Joint Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., Vermont Electric Power Company, Inc., and Vermont Transco LLC, for a Certificate of Public Good, pursuant to 30 V.S.A. Section 248, for authority to construct up to a 63 MW wind electric generation facility and associated facilities on Lowell Mountain in Lowell, Vermont, and the installation or upgrade of approximately 16.9 miles of transmission line and associated substations in Lowell, Westfield and Jay, Vermont.	)	Docket No. 7628

PROPOSED FINDINGS AND BRIEF OF
THE LOWELL MOUNTAINS GROUP, INC

I. INTRODUCTION

Green Mountain Power Corporation ("GMP"), Vermont Electric Cooperative, Inc. ("VEC"), Vermont Electric Power Company ("VEPC") and Vermont Transco, LLC ("VTL") (collectively the "Petitioners") propose construction of 20 or 21 industrial-scale wind turbines along more than 3 miles of the Lowell Mountain ridgeline. The project requires a Certificate of Public Good from the Public Service Board ("PSB"), pursuant to 30 V.S.A. § 248. Lowell Mountains Group, Inc. ("LMG") intervened regarding the Orderly Development of the Region [30 V.S.A. § 248(b)(1)], Economic Benefit to the State, including impacts on regional property values [30 V.S.A. § 248(b)(4)], Aesthetics and Natural Resource Impacts [30 V.S.A. § 248(b)(5) and 10 V.S.A. § 6086(a)(8)]. *See* Order re: Motions to Intervene, entered September 3, 2010. Upon reconsideration, LMG's intervention was expanded to include the health impacts of noise on its members. Order Re: Motions for Clarification and Reconsideration, entered 9/30/2010, p. 4. LMG submits the following proposed findings and brief in opposition to the project.

II. SUMMARY

The record is inadequate for the PSB to conclude the project meets the requirements of 30 V.S.A. § 248. The severe impacts of the project cannot be justified under the law. The project is out of scale with the surrounding area, would be shocking and offensive, and would

cause undue adverse impacts not mitigated or outweighed by proven benefits. Overall, the project would not result in a public good and should be denied a Certificate of Public Good. If a CPG is issued, it should be appropriately conditioned as requested herein.

Petitioners have failed to adequately study or appreciate the undue adverse impacts of the project on migratory birds, bats, wetlands, headwaters, deforestation, habitat fragmentation, aesthetics, noise pollution, economics and tourism. A community of people would be robbed of a natural sanctuary in exchange for an undetermined economic return. The carbon benefits of the project are largely speculative and unknown, while the devastation the project will cause is substantial and grasped all too well by the area's inhabitants. Rather than select renewable resources with limited impact on the surroundings, Petitioners seek to construct a towering industrial facility on one of the few undisturbed natural areas left in the state. With such horrific impacts as denuded natural areas, elimination of rare wetlands, elimination of Montane Spruce forest, destruction of native song birds, visual and sound pollution changing the entire wilderness experience offered by the Lowell Mountain range, the project would have to be an economic and power production necessity to be justified. Instead, the project would provide intermittent power, theoretically reducing production somewhere on the grid, without ever justifying the extreme environmental impacts the project would have on the ridgeline and people of the Lowell Mountains.

The impacts of the project would spread like ripples in a pond, affecting not only the local population but also surrounding communities, all Vermonters and visitors to our state. By destroying a pristine and unique natural area, we would lose a piece of ourselves, our heritage and our world. It will never be the same. Unintended consequences of not heeding the precautionary principal, the risk of unknown unknowns, and the long-term impacts of depriving

a rural area of its identity, will all be shouldered by real people who are crying out "do not do this to us!" Meanwhile, the benefits of the project would accrue mostly to foreign shareholders and a select few, ultimately amounting to little more than the ability to say, "we produce renewable energy" without any sense of the true costs that have been incurred to win that political victory.

Additional technical hearings should be convened to determine setbacks, the impacts of the final turbine selection, baseline sound monitoring requirements including actual outdoor/indoor attenuation, the financial ramifications of the amended decommissioning plan, and to address amendments to the petition necessitated by material changes resulting from GMP-ANR-1.

III. PROPOSED FINDINGS OF FACT

A) General Findings

1. The Lowell Mountain ridgeline is part of 29,680 acres comprising the 12th largest uninterrupted natural area (habitat block) in Vermont's Northern Forest. Wallin, Technical Hearing Transcript ("THT"), 2/7/11, p. 62; and Sorenson Pre-filed Direct Testimony ("PDT"), p. 19; Sorensen THT, 2/24/11, p. 217; *and* Pughe Rebuttal, p. 2.
2. The Project consists of building 20-21 wind turbines, 459.3 feet tall, along the top of the Lowell Mountain ridgeline. Kane Surrebuttal, pp. 1– 2; *and* GMP-DR-2, *Aesthetic Assessment of the Proposed Kingdom Community Wind Project* (2010) Landworks.
3. The turbines would be distributed about 975 feet apart over approximately 4 miles distance along the top of the ridgeline. Pughe THT, 2/3/11, p. 20; *and* DPS-MK-2, p. 1.

4. DPS witness Mark Kane's analysis of aesthetic impacts addresses the presence of forest cover by classifying areas within forest where terrain orientation indicates visibility as "obscured." Kane Surrebuttal, 1/10/11, p. 3, lines 17-19.
5. Using GIS data for terrain and forest cover, as done by Petitioner's witness David Raphael, is not sufficiently accurate to simulate such effects. Kane Surrebuttal at 4, lines 1-6.
6. The known errors [in the GIS data used by Mr. Raphael] in both elevation and forest cover could mean large areas of potential visibility were completely missed. Kane Surrebuttal, pp. 3-4.
7. The area east of Lowell Mountain, within portions of Lowell and Albany along and adjacent to the Bayley Hazen Road, would be most directly and significantly impacted by the project. Kane Surrebuttal, 1/10/11, p. 4, lines 15-20; *and* DPS-MK-SUR-1.
8. Local people directly and significantly impacted by views of the project include up to 120 residences. Kane Surrebuttal, 1/10/11, p. 5, lines 6-9; *and* DPS-MK-SUR-1; *see also* LMG Surrebuttal, 1/10/11, p. 1.
9. Residents living to the east of the project would have frequent views of the project in and around their properties and as they travel to/from their homes, and the project would become part of the visual fabric of the surrounding community. Kane Surrebuttal, p. 5, lines 14-19.
10. The impacted local population is augmented with snowmobilers, hikers and Nordic skiers. Kane Surrebuttal, p. 5, lines 21-22.

11. Petitioners propose clear-cutting 151 acres of forest, including areas of up to 540 feet in width along the top of the Lowell Mountain ridgeline. Jewkes Updated Direct, 1/26/11, p. 5; Burke PFT, p.10; Sorenson Surrebuttal, p.22[1].
12. The project would require 6.5 miles of roads, including 4 miles along the ridgeline of Lowell Mountain. Pughe THT, 2/3/11, p.20; *and* Jewkes THT, 2/3/11, p.195.
13. Elevations along the Lowell Mountain ridgeline exceed 2,500 feet above sea level. Kane PDT, 10/22/10, p. 5, lines 16-22; Lowell Zoning Bylaws, March 4, 2003, page 8.
14. Installation or upgrading 16.9 miles of electric transmission line is required to connect the project to the ISO-NE power grid. Pughe PDT, 5/21/10, pp. 7-11; *and* PET-DPE-2.
15. The project would cause Jim Blair, owner of Eden Dogsledding, to lose the scenic landscape his business depends upon. LMG Surrebuttal, p. 1, lines 14 – 23. If the project is built, Mr. Blair may have to move. LMG JB PDT, p.2; LMG-JB-1.
16. Because of their existing health problems, and proximity to the project, the Willey family will endure visual and health impacts caused by the turbines. LMG Willey PDT, pp. 1-2.
17. The Liddy family has a camp with breathtaking views of the pristine ridgelines and forest, including Mount Norris and the southern end of the Lowell mountain range. They can already see the lights from the meterological towers, and have had to keep a window panel closed during the summer to avoid annoyance. LMG Liddy PDT, pp. 2-4.
18. The Christiansen family home faces the Lowell Mountain range, and was designed specifically to provide them with their daily view. LMG DC PDT p.1. The Christiansens are already distressed just by the blinking red lights on the meteorological towers.[2] *Id.*

[1] Greater than twice the width of portions of Interstate 89. Sorenson THT, 2/24/11, pp. 220-221.
[2] "It will be impossible to live, play and work in my town and the surrounding area without a view of the turbines. No longer will I experience a pastoral setting; rather, I will be in the shadow of a sizable industrial area."

19. The Brooks family has a clear, unobstructed view of the project from inside their house and throughout their property, where they enjoy many outdoor activities involving nature. LMG JB PDT, p. 2-3.

20. The project's power production, after accounting for the rated capacity factor, would at most total approximately 18 MW (65 MW nameplate capacity times 28.4 percent capacity factor). Smith THT, 2/4/11, p. 174.

21. Green Mountain Power anticipates the project will supply only 6-7 percent of the Company's electricity needs.

B) Orderly Development

22. The Lowell Town Plan provides the following limited guidance regarding whether the project is consistent with the orderly development of the area: "The Planning Commission recommends the development of renewable energy resources. These would include the use of wood, solar, wind, and hydro energy." Lowell Town Plan, April 14, 2009, Section G, page 31.

23. The Lowell Town Plan does not provide an unambiguous policy in favor of locating 20-21, over 400 foot tall wind towers along more than 3 miles of the Lowell Mountain ridgeline. *Id.*

24. The project is located in the Conservation Mountain District. Lowell Zoning Bylaws, March 4, 2003, page 8.

25. The Lowell Zoning Bylaws clarify that development of windmills is a Conditional Use in the Conservation Mountain District. *Id.*

26. The Lowell Zoning Bylaws provide, "In order for a conditional use permit to be granted, the proposed use shall not adversely affect" the character of the area. *Id*, § 206.01, pp. 9-10.

27. The industrial scale of the project is not consistent with any clear community standard favoring industrial-scale wind development along the ridgeline of Lowell Mountain. Lowell Town Plan; *and* Lowell Zoning Bylaws.

28. The scale / size of the project, consisting of industrial wind turbines exceeding 400 feet tall along miles of the Lowell Mountain ridgeline, is not contemplated by the Regional Plan, the Lowell Town Plan or the Lowell Zoning Bylaws.

29. Lowell Selectman, Richard Pion, who was responsible for preparing a ballot initiative regarding the project, was unaware the Vermont League of Cities and Towns recommends boards should be careful not to put language into the article that may be construed to sway. Pion THT, 2/4/11, p. 48.

30. The ballot initiative seeking approval of the project from the voters of Lowell included a reference to the amount of money the town would receive under its agreement with Petitioners, without any reference to the impacts the project might have. Pion THT, 2/4/11, p. 48.

C) Economic Benefits

31. Whether the project would be "cost-effective" should be determined by describing a specific course of action to reach a desired effect. Holland Surrebuttal, 1/10/11, ¶ 1, lines 1-3.

32. Petitioners have not defined the desired effect in their cost effectiveness analysis. Holland Surrebuttal at ¶ 3.

33. In order to present an adequate cost effectiveness analysis, the Petitioner should have calculated the present-valued cost-effectiveness ratio of each alternative to the project, and demonstrated

each option has a higher cost-effectiveness ratio, with sufficient detail to demonstrate analytic integrity. Holland Surrebuttal at ¶ 8.

34. Increased energy efficiency, geothermal projects, and new nuclear projects would be significantly more cost-effective than the proposed wind project. Holland Surrebuttal at ¶ 9.

35. The economic impacts of the project on tourism and property values *in Vermont* was not directly studied and is essentially unknown. Kavet THT, 2/4/11, pp. 134-149.

36. The Petitioners rely upon comparing the project's cost per kWh compared with other new renewable energy resources to support the project's cost effectiveness. Smith PDT, 5/21/10, p. 4, lines 8-13.

37. Petitioners' economic benefits analysis assumes the market rate of power will continue to increase at a rate they have already had to amend downward due to actual market conditions. *Compare* Smith PDT, 5/21/10, pp. 8-14 *with* Smith Rebuttal, 11/22/10, pp. 4-13.

38. The cost of power produced by the Project will depend upon multiple expenses that have not been determined, such as contributions to a decommissioning fund, the cost of implementing the changes to the project contemplated by the ANR/GMP MOU, and the actual cost and construction of the turbines and related improvements at the site.

39. Petitioners' cost-effectiveness analysis depends upon the assumption the project will obtain federal production tax credits. Pughe THT, 2/3/11, p. 16.

40. GMP has not shown that the project would provide the "lowest present value life cycle cost" to achieve stabilized access to non-polluting power. Holland PDT, p. 4, lines 29-31.

41. Power from the project may cost Vermonters in excess of market prices for 25 years. Holland PDT, p. 5, lines 9-10.

42. The output of the plant is uncertain on an annual basis and on an hourly basis. Kieny PFD, 5/21/10, p. 6.

43. Assuming a capacity factor of around 28 percent, the project would produce at most 18 MW, which is the assumption for the financial analyses that have been conducted. Kieny THT, 2/4/11, p. 215.

44. If the output of the project were less than projected, the cost per kWh of electricity produced by the project would increase. Kevdar PFD, 5/1/2010, p. 5; *and* Kieny PFD, 5/21/10, p. 6.

45. An accepted way of dealing the uncertainty of future power costs is to indicate a range of variation for critical variables over time and then to perform a Monte-Carlo Analysis (running the model thousands of times with random variation of the critical variables over the life cycle of the project), resulting in a probability statement about the cost-effectiveness of the project. Holland PDT, p. 5, lines 17-25.

46. When the project is operational, Petitioner expects up to three fulltime employees working at the site. Becker PDT, 10/22/10, p. 2, lines 18-19.

47. Eden Dogsledding supports many more long-term jobs the three fulltime employees GMP expects the project will ultimately produce. LMG JB Surr., pp.2-3.

48. Lower clearing prices for electricity potentially resulting from the project will not result in a societal benefit, since lower power prices are offset by lower returns for owners of generation and their shareholders. Lamont Surrebuttal, 1/10/11, p. 3.

D) Natural Resource Impacts (Wetlands, Stormwater, Birds, RINA, Habitat Fragmentation)

49. Fragmentation is "commonly viewed by the professional conservation science community as some of the greatest threats to wildlife and the conservation of biological diversity, along with climate change and invasive species." Sorenson Surrebuttal Testimony, p. 6.

50. Petitioners propose, "an enormous project in a remote, undisturbed environment," that would fragment the interior habitat of the affected area. Austin THT, 2/7/11, p. 178.

51. It is undisputed that "there will be significant and profound fragmentation effects from a project of this scale." Austin THT, 2/7/11, p. 177.

52. The easements contemplated by the GMP/ANR MOU (GMP-ANR-1) will not offset the effects of fragmentation that are direct impacts, for example on forest interior birds. Sorensen THT, 2/24/11, p. 240, lines 4 – 12.

53. Because there is no set time limit before part of the ridgeline will be allowed to revegetate, the fragmentation caused by this project will exist for an unknown duration of time. Sorenson THT, 2/24/11, pp. 198-199.

54. Project impacts may not be reduced for another 50 to 100 years. Sorenson THT, 2/24/11, p. 198.

55. Petitioners have not explained the similarities or differences between the clearing associated with the project and forest management practices utilized during ordinary timber harvests. Austin PDT, p. 18.

56. Both Sections 3 and 3.2 of the ANR/GMP MOU, and the eventual restoration of the site, must be satisfied before Mr. Sorenson's conditions will be met. Sorenson THT, 2/24/11, p. 200.

57. Parcels 1-3 proposed in the ANR/GMP MOU must be placed into conservation before GMP may begin construction. Sorenson THT, 2/24/11, p. 236.

58. If ANR and GMP cannot agree on the details of the plans, the undue adverse impacts will remain, and the project should not go forward. Sorenson THT, 2/24/11, pp. 207-208.

59. GMP has not met all of ANR's concerns, because the proposed ridgeline easement does not permanently protect the entire ridgeline where the turbines will be located. Sorenson THT, 2/24/11, pp. 208-209.

60. The GMP/ANR MOU does not require mortgages or other encumbrances to be subordinate to the contemplated conservation easements. Sorenson THT, 2/24/11, p. 221, lines 1-5.

61. The GMP/ANR MOU does not provide any funding source for enforcement of the contemplated easements, nor is any stewardship plan included to ensure compliance with any Conservation Easements. Sorenson THT, 2/24/11, p. 221.

62. The GMP/ANR MOU does not limit the number or extent of logging roads allowed under the logging roads exception to the protections of the easements. Soresnson THT, 2/24/11, p. 223.

63. ANR will be responsible for the cost associated with monitoring and enforcing the conservation easements contemplated by the GMP/ANR MOU. Sorenson THT, 2/24/11, p. 229.

64. The cost to the State of Vermont associated with implementing the GMP/ANR MOU to be incurred by ANR has not been estimated or included in the record. Sorenson THT, 2/24/11, p. 229.

65. Additional mitigation could be required if, in the future, additional animals become threatened or endangered. Sorenson THT, 2/24/11, p. 226.

66. The GMP/ANR MOU does not address the details of how the access road will be decommissioned, and the details of decommissioning and restoration still have to be determined. Sorenson THT, 2/24/11, pp. 244, 247-248.

67. The GMP/ANR MOU does not provide any mechanism for the PSB or other parties to review and comment on the contemplated easements. Sorenson THT, 2/24/11, p. 238.

68. There are two (2) state-significant natural community types in the proposed project area, which are deemed as such because of their size and current condition (large, relatively intact landscape). Sorenson THT, 2/2411, p.193.

69. It is undisputed that the project would degrade the Montane Spruce Fir Forest to the degree that it will no longer be considered state significant. Sorenson THT, 2/24/11, p.194; *and* Sorensen PDT, p.14.

70. Degrading the state significant Montane Spruce natural area to the degree it will no longer be state significant constitutes an undue adverse effect on the environment. Sorenson THT, 2/24/11, p. 194.

71. Even after implementation of the GMP/ANR MOU, reestablishing the degraded forest is not likely possible due to the level of site disturbance. Sorenson PFT, p. 29; *and* Sorensen THT, 2/24/11, p. 217, lines 2-8.

72. No provision of the GMP/ANR MOU obviates the undue adverse impact of the project on the state significant natural area and intact forest habitat. Sorenson THT, 2/24/11, p. 194.

73. The wetlands along the Lowell Mountain ridgeline act as functional headwaters and are a critical transition between groundwater and surface water. Morrison Surrebuttal, p. 3.

74. Headwater wetlands moderate water temperature and contribute organic matter to the stream, both of which are critical to stream biota. *Id.*

75. Impacts that occur at the beginning of a stream can affect water quality and aquatic biota downstream. *Id.*

76. The entire Lowell Mountain ridgeline constitutes headwaters. Nelson THT, 2/24/11, pp. 257-258.

77. One of biggest environmental concerns presented by the project is the impact on the streams at the project site. Jewkes THT, 2/3/11, p. 215.

78. High elevation wetlands would be permanently impacted by the project. Jewkes THT, 2/3/11, p. 221.

79. The project would result in 9,892 square feet of direct impacts to function headwater wetlands. Morrison THT, 2/24/11, p.149-150 (referencing Morrison Surrebuttal, p. 3).

80. The impacted wetlands are critical to water quality. Morrison Surrebuttal, p. 4.

81. The wetlands mitigation proposed by Petitioners is inadequate. Morrison THT, 2/24/11, p. 151.

82. Petitioners and ANR are relying upon the Section 401 Water Quality Certification and Section 404 Army Corps of Engineers Clean Water Act permits, which have not yet been issued, to ensure water quality. Morrison THT, 2/24/11, p. 152.

83. It is possible for an ecosystem to lose functionality if features such as critical functional headwater wetlands are consistently altered without compensation. Morrison Surrebuttal, p. 4.

84. Although the project is considered high risk (usually allowing only 7 acres of concurrent earth disturbance), 14 acres of concurrent earth disturbance are being proposed. Burke THT, 2/24/11, p.172.

85. Runoff from impervious surfaces proposed at the project site would be significant compared to the absence of runoff from the presently forested areas. Jewkes THT, 2/3/11, p. 213.

86. The project would result in the conversion of 27 acres of forestland into impervious surface. Burke PFT, p. 6.

87. The Petitioners have not proposed any mitigation that preserves wetlands comparable to those that would be destroyed by the project, and the ANR/GMP MOU does not alter the originally proposed mitigation plan relative to wetlands. Morrison THT, 2/24/11, p. 155.

88. Generally, "[n]o direct or indirect impacts are allowed on RC2 designated wetlands. It is not likely that direct impacts will be permitted on RC3 wetland as well." Austin EX-ANR-JA-2 p. 10.

89. If permitted, the project will displace black bears from necessary Bear Scarred Beach ("BSB") habitat. Austin Surrebuttal, p.8.

90. Necessary BSB habitat includes forested wetlands. Wallin THT, 2/7/11, p. 11.

91. Species other than bear will be impacted by the loss of habitat caused by the project. Wallin THT, 2/7/11, pp. 88-89.

92. Ridgeline wind facilities in the East have resulted in the highest bat collision mortality levels among wind facilities in the country: 2,092 bats were killed by eastern wind turbines. Darling PDT, p. 6.

93. Taller turbines may kill even more bats. Darling PFT, p. 6.

94. A minimum cut in speed of 5.0 meters per second is required to reduce bat fatalities. Darling PDT, pp. 9-10; Gravel THT, 2/7/11, p. 133.

95. Studies have shown that increasing turbine speed to 5.5 meters per second results in a 50% reduction in bat mortality, while lower turbine speeds (4.0 meters/ second) results in 5.4 times as many bat fatalities. Darling PDT, p. 9.

96. Increasing the cut-in speeds results in a 73% mean reduction in bat fatalities. *Id.*

97. Half of the turbines proposed by Petitioners would have cut in speeds below 5.0 meters per second. *See* GMP/ANR MOU, dated 10/22/11, Attachment A, p. 6.

98. There will be direct and indirect impacts to bats caused by the project, including deaths from the turbines themselves and habitat loss. Gravel THT, 2/7/11, p. 132.

99. The potential for bat fatalities resulting form the project could exceed those that would be considered undue adverse impacts to bat populations. Darling PFT, p. 7.

100. Bats are most vulnerable to collision mortality during the fall migration period and between April 1st and October 15th. Gravel PDT, p. 8.

101. During the times when bats are most vulnerable to the impacts of wind turbines, they may be struggling with WNS, bearing and nursing young, and the young may be learning to fly, forage, and select roosts for hibernation. Gravel THT, 2/7/11, pp. 132-133.

102. The GMP/ANR MOU would allow ten (10) turbines to operate at cut in speeds below the threshold necessary to reduce bat mortality. GMP-ANR-1.

103. The GMP/ANR MOU permits nearly half of the proposed turbines to operate at cut in speeds shown to be ineffective at reducing bat mortality. *See* GMP-ANR-1, Monitoring for Bat Fatalities, 8c & d (permitting cut in speeds of 3 and 4 meters per second).

104. In addition to the international studies, testimony from Mr. Darling and from GMP's witness, Mr. Gravel, confirm that a minimum cut in speed of 5.0 meters per second is required to reduce bat fatalities. Darling PDT, pp. 9-10; Gravel THT, 2/7/11, p. 133.

105. Allowing inadequate cut-in speeds while requiring monitoring, where minimum safe cut-in speeds have been established, would cause predictable, undue adverse impacts. *Id.*

106. A minimum cut-in speed of 5.0 meters per second for all 21 turbines is necessary to reduce predictable, preventable bat fatalities. *Id.*

107. Over 440,000 birds are killed each year by wind turbines. Gravel THT, 2/7/11, p. 131.

108. There are 7 birds listed in Vermont's Wildlife Action Plan as species of greatest conservation need, including the Canada warbler. Austin PDT, p. 19.

109. Clearing for the project will remove habitat for forest interior songbirds, which will cause a species shift in favor of edge species. Gravel THT, 2/7/11, p. 111.

110. If the areas cleared for the project are not allowed to re-forest, interior birds will not return. Gravel THT, 2/7/11, p. 128.

111. The access roads and associated clearing for the project would result in, "increased rates of nest predation, increased rates of nest parasitism, and shifts in species composition within the area. The response by those species is very complex. To some extent unpredictable." Sorenson THT, 2/24/11, p. 180.

112. Mitigation areas are not necessarily available to displaced wildlife. Austin Surebuttal, p. 16; *see, also,* Sorenson THT, 2/24/11, pp. 217-218.

113. Large areas of unfragmented forest habitat, such as those at the project site, contain source populations for interior-forest-breeding bird species, which habitat provides secure

populations needed to recolonize when smaller areas are depopulated. Sorenson THT, 2/24/11, p. 181.

114. ANR is responsible for ensuring the welfare and survival of species that are stressed by development. *See* Sorenson THT, 2/24/11, p. 187.

115. In terms of raptor impacts and needed mitigation, there are significant numbers of raptors along the internal ridges in the northeast, and peak periods of migration are important when studying potential impacts. Gravel THT, 2/7/11, p.130; 131-132.

116. Peak periods of raptor migration include the fall. *Id.*

117. No fall migration survey was performed by the Petitioners, and the sole study was conducted in the spring during a consecutive twelve (12) days period. Gravel THT, p. 129.

118. The Hawk migration association suggests a minimum of 3 years of study. Gravel THT, 2/7/11, p.129.

119. The clearing and construction associated with the project risks direct and indirect impacts to raptors, including at least 134 raptors representing 13 species. Gravel PFT, p.5; *and* Ex-Pet-AG-1 pE1.

120. Of the raptors observed in the project area during monitoring, 69% were flying at or below 135 meters for at least a portion of their flight. Ex-Pet-AG-1 p. E1.

121. One endangered species, the bald eagle (Haliaeetus leucocephalus), was observed 1,060 meters outside the Project area boundary at a height of 500 meters above ground level. Ex-Pet-AG-1 p. E1.

122. Currently there is no clear relationship between pre-construction and post-construction data for the prediction of raptor collision risk at wind sites. Ex-PET-AG-1 p.31.

123. The GMP/ANR MOU does not substantially mitigate impacts to state significant natural communities in particular, or impacts caused by habitat fragmentation generally. Sorensen THT, 2/24/11, p. 194; *and* GMP-ANR-1.

124. The GMP/ANR MOU fails to ensure that any conservation easement will take precedence over any encumbrance to the property, allowing foreclosures or bankruptcies to potentially invalidate the protections purportedly guaranteed by the MOU. *Id.*

125. The Petitioners and ANR have failed to specify the exact acreage that will be permanently conserved, where exactly the conservation areas will be located, and what value the preserved areas will have compared to the decimation caused by the project. *Id.*

126. Some areas that Petitioners will be required to preserve pursuant to the GMP/ANR MOU have not yet been identified and must be procured from nearby land-owners in the future. Sorrensen THT, 2/24/11, pp. 40-41.

127. The GMP/ANR MOU does not ensure that lessors owning property in the project area will agree to comply with the new requirements of the MOU. *Id.*

128. Pursuant to Section 3.2 of the GMP/ANR MOU, conservation easements of "adequate size and location" would be required as a condition subsequent to the CPG, but the project could be fully constructed (without any ANR staff having monitored compliance with the condition) before the condition is met. GMP/ANR MOU, p.12, § 10.

129. The GMP/ANR MOU fails to establish the cost of complying with the additional conditions contained therein, whether GMP will set aside funds to ensure acquisition, monitoring and decommissioning costs associated with the MOU, and the Petitioner has failed to reassess the cost of the project in consideration of the MOU.

130. There is no monitoring plan to ensure compliance with the GMP/ANR MOU, and there is

no protocol for responding to violations. GMP-ANR-1.

131. Mitigation Parcel 1 in the GMP/ANR MOU is not permanent, thus the goal that permanent effects should have permanent mitigation will not be met if the project is approved. GMP-ANR-1; *and* Sorensen THT, 2/24/11, p. 208.

132. The GMP/ANR MOU continues to allow unfettered cutting of BSB habitat, under the unlimited and uncontrollable exception to preservation of BSB habitat for "construction of logging roads." GMP-ANR-1; *and* Sorensen THT, 2/24/11, p. 223.

133. The GMP/ANR MOU provides no limitation on the width or number of logging roads that may be constructed in the supposedly "permanently conserved" BSB habitat easement areas. *Id.*

134. Differences in opinion as to what logging road construction practices comply with a particular forest management plan crate an opportunity for disagreement and ultimately less protection than may have been intended by the parties. *Id.*

135. The GMP/ANR MOU would allow snowmobiling in the project area, even during sensitive times. Sorensen THT, 2/24/11, p. 224; *and* GMP-ANR-1.

136. The GMP/ANR MOU contains several general requirements that will only be met if ANR permits are subsequently, essentially delegating to ANR responsibility for the policy decision as to whether the project's impacts would be undue and adverse. GMP-ANR-1.

137. The GMP/ANR MOU does not provide any opportunity for interested parties to examine drafts of the conservation easements, before they are finalized, to ensure adequate protections are established. GMP-ANR-1.

138. Turbine 15 has not been moved as part of Petitioners's mitigation plan. *See* Austin

Surrebuttal, pp. 4-5.

139. The GMP/ANR MOU fails to define or limit "past practice" as the term is used under Section 2.3.2 c. GMP-ANR-1.

140. The Ridgeline Easement proposed in the GMP/ANR MOU does not adequately protect species, and fails to provide any mechanism for greater protection in the event additional species become threatened or endangered over time. Sorensen THT, 2/24/11, p. 225.

141. Parcel 4 identified in the GMP/ANR MOU fails to define "the landowner's forest management objectives."

142. GMP-ANR-1, Section 4.6 and 6 fail to set a minimum for the period of non-native invasive species management. GMP-ANR-1, pp. 10-11.

143. There is no time limit in the GMP/ANR MOU within which GMP must revise its management plan for the Serpentine Outcrop RINA.

144. The GMP/ANR MOU includes no further mitigation of the high-level wetland areas, nor protection of the headwaters.

145. The GMP/ANR MOU fails to curtail construction during fall and spring bear feeding times. *See* Austin PDT, p. 14.

146. The GMP/ANR MOU fails to place any limitation on logging Bear Scarred Beech. (See Austin PFT, p. 14.

147. The Petitioners have no habitat management plan, and the GMP/ANR MOU only references forestry practices.

148. GMP is responsible for all the costs involved in the GMP/ANR MOU, including decommissioning costs, which have not been accounted for in Petitioners' const-

effectiveness analyses. *See* Nelson 2/24/11, pp. 259-260; *and* Sorensen THT, 2/24/11, p. 242.

149. Just mulching and seeding, per the original mitigation plan, would have cost over $2 Million Dollars, and the cost of implementing a revised mitigation plan that will result from the GMP/ANR MOU has not been calculated or considered. Sorensen THT, 2/24/11, p. 232.

150. The impacts of the project could be greater than what has been estimated. Jewkes THT, 2/3/11, p. 231.

151. Despite ANR's repeated requests, GMP failed to map the areas surrounding the project that are of significant state importance. Sorenson THT, 2/24/11, p. 193.

152. Rather than respond in a direct manner to ANR's requests for information on indirect impacts to BSB habitat, GMP, instead responded that reference to "indirect impacts" was "vague and ambiguous" Darling PDT, p. 11 (*citing* Wallin's response to ANR's Interrogatory to GMP #29).

153. The term "indirect impacts" has been used for over 20 years by the PSB and Act 250 District Commissions.

154. Petitioner's refusal to provide information regarding indirect impacts on BSB habitat suggests there may be unknown problems concerning the design, operation and decommissioning of the project. Austin PDT, p. 20.

155. Petitioners have not presented any evidence that the GMP/ANR MOU will not result in an undue, adverse, indirect impact on bears. Wallin THT, 2/7/11, p. 43-44.

156. Petitioners have failed to account for bears' sensitivity during the fall and spring feeding times, or any mitigating measures that could be taken during those time periods. Wallin THT, 2/7/11, pp. 70-71.

157. Mr. Wallin is not familiar w/ US Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee, he did not consult said document before soing surveys and investigation. Wallin THT, 2/7/11 pp. 59-60; *and* ANR-CROSS-9.

158. Petitioner's continued use of Searsburg to support its opinion that black bears are not impacted by industrial wind turbine projects is not supported by scientifically reliable evidence. Austin Surrebuttal, p. 9.

159. Mr. Wallin's reliance on Searsburg to defend claims that there would be no displacement or indirect impacts to bears can be found in Sheffield and Deerfield cases and neither ANR nor the PSB has found this tautology useful…. [GMP] has an obligation to provide the Board with reliable information that the Project will not result in an undue adverse effect to the natural environment. [GMP] has not provided this information." Austin Surrebuttal, pp. 10-11.

160. Petitioner failed to perform an adequate raptor study.

161. Contrary to Petitioner's claims, the fragmentation created by this project will not benefit the area wildlife: This is a critical question for the state of Vermont to consider with respect to wind energy development on remote ridgelines because these areas currently provide the core habitat blocks that remain in the state and there are many areas of Vermont that are, indeed, highly fragmented. Austin PDT, p. 21.

162. The natural resource impacts caused by the project will be permanent.

E. Aesthetics

163. Aesthetics affects the everyday reality for people living within the visibility of industrial wind turbines. LMG Surrebuttal, 1/10/11, pp. 1-2.

164. Aesthetics are important in Vermont, including preserving the pastoral landscape characterized by small towns separated by open landscapes. LMG Surrebuttal, 1/10/11, p. 2.

165. Not only would the turbines overwhelm the landscape from areas of Lowell and surrounding towns, but they would also be dominant and pervasive in the visual landscape. *Id.*

166. The Lowell Mountains have a peak elevation of 2,640 feet, and are a prominent north-south oriented ridgeline within the center of the landscape.[3] Kane PDT at 5.

167. The Lowell Mountains are so prominent within their landscape, that they "command a relatively large viewshed." Kane PDT at 6.

168. The project may be visible to up to 25% of the area within ten miles. Kane PDT at 6.

169. "This high correlation between visibility and travel corridors (i.e., Route 100, 14) makes the effective visibility of the project to persons in the region much higher. It also increases the duration of views along roadways and the persistence of views from residential dwellings." DPS-MK-2 p. 14; Pion THT, 2/4/11, pp. 58-59.

170. There are significant stretches on Route 100 and from other parts of town roads where you can see the Lowell Mountain Range. Pion THT, 2/4/11, p. 58-59.

171. The visual impacts of the project are not contained within one community, but are visible form all the surrounding communities. Henderson-King THT, 2/8/11, p. 16.

[3] See figure 5, DPS-MK-2, which portrays the visual dominance that Lowell Mountain has in the region, and its role in defining sub viewsheds. The DPS analysis of the turbines was based on their placement, and did not change upon submission of GMP-ANR-1. Confirmed by Mr. Beling, Technical Hearing Transcript, 2/24/11, p. 38.

172. The Lowell mountains can be seen for 6 months out of the year from the Craftsbury area. Henderson-King THT, 2/8/11, pp. 12-14.

173. The meteorological towers can be seen from a significant distance, yet they do not stand even half the height of the proposed turbines, nor are they as wide, nor do they require the same extensive clearing as will be required for the turbines. Pughe THT, 2/3/11, p.44; Raphael THT, 2/8/11, p. 47; *see, also,* Docket # 7558, Order issued 2/8/2010 (Meteorological Sites A & C = 262 feet; Site B = 164 feet).

174. "The presence of many large commercial wind turbines on a broad ridgeline that is visible from many public vantage points is incompatible with its relatively intact surroundings." Kane PFT, p. 9.

175. Residential windmills are between 80-100 feet in height pose potential aesthetic impacts. Raphael THT, 2/8/11, pp. 95 and 163-164.

176. By comparison, the industrial turbines proposed by the Petitioners would be up to 459 feet tall. GMP-DR-2.

177. Windmills have a significant ability to impact the visual landscape from various distances, and analyzing up to approximately three miles from the project resulted in Mr. Kane's determination the project would have an unduly adverse impact on aesthetics. Kane THT, 2/9/11, p. 9.

178. "[A]verage persons within this area will be shocked or offended by this project. Some of the pubic views of the project within a 3 mile distance are persistent in duration and/or have little local obstruction… that could reduce visibility." Kane Surrebuttal, p. 9; DPS-MK-SUR-2; Pet.-DR-2, Appendix 9d Rev.

179. The ubiquitous nature of the array along the most prominent ridgeline in the landscape creates an unduly adverse condition." Kane PFT, p. 11.

180. "The project will become part of the visual fabric within this community." Kane Surrebuttal, p. 5.

181. Moreover, E911 data places the number of affected residences at 120, 117 more than stated by Mr. Raphael, where residents in the area will have frequent views, within and without their homes, and as they travel to and from their homes. Kane Surrebuttal, p. 5.

182. There are approximately 4,619 residential structures within the 10-mile viewshed of the project. DPS-MK-2, p. 7.

183. Snowmobilers, hikers, skiers, and other areas tourists raise the number of people impacted by the aesthetic affects of the project even higher. Kane Surrebuttal, p. 5.

184. Industrial sized turbines are not commonplace, nor commonly accepted in the Northeast Kingdom. Raphael THT, 2/8/11, p. 127.

185. Whether *in the future* industrial turbines become "part of the working landscape" is not determinable and is irrelevant to the analysis of whether the project has an undue adverse effect on Vermont's *present* landscape. *See, e.g.,* Raphael THT, 2/8/11, p. 248.

186. The biggest difference between the project compared to Searsburg or Sheffield or Deerfield is that the turbines are much more visible for much longer spans along roads than they were in those other dockets. Raphael THT, 2/8/11, p. 246.

187. There's nowhere from which the Sheffield or Deerfield wind projects are viewable, particularly with an extended vista, similar to the views from Albany driving along Route 14 North. Raphael THT at 248; *and* DPS-MK-SUR-2, -3 and -4.

188. Guests of Eden Dog Sledding have complete views of the Lowell Mountain Range where they presently enjoy a wilderness experience for recreation and relaxation throughout the year. Blair Surrebuttal, p. 1.

189. The quiet, pristine area with heritage views is the reason guests come to the Eden Dogsledding Lodge. There are moonlit tours as well as many other activities both day and night that focus on the natural environment and views. LMG JB Surr. p.2. LMG-JB-4-5.

190. Seeing a string of three and a half miles of windmills would be a profound, dramatic change to the visual experience, which is presently of an undeveloped mountain range. Raphael THT, 2/8/11, p. 248.

191. The proposed FAA required lighting would cause an undue adverse aesthetic impact to the area, and no solution has been reached to install an alternative lighting system. Kane THT, 2/9/11, pp. 82-83.

192. The lighting of the project would result in an undue adverse impact, because of the elevation of the project would make the effect of the lighting more pronounced, alter the viewer's experience of a significant public resource, and can only be mitigated with a system that turns the lights off for a majority of the time. *Id.*

193. There will be more lights at the project than past projects approved by the Board: 9 lights spread along the north-south ridgeline in a very wide aperture. Kane THT, 2/9/11, pp. 82-83.

194. Nine sets of blinking red lights standing 459 feet above the average 2,630-foot elevation of the Lowell Ridgeline will dominate the nightscape. *See* Exh DPS-MK-p. 11.

195. The entire area is devoid of any large commercial enterprises or towers or other large scale lighting sources.

196. Indeed, a visit to this area during the night establishes the only lights visible other than house porch lights and a few vehicle headlights, are the starts, planets and moon.

197. As the lighting from the relatively small meteorological towers (164-262 feet) can be seen from a great distance, the impact of the fully lit turbines would be even more insidious/pervasive. Pughe THT, 2/3/11, p. 44; *see, also,* PSB Docket #7558, Order issued 2/8/2010.

198. The Landworks Report presents several illustrations that purport to describe steps taken in the design to help it more readily fit into the visual context (e.g., order and uniformity). These figures are based on a set of guidelines presented in a 2002 publication that are meant to help reduce "objectionable aesthetic impacts" associated with wind projects. DPS-MK-2, p.29.

199. The same publication suggests that developers "limit tower height and turbine size, and goes on to state that tall towers "may be out of scale with the terrain" and presents several case studies identifying where limitations on tower height were appropriate. *Id.*

200. The publication also was written at a time when 85-meter towers were very uncommon as evidenced by the case studies presented in the book. DPS-MK-2, p. 29.

201. The turbines will result in a significant diminishment of scenic qualities east of Abany. Kane THT, 2/9/11, p. 31.[4]

202. Depending upon the final road design, which will be at the sole discretion of the contractor during micro sighting, the resulting scar could be visible and increase the

[4] "The western areas within the study area (within Lowell, Eden) are generally more forested and less open. Areas on the eastern side of the range within Irasburg, Albany and Craftsbury are more pastoral, with significant areas of open pasture, meadow and farmland." DPS-MK-2, p. 9.

project's detrimental aesthetic effects. Jewkes THT, 2/3/11, p. 238; *and Id*.

203. Since the proposed wind turbines will require more clearing, will be more numerous, taller and wider than the existing meteorological towers, the proposed towers will be much more visible than the meteorological towers. Raphael THT, 2/8/11, p. 47.

204. Tourism is an important component of the economics of the Northeast Kingdom, and GMP's expert admitted that aesthetics could have negative effect on tourism. Kavet THT, 2/4/11, p. 98.

205. The GMP/ANR MOU (GMP-ANR-1) does not change the undue adverse aesthetic impacts of the project. Mr. Beling (referring to discussion with DPS Expert Mr. Kane) THT, 2/24/11, pp. 38-39.

206. It is unknown whether the OCAS system will be approved for the project, and the OCAS system has not been approved in North America. Pughe Rebuttal (Corrected), p. 5.

207. It is unknown whether the OCAS system is a viable mitigation strategy.

208. GMP has refused to reduce the height, the noise, or the number of the turbines or to create additional setbacks, because their main concern is to maximize generation for the site. *See* Pughe THT, 2/3/11, PFT; *see, also,* PFD Kane, p. 13.

209. Reducing the number of turbines could still permit GMP to meet its range of projected output. Pughe THT, 2/3/11, pp. 62-65.

210. Correspondingly, reducing the height of the turbines so as to avoid the necessity of the OCAS system, would mitigate the adverse nighttime effects should this system prove impossible to implement, and would also reduce some the dominance of the turbines over the surrounding landscape.

211. Rather than seeking to mitigate the potential noise impacts, GMP has chosen two

different turbine models that would violate the PSB's prior noise limits and require NRO mode nightly in order to meet these limits. *See* Kaliski Rebuttal, pp. 26-28.

212. Moreover, each time GMP has presented a new turbine as possibly being used for the project, it has found a larger, more dominating product.

213. GMP has failed to show the PSB the details of the clearing and re-vegetation program.

214. To mitigate the impact of the connecting transmission lines, in conjunction with the access road (neither of which are a natural part of the working landscape), additional information is necessary. Kane PDT, p.13; *see*, *also,* Kane Surrebuttal, p. 13.

215. It is not credible that the visibility of the proposed wind turbines would help mitigate their impacts. Raphael THT, 2/8/11, pp. 216-217.

216. Raphael diminishes the effect of the turbines by stating that people stay indoors, or are focused on other activities, or have the choice to turn away from the turbines. *See*, e.g., Raphael THT, 2/8/11, p. 92, 93-94, 144, 174-175; *and* Pet-DR-2 pp. 11 and 41.

217. Raphael states the turbines will not be see if the viewer kneels down, (Raphael THT, 2/8/11, p. 88, lines 20-22); stays inside a camp structure on the long trail (*Id. at* 93-94), focuses on a campfire at night (*Id.*), turns the other way, leaves the area and goes elsewhere, or stay in one place avoiding a view of the project. Raphael THT, 2/8/11, pp. 174-175; *see, also,* Kane THT, 2/9/11, pp. 51-52.

218. The average person should not have to turn or move away to avoid visual impacts. Kane THT, 2/9/11, p. 52.

219. People spend a fair amount of time outside their homes, including driving, recreating, and working on their properties. Raphael THT, 2/8/11, p.40-41.

220. The use and enjoyment of property should consider the entire assemblage of structures

and outdoor "amenity" spaces. DPS-MK-2, p. 17.

221. It is not credible that persistent views from roadways result in a reduced impact on aesthetic resources, just because the roadways may not have been designated as "scenic". Raphael THT, 2/9/11, pp. 153-154.

222. The trimming of trees at the Long Trail's Tillitson Camp was clearly done to open the view to the Lowell Mountain Range. Raphael THT, 2/8/11, p. 45 (referring to the view from the Long Trail's Tillotson Camp).

223. Mr. Raphael's 5% viewshed determination understates the full potential adverse aesthetic impact of the project. *See* Kane Surrebuttal, pp. 3-4; Kane THT, 2/9/11, pp. 44-45.

224. Mr. Raphael chose a methodology that did not err on the side of caution and allowed for the extent of visibility to be understated. Kane THT, 2/8/11, p. 45.

225. Mr. Raphael's simulations did not address limits of clearing from the Westfield (Appendix 9A) and the Belvidere Fire Tower (Appendix 9B), where the clearing for the project's road and the proposed transmission lines will likely be visible.

226. No simulation of the view was provided from areas from Craftsbury although the viewshed analysis indicated substantial potential visibility within that area.

227. No simulation of the view was provided from Lake Eden, although that area has a very high concentration of camps and was identified as an area for potential visibility. DPS-MK-2, p. 15.

228. The Landworks Report states that "these types of lights are a common sight and visible throughout Vermont…."30 Based on our review of the project area during late evening and early night time hours (September 28, 2010) we saw no evidence of any FAA or tower lighting. The proposed lighting is not consistent with the visual context. DPS-MK-

2, p.27.

229. What was not discussed in much detail was the persistency of visibility: As viewed from the east, Lowell Mountain is the background and the proposed array will become associated with this background. DPS-MK-2, p.28.

230. Raphael states the turbines are only ¼ of the elevation of the mountains. Yet, this number is contradicted during Raphael's cross- examination and by DPS Expert Kane. *See* Kane THT, 2/9/11, p. 210 (the turbines will be just under 50% of the elevation); *and* DPS-MK-2, p. 30.

231. Following cross-examination, Mr. Raphael admits he should have made more reference to tourism infrastructure in the region. Raphael THT, 2/8/11, p. 237-238.

232. Mr. Raphael never inquired as to the number of tourists, employees, etc. in the Northeast Kingdom. Raphael THT, 2/8/11, pp. 258-259.

233. Tourists come to see the foliage on the mountains. Raphael THT, 2/8/11, p. 165. The Highland Lodge, in Geensboro, provides foliage tours, and Craftsbury Ourdoor Center is also located in the Northeast Kingdom. Raphael THT, 2/8/11, pp. 165, and 166-167.

234. The Northeast Kingdom has been designated at a Geotourism destination by National Geographic, which means that it sustains or enhances the natural geographic nature of the place, the environment, the aesthetics, the heritage, the well being of the residents, and the culture. Raphael THT, 2/8/11, p. 167.

235. The Eden Dogsledding Center attracts tourists internationally. It is leading the entire industry with its methods of raising and treating the dogs. Blair PDT, p. 2, *and* Blair Surrebuttal, p. 3.

236. Raphael's arbitrary addition of 40 feet high, simulated forest cover results in diminution

of the potentially affected areas. Kane Surrebuttal, p. 3.

237. This method potentially excludes large areas where people will see the turbines. Kane Surrebuttal, pp. 3-4

238. Given the import of a viewshed analysis to understanding the full potential impact of the turbines, Raphael's 5% determination should be rejected as it understates the full potential adverse aesthetic impact. *See* Kane Surrebuttal, pp. 3-4; *and* Kane THT, 2/9/11, pp. 44-45.

239. Site visits by non-petitioner expert witnesses verify that Raphael's 18 exhibits do not accurately portray the extent of visibility for the neighboring communities. *See* Henderson-King THT, 2/9/11, p.12.

240. Raphael's analysis is faulty because he incorporates purported societal benefits. *See* Raphael THT, 2/8/11, pp. 196-198; 200-203; 239.

241. Raphael's 18 exhibits do not accurately portray the extent of visibility for the neighboring communities. Henderson-King THT, 2/9/11, p. 12.

242. There is no screening in certain locations where GMP's expert states there is screening. Kane THT, 2/8/11, p.45.

243. The elevation shown in Mr. Raphael's data set could be inaccurate by 7 to 15 meters. Raphael THT, 2/8/11, p. 22. (Mr. Raphael did not know the margin of error with respect to forest data used. *Id*. at 25.)

244. Raphael use of the turbine's hub height in his visual analysis neglects 150 additional feet of blade height, which can increase the turbines' visibility. Kane THT, 2/8/11, p. 44-45.

245. Despite Raphael's insinuations small towns are not required to designate a road as a scenic highway in order for the impact of the turbines on that landscape to be considered

at the same level as if they had been so designated. Raphael THT, 2/8/11, p.237.

246. By contrast, Mr. Kane's viewshed analysis thoroughly and accurately incorporates all areas potentially affected as he chose the more cautious approach, while still verifying his analysis with site visits and careful review of Petitioner's data. *See* Kane Surrebuttal Kane, p. 4.

247. GMP has failed to show the PSB the details of the clearing and re-vegetation program DPS Expert Kane stated was needed to mitigate the impact of the connecting transmission lines in conjunction with the access road, (neither of which are a natural part of the working landscape). Kane PDT, p.13; *see, also,* Kane Surrebuttal, p. 13.

248. If wind projects get lined up all along the secondary ridge of the Green Mountains, Northfield, Granville, as you hike the Long Trail, 30 years from now you could be looking at turbines off to your right the whole way, which would be a significant cumulative impact to large sections of the Long Trail. Page THT, 2/9/11, 208-209.

249. Reducing the size of the project would reduce the risk of future, undue cumulative impacts.

250. Mr. Raphael's aesthetics analysis did not consider the impact of the project on wildlife and habitat fragmentation, the potential for annoyance from turbine noise or shadow flicker, the potential economic impacts such as to property values or tourism, the loss of recreational opportunities on the ridgeline in the area, the intrinsic importance of the forested area to those who live around it, and the ability to view the mountains in their natural state. Raphael THT, 2/8/11, pp. 118-119, and 150.

251. A public investment does not need to be recognized as a scenic resource in order to be evaluated under the public investment criteria. Raphael THT, 2/8/11, p. 48.

252. Green River Reservoir is a unique place with a wilderness character, and a public investment that would be impacted by the project. PET-DR-2, p. 39.

253. Tillitson Camp along the Long Trail is the most significant scenic area with direct views of the project. Raphael THT, 2/8/11, p. 75.

F. Health Impacts of Noise

254. LMG proposes that the Board impose a 30dBA standard inside the home, measured just below a fully open window, a 35 dBA exterior standard and a 35dBl standard at the property line, based on a maximum of1 hour averaging. *See* Loveko Rebuttal, pp. 2-11.

255. Infrasound has been an issue raised in the context of wind turbines. McCunney THT, 2/10/11, p. 31.

256. It is wise to check all frequencies of noise for the turbines, including infrasound. McCunney THT, 2/10/11, p. 35.

257. Scientific studies have shown that guinea pigs, like human beings, are affected by infrasound'; therefore, it is logical that cows, dogs, and other animals may also be affected. LMG Surrebuttal, p. 1; *see, also,* Lovko Surrebuttal, pp. 12-13.

258. The potential adverse health impacts from noise, caused by annoyance, the fluctuating nature of wind turbine noise, and sleep disturbances since noise occurs more at night is undisputed. McCunney THT, 2/10/11, pp. 56-57.

259. The main health effect of noise stress is disturbed sleep, which may lead to other consequences. McCunney THT, 2/10/11, p.22-23.

260. There can be indirect health impacts from wind turbine generated noise levels below 45 dBA, including sleep disturbance or deprivation, annoyance, and stress. McCunney THT, 2/10/11, pp. 40-41.

261. Health effects associated with sleep disturbance may be experienced at decibels under 45 dBA. McCunney THT, 2/10/11, p. 41.

262. Sound levels from wind turbines below 45 dBA may cause an adverse effect on people's health and well-being. McCunney THT, 2/10/11, p. 41.

263. Sleep deprivation can increase risks of high blood pressure and myocardial infarction. McCunney THT, 2/10/11, p. 56.

264. People with Asperger's Syndrome, like Lowell Mountains Group member Jim Blair, may be more sensitive to noise. McCunney THT, 2/10/11, p. 138.

265. The World Health Organization ("WHO") recognizes annoyance as a critical health effect. McCunney THT, 2/10/11, p.25.

266. Members of the scientific community believe there is a need for further research directly addressing the physiological consequences of long-term low-level infrasound exposures on humans. McCunney THT, 2/10/11, p. 29.

267. "Based on our understanding of how low frequency sound is processed in the ear and on reports indicating wind turbine noise causes greater annoyance than other sounds of similar level and affects the quality of life in sensitive individuals, there is an urgent need for more research directly addressing the physiological consequences of long term low level infrasound exposures on humans." McCunney THT, 2/10/11, pp. 30-31.

268. The project is proposed for a rural area, where background noise levels are very low, lower than 16 decibels. Kaliski Rebuttal, p. 9.

269. There is a significant difference between the background level of noise at an airport or highway and that in a quiet rural area. McCunney THT, 2/10/11, p. 101.

270. The level of noise from a turbine will be more perceptible in a place like Lowell, where the sounds of nature currently predominate, than a place like Manhattan where there are lots of other background noises. McCunney THT, 2/10/11, p. 109.

271. Use of averaging allows the turbines to exceed the threshold levels for health impacts several times per hour, day or week, yet still meet the standard. James Rebuttal, pp. 4-5.

272. "If the main goal is to prevent sleep disturbance, sounds should not be averaged or would need to be averaged over very short time periods. Otherwise the 'peaks' of sound that are enough to disrupt sleep will be undetectable when averaged out with quieter times. If this is not done, then compliance becomes uncoupled from the goal that it was set out to achieve, which is prevention of sleep disturbance." Lovko Rebuttal, 11/22/10, p.5.

273. Requiring that the standard be met at the property line ensures that non-consenting landowners will continue to have the rights to full use of their properties.

274. The purpose of setbacks from the project to adjacent property lines would be to protect health and ensure safety of members of the public as well as to protect the character of the neighborhood.

275. In Maine, for example, the turbine noise levels are measured at the boundary of the property owned by the proposed developer in order to determine compliance. McCunney THT, 2/10/11, p.164

276. "Maine DEP has been evaluating noise models and predicted noise levels from proposed wind power facilities using a handicapping system that requires an applicant to prove that dBA noise levels will be at such a level at property boundaries that they are effectively controlling for low frequency noises in the dBC range." PET-RJM-3 p.4.

277. "LFN (low frequency noises) encounter less absorption as they travel through air than higher frequency sound, so they persist for a longer distance; the amount of sound transmitted from the outside to the inside of a building is higher with LFN; and some models for assessing impact of noise do not adequately include LFN." PET-RJM-3, p.4.

278. The figure of 15-decibel attenuation from outside to inside varies based on the construction of the house, its age, the quality of the windows, and lots of other factors. McCunney THT, 2/10/11, p.165.

279. Without testing the actual noise attenuation from outside to inside is unknown. *Id.*

280. It is possible that the noise level could be met at the house but not at a portion of the non-consenting adjacent landowner's property; however, if the noise limits were expressed in a set back then people in the vicinity would have a more reliable guarantee that the noise levels at people's homes and residences would be met. McCunney THT, 2/10/11, p. 170.

281. GMP's own health expert agrees that the noise from wind turbines should be kept below 35 decibels. McCunneyALB-Cross-7 at 37-38.; McCunney THT, 2/10/11, p.104.

282. A noise limit of 30dBA inside is required avoid sleep interruption. Irwin THT, 2/24/11, p.62.

283. A noise limit of 35 dBA outside and 30 dBA inside is the minimum necessary to protect the health and safety of the sleeping public, and to avoid an undue adverse aesthetic effect caused by noise.

IV. ARGUMENTS

A) THE PROJECT IS GENERALLY OUT OF SCALE WITH ITS SURROUNDINGS, AND IS NOT IN THE PUBLIC GOOD

The PSB must determine whether the project is in the "general good of the state." Vt. Stat. Ann., tit. 30, § 248(a)(2)(B). This is a broader concern than whether the project will result in a positive economic benefit. Vt. Stat. Ann., tit. 30, § 248(b)(4). The record is insufficient for the PSB to conclude that the project is in the general good of the state.

The uncalculated carbon sequestration lost by clear-cutting at the project site, the permanent destruction of fragile natural areas, segmentation of the 12th largest intact section of northern forest, elimination of a state significant Montane Spruce forest, the sweeping aesthetic impacts, the risk of health impacts, the absence of adequately predictable financial benefits, and the limited electricity production all weigh against issuing a CPG in this docket. Unlike the Sheffield and Georgia wind projects, the Lowell Mountain wind project would be overly burdensome without sufficiently greater benefits to justify the substantially more significant impacts.

Petitioners have further failed to account for the substantially greater benefits of employing small-scale renewable resources throughout Vermont, rather than constructing huge industrial wind turbine arrays atop sensitive ridgelines. With options such as solar, small-scale-hydro, bio-gas, methane digesters, wood and waste pellet gasification, cogeneration, and even sensibly sized windmills, it is unclear why Petitioners would opt for the most destructive and aesthetically displeasing renewable resource available. Only tax credits and extravagance explain GMP's decision to enrich itself at the expense of the Lowell Mountain range. Fortunately, the PSB exists to protect the public not to authorize any renewable electric generation facility regardless of the impacts. The undue adverse impacts of project, combined

with the modest benefits and obvious superiority of alternatives, compels a finding that the project would not be in the public good.

(1) Additional Hearings are Necessary if a CPG is Issued

In the event the PSB issues a Certificate of Public Good, LMG requests additional proceedings to determine the Petitioners' compliance with conditions related to all aspects of the project not specifically delineated at the time of the Technical Hearings. Post-certification proceedings are appropriate to determine whether a project has complied with conditions imposed by the PSB. *In re Vt. Elec. Power Co.*, 131 Vt. 427, 435, 306 A.2d 687, 692 (1973) (stating that use of post-certification proceedings is "an accepted practice of the Board and administrative tribunals generally"). Further proceedings should be held to determine adequate setbacks from the project to neighboring property boundaries, camps or residences, actual attenuation of sound at those same locations, the actual location and terms of all proposed conservation easements, the actual location and character of any new mitigation areas, the difference in cost and financial benefit of the project necessitated by compliance with GMP-ANR-1, the adequacy of NRO mode on the final turbine model selected, the actual lighting plan for the project, and as appropriate issues raised in the stormwater and wetlands permitting processes.

B) THE PROJECT WOULD UNREASONABLY INTERFERE WITH THE ORDERLY DEVELOPMENT OF THE AREA

Zoning bylaws are designed to implement the town plan, and may provide meaning where the plan is ambiguous. *In re Kisiel*, 172 Vt. 124, 130 (Vt. 2000). Here, the Lowell Town Plan provides little guidance regarding installation of industrial-scale wind turbines, exceeding 400 feet in height and requiring clearing and road building over four (4) miles of the secondary

ridge of the Green Mountains. The Lowell Zoning Bylaws thus provide guidance, designating windmills a conditional use in the Conservation Mountain District where the project site is located. Lowell Zoning Bylaws, March 4, 2003, p. 8. Conditional use designation means that the duly enacted land use policy of the Town of Lowell is that wind turbines shall not adversely affect the character of the area. *Id*, § 206.01, pp. 9-10.

The project will have an undue adverse effect on the character of the area, completely transforming a pristine, peaceful piece of undisturbed nature into an unsightly, noisy, fragmented and denuded ridgeline. The orderly development of the area, consistent with the Town of Lowell's governing documents, would permit continued growth of small-scale wind or other renewable electric generation projects. An industrial-scale wind generation facility along over three miles of the Lowell Mountain ridgeline, causing severe environmental and aesthetic impacts while producing limited electricity intermittently feeding into the ISO-NE grid, is not consistent with the orderly development of the area.

The Lowell Town Plan emphasizes maintaining the town's beautiful rural character as much as possible, recognizes an atmosphere of preservation contributes to a quaint New England town, and calls for maintaining the scenic Route 58 corridor. Development of renewable energy sources *focuses on residential windmills*.

The Eden Town Plan lists 29 historic resources entered in state register, notes scenic resources including Route 100 and 118, mentions various bodies of water and stresses that large obvious structures should be carefully sited to minimize impacts on scenic resources, specifically calling out the Long Trail as a place towers should not be located. The Eden Town Plan's reference to permitting wind generation focuses on residential wind development does not contemplate industrial sized turbines. (p.5) Finally, safety and aesthetic concerns predominate.

The Westfield Town Plan includes primary goals such as maintaining the rural character of the town. Telecommunications towers should be located while respecting the integrity of residential areas, aesthetic concerns and natural resource designed to minimize aesthetic impacts

The Craftsbury Town Plan emphasizes significance of the Common, and the three historic districts on the state register.

The Orleans County Regional Plan specifies weighing benefits and impacts not only on host town but also on other towns.

From an orderly development perspective, the project will actually provide little if any benefits. Only a few long-term jobs will be created, in exchange for permanent and extreme environmental impacts. Only a relatively small amount of electricity will be produced, at a relatively high cost. Rather than a large-scale wind project along the ridgelines, it would be more consistent with Vermont's working landscape, clustered villages and open undeveloped landscapes, to build renewable energy projects that fit in with their immediate surroundings.

Modestly-sized windmills, run-of-the-river hydroelectric turbines, pellet gasification relying upon forest products and recycled waste for fuel, solar arrays located near existing development, methane digesters, bio-gas plants, co-generation, heat pumps, fuel cells, and energy efficiency measures all would contribute beneficially to the orderly development of the area surrounding Lowell Mountain. Of all the renewable resource options, only windmills threaten to destroy a way of life, eliminate a sanctuary, ruin businesses, and wreak havoc on sensitive natural areas. The financial benefits of the project flow predominantly to a private corporation, while the externalized environmental harms are born by over one hundred local citizens, thousands of plants and animals, the waters held in trust by the people of Vermont, and

the unique views of our rolling ridgelines. Such adverse impacts in the service of unimpressive benefits often result from development that is promoted for political reasons, not the public good.

Where the public good is concerned, orderly development of an area should reflect the duly considered ordinances and policies of a Town. No project before a zoning board is put to a Town vote. Towns enact plans and zoning ordinances to express the policies of the citizens sitting as a legislative body. Simply putting a particular project to a town vote subverts, rather than enhances, the democratic nature of the decision-making process, because only those people with an interest in the question on the ballot at the time of the singular vote are heard. Whereas, a town plan or zoning ordinance is subjected to review and revision by the planning commission, at public hearings, and is ultimately put before a vote at town meeting. Taking an end-run around the municipal planning process by asking voters to decide whether a project should be approved is inappropriate at best and potentially corrupt. In this case, the explicit disclosure of the Town of Lowell's financial benefit from the project tainted the vote in favor of the project, and suggests that the planning documents should be given all the more predominance.

C) THE PROJECT WOULD NOT RESULT IN A NET ECONOMIC BENEFIT TO THE STATE AND ITS RESIDENTS

In determining whether the project will result in an economic benefit to the State and its residents, consideration should be given to what the precise extent of economic benefit the project will produce. Vt. Stat. Ann, tit. 30, § 248(b)(4). How is the economic benefit being proven? To whom will the economic benefits flow? How are the benefits being measured? Do the measurements account for contingencies? What are the actual economic benefits to the citizens of the State over the entire life of the project?

Petitioners provide only a paucity of economic analysis, and do not address the foregoing questions.

Mr. Kvedar performed two analyses: 1) converting the expected capital and operating costs associated with the project into a cost per kWh, in annual and levelized terms (underlying Mr. Smith's comparison of the project to alternatives based on the projected market cost of power); and 2) estimating the expected change in retail revenue requirements due to the project, based on a cost of service methodology. Kvedar PDT, 5/21/10, p. 4, lines 2-7. Mr. Kvedar's conclusion that the project would, after five (5) years, begin to have a retail rate impact lower than the market alternative both assumes consistently increasing market rates and fails to account for numerous project costs that have yet to be determined. Considering the significant project costs that have to be added into Mr. Kvedar's models to account for changes to the project caused by GMP-ANR-1 and decisions not yet made by Petitioners, and the prospect of market alternatives remaining flat or increasing at a lesser rate than anticipated, there is an insufficient record from which to conclude the project will result in an economic benefit to Vermont or its residents. *See, also,* Holland PDT, pp. 5-7.

In addition, the economic benefits impacts analysis performed by Mr. Kavet (Pet.-TEK-2) establishes that more than half of the initial $150 million investment under both project configurations will be for the physical turbine components, and will therefore result in virtually no in-state economic benefits. Pet.-TEK-2, p. 2-3. Long-term, the project will result in no more than 30 or so jobs. *Id.* at 3. The project is projected to result in direct payments to the State and Town of over $38 million over the entire 25-year lifespan. Thus, the question becomes whether between $40 and $50 million over 25

years is a fair price for destroying the Lowell Mountain range. Considering the impacts on the rural environment, landscape-dependent establishments like Eden Dog Sledding, declining property values resulting from rustic properties becoming part of an industrial wasteland, and the unknown costs resulting from decisions not yet made by the Petitioners, there is insufficient proof for the PSB to find the project would result in a positive economic benefit to the State.

Moreover, Mr. Kavet's economic impacts analysis only assesses impacts on property values in other states than Vermont. Kavet THT, 2/4/11, p. 134. Petitioners have utterly failed to provide any realistic Vermont-based analysis of the actual negative impacts to area property values that will likely be caused by the project. Kavet THT, 2/4/11, pp. 134-139.

D) THE PROJECT WOULD HAVE UNDUE ADVERSE EFFECTS ON THE NATURAL ENVIRONMENT AND NATURAL RESOURCES

The natural resource impacts of the project will be so severe that an eleventh hour Memorandum of Understanding was developed between GMP and ANR. GMP-ANR-1. The GMP/ANR MOU contains multiple conditions subsequent that require significant expenditures to preserve areas not presently under the Petitioners' control. LMG renews its objection to GMP-ANR-1, on the grounds that the exhibit requires undisclosed changes to the application and delegate to the Agency of Natural Resources decisions that should be part of the public CPG hearing process. What areas are placed under conservation pursuant to GMP-ANR-1, and the precise covenants imposed, should be the subject of further proceedings before the PSB.

Petitioners have not presented adequate studies of the project's impact on migrating birds or bats. At least a fall migratory bird analysis would be required to make the requisite findings. As in *East Haven*, without sufficient studies necessary to assess the proposed Project's potential impacts on birds and bats, a CPG cannot be issued. *See* In *Re: EMDC, LLC, d/b/a East Haven Windfarm*, Order Entered 7/17/2006, p. 91; *and* GMP-ANR-1 (ten turbines would still have inadequate cut in speeds based upon known data regarding bat mortalities).

E) THE PROJECT WOULD HAVE UNDUE ADVERSE EFFECTS ON AESTHETICS UNDER THE *QUECHEE* TEST

> Anything I can say about New Hampshire
> Will serve almost as well about Vermont,
> Excepting that they differ in their mountains.
> The Vermont mountains stretch extended straight;
> New Hampshire mountains curl up in a coil.
>
> *New Hampshire* by Robert Frost

Aesthetics is an area of human experience that although somewhat subjective, still conforms to analytic principals. Eliminating billboards from Vermont's roads, enacting Act 250 and incorporating its criteria into the Section 248 process, enabling local planning and zoning, and investing in marketing and tourism all evidence Vermont policy in favor of preserving the rural aesthetic throughout the state. Development projects should not have an undue adverse effect on aesthetics, scenic or natural beauty, historic sites or rare and irreplaceable natural areas. Vt. Stat. Ann, tit. 30, § 248 (b)(5), *and* Vt. Stat. Ann., tit. 10, § 6086(a)(8).

(1) Considering the Project's Significant Adverse Effects on Aesthetics, the Benefits of the Project Have Not Been Adequately Quantified, Mitigation is Insufficient, and Lower-Impact Renewable Projects Should be Selected Instead

In determining whether the project would have an undue adverse aesthetic impact under §

248(b)(5), the Board employs the so-called Quechee test. In re Amended Petition of UPC Vt. Wind, LLC, 2009 VT 19, ¶ 24 (Vt. 2009). The Board inquires first whether a project will have an adverse impact on scenic and natural beauty; if so, the next inquiry is whether the impact will be "undue." In re Times & Seasons, LLC, 2008 VT 7, ¶ 8, 183 Vt. 336, 950 A.2d 1189. An adverse impact is considered undue if: (1) it violates a clear, written community standard intended to preserve the aesthetics or scenic natural beauty of the area; or (2) it offends the sensibilities of the average person; or (3) the applicant has failed to take generally available mitigating steps that a reasonable person would take to improve the harmony of the proposed project with its surroundings. In re Amended Petition of UPC Vt. Wind, LLC, 2009 VT 19, ¶ 24.

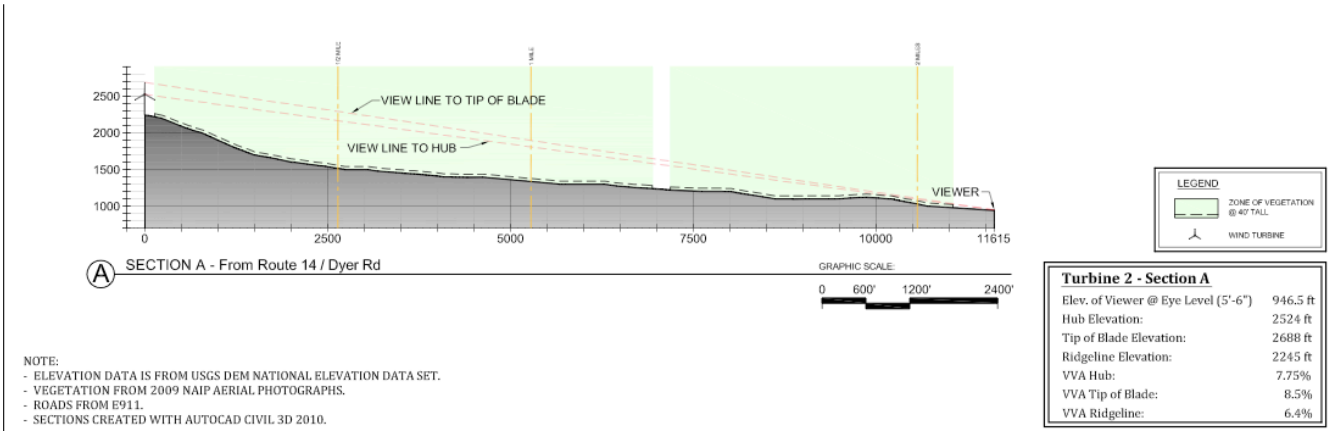
The project in UPC Vt. Wind, viewed from the surrounding area, was generally a distant view that was not overwhelming to observers. In re Amended Petition of UPC Vt. Wind, LLC, 2009 VT 19, ¶ 27. In this case, unlike UPC Vt. Wind, LLC, the project will be shocking and offensive to the average viewer, dominating the immediately surrounding landscape, rendering significant natural areas no longer significant, and imposing significant noise pollution upon two prominent valleys. LMG Proposed Findings of Fact, Supra, ¶ 150-234.

Department of Public Service ("DPS") witness Mr. David Lamont originally concluded that the project would not be in the public good, substantially because of its undue adverse aesthetic impacts:

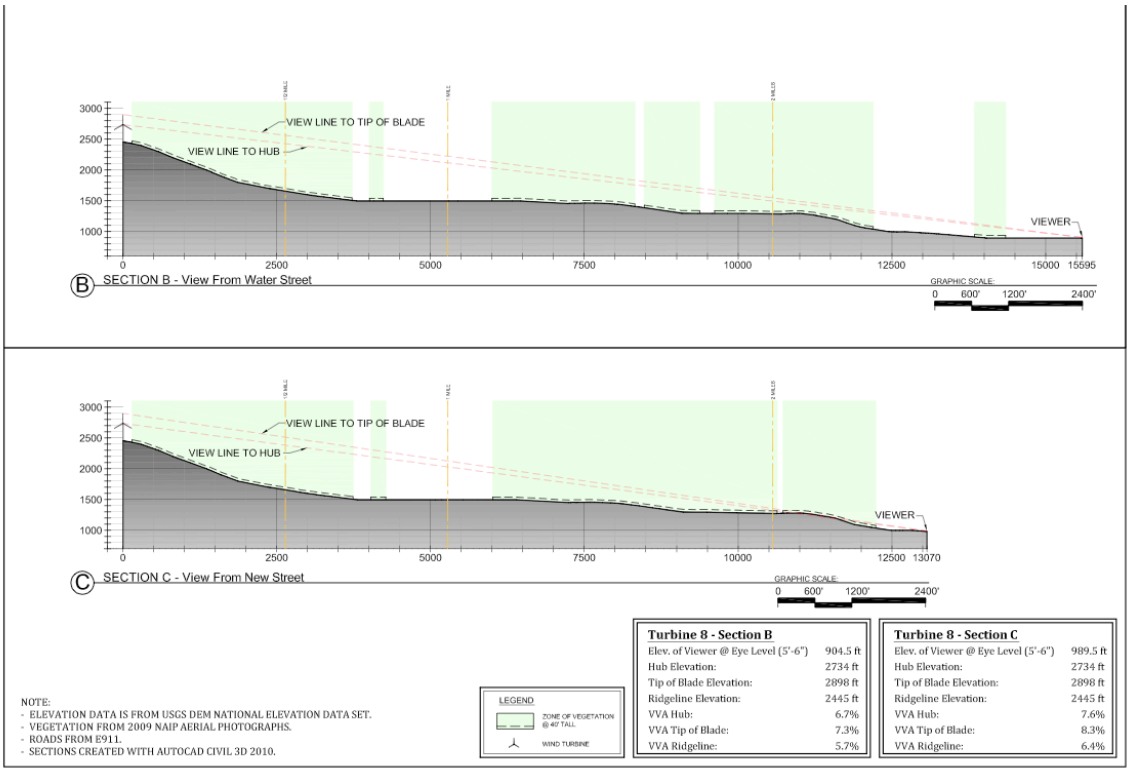
> In general, it is the Department's position that, as currently proposed, the project will not promote the general good of the State as required by 30 V.S.A. '248(a)(2). It is the position of the Department that the project is needed by both VEC and GMP as required by 30 V.S.A. '248 (b)(2), and that it would represent an economic benefit to Vermont. The project also represents a cost effective way to meet statutory goals for renewable energy supply. However, based on the testimony of other witnesses in this case, it is the Department's opinion that the aesthetic impact is undue and that the analysis of the transmission alternatives failed to consider other, potentially less costly alternatives to the proposed upgrade. As a result, I cannot conclude that the project is in the general good of the state.

Pre-filed Direct Testimony of Mr. David Lamont, 10/22/10, p. 2, lines 7 – 17.

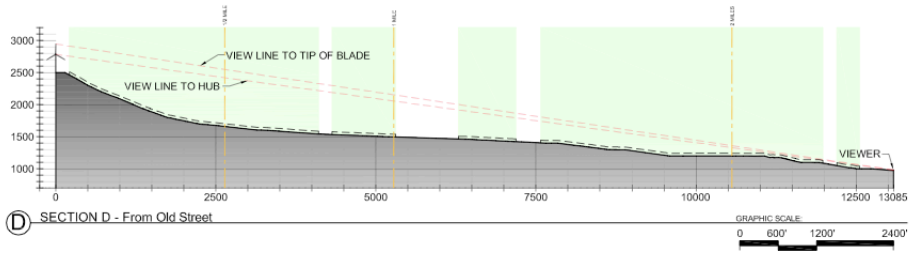
Mr. Lamont's Direct Testimony relied upon the aesthetics analysis performed by DPS witness Mr. Mark Kane. Mr. Kane produced "Kingdom Community Wind: Aesthetics Resource Impact Assessment Report," dated October 2010. DPS-MK-2. Mr. Kane found that Lowell Mountain's high elevation peaks constitute a prominent north-south oriented ridgeline central to the landscape within 10 miles of the project. Direct Testimony, Mark Kane, 10/22/10, pp. 5-6. Mr. Kane describes a prominent viewshed, as large as 25% of the overall land area within the 10-mile area impacted. *Id* at 6, lines 19-21; *and* DPS-MK-SUR-1. The most significant viewshed impacts of the project are from the east, graphically represented as such:

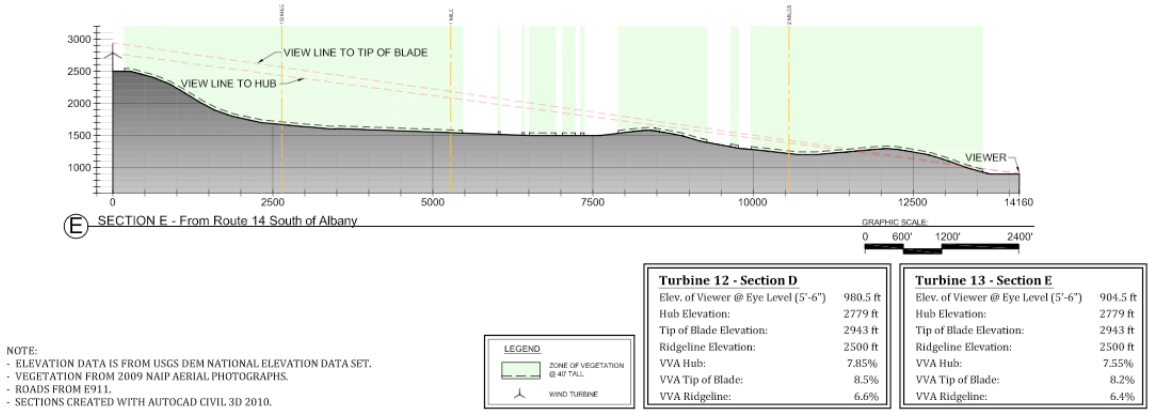


DPS-MK-SUR-2 (Section Views from Albany).



DPS-MK-SUR-3 (Section Views from Albany).





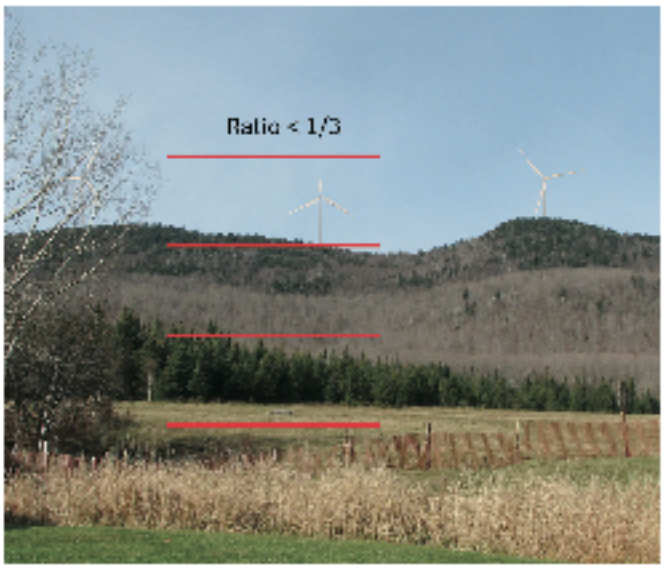
DPS-MK-SUR-4 (Section Views from Albany).

Mr. Kane's viewshed analysis was filtered through his own field observations and the careful review of other data provided by the petitioner. Kane Surrebuttal, 1/10/11, p. 10, lines 10-11. Based upon the viewshed impacts predicted by Mr. Kane's visibility analysis, and examination of E911 data, he estimates the view at up to 120 residences could be impacted by the project. Kane Surrebuttal, 1/10/11, p. 5, lines 2-9; *and* DPS-MK-2, pages 29-30; *and* DPS-MK-SUR-1. Such impacts may include frequent views of the project while residents go about their daily lives. Kane Surrebuttal at 5. And, "areas of high visibility are highly correlated to large stretches of major roadways (Route 100 and 14) and areas of recreational use (Tilliston Camp and Belvidere Fire Tower on the Long Trail VAST trails and the Catamount Nordic Trail). Kane Direct, 10/22/10, p. 8, lines 4-7.

Mr. Kane consistently testified that the project would have an undue adverse impact on aesthetics for areas within 3 miles of the turbine array, because the industrial development would be shocking, offensive and incompatible with its surroundings. Kane Direct, 10/22/10, pp. 9-11; DPS-MK-2, fig.6; Kane Surrebuttal, 1/10/11, p. 8, lines 14-22; Kane THT, 2/9/11, pp. 31-32. The average persons within three miles would be shocked or offended by the project. Kane Surrebuttal, p. 9; DPS-MK-SUR-2; Pet.-DR-2, Appendix 9d Rev. If the OCAS system is not installed, the project's aesthetic impact would certainly be unduly adverse. Kane THT, 2/9/11, pp. 85-86. The offensive presence of the project in the viewshed can be predicted by the following simulations:

Photograph 8: Enlargement of simulation from Route 100 in Westfield (Figure 13) with potential clearing areas

DPS-MK-2, p. 18.



Photograph 11: Simulation from Nelson Farm with scale reference

DPS-MK-2, p. 26.

Returning to Mr. Lamont's changed testimony (first finding the project was not in the public good, then agreeing with Petitioners that the project is in the public good), the most influential factor contributing to that change is the project's impact on carbon ("CO^2") emissions

reductions:

> The principal benefit associated with this project is its production of carbon free renewable electricity for GMP customers.
>
> Lamont Rebuttal, 1/10/11, p. 2, lines 19-20.

Upon changing his testimony, Mr. Lamont did not quantify any changes to the aesthetic impacts of the project; instead, he subjectively weighted aesthetics against theoretical carbon reduction numbers without explaining how each was measured. Lamont THT, 2/24/11, pp. 109 – 111. Mr. Lamont acknowledged that Mr. Kane's testimony remained that the project would result in an undue adverse impact on aesthetics. Lamont THT, p. 111, lines 1-2. Instead of identifying reasons the project's actual aesthetic impact would not be unduly adverse, Mr. Lamont focused on the carbon emissions reductions and associated renewable energy policies he believes the project will help implement. Lamont Surrebuttal, pp. 3-7.

Mr. Lamont credited the project with CO^2 emissions reductions, treating renewable power as an economic and environmental benefit (Lamont THT, 2/24/11, pp. 91-92), without identifying any quantifiable CO^2 reduction from the project. Lamont THT, 2/24/11, p. 110, lines 15-18. Instead of measuring CO^2 reduction "benefits", Mr. Lamont apparently inferred a CO^2 reduction benefit based upon the prediction that power produced by the project would most likely replace non-renewable generation somewhere else on the grid. Lamont THT, 2/24/11, pp. 107-109. Mr. Lamont testified the wind turbines would generally, "avoid the operation of a unit in the NEPOOL grid within New England, and generally the marginal unit, although not always, is a combined cycle gas unit, at least for the kind of foreseeable future." Lamont THT, 2/24/11, p. 108, lines 6-10.

The reduction in such combined cycle gas electricity production would involve turning down units, not shutting down base load power. Lamont THT, 2/24/11, pp. 108-109. Whether

there would be a net CO^2 reduction during the project's operation depends, therefore, on whether displacement of carbon emitting power would occur *and* result in a net reduction in carbon emissions. Only if the turn down ratios of the power plants reducing capacity to accommodate the wind power are established, and the carbon production of those plants at lower production levels is sufficiently less than at higher productivity levels, would provable net carbon reduction occur. *See* Lamont PDT, 10/22/10, pp. 7-8. There is not, however, any evidence in the record that establishes the net carbon reduction that would be directly and proximately caused by the project, if any, with actual measurements of turn down ratios and carbon production when relevant plants operate at lower production levels and thus lower efficiencies. Lamont PDT, p. 7, line 15 – p. 8, line 3.

Petitioners have failed to establish the project would result in net carbon emissions reductions. Any net carbon reduction resulting from the project could only be calculated after considering the loss of carbon sequestration caused by deforestation along the Lowell Mountain ridgeline, which has not been done. Lamont THT, 2/24/11, p. 109, lines 2-14. Additionally, Mr. Lamont's belief that wind turbine operation results in CO^2 emissions savings is largely based upon the planning studies performed by ISO New England, which also fail to account for the carbon sequestration lost to deforestation. Lamont PDT, 10/22/10, p. 7, line 5 – p.8, line 3 (citing *New England Electricity Scenario Analysis Final Report*, ISO New England, Inc., August 2007, http://www.iso-ne.com/committees/comm_wkgrps/othr/sas/mtrls/elec_report/scenario_analysis_final.pdf). The record is devoid, however, of any analysis regarding the actual efficiency reductions associated with ramping down various base-load power production facilities to accommodate intermittent wind power production. Nor has there been an assessment of the additional carbon emissions

resulting from operating various base load generation plants at lower efficiencies. Although wind power may usually offset combined cycle gas plants, some other facilities will eventually be online and required to reduce their generation at times the wind power becomes available. Efficiencies will likely depend upon when the wind power is available throughout the year, with predictable correlations between times when wind is usually robust or weak. No such contingencies are even discussed, much less measured, in any detail by Petitioners' or DPS's experts. Therefore, the Petitioners have failed to prove the project would result in net carbon emissions reductions.

Mr. Lamont cites 30 V.S.A. § 8001 [Renewable energy goals], *and* 30 V.S.A. § 202a. [State energy policy] in support of the proposition that the renewable energy benefits of the project outweigh the undue adverse impacts on aesthetics. Lamont Surrebuttal, 1/10/11, pp. 3-6. Again, without calculating the loss of carbon sequestration from clear-cutting at the project site (Lamont THT, 2/24/11, p. 109, lines 12-15), and without quantifying the impact on aesthetics (Lamont THT, 2/24/11, p. 110-111), Mr. Lamont's change in position is not supported by the evidence. Moreover, Mr. Lamont never explains why carbon reduction was not significant enough a factor to find the project was in the public good when he filed his Direct Testimony, but the aesthetic impact was somehow cured by carbon reduction when his Surrebuttal Testimony was filed. The size of the proposed wind turbines, and the likely impacts on the viewshed, only increased during the course of the proceedings. Since no changes to the project reduced its undue adverse effects on aesthetics, only Mr. Lamont's views about the benefits of wind power seem to have changed.

To the extent the project is intended to satisfy renewable resource goals, meaningful progress may be elusive. Robert Holland's Surrebuttal Testimony, ¶ 11, cites "Toward a New

National Energy Policy: Assessing the Options" to support his position that the federal and state goals behind promoting renewable energy may not be met by the project. Little is being done to reduce oil usage, as renewable projects do not replace the high or average carbon emitter. *Id.* Instead, they generally replace the highest cost carbon emitter, frequently low carbon natural gas. *Id.* Incentivizing the use of a particular fuel fails to reward all fuels based on reduced carbon content. *Id.* Renewable portfolio standards alter the fuel mix without doing much to reduce energy use, and the resulting mix of generation spurred by a renewable energy portfolio is more expensive than without the policy. *Id.* In areas with low levels of competition, like Vermont, the costs of expanded fuel portfolios are borne by rate-payers. Holland Surrebuttal, ¶ 11.

The carbon reduction cited by Mr. Lamont as weighing in favor of the project, if it could be established, is meaningful to Mr. Lamont in the context of the statutory provisions he cites as evincing state policy in favor of renewable energy projects. Lamont Surrebuttal, pp. 3-5. Mr. Lamont analogized the project to *In Re: Petition of EMDC, LLC, d/b/a East Haven Windfarm* ("East Haven"), Docket 6911, Order of 7/17/2006 at 103, n.125, where the PSB attempted to, "balance the benefits and costs of the proposed development." Mr. Lamont attempted to apply the same balancing in this docket as the Board applied in *East Haven*, and relied upon *East Haven* as precedent to find this project, "taken as a whole, satisfies that precedent." Lamont Surrebuttal, 1/10/11, p. 7.

While the *East Haven* and other decisions of the PSB may provide useful guidance, the aesthetic impact of each proposed project must be judged based on the facts particular to it. *East Haven* at 52. The *East Haven* project involved four 1.5 MW turbines on the 17-acres at the summit of East Mountain, with turbines spaced approximately 900 feet apart and nacelles 220 feet above the ground. *Id.* at 9, ¶ 10. The PSB found in *East Haven* that the number of

individuals who would experience an undue adverse aesthetic impact were quite small in number, and that when the overall benefits and impacts of the proposed Project are considered, the turbines would not have an unacceptable impact on the conserved Champion lands. Lamont Surrebuttal, 1/10/11, p. 6, lines 19-22 (quoting *East Haven* Order, dated 7/17/06, internal quotations omitted).

Mr. Lamont applies the reasoning contained in the *East Haven* case to conclude that 20-21 towers over 400 feet high would not have an unacceptable impact on over 120 residences in the rural residential area surrounding the project. *Id.* *East Haven* is not analogous to the project in this docket, however, because the *East Haven* project was substantially smaller, and impacted substantially fewer residents and tourists.

In addition, the rational behind Mr. Lamont's Surrebuttal Testimony and the *East Haven* Order regarding aesthetics, is that relatively small impacts can be outweighed by the societal benefits of renewable power. *East Haven* at 102. In *East Haven,* the PSB found:

> deciding whether to approve this wind-generation facility requires a balancing between the decided benefits of this clean energy resource and its undeniable adverse impacts on the surrounding conserved landscape. Consistent with this Board's precedent, our consideration of a project's impacts on aesthetics and scenic or natural beauty must be significantly informed by overall societal benefits of the project.
>
> *East Haven* at 102 (citing In Re: Northern Loop Project, Docket 6792, Order of 7/17/03 at 28) (internal quotations omitted).

That rational is not applicable to the Lowell Mountain project proposed by Petitioners, because the benefits of the project have not been adequately proven and the undue adverse impacts are so extreme. Kane Direct, 10/22/10, pp. 9-11; DPS-MK-2, fig. 6; Kane Surrebuttal, 1/10/11, p. 8, lines 14-22, and p. 9; Kane THT, 2/9/11, pp. 31-32; DPS-MK-SUR-2; *and* Pet.-DR-2, Appendix 9d Rev.

Mr. Lamont provides no quantification to support his bald assertion that the project would

result in such larger benefits as to outweigh the significantly larger undue adverse impacts, as would be necessary to make the *East Haven* case analogous. GMP's President Mary Powell even acknowledged during cross-examination that the impacts of the project must be understood in order to balance benefits and impacts, and that the CPG process should identify any aesthetic impacts. Powell THT, 2/3/11, pp. 142-143. Ms. Powell refused to acknowledge, however, that her broad justifications for the project fail to recognize a greater magnitude of impacts than those approved in the past. *Id* at 144, lines 16-22. In the final analysis, there is simply no justification for treating a project with at least five times the aesthetic impacts as the *East Haven* project as satisfying the same balancing test, without providing more detailed proof of defined benefits and explaining how §248(b)(5) accommodates the established undue adverse effect.

(2) The Project Should be Denied a CPG, Considering the Plain Meaning of 30 V.S.A. § 248(b)(5) and the Requirements of the *Quechee* Test

Appropriately balancing the societal benefits of wind projects against the aesthetic impacts must be done without eliminating from the 30 V.S.A., § 248 permitting process all meaningful protection of aesthetic resources. Vt. Stat. Ann., tit. 30, § 248(b)(5), *and* Vt. Stat. Ann., tit. 10, § 6086(a)(8). Indeed, if the project's benefits are not established or remain relatively undefined, and significant aesthetic impacts are overlooked by reference to inapposite, smaller projects approved in the past. Thus, the project threatens to weaken into oblivion the policy of protecting Vermont from undue adverse aesthetic impacts.

Interpretation of statutes requires ascertaining and giving effect to the intention of the Legislature. *State v. Legacy*, 116 Vt. 320, 322, 75 A.2d 668. The legislative intent must be ascertained from the plain language of the statue. *Doubleday v. Town of Stockbridge*, 109 Vt. 167, 172, 194 A. 462. The ordinary meaning of the language must be presumed to be intended,

unless contrary to the object of the statue. *Snyder v. Central Vt. Ry.*, 112 Vt. 190, 193, 22 A.2d 181. Where the meaning of a statute is plain, courts have the duty to enforce it according to its obvious terms, and there is no necessity for construction. *Donoghue v. Smith*, 119 Vt. 259, 263-264 (Vt. 1956) (internal citations omitted).

Thus, although the legislature enacted the statutory provisions Mr. Lamont cites in support of balancing the aesthetic impacts of the project against allegedly weightier renewable energy resources policy, Mr. Lamont fails to account for the fact that the plain language of 30 V.S.A. § 248(b)(5) was never altered. Mr. Lamont previously relied upon Mr. Kane's unyielding opinion that the project would result in undue adverse effects on aesthetics, and accordingly Mr. Lamont found the project would not be in the public good. Lamont PDT, 10/22/10, p. 11.

The legislature clearly could have enacted a "renewable energy" exception to 30 V.S.A. § 248(b)(5), but chose not to do so. Thus, in order to be allowed, a high-impact project must either not have an undue adverse effect on aesthetics to start with, or have an undue adverse effect until demonstrably, significant benefits are established that render any undue adverse impacts no longer undue. Instead of finding either alternative applied, Mr. Lamont merely concluded that the benefits of the project outweigh the impacts, without addressing whether the undue adverse impacts on aesthetics identified by Mr. Kane were somehow rendered no longer undue by the project's calculated benefits. Lamont Surrebuttal, 1/10/11, p. 2.

The statutory construction question is thus whether the project can have undue adverse effects on aesthetics, and still comply with 30 V.S.A. § 248(b)(5). LMG submits that it cannot. The plain meaning of the statute is clear:

> (b)Before the public service board issues a certificate of public good as required under subsection (a) of this section, it shall find that the purchase, investment or construction:
> ***
> (5) with respect to an in-state facility, will not have an undue adverse effect on esthetics,

> historic sites, air and water purity, the natural environment and the public health and safety, with due consideration having been given to the criteria specified in 10 V.S.A. §§ 1424a(d) and 6086(a)(1) through (8) and (9)(K).

Thus, in order to comply with the statute, a CPG may be issued only if the project will not have an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment and the public health and safety. There is no room in the statue for balancing an *undue* adverse effect on aesthetics against the benefits of renewable power derived from other statutory provisions. Therefore, since the project was repeatedly found to have an undue adverse effect on aesthetics, a CPG may be issued only if the adverse effects were somehow ameliorated so as to no longer be "undue."

Vanishing the word "undue" from the phrase "undue adverse effects" in consideration of a project's renewable resource benefits (if proven) is similarly impermissible under the *Quechee* test. *In re Vt. Elec. Power Co*., 2006 VT 69, ¶ 9 (Vt. 2006) (adverse impact on aesthetics is undue if project violates a clear community standard, offends the sensibilities of the average person, or the applicant has failed to take generally available mitigating steps that a reasonable person would take to improve the harmony of the proposed project with its surroundings.)

There has been no reduction in the adverse effects of the project since Mr. Lamont's original opinion that the project would not be in the public good. Kane PFD, *and* Kane Surrebuttal. Only projects with less significant aesthetic impacts than building 20-21 wind turbines, over 400 feet tall on the Lowell Mountain ridgeline, have been found to be in the public good based upon balancing the adverse effects against the policy benefits of promoting renewable power. *See, e.g., In re Amended Petition of UPC Vt. Wind, LLC,* 2009 VT 19; *and East Haven; c.f. In re Halnon*, 174 Vt. 514 (Vt. 2002)(where single windmill was found to violate Quechee test, because of inadequate mitigation, and finding it would be offensive and

shocking to neighbors and the average person). Moreover, in those cases the effects were deemed adverse (as opposed to unduly adverse) with due consideration to the countervailing policies in favor of renewable energy Mr. Lamont describes. In this case, however, the project was consistently determined to have an undue adverse effect on aesthetics, the impacts have not been reduced, and the benefits have remained consistently speculative. Only the subjective opinion of Mr. Lamont seems to have changed from his Direct Testimony to his Surrebuttal Testimony, as there were no objective changes that would reduce the project's impacts on aesthetics. Accordingly, the project would have an undue adverse effect on aesthetics and should not be granted a Certificate of Public Good.

(3) Generally Available Mitigation Measures Have Not Been Taken

Petitioners have failed to take generally available mitigating measures that a reasonable person would take to improve the harmony of the project with the surrounding area. *See In re Halnon*, 174 Vt. 514 (singular wind tower denied CPG, in part due to failure of the applicant to take generally available mitigating steps which a reasonable person would take to improve the harmony of the proposed turbine with its surroundings). The project could easily be scaled down by reducing the number of wind turbines to 15 or 16, the same number of turbines allowed in Sheffield. *In re Amended Petition of UPC Vt. Wind, LLC*, ¶ 3. The turbines selected could be slightly smaller to reduce the visual impact of the project and produce less noise. Id. Yet, rather than select any less-invasive alternatives, Petitioner has consistently increased the size and noise impacts of the proposed turbines, ensuring the adverse impact on aesthetics will remain undue. *See, e.g., In re Vt. Elec. Power Co.*, 2006 VT 69, P10 (Vt. 2006) (where VELCO proposed a number of measures to mitigate the adverse aesthetic effects of a 345-kv line, and the Board found that these and other supplemental mitigation measures would negate any undue impacts

from the line). Petitioner's largess is such the most recently proposed turbine would be taller than the other models, producing enough noise to require a Noise Reduction Operation mode to ensure the turbines remained within even the 45 dBA limit set by the PSB in other (more isolated) wind projects.

(4) The Project will Have an Undue Adverse Effect on Historic Sites, Contrary to 10 V.S.A. § 6086(a)(8) and 30 V.S.A. § 248(b)(5).

As has been the case with many GMP witnesses, Ms. Pritchett fails to establish that this project will not cause undue adverse impacts on historic sites. Her evaluation is lacking many important components and her analysis shows bias, resulting in an incomplete and non-credible conclusion. .Initially, her report states that she reviewed reference materials provided by Landworks and VERA but nowhere does it state that she reviewed any of the analysis performed by the Department of Public Service's expert, Mark Kane, which presents a starkly different picture of the 10 mile viewshed and the undue adverse effect these turbines would have on it. Although she performed fieldwork, as was evidenced during cross examination, her fieldwork was incomplete as it excluded certain locations which would have clear, unobstructed views of the project. Finally, she neglected to analyze the noise level from GMP's newly proposed turbines, a required part of the *Middlebury* analysis.

Ms Pritchett's definition of viewshed includes the natural environment that is visible from the region. Pritchett THT, 2/9/11, p.9. She agreed that historic preservation in Vermont is important, Pritchett *Id*. at 10, especially as development pressures intensify. *Id*. She further agreed that preservation includes places as well as buildings, and that the historic import of places includes preserving their views. *Id*., p.10. For example, a modern building sited in the middle of Craftsbury Common would degrade the historic experience that the town sought to

preserve through its creation of a historic district. I*d*., pp.10-11. Likewise, as noted in her report, part of the qualities that make important resources historic are the landscape and setting, or character. PET-LP-1 pp. 19, 20-21. [5]

Pritchett states that all the towns that have plans "identify important historic sites, and scenic views or landscape elements considered worthy of preservation." *Id*. at 4. [6] (Similarly, the Northeast Vermont Development Association Regional Plan specifically calls for considering negative impacts and potential benefits not just on host town but also on other affected towns when assessing wind energy development. It requires specific consideration of the appearance and operation of facilities as they could impact the essential character of an area and siting proposed turbines to minimize visual impacts. Pritchett PET-LP-1 p. 5.

Yet, despite these acknowledgements, in her report Pritchett uses various justifications to largely dismisses or downplay the impact of the turbines. For example, and, perhaps the most preposterous, she claims that for some resources there will be no "interference with the ability of the public to interpret or appreciate the historic qualities because…[they] have already undergone alteration and change due to modern encroachment or alterations to historic buildings." Pritchett PET-LP-1 p. 19. Pritchett fails to explain, however, why alterations and change to historic buildings effects the ability of citizens to enjoy historic places, like the Bayley

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[5] Nowhere does Pritchett acknowledge the importance of the mountains to Vermont's historic aesthetics. Indeed, nearly every painting or photograph depicting Vermont's rural, "quaint new England town" quality includes its mountains. Certainly, the presence of spinning 459 foot tall metal turbines substantially alters this picture, both directly and indirectly

[6] Lowell: noting the historic significance of the Bayley Hazen Road and preserving the scenic Route 58 corridor "from Lowell Mountain to Hazen's Notch maintained with development that will not detract from enjoyment of views along the corridor"; Eden: noting historic and scenic resources including Rte 100 and various bodies of water suggesting *residential* wind generation may be possible provided that it complies with scenic, aesthetic and safety considerations, large structures sited to minimize impacts on scenic resources; Westfield: identifying a primary goal of maintaining rural character, noting important natural and scenic resources such as Hazen's Notch, the Missisquoi River, and noting that telecommunication sitings should respect the integrity of aesthetic concerns and natural resources and be designed to minimize aesthetic impacts; Craftsbury: emphasizing the significance of the Common-noting its picturesque quality, identifying three historic districts and seeking to encourage emphasis on the town's historic heritage.

Hazen Road. Nor does she address in a realistic way how adding 21 turbines, 459 feet tall across nearly 4 miles of mountaintop would further impact peoples' to appreciate the historic villages and other places in the area immediately surrounding Lowell Mountain.

Further examples of Pritchett's faulty analysis can be found where she appears to mimic David Raphael by repeatedly downplaying the visual effects of the turbines. She focuses instead on the turbines' location atop the mountains, appearing to say that one's focus will be limited to the buildings and land below the mountains. She further attempts to minimize the turbines' impact by likening them to the windmills used in the 19th century. Pritchett PET-LP-1 p. 23.[7] Given what is known about the look of 19th century turbines and the look of these proposed turbines, this comparison is highly suspect.to say the least, made even more so given that Pritchett herself admits the turbines are "large and clearly modern." *Id*. at 20. She also espouses the belief that since you can turn away from the turbines and face east (at the Nelson farm for example), the presence of the turbines to the west as a backdrop will not cause an undue adverse effect Pritchett Report p.20. Simply put, Pritchett's refusal to find an undue adverse impact on the Nelson farm itself, despite contrary findings by every witness (except Raphael), makes her other conclusions not credible.[8] Add to this refusal, the determination made by DPS that within 3 miles of the project, the turbines would become a part of the visual fabric in the surrounding communities. Kane Surr. p.5.

Finally, Ms. Pritchett neglected three important aspects of review:

[7] "A wind farm is part of a working landscape. The turbines will be much taller than wind mills frequently used in the 19th century agricultural landscape, yet their use is associated with these earlier structures. Like the historic wind mills, today's wind turbines are not necessarily permanent features on the landscape. They may be removed at a later date when they are no longer needed and the landscape will remain intact without permanent change or intrusion. *Id*.

[8] This is especially true given Pritchett's own repeated emphasis on the visual integrity of the Nelson farm. PET-LP-1 pp.14, 17.

1. Her review of historic resources was incomplete. She did not know that a famous historical and literary figure had resided on Lake Eden, and that one of his poems actually mentioned the Lake. Pritchett THT, 2/9/11 pp.12-13. Moreover, Pritchett did not know that, unlike the Eden camp she chose to photograph, Lorca's historic camp had a clear view of the project. p.15.

2. Pritchett's *Middlebury* analysis[9], failed to incorporate "whether the proposed project will have other effects on the historic structure, landscape, or setting which are incongruous or incompatible with the sites' historic qualities, including, but not limited to, such effects as isolation of an historic structure from its setting, new property uses, **or new visual, audible or atmospheric elements**." (emphasis added).[10]

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[9] 1. Whether the proposed project is historic. 10 V. S. A. 6000(9) provides:
"Historic site" means any site, structure or district or archaeological landmark which has been officially included in the National Register of Historic Places and/or the state register of historic places or which is established by the testimony of the Vermont Advisory Council on Historic Preservation as being historically significant.

Accordingly, there are three ways in which a site's historic nature may be established under Act 250:
(1) placement on the National Register of Historic Places; (2) placement on the Vermont register of historic places; and (3) persuasive evidence of historic significance brought before the Board
or District Commission by the testimony of the Vermont Advisory Council on Historic Preservation.

2. Whether the proposed project will have an adverse effect on the historic site:
In evaluating adverse effect on a site, it is central to determine whether a proposed project is in harmony or fits with the historic context of the site. Important guidelines in evaluating this 'fit' include: (1) whether there will be physical destruction, damage, or alteration of those qualities which make the site historic, such as an existing structure, landscape, or setting: and (2) whether the proposed project will have other effects on the historic structure, landscape, or setting which are incongruous or incompatible with the sites' historic qualities, including, but not limited to, such effects as isolation of an historic structure from its setting, new property uses, or new visual, audible or atmospheric elements. Re: *Middleburv College,* #9AO177-EB, Findings of Fact, Conclusions of Law and Order at 10 (Jan. 26, 1990); cited in Re: OMYA. Inc. and Foster Brothers Farm. Inc., #9A0107-2-EB, Findings of Fact, Conclusions of Law, and Order at 39 (May 25, 1999), aff'd, OMYA Inc. v. Town of Middlebury, 171 Vt. 532 (2000).

3. Whether the proposed project's adverse effect will be undue:
The 'undue' quality of an effect on a historic site can be judged in several different ways. A positive conclusion on any one of the following guidelines can lead to a determination that an adverse effect is undue:
a. The failure of an applicant to take generally available mitigating steps which a reasonable person would take to preserve the character of the historic site.
b. Interference on the part of the proposed project with the ability of the public to interpret or appreciate the historic qualities of the site.
c. Cumulative effects on the historic qualities of the site by the various components of a proposed project which, when taken together, are so significant that they create an unacceptable impact.
d. Violation of a clear, written community standard which is intended to preserve the historic qualities of the site. Re *Middlebury College*.

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[10] Re: *Middleburv* College.

When confronted with the facts that Garcia Lorca resided at an Eden Camp, with direct views of the Lowells, and wrote about Lake Eden, Pritchett conceded she did not know this. Criterion 11 specifically addresses impact when dealing with the home of an important artist whose work portrayed the viewshed landscape, *see* Pritchett PET-LP-1 p.22, as is the case with Garcia Lorca and his poem about Lake Eden. However, when offered the opportunity to go back and further investigate this important omission, with the proffered exhibit, GMP's attorney objected to the admission of this exhibit. Would not GMP want its experts to have as complete information as possible when making their determinations before the Board?

During cross-examination, Ms. Pritchett concedes that she did not conduct any analysis regarding audible elements as required by *Middlebury* nor did she talk with GMP's noise expert, Mr. Kaliski, thus calling into question the very foundation for the conclusory statement at page 19 of her report that the project will not have audible effects incongruous or incompatible with historic qualities. Ms. Pritchett conceded that she did not know that Mr. Kaliski had concluded that one of the proposed model turbines will violate the Board's prior maximum standards for noise if not operated in NRO mode. Pritchett THT, 2/9/11, pp.16-17. She further conceded that had she known that noise levels might be higher than she had assumed, she might have changed her conclusion with regard to the Nelson property. *Id*. at pp.21-22, 24-25. Given the inclusion of auditory effects in the historical analysis, should not have GMP provided its expert with complete information regarding the impacts of sound? *See id* at 24 (acknowledging that she did not ensure that the information provided by GMP regarding noise was correct and valid).

Contrary to Pritchett's conclusions, an objective utilization of the criteria for evaluating the effect of the project on historic resources, see Pritchett PET-LP-1 p.20, compels a finding of undue adverse impacts because of the project's many substantial direct and indirect impacts.

Because it permanently physically alters the mountain range, the project causes a direct impact on historic resources (which are not limited to buildings but include views); because the project causes significant alteration and deterioration of the setting and character of a historic resource (again, which are not limited to buildings), the project also has an indirect impact. The Board cannot find that this project does not have an undue adverse effect pursuant to the *Middlebury* analysis because GMP failed to adequately analyze all of the required aspects of *Middlebury*, namely, the audible elements. Accordingly, the Board should deny GMP's petition.

F) THE PROJECT WOULD HAVE AN UNDUE ADVERSE EFFECT ON PUBLIC HEALTH (30 V.S.A. § 248(B)(5)), ORDERLY DEVELOPMENT (30 V.S.A. § 248(B)(1)), AND AESTHETICS, BECAUSE OF THE IMPACTS OF NOISE. (10 V.S.A. § 6086(A)(8))

LMG proposes that the Board impose a 30dBA standard inside the home, measured just below a fully opened window and a 35 dBA level outside of the residence as well as a 35 dBA standard measured at the property line[11]. Adopting these standards is necessary to protect the public health and the character of the area, and it is consistent with the testimony of Expert Witnesses Blomberg, James, Lovko, and McCunney and hundreds of experts around the world.[12] The standard applied in prior Vermont wind turbine cases is insufficient to protect residents against sleep interference, audibility in homes, and does not protect the character of the area.

Additionally, a setback that achieves the Board's eventual proposed property line standard should be employed to fully protect residents from the effects of noise and other safety issues such as tower collapse and ice throw.[13] Moreover, the town of Lowell permits

[11] Blomberg testified that the "swish swish" sound produced by the turbines is impulsive in nature, and using the EPA adjusted methodology, the level would need to be 35dBA, due to its 1 second duration. This amplitude modulation and the resulting effects on the EPA's methodology will be explained .
[12] At the 2007 Wind Turbine Noise conference in France, the acoustical experts unanimously agreed that they would not want to live with turbine levels of 45 dBA. Blomberg PDT p.13.
[13] These safety issues will be presented in a separate section.

landowners to build a home within 50 ft of a property line, therefore, a property line standard must be used to be fully protective of landowners and their property rights. These noise level limits should be based on an averaging of 1 hour or less. In order to determine why the Board should impose these noise limits, the reason behind them must be fully understood.

(1) GMP's Noise Expert's Study was Faulty and Incomplete, Resulting in Significant Underestimation of the Sound Levels to Which Surrounding Property Owners will be Subjected

It is axiomatic that where monitoring and modeling performed are inaccurate and incomplete, their results will be distorted. The Board will not be presented with an accurate understanding either of the existing sound levels or of the noise impacts that the proposed project will cause. GMP hired Kenneth Kaliski to perform a noise impact study for the proposed Lowell Mountains Industrial Turbine project. In addition to omitting many key components required for a complete noise impact assessment,[14] his study failed to employ many of the ANSI standards and contradicts his methods and testimony in the *Sheffield* Wind Turbine case (Docket # 7156) where he testified on behalf of opponents of the project, the town of Sutton. The result is that his conclusions significantly underestimate the sound levels that will be received on the surrounding properties. James PDT p.4. Furthermore, his analysis completely omits any aesthetics analysis pursuant to *Quechee* . Additionally, Mr. Kaliski's report evidences bias rather than the objective analysis expected of an expert witness and, therefore, should not be relied upon.

a. Kaliski's Noise Impact Study Wrongfully Excludes Seasonal Camps.

[14] For example, Mr. Kaliski did not know how close the closest property line was to the nearest turbine Kaliski THT, 2/22/11, p.145, nor did he overlay a map to show the sound levels at the property line Kaliski THT at pp.97-98. Further, he did not conduct analysis at lands less than .6 miles from the turbines, and most of his analysis was performed at locations over one mile from the turbines. *See* Table One Exh-PET-KHK- Noise Addendum-corrected p.4 (showing distances of between .64 of a mile to 2.56 miles).

Vacation homes and second homes should be afforded the same protection as year round homes, yet Mr. Kaliski excluded them from his conclusions because of his definition of "residence". Blomberg PDT, p. 17; PET-KHK-2- p.1; THT 2/22/11 pp. 157-158; 192-193. It is beyond argument that the people inside of these camps will be subject to the same noise as those living within Kaliski's defined "residences". As many of these camps are utilized during the summer months, but may have less insulation; therefore lower attenuation, and the windows will be open, leaving them even more vulnerable to the impacts from noise. While Mr. Kaliski monitored at one camp, where, incidentally, the lowest background levels were recorded, he ignored this in his modeling results. PET-KHK-2, pp. 21-22; c.f. PET-KHK, pp. 26-28. Further, the modeling results actually show that the noise levels of the turbines would not meet the 45 dBA standard at the camps. PET-KHK-2, pp 27-28.

b. GMP's Noise Expert Provided an Insufficient Aesthetics Analysis: he did not Perform a Quechee Analysis Pursuant to 10 V.S.A. § 6086(A)(8)

The Noise Impact Report submitted by GMP's witness Kaliski did not discuss how the turbines would fit into the existing soundscape. Blomberg PDT, p.10. Mr. Kaliski did not attempt to identify any community standard relative to noise impacts. Kaliski THT, 2/22/11, p.117. Mr. Kaliski was not aware of local zoning regulations, which place windmills as a conditional use. Kaliski THT at 146. When questioned on cross examination about the aesthetic standard, Kaliski espoused that the standard should be objective and not take into account the existing character of the area: "people are entitled to the same amount of noise no matter where they live." Kaliski THT, 2/22/11, p.53. As the Board pointed out, people who live in rural areas expect quiet, as opposed to those living in urban areas with higher noise levels. THT, 2/22/11, p.

53-54.[15] Communities adopt conditional use criteria specifically to protect the character of an area and to ensure that it is not adversely impacted. Were the Board to follow Kaliski's statement to its logical conclusion, there would be no need to monitor existing background levels because that factor would be irrelevant.[16] Reviewing Mr. Blomberg's LMG-LB-5, the Board can see that the turbines will be four times as loud as existing background levels on nearly 2,000 acres of land not owned or leased by GMP and twice as loud on 5,759 acres of land not owned or leased by GMP.[17]

GMP's Noise Impacts Report fails to tell the Board what the impact of the noise of the turbines will have on the neighbors. It provides very little information that would be helpful to assessment of the impact, such as where or how many people will be subjected to noise that would be audible in homes; in which areas the turbine noise may cause sleep interference; or in which areas the noise will cause annoyance. The report also doesn't state which areas will experience increased background noise levels and by how much." Blomberg PDT at 2.

Kaliski failed to mention the issue of nighttime sleep impacts in relation to where they could occur around the Lowell Mountains. No map of sleep interference impacts was provided. The report itself only mentions sleep interference in reference to the WHO Guidelines in a

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[15] GMP's health expert agrees that the level of noise from a turbine will be more perceptible in a place, like Lowell, where there are only sounds of nature than a place like Manhattan where there are lots of other background noises. McCunney THT, 2/10/11, p.109.

[16] Vestas Policy on Noise from Wind Turbines notes that governments incorporate existing background sound levels in making their determination as to a noise limit:

> Relative noise limits: turbine noise emission must not exceed the level of background noise (both turbine and background noise are measured as a function of wind speed); such limits are often supplemented with a low absolute maximum noise limit to cover those situations in which turbines are located in areas of very low background noise;

ALB-RJ-3 p.2

[17] Mr. Kaliski did admit that some homes would frequently hear noise from the turbines that they do not currently experience. Kaliski THT, 2/22/11, p.143.

footnote, and once in the Conclusions,[18] and fails to assess annoyance or community reaction to the predictable noise pollution that would be caused by the project. Although the BLM document to which Kaliski refers in his report states that a 10 dBA increase causes adverse community response, he decided to omit this important information. *See* PET-KHK-2 p 8; *and* Kaliski THT, 2/22/11, pp. 45-46 and ALB-Cross-11.

c. Kaliski's Analysis was Deficient Because he Performed no Analysis of Low Frequency or Infrasound

Kaliski performed no analysis of low frequency or infrasound, *see* Blomberg PDT, p.24 (no modeling was performed below 31 hz), and Kaliski does not propose any monitoring below 16 hz. . Because all of the acoustic data for wind turbines submitted by Mr. Kaliski stops at 63 or 31 Hz depending on the turbine, the Board has insufficient information from which to evaluate infrasound emissions. Kaliski's reason for omitting infrasound *modeling* is his conclusion that it was "not necessary". Kaliski THT, 2/22/11, p. 157. Yet, "[t]he lack of a comprehensive assessment of infrasound and low-frequency noise relative to the project and those potentially affected is a glaring omission." Kane PDT, p.14. Even GMP's health expert, Dr. McCunney, admits that *all* frequencies should be monitored. McCunney THT, 2/10/11, p. 35. However, it would make no sense to only allow a determination of whether low frequency noise is a problem, after the turbines are built. The WHO document, cited throughout this case, specifically warns, "if significant low frequency noise is present a better assessment of the health effects would require using… an indoor criteria of less than 30 decibels." James PDT, p. 20. WHO also states that when there is a predominance of low frequency sound, adverse health effects are a serious

[18] On cross examination, he states that "sleep disturbance is an issue that, for example, that we want to protect everybody. Kaliski THT 2/22/11 p.53, but, ironically, this is said after he denied that the noise limit should be relative to the existing background noises.

concern. James THT, 2/23/11, pp. 55-56. In addition, annoyance from low frequency sounds tends to be greater than that from higher frequencies. Lovko Surrebuttal, p.12. Finally, interior locations typically are subjected to low frequency noise without masking from high frequency sound or typical attenuation. James PDT, p. 19.

Kaliski's omission of low frequency and infrasound makes his report deficient; this is especially troubling given that it is well-known that turbines emit low frequency and infrasound and that these have special attributes that affect how sound travels and its effects on people's health and well-being. Once again, GMP is not presenting the Board with complete analysis necessary for it to make fair assessment of the turbines' impact. Accordingly, GMP's petition should be denied.

d. Petitioner Failed to Perform a Sufficient Health Impacts Assessment

Kaliski's health impacts assessment was also insufficient. In his testimony, Kaliski referred only to direct health impacts and limited those to Awakenings sleep disturbance and speech interference. Kaliski THT, 2/22/11, p. 176-177. He excluded indirect health impacts, including those from sleep loss and stress and other forms of sleep disturbance, for example, motility. *See*Blomberg Surr. p.13. Nor did he assess impacts on vulnerable populations such as Mr. Blair, who suffers from Asperger's Syndrome, even though he admitted some populations might be more vulnerable to turbine noise. Kaliski THT, 2/22/11, p. 134.

e. Petitioners Mistakenly Rely Upon Novel, Non-Standard Engineering Methods for Background Monitoring and Modeling

In conducting his background monitoring, Kaliski did not follow ANSI 12.9 part 2 "Assessment of the general community noise environment and establishment of baseline environmental sound levels." Kaliski THT, 2/22/11, p. 70.

Kaliski used the Cadna/A ISO 9613-2 method in his modeling. *See* PET-KHK-2, p.25 (used to calculate the attenuation of sound originating from a point sound source); *see, also,* Albany-Cross-17, p. 1. Sound propagation from industrial wind turbines includes spherical and cylindrical properties. James PDT, p. 9. Studies performed by NASA show that at distances greater than 750 meters (.466 of a mile), similar to the distance of residences in this project, the sound propagation is more closely cylindrical. *Id.* This means that if a model algorithm specifically designed for turbines, such as the Swedish model discussed in James' testimony, were used for this Project rather than the one Kaliski utilized, which is for general purpose modeling, the sound level at homes at approximately 1000 meters away would increase by as much as 1.5 to 7 decibels above those predicted by the ISO. James at 9. This would result in many homes around the project exceeding the 45 dBA hourly average proscribed by the PSB in other cases. *Id.*[19]

Furthermore, the ISO model used in Kaliski's report, KHK-2, p. 26, is not validated for use outside of distances and heights referenced in table 5, page 14 of ALB-Cross-17. *See also* Kaliski THT, 2/22/11, pp. 105-106. The plus or minus 3 decibel accuracy estimates, also shown in table 5, are independent of any uncertainties in sound power determination; nor are they to be used for distances greater than 1000 meters. ALB Cross-17, p.13 *and* Kaliski THT, 2/22/11, p. 106. This means that Kaliski's addition to his modeling of 1 to 2 decibels to the manufacturer's nominal sound power, PET-KHK-2, p.26, should have been increased by another 3 decibels shown in table 5 of ALB Cross 17. Kaliski THT, 2/22/11, pp. 106-107.

ISO 9613-2 is only valid for moderate nighttime inversions: the valid range of wind

[19] A monitoring study performed in New Zealand, on a terrain similar to the proposed project site in Lowell, is telling of this discrepancy. This study found the sound level to be 50 dBA at 2.5 kilometers away. When this condition was modeled using the ISO as used in Cadna/A, the predicted level was only 33 dBA – a 17 decibel underestimation. When modeled as suggested by NASA, the predicted level was 49 dBA, only one less than the actual monitoring results. James PDT p.10.

speeds is 1 to 5 meters per second at 3 to 11 meters high. ALB-Cross-17, p. 3; *see also* ALB Cross-18, p. 12; *and* Kaliski THT, 2/22/11. p. 109. Since it does not model above 7 meters per second, and the winds at the project site are above 7 meters per second Kaliski THT, 2/22/11, p. 119, Kaliski chose to estimate in his modeling. *Id.* at 121.

Neither did Kaliski monitor for the worst case scenario for sound propagation. Since moderate nighttime inversions are not the worst case scenario for sound propagation, rather, severe temperature inversions have the potential for the highest impact from noise, Kaliski's chosen model did not account for the worst-case scenario. S*ee* ALB-Cross-9 , Q&A.7. A further concern raised in this context is that in his report where he represented GMP, Kaliski stated the worst case meteorology is a moderate nighttime inversion, PET-KHK-2, p.29, which would then show that his results accounted for this situation, but when he testified in the *Sheffield* turbine case, Kaliski stated that the worst case meteorology is instead severe temperature inversion. ALB-Cross-9; Q & A 7.

Likewise, the 95% confidence value for the model ranges from 4.5 to 6.9 dBA, ALB-Cross-17, p.28, yet Kaliski did not add these numbers into his results. Kaliski THT, 2/22/11, p. 122). The model is based on petroleum and petrochemical complexes, below a height of 25 meters - not turbines, which have a height of 80-84 meters, ALB-Cross-19, Introduction; *see, also,* Kaliski THT*,* 2/22/11, pp.110, *and* 112-113, meaning the model was not validated for elevations at the proposed turbine heights. *Id*.

Similarly, the grazing angle on which Kaliski's model was based is 0 to 6 degrees for a source 25 meters high, but the turbines have an angle of between 12 and 18 degrees, resulting in a different actual grazing angle than what was modeled. Similarly, the noise path from the petrochemical complexes was never more than 30 meters, *id.* at 116, while the turbines are 130

meters, 4 times as high. Elevation is the key to the two meteorological conditions that Kaliski says affect sound propagation: ie, wind shear and temperature lapse. Kaliski THT, 2/22/11, pp. 116-117. However, the model he used was based on measurements at one and 11 meters, resulting in modeling that does not take into account the meteorological conditions at hub height for the turbines. Kaliski THT, 2/22/11, p.118. The result is that Petitioner presented no angle of attack modeling (for wind shear analysis), even though it would be necessary to determine whether the sound produced by the project may be .4 to 11.5 decibels greater than the Petitioner has predicted. Kaliski THT, 2/22/11, p. 94.

These errors undermine the purported accuracy of any modeling or monitoring Mr. Kaliski performed. As the following sections will highlight, many other irregularities occurred throught RSG's noise analysis. Accordingly, the Board should deny GMP's petition for a CPG because the bases of its monitoring and modeling were seriously flawed.

f. Kaliski's Background monitoring was biased and flawed, violating the ANSI standards

Photographic review of where Mr. Kaliski chose to place the monitors for measuring existing background noise levels, in conjunction with review of the accompanying charts, and his own acknowledgements under cross examination show that Mr. Kaliski violated several standards set forth by ANSI-ASA_S12.18-1994_(R 2009) ('ANSI") Procedures for Outdoor Measurement of Sound Pressure Levels and ANSI S12.9-2005, Parts 3 and 4 Quantities and Procedures for Description and Measurement of Environmental Sound.[20] *See* Blomberg

[20] ANSI Standard S12.9, Part 3 reads:

> Background noise can be divided into two categories: (1) short-term background and (2) long-term background sound. Short-term background sound are cause[d] by such sources as a nearby barking dog, a nearby accelerating motor vehicle, or an aircraft fly over. Short-term background sounds are relatively loud and their time of occurrence and sound exposure cannot be statistically described during the basic measurement period. Long-term background sound includes the

Surrebuttal, pp. 27-28; *and* James PDT, pp.3-4. In sum, Mr. Kaliski's report "shows data taken during prohibited times, test reflections near objects, objects that induce localized high noise from leaf rustle, and/or situated near high noise areas such as streams and roads." James PDT, p. 7.[21] This is important because it artificially elevates the existing background sound levels which presents the Board with the impression that the noise impact from the turbines will be less than it

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composite of all sounds from sources far and near which are (1) not short-term background sounds and (2) not sound from the specific noise source under study.

[21] Standards for conducting background sound level tests are provided in ANSI 12 S12.18/S12.9 and they include requirements such as:
ANSI S12.9 Pt 3, Section 5.4 long term background sound is the "sound measured during a measurement period specified in this standard, after excluding short-term background sounds..."

ANSI S12.9 Pt3, Section 7.1 Background sound "Long term background sound includes the composite of all sounds from sources far and near which are (1) not short-term background sounds....", "Short term background sounds are caused by such sources as a nearby barking dog, a nearby accelerating motor vehicle, or an aircraft flyover", "...procedures described herein provide a systematic method to remove the effects of short-term background sounds..."

ANSI S12.9 Pt. 3, Section 8.1 Site Selection states "Measurements ... shall be consistent with the general requirements of ANSI S12.18", "(b) Microphones shall be located 7.5 m or farther from any surface where reflections may influence the measure sound pressure levels...", "Notes (1) Reflecting objects with small dimensions (trees, posts, bushes, etc.) shall not be within 1.5 m of the microphone...", " (3) Nearby reflecting objects should also be avoided since they may increase the level of the background sound (e.g. sound produced by the rustling of leaves)," and "(b) To minimize the effects of wind on the microphone, sound measurements shall not be taken when wind velocity is greater than 5.5 m/s at the microphone position..."

ANSI S12.9 Pt. 3, Section 8.6.1 states that the data must be corrected for short term events during the background test "Omit the sound pressure levels or sound exposures for any block corrupted by short term background levels."

ANSI S12.9, Section 8.6.2 (b) states "A means shall be available to inhibit data collection whenever a short-term background sound occurs...This means shall be used to eliminate the contribution of short term background sounds."

ANSI S12.18 in Table 1 for Method #1: General method for routine measurements reaffirms the precautions about measurements during windy conditions by stating "No sound level measurement shall be made when the average wind velocity exceeds 5.5 m/s when measured at a height of 2 +/- 0.2 m. above the ground." When measuring background sound levels below 30 dBA this restriction should be 2.2 m/s to avoid pseudo noise from air movement across the microphone diaphragm. "(5) No measurements shall be made during measureable precipitation...." or when the ground is wet or snow covered (6).

ANSI S12.18 Section 4.4.1.1 Wind, temperature and cloud cover states "No sound level measurement shall be made when the average wind velocity exceeds 5 m/s... No attempt shall be made to adjust measured noise levels based on the wind data."

(James PDT pp.6-7).

will be in reality. Blomberg PDT, p. 21. Moreover, Kaliski's decision not to eliminate the short term noises, such as rain and wind, compounds his mischaracterization of the long-term background sound levels in the Lowell area. Blomberg PDT, p.17. Since the goal is to protect the public from the turbines' noise, it is essential to provide accurate information about the existing background levels.

Review of each location illustrates Kaliski's flawed and misleading methodology. The Nelson Home (1A & 1B): location 1A was placed near a stream; location1B was placed near a road. PET-KJK-2, pp.15-16. While Mr. Kaliski uses the excuse that the property owners chose this location, such a statement from a professional is questionable. The Nelsons are lay people who had no ides of the potential for elevated background readings or the effect it could have on determining the extent of the noise impact from the turbines. Mr. Kaliski, on the otherhand, who was familiar with the ANSI standards and the potential for elevated readings, should not have agreed to this location.. The initial location near the stream inflated the background level, violating ANSI standard A S12.9 Pt. 3, Section 8.1. While moving the monitor away from the stream, 1b is problematic because it was placed one meter from the Bayley Hazen road, violating ANSI standard S12.9 Pt. 3, Section 8.1. *See* Blomberg PDT, p.18; *and* Blomberg Surrebuttal, p. 27.

Eden Road-Gebbie property (2): location 2 was placed 10 feet from a driveway, 120 feet from Eden Road, and near a stream. PET-KJK-2 p.17; Kaliski THT, 2/22/11 pp.167-168. This violates ANSI standard S12.9 Pt. 3, Section 8.1. In addition, the quietest recorded periods at this location are 10 to 20 decibels louder than the other locations, which is suspect and should have resulted in re-evaluation. Blomberg PDT, p. 19.

Irish Farm Road, the Day residence, Northwest of the Project (3); location 3 was near the road and brush, PET-KJK-2 p.18, violating ANSI Standard ANSI S12.9 Pt. 3, Section 8.1. This placement approximately 18-20 feet from the road is less than ½ the distance, the federal standards allow for measuring trucks and motorcycles. Blomberg PDT, p. 19. Cheney Road, the Eddy residence, West of the Project (4): location 4 was placed next to a fence line with tall plants/flowers. PET-KJK-2 p.19.

Route 100, the Christiansen residence, West of the Project (5): location 5 was placed near a driveway, near a tree, and in the line of sight of Rte 100, PET-KJK-2, p. 20; Kaliski THT, 2/22/11, p. 173, violating ANSI Standard S12.9 Pt. 3, Section 8.1. Location 5 was 30 feet from a driveway and within the line of site of Route 100. Blomberg PDT, p. 19. Although the Christiansen property is 60 acres and the home is not visible from the road, Kaliski chose to place the monitors so as to represent noise from .3% of the land that would be impacted by Route 100. Blomberg PDT, p.19. The Christiansens chose their home location so that it would have a view of the Lowell Mountains and to reduce noise and visual impact from Route 100. *Id*. at 19-20. Accordingly, the noise monitoring performed does not capture the reasonable sensibilities of the Christiansens.

Irish Hill Camp, - North of the Project (6): location 6 was placed next to a tree, which although noise making leaves were not nearby, still has reflection. PET-KJK-2 p.21 (ANSI std-S12.9, Part 3 Section 1.8. advising not to place monitor next to trees). This location is the only one that is not near a road, and it has the lowest reported reading of an L90 of 16 decibels. However, we know that the *actual* lowest reading was even lower since the L90 excludes 10% of the lowest sound levels. Kaliski THT, 2/22/11, p.139. We do not know the lowest level of sound produced at this location, or at any of the Kaliski monitoring locations since Kaliski did not

provide it, but even the median level at the site was under 25 dBA, resulting in at least a 20 decibel increase in noise if the noise limits were set at the previously-used 45 dBA limit.

To compound the effects of improper monitoring locations in his measurements, Kaliski failed to exclude short term events such as the periods of heavy rain and gusty wind violating ANSI Standards S12.9 Pt 3, Section 5.4; ANSI S12.9 Pt. 3, Section 8.6.1, and ANSI S12.9, Section 8.6.2 (b) *supra* footnote 9; Kaliski THT, 2/22/11, p. 56; *see also* Blomberg PDT, p.21. Kaliski admitted that the sound levels during the rain and wind events are higher. Kaliski THT, 2/22/11, pp. 56-57. Kaliski further admitted that he did not monitor the wind at each site so he does not know if the wind caused turbulence on the microphone which would contaminate his results, nor did he know what caused the other spikes in his charts. Kaliski THT, 2/22/11, pp. 65, 162, 164, 165, 172, 173. His deciding not to eliminate these events both violates ANSI standards and contradicts his sworn testimony in the *Sheffied* case, where he testified these events were unusual and not typical of background noise levels in the area. Kaliski THT, 2/22/11, pp. 58-59. Mr. Kaliski's claim that the sound level monitoring done by the opposing party in *Sheffield* was inaccurate and misleading because it did not eliminate certain events is equally true of Mr. Kaliski's work in this docket. Kaliski THT, 2/22/11, p. 61.

Although Kaliski states that non-petitioners have focused on the lowest background sound levels, in fact, the background sound levels taken by Albany-Craftsbury and Lowell Mountains Group's experts are no lower than those taken by GMP's expert. Kaliski THT, 2/22/11, p. 66).[22] Kaliski himself found sound levels even lower than his reported L90 readings of 16 decibels (but did not report them). Kaliski THT, 2/22/11, pp. 66-67; *and* Pet-KHK-2, Table 4 p. 22, corrected by Kaliski Rebuttal, p. 9.

[22] Mr. Blomberg's study found existing background noise levels from the lows of 22 dBA. LMG-LB-11.

Finally, the Petitioner's methodology did not consider ANSI S9 Part 2 and its assessment of accuracy. ANSI lists confidence intervals based on the number of sampling locations and the specific class on which these sampling numbers are based: Kaliski performed the monitoring survey using fewer than the appropriate number of sites. Kaliski THT, 2/22/11, p. 75, attempting to reach a 5 dBA margin of error (requires 8 sites). *Id*. The ANSI requires that the monitoring be tested for measurement precision; first, the data must be shown to be independent, which cannot be inferred from testing on consecutive days. ALB-Cross-14 at 8-9. Kaliski did not perform the tests for independence, pursuant to Section 9.4.2., Kaliski THT, 2/22/11, p. 79. Finally, Kaliski's monitoring sites were not appropriately chosen. Pursuant to Section 8.2.1 of the ANSI standards, the tester is supposed to use randomly selected locations, which Mr. Kaliski did not do. Kaliski THT, 2/22/11 p.76.

As review of Mr. Kaliski's monitoring makes clear, many ANSI standards were not followed, monitors were placed too close to water sources and/or to roads, short term events were not removed, locations were not random, nor were the appropriate number of locations used; no independence analysis was performed, all of which resulted in artificially elevated background levels. If gone unchallenged, the consequences of these choices may be severe as the Board may get the false impression that the noise impact from the turbines is less than it will be. Once again, GMP is presenting the Board with inaccurate and misleading information regarding the extent of the impact from its proposed project. The people who will suffer are those who will be forced to live with these impacts. Accordingly, the Board should deny GMP a CPG.

g. Kaliski failed to analyze the fluctuating nature of the turbines.

The sound from the turbines fluctuates with the blade movement, creating a "swish swish and is most common at night. James Rebuttal, p.3.[23] The "swish swish" sound produced by the turbines is different than transportation noises, on which the WHO and other studies were based, yet Kaliski treats the sound produced from windmills and the sound discussed in the WHO essentially the same. GMP's health expert agreed that the fluctuating nature of sound from wind turbines is a major concern, and may be more perceptible at night. McCunney THT, 2/10/11, p. 57. Accordingly, WHO notes that "**lower sound limits will need to be provided for sources with high levels of low frequency sounds** (such as wind turbines)… and when sounds are not continuous (i.e. fluctuate like wind turbine noise)[24]… and areas where background levels are low (such as rural areas like Lowell/Albany)". Lovko Rebuttal, p.3. This amplitude modulation is part of the reason why LMG recommends that the Board impose a standard of 35 dBA at the property line.

Noise is much more intruding in a soundscape where the background is quiet; while a 40 decibel noise in an urban area might constitute the existing background level, would be more than 20 decibels above the existing background in Lowell, which is a rural area. Blomberg PDT p.14. The character of the neighborhood held a central role in the EPA's development of a 55 dBA criteria. *Id.* at 15. To reach 55 dBA,, the EPA' normalized, ie: adjusted, its noise levels to an urban residential neighborhood. *Id*. *See also* Ex-LMG-LB-10 (EPA Levels Document). Likewise, normalizing the noise levels to the quiet, rural area of Lowell results in a much lower level. *See* Blomberg PDT at 15. Further, it should be noted that in order to protect the quiet

[23] "Wind turbines have the dominant -- the point at which the primary acoustic energy is focused is between zero Hz and about 20 Hz. So much so that if you are to eliminate all the rest of the frequencies you would probably get the same measurement as long as you're using dBC. In any kind of rotating machine the dominant energy is at what is called the blade passage frequency, and that's the rotational speed of the hub times the number of blades converted to cycles per seconds. For a wind turbine that is one cycle per second, and that is where the peak energy occurs," James THT, 2/23/11, p. 56.

[24] This amplitude modulation has been found to be more annoying than steady noise Lovko at 3.

character of the Lowell area, the standard must be lower than that used to protect against activity or communications interference. Blomberg Surr. pp9, 21 (noting that the EPA's 55 dB standard is a "maximum level compatible with adequate speech communication outdoors and indoors.").

h. GMP has an insufficient monitoring plan for the NRO modes

NRO mode has never been used for a wind project in Vermont. Kane Surrebuttal, p. 14. Use of it would require reductions of between 1 and 4 decibels even to comply with the prior Board standards. *Id.* The only monitoring plan GMP has presented to the Board is an outline found in Kaliski's rebuttal testimony. Kaliski Rebuttal, pp. 24-26; Kaliski THT, 2/22/11, p.155. Under this plan, GMP will monitor twice during one and a half years and only at five locations and only for a short period of time. Kaliski THT, 2/22/11, p. 216. Given Kaliski's testimony that the NRO might be activated nearly every night, possibly for a couple of thousand hours per year, Kaliski THT, 2/22/11, p. 210-211, and his admission that even after programming the turbines to set NRO in place, proscribed noise levels may be exceeded, the monitoring plan put forward by the Petitioners is woefully inadequate. Given that the NRO mode will need to be triggered nearly every night, and given that there is no room for error or tolerances in Kaliski's modeling, there are likely many hours and many locations when and where the NRO is needed but may not be triggered or adequate.

GMP's proposal to use NRO as an acceptable and effective means of mitigating the turbines' undue adverse noise impact is unacceptable. It's effectiveness remains untested; GMP's own witness admits that it would need to be used nearly every night; any miscalculation will result in residents enduring noise that exceeds the allowable maximums. Before any acceptance of this proposal, NRO must be monitored on the turbines GMP proposes to use, and monitored at an existing wind facility comparable to the Lowell project site to determine its

efficacy. Further, GMP must present the Board with a much more detailed monitoring plan that can be reviewed by the parties and their experts prior to its adoption by the Board. Accordingly, the Board should deny GMP a CPG

(2) The Project Meets Both Prongs of the *Quechee* Test due to the Impacts of Noise, and Would Have Undue Adverse Effect on Aesthetics Caused by Noise.

It is not disputed that noise from the project would cause an adverse effect, thus satisfying the first prong of the *Quechee* test[25] LMG's expert, Mr. Blomberg, has testified that the project will certainly have an adverse impact on the area; there is no evidence in this record that 45dBA is in harmony with the area. *See* Blomberg Surrebuttal, p. 7. The existing background sound levels provided by GMP range from the low 16s[26] to 40 dBs. Kaliski THT, 2/22/11, p. 42-43; *and* Pet-KHK-2, p.3-corrected Reb p.9. For the sake of argument, assuming the turbines would meet the Board's prior standard of 45 dBA, GMP's own experts conclude that noise 5 dBs above the existing background level would be clearly noticeable, Kaliski THT, 2/22/11, p. 44, and noise about 10 dBs or more above background would be approximately twice as loud as the background and clearly audible even if it was only in the 30 to 40 dB range[27]. Kaliski THT, 2/22/11, p. 43.

A 45 dBA noise would exceed background levels by at least 30 dBAs at times and, in general, be twice as loud as the typical background level; the increase in noise is clearly not in harmony with the surrounding area. Mr. Kaliski has provided the Board with no evidence or

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[25] Under the first prong, the Board must determine whether the project will have an adverse impact on aesthetics and the scenic and natural beauty of the area because it would not be in harmony with its surroundings. *In re Halnon,* 174 Vt 514,515 811 A2d161, (2002).

[26] Mr. Kaliski never presented us with the actual lowest level; rather he stopped at the L90 level. Because of this omission, the Board will not know the actual quietest background sound. In and of itself, the 40 dB measurement that Kaliski took is suspect. Please see discussion on Kaliski's flawed background methodology.

[27] It is common sense that noise twice as loud would be clearly audible.

rebuttal regarding this prong. In fact, during cross-examination, he admitted that the impact of the noise levels from the project on the surrounding residences would be out of character with the surrounding land uses, Kaliski THT, 2/22/11, p. 44, and that the turbines would cause an impact to the character of the area up to 2,500 feet away. Kaliski THT at 142.

Since the project's noise levels produce an adverse impact, pursuant to *Quechee*, the Board must determine whether this impact is unduly adverse. Under the second prong, an adverse impact is undue if it violates a clear, written community standard, is shocking or offensive to the average person, or fails to include available mitigation. *In re Halnon,* 174 Vt 514,515 811 A2d161, 163 (2002*).*

The proposed project fails this first of the three second-prong factors when the impacts of noise are included in the analysis. Lowell's town plan recommends that all land above 2000 feet be designated as being in the Conservation Mountain District and that it should have a very low intensity of development. PET-DR-2, p. 67. Review of the zoning by-laws correlates with the town plan as the ridgeline is labeled as "The Conservation Mountain District."[28] Lowell's stated objective for this district is "[t]his is the district of the community that should have the least intensity of development as it is generally hilly, has poor access, and in many cases, has shallow soils. With any intensity of development, much permanent damage will be done to the area. Generally speaking these lands are above 2,000 feet in elevation."LMG-LB-8. Lowell specifically is referring to the project area, the ridgeline. Lowell places windmills, without clarification as to whether residential or industrial, as a conditional use. One of the criteria of conditional use is that it not adversely impact the character of the area. Blomberg Surrebuttal,

[28] While the PSB has deemed Town Plans to be more appropriate to rely on for a clear, written, community standard rather than zoning by-laws, *see* In re Georgia Mountain, Dkt.7508, 6/1/10 p.52, incorporation of the by-laws can show correlation with the town plan and further explain its statements.

p.6.[29] So, in order for windmills to meet conditional use criteria, they must not adversely impact the character of the area. The zoning bylaws further require the developer to provide the noise levels and hours of operation of noise sources, *see* LMG-LB-8, Section 206.05 p.11, demonstrating a concern for noise impacts. Applying the above analysis under the first *Quechee* prong, it is clear that the proposed turbines will adversely impact the character of the area because of their noise impacts..

Working together, the Lowell Zoning Bylaws and Town Plan both limit development in the project area, citing the importance of protecting these high elevation, sensitive environmental areas and preventing permanent damage caused by intense development. Windmills are listed as a conditional use so they must not cause an adverse impact to the Conservation Mountain District area. The turbines proposed for this project do indeed cause an adverse impact to the character of this protected area, because the development proposed is intense: 4 miles of ridgeline roads, blasting of the mountain tops, clearcutting over 100 acres, creating large impervious surfaces, etc; it will cause permanent damage. Furthermore, GMP's turbines have the potential to violate the Board's prior noise maximum, and create noise 30 decibels above

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[29] Table 204.03: "C-M" Conservation-Mountain District
Objective: This is the district of the community that should have the least intensity of development as it is generally hilly, has poor access, and in many cases, has shallow soils. With any intensity of development, much permanent damage will be done to the area. Generally speaking these lands are above 2,000 feet in elevation.
…
§ 206: Conditional Uses
206.01 Permitted upon issuance of a conditional use permit by the Board of Adjustment after public notice and hearing are those uses specified in Tables 204.01 to 204.04 as conditional uses. In order for a permit to be granted the proposed use shall not adversely affect:
A. The capacity of existing or planned community facilities;
B. The character of the area affected;
C. Traffic on roads and highways in the vicinity;
D. Bylaws in effect, and;
E. Utilization of renewable energy resources.
206.02 In permitting a conditional use, the Board may impose, in addition to the regulations and standards specified by this bylaw, other conditions found necessary to protect the best interests of the surrounding property, the neighborhood or the municipality as a whole. LMG-LB-8 (pp.1-3).

existing background, resulting in an adverse impact to this area. Accordingly, the Board should deny GMP's petition because it violates a clear, written community standard.

The proposed project fails the second factor in the second-prong of the *Quechee* test, due to noise, because noise from the project would offend the sensibilities of an average person. An average person would be offended when noise caused by a neighbor interferes with sleep or an ability to have full use of property due to noise levels. *See* Blomberg Surrebuttal, p. 11. An increase of only 5 decibels above background would be clearly noticeable Kaliski THT, 2/22/11, p. 44, and result in expected widespread complaints. Blomberg PFT, p.7; Blomberg Surrebuttal, pp. 2 and 23. An increase of 10 decibels would be clearly audible. Kaliski THT, 2/22/11, p. 10, and create the expectation of vigorous community reaction. Blomberg PDT at 7. Moreover, levels exceeding 35 dBA would risk sleep loss, since sleep interference begins at 30 dBA *See* Blomberg Surrebuttal, p. 13 and 20, *and* Lovko Rebuttal, p. 4; *and* James PDT, p.20 (referencing WHO). Levels of more than 35 dBA would exceed what GMP's expert McCunney himself would find acceptable for his home. ALB-Cross-7 at 37-38.; McCunney THT, 2/10/11, p.104.

Reviewing Mr. Blomberg's maps show the widespread nature of the noise impacts: The turbines would be audible on 10,186 acres; they would be twice as loud on 5759 acres and 4 times as loud as existing background on 1956 acres; they would spur widespread complaints on 7581 acres, severe threats of legal action on 2509 acres, and vigorous community reaction on 1077 acres; they would cause awakenings and disturbed sleep on 5156 acres and adverse health effects due to sleep interference on 678 acres. LMG-LB 2,4,5 and 7. Given that a 10 decibel increase would create such an intense response from the community, even were the turbines to meet the Board's prior standard of 45 dBA, and using Kaliski's monitored L90 finding of 16 decibels at one of the locations near the project, this would equate to noise impacts upto 30

decibels above existing noise levels. It is unfathomable that this would *not* shock of offend the sensibilities of an average person. Accordingly, GMP's project fails this part of the *Quechee* test and must be denied.

The project fails the third portion of the second prong of the *Quechee* test, relative to noise impacts, because GMP has failed to take generally available mitigating steps that a reasonable person would take to improve the harmony of the proposed project with its surroundings such as setbacks, property line standards and smaller turbines. *See* Blomberg Surrebuttal at 11.

The Board in the *Georgia Mountain* turbine case noted that the developer mitigated the impacts of its proposed project because it agreed to use turbines that minimized sound and conduct a pre-construction monitoring plan specific to the effects of turbulence. *In re Georgia Mountain* Dkt # 7508 (6/1/10 p.57). In this case, however, not only has GMP failed to take mitigating steps, but it has also **aggravated** the impact of the project by proposing the use of turbines bothtaller and louder than the ones it originally proposed in its petition.. GMP's noise expert admits that the newest model would only meet the Board's prior noise standard if Noise Reduction Operation mode is employed. Kaliski Rebuttal, p. 26. Even with NRO mode employed, there might be times the project exceed allowable noise levels. Kaliski THT, 2/22/11, p. 148. Finally, NRO might be required nearly every night to meet this standard. Kaliski THT, 2/22/11, pp. 210-211, possibly resulting in noise levels exceeding safe allowances a couple of thousand hours per year. *Id*. at 211. In fact, GMP's own noise expert admits that the turbines would have an undue adverse effect on homes located within 200 feet of the turbines. Kaliski THT, 2/22/11, p.135.

Moreover, unlike the petitioners in the *Georgia Mountain* case, GMP has refused to use turbines designed to significantly mitigate noise impacts, *Geogia Mountain*, p.57, and has failed to conduct pre-construction turbulence modeling to ensure additional noise due to excessive turbulence is avoided. *Id*. Kaliski's statement that GMP is mitigating the turbines' effects through sighting with respect to turbulence. Kaliski Rebuttal, p.13, is contradicted by his admission that "GMP's turbine layout was not specifically designed to reduce turbulence". *See* Blomberg Surrebuttal, p.33 (*quoting* Kaliski's discovery responses). It is significant GMP has presented no evidence that a condition requiring all remedial steps necessary to bring the sound levels into compliance, including modification or cessation of turbine(s) operation, would have any negative impacts on the project, suggesting such a condition should be imposed. *See, e.g., Georgia Mountain* at 57.

Furthermore, a property line standard, larger setbacks (presently, GMP has Turbines less than 200 feet from a neighbor's property line), and lower-at residence limits are needed to improve the harmony of the project with its surroundings, none of which GMP appears willing to consider Blomberg Surrebuttal, p. 34.

As the above analysis of noise impacts demonstrates, the proposed project fails to meet Criterion 8 because it creates an undue adverse impact on aesthetics caused by noise. Not only was Mr. Blomberg the *only* expert to conduct a *Quechee* analysis with full recognition of the noise impacts, but the starting point is the uncontroverted fact the project would have an adverse impact and satisfies the first prong of the *Quechee* test. As all disjunctive conditions of the second prong are also met by the impacts of noise, the project has an undue adverse effect on aesthetics caused by noise and must be denied.

(3) The Project Does Not Comply 10 V.S.A § 6086 (a)(1) or 30 V.S.A. § 248(b)(5), Because Noise Produced Would Cause an Undue Adverse Impact on Human Health

Act 250, Criterion 1 (10 V.S.A. § 6086(a)(1) encompasses noise in its definition of air pollution when that noise creates an adverse health effect. Re: Vermont RSA Limited Partnership, DR #441, MOD at 2 (5/11/05). In the context of Criterion 1, adverse health effects can be psychological as well as physical. J.P. Carrara & Sons, #1R0589-3-EB (2/2/94). [EB #554]. Unlike the noise analyzed in typical Environmental Board cases, however, wind turbine noise is unique because turbines may operate 24 hours a day. Accordingly, wind turbines "can pose unique threats to public health as a result of sleep interference." Blomberg Surrebuttal, p. 19. Additionally, as analysis of many of the noise modeling standards makes clear, turbines'sound emissions are not always accurately measured.

The World Health Organization ("WHO") recognizes annoyance as a critical health effect. McCunney THT, 2/10/11, p. 25. "There is well accepted evidence in the medical literature showing that noise can cause adverse health effects on people, including hypertension, heart disease, hormonal stress reactions, and sleep disturbance" just to name a few. Lovko Rebuttal, p.3 (*citing* WHO 2009)). Before applying the WHO guidelines in instant case, it should be noted that the WHO references studies based on transportation noise. *Id*. Moreover, the 1999 version of the WHO report warns that lower sound limits would be needed for noise sources with high levels of low-frequency sounds, such as turbines. *Id*. In addition to complications caused by low-frequency and infrasound emissions and amplitude modulation, there are additional impacts when locating industrials sized windmills in quiet, rural areas, where there is reduced attenuation

at camps and residences, increased noise production at night, and increased travel distances for this type of noise (ie: low frequency). *Id*. at 3-4.

Adverse direct health effects have been observed at 40 dBA for general noise sources. LMG-LB-3, *WHO Executive Summary*, Table 3. WHO further observed a number of effects on sleep, including self-reported sleep disturbances, arousals, and awakening, with vulnerable groups including children, the elderly, and the chronically ill being more susceptible. *Id.* GMP's health expert agrees that some populations might be more vulnerable to turbine noise. Kaliski THT, 2/22/11, p. 134; *and* McCunney THT, 2/10/11, p. 129. People with Asperger's Syndrome, like Jim Blair, may be more sensitive to noise. McCunney THT, 2/10/11, p. 129.[30] Mr. Blair has explained the potential impacts the noise from this project could have on his life: "The noise from the project may make him unable to function because of sensory overload that leads to inability to function, emotional paralization, and long term anxiety…. One of the reasons I moved to this remote location was to avoid high levels of background noise that trigger such sensory reactions. If this project is built, I may have to move…. As adults with autism grow older, they have more issues and cannot easily move. Displacement for me would be devastating." LMG JB PDT p.2.

There can be indirect health impacts from turbine noise levels below 45 decibels, including sleep disturbance or deprivation, annoyance, and stress, which may cause an adverse effect on people's health and well being. DPS-Cross-3. Sleep deprivation can be a serious

[30] The science of health effects caused by turbine noise is quickly evolving, and members of the scientific community believe there is a need for further research directly addressing the physiological consequences of long term low level infrasound exposures on humans. "Based on our understanding of how low frequency sound is processed in the ear and on reports indicating wind turbine noise causes greater annoyance than other sounds of similar level and affects the quality of life in sensitive individuals, there is an urgent need for more research directly addressing the physiological consequences of long term low level infrasound exposures on humans." DPS Cross-5, p.19).

medical concern and clearly can increase risks of high blood pressure and myocardial infarction. ALB-Cross-7. In addition to physical manifestations of health impacts, numerous studies have found that psychological health effects from turbine noise, including depression. Lovko Rebuttal, p.11 (*citing* Colby, Hanning, Nissenbaum, and Pierpont).

Levels below 45 dBA can cause health impacts; an adverse impact on public health is *likely* when noise exceeds 40 decibels. Lovko, at 4 (citing WHO 2009). Given this statement by WHO, it seems that the Board should not limit its consideration to traditional noise analysis in order to ensure the project does not unduly impact human health. Indeed, several state departments of health and international entities suggest that noise levels be similarly limited. Lovko at 8 (citing limits of 35 dBA, 5 dB above background, outdoor limit of 40 dBA, and increased complaints at levels above 35 dBA).[31] "There is clear and consistent evidence in peer reviewed literature that people start to suffer adverse health effects" at levels below 45 dBA. Lovko Surrebuttal at 2.

Accordingly, not only would the project cause adverse health impacts due to noise, but also the Board's prior standard does not protect health. The standard 45 dBA used in the past would, within a year, allow up to 332 events that reach 90 decibels, lasting 15 seconds at a time each. McCunney THT, 2/10/11, pp. 83-85. The Board should therefore find that the noise that would be produced by the project would cause an undue adverse health impact, and the Petitioners' request for a CPG should be denied.

(4) Additional Standards must be implemented to protect the public from direct and indirect adverse effects of noise.

[31] LMG's expert calculated approximately 5,156 acres of land not owned or leased by GMP will exceed Lnight 30 dBA and 678 acres will exceed 40 dBA. Blomberg PDT pp.4-5; see LMG-LB-2. These affects can be serious and have recurring consequences on the individuals and on those around them, ranging from injury causing car accidents to stresses on the relationships of family, co-workers, and the quality of work product. *See* Blomberg Sur. p.20.

LMG proposes that the Board impose a 30dBA standard inside the home, measured just below a fully opened window and a 35 dBA level outside of the residence as well as a 35dBA standard measured at the property line. Mr. Blomberg testified that the swish swish is impulsive in nature and using the EPA adjusted methodology, the level would be 35dBA, due to its 1-second duration.. Adopting a 35dBAstandard protects sleep, the character of the area, and it is consistent with the advice of expert Witnesses Blomberg, James, Lovko, McCunney, and many others who contribute to the WHO analysis that sets 40 dBA annual as a minimum, advising that noise produced in rural areas and low-frequency noise may require less permissive standards. WHO; *and* McCunney THT, 2/10/11, pp. 104. The property line standard should be combined with a setback to fully protect residences from the effects of noise, tower collapse and ice throw. Only by allowing property owners adjacent to the wind project to fully use their land as permitted by local planning and zoning ordinances could the project's adverse impacts be acceptable.

The decibel limit applied in this case should be based on a maximum of 1-hour averaging, but the average decibel limit allowed should be reduced from 45 dBA outside to 35 dBA outside. The 45 dBA standard previously applied to other Vermont wind turbines is insufficient to protect residents in the Lowell area against sleep interference, audibility in homes, and does not protect the character of the area. DPS agrees that if it is shown there can be negative impacts, such as annoyance, at or below 45 dBA, then the standard should be below 45 decibels. Kane THT, 2/9/11, p. 72; *see, also,* McCunney THT, 2/10/11, p. 41 (agreeing that annoyance may cause medical disorders such as sleep deprivation and that it may cause an adverse effect on people's lives and well-being.)

a. Baseline monitoring is needed to determine the existing character and soundscape of the area

As previously discussed, the noise limit applied to the project must take into consideration the existing soundscape in the area. Residents expect quiet in the rural areas of Lowell, consistent with the existing background sound. The project could account for more than a 10 decibel difference in residents' experience of exterior noise. Blomberg PDT, p. 14. In order to determine criteria for setting noise limits, the EPA employed a methodology in which the character of the neighborhood played a central role: quiet rural areas were adjusted 10 decibels, and another 5 where the communities had no prior experience with the intruding noise. Further, an additional 5 dBA adjustment was required where the noise was impulsive. Blomberg PDT, p. 15 (referring to and explaining LMG-LB-10 pp. D-18, 20, and 21). All of the mentioned adjustment factors apply to Lowell.

Employing these factors to the present case and beginning with the EPA's normalized urban value of 55 dBA[32] results in a recommended sound pressure limit of 35 dBA to protect against adverse community reaction. Blomberg PFT, p. 15; *see, also,* Blomberg Surrebuttal at 23. It bears repeating that the EPA itself noted that even a 5 decibel increase over existing noise by an intruding noise is likely to trigger widespread complaints or a threat of legal action, validating the need to consider relative changes in sound pressure levels as well as a maximum averaged limit. Blomberg Surrebuttal, p. 2.

[32] To reach 55 dBA, the EPA' normalized, ie: adjusted, its noise levels to an urban residential neighborhood. Likewise, normalizing the noise levels to the quiet, rural area of Lowell results in a much lower level. *See* Blomberg PDT at 15. Further, it should be noted that in order to protect the quiet character of the Lowell area, the standard must be lower than that used to protect against activity or communications interference. Blomberg Surr. pp9, 21 (noting that the EPA's 55 dB standard is a "maximum level compatible with adequate speech communication outdoors and indoors.").

In order to effectively protect the public's health, GMP must prove to the Board, prior to construction, the efficacy and comprehensiveness of the NRO mode. The post-operative monitoring plan proposed is gravely lacking in many respects, resulting in the public bearing the risk and paying the price for deficiencies. NRO has not been integrated into a Wind project in VT, and these turbines would require between 1 and 4 decibels to achieve compliance. Kane Surrebuttal, p.14.

GMP proposes only 2 sets of monitoring during a one and one-half year period. It has limited its proposed locations to 5, and relies on the public to complain before it takes any corrective measures not made evident through its monitoring. It seeks to limit complaints to the first five years. Members of the public should not be limited in their ability to file complaints about turbine noise; they should be able to file complaints for the entire life of the project. See Kaliski THT 2/22/11 pp.200, 207-208(seeking to limit complaints to first five years of operation). They should neither be limited by the scope of what they may complain about, nor should they have the burden of establishing the source of the noise. Kaliski THT, 2/22/11, pp. 200, 208-209.

Since GMP's noise expert admitted that NRO mode would be required nearly every night and for over a thousand hours annually, just to meet the prior 45 dBA standard, there must be *proof* that it actually will reduce the noise enough to protect the public's health rather than expecting the Board and the people who will be impacted, to believe their assertions which have not been tested. *See* Blomberg Sur pp31-31. In his response to LMG's discovery requests, Kaliski admitted that "no noise testing, methodologies or protocols have been established to determine if and when the NRO mode will be required." Blomberg Sur p.31. Even assuming the turbines do have a maximum noise of 108 or 107 dBA, the NRO can only reduce the noise by 1-

4 decibels. Kaliski THT 2/22/11 pp.40-41. SUR Kane p.14. This may be insufficient to create any noticeable change in the noise endured by the people living in proximity to the project. The Board should not wait until the project has been constructed to learn if the monitoring and implementation are even feasible much less effective, especially considering the many instances when GMP has been less than forthcoming about potential negative aspects of their proposed project. The risks to the people of the Lowell area are too great and as are the economic impacts to the project if permitted to proceed.

b. Considering all of the factors, LMG's proposed sound pressure limit of 35 dBA outside is reasonable

The most effective and efficient standard to employ is 35 dBA outside. Proposing an exterior 35 dBA hour limit, although it permits some sleep disturbance, is a reasonable split between providing some protection at 40 dB and full protection at 30 dB. James THT 2/23/11 p.47. By so doing, the Board will also protect the interior levels without all of the complexities required by interior monitoring. The Board's previously employed 30 dBA standard should be adequate to protect health, and the following explains how a 30 dBA interior standard should be applied.

The Board should impose the 30 dBa interior standard *without* the "givebacks" which take away its protection. (1) the utilization of an instantaneous levels rather than an hourly average is more protective. Lovko- Reb. pp.4-5 (stating that for instantaneous effects such as sleep disturbance, LMax is a more accurate standard to use than averaging). The WHO notes that 32 dBA LMax is the threshold level for motility. It is instances of noise rather than hourly averages of noise that cause sleep interference. A 45dBA noise can persist for over a minute, but if averaged out over an hour, would still meet this standard; Kaliski agrees the Board's standard

can still be met with exceedences over the 30 dBA. *See* Blomberg Sur pp.16-17; (2)averaging should not be used to determine the attenuation due to structures as is done in the *Sheffield case.* (*Id*.). (3)the measurements should be taken just inside the windows rather than in the center of the room because people do not sleep in the center of the room. It is much more likely they will sleep near or against a window, and in the summer, the windows will be open. If these windows are closer to the project site, these people will not be protected by the Board's standard.*Id*..[33] (4) A 15 dBA reduction from outside to inside as discussed by Kaliski is inappropriate in a windows fully open configuration, 7 dBA is more accurate. Blomberg PDT p.6. Points one and three are additive, meaning that instantaneous levels could exceed 32 dBA, the threshold for motility (a type of sleep interference), by 20 or more decibels, yet still meet the Board's prior interior and exterior standards. Blomberg, Sur p.17.

In order to achieve 30 dBA inside, you need to have 35 dBA outside because of the minimal attenuation experienced when beds are located near windows. Since interior measurements are more difficult, and certainly more intrusive, than exterior ones, this problem can be averted by setting the exterior level at approximately 5 dBa higher than the desired interior level. *See* Blomberg Sur. p.17. Shorter averaging times such as either instantaneous measurements or at 5 minute intervals will avoid the averaging problems, while the 5 decibel level will compensate for the limited noise reduction near windows. *Id*. *See also* Lovko Reb. at 5.

Petitioner's recommendation of a 45 dBA (exterior)(8 hour) standard could result in 50% of the people being annoyed. Lovko at 10, and exceed the 2009 WHO report recommendations. (Id.). Albany's expert Lovko is unaware of any studies the turbines that show this level would

[33] Petitioner's seeming obsession with the loudness of nighttime crickets is easily calmed not only by simple logic that turbines, unlike crickets create industrial noise, not expected nor pre-existing in the Lowell area, but also by the fact that crickets emit higher frequency sounds than do turbines. Low frequency noises, such as the "swish swish" of turbines, are not masked by higher frequency noises. Kaliski THT, 2/22/11, p.152. *See* McCunney THT, 2/10/11, p.109.

protect public health. *Id*. As Rick James states, when you design a bridge, you do not design it at the point where it could collapse. "When we are designing something for a community, do we design the wind turbine project so it is right at the brink of causing adverse health effects. I prefer to err on the side of caution and provide a safety factor." James THT, 2/23/11, p.44.

Similarly, the Board should not impose a standard at the brink of health effects, especially given the emerging field studying the effects of turbine noise. The Board should err on the side of caution and impose a standard truly protective of human health.

c. The PSB should implement setbacks at the property line to protect the health and safety of the public and to simplify enforcement of noise limits

Our state Supreme Court has found that setback requirements which reasonably relate to the public health, safety, and welfare, are a generally valid land-use tool. *In re Letourneau*, 168 Vt 539, 544 (1998). Setbacks in this case are critical because of the complexity of monitoring, as evidenced by cases such as Vinalhaven, in which the disputes are so tangled that the parties cannot even agree to the actual noise levels of the turbines. Blomberg THT, 2/22/11, p.273. In this case, sufficient setbacks are reasonably related to the public health, safety, and welfare. A lot of these problems can be avoided if the Board imposes a decent setback and uses distance as its criteria as a surrogate [for a property line noise standard]." Blomberg THT, 2/22/11, p.273.

This Board has noted the use of setbacks that are 2-5 times the height of the turbine; the former to be measured to the property line and the latter, to the right of way. *In Re Georgia Mountain* Dkt 7508 p.33 n.36. As proposed, the project is less than 200 feet from the nearest property line. Its safety setbacks are located on non-consenting landowners' property. GMP is offering these landowners no compensation for this forced intrusion, and dismisses their

concerns, while hypocritically calling itself a "good neighbor" and stating it has sought to develop a "relationship of trust with the community". Dostis PDT pp.6-7. The setbacks for noise should be commensurate with the distance required to reduce noise levels to a property line standard ie: 35 decibels, and one that is relative to the noise levels of the specific turbines eventually chosen for the project. Most importantly, perhaps, the setbacks must take into consideration the importance of preserving the levels that presently exist in the Lowell area[34].

d. Petitioners have failed to present a cogent theory for limiting and monitoring sound produced by the project

As previously analyzed herein, Kaliski's methodology and conclusions are incomplete, misleading, and show a bias for his client's position. He is unable to form an opinion as to an adequate setback from property lines, nor did he know the distance from the turbines to the property lines THT 2/22/11 p.144; Blomberg Surrebuttal, p. 36; He chose monitoring locations in proximity to bushes, trees, water, and/or driveways or roads and refused to remove the short term noises, which violate ANSI standards and tend to inflate the actual existing background sound levels; he did not monitor for low frequency or infrasound; he failed to calculate wind shear; he failed to model under the worst meteorological conditions; he repeatedly downplayed the potential noise impacts of the turbines by stating that certain people may just be "annoyed" and that the Board should assess how many people actually complain; he failed to take into account the increased sensitivity of vulnerable populations; he excluded portions of sources from his reports which would tend to negatively affect his own conclusions; he failed to include

[34] Once again Mr. Kaliski's research was incomplete: Under cross-examination, Mr. Kaliski admitted that he did not know whether his modeling would show whether the project would or would not result in a nuisance on someone else's property. Kaliski THT 2/22/11 p.101. He did not know how close the closest property line was to the nearest turbine Kaliski THT 2/22/11 p.145, nor did he overlay a map to show the sound levels at the property line Kaliski THT 2/22/11 pp.97-98. Further, he did not conduct analysis at lands less than .6 miles from the turbines, and most of his analysis was performed at locations over one mile from the turbines. *See* Table One PET-KHK- Noise Addendum-corrected p.4 (showing distances of between .64 of a mile to 2.56 miles)

analysis amplitude modulation; he excluded seasonal residences from his analysis, and very importantly, he did not perform a *Quechee* analysis.

In stark contrast, Mr. Blomberg is the only expert who conducted a *Quechee* analysis that adequately includes the impacts of noise, and he found that the project had undue adverse impacts under all three conditions of the second prong of the *Quechee* test. LMG's noise expert utilized conservative methodology, most of which was based on Kaliski's own documents and measurements. His maps were drawn using Kaliski's data. Blomberg Sur p.3; *see* LMG-LB-2,4,5,7. Blomberg presented the Board with louder background sound measurements than those Kaliski found. Kaliski THT, 2/22/11, pp.66-67. His analysis and results are corroborated by Rick James and Dr. Lovko and validated by the approved methodological standards. In sum, there is nothing in the record to substantiate any finding other than that the proposed turbines produce an undue adverse impact on health and aesthetics due to noise; therefore, the Board should deny GMP's petition.

e. Noise from the Proposed Wind Turbines Would Have an Undue Adverse Impact on the Health of People Living in Close Proximity to the Project

WHO recognizes annoyance as a critical health effect, and GMP's expert on health effects of noise agrees with Albany's experts James and Lovko regarding the potential health implications of annoyance from noise and that disturbance occurs more at night. McCunney THT, 2/10/11, pp 25, 56-57. There can be indirect health impacts from turbine levels below 45 decibels including sleep disturbance or deprivation, annoyance, and stress., which may cause an adverse effect on people's health and well-being, for example, sleep deprivation can increase risks of high blood pressure, myocardial infarction. McCunney THT, 2/10/11, pp. 41, 56.

People with Asperger's Syndrome, like Jim Blair, may be more sensitive to noise. McCunney THT, 2/10/11, p.138. Additional research is needed directly addressing the physiological consequences of long-term low-level infrasound exposures on humans. *Id. at* .29. "Based on our understanding of how low frequency sound is processed in the ear and on reports indicating wind turbine noise causes greater annoyance than other sounds of similar level and affects the quality of life in sensitive individuals, there is an urgent need for more research directly addressing the physiological consequences of long term low level infrasound exposures on humans." *Id.* at 30-31.

It is accepted in the medical field that community noise can have negative and serious impacts on people's health. Lovko Sur. p.2. Accordingly, as Dr. Lovko states, "the question is no longer, can noise from wind turbines create health problems? Clearly, they can, the question is how to protect the public." Lovko Sur. at 2. Accordingly, given the extent of health impacts from turbine noise, the Board should deny GMP's petition for a CPG because the project will cause undue adverse health impacts to the public.

V. CONCLUSION

The project proposed by GMP and the other Petitioners exceeds the size and impacts of other wind developments that have been approved by the PSB. The scale of the project is out of tune with the Vermont landscape, particularly in the rural residential area surrounding Lowell Mountain. Unlike the *Sheffield* and *Georgia Mountain* projects, there is a multitude of neighbors, visitors, residents and part-time residents who are clamoring against destroying the ridgeline that is in their daily view. The same people, real people, are terrified that their health, wilderness and way of life will be forever damaged beyond repair or recompense. Considering the speculative nature of the purported benefits the project offers, and the severity of the

destruction the project will wreak on the land and the people of Vermont, the project would not be in the public good.

While the Petitioners will rely upon tax incentives (paid for by all citizens), the sale of REC credits (with disproportionate environmental costs borne by the people of Vermont), and the technical operations of the ISO-NE power grid and its producers (beyond the control of any of us) to make the project viable and environmentally beneficial, they seek to externalize the greatest cost of this industrial development onto the people living within several miles of the Lowell Mountain range. The project has been designed to maximize wind production, without due consideration to minimizing the impacts on the people whose livelihoods and lifestyles would be forever altered. What is good for GMP is not, necessarily, good for Vermont's public.

Refusing to reduce the number of wind turbines, continually increasing their size and noise-production, failing to adequately study natural resource impacts, having a pusilanimous sound monitoring plan without adequate pre-construction baseline monitoring, failing to adequately assess the purported carbon reduction claimed by the project, measuring only selected economic benefits from the project while ignoring potentially negative economic impacts, analyzing impacts of the project mostly with reference to out-of-state wind facilities, and impetuously refusing to acknowledge the real aesthetic impacts of the project, including noise, suggests that the Petitioners are not concerned about the actual effects of the project. Instead, Petitioners seem willing to accept or minimize any impact, so long as the project is economically viable and can be claimed to produce "renewable" power.

Petitioners have yet to explain how the sale of REC credits is in the public good of the people of Vermont. They have failed to explain how a relatively small amount of wind power can justify the severe environmental impacts that they are reluctant to fully catalogue. Nor have

they demonstrated whether, how, and to exactly what degree, the project will economically benefit the State of Vermont, especially considering the additional costs that will be incurred based upon testimony at the Technical Hearings and GMP-ANR-1.

Ultimately, the decision as to whether the project is in the public good is a policy decision that should take into account the actual need for the amount of renewable power proposed, the degree to which this project meets that need in a responsible way, and the impacts the project will have on the people of Vermont. The project is out of scale with its surroundings, and significant impacts could be reduced if it were reduced to a reasonable size. The economic benefits of the project are illusive and undefined. The carbon-reduction claimed by Petitioners is speculative and dependent upon third parties and factors beyond the Petitioners' control. The environmental impacts of the project are overwhelming, and the aesthetic impacts are shocking and offensive. On balance, Petitioners have not established that the project, as presently designed and with the additional costs that have yet to be identified, is in the public good. Therefore, the Public Service Board should deny the joint petitioner for a Certificate of Public Good.

If the project is permitted, the people of Lowell and surrounding towns will have to suffer the consequences for years to come. Vermont's landscape will be altered forever, a state significant natural area will be lost, and a sanctuary where only the sounds and sights of nature prevail will give way to the march of industrialization. All in the name of "green" power? There are, of course, other alternatives. Alternatives with less severe impacts. Solar, bio-gas, co-generation, run-of-the-river hydroelectric, and pelletized fuels made from Vermont renewable forest products are all available with significantly less onerous impacts on the people of Vermont. Many are approaching parity with wind and market rate power costs. Rather than

make a decision the people of Vermont will regret for generations, LMG implores the Board to act with caution, employ the precautionary principal, and refuse to allow the devastation that will be caused by this project without greater assurances of the benefits and some meaningful attempt to limit the harms.

In the event the Board grants a CPG in this matter, LMG seeks further technical hearings as requested herein, and meaningful conditions requiring the Petitioners to reduce the size of the project and accurately measure its impacts. LMG specifically requests that any CPG require the Petitioners to reduce the number and size of turbines, as this is an available means of mitigation that could produce a similar amount of power while reducing the project's significant impacts.

WHEREFORE, for the foregoing reasons, Lowell Mountains Group, Inc. prays the Public Service Board will DENY the Joint Petition for a Certificate of Public Good.

LOWELL MOUNTAINS GROUP, INC:

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