the project will affect the aesthetics of the region through its visual
22 contrast. This is not how contrast is used by BLM. Using contrast in this manner implies that
23 every wind project will have an unreasonable adverse effect on aesthetics because wind turbines

1 are inherently tall and contrast with the environment. This simplification of the BLM use of
2 contrast rating leads to highly biased results.

3 Wind turbines will always exhibit contrast with their surroundings. BLM recognizes this
4 and has developed guidelines for more accurate analysis of wind turbines' effects on resources.⁴
5 Modern visual assessments of wind projects have employed complementary tools to assess visual
6 impacts in conjunction with the original BLM guidelines. *A Visual Impact Assessment Process*
7 *for Wind Energy Projects* authored by Jean Vissering for the Clean Energy States Alliance, 2011,
8 p. 28 (that was also subject to peer review by LandWorks), states: "The 'contrast' of many
9 development projects can be softened through changes in form, color, or through vegetative
10 screening. These are not options available with most wind projects. Wind turbines inherently
11 result in a high degree of contrast due to their visual characteristics (large scale, white color,
12 moving blades) and required siting locations (rural landscapes, often higher elevations). The
13 degree of contrast may be useful to examine, but only as part of a number of other considerations
14 (described above). The concepts of *degree of prominence* and *dominance* (as used in NHSEC
15 rules Site 301.14(a)(6)) may be more useful, because they examine how a wind project will be
16 seen within its context – not in terms of color, form, or texture, but rather by its overall visibility,
17 its relationship to specific valued landscape features, and the expectation of users."

18 Terraink does not employ "common sense" in its use of contrast. It is not practical to
19 think that the turbines of today can meet the basic philosophy that underlies the BLM contrast
20 rating developed 30 years ago – that the form, line, color, and texture of a turbine(s) can be in
21 harmony with its surroundings. Wind turbines are going to be visible, as they need to be tall

⁴ United States Department of the Interior. 2013. Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands. Bureau of Land Management. Cheyenne, Wyoming. 342 pp, April.

1 enough to capture the wind and must be located where sufficient wind resources are available.
2 Terraink ignores this level of practicality and reality.

3 Assessing the degree of prominence and dominance within the context of the overall
4 view yields more meaningful results when evaluating a wind project. Criteria such as number of
5 turbines, percentage of visibility, proximity, angle of view, visual dominance, and coherence, can
6 help make more comprehensive and meaningful determinations of visual effect. These are the
7 variables that LandWorks employed to properly analyze the visual effect of the project in the
8 region. It is not evident that these considerations are included in the Terraink approach.

9 **Q: The end product of Terraink’s visual investigation is the table on Page 56 of the**
10 **VIA (Table 6). Can you explain why this table is not an acceptable summation or**
11 **conclusion of a proper visual assessment?**

12 A: Terraink assembles all the underlying rating information in this table to draw the
13 ultimate conclusions about resources. Yet, as Ms. Connelly admitted at the technical session,
14 there is no place in the methodology that describes how to take this information, integrate it
15 together, weight it and then render ultimate conclusions about each resource. Simply said, it
16 would be impossible for any third party using this methodology to know how to make those
17 judgments in a consistent, repeatable manner. This is a serious flaw in the analysis and
18 undermines all objectivity and transparency in this never-before-used methodology.

19 An effective visual assessment methodology must follow a logical order of identifying
20 resources, defining their sensitivity, determining the extent and nature of a project’s visibility
21 from the resource, and how that visibility will affect the typical user who visits that resource.

22 In addition to the lack of rigor in attempting to derive quantitative conclusions, there are
23 also contradictions between the results in Table 6 and Terraink’s (extremely limited) discussion

1 of how the Project will impact future use. Table 6 predicts that Black Pond will have a high
2 visual impact, yet in the discussion on page 52, Terraink determines that the “experience of the
3 typical user will not change with the installation of the project from the ROS Developed Natural
4 Class.” This contradiction is not reconciled anywhere in the VIA. It is unclear how the overall
5 visual impact can be so high that the Project is unacceptable, yet the overall user experience will
6 not change. This is indicative of a key fatal flaw of the visual assessment that is prevalent
7 throughout the report.

8 **Q: Towards the end of the report Terraink discusses mitigation options and**
9 **includes potential mitigation options on the rating forms. Is Terraink’s approach to**
10 **mitigation reasonable and is it consistent with current wind siting protocols?**

11 A: No. Based on the report and the rating forms, Terraink has very limited experience
12 with wind project mitigation. The mitigation options offered on the rating form are outdated and
13 in no way consistent with current best practices for wind mitigation. This lack of experience and
14 outdated approach is also not consistent with updated BLM best management practices.

15 Terraink includes a list of 11 mitigation recommendations for each rater to choose from,
16 which are based on the decades old BLM VRM methodology. While some of these are possible
17 options, most are not reasonably applicable or practical for wind turbines. Furthermore, there are
18 many other available mitigation strategies that are specific to wind projects that are not included
19 here. These include best management practices recently developed by the BLM specifically for
20 wind power and renewable energy projects.⁵ Below is a partial list of key mitigation strategies
21 not considered by Terraink, but recommended by the BLM. The Antrim Wind project has
22 already implemented many of these mitigation recommendations as noted in italics:

⁵ United States Department of the Interior. 2013. Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands. Bureau of Land Management. Cheyenne, Wyoming. 342 pp, April.

- 1 • Incorporating stakeholder input during the siting process – *AWE has engaged*
2 *extensively with the public over the past 7 years and AWE has responded to concerns*
3 *raised in the previous SEC docket.*
- 4 • Being sensitive to and responding to topography when siting wind turbines – *The*
5 *AWE project requires limited alteration of existing topography, and is sited on hill*
6 *tops that are broad and more amenable for road and pad development.*
- 7 • Clustering or grouping turbines to break up overly long lines of turbines -- *the*
8 *Antrim project is a single, short string of only nine turbines*
- 9 • Creating visual order and unity among turbine clusters - *the single string of 9 turbines*
10 *is generally uniform and orderly when viewed from most scenic resources*
- 11 • Siting wind turbines to minimize shadow flicker – *Project will adhere to strict SEC*
12 *standards*
- 13 • Using Audio Visual Warning System (AVWS) technology to reduce night sky
14 impacts -- *Project will employ radar activated night lighting to minimize night sky*
15 *impacts.*
- 16 • Creating visual uniformity in shape, color, and size – *All turbines are the same model,*
17 *color and size. #9 is shorter in order to reduce visibility from nearby resources.*
- 18 • Using fewer, larger turbines -- *AWE's 9-turbine project features 28.8 MW of capacity*
19 *vs. the older Lempster project, which features 12 turbines (33% more) and only 24*
20 *MW of capacity (15% less).*
- 21 • Using non-reflective coatings on wind turbines and other facility components –
22 *employed by AWE*
- 23 • Prohibiting commercial messages and symbols on wind turbines – *employed by AWE*

- 1 • Using off-site mitigation – *AWE has committed \$100,000 for off-site mitigation to the*
2 *New England Forestry Foundation for off-site land conservation as well as \$40,000*
3 *to the Town of Antrim for recreational enhancements at Gregg Lake Beach, and*
4 *reached an MOU with the NH Division of Historic Resources for additional off-site*
5 *mitigation*

6 In addition to these considerations, Terraink fails to acknowledge several other key
7 mitigation measures being employed by AWE that are desirable and have been accepted by
8 regulatory authorities in Maine, New Hampshire and Vermont:

- 9 • Extensive on-site land conservation, preserving 100% of the project ridgeline and 908
10 acres in total;
- 11 • limiting cut and fill, clearing and blasting;
- 12 • siting next to an existing transmission facility and major roads and thus requiring no
13 additional transmission line construction and very limited new road construction; and
- 14 • extensive screening of the substation facility and immediate revegetation of the site
15 post construction.

16 Offering the panel raters an inappropriate list of mitigation options that could never be
17 implemented sets up a process that is destined to produce a skewed result. A range of mitigation
18 measures for wind projects have been developed, widely accepted, and recognized as the best
19 approach to address potential impacts and create broad societal benefits. AWE has employed a
20 great number of extensive mitigation methods that are consistent with these approaches.

21 **C. Evaluation of Resources**

1 **Q: In her testimony and VIA, Ms. Connelly concludes that for six sensitive**
2 **resources, the threshold of acceptable visual impact will be exceeded if the Project is**
3 **constructed. Do you agree with this assessment?**

4 A: No, this assessment is not accurate or reliable.

5 **Q: Explain why Terraink’s assessment is not accurate or reliable.**

6 A: As discussed above, Terraink’s visual assessment methodology diverges widely
7 from BLM methodology without any explanation for the departure, and therefore yields incorrect
8 results. I will discuss each of the 6 resources that Ms. Connelly says will experience an
9 unreasonable adverse aesthetic effect and point out how her flawed methodology generates the
10 wrong conclusions with regard to the effects on these resources. Then I will examine each
11 resource using Terraink’s photosimulation from that resource and apply LandWorks’ proper and
12 well-established methodology, which is based on accepted technical standards, and has been
13 used to evaluate numerous other wind projects.

14 Before going through each of the six resources, it is useful to summarize 5 consistent and
15 chronic errors that run through Terraink’s visual assessment.

16 1. Terraink relied too heavily on static photo simulations with limited “fields of view” not
17 reflective of what the eyes actually see and what humans take in visually, and violated
18 BLM guidelines by not examining resources from multiple angles and multiple locations
19 to understand how a user experiences the resource in its entirety.⁶ Worst case, static
20 photo simulations help understand what a project will look like in relation to one fixed
21 vantage point from one location within a resource. But they tell very little about how the

⁶ *BLM Manual 8431 - Visual Resource Contrast Rating*, pg. 3, and *BLM Manual H-8410-1 - Visual Resource Inventory*, pg. 4

1 project will be absorbed by the landscape and experienced by users from the resource as a
2 whole.

3 2. Terraink did not follow the criteria set out in the SEC rules in analyzing resources.

4 **White Birch Point** does not have legal public access and therefore is not considered a
5 scenic resource. And while **Black Pond** does have limited public access, the photo
6 simulation was taken (and hence all analysis was performed) from private property and is
7 therefore not representative of a user's view and what they would actually experience.

8 Removing these 2 resources from Terraink's list significantly reduces the visual effect to
9 the region overall.

10 3. Terraink misrepresents the field of view. As stated, field of view is determined by what a
11 viewer would experience from the resource. It is not determined by the field of view of
12 that the camera captures in the photo-simulation.⁷ Terraink provided the camera field of
13 view as if it were the viewer's field of view. This provides an incorrect impression of the
14 percent of view that the Project will occupy. For instance, at Willard Pond, Terraink says
15 that there is "a visual arc of 21.03 degrees and a field of view of 37.85 degrees."
16 (Terraink VIA, p41). This implies that 55.5% of the field of view is taken up by the
17 project ($21.03/37.85=55.5\%$). But this is not correct seeing as a user experiences 360
18 degree views when on a body of water. Again, Terraink is relying too heavily on a single

⁷ Visual Simulation: A User's Guide for Architects, Engineers, and Planners. Stephen R.J. Sheppard. p. 67. "In any given view, the field-of-view - the amount of a scene that is included in the simulation - is important. In real views, our sight covers almost 180 degrees from side to side, including peripheral vision, but we focus generally on objects within the central 50-degree range. In a simulation, the frame or edge of the picture (usually rectangular) limits the breadth and height of the scene that is shown. Given a particular viewpoint and direction of view, a simulation may show a wider or narrower view than we would see on-site."

Foundations for Visual Project Analysis, Smardon, Palmer, Felleman, p. 41. "The location of our eyes within the skull provides a unique geometrical configuration for the stimulus inputs. Each eye has a field of vision of approximately 166 degrees (head stationary, eye moving). The skull position creates a central area of 124 degrees where the images overlap. This is called the binocular field. It is of particular importance due to the stereo nature of depth perception which occurs in this region. Within the binocular field is a narrow region of highest acuity, the foveal (macular) field...On either side is a monocular field of 42 degrees, containing inputs from only one eye. These are commonly referred to as peripheral vision areas. The total resultant cone of vision is 208 degrees."

1 photo-simulation from each resource rather than analyzing how a viewer experiences the
 2 resource as a whole. This error occurs at each of the resources Terraink evaluated.

3 Correct field of view percentages places the view of the project in its proper perspective
 4 and “presence” in the landscape and reduces the visual impact the Project may have on
 5 the resource.

6 4. Terraink provides incorrect ROS designations for numerous sites. This inflates the visual
 7 impact of Meadow Marsh, Goodhue Hill, Bald Mountain and Willard Pond.

8 5. Terraink relies on an outdated and misconstrued concept of Contrast in order to evaluate
 9 the aesthetic impact of the Project on the selected resources. Current visual assessment
 10 for wind projects uses additional visual factors (as used by LandWorks in their analysis
 11 and listed in resource tables below) to accurately assess how a project will fit in the
 12 context of a selected resource and be experienced by a typical user. These include: 1)

13 Number of Turbines, 2) Percentage of Visibility, 3) Proximity of the Project, 4) Angle of
 14 View, 5) Visual Dominance and 6) Clutter/Coherence.

15 Below is a table that summarizes where these 5 errors appear in Terraink’s visual assessment of
 16 each resource:

Resource	Overreliance on single static photo	Incorrectly including private resources	Improper use of field of view	Incorrect ROS designations	Misapplication of Contrast Rating
<i>White Birch Point</i>	✓	✓	✓		✓
<i>Black Pond</i>	✓	✓	✓		✓
<i>Meadow Marsh</i>	✓		✓	✓	✓
<i>Goodhue Hill</i>	✓		✓	✓	✓
<i>Bald Mountain</i>	✓		✓	✓	✓
<i>Willard Pond</i>	✓		✓	✓	✓

Resource 1: White Birch Point

1 Terraink Errors

- 2 • Not a scenic resource: Private property without public access is not considered a scenic
- 3 resource under the SEC rules. Including this resource inflates the aesthetic impact on this
- 4 portion of the project viewshed. It needs to be removed from the analysis.
- 5 • Improper use of Field of View: Field of view is 360-degrees not 37.68-degrees.
- 6 • Contrast rating misapplied: Terraink’s report fails to use visual factors more relevant to
- 7 wind projects as described above.
- 8 • Sensitivity rating misapplied: Panel raters included Residents, Recreationalists and
- 9 Commuters in their sensitivity analysis. This is private property so there should only be
- 10 residents. Scoring all three categories inflates the sensitivity of the resource.

11 LandWorks Methodology

- 12 • White Birch Point was not considered a scenic resource as it is private property.
- 13 • The table below shows a LOW - MOD score, so even if the property were a scenic
- 14 resource the Project would not have an unreasonable adverse aesthetic effect.

15

	Number of Turbines (#)	Percentage Visibility (%)	Proximity (miles)	Angle of View (% degrees)	Visual Dominance	Clutter/ Coherence	WHITE BIRCH POINT OVERALL VISUAL EFFECT
Ranking	LOW	LOW	MODERATE	MODERATE	HIGH	LOW	LOW-MODERATE
Description	4	5%	2 miles	9%	Project is visible within close proximity and will become a substantial element within some views, but is not the main element within all views given the 360° angle of view, much of which does not include the project.	No overlapping turbines. Evenly spaced. Limited angle of view.	

16

17 Summary

18 Terraink compounded error upon error. They mischaracterized White Birch Point as a scenic

19 resource, and then gave it a HIGH rating by misusing BLM methodology in their application of

1 sensitivity analysis. Even if White Birch Point were an eligible resource, the Project would not
2 have an unreasonable adverse aesthetic effect on the resource and thus the region as a whole.
3 Terraink’s conclusion on this resource is contradictory. Terraink effectively agrees with
4 LandWorks’ assessment saying in the report “the experience of the typical user will not change
5 from the ROS Developed Natural Class.” at White Birch Point. (pg. 43). If the visibility of the
6 Project will not change the experience of the typical user, how could Terraink conclude that the
7 visual impact could be high and the visibility of the Project would have an unreasonable adverse
8 effect on aesthetics?

9 **Resource 2: Black Pond**

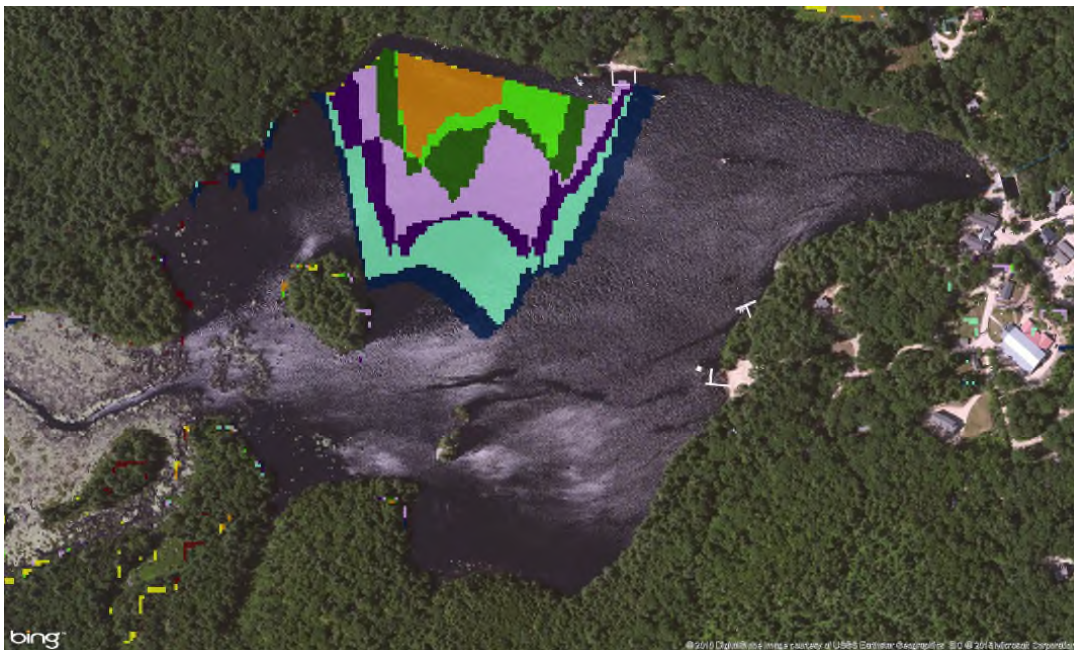
10 Terraink Errors

- 11 • Viewpoint taken from a private property: Terraink’s viewpoint is not indicative of a
12 user’s experience as it is on private property, and the review requires the analysis to be
13 conducted from a location that has public access and is a public resource. The correct
14 location for the viewpoint should have been from the pond or boat launch area. All
15 analysis of this resource is therefore invalid and should be discarded.
- 16 • Overreliance on one photo simulation and lack of understanding of how the Project will
17 be viewed: Terraink claims that the turbines “will distract from the woodland experience,”
18 and will have an “extended viewing time.” (Terraink VIA, p. 52). Setting aside that this
19 refers only to the view from the private property, this is based solely on the visual
20 simulation, which focuses the project in view. There is no understanding of where the
21 turbines are viewed from, and how they are seen in the full context. The private camp
22 facilities are located primarily within a wooded setting and attendees will have very little
23 exposure to the project on a daily basis. From the dock and on the pond, visibility of the

- 1 project diminishes even further as the terrain slopes down from the vantage point, and
2 views are further blocked by the tall evergreen trees on the opposite shore
- 3 • Improper use of Field of View: Field of view is assumed 180-degrees not 38.88-degrees.
 - 4 • Contrast rating misapplied: Terraink's VIA fails to use visual factors more relevant to
5 wind projects.
 - 6 • Sensitivity rating misapplied: Panel raters included Residents, Recreationalists and
7 Commuters in their sensitivity analysis. There are no commuters at this location. Scoring
8 all three categories inflates the sensitivity of the resource.

9 LandWorks Methodology

- 10 • LOW scenic resource designation, only mentioned in one guidebook and no websites,
11 very limited public access.
- 12 • LOW to MODERATE rating across all categories for visual effect.
- 13 • If a vantage point from the water were analyzed, the number of turbines and percent of
14 visibility from the pond is quite low as shown in the graphic representation below:



Aerial view of Black Pond and its area of potential visibility

Results summarized in table below:

	Number of Turbines (#)	Percentage Visibility (%)	Proximity (miles)	Angle of View (% degrees)	Visual Dominance	Clutter/Coherence	BLACK POND OVERALL VISUAL EFFECT
Ranking	LOW	LOW	MODERATE	MODERATE	LOW	LOW	
Description	6	22%	3.2 miles	7%	Size and scale of project is diminished by distance, limited viewing angle, limited turbines visible, and limited area from which to view the project. The scale of the project is further absorbed by views in varying directions and other landscape elements including water, varying topography, vegetation and foreground elements.	Very slight irregular spacing and overlap due to angle, but maintains general unity.	LOW

*Note percent visibility is calculated from the water.

1 Summary

2 Even using a correct viewpoint from the pond, the project does not have an unreasonable adverse
 3 aesthetic effect on this resource. And once again, Terraink implicitly agrees with our findings
 4 that the project will not have an unreasonable effect on aesthetics. Their report says “there is
 5 little evidence to support that Black Pond is a significant public recreation or fishing location.”
 6 (Terraink VIA, pg. 31). Although the SEC rules require consideration of the “The extent, nature,
 7 and duration of public uses” of the resource (Site 301.14(a)(3)), Terraink disregarded this in their
 8 analysis and this fact contributes to their improper rating. If the resource does not receive a lot
 9 of use, and the visual effect of the Project is limited, then the Project will not cause an
 10 unreasonable adverse aesthetic effect on the resource.

11 **Resource 3: Meadow Marsh:**

12 Terraink Errors

- 13 • Overreliance on only one photosimulation and lack of understanding of how the Project
 14 will be viewed. Terraink’s photo simulation captures the Project view but does not take
 15 into account the entire resource: the photo used in the simulation is taken standing on a

1 narrow vehicle bridge – there are no sidewalks, walkways, or designated pathways
2 devoted to pedestrians here. It is not a place that people would typically linger for an
3 extended amount of time to take in the view. It is not the primary direction of view for
4 users walking the trail. There are other more amenable areas of the trail than this,
5 including a designated location within the Marsh from which users can relax and enjoy
6 the view, where a bench is specifically provided for this purpose. The view in the picture
7 below would have been more representative of the key observation point for typical users
8 here, but was not provided. Even at the viewing bench, the Project is largely blocked by
9 existing vegetation and is not a primary focal point in the view.

- 10 • Improper use of Field of View: Field of view is 360-degrees not 37.85-degrees.
- 11 • Incorrect ROS designation: the impression from the photo simulation may be Semi
12 Primitive Mechanized, but if you turn around and take in the whole view and experience
13 from this location, you see clear evidence of human activity and that this is not a
14 primitive location (see photo that follows). It is within a half-mile of (and actually 100
15 yards from) a maintained road that is visible and clearly audible from this location. The
16 boat launch and beach at Gregg Lake are visible and the sights and sounds of motor
17 boating, sailing, swimming and other activities are present. The so-called trail follows an
18 existing, maintained dirt road. Meadow Marsh should be categorized as Semi-
19 Developed-Motorized, just like Black Pond and White Birch Point.
- 20 • Contrast rating misapplied: Terraink’s report fails to use visual factors more relevant to
21 wind projects.

- 1 • Sensitivity rating misapplied: Panel raters included Residents, Recreationalists and
2 Commuters in their sensitivity analysis. No commuters are present here and scoring all
3 three categories inflates the sensitivity of the resource.



Photo looking in opposite direction from the Terraink photo simulation vantage point. As the photo shows, the marsh is accessed by a road, much of which is wooded, and is proximate to a busy recreational area that will not have the Project as a primary focal point.

4 LandWorks Methodology

- 5 • LOW cultural designation as it is a local resource not specifically identified for its scenic
6 quality and is not mentioned in any state or national guidebook or website.

- 7 • LOW-MODERATE overall visual effect.

8 Results summarized in table below:

	Number of Turbines (#)	Percentage Visibility (%)	Proximity (miles)	Angle of View (% degrees)	Visual Dominance	Clutter/ Coherence	MEADOW MARSH OVERALL VISUAL EFFECT
Ranking	LOW	LOW	HIGH	MODERATE	MODERATE	LOW	LOW-MODERATE
Description	3	4%	1.5 mi	7%	Project is visible and will attract attention at this fixed location, however other landscape features like the wetland are the primary focus here. Prominence within the entire resource is also tempered by the fact that the trail follows a maintained road, passes through primarily wooded areas, and users are typically in motion. The primary viewing location, at the bench, has limited views away from the project.	No overlapping turbines. Evenly spaced. Limited angle of view.	

1 Summary

2 Overreliance on photo simulations, expressly counter to BLM methodology, has strongly biased
3 Terraink’s analysis of this resource. Terraink failed to look at the resource in its totality, in its
4 setting, and understand how the resource is used and experienced. The result is an extreme
5 inflation of the visual impact of the Project on the resource. Meadow Marsh trail will not
6 experience a significant change, let alone an unreasonable adverse effect, to a user enjoyment of
7 the resource.

8 **Resource 4: Goodhue Hill**

9 Terraink Errors

- 10 • Overreliance on only one photosimulation and lack of understanding of how the Project
11 will be viewed. A single fixed point fails to capture the character and use of the resource.
12 Terraink’s viewpoint does not take into account that the area is an active logging area,
13 with remnant debris piles, clearing areas and roads that are not particularly scenic or
14 pleasing, the view is now becoming obscured and will be blocked shortly.
- 15 • Improper use of Field of View: Field of view is assumed 180-degrees not 38.39-degrees.

- Incorrect ROS designation: Terraink erroneously classifies this resource as Semi-primitive Nonmotorized, but this is inaccurate given that the trailhead is at the terminus of a maintained road with parking facilities, and human alteration is prevalent throughout given the extensive silviculture occurring here. Goodhue Hill should be categorized as Semi-primitive Natural.
- Contrast rating misapplied: Terraink’s VIA fails to use visual factors more relevant to wind projects.
- Sensitivity rating misapplied: Panel raters included Residents, Recreationalists and Commuters in their sensitivity analysis. Commuters are not present here and scoring all three categories inflates the sensitivity of the resource.

LandWorks Methodology

- LOW scenic quality rating due to character of the resource as a whole
- LOW cultural designation with only one reference in the literature
- MODERATE visual effects across visual assessment spectrum.

Results summarized in table below:

	Number of Turbines (#)	Percentage Visibility (%)	Proximity (miles)	Angle of View (% degrees)	Visual Dominance	Clutter/ Coherence	GOODHUE OVERALL VISUAL EFFECT
Ranking	MODERATE	LOW	MODERATE	MODERATE	HIGH	MODERATE	MODERATE
Description	8	8%	2.0 mi	15%	Project is visible within close proximity and will become a substantial element in some views, but the visual absorption capability of the landscape and alternate views will help deemphasize some of the prominence.	Some irregular spacing and overlap due to proximity, but maintains general unity.	

Summary

Based on several visits to Goodhue Hill, LandWorks found the experience of the resource to be pleasant but not compelling, and noted that until recently (after the Project was proposed in

1 2012) the trail and clearing did not exist and was not even listed in the trail map. The area
2 around this viewpoint is degraded and vegetation is already beginning to obscure the view
3 towards the Project area. There are numerous other resources in the region that provide more
4 engaging and satisfying opportunities to be out in nature, hike and enjoy views.

5 **Resource 5: Bald Mountain**

6 Terraink Errors

- 7 • Viewpoint selected by Terraink is not at all representative of the resource: The viewpoint
8 highlights the Project but misrepresents the experience of a typical user. This is not a
9 view most users will experience. In order for a hiker to get to this viewpoint, the hiker
10 must scramble down off the trail, on to the rocks, and look to the left to see this particular
11 view. Terraink’s single selected viewpoint suggests that this is the primary view a user
12 experiences. But EDR’s field notes paint a very different picture. From six other
13 viewpoints (VP 23, 24, 25, 26, 28 & 29), it is indicated that there is no view of the project
14 at all. These viewpoints include far more prominent viewpoints, including the first open
15 view a hiker would encounter (VP 23 & 24) with views towards Willard Pond, the second
16 open viewpoint with Mount Monadnock as the prominent view (VP #25 & 26), and the
17 actual summit of Bald Mountain (VP #28), which has no views of the project. Even Ms.
18 Connelly’s field notes say “walk off trail – lower to see turbines.” Thus, while the
19 photosimulation picture focuses the project in center view, the primary focal point from
20 this particular location is actually looking away from the project. The table below
21 includes EDR’s field notes from the six other viewpoints at this resource – none of which
22 were provided to the rating panel or included in Terraink’s analysis:

23

Viewpoint #	Comments
23&24	Tamposi Trail, First open view. Toward Lake. View toward project blocked by summit of Bald Mt.
25	Second open view – Bald Mt. Trail. Mt. Monadnock = prominent focal point
26	Direct View at Monadnock
28	Actual Summit – off trail, no view
29	Clear cut at the end of Blue spur trail off Tamposi Trail – open view but not toward project site

- 1 • Improper use of Field of View: Field of view is assumed 180-degrees not 37.83-degrees.
- 2 • Incorrect ROS designation: Terraink erroneously classifies this resource as Semi-
- 3 primitive Non-motorized, but this is inaccurate given that the trailhead is within 0.5 miles
- 4 of a maintained road. Bald Mountain Trail should be categorized as Semi-primitive
- 5 Natural.
- 6 • Contrast rating misapplied: Terraink’s VIA fails to use visual factors more relevant to
- 7 wind projects.
- 8 • Sensitivity rating misapplied: Panel raters included Residents, Recreationalists and
- 9 Commuters in their sensitivity analysis. Commuters are not present here and scoring all
- 10 three categories inflates the sensitivity of the resource.

11 LandWorks Methodology

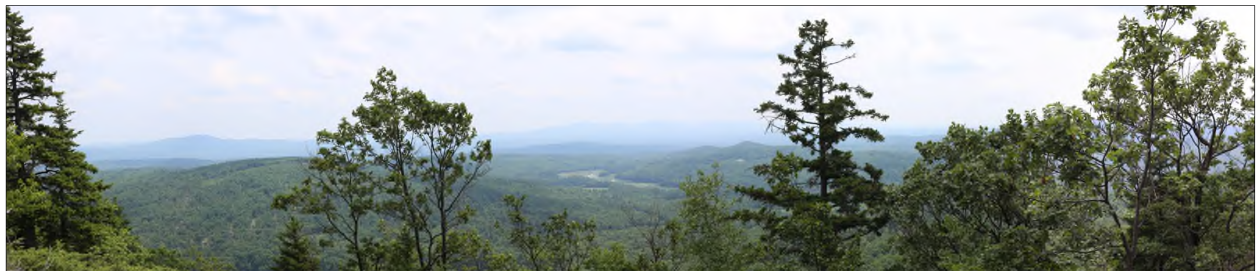
- 12 • MOD cultural designation as it is featured in a number of books and websites
- 13 • Project has a LOW-MOD overall visual effect on the resource. The Project is close to the
- 14 resource and there is some irregular spacing, but users views are drawn away from the
- 15 Project to more interesting landscape elements, and there are several other viewpoints
- 16 available on the trail with no views to the Project. Illustrative photos included below:



The primary panorama view from the easterly overlook on Bald Mountain. To get to the viewpoint that Terraink performs their assessment, from here one must creep down the ledge and look left.



Summit view from the main overlook on Bald Mountain. The Project is not visible.



Another open view along the trail. Human alteration and development is visible in the landscape. The Project is not visible here.

Results summarized in table below:

	Number of Turbines (#)	Percentage Visibility (%)	Proximity (miles)	Angle of View (% degrees)	Visual Dominance	Clutter/Coherence	BALD MOUNTAIN OVERALL VISUAL EFFECT
Ranking	LOW	LOW	HIGH	MODERATE	MODERATE	MODERATE	LOW-MODERATE
Description	6	10%	1.5 mi	9%	Project is visible within close proximity, but views away from the project toward other more prominent landscape elements remain the primary focus of the view.	Some irregular spacing and overlap due to proximity, but maintains general unity.	

1 Summary

2 Terraink did not spend sufficient time at the resource, based their analysis on a single limited
3 viewpoint, and did not consider how the lack of potential visibility of the project would actually
4 affect the user's experience. EDR's field notes provide a more accurate assessment of the
5 visibility of the project from the resource and the typical user's experience of the project from
6 the resource. Terraink's failure to account for the numerous other views that are more accessible
7 than the single chosen view leads to a false conclusion about the resource as a whole. During the
8 several visits LandWorks made to this resource we found that some of the most compelling
9 aspects of the experience were actually within the woodland canopy and along the trail where
10 glacial effects and intriguing geological formations are experienced. The views to the Project are
11 so limited - and not central to the panoramas taken in from the vantage points - that the impact
12 cannot possibly rise to the unreasonable level. The case in point is the more accessible vantage
13 point near to which the Terraink simulations were developed from. This vantage point is a
14 logical terminus for the hike to this portion of the summit. Upon reaching this location there is no
15 direct view of the summits of Willard Mountain and Tuttle Hill to the north - rather the eye is
16 drawn to Willard Pond dramatically situated below and the hills to the east.

17 **Resource 6: Willard Pond**

18 Terraink Errors

- 19 • Fixed, static viewpoint fails to capture how the project is viewed in the broader landscape.
20 It does not capture the full experience of the typical viewer in relation to other aesthetic
21 and environmental influences that a paddler, boater, swimmer or fisherman might
22 experience, like movement, sound, weather, and even smell.

- 1 • The photo simulation focuses the Project in center view, elevating its presence and
2 sensitivity, when in fact the user will be constantly moving and experiencing a variety of
3 viewpoints from a range of locations on the pond, many of which will not have views of
4 the Project.
- 5 • The reliance on one photosimulation overemphasizes the quality and sensitivity of the
6 resource in relation to all other resources available throughout the region, and this fact is
7 not accounted for in the Terraink analysis.
- 8 • Improper use of Field of View: Field of view is 360-degrees not 37.85-degrees.
- 9 • Contrast rating misapplied: Terraink’s VIA fails to use visual factors more relevant to
10 wind projects.
- 11 • Terraink incorrectly categorizes Willard Pond as Semi-primitive Nonmotorized (SPNM)
12 “where locals and recreational users can anticipate that they will be enveloped in a
13 naturalized area without motorized or mechanized uses, with a high probability of
14 observing wildlife without the intensive interruption of other users.” (Terraink VIA, p.
15 40) However, to qualify as SPNM according to ROS guidelines, “Interactions between
16 users is low,” which is not the case as we found visiting the Pond on summer days.
17 “Motorized use is not permitted,” yet electric motors are permitted. There should be a
18 “high probability of experiencing ... self-reliance by applying outdoor skills in an
19 environment that offers challenge and risk,” which Willard Pond does not offer. (Visual
20 Impact Assessment References Reference 1 – ROS) And, it should be at least 0.5 mile
21 from all maintained roads, railroads, or trails with motorized or mechanized use. Willard
22 Pond should have been rated as Semi-developed Natural. This incorrect ROS designation

1 misleads the rating panel, mischaracterizes the value of the resource and invalidates the
 2 conclusions on visual impact.

- 3 • Sensitivity rating misapplied: Panel raters included Residents, Recreationalists and
 4 Commuters in their sensitivity analysis. Scoring all three categories inflates the
 5 sensitivity of the resource, and including “commuters” is not appropriate.

6 LandWorks Methodology

- 7 • MOD cultural designation as it is featured in a number of books and websites but is not
 8 of state or national significance.
- 9 • Project has a MODERATE overall rating when analyzing visibility from the Terraink
 10 viewpoint. The Project is close to the resource and there is some irregular spacing, but
 11 the number of turbines visible is low, as is the angle of view, which lower the overall
 12 visual effect.

13 Results summarized in table below:

	Number of Turbines (#)	Percentage Visibility (%)	Proximity (miles)	Angle of View (% degrees)	Visual Dominance	Clutter/ Coherence	WILLARD POND OVERALL VISUAL EFFECT
Ranking	LOW	HIGH	HIGH	MODERATE	HIGH	MODERATE	MODERATE
Description	5	80%	1.6 mi	7%	Project is visible within close proximity and will become a substantial element within some views, but is not the main element within all views given the 360° angle of view, much of which does not include the project.	Slightly irregular spacing and overlap due to proximity, but maintains general unity.	

14 Summary

15 Limited time spent at the resource and an overreliance on a single, static photo simulation
 16 inflates the quality and sensitivity of the resource. There is no acknowledgement of key factors
 17 that would impact the overall sensitivity rating. Willard Pond is not one of the state’s identified
 18 “remote” fisheries. It is not identified as a scenic resource in any national, state, or local public

1 planning document, or as a distinguished or highly advertised recreational resource, a factor that
2 would, according to BLM, help form the basis for assigning sensitivity level. There is no
3 account for the types of users, the amount of use, and the primary activities occurring here.
4 Without user survey data it is important to spend time experiencing the resource at peak seasons
5 to understand how the resource is used. LandWorks' investigation at the site found that users
6 will not experience an unreasonable adverse effect on aesthetics as they recreate around the pond.
7 This finding is consistent with and supported by other examples in New Hampshire and across
8 New England such as the Lempster Wind project that is located at an almost equal distance to
9 several less developed ponds inside Pillsbury State Park where usage has increased faster than at
10 any other State Park in New Hampshire since the Lempster Wind project was constructed.⁸

11 **Q. Are there other concerns or comments you have with regard to the Terraink**
12 **Visual Impact Assessment report or Ms. Connelly's testimony as they relates to the SEC**
13 **rules?**

14 A. Yes. The analysis in the Terraink VIA and Ms. Connelly's testimony ignore
15 central components of the SEC rules. These include the requirement that a visual assessment
16 directly address "The expectations of the typical user" and "The effect on the future use and
17 enjoyment of the scenic resource" (Site 301.5 (6)(a) and (b)). Terraink did not develop an
18 accurate understanding of the expectations of the typical user at these resources.

19 With regard to the effect on future use and enjoyment of the resources, the Terraink VIA
20 is largely silent on this question and their evaluation lacks substantive analysis backed up by
21 observation, experience or research for any of the resources they selected in this respect. Where
22 Terraink does address the potential impacts of the proposed facility on future use, as in the case

⁸ Gottlob, B. (2013). The Impact of Wind Farms on Tourism in New Hampshire. PolEcon Research. Available online at http://issuu.com/polecon/docs/polecon_wind_farm_tourism_report.

1 of Black Pond and White Birch Point, Terraink notes that the “experience of the typical user will
2 not change with the installation of the Project from the ROS Developed Natural Class.”
3 (Terraink VIA, pg. 43) Given the manner in which Terraink evaluated resources, coupled with
4 the flaws in the methodology, there is no way Ms. Connelly or any of the other rating panel
5 members can accurately understand how individuals use and enjoy these resources and therefore
6 be able to properly assess the effect on their use and enjoyment once the Project is constructed.
7 Terraink and Ms. Connelly’s lack of field work prevented her from actually witnessing users in
8 the context of the resources she was evaluating or developing any sense of regional context that
9 comes from visiting similar resources in the area that will not be affected by the Project, of
10 which she visited none. The SEC rules require that the Committee consider “the existing
11 character of the area of potential visual impact” (emphasis added). This is not possible from
12 Terraink’s report since they did not visit other resources in the area.

13 As evidenced by other wind projects and in contrast to Ms. Connelly’s conclusion, people
14 still visit and enjoy resources, such as those around the proposed Antrim Project, after wind
15 energy projects have been constructed. The crowds still come to Rumney Cliffs and Rattlesnake
16 Mountain in direct view of the Groton Wind project. Use has increased at Pillsbury State Park
17 and May Pond and people still camp and paddle in close proximity and view of the Lempster
18 Wind project there.⁹ LandWorks draws on over 25 years of involvement with wind energy
19 projects, beginning with our involvement in Searsburg, VT, as experts for the Vermont
20 Department of Public Service and extending through the evolution of wind projects throughout
21 New England up to today. We monitored the before and after results of that first grid scale wind
22 energy project in New England. Post construction review found that the project had limited, if

⁹ Gottlob, B. (2013). The Impact of Wind Farms on Tourism in New Hampshire. PolEcon Research. Available online at http://issuu.com/polecon/docs/polecon_wind_farm_tourism_report.

1 any, material effect on the use and enjoyment of the National Forest and adjacent resources. In
2 fact, we found that the project became an attraction in and of itself and is noted as part of the
3 Molly Stark Scenic Byway, which is proximate to the project. We have observed and researched
4 recreational users, in all types of settings and at a range of resources, still swimming, paddling,
5 fishing, hiking, observing wildlife, snowmobiling, skiing, ice fishing, etc. in full view of wind
6 turbines all across New England since that first wind project in Vermont 25 years ago. This long
7 experience, coupled with the extensive time LandWorks spent in the area of the Antrim Project,
8 gives us essential tools to be able to assess how the Antrim Project will affect the future use and
9 enjoyment of the typical user, as required under the SEC rules.

10 The SEC rules also require the Committee to consider the “the extent, nature and duration
11 of public use of affected scenic resources” (Site 301.14 (a)(3)). Neither the Terraink VIA nor the
12 testimony of Ms. Connelly addresses the issue of the “extent, nature and duration of public use.”
13 This is directly contradictory to the SEC rules. Failure to take this requirement into account is a
14 significant flaw in general and in this case even more problematic as it ignores a key SEC
15 requirement and leads in part to Terraink’s faulty conclusions with respect to each resource.

16 **Q. Do you have any response, in particular, to Terraink’s report conclusion on**
17 **Pages 67-68 of the VIA?**

18 A. Yes I do. This conclusion is particularly out of place and contradictory. On the
19 one hand Terraink “acknowledges and agrees with both LandWorks and Jean Vissering’s
20 evaluation that the Antrim site appears to be a ‘good’ location on paper due to the
21 topography, ‘moderate’ visual effects on many of the SEC determined resources, limited views
22 from towns, major roadways, water bodies and wooded lands,” (pg. 68, Terraink VIA). Yet, on
23 the other hand Terraink then, uses an entirely unsubstantiated point that is not discussed

1 anywhere else in the methodology or VIA as a seemingly large part of the basis for
2 determinations of unreasonable adverse effects. Specifically, Terraink concludes by saying that
3 “what cannot be accounted for is the vigor and commitment of the local population’s passion and
4 investment in purchasing, connecting, protecting, and preserving local conservation lands as a
5 means to protect the regional landscape, which goes beyond National and State significance.”
6 Where in her methodology has Ms. Connelly “accounted” for this? Ms. Connelly provides no
7 explanation as to how this undocumented effort to conserve land relates to her methodology for
8 determining “reasonable” or “unreasonable” effects on aesthetics. There is no discussion
9 whatsoever as to how this Project changes or affects the intent or activities of the local
10 population with regard to conservation in general or those lands in particular. This final
11 conclusion is just further evidence of the lack of any clear, cohesive analysis that is rooted in
12 established and defensible methodology and on facts.

13 **Q. Do you have any comments on Ms. Connelly’s statements regarding the**
14 **appropriateness of conservation lands as mitigation?**

15 A: Yes, I strongly disagree with her on this point and her statements are not
16 consistent with widely adopted practices across New England. Contrary to Ms. Connelly’s
17 rejection of the notion that conservation measures are an effective tool for mitigation, there are
18 many examples of conservation set asides for mitigation purposes associated with wind energy
19 projects. In fact the BLM specifically recognizes this, stating, “Offsite mitigation serves as a
20 means to offset a loss of visual landscape integrity. For example, offsite mitigation could
21 include reclaiming unnecessary roads, removing abandoned buildings, reclaiming abandoned
22 mine sites, putting utility lines underground, rehabilitating and revegetating existing erosion or

1 disturbed areas, **or establishing scenic conservation easements.**¹⁰ (emphasis added). Jack
2 Kenworthy’s Supplemental Pre-Filed Testimony also highlights several New Hampshire
3 precedents, as well as the views of leading New Hampshire conservation organizations on this
4 issue that refute Ms. Connelly’s position on this issue.

5 **II. RESPONSE TO PRE-FILED TESTIMONY OF RICHARD BLOCK**

6 **Q: Have you read the prefiled testimony of Richard Block?**

7 A: Yes, I have.

8 **Q: How do you respond to Mr. Block’s accusation that you have ignored**
9 **potential viewing locations and cherry-picked and manipulated data to achieve desired**
10 **results?**

11 A: LandWorks did not ignore any potential scenic resources as defined by Site
12 101.24 “‘Scenic resources’ means resources to which the public has a legal right of access.”
13 LandWorks started with a list of 290 resources within the 10-mile study zone. Resources were
14 removed from this list if it was determined they had no Project visibility. The process for
15 determining visibility is industry standard, time tested and robust, as discussed later. The
16 resources that have potential visibility are then analyzed on Cultural Designation and Scenic
17 Quality. A resource can have a moderate Cultural Designation or a moderate Scenic Quality and
18 still be considered sensitive. This process is described very precisely in LandWorks’ VA. There
19 is no opportunity to manipulate the data.

20 **Q. Do you agree with Mr. Block’s assertion that the methodologies LandWorks**
21 **used are intended for use primarily west of the Mississippi?**

¹⁰http://www.blm.gov/style/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION/_energy/renewable_references.Par.1568.File.dat/RenewableEnergyVisualImpacts_BMPs.pdf

1 A: No. Although the majority of BLM and USFS managed lands are located west of
2 the Mississippi, the visual analysis tools and processes associated with the *Visual Resource*
3 *Management* and the *Scenery Management System* are applicable to all types of landscapes with
4 scenic quality (i.e. not just landscapes of national significance). All of these methodologies have
5 served, and continue to serve, as established reference points for many professional visual
6 assessments.

7 **Q: Please respond to Mr. Block’s claim that the viewshed mapping is inaccurate**
8 **and distorts data in the assessment.**

9 A: Viewshed mapping conducted by LandWorks meets industry standards and is a
10 customary tool used in all visual assessments. As stated in the LandWorks VA, viewshed
11 analyses are used mainly as a point of departure for identifying scenic resources with potential
12 visibility and cannot be relied upon to represent what will actually be seen on the ground from a
13 specific location. Additional visual studies (e.g. visual simulations, line-of-sight sections, 3D
14 modeling, field analysis) are conducted to understand the details and context of a view from a
15 specific location. To that end, the visibility, or lack thereof, of every scenic resource identified
16 was verified in the field and through 3D modeling.

17 Exhibit RB-3 was prepared by Mr. Block to demonstrate examples of views of the
18 Project site that apparently have been indicated as not having Project views based on the
19 LandWorks viewshed mapping. These locations are from private properties or areas that do not
20 represent scenic resources and are therefore not relevant to the analysis. Furthermore, the photo
21 presented by Mr. Block for Loverens Mill Cedar Swamp depicts the view from the road, which is
22 not representative of visibility from within the scenic resource itself. The overall visibility of

1 Loverens Mill Cedar Swamp was verified through 3D modeling and field analysis, which
2 entailed hiking all the trails within the resource.

3 **Q: Mr. Block states that the thresholds used in the LandWorks’ visual**
4 **assessment were developed so that a “high” rating could never be achieved, specifically**
5 **thresholds for number of turbines visible, is this accurate.**

6 A: No. The methodologies and thresholds were previously developed and applied by
7 LandWorks and other visual experts in other visual analyses. As stated in the LandWorks visual
8 assessment, the methodology for determining rating thresholds for number of turbines visible is
9 an approach created by Dr. James Palmer, a well-known and widely published Visual Quality
10 Expert, and has been used and accepted in wind applications in Maine. Compared to many wind
11 projects in the northeast, Antrim is quite small. LandWorks Exhibit 20 “Turbine Size in the 20th
12 Century,” including in the VA, lists the number of turbines installed for a range of projects in
13 the northeast. Antrim is the smallest of them all with nine turbines, while Bingham Wind
14 included 62 turbines. It is also critical to note that this is only one of six criteria used to assess
15 visual effect in the LandWorks VA. It is certainly possible using our methodology that a project
16 could receive a low or moderate rating under this one criteria and still result in a moderate-high
17 or high overall visual effect rating, but it happens to not be the case for this project.

18 **Q. Mr. Block also claims that because no resources were selected in close**
19 **proximity to the proposed Project site, most of the resources on the list receive a “Low”**
20 **rating. Is this an accurate statement?**

21 A: No. LandWorks does not arbitrarily or subjectively select scenic resources to
22 analyze. Scenic resources with visibility and that are found to have high sensitivity through an
23 objective process are analyzed.

1 **Q: Mr. Block criticizes the LandWorks analysis, asserting that the viewshed**
2 **mapping was based on the hub and not the tip of the blade – is this accurate?**

3 A: No. LandWorks produced viewshed maps that account for potential visibility of
4 both hub height and turbine tip height and that information is included in the VA and available
5 for review and comparison. In terms of overall project visibility, only an additional 2.6 square
6 miles or 0.7% of the 10-mile study area has additional visibility of the turbine tips, as noted in
7 our report (footnote p. 2). This additional visibility is primarily found at the edges of areas that
8 already have visibility of the hubs. There are no new resources that would have been analyzed if
9 the viewshed from the tip was used.

10 **Q: Do you agree with Mr. Block’s assertion that the LandWorks**
11 **photosimulations are not consistent with the requirements in the SEC rules?**

12 A: No, I do not agree. In my professional opinion these photosimulations meet SEC
13 criteria and do an excellent job of portraying the Project for the layperson and the professional.

14 **Q: Mr. Block criticizes LandWorks use of color and contrast for the Bald**
15 **Mountain simulation, which he states results in an outcome “where the turbines on the left**
16 **side of the photo which would be located on the nearer ridge actually appear as if they are**
17 **farther away and on the more distant ridge.” Please comment on Mr. Block’s assertion.**

18 A: The turbines in the Bald Mountain simulation are represented in an accurate
19 fashion. While the more distant turbines could have been made to appear hazier, this would serve
20 to blend them into the background sky more. LandWorks’ approach to visual simulations is to
21 fall on the side of a higher contrast representation of turbines given the photo that we are
22 working with. In no way does the simulation make the nearer turbines appear that they are on a
23 more distant ridge, as their larger scale is clearly evident.

1 **Q: Mr. Block claims that the LandWorks simulations use an excessive amount**
2 **of aerial perspective qualities that were deceptively applied i.e. “haze or fog effect.” Is this**
3 **an accurate statement?**

4 A: No. LandWorks does not add any haze or fog to the photographs under any
5 circumstances. The photographs represent the atmospheric conditions that existed on the day the
6 photograph was taken. If anything, we represent the proposed Project with more contrast and
7 clarity than would be the case due to any atmospheric haze that might be present in the
8 simulation photographs. For example, see Exhibit 11, where the turbines appear whiter than any
9 portions of the clouds above, and the shadow from proposed clearing is depicted much darker
10 than adjacent shadows. The intent is to depict the worst-case scenario, while remaining as
11 consistent as possible with the reality based on the weather and lighting conditions present in the
12 photograph.

13 **Q: Please comment on Mr. Block’s statement that the color coding used on**
14 **LandWorks’ viewshed maps is illogical.**

15 A: The selection of colors was chosen so that there was a clear distinction between
16 the different number of turbines visible. There is no industry standard on how these colors should
17 be coded in viewshed mapping.

18 **III. RESPONSE TO PRE-FILED TESTIMONY OF LORANNE BLOCK**

19 **Q: Have you read the prefiled testimony of Lorraine Block?**

20 A: Yes, I have.

21 **Q: Please respond to Mrs. Block’s comment that the project “is simply grossly**
22 **out of scale and just totally inappropriate for the region. Tuttle Hill is a central focus hill**
23 **that can be seen from all corners of our community...”**

1 A: LandWorks addresses the issues of scale and visual dominance in a number of
2 locations throughout our VA. Overall Project visibility is addressed in our report, which
3 objectively refutes her claim that “Tuttle Hill is a central focus hill that can be seen from all
4 corners of our community”:

- 5 • When compared to other built projects in New Hampshire, the percentage of overall
6 visibility from the blade tip for the Antrim Project (3.2%) is less than the Groton wind
7 project (4%) even with a taller overall height (399 ft. Groton vs. 489 ft. Antrim).
- 8 • Primary project visibility is limited to several local ponds and lakes and a few local and
9 regional summits. These views are predominantly in the middle- to background distance
10 zones, further reducing their visual effect.
- 11 • Of the 55 public lakes and ponds identified within the 10-mile study area (there are
12 several more without delineated access areas), only 7 have potential visibility of the
13 project, and only 1 is considered sensitive.
- 14 • Traveling on almost all of the local and adjacent roads provides little if any Project
15 visibility given the local terrain and the nature of the wooded landscape, with many areas
16 of mature evergreen and deciduous forests. The state scenic byway that runs through this
17 region will have no visibility of the Project.
- 18 • The Project will not be visible at all from the Town Center in Antrim.
- 19 • The project ridges are surrounded in most every direction by mountains and hills (i.e.
20 Bald Mountain, Goodhue Hill, Meetinghouse Hill, Windsor Mountain, Round Mountain,
21 Morrison Hill and Fletcher Hill), which block or greatly reduce local visibility. The
22 similarity and limited visibility of these ridges indicates their low prominence in the
23 region. Even when viewing from high points such as Pitcher Mountain, the project ridges

1 are difficult to discern from the profusion of similar shaped hills and ridges at similar
2 altitudes. (LandWorks VA Section 5 B.1 on p. 92)

3 The 9-turbine Project proposed in AWE’s Application represents a significant reduction
4 in scale from the prior project proposed to the SEC in 2012. The scale of this Project in the
5 landscape must be evaluated under the newly developed SEC rules, which LandWorks has done
6 in both a regional and local/proximate context. This analysis is more fully discussed in my
7 original Pre-Filed Testimony on pages 11-15. As a result of our analysis we have concluded that
8 the nature and experience of the landscape in the Project area, with its hilly landscape, winding
9 roads, and extensive vegetation will result in a Project that will not seem too “present” – it will
10 not substantively alter the visual qualities and character of that landscape and thus will not be out
11 of scale.

12 **Q: Please respond to Mrs. Block’s comment that regarding the change in**
13 **elevation of Tuttle Hill as compared to the height of the turbines, where she states “Using**
14 **the rise of 610 to 680 feet and a turbine height of 489 feet, one can see that the turbines are**
15 **72% to 80.2% as high as Tuttle Hill.”**

16 A. In terms of comparing rise of elevation to rise in turbine height, it is inappropriate
17 and misleading to compare the height of the turbines to the change in elevation of the landform,
18 since this is not what the viewer actually experiences. It is the relative or perceived scale that
19 more accurately depicts what one actually sees in the three-dimensional landscape.¹¹
20 LandWorks addressed this in Exhibit 21 of the VA. This exhibit provides proportional
21 measurements of the perceived heights of proposed turbines in relation to the existing landforms
22 for two sensitive resources associated with the Antrim Wind project (Willard Pond and Gregg

¹¹ Smardon, Richard C., James F. Palmer, and John P. Felleman. *Foundations for Visual Project Analysis*. New York: Wiley, 1986. Print.

1 Lake). The same analysis is then provided for two sensitive resources associated with the
2 permitted and constructed Lempster Wind project (both undeveloped ponds inside Pillsbury
3 State Park), and the ratios are compared. The results clearly indicate that the visual ratio (e.g.
4 what users will actually experience) is nearly identical to that of the Lempster wind project.
5 There is empirical evidence that wind farms with very similar relative scale attributes, when
6 viewed from sensitive resources such as the undeveloped ponds in Pillsbury State Park, do not
7 disrupt the user experience. See the discussion in the LandWorks VA concerning comments of
8 users at Pillsbury State Park. The comparison that LandWorks performed in Exhibit 21 of the
9 VA strongly suggests that the experience of the Antrim Wind Project will be very similar.

10 In addition to the Lempster Wind example, Mrs. Block's analysis leads to conclusions
11 that are inconsistent with the reality of other wind projects in New England with taller turbines
12 on lower landforms. These projects were permitted after it was determined that they would not
13 lead to unreasonably adverse effects on aesthetics with due consideration given to a range of
14 factors. For example the Hancock Wind farm in Maine is currently under construction. It
15 features turbines that are 574' tall (86 feet taller than the tallest proposed turbines in Antrim) on
16 landforms that are between just 77 feet to 257 feet above mean sea level (ASML) (turbine
17 elevations start between 330 feet and 510 feet AMSL and the surface of Spectacle Pond is at 253
18 feet). The height of these turbines is between 223% and 745% of the elevation rise in the
19 landscape yet the aesthetics experts and regulators in Maine found there would be no
20 unreasonable adverse effects to aesthetics. A mathematical relationship such as what Mrs. Block
21 suggests clearly cannot be relied upon to determine the reasonableness of aesthetic effects.

22 As a further illustration of the improper application of scale by Mrs. Block, if her
23 representation of the scale relationship was a valid metric in determining visual effect, the logical

1 conclusion would be that no wind turbine could ever be sited on flat ground or gently rolling
2 hills. Since we know that this is not the case, her underlying assessment must also be found
3 invalid.

4 **IV. RESPONSE TO PRE-FILED TESTIMONY OF MICHAEL BUSCHER**

5 **Q: Have you read the prefiled testimony of Michael Buscher and reviewed the**
6 **exhibits prepared by T.J. Boyle on behalf of New Hampshire Audubon?**

7 A: Yes, I have.

8 **Q: Do you have any comments regarding the animated simulation and**
9 **testimony provided by T.J. Boyle for the Audubon Society?**

10 A: The video animations prepared by T.J. Boyle and associates do not represent the
11 most state of the art application of animation technology, and these animations present a
12 distorted and almost surreal version of reality. The use of still frame photographs instead of
13 video footage results in a highly unnatural viewer experience where the only movement that is
14 perceived in the animations is that of the turbines. Despite the appearance of small waves on the
15 surface waters, these waves are completely static and unusual. The movement of the turbines,
16 therefore, attracts more attention than it would otherwise. The technology to combine animations
17 with video footage (with sound as well) is available and should be used in order to present a
18 more realistic and undistorted simulation of proposed Project components in their setting¹². In
19 fact, T.J. Boyle appears to have such capability, as video animations that utilize video footage
20 with sound are available for viewing on their company website.¹³

¹² On page 129 of the BLM Guide “Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities” they discuss the value of animations for their ability to represent a “dynamic” viewing experience that captures the changing visual conditions of the setting. This includes activity, motion, changes in position, changing lighting conditions, moving clouds, sounds, etc. that a viewer would typically experience.

¹³ <http://www.tjboyle.com/gallery/boem-nc/>

1 **Q. Given your analysis, what is your overall conclusion with regard to this**
2 **animation?**

3 **A** I do not think it is a reliable tool with which to assess the visual effect of the
4 Project from Willard Pond or Gregg Lake, and I don't believe that the SEC should rely on this
5 exhibit in their review of this Project. This still-photo based animation unduly elevates the
6 presence and alleged effect of the turbines and excludes all of the other elements routinely found
7 in a dynamic outdoor environment.

8 **Q: Are there any other areas that you would like to address in your testimony that**
9 **are not related to the rebuttal of Mr. & Mrs. Block, Michael Buscher or Terraink?**

10 A: Yes. There are two updates I would like to address: (1) the recent changes made by
11 AWE to the civil design plans in response to comments by NH Dept. of Environmental Services;
12 and (2) the addition of a small additional radar tower to accommodate the ADLS system.

13 **Q: Have you evaluated the civil design changes that AWE made in response to the**
14 **DES comments and do they alter any of the conclusions of your Assessment?**

15 A: Yes, I have evaluated the revised clearing limits and civil design plans that AWE has
16 provided me, and they do not alter any of the conclusions in the LandWorks VA or my testimony.
17 The changes to the civil design plans result in a slight increase in clearing (2.3 acres) for
18 construction and an increase in the post restoration footprint of the project of 0.15 acres).
19 Neither of these changes creates any new significant visual impacts or alters our conclusions in
20 any way.

21 **Q. And have you evaluated the aesthetic effects of the additional radar tower and**
22 **does this element alter your assessment or conclusions in any way?**

1 A: Yes, I have evaluated the additional small radar tower and no it does not alter my
2 assessment or conclusions with respect to the visual assessment. AWE has informed me that this
3 second radar is necessary in order to meet the requirements of the FAA with respect to the
4 utilization of the ADLS at this site, thus it is necessary in order to maintain air traffic safety
5 while implementing a significant aesthetic mitigation measure. The tower itself is a narrow
6 (approx. 18-24") monopole steel tower with a small radar (approximately 2.5' in overall height
7 with a 50" horizontal radar antenna). The tower will be installed inside the existing footprint of
8 the Project facilities approximately 190 feet from turbine #9. The introduction of this new visual
9 element is very minor, will not be visible at all from Willard Pond, the most sensitive resource in
10 the study area, and is necessary to assure aviation safety while bringing a significant mitigation
11 measure to the Project.

12 **Q: What are your final conclusions after having read the Terraink VIA, and the**
13 **testimonies of Ms. Connelly, Mr. and Mrs. Block and Mr. Buscher?**

14 A: After the exhaustive analysis that LandWorks performed in support of our initial
15 assessment and now the review of the testimony and analysis submitted by others in this Docket,
16 our conclusions are only reinforced. Applying the comprehensive and tested LandWorks
17 methodology, and evaluating the Antrim Wind Project through the lens of the New Hampshire
18 SEC criteria, LandWorks found that this Project, as proposed, has extremely limited visibility
19 (2.5%) within the 10 mile viewshed, that there are very few significant scenic resources within
20 the viewshed that have visibility of the Project, that the level of significance of those resources is
21 not high in the overall context of scenic resources throughout New Hampshire, that the level of
22 use at each of the scenic resources that have visibility is relatively low, that the Project has
23 provided for extensive and appropriate mitigation measures, does not violate any community

1 standards with regard to aesthetics in Antrim or surrounding communities, and will not be
2 shocking or offensive to the average person or typical user because the views of the project will
3 not prevent that typical user from the use and enjoyment of the resources that we have identified
4 as being sensitive. Thus it will not result in an unreasonable or unacceptable visual effect to the
5 aesthetics and visual character of scenic resources in the Project area or the region as a whole.

6 **Q. Does that conclude your testimony?**

7 A. Yes it does.