NEW YORK STATE BOARD ON ELECTRIC GENERATION
SITING AND THE ENVIRONMENT

CASE 16-F-0559 – Application of BLUESTONE WIND, LLC for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 of the New York State Public Service Law for the Bluestone Wind Project

INITIAL BRIEF OF BLUESTONE WIND, LLC

Submitted by:

YOUNG/SOMMER LLC

James A. Muscato II, Esq.
Elizabeth M. Morss, Esq.
Jessica Ansert Klami, Esq.
Attorneys for Bluestone Wind, LLC
Five Palisades Drive
Albany, NY 12205
jmuscato@youngsommer.com
Phone: (518) 438-9907 ext. 243

Dated: August 9, 2019

INITIAL BRIEF OF BLUESTONE WIND, LLC (CASE NO. 16-F-0559)

TABLE OF CONTENTS

I. INTRODUCTION

Bluestone Wind, LLC ("Bluestone Wind" or the "Applicant") hereby submits this initial brief supporting the granting of a Certificate of Environmental Compatibility and Public Need ("CECPN" or "Certificate") under New York State Public Service Law ("PSL") Article 10 for the Bluestone Wind Project (the "Project" or "Facility"). The Project, a wind powered electric generating facility, will have a capacity of up to 124.2 megawatts ("MW") to be located in the Towns of Sanford and Windsor, Broome County, New York.

The Bluestone Wind Project presents a unique opportunity for the New York State Board on Electric Generation Siting and the Environment ("Siting Board") to certify a clean energy project in the Southern Tier of New York that will significantly contribute to New York State's aggressive clean energy goals, while avoiding and minimizing potential significant impacts to the environment. Just recently, Governor Cuomo signed the Climate Leadership and Community Protection Act ("CLCPA"), which adopts the most ambitious and comprehensive climate and clean energy legislation in the country. The CLCPA requires the State to achieve a carbon free electricity system by 2040 and reduce greenhouse gas emissions 85% below 1990 levels by 2050, setting a new standard for states and the nation to expedite the transition to a clean energy economy. Projects like Bluestone Wind are crucial to help New York achieve its ambitious clean energy goals.

With New York State's energy goals in mind, Bluestone Wind anticipates commencing construction of the Project as soon as possible upon issuance of its Article 10 Certificate, and the Applicant has gone to great lengths to work with the Parties in this proceeding to propose acceptable Certificate Conditions and a Site Engineering and Environmental Plan ("SEEP") Guidance Document to avoid, minimize and mitigate potential impacts (Hearing Exh. 10 & 11).

The Certificate Conditions and SEEP Guidance Document address issues raised by the Parties in this proceeding and narrow issues in dispute to expedite the certification and construction of the Facility. The Applicant, DPS and DEC have agreed on the majority of the contents of the Certificate Conditions and SEEP Guidance Document, and most of the exceptions to the Certificate Conditions and SEEP Guidance Document raised by DPS and DEC in direct testimony were resolved through rebuttal and hearing testimony.

On the few issues that remain, Bluestone Wind has provided record support for a resolution of the issues in the Applicant's favor and in a manner that will allow the Project, as proposed by the Applicant, to proceed to construction and provide the anticipated economic and environmental benefits.

II. DESCRIPTION OF FACILITY

The proposed Facility is a utility-scale wind project located in the Towns of Windsor and Sanford, Broome County, New York. The Facility will be located on privately leased rural land that can continue to be used for farming, forestry and other compatible purposes once the Facility is constructed. The private parcels proposed to host the Facility components are referred to as the "Facility Site" (Hearing Exh. 2, Figure 2-2 for mapping showing the Facility Site). The applicable study areas differ based on the resource being studied (Hearing Exh. 2, Application Exh. 3(a)(5)). Off-site ancillary features for the Facility are limited to temporary public road improvements (Hearing Exh. 2, Application Exh. 3(a)(3)).

During the earlier stages of Project development, the Applicant considered a 53-turbine layout with maximum capacity of 124 MW, comprised of a comparatively large number of smaller turbines (Hearing. Exh. 2, Application Exh. 9(c)(4)(ii)). In the course of Project development, environmental, economic, visual, landowner participation and other constraints prompted the

Applicant to reduce the size of the Facility. The Application submitted to the Siting Board on September 18, 2018 (the "Application") called for the installation of up to 33 turbines (rather than the 53 turbines originally considered) while maintaining the maximum capacity of 124 MW. As part of an April 19, 2019 Application Update (hereinafter "Application Update"), the Applicant further reduced the size of the Facility by eliminating 6 turbines and the associated roads and collection lines from the Project. The Applicant also shifted certain other turbines to comply with setback requirements and/or reduce environmental impacts, increased the width of the permanent access roads from 16 to 20 feet to comply with manufacturer requirements, added a second laydown yard, and made other changes (Hearing Exh. 7, Application Update, pp. 2-3).

The Facility, as currently proposed, will consist of up to 27 turbines with a total nameplate capacity of no more than 124.2 MW. The key components of the Facility are described below:

- ***Turbines:*** The Facility's 27 turbines will be located in the Town of Sanford (23 turbines) and the Town of Windsor (4 turbines) (Hearing Exh. 7, Application Update Exh. 3, Table 3-2 Update). Five turbine models are currently under consideration. The tip height of these turbines (blade length plus tower hub height) range from 200 meters (655 feet) to 205 meters (673 feet) (Hearing Exh. 7, Application Update Exh. 6(a), Table 6-1 Update).
- ***Access roads:*** The Facility access roads will be approximately 16 miles long. Temporary access roads will be gravel surfaced and sufficiently wide to accommodate construction vehicles/component delivery. Following construction, the roads will be restored for use as permanent access roads, which will be gravel-surfaced and typically 20 feet wide (Hearing Exh. 2, Application Exh. 2(a); Hearing Exh. 7, Figure 3-1 Update).

- ***Collection lines:*** The Facility includes approximately 40 miles in circuit length of collection lines that deliver power from the turbines to the collection substation. Overhead collection lines are not currently proposed (Hearing Exh. 2, Application Exh. 2(a); Hearing Exh. 7, Figure 3-1 Update).
- ***Collection and point of interconnection (POI) substations:*** The collection substation is located at the terminus of the Facility's 34.5 kilovolt (kV) electrical collection system and will include a 10 MW battery storage system. The POI substation is located adjacent to an existing New York State Electric and Gas (NYSEG) transmission line. The substations will be connected by a 200-foot long span of overhead 115 kV transmission line (Hearing Exh. 7, Application Update, p. 1).
- ***Meteorological towers:*** Two approximately 130-meters (426-feet) tall permanent wind measurement towers will be installed in the Towns of Windsor and Sanford to collect wind data and support performance testing of the Facility (Hearing Exh. 7, Application Update, p. 1).
- ***Operation and maintenance (O&M) building:*** This approximately 5,000 square foot building will be constructed in the Town of Sanford next to a planned laydown yard. It will house permanent staff offices and store maintenance equipment and supplies (Hearing Exh. 7, Application Update, p. 1).
- ***Temporary laydown yards/staging areas:*** Two temporary construction laydown yards will be established to accommodate construction trailers, supplies, large project components, and parking for construction workers. The first laydown yard will be located adjacent to the planned O&M building in the Town of Sanford and includes space for a potential temporary concrete batch plant (if needed). The second laydown

yard – which was included in the April 2019 Application Update – will be located on the south side of William Law Road across from the original laydown yard (Hearing Exh. 7, Application Update, pp. 2-3).

From the outset of the Project, the Applicant has continually revised the Facility layout with the goal of minimizing/balancing potential environmental impacts while at the same time addressing the interests of landowners and adjoining property owners. After the initial decision to scale back the Project from 53 to 33 turbines, the Applicant continued to evaluate the Project layout and propose minor adjustments ("micro-siting") in response to specific environmental and other concerns (Hearing Exh. 2, Application Exh. 9(b)(5), Table 9-1). As discussed in the April 2019 Application Update, the Applicant further reduced impacts by decreasing the number of turbines from 33 to 27 and shifting the locations of 8 of the remaining turbines to ensure compliance with setback provisions, reduce environmental impacts and respond to concerns raised by the Broome County Department of Environmental Services about the possible impacts of a turbine on a microwave path that is part of the County's planned 911 network update (Hearing Exh. 7, Application Update, p. 2).

III. PROCEDURAL HISTORY

This Article 10 proceeding commenced on October 4, 2016 with the filing of the Applicant's Public Involvement Program Plan ("PIP"). After review and comment from New York State Department of Public Service ("DPS") Staff, a Final PIP was filed on December 2, 2016. The Applicant then consulted with stakeholders regarding the Article 10 process, identification of resources and scope of study, and early-stage development of the Facility (Hearing Exh. 2, Application Exh. 2(c)). On August 18, 2017, after the statutory notice and publication, the Applicant filed a Preliminary Scoping Statement ("PSS"). Comments on the PSS

were received from the Parties, and on September 29, 2017, a Response to Comments was filed and served by the Applicant in the same manner as the PSS (*Id*.).

A Pre-Application conference was held on October 16, 2017 in the Village of Windsor and attended by the Applicant and representatives from DPS, the Towns of Windsor and Sanford, and the Delaware-Otsego Audubon Society ("DOAS"). Immediately following the pre-application conference, the Applicant, DPS, the New York State Department of Environmental Conservation ("DEC"), the New York State Department of Health ("DOH"), the New York State Department of Agriculture and Markets ("DAM"), DOAS and the Towns began negotiating Stipulations regarding the scope and methodology of studies to be included in the Application. After months of negotiations and notice of, and public review and comment on, the proposed Stipulations, the Stipulations were fully executed by the Applicant, DPS, DEC, DOH, DAM, DOAS and the Towns on or about September 9, 2018 (Hearing Exh. 1, Executed Application Stipulations). Building on the detailed regulatory requirements in Article 10, the Stipulations contained further details regarding the scope, content and level of information to be provided in the Application.

On September 18, 2018, Bluestone Wind filed the Application pursuant to PSL § 164 with the Secretary of the Board on Electric Generation Siting and the Environment ("Siting Board") (Hearing Exh. 2 & 3). The Application was reviewed by the Chair of the Siting Board and additional information was requested from the Applicant related to the Application and the Facility. On December 10, 2018, the Applicant submitted supplements to the information in the Application (Hearing Exh. 4 & 5). On December 27, 2018, the Siting Board determined that the Application complied with the PSL and met the regulatory requirements and therefore deemed the Application "compliant" (Hearing Exh. 6).

Following the determination from the Siting Board that the Application complied with the requirements of the PSL, the public hearing and adjudicatory phase of the Article 10 process commenced. A pair of information forums and public statement hearings were scheduled in the Village of Windsor for January 29, 2019; however, the forums were rescheduled for February 19, 2019 because of weather. Notice of the original and rescheduled forums/hearings was published in several local newspapers and a copy of the notice was served on all stakeholders, including host and adjoining landowners. Also, a link to the notice was published on Bluestone's Project website. A procedural conference was held the next day on February 20, 2019 to identify interested parties and issues for adjudication, discuss a litigation schedule, and address other matters. In advance of the procedural conference, the Hearing Examiners circulated a proposed procedural schedule, which was discussed with the Parties during the procedural conference. The Examiners issued a ruling on the procedural schedule on March 7, 2019. The schedule was later extended to give the Parties additional time to pursue settlement.

Discovery concerning the Application was undertaken from February through July of 2019. In a pair of rulings issued on April 5, 2019 and May 7, 2019, Broome County Concerned Residents ("BCCR") and Heather DeHaan were each granted party status. Issues statements were filed by DPS, DEC, DOAS, BCCR, the Towns of Windsor and Sanford, and Heather DeHaan. DAM specifically declared that they had no issues concerning the Project.

Direct testimony and exhibits were submitted by or on behalf of the following entities on or about June 7, 2019: DPS, DEC, DOAS, Heather DeHaan and BCCR.[1] The Applicant submitted rebuttal testimony on June 21, 2019. The evidentiary hearing was held in Deposit, New York, on

[1] The following members of BCCR submitted testimony concerning the Project: John Alfano, Rose Auld, Julie Beyer, Karl Katen, Patricia Kurz, Joanne McGibney, Gail Musante, Angela Olson, Jerry L. Punch, Steve and Luann Therrien, Jay Vandermark, Gerald Lee Wexelberg III, and Mary Willis. In addition, BCCR provided testimony submitted by James F. Palmer in conjunction with the Number Three Wind Project (Case No. 16-F-0328).

July 9 through July 11, 2019, at which an evidentiary record of 148 exhibits was accepted into evidence and over 2,200 pages of transcript were developed. The Record includes the Application and Supplement, the April 2019 Application Update, the May 2019 Eagle Update, Stipulated Certificate Conditions, responses to various Information Requests ("IRs"), and testimony (supported by documentary evidence) submitted by or on behalf of the Applicant, DPS, DEC, and others.

A. Certificate Conditions and Site Engineering and Environmental Plan (SEEP)

Between December 31, 2018 and February 15, 2019, the Applicant and the Parties engaged in exploratory settlement discussions and determined that settlement could potentially be accomplished with respect to most issues. As previously noted, on February 20, 2019, the Parties attended a procedural conference during which they identified potential issues and expressed an interest in resolving the issues without litigation. The Applicant proposed a schedule at the conference that called for postponing the litigation schedule based on the Parties' representations regarding their interest in potential resolution of issues and agreed to schedule a call to discuss the process for settlement. Thereafter, a dual schedule for settlement was proposed by the Parties for the Examiners to consider.

On February 15, 2019 and February 22, 2019, the Applicant submitted draft Certificate Conditions and a draft Site Engineering and Environmental Plan ("SEEP") guidance document ("SEEP Guidance Document") to the Parties for review and comment. On February 25, 2019, the Applicant held a teleconference on notice to all Parties to discuss a potential settlement schedule. Directly following the conference, a proposed schedule for settlement and litigation was submitted to the Parties and Hearing Examiners. On February 26, 2019, the Applicant submitted a formal notice of settlement pursuant to 16 NYCRR § 3.9(d). Formal settlement negotiations were held on

March 13, 2019, March 26, 2019, April 22, 2019, and May 29, 2019. All settlement conferences were duly noticed to all Parties and held in person or by telephone. In-person conferences included the option to participate via video conference and/or telephone.

As a result of the settlement discussions, the Applicant, DPS and DEC agreed upon proposed Certificate Conditions for inclusion by the Siting Board in the CECPN issued to the Facility (Hearing Exh. 10, Final Bluestone Certificate Conditions). The Applicant, DPS and DEC also agreed on a framework for developing a SEEP (i.e., the SEEP Guidance Document) (Hearing Exh. 11, Final Appendix A Bluestone SEEP). The SEEP Guidance Document – which is proposed to be included as Appendix A to the Certificate Conditions – addresses the requirements for development of final engineering details; site plans for construction, restoration, and environmental control measures; plan and profile drawings of the development site and facility components; and maps of the facility site and the overall facility setting as appropriate to demonstrate compliance with the CECPN. The Applicant, DPS and DEC agreed to the vast majority of Certificate Conditions and SEEP Guidance Document provisions. DPS excepted the following Certificate Conditions: Certification Conditions 48(a), 50, 68(a), 68(b), 68(c), 70, 75(d)(i-iii), 76, 77(a), 78(a)(b), 79(a), 80(c)(d), and 82(c) (Hearing Exh. 13, DPS Signature Page). Conditions 75-82 are all related to sound. The remaining excepted conditions relate to: the decommissioning plan (48), the emergency action plan (50), and eagles (68 and 70). In addition, the DPS Staff Policy Panel testified that Section D of the SEEP Guidance Document relating to tree clearing is inadequate (Tr.1578, L11-20). DEC excepted Certificate Conditions 68(a) and (b) and 106(b), related to eagles, and Conditions 113, 129 and proposed SEEP Specification B-18(a)(iii), related to streams (Hearing Exh. 14, DEC Signed Stipulations and Exceptions). The Applicant's response to these exceptions is included in the appropriate sections below. However,

most of the concerns raised by DEC and DPS with respect to the excepted conditions have been resolved through testimony, including eagles and DPS's concerns with the SEEP Guidance Document. The Applicant believes the only conditions truly still in dispute are those related to sound.

IV. LEGAL BACKGROUND

A. Required Findings under PSL § 168

Article 10 requires the Siting Board to make the final decision on an application for a Certificate upon the record made before the presiding examiner, including briefs (*see* PSL § 168(1)). Pursuant to PSL § 168(2), to grant a certificate, the Siting Board must make explicit findings regarding the nature of the probable environmental impacts of the construction and operation of the Facility on:[2]

> (a) ecology, air, ground and surface water, wildlife, and habitat;
> (b) public health and safety;
> (c) cultural, historic, and recreational resources, including aesthetics and scenic values; and
> (d) transportation, communication, utilities and other infrastructure.[3]

In this case, in order for the Siting Board to grant a Certificate for the construction or operation of the Facility, the Siting Board must determine under PSL § 168(3) that:

> (a) the facility is a beneficial addition to or substitution for the electric generation capacity of the state; and
> (b) the construction and operation of the facility will serve the public interest; and

[2] The Application does not include any "related facilities" as the term is used in PSL § 168(1) and defined in 16 NYCRR § 1000.2(aj).

[3] Where applicable, such findings shall include the cumulative impacts of emissions on the local community, including whether the construction and operation of the facility results in a significant and adverse disproportionate environmental impact on an environmental justice community, as defined by the regulations promulgated by DEC pursuant to PSL § 164(1)(f), which can be found at 6 NYCRR Part 487. The operation of the Facility will not result in any emissions. Also, the Facility is not proposed near an environmental justice area and will not result in significant and adverse disproportionate environmental impacts to such a community, as those terms are used in the context of paragraph (f) of PSL § 164(1) and by the DEC in its regulations at 6 NYCRR Part 487 (*See* Section XI. B below for a discussion of environmental justice issues).

(c) the adverse environmental effects of the construction and operation of the facility will be minimized or avoided to the maximum extent practicable; and
(d) the facility is designed to operate in compliance with applicable state and local laws and regulations issued thereunder concerning, among other matters, the environment, public health and safety, all of which shall be binding upon the applicant…

In making the determinations required in PSL § 168(3), the Siting Board shall consider under PSL § 168(4):

(a) the state of available technology;
(b) the nature and economics of reasonable alternatives;
(c) environmental impacts found pursuant to PSL § 168(2);
(d) the impact of construction and operation of related facilities, such as electric lines, gas lines, water supply lines, wastewater or other sewage treatment facilities, communications and relay facilities, access roads, rail facilities, or steam lines;
(e) the consistency of the construction and operation of the facility with the energy policies and long-range energy planning objectives and strategies contained in the most recent state energy plan;
(f) the impact on community character and whether the facility would affect communities that are disproportionately impacted by cumulative levels of pollutants; and
(g) such additional social, economic, visual or other aesthetic, environmental and other considerations deemed pertinent by the Board.

As set forth in the Brief, the Record provides sufficient evidence for the Siting Board to make the required determinations in PSL § 168(3) based on the findings and considerations of PSL § 168(2) and (4). Therefore, the Siting Board should issue the CECPN for the Bluestone Wind Facility, as designed by the Applicant, with the Certificate Conditions proposed in Hearing Exhibit 10. The Applicant's Brief provides an outline of the required determinations below, together with the Record evidence that supports the Siting Board's findings and determinations.

B. Burden of Proof

Under 16 NYCRR § 1000.12(b)(1), the Applicant bears the burden of proof to demonstrate that the Siting Board's required findings under § 168 of the PSL can be made. This proof must be based on a preponderance of the evidence standard (16 NYCRR § 1000.12(c)). However, any

party raising issues found to be adjudicable has the ultimate burden of proof on its identified issues at the evidentiary hearings.

The evidentiary rules preclude the Siting Board from relying on evidence introduced for the first time in a brief, because the brief itself is not part of the official "Record." Under 16 NYCRR § 1000.12(9), "briefs and other documents that attempt to persuade through argument are not evidence and may not be entered into the evidentiary record of a proceeding." Therefore, any new issues raised for the first time in a brief, and not previously introduced into evidence, will not be contained within the Siting Board's Record and will not be used to inform the decision.

C. Balancing Required by PSL § 168

As a siting statute preempting various aspects of State and local laws, Article 10 grants the Siting Board broad authority to consider the relevant facts in the Record and the considerations in PSL § 168(4) in making the determinations required by PSL § 168(3). This balancing of interests is particularly reflected in the statutory requirement that the Board determine that adverse environmental effects have been avoided or minimized *to the maximum extent practicable* (taking into account the considerations set forth in PSL § 168(4)). Thus, the Siting Board has substantial flexibility to consider the particular facts of the Facility and weigh the various competing criteria, interests, and concerns.

V. PUBLIC INVOLVEMENT

A. Public Involvement Requirements

Projects subject to Article 10 must implement a multistep program to facilitate public involvement, which is set forth primarily in 16 NYCRR §§ 1000.4 to 1000.7. The program imposes obligations on both the applicant and DPS to ensure that the public is informed about the project and is provided with opportunities to participate throughout the review process. It also requires the

applicant to make funding available to assist municipalities, organizations and individuals with their evaluation of the project.

There were numerous public involvement opportunities during the pre-application and application/hearings phases of the Article 10 process for the Bluestone Wind Project. In addition, the Applicant provided $167,750 in intervenor funds to facilitate parties' involvement throughout the Article 10 process. (Upon filing the PSS and Application, the Applicant submitted intervenor fees of $43,750 and $124,000, respectively.) As set forth in greater detail elsewhere in this brief, the Applicant made numerous changes to the Project to reduce environmental impacts and address concerns raised by the public concerning the Project.

B. Bluestone Wind Public Involvement

The public participation program for the Bluestone Wind Project prior to submission of the Application is set forth in Application Exhibit 2 (Hearing Exh. 2, Application. Exh. 2(c)). As previously noted, the Applicant drafted a PIP outlining the measures proposed to be implemented to facilitate public involvement, which was submitted to the Siting Board on October 4, 2016. DPS provided comments on the PIP, and the PIP was updated, finalized and filed by the Applicant on December 3, 2016 (Tr.2125, L17-20; Hearing Exh. 133, Exh. POP-R3 [PIP]). The PIP has remained current throughout this Article 10 proceeding and has been the subject of a number of PIP tracking update filings (Tr.2126, L1-3).

In conjunction with the PIP, the Applicant developed a master stakeholder list that includes dozens of affected federal, state and local agencies, municipalities and school districts, public interest groups, utility companies, and tribal representatives, as well as adjacent landowners identified based on the location of components within the Facility Site. The Master Stakeholder list expanded as the layout of the Project was determined and participating and adjacent

landowners were identified (Hearing Exh. 2 & 3, Appendix B [Master List of Stakeholders]; Tr.2124-2125). In the approximately 21 months between filing of the final PIP and submission of the Application, the Applicant implemented numerous public participation initiatives in fulfillment of the PIP:

- The Applicant established a Facility-specific website that includes extensive information about the Facility, including a Facility overview, maps and figures, and key project documents;
- The Applicant established a toll-free phone number for public questions and comments;
- The Applicant provided copies of key Project-related documents at the following repositories:
  - Windsor Library, 107 Main Street, Windsor, NY 13865; and
  - Deposit Free Library, 159 Front Street, Deposit, NY 13754;
- The Applicant held open houses in 2017 in Windsor and Deposit to provide information about the proposed Facility. Notice of the meetings was published in 3 local newspapers a minimum of 14 days in advance of each open house and was posted on the Project website. The meetings were attended by representatives of Bluestone and technical experts, including avian biologists, civil engineers, noise consultants and environmental permitting specialists. The open houses were well attended, and members of the public asked questions in both a group setting and on a one-on-one basis;
- The Applicant consulted extensively with affected agencies and government entities, including attending town board meetings in the Towns of Sanford and Windsor to answer questions about the proposed Facility;

- The Applicant engaged in multiple discussions with the host communities and affected school districts on the Facility layout, transportation routes, and Host Community and Road Use Agreements;
- As discussed below, the Applicant submitted a Preliminary Scoping Statement to the Secretary on August 18, 2017. Notice of the PSS was published in the local newspapers in addition to being posted on the Applicant's Project website. At the close of the public comment period, the Applicant prepared a chart summarizing the comments received on the PSS and the Applicant's response, which was filed with the Secretary;
- In April 2018, the Applicant's consultant mailed a water well survey to the 189 landowners within a 2,000-foot radius of the proposed Facility Area that included a brief summary of the Project and the Article 10 process, contact information for the Applicant and instructions for obtaining additional information, and a questionnaire seeking information about wells located on their land (Hearing Exh. 2 & 3, Application Exh. 23(a), Appendix XX); and
- In late August 2018, the Applicant mailed stakeholders, including all adjacent landowners, an update on the Project and notice of the planned filing of the Application. In addition, notice of the planned filing of the Application was published in the local newspapers in accordance with the requirements of Article 10 (Hearing Exh. 2, Application Exh. 2(c); Hearing Exh. 134, Exh. POP-R4 [Bluestone Wind Project PIP Tracking Log]; Tr.2125-2129).

The Applicant has continued its public participation efforts in the months since submission of the Application in September 2018. As set forth in the most recent PIP Tracking Activities Log posted on DMM, the Applicant has: met with or talked with representatives of numerous local

government entities and other groups, such as DOAS, to provide them with information/updates concerning the Project and/or discuss specific issues, including proposed changes to the Facility layout; developed a handout with Innovant Public Relations to be distributed to members of the public; and transmitted several press releases on Project-related issues. The Applicant also held Informational Forums at the Windsor Community House on February 19, 2019. Notice of the forums was published in three local newspapers in advance of the meeting, mailed to the stakeholder list, and posted on the Bluestone Wind Project website. The forums were followed a day later by the Bluestone Procedural Conference discussed in Section III above. In addition, on May 1 and May 30, 2019, meetings were held with various Bluestone landowners to update them about the Project (Hearing Exh. 134, Exh. POP-R4 [Bluestone Wind Project PIP Tracking Log]).

Although much of the responsibility of informing the public about an Article 10 project rests with the Applicant, DPS is also responsible for keeping the public informed about project-related developments. Consistent with that responsibility, DPS has advised the parties on the party and service lists via mail or email about filings, rulings and notices of project milestones and activities, including the availability of intervenor funding, comment periods, procedural conferences, technical conferences and public statement hearings. In addition, the Siting Board issued a press release in advance of the Public Statement Hearing and mailed a letter and fact sheet to approximately 135 municipal and elected officials, agencies and community-based organizations in the Project Area. As set forth in in the DPS Consumer Services Panel Testimony, the Applicant, at the direction of the Presiding Examiner, also took steps to inform the public about planned Informational Forums and Statement Hearings (Tr.1477-1480).

After reviewing the public outreach history in this matter, the DPS Consumer Services Panel concluded in its Direct Testimony that “the Applicant was mostly successful in

implementing the PIP plan elements" (Tr.1470, L9-11). As stated by the DPS Consumer Services Panel:

> "[t]he Applicant encouraged participation from municipal officials and affected local, state and federal agencies, and as evidenced in the meeting tracking logs, sought input from these stakeholders. In addition, the Applicant attended local town board meetings, communicated with utility representatives, school districts, emergency response organizations, and other stakeholders by telephone, letter and email, and hosted two open houses for the public between January 2017 and November 2017. The Applicant also participated in public hearings with the Towns of Sandford [sic] and Windsor about height variance and MET Tower issues. The Applicant posted notice of the open house meetings in the local newspapers of record and on its website and sent notification letters to the stakeholders. The Applicant provided access to Project information through the Project website and the establishment of local document repositories. In addition, in response to DPS Staff recommendations, the Applicant also published project notice of the Application filing and other project milestones in a free community newspaper." (Tr.1470, L11-21 to 1471, L1-15).

The DPS Consumer Services Panel concluded that certain elements of the PIP plan "were less successfully implemented" (Tr.1471, L16-17). Of particular note, the DPS Panel raised concerns about development of the stakeholder list and the definition of "adjacent landowner." In its response to the PIP plan, DPS recommended a definition of adjacent landowner broader than that contained in 16 NYCRR § 1000.2(a) for purposes of providing notice. DPS also expressed concern that the stakeholder list accompanying the PIP did not include host and adjacent landowners (Tr.1474-1475). In response, the Applicant noted that it could not identify host/adjacent landowners until the Facility layout had been finalized (Tr.2125). An updated Master Stakeholder list including host landowners and adjacent landowners as defined in 16 NYCRR § 1000.2(a) (i.e., adjacent landowners within 500 feet of the Project) was filed with the Application. The Applicant also expanded the list to include additional landowners identified from the groundwater well survey discussed above (which sought information from residences within 2,000

feet of the Project Area) as well as organizations identified through outreach to visual stakeholders, discussed in Section VIII. A below (Tr.2125). As part of the agreed upon Certificate Conditions, the Applicant will provide construction notices to adjacent landowners within 2,500 feet of parcels upon which Project components will be located (Hearing Exh. 10, Final Bluestone Certificate Conditions, 20).

In fulfillment of its obligations under Article 10, the Applicant made $167,750 in funds available to the Towns of Sanford and Windsor, DOAS and BCCR. The Towns were granted application stage funding to enable them to participate in the scoping process. At the same time, the Examiners awarded funds to DOAS to obtain GPS data regarding the migration of golden eagles and conduct eagle surveys. After the Application was submitted, the Towns were awarded additional funds to defray expenses for expert witnesses, consultants, legal representation and administrative fees; DOAS received additional funds to retain the services of a research biologist to address potential impacts of the Project on eagles and other raptors. Funds also were awarded to BCCR to retain an attorney to assist the group in assessing the legal and other implications of the Project (Tr.1481-1482).

During the hearing, the attorney representing BCCR asked both the Applicant's Public Outreach Panel and the DPS Consumer Services Panel questions about the public outreach process. Although the questions ranged broadly, they focused largely on the scope and timing of the Applicant's outreach to landowners near the Facility Site. This testimony largely confirmed the information provided in the DPS Consumer Services Panel's Testimony and in the Applicant's Public Outreach Panel's Rebuttal Testimony. In particular, it showed that the Applicant's preliminary stakeholder list focused on municipalities, government agencies, and other organizations because the Project layout had not been established, making it difficult to identify

host and adjacent landowners (Tr.466-468, 471-478), and that the maps provided with the PIP and other pre-application documents, posted on the Project website, and presented at public meetings, provided basic information about the location of the Project, enabling members of the public to determine generally what properties could be affected by the Project (Tr. 468). The DPS Consumer Services Panel testified that while they encouraged the Applicant to include host and adjacent landowners on the stakeholder list in their comments on the PIP, this was only a recommendation (Tr.535).

C. Public Comments

As required by 16 NYCRR § 1000.5, the Applicant submitted a Preliminary Scoping Statement to the Secretary on or about September 29, 2017. As noted above, notice of the PSS was published in local newspapers and posted on the Project website. At the close of the public comment period, the Applicant prepared a chart summarizing the comments received on the PSS and the Applicant's response, which was filed with the Secretary. The majority of the comments received were from DPS. Although the comments covered a broad range of issues, many focused on noise impacts, preliminary design and construction concerns, and visual/shadow flicker impacts. DEC's comments focused on terrestrial ecology, wetland and water resource impacts. Comments also were received from DAM and DOH. Both host communities also submitted comments, although the vast majority came from the Town of Sanford. While the Towns' comments covered various subjects, the majority addressed noise, visual, transportation and public safety concerns. DOAS and Delaware Highlands Conservancy submitted comments relating to bird/bat and wildlife impacts and impacts to protected lands, respectively (Hearing Exh. 2, Application Exh. 2(c)). The Applicant worked with staff from these agencies to address the issues raised during the PSS review, and many of the key demands of the agencies were incorporated into

the executed Stipulations submitted to the New York State Public Service Commission by letter dated September 6, 2018 (Hearing Exh. 1, Executed Application Stipulations).

Over the course of the pre and post-Application review process, DPS has received comments from various individuals either in writing or during the Public Statement Hearings on October 11, 2018. The substance of these comments is summarized in the testimony of the DPS Consumer Services Panel and will not be repeated in detail here (Tr.1483-1495). In addition, various parties submitted issues statement following the Public Statement Hearing to identify matters of particular concern that they believed required litigation. Key issues raised during the public participation process are summarized briefly below:

- *Noise, shadow flicker and related impacts.* Various members of the public raised questions about noise, shadow flicker and related impacts associated with the operation of wind turbines. The Applicant responded to these comments as it prepared the Application. For example, in response to comments from the Town of Sanford, the Applicant added cemeteries to the list of receptors included in noise and shadow flicker studies (Tr.481). As set forth in Section VII. A below, the Applicant has conducted a comprehensive assessment of the noise impacts associated with the Project. The Record shows that the Applicant's proposed design goals and regulatory limits are protective of human health and the environment and that the Facility has avoided, minimized and mitigated annoyance to the maximum extent practicable. With respect to shadow flicker, as discussed in Section VII. B below, the Applicant analyzed the impacts of the Project layout and determined that only 11 non-participating receptors will exceed the agreed-upon threshold of 30 hours. The Applicant has proposed appropriate mitigation measures to address these shadow flicker impacts. The Record in this matter thus shows

that the Applicant has avoided/minimized shadow flicker impacts to the maximum extent practicable and has offered appropriate mitigation measures to address those impacts that cannot be avoided. It is also worth noting that many of the BCCR members who raised concerns about the potential impacts of noise and shadow flicker are outside of the study areas for these impacts and will not be impacted by the Project. Studies show that other BCCR members, although within the noise and shadow flicker study areas, will experience impacts well below the thresholds that have been established in other Article 10 proceedings (Tr.2139-2144).

- *Birds*. Commenters – most notably the DOAS – expressed concern that the Facility will have a negative effect on bald and golden eagles. As set forth in Section VI. D below, the Applicant's thorough analysis showed that the Facility will not have a significant impact on bird populations generally and that the Applicant has avoided, minimized and mitigated potential impacts to eagles. DOAS received intervenor funds from the Applicant to facilitate its analysis of eagle impacts and its participation in the Project review process, ensuring that key avian issues are fully addressed. Based on their direct input, the Applicant's avian consultant modified the scope of their avian studies to incorporate various data provided by the DOAS (Tr. 2136).
- *Visual impacts.* Several commenters noted that large wind turbines will cause significant visual impacts, spoiling scenic vistas. As discussed in Section VIII. A below, the Applicant conducted extensive studies of the potential visual impact of both the original and updated layout. The Applicant reached out to dozens of representatives of the community to obtain their input on the list of visually sensitive resources, adding an additional 30 resources as a result of this outreach process. Later, the Applicant

reached out to community representatives on the selection of viewsheds for preparing visual simulations and again made changes/additions based on the input received. Also, the Applicant modified the Visual Impact Assessment to perform certain simulations with leaf-on and leaf-off conditions at the request of the Town of Sanford (Tr.2138, L16-18). As this history shows, the Applicant has made significant efforts to avoid impacts to important visual resources and engage the community in the review process. Because visual impacts cannot be wholly eliminated, the Applicant has proposed measures to mitigate visual impacts to historic resources following outreach to representatives of local municipalities and historic societies concerning possible cultural mitigation projects (Hearing Exh. 2, Application Exh. 20(b)(2), pp. 29-30, Appendix GG [Cultural Resources Mitigation Plan]).

- *Cultural resources.* The Applicant has worked closely with the New York State Office of Parks, Recreation and Historic Preservation ("OPRHP") to assess the impact of the Project on cultural resources. It also coordinated closely with the Oneida and Delaware Indian Nations regarding the identification and avoidance of stone landscape features ("SLF") (Tr.2137). As discussed in Section XIII. O below, as a result of these efforts, the Project, as currently designed, will impact only 4 of the 66 individual SLFs identified on the Facility Site. The Applicant is continuing to work with the Nations and OPRHP to minimize and mitigate cultural impacts still further.
- *Property value.* Various members of the public raised concerns about the impact of the Project on their property values. In light of these concerns, the Applicant included a detailed literature review focused on property values in Exhibit 4(p)(1) of the Application, which is not a requirement of the Article 10 regulations (Tr. 2137). The

Applicant also retained Eric Brunner, PhD, a professor of Economics and Policy, to offer testimony on this issue (Tr.1929-1938). The overwhelming evidence in the Record demonstrates that the Facility will not have any long-term impact on property values.

- *Transportation impacts.* Several members of the public raised concerns about the impact of the Project on transportation. As discussed in Section IX. A below, transportation-related impacts will largely be limited to the construction period and will be spread across the Facility Area. Any impacts in a particular area are likely to be minor and of short duration. The Applicant has reached out to local airports/heliports and has sought the required approvals from the Federal Aviation Administration ("FAA"). With one exception, none of the local airports/heliports raised any concerns about the Project.[4] Issuance of final Determinations of No Hazard from the FAA reflect a decision by the federal agency charged with overseeing the safety of the nation's airspace, that the Project does not pose a danger to aviation.
- *Groundwater impacts.* Several members of the public raised concerns about the potential impact of the Project (in particular, blasting associated with construction of the Project) on groundwater wells. As discussed in Section VI. B below, the vast majority of groundwater wells are located outside the safe distances established by DOH to protect groundwater wells and water quality. In addition, the Applicant has agreed not to blast within 500 feet of groundwater wells and to adhere to a detailed blasting plan designed to protect all types of structures, including wells, in the vicinity

[4] The Applicant's consultant spoke with the manager of the Greene Airport by phone on June 26, 2018. At that time, he identified no concerns regarding the Project (Hearing Exh. 2, Application Exh. 25(f)(2)). Thereafter, the manager raised questions about the safety of general aviation aircraft and turbine lighting. The Applicant provided additional information to the Greene Airport and no further concerns were raised.

of the blasting location. Finally, the Applicant has agreed to a pre and post-construction groundwater monitoring program, with the goal of identifying and remedying impacts to wells in the unlikely event they occur.

Various commenters also raised concerns about the purported lack of transparency and involvement concerning the Project. Of particular note, on BCCR member suggested that the Applicant's leases and good neighbor agreements contain clauses barring landowners from discussing the Project with their neighbors. Bluestone's leases and good neighbor agreements do ***not*** contain clauses barring public involvement in the Project, nor has the Applicant otherwise prevented information about the Project and its impacts from circulating to the public (Tr.489; Tr.2142). More generally, as set forth above, the Applicant implemented numerous measures to inform the public about the Project consistent with its PIP plan and with the requirements of Article 10. Although DPS identified certain minor concerns in the Applicant's outreach effort, it concluded that the Applicant was generally successful in implementing the majority of its PIP plan elements. Therefore, the Siting Board can conclude that the Applicant has complied with, if not exceeded, the public outreach requirements of Article 10.

VI. THE NATURE OF IMPACTS ON ECOLOGY, AIR, GROUND AND SURFACE WATER, WILDLIFE AND HABITAT AND MITIGATION OR AVOIDANCE THEREOF – PSL § 168(2)(a), 168(3)(c)

PSL § 168(2)(a) requires the Siting Board to make the required findings regarding the nature of the probable environmental impacts of the construction and operation of the Facility on ecology, air, ground and surface water, wildlife and habitat. Section 168(3), in turn, requires the Siting Board to determine that any adverse environmental effects of the construction and operation of the Facility will be avoided or minimized to the maximum extent practicable before it issues a Certificate under Article 10.

This section addresses only those ecology-related subject areas that were the subject of dispute among the parties in written testimony and/or hearings. These include tree clearing, groundwater, including water supply wells, surface water (streams), bald and golden eagles, and bats. Other ecology-related issues are discussed in Section XIII. M& Q below. This includes air, ecology generally, wildlife, birds (excluding bald eagles and golden eagles), habitat, and wetlands.

A. Ecology

1. Forest Impacts, Including Tree Clearing

The impact of construction and operation of the Facility on forests is addressed in Exhibit 22 of the original Application as updated in April 2019 (Hearing Exh. 2, Application Exh. 22; Hearing Exh. 7, Application Update Exh. 22(b)). Approximately 4,900 acres (87%) of the Facility Site is forested. Of this amount: approximately 44.6 acres of forest will be converted to built facilities (i.e., access roads, turbines, etc.), and 76.7 acres of forest will be permanently converted to a successional state (i.e., cleared and maintained as successional communities for the life of the Project). A total of 207.6 acres will be temporarily disturbed but allowed to reforest following post-construction soil stabilization; ecological succession will restore the forested condition of these areas with time (Hearing Exh. 2, Application Exh. 22(a)(1), (b)(1)). The April 2019 Application Update layout and design would result in a 58.5-acre reduction in forest clearing as compared to the original Application layout (Hearing Exh. 7, Application Update Exh. 22(b), Table 22-3).

In designing the Facility, the Applicant avoided areas of forest to the maximum extent practicable through measures such as burying underground collection lines in areas of existing disturbance (e.g., existing forest logging roads), collocating access roads with existing roads and

farm lanes, and confining disturbance to the smallest area possible (Hearing Exh. 2, Application Exh. 22(c)).

Andrew Davis, Utility Supervisor, DPS Office of Electric Gas and Water, Environmental Certification and Compliance Section, testified that there may be opportunities to reduce forest clearing at specific sites based on micro-siting and development of final site plans and construction limitations to be represented in compliance filings. In particular, he pointed to turbine site T28, which involves clearing of approximately 5 acres of beech-maple and hemlock northern hardwoods forest to accommodate a wind turbine laydown area (Tr.1361-1362). In his rebuttal, Gregory Liberman, Senior Project Manager, Environmental Design & Research, Landscape, Architecture, Engineering & Environmental Services, D.P.C. ("EDR"), noted that the site work at T28 needs to account for a steep slope to the southwest of the turbine, limiting its ability to shift Facility components and reduce the amount of forest clearing. Efforts to further reduce clearing "can be accounted for in the final design" (Tr.2040, L1-2).

The DPS Staff Policy Panel also objected to Section D of the SEEP Guidance Document ("Tree Clearing Plan") based on Mr. Davis's testimony (Tr.1578, L9-20). The Applicant has agreed with the proposed changes recommended by Mr. Davis and the Staff Policy Panel with respect to Section D of the SEEP Guidance Document. A revised version of the SEEP Guidance Document with the requested changes was submitted with the rebuttal testimony of William Whitlock (Hearing Exh. 129, Exh. WW-R1, Revised Appendix A Bluestone SEEP). The Applicant believes these changes resolve DPS's concerns with respect to the Tree Clearing Plan section of the SEEP Guidance Document.

As the discussion above shows, the Facility layout minimizes impacts to natural resources, including forests, while maintaining the renewable energy production capability of the Project.

While DPS staff have expressed concern about the extent of tree clearing, the history of the Project shows that the Applicant already has made significant efforts to reduce tree clearing impacts, including the recent reduction in the number of turbines from 33 to 27, which reduced forest impacts by 15%. Going forward, the Applicant will continue to look for ways to reduce tree clearing as it prepares the final Facility design. Under these circumstances, the Siting Board can reasonably conclude that the Applicant has avoided and minimized impacts to forests to the maximum extent practicable consistent with PSL § 168(2)(a) and 169(3)(c).

B. Groundwater, Including Water Supply Wells

The Applicant has set forth in detail the nature of the probable impacts of construction and operation of the Facility on drinking water supplies and groundwater generally (Hearing Exh. 2, Application Exh. 23(a), Appendix JJ [Report of Expected Geotechnical Conditions] and Appendix XX [Water Well Data and Private Well Survey]). It also has submitted various plans and agreed to Certificate Conditions designed to avoid/mitigate impacts to groundwater (Hearing Exh. 2, Application Exh. 23(a), Appendix HH [Preliminary Blasting Plan], Appendix II [Inadvertent Return Plan], Appendix KK [Preliminary Stormwater Pollution Prevention Plan ("SWPPP")], and Appendix YY [Spill Prevention, Control and Countermeasures ("SPCC") Plan] and Hearing Exhibit 10, Final Bluestone Certificate Conditions). Based on the information provided and the proposed Certificate Conditions, the Siting Board should determine that the potential adverse environmental effects to water supply wells from construction and operation of the Facility have been avoided or minimized to the maximum extent practicable.

To confirm the potential for impacts to groundwater during construction and operation of the Facility, the Applicant conducted extensive investigations to identify groundwater and drinking water resources, including, but not limited to: (1) reviewing public soil survey and other public

information and conducting its own preliminary assessment of expected geological conditions (Hearing Exh. 2, Application Exh. 21 and 23(a)(1)-(2), Appendix JJ [Report of Expected Geotechnical Conditions]), (2) seeking information about groundwater wells within one mile of the preliminary Facility Area from the Broome County Health Department and DEC, (3) surveying residences/businesses located within a 2,000-foot radius of the proposed Facility Area to obtain information about existing groundwater wells, and (4) obtaining information about nearby public water wells from DOH (Hearing Exh. 2, Application Exh. 23(a)(2), Appendix XX [Water Well Data and Private Well Data]).

Based on that investigation, the Applicant determined that the average depth to groundwater in the area ranges from the ground surface to greater than 78 inches, with high water tables most common in low-lying areas in and adjacent to wetlands (Hearing Exh. 2, Application Exh. 23(a)(1)). The Facility Site does not contain any primary aquifers (a designation applied by the U.S. Geological Survey ["USGS"] and DEC to aquifers that are highly productive and utilized by major municipal water supply systems). Approximately 291 acres located in the far western portion of the 5,657-acre Facility Site as described in the original Application is located over the Clinton Street-Ballpark Valley sole source aquifer ("SSA") (defined by the U.S. Environmental Protection Agency ["USEPA'] as an aquifer that supplies at least 50% of the drinking water in a given area). Also, the Facility Site overlays a part of an unconsolidated aquifer mapped by DEC (Hearing Exh. 2, Application Exh. 23(a)(2)).

The Facility is not anticipated to result in any significant impacts to groundwater quality or quantity or drinking water supplies. During construction, there is potential for short-term, minor impacts to groundwater from minor localized disruption of groundwater flows down-gradient of proposed turbine foundations, minor modifications to surface runoff or stream-flow potentially

affecting groundwater recharge characteristics, minor degradation of groundwater quality from accidental spills and installation of concrete foundations, impacts to groundwater recharge areas (wetlands), and groundwater migration along collection line trenches (Hearing Exh. 2, Application Exh. 23(a)(3)). However, these impacts will be insignificant or avoided altogether through adherence to the SWPPP and SPCC Plan (Hearing Exh. 2, Application Exh. 23(c)-(d)).

More generally, the Facility is not expected to result in any significant impacts to groundwater quality or quantity, drinking water supplies, aquifer protection zones, or groundwater aquifers in the Facility Area. The majority of the proposed turbines will be located on hilltops, generally above and outside of the aquifer footprints. Moreover, excavations for foundations, roadways, and underground collection lines are expected to be relatively shallow and so are not anticipated to intercept groundwater. As part of its geotechnical investigation, 19 borings were completed at representative locations to depths ranging from 6 to 25 feet. Groundwater was not encountered in any of the 19 borings (Hearing Exh. 2, Application Exh. 23(a)(3)). This fact suggests that excavations required to install turbines and other facility components are unlikely to encounter or impact groundwater.

Also, the Facility components are generally located some distance from groundwater wells. DOH has established standards governing water well protection that include provisions relating to well location (*see* 10 NYCRR Part 5, Appendix 5-B, Table 1, Required Minimum Separation Distances to Protect Water Wells from Contamination). The largest minimum distance specified is 300 feet, which applies to chemical storage sites not protected from the elements (e.g., salt and sand/salt storage) and landfill waste disposal sites. Smaller separation distances are required for such obvious sources of potential water well contamination as land surface spreading or subsurface injection of liquid or solid manure (200 feet), cesspools (200 feet), underground single-walled

chemical or petroleum storage tanks (150 feet), and sanitary privy pits (100 feet). Of particular note, the DOH chart includes a separation distance of 100 feet for "[a]ll known sources of contamination otherwise not shown above." In the *Cassadaga Wind* proceeding (Case 14-F-0490), DPS Staff recommended a setback distance of 100 feet from turbine locations to all public and private wells, which is consistent with DOH required minimum distances.

With respect to the Bluestone Wind Project, there are no private or public wells located within 200 feet of proposed turbine locations. Although there are 2 public wells located within 100 feet of a proposed collection line, the line will be installed on the opposite side of an existing road from where the wells are located, and the shallow excavation for line installation is not anticipated to affect groundwater (Hearing Exh. 2, Application Exh. 23(a)(3)). In addition, as set forth below, the Applicant has committed to perform pre and post-construction monitoring at locations such as this to determine whether construction of the Facility has impacted groundwater and to remedy any adverse impacts identified (Hearing Exh. 10, Final Bluestone Certificate Conditions, 45).

As previously noted, approximately 219 acres (3.9%) of the 5,657-acre Facility Site as described in the Application is located over the Clinton Street-Ballpark Valley SSA. Because the proposed Facility is not receiving any federal financial assistance, it is not subject to USEPA review under the Safe Drinking Water Act. Nevertheless, the Applicant reviewed available groundwater data concerning the SSA in relation to the proposed Facility and has concluded that construction, operation and maintenance of the Facility is not expected to result in the introduction of contaminants to the SSA. As previously noted, the Applicant has developed and will implement multiple plans requiring measures to avoid, minimize and mitigate impacts to groundwater resources, including the SWPPP, SPCC Plan, Inadvertent Return Plan and Blasting Plan. Also, the Facility will add only small areas of impervious surface, which will be dispersed throughout the

Facility Site and will therefore have a negligible effect on groundwater recharge (Hearing Exh. 2, Application Exh. 23(a)(3)(i)).

To ensure against impacts to groundwater, the Applicant has agreed to Certificate Condition 45, Water Supply Protection, which requires the Applicant to file a notice confirming that no wind turbines will be located within 100 feet of an existing water supply well or water supply intake. The Certificate Condition also prohibits blasting within 500 feet of any known existing, active water supply well or water supply intake on a non-participating parcel. Pre and post-construction well monitoring will be conducted on non-participating parcels within 1,000 feet of any blasting for which access is granted, or if engineering constraints require collection lines or access roads within 100 feet of a known existing, active water supply well on a non-participating parcel (Hearing Exh. 10, Final Bluestone Certificate Conditions, 45). If the testing indicates that the well has been impacted by the Project, the Certificate Holder will cause a new well to be constructed.

Jeremy Flaum, Utility Analyst 3, DPS Office of Electric, Gas and Water, testified concerning the possible impact of the construction and operation of the Facility on drinking water resources. He noted that while there were several public and private water supply wells in the Project Area, including several locations in close proximity to Project facilities, that appropriate setbacks and other measures for protecting water quality had been included in Stipulated Certificate Condition 45. In particular, he concluded that this Certificate Condition "establishes turbine setbacks that are consistent with the requirements of the New York State Department of Health … for minimum separation distances to protect water wells from contamination included in Table 1 of 10 NYCRR Part 5, Subpart 5-1 Standards for Water Wells – Appendix 5B." (Tr.1404, L13-19).

To facilitate drinking water protection efforts, Mr. Flaum also recommended that the Certificate Holder contact well owners in the Project area in order to survey the exact location of their wells and include the information on maps included in the Stipulated SEEP (Tr.1405, L15-21). The Applicant agreed with this recommendation. The Applicant notes that water supply and private wells were identified prior to filing the Article 10 Application by submitting Freedom of Information Law ("FOIL") requests to DOH, DEC and Broome County, and by sending a well survey to all residences/businesses located within a 2,000-foot radius of the proposed Facility Area. Prior to the commencement of construction, and in relation to the final design of the Facility, the Applicant will perform additional coordination with water well owners as described in Stipulated Certificate Condition 45 (Tr.1996, L14-20).

Although there are no outstanding areas of dispute between the Applicant and DPS concerning drinking water issues, several members of the BCCR raised general concerns about the potential impact of the Facility on groundwater/drinking water. As noted above, DOH has established distance standards to protect drinking water wells that range from 100 to 300 feet depending on the nature of the potential contaminant source. Karl Katen's parcel is 5,195 feet from the nearest turbine (Tr.2141, L3-4). Accordingly, any well on his property is significantly outside the safe distance standards set by DOH and the 500-foot blasting limit agreed to by the Applicant and will not be impacted by construction and operation of the Facility. Angela Olson's parcel is over 1,500 feet from the nearest turbine, which is also outside of these limits (Tr.2144, L14-15).

In conclusion, construction and operation of the Facility is not anticipated to adversely impact groundwater/drinking water quality or quantity. To ensure against such impacts, the Applicant has agreed to comply with setback requirements, conduct post-construction

groundwater monitoring, and implement a SWPPP and SPCC Plan to minimize the potential for such impacts and respond appropriately in the unlikely event such impacts occur. Under these circumstances, the Siting Board can reasonably conclude that the Applicant has avoided and minimized potential impacts to groundwater/drinking water to the maximum extent practicable.

C. Surface Water

The Application, as updated, sets forth in detail the nature of the probable impact of construction and operation of the Facility on streams and other surface water bodies (Hearing Exh. 2, Application Exh. 23(b), Appendix K [Preliminary Design Drawings, including wetland and stream resources], Appendix VV [Wetland Delineation Report], and Appendix WW [Wetland and Stream Impact Drawings]; Hearing Exh. 7, Application Update Exh. 23(b)). It also has submitted various plans and agreed to Certificate Conditions designed to avoid/mitigate impacts to streams (Hearing Exh. 2, Application Exh. 23(c) and (d), Appendix II [Draft Inadvertent Return Plan], Appendix KK [SWPPP], and Appendix YY [SPCC Plan]; and Hearing Exh. 10, Final Bluestone Certificate Conditions). Based on the information provided and the proposed Certificate Conditions, the Siting Board can reasonably determine that the potential adverse environmental effects to streams will be avoided, minimized or mitigated to the maximum extent practicable.

a) Water Intakes

The Applicant reached out to DOH, DEC and the Broome County Department of Health seeking information about surface public drinking water intake sites within one mile of the Facility, or, if there were no such intake sites, the nearest intake downstream of the Facility Site. DOH identified 30 water intake well locations within one mile of the Facility; however, no surface public drinking water supplies were identified. According to the Broome County Department of Health, the only surface drinking water intake under its jurisdiction is the City of Binghamton filtration

plant, which is located 25 miles downstream of the Facility Site (Hearing Exh. 2, Application Exh. 23(b)(3)).

b) Streams

The Applicant undertook a detailed assessment of the impact of the evolving Project on streams as part of the wetland and stream delineation process. Streams were identified according to the Cowardin Classification System (1979) and stream boundaries were determined based on the presence of ordinary high-water line characteristics (Tr.2021, L4-12; Hearing Exh. 2, Application Exh. 23(b), p. 12 of Appendix VV).

Under Article 15 of the New York Environmental Conservation Law ("ECL") (Protection of Waters), DEC has jurisdiction over any activity that disturbs the bed or banks of protected streams. Protected streams include any stream, or portion of a stream, that has been assigned any of the following water classes and standards: AA, AA(T), AA(TS), A, A(T), A(TS), B, B(T), B(TS), C(T) and C(TS) (with streams classified with a T or TS supporting trout or trout spawning, respectively). In addition, streams mapped and classified as C only are regulated as navigable waters and subject to Article 15.

Protected streams within the Facility Site are classified as Class A, Class B(T) and Class C(T) and include Fly Creek, Marsh Creek and tributaries, Oquaga Creek Upper tributaries, and Big Hollow Brook (Hearing Exh. 2, Application Exh. 23(b)(2)).

The layout proposed in the September 2018 Application identified a total of 22 proposed stream crossings, including crossings at 11 stream locations classified by NYSDEC as C or higher and therefore subject to Article 15 (Hearing Exh. 2, Application Exh. 23(b)(4)). In total, the Applicant anticipated temporary impacts to approximately 1,653 linear feet of perennial, intermittent, and ephemeral stream and approximately 1,418 linear feet of permanent impacts

resulting from the original layout included in the September 2018 Application. The total square feet of disturbance was estimated at 7,728 feet (temporary) and 8,011 (permanent). At the time of the Application, the Applicant anticipated using trenchless technologies at two stream crossings (Marsh Creek and Oquaga Creek). No permanent impacts to wetlands containing open waters were anticipated (Hearing Exh. 2, Application Exh. 24(b)(4)).

As previously noted, the Applicant submitted an Application Update in April 2019 that reduced the number of turbines from 33 to 27 and shifted various remaining turbines to comply with setback requirements and avoid interference with possible impacts to a microwave path. As part of the update, the Applicant proposed to use trenchless technologies (horizontal directional drilling ["HDD"] or jack and bore) at 6 additional crossings of DEC-protected streams, resulting in a 1,630 square-foot reduction in temporary impacts to these streams (Hearing Exh. 7, Application Update Exh. 23). The Application Update also modified the collection line crossing at Oquaga Creek east of NY State Route 41 to use jack and bore to cross the creek and direct burial to install collection lines within the adjoining Article 15 wetland (Wetland M). A detailed analysis of the Oquaga Creek crossing alternatives was included with the Application Update (*Id.* Appendix RRR).

In the September 2018 Application, the Applicant originally planned to use HDD to avoid impacts to Oquaga Creek, a DEC class C stream, and associated wetlands. However, in further design of the crossing, the Applicant's engineer determined that HDD was not considered viable, and the Applicant revised its design to propose trench installation (direct burial) and jack and bore technologies at this location. The installation of an overhead collection line was also considered. However, this alternative was ultimately not selected. Although the overhead line would have fewer temporary wetland and stream impacts compared to the trench installation, it would result

in additional potential impacts to avian species – eagle species, in particular – and visual impacts within the vicinity of Oquaga Creek (Hearing Exh. 7, Appendix RRR). The Applicant also evaluated other potential crossing locations, including one located south of the proposed trench installation, east of Bosket Road. However, this route was determined to be infeasible due to inadequate width along Bosket Road to facilitate the collection lines and required construction access (*Id.*). DPS Staff agrees that a direct burial installation at the currently proposed crossing location is the current preferred approach (Tr.1371).

The Applicant is continuing to refine the final design of the Facility, including the crossing of Oquaga Creek and nearby Wetland M. DPS and DEC have agreed that a final plan will be prepared and included in the SEEP. Section B.17(c) of the SEEP Guidance Document was developed specifically to address the final logistics of this crossing and calls for the preparation of a Stream Crossing Plan, which will include an analysis of the proposed collection line crossing of Oquaga Creek (Hearing Exh. 11, Final Appendix A Bluestone SEEP).

During construction, potential direct or indirect impacts to streams may occur as a result of the installation of access roads, the installation of electrical collection lines, the development and use of temporary workspaces around the turbine sites, laydown area, and substation. Direct impacts are anticipated to include (1) an increase in water temperature and conversion of cover type due to clearing of vegetation, (2) siltation and sedimentation due to earthwork, such as excavating and grading activities, (3) disturbance of stream banks and/or substrates resulting from buried cable installation, and (4) the direct placement of fill in surface waters to accommodate road crossings. Indirect impacts may result from sedimentation and erosion caused by construction activities (e.g., removal of vegetation and soil disturbance) (Hearing Exh. 2, Application Exh. 23(b)(4)).

As with wetlands, these impacts have been avoided and minimized to the extent practicable through site planning and initial Facility component siting efforts and detailed on the ground field investigations. During an iterative design process, Facility components have been continually removed or relocated to avoid or minimize both temporary and permanent impacts to surface water to the maximum extent practicable. Specifically, the Applicant has implemented numerous shifts of access roads, collection lines, turbines and the POI substation to avoid resources (Hearing Exh. 2, Application Exh. 9(b)(5)). Other measures include utilizing existing or narrow crossings whenever possible, upgrading undermaintained/undersized crossings, implementing equipment restrictions, restricting herbicide use, and limiting clearing of vegetation along stream banks, when possible, among other measures. In addition, the Applicant will restrict work periods consistent with DEC guidance and employ engineering techniques such as HDD to minimize surface water impacts (Hearing Exh. 2, Application Exh. 23(b)(4) and (5)).

As discussed in the Application, the surface waters most vulnerable to sedimentation are those with steep uplands adjacent to work areas. While the Facility has been designed to avoid steep slopes to the maximum extent practicable, some construction in areas of steep slopes is unavoidable. Consistent with the discussion of wetlands below, to avoid siltation and sedimentation in streams adjacent to steep uplands, the Applicant will implement measures set forth in the SWPPP as well as stream crossing measures such as HDD and jack and bore, which are designed to reduce impacts to surface waters (Hearing Exh. 2, Application Exh. 23(b)(4)). Anticipated locations of trenchless crossings (i.e., HDD or jack and bore) in relation to surface water resources were identified in Figure 23-2 and the Wetland and Stream Impact Drawings [Appendix WW] included with the original Application and listed in Table 23-4 Update in the April 2019 Application Update. Final specifications associated with trenchless crossing

installation will be prepared by the BOP contractor in accordance with all relevant environmental permitting conditions and SEEP requirements (*Id.*). Additionally, the Applicant prepared an Inadvertent Return Plan intended to minimize the potential for a frac-out associated with HDD activities (Hearing Exh. 2, Appendix II).

To further ensure that the Applicant meets its commitment to avoid and minimize impacts to streams to the maximum extent practicable, the Applicant has stipulated to numerous Certificate Conditions as set forth below (Hearing Exh. 10, Final Bluestone Certificate Conditions):

- Appointment of an Environmental Monitor to oversee construction of the Facility and ensure that all agreed-upon measures to protect wetlands are implemented (Certificate Conditions 85-87);
- Requiring pre-construction flagging of sensitive areas, including streams, and adherence to construction limits (Certificate Conditions 90 & 91);
- Implementation of precautions to preclude contamination of streams by deleterious materials or construction activities (Certificate Conditions 93-95, 107, 114-116, 118, & 124) and ensure compliance with spill reporting requirements (Certificate Conditions 108 & 117);
- Limiting time period for stream work (Certificate Condition 109);
- Following the measures outlined in Section B.17 of the SEEP Guidance Document in locations where electric collection lines will be installed by open trenching, particularly along or across areas of steep slopes; and
- Completing work in streams and installing underground collection lines and access roads using specific methods (Certificate Conditions 110-113, 123 & 125-129). Note that DEC took exception to Certificate Condition 113, authorizing culvert crossings if

a bridge is not practicable and to Certificate Condition 129 providing that structures placed in a stream must not create a drop height greater than 6 inches. These exceptions are discussed below.

DEC's stream expert, Jean Foley, Habitat Protection Biologist, DEC Division of Fish and Wildlife, identified several issues relating to stream impacts in the course of her testimony in this matter. First, Ms. Foley testified that she needs specific plans for each stream crossing in order to conduct a "proper evaluation" of impacts (Tr.1318, L1). As discussed in the Testimony of Gregory Liberman, Senior Project Manager at EDR, although the Applicant has agreed to provide additional construction level detail pursuant to Section 17 of the SEEP Guidance Document, no additional detail is needed now for the Siting Board to make the determinations required by Article 10. The Article 10 regulations require the submission of preliminary design drawings only as evidenced by the title of 16 NYCRR § 1001.11. Moreover, the Application, as updated, provides extensive information about each stream crossing, including the DEC stream classification, the area and length of stream impacted at each crossing (both temporary and permanent), the type of impact (i.e., collection line, access road), and the proposed avoidance or crossing method. The stream impact figures (Appendix WW) show the extent of proposed work causing impacts based on the preliminary design drawings). Meanwhile, the preliminary design drawings (Appendix K) identify impact areas, alignments and locations (Tr.2023-2024). These and other documents included in the Application, provide DPS with more than enough information to assess the potential impact of the Project on streams and determine whether the Applicant has avoided or minimized those impacts to the maximum extent practicable.

In her testimony, Ms. Foley identified impacts to a DEC Class A stream and Class C(t) stream that were not included in Table 23-3 of the Application based on a desktop analysis

(Tr.1328). Greg Liberman at EDR reviewed Ms. Foley's testimony and was unable to identify the two potential stream crossings addressed in Ms. Foley's testimony. Regardless, "the same measures of impact avoidance, minimization and mitigation, as described in Exhibit 22 and 23, and under Section 17(c) of the SEEP Guidance Document, if not already addressing the stream impacts identified by DEC, would apply to these resources as part of the final design process" (Tr.2030, L8-12). Accordingly, the omission, if any, does not affect the ability of the Siting Board to make the determination required under PSL § 168(2)(a) and (3)(c).

Finally, while Ms. Foley identifies various temporary and permanent impacts that "directly and adversely affect the best usages of … stream[s] …" (Tr.1329, L5), [5] she goes on to testify that "the Applicant demonstrated that the Project, as proposed, meets the applicable statutory and regulatory standards" subject to the proposed Certificate Conditions (Tr.1329, L9-10). However, her testimony includes certain exceptions, which are addressed below:

- Per Ms. Foley, the Applicant should conduct an alternative analysis with a detailed explanation of the site-specific conditions that lead to the conclusion that a trenchless crossing method is not constructible or feasible at a given stream crossing (Tr.1329-1330). As set forth in greater detail in the Testimony of Greg Liberman, the Applicant has already committed to use trenchless technologies to install collection lines at all

[5] For each of these purported impacts identified by Ms. Foley, the Application identifies measures to avoid/minimize these impacts. These measures are summarized in the Testimony of Gregory Liberman (Tr.2025-2027). For example, Ms. Foley identifies as a stream impact the direct placement of fill in surface waters to accommodate road crossings, causing suspension of sediments (Tr.1328). As Mr. Liberman notes, over the course of the Project, the Applicant rerouted access roads at 13 locations and collection lines at 11 locations and shifted the POI substation location and access road – all with the goal of avoiding or minimizing impacts to surface water associated with road crossings (Tr.2025-2026; Hearing Exh. 135, Exh. GSL-R1 [Applicant Response to IR-1, Stream Crossings]). Likewise, the Applicant has implemented measures designed to address impacts identified by Ms. Foley relating to installation and potential blockage of culverts, disturbance of stream banks and/or substrates resulting from buried cable installation, increased water temperature and conversion of cover type, and siltation and sediment due to earthwork (Tr.1328-1329; Tr.2026-2027). Mr. Liberman's response clearly demonstrates that the Applicant has avoided and minimized impacts to surface waters to the maximum extent practicable (Tr.2026-2027).

state-regulated streams, class C or higher. The remaining unregulated streams – which consist of small drainage features in the upper portions of that watershed that are not mapped or identified by DEC – will be subject to SEEP Guidance Document Section B.17(c), which requires the Applicant to conduct a site-specific assessment of constructability for all utility lines that cannot use trenchless methods and comply with numerous other requirements, all of which are designed to avoid and minimize stream impacts. Under these circumstances, the additional assessment requested by DEC is unnecessary and will not result in a design that further avoids or minimizes impacts (Tr.2034-2035);

- Ms. Foley has recommended that the Applicant provide an analysis of all underground stream crossings to determine the proper site-specific separation distances between the top of the buried cable and the stream bed to prevent exposure of the cable from both vertical and horizontal erosion and movement (Tr.1330). As set forth in the Testimony of Greg Liberman, DEC staff has indicated that they intend to request a Vertical Adjustment Potential ("VAP") analysis and Lateral Adjustment Potential ("LAP") analysis for each stream crossing. These types of studies are typically required for pipeline facilities that have the potential to release pollutants/hazardous materials directly into streams; no such risk is present here. Buried electrical cables associated with the Facility do not present a risk of releasing pollutants into streams, and therefore the requested VAP and LAP analyses are not necessary. Nevertheless, the Applicant has agreed to perform an assessment of the vertical and lateral profile at the Oquaga Creek crossing (Stream M) in light of its unique location and potential for the collection

line to cross the future Constitution Pipeline. Otherwise, the Applicant objects to conducting the requested VAP/LAP analyses as unnecessary (Tr.2035-2036).

- DEC has taken exception to Certificate Condition 113 and proposes to revise it as follows (new language in italics):

> *Bridges shall be installed where a new permanent crossing is required.* If a bridge is not practicable, a culvert crossing will be utilized for stream crossings and shall meet the following NYSDEC and/or U.S. Army Corps of Engineers requirements as outlined in Section B of the Appendix A, "Guidance for the Development of Site Engineering and Environmental Plan for the Construction of the Bluestone Wind Project."

Ms. Foley does not explain in her testimony the reason for the proposed change. However, it appears to mandate the use of bridges for all new permanent stream crossings of any stream or waterbody, regardless of their size or protected status. As a preliminary matter, installing bridges may require more clearing and excavation and thus result in greater temporary stream impacts. Long term, the use of culverts that meet DEC and United States Army Corps of Engineers ("USACE") sizing criteria and design standards will facilitate turbine delivery and future access while preserving long-term water quality. Also, the use of culverts is consistent with conditions issued by DEC on other wind projects. Accordingly, DEC's proposed addition to Certificate Condition 113 should be rejected (Tr.2037).

- DEC proposed to revise Certification Condition 129 to read "Any in-stream *habitat* structures placed in a stream must not create a drop height greater than 6 inches." It is unclear why the term "habitat" was added since the Applicant is not proposing to install in-stream habitat structures. Therefore, this additional language is not applicable to the Project and should be rejected (Tr.2038 L1-3).

- The Applicant agrees with DEC's proposed revision to SEEP Specification B-18(a)(iii) (Tr.2038 L4-8).

In closing, the Record in this proceeding shows that construction and operation of the Project meets the applicable statutory and regulatory standards under ECL Article 15. The Siting Board should specifically reject the exceptions identified by DEC for the reasons outlined above and find that, subject to the Certificate Conditions set forth in Hearing Exhibit 10, the Applicant has avoided and minimized impacts to streams associated with construction and operation of the Project to the maximum extent practicable consistent with PSL § 168(2)(a) and (3)(c).

D. Bald and Golden Eagles

The Applicant has set forth in detail the nature of the probable impact of construction and operation of the Facility on bald and golden eagles (Hearing Exh. 2 & 3, Application Exh. 22 and Application Appendices: Appendix OO [Site Specific Surveys], Appendix PP [DOAS Spring and Fall Raptor Surveys], Appendix QQ [Threatened and Endangered Species Database Information], Appendix RR [Habitat Fragmentation Analysis], Appendix SS [Avian Risk Assessment], Appendix TT [Net Conservation Benefit Plan] and Appendix UU [Cumulative Impact Assessment]; Hearing Exh. 9, Application Update Eagles Use Survey Data).

The Record demonstrates that the Applicant has avoided, minimized and mitigated impacts to eagles to the maximum extent practicable. The record evidence in this proceeding establishes that eagle use in the Facility is highest during spring (February 15 – April 30) and fall (October 15 – November 30) migration and that eagle use is concentrated along Oquaga Creek proximate to turbine locations T25, T26 and T29 (Tr. 1984-1985; Hearing Exh. 9). The Applicant, DEC and DPS have agreed upon Certificate Conditions that address this higher risk area and time period. The attempts by certain Parties to classify eagles observed during the migratory period as

exhibiting non-migratory behavior is of no consequence, as the minimization measures agreed to will benefit all eagles in the area whether actively migrating or not.

The agreed-upon Certificate Conditions ensure impacts to eagles have been avoided and minimized, and any adverse impacts to eagles remaining will be outweighed by the positive impacts anticipated from the mitigation measures proposed (Hearing Exh. 10, Final Bluestone Certificate Conditions, 68, 69 & 70). The Applicant has agreed to work with DEC to identify mitigation projects that will result in a net conservation benefit to eagles, and the Applicant is committed to working with DEC to implement one or more of the mitigation measures identified by DEC to meet the regulatory requirements under ECL Article 11 and 6 NYCRR Part 182 (Hearing Exh. 10, Bluestone Final Certificate Conditions, 69). Additionally, the Applicant, DEC and DPS have agreed to an adaptive management approach that will be used to respond to any unanticipated impacts on eagles from operations. This approach will effectively reduce unforeseen impacts should they occur (Hearing Exh. 10, Bluestone Final Certificate Conditions, 70).

a) *The Record Evidence in This Proceeding Demonstrates Eagle Use is Highest During Migration When Minimization will be in Place*

To determine the type and number of bird species present within the Facility, including eagles, work plans for pre-construction avian monitoring surveys were developed by Western Ecosystems Technology, Inc. ("WEST") in accordance with guidance provided by the U.S. Fish and Wildlife Service ("USFWS"), DEC, and in consultation with DOAS.

WEST surveys for eagles were planned specifically in accordance with USFWS *Eagle Conservation Plan Guidance* ("ECPG") (USFWS, 2013, USFWS, 2016b). All work plans were prepared in consultation with DEC and USFWS, which included the following surveys: Breeding Bird Surveys conducted during the Spring of 2017, Eagle Use Surveys conducted for three years between March 2016 and March 2019, Raptor Migration Surveys conducted during the fall of

2016 and spring of 2017, and Eagle Nest Aerial Surveys conducted during the spring of 2017. Copies of all reports providing detailed results of each survey completed prior to the filing of the Application were provided in Appendix OO of the Application (Hearing Exh. 3). Details for the third year of Eagle Observation Surveys, which were completed after the Application was filed, was provided in the Application Update, Eagle Use Survey Data (Hearing Exh. 9).

In addition to on-site surveys conducted by WEST, additional information on eagle activity at the Facility Site was provided by DOAS. DOAS provided data that was purchased with intervenor funds from Conservation Science Global, which included a series of maps illustrating the spring, fall and winter movement of telemetered golden eagles within 20 kilometers (km) (12.4 miles [mi]) of the Facility (Hearing Exh. 29). DOAS also conducted a Fall 2017 Raptor Survey and a Spring 2018 Raptor Survey, which were included in Appendix PP of the Application (Hearing Exh. 2, Appendix PP; Hearing Exh. 34 & 35). DOAS also conducted a Spring 2019 Raptor Survey after the filing of the Application (Hearing Exh. 36).

As explained below, the results of the on-site surveys by WEST, the telemetered data provided by Conservation Science Global, and the DOAS surveys all indicate that eagle use in the Facility is highest during spring and fall migration and that use is concentrated proximate to turbine locations T25, T26 and T29 (Tr.1984-1985). The data thus supports the Applicant's minimization measures, which are targeted to this timeframe and location.

i. WEST Eagle Use Surveys

WEST's eagle use surveys used point counts to assess use of the Facility Site by eagles. To ensure spatial representativeness of the sampling, point counts need to be conducted from multiple representative locations throughout the Facility Site (Tr.1990, L4-7). This method is recommended by USFWS for eagle risk assessment because it provides data describing the typical

use of a Facility Site overall (Tr.2109, L6-8). In addition, this method has been used in other Article 10 cases and DEC is in general agreement with using this method to survey the Facility Site for use by eagles. Both DEC and USFWS were consulted early and often in the development of pre-construction studies (Tr.1957, L14-15). In this case, WEST set up initial survey locations in a GIS program to ensure systematic coverage across the Project Area and then micro-sited the locations in the field to find the best accessible, representative, and visible point count locations for the surveys (Tr.288, L15-25; Tr.289, L2-11).

During Year One (2017), 12 survey plots were surveyed and during Years Two (2018) and Three (2019) 24 survey plots were surveyed due to a shift in focus to a larger Project Area (Hearing Exh. 9, Application Update Eagle Use Survey Data). 11 of the survey plots were surveyed during all three years due to the amount of overlapping area between the Year One and Year Two/Three Project Areas (*Id*.). Surveys were conducted monthly from March 19, 2016 – March 31, 2019. To increase the temporal coverage of the surveys, 6 plots were surveyed per week every month to ensure all plots were surveyed once monthly (24 total). Surveys were scheduled to rotate the order of the survey plots and to cover all daylight hours. Survey intensity was increased to weekly surveys of each point during the fall (October 15 – December 2, 2017 and 2018) and spring (February 20 – March 31, 2018 and 2019) to address migrating eagles (*Id*.).

During the 3 years of eagle use surveys at the Facility, a total of 1,241 hours of surveys were completed and 223 bald eagles (0.18 bald eagles per survey hour) and 58 golden eagles (0.05 golden eagles per survey hour) were observed (Hearing Exh. 9, Application Update Eagle Use Survey Data). The highest number of bald eagles were observed during late-winter/spring and fall, with 55.2% of all bald eagle observations from late Feb – April and an addition 30.9% of bald eagle observations from September – November for a total of 86.1% of all observations Bald eagle

use during the third year of studies showed an area of concentrated use along Oquaga Creek. Golden eagle observations were primarily limited to the spring (late February – March) and fall (October – November). No golden eagles were observed by WEST in December, January, April, June, July, August, and September. One golden eagle was observed in May of 2019 (*Id*.). Golden eagle use during the third year of eagle studies showed an area of concentrated use along Oquaga Creek (*Id*.). In conclusion, the WEST survey data indicates that bald and golden eagle use in the Facility Area is concentrated during the late winter/spring and fall months along Oquaga Creek.

ii. Telemetered Data

DOAS used intervener funds to hire Dr. Tricia Miller to assist them in reviewing the Application and to obtain golden eagle telemetry data collected by Dr. Miller's group, Conservation Science Global (Hearing Exh. 22). Dr. Miller and her group have been tracking golden eagles in the eastern USA since 2006. Conservation Science Global captures golden eagles and outfits them with GPS satellite tracking devices to collect data on their movements in the eastern United States. Dr. Miller's telemetry data indicates that only 5% of the golden eagles tracked have come within 12.4 miles of the Facility Site over a ten-year period (Tr.1977, L21). Only ***one*** golden eagle was tracked using the Facility Site for stopover during fall migration in 2017 (Tr.1977, L20). This eagle showed an area of use along Oquaga Creek during its time in the Facility Area (Hearing Exh. 22). Notably, this same eagle did not return to the Facility Area the following year. None of the golden eagles tracked by Dr. Miller have been identified as wintering in the Facility Area (*Id.*). The telemetered data thus is consistent with the WEST surveys, which did not observe any golden eagles during the winter and showed an area of concentrated use along Oquaga Creek during migration.

iii. DOAS Surveys

DOAS conducted a fall raptor survey in 2017 and spring raptor surveys in 2018 and 2019. Each survey was at the same point count location (WEST point location 15). DOAS did not conduct surveys in December, January, April, May, June, July, August, and September. DOAS used a migration-monitoring style count, also known as a long-sit count (Tr.1959, L3). In this methodology, an observer spends all or most of a day at a single location (*Id*.).

During three seasons of eagle surveys, DOAS made 444 bald eagle observations (1.15 bald eagles per survey hour) and 105 golden eagle observations (0.27 golden eagles per survey hour) at this single point count location (Hearing Exh. 34, 35 & 36). These observations were consistent with WEST's observations at this point count location during the same time of year and support the conclusion that eagle use is highest during the migratory periods.

iv. Data Summary

The WEST surveys, telemetry data, and DOAS surveys all indicate that eagle use in the Facility is highest during spring (February 15 – April 30) and fall (October 15 – November 30) migration and that use is concentrated along Oquaga Creek (turbine locations T25, T26 and T29) (Tr.1984-1985).

To avoid and minimize impacts to eagles during this time period at this location, the Applicant, DPS and DEC have agreed to minimization specifically targeted at these locations during the migration periods. Certificate Condition 68 requires either the use of a single bio-monitor to simultaneously monitor turbine locations T25, T26 and T29 during the spring migration (February 15 – April 30) and fall migration period (October 15 – November 30) during all daylight hours for a minimum of two years after operation begins or the deployment of IndentiFlight® or equivalent automated avian detection and curtailment technology systems covering the same turbine locations. The biomonitor or detection system will monitor for eagle presence and will

initiate targeted turbine curtailments based on those observations, meaning if an eagle is observed, turbines will be shut down in accordance with developed protocol. This type of minimization will benefit all eagles in the vicinity of turbines 25, 26 and 29 during the migratory periods regardless of the eagle's activity.

b) <u>DOAS Analysis of the Status of Golden Eagles Observed During Surveys is Subjective and Flawed</u>

In this proceeding, DOAS has argued that the Facility Area is an important golden eagle wintering habitat and that non-migratory or wintering eagles may be at greater risk than migratory eagles (Hearing Exh. 23). Therefore, DOAS and Dr. Miller attempted to determine how many eagles observed by DOAS were migratory, non-migratory or wintering. However, as explained below, the analysis conducted by DOAS and Dr. Miller is speculative and should not be the basis for implementing the minimization recommendations made by DOAS and Dr. Miller. Moreover, as stated repeatedly herein, the Applicant's proposed minimization will benefit all eagles whether migratory, non-migratory or wintering during the timeframes identified.

i. DOAS and Dr. Miller's Non-Migratory Classifications of Golden Eagles are Subjective and Speculative

As previously noted, DOAS and Dr. Miller attempted to classify DOAS's golden eagle observations from the spring 2018 and 2019 DOAS surveys using three classification categories: migratory, non-migratory and wintering.[6] The purpose of this effort was to demonstrate that the Facility presents an increased risk to eagles, as DOAS argues non-migratory and wintering eagles are at a greater risk than migratory eagles (Hearing Exh. 23).

DOAS and Dr. Miller's non-migratory vs. migratory category is based solely upon observed behavior of the bird at the time of the observation. It does not mean that the bird is not

[6] DOAS also used the term "local" in their reports which is equivalent to "non-migratory" (Tr.815, L2-5).

migrating, it simply means at the time the bird was observed it was exhibiting some behavior that DOAS and Dr. Miller classified as something other than migrating north. Migratory birds must eat and rest. Based upon observational notes provided by DOAS, some migrating eagles do appear to use the Facility area to rest and forage, but again this does not mean the birds are not migrating, it simply means at the time the bird was observed it was doing something other than flying north.

The line between migratory and non-migratory behavior is very subjective. In some cases, Dr. Miller's analysis appeared contradictory (Hearing Exh. 22, Appendix A). For example, in Appendix A of Dr. Miller's assessment of the seasonal status of golden eagles, bird ID 0306-3 was classified as unknown with a notation that "although the bird perched in view, it flew north". However, bird ID 0322-33 appeared to do something very similar, perching then flying north, yet this bird was marked as non-migratory. There were also entries marked as migratory by DOAS but non-migratory by Dr. Miller and the reasoning for that categorization remains somewhat unclear (Tr.583-584). Considering the difficulty and subjective nature of classifying eagles as non-migratory based on observed behavior, any attempt to classify a bird in this manner should be treated with caution and should not be relied upon as a basis for recommending minimization or mitigation.

ii. DOAS and Dr. Miller's Seasonal Classification Methodology is also Flawed

Dr. Miller's wintering classification is based solely on the time of year the bird is observed (Hearing Exh. 22). Figure 3 of Dr. Miller's seasonal assessment outlines the timelines she uses to classify the seasonal status of golden eagles in the Project Area; adult golden eagles seen on or before February 24th are classified as wintering and juvenile golden eagles seen on or before March 20th are classified as wintering (*Id.*).

At the hearings, it was clear that this technique of classifying eagles as wintering is not without flaws. Of the 70 golden eagle observations recorded by DOAS in the spring of 2018 and 2019 Dr. Miller originally classified 19 observations as wintering. At the hearings she admitted that three of the wintering observations should have been non-migratory (Tr.587). It is also important to note that many of the observations were likely the same bird seen multiple times, and the observations do not represent individual birds. At least 1 of the birds marked by Dr. Miller as wintering represented ***at least 6*** observations (Hearing Exh. 22, Appendix A). DOAS admits they were only able to identify 10 individuals overall (6 in 2018 and 4 in 2019) (Tr.1689, L13-16). Dr. Miller also relied upon DOAS observations to determine the age of the bird, although in her report she admits that "unless the birds are in hand, age estimate need to be interpreted with caution" (Hearing Exh. 22, p. 4). Her report admits that juveniles and subadults are hard to distinguish and that subadults migrate earlier than juveniles (*Id*.). Yet for purposes of her analysis, she assumed that any bird observers classified as juveniles were either juveniles or young-sub adults (*Id*. p. 7). If in fact those birds were older sub-adults, the classification of any wintering juvenile between February 24th and March 20th could be migratory or non-migratory depending on observations. This is an extremely important distinction because of the 19 observations Dr. Miller classified as wintering, 12 were juveniles observed during this timeframe (Hearing Exh. 22, Appendix A). An error in classification would mean that the area is not used by wintering golden eagles at the level implied by Dr. Miller's analysis.

A careful review of DOAS survey data shows that DOAS observed only a few golden eagles prior to February 24th, the date Dr. Miller lists for the start of adult golden eagle migration in the area. In 2019, between February 5th and February 24th DOAS recorded 6 observation of adult golden eagles, and at least 1 of those was of the same bird (Hearing Exh. 36, Appendix D).

While most golden eagle observations categorized as wintering by Dr. Miller were juveniles (12 of 19), none of the golden eagles observed by DOAS during the period prior to February 24th were juveniles. If juveniles are actually wintering in the area as Dr. Miller's classification would suggest, it would be reasonable to expect that would be observed prior to February 24th, yet none were, again implying the Facility area is not used by wintering golden eagles at the level implied by Dr. Miller's analysis.

Finally, even Dr. Miller admits that "seasonal movements and habitat of Golden Eagles in eastern North America are not well understood" (Hearing Exh. 22, p. 1). Dr. Miller admitted that there is not enough data to examine the density of golden eagles wintering in the area (Tr.670, L8-12). Dr. Miller's timeframes for migration are based on her telemetered data, which is only a fraction of the estimated population of eastern golden eagles, and her data may be inaccurate and subject to change as our understanding of eastern golden eagles grows.

As discussed above, there are numerous potential inconsistencies and inaccuracies in the DOAS classifications of golden eagles as migratory versus non-migratory. These problems cast doubt on efforts by DOAS and Dr. Miller to classify certain golden eagles as non-migratory for purposes of demonstrating that the Project will adversely impact the species. More important, regardless of these inaccuracies, the WEST surveys, DOAS Surveys, and telemetered data all indicate that that eagle use in the Facility is highest during spring and fall migration and is concentrated along Oquaga Creek (Tr.1984-1985). DEC, DPS and the Applicant have agreed to appropriate minimization measures to avoid and minimize impacts to eagles during this risk period at these turbine locations (Hearing Exh. 10, Final Bluestone Certificate Conditions, 68). ***This strategy will protect all eagles regardless of status as wintering, migrating or non-migrating during the migration period.***

In addition, the Applicant, DPS and DEC have agreed to implement adaptive management to address eagle mortality at any turbine location during any time of the year (Hearing Exh. 10, Final Bluestone Certificate Conditions, 68 & 70). An adaptive management approach, as agreed to by the Applicant, DPS and DEC, is effective in minimizing the risk to eagles year-round at all turbine locations.

c) Visibility of WEST Survey Plots Was Adequate to Assess Risk

Despite WEST's intensive survey effort, DOAS and other Parties have raised questions about whether the eagle surveys conducted by WEST adequately assessed eagle risk given reduced visibility in the Project Area due to terrain and forest cover. DOAS argues that visibility was limited to such a degree to cause an inaccurate assessment of risk (Tr.1732; Hearing Exh. 33, p. 2).

WEST analyzed the proportion of the three-dimensional airspace in the Facility Site that was visible based on topography and determined that 25.6% of this airspace was visible based on the impacts of topography on sightlines (Hearing Exh. 9). Although 25.6% is below USFWS recommendations to capture 30% of the project area, the USFWS recognized the Applicant's efforts to perform eagle use surveys exceeded the survey requirements under USFWS regulations and found that the data collected is of sufficient quality to predict risk to eagles (Hearing Exh. 97). DEC has also not raised any issues with respect to the visibility of survey point count locations and assessment of risk and recognizes for all projects that there will be gaps in coverage because obtaining 100% visibility over an entire wind farm project would be an impossible task (Tr.139). WEST also testified that in their experience the visibility and terrain at the Bluestone Facility is typical of wind projects in the Northeast (Tr.359, L9-22).

Dr. Miller performed her own visibility analysis using a digital viewshed mapping tool and estimated that visibility for individual survey plots ranged from 12.1% to 70.2% with an average visibility of 38.3% and concluded that only 11.9% of the Project Area was therefore surveyed (Hearing Exh. 27). However, Dr. Miller's analysis examined only the ground surface, whereas WEST's surveys recorded eagles from ground surface up to 200 meters above ground level (Tr.1972, L18).

Members of DOAS also performed their own analysis and visited 14 survey point count locations in June 2019 to determine visibility (Hearing Exh. 33). However, DOAS's visibility analysis was performed in June, when visibility would have been lowest. As described above, WEST's eagle surveys were performed throughout the year and visibility due to vegetation would change depending on the season, thereby increasing the overall visibility at those survey points.

Even with all the testimony regarding visibility, it is important to note that no Party to the proceeding has identified other point count locations with higher visibility, which would allow the Facility to achieve spatial representative coverage as WEST has done with their point count locations. In fact, DOAS concedes the point count locations chosen by WEST "are as best as could be found in that vicinity" (Hearing Exh. 33, p. 2). In essence, DOAS is arguing that any project with terrain and visibility like Bluestone can never accurately assess eagle risk. This conclusion is belied by the USFWS assessment of the survey efforts and survey data carried out by WEST, which acknowledges that such efforts are sufficient to assess eagle risk.

Overall, WEST surveyed 24 points at representative locations throughout the Facility Site. These locations are the best locations for eagle use surveys despite visibility issues presented by topography and vegetation. The results of these surveys are consistent with DOAS surveys and the telemetry data provided by Dr. Miller and are useful in characterizing risk at the Facility Site. The

surveys have allowed DEC, DPS and the Applicant to determine how best to avoid and minimize risk to eagles at the Facility Site, focusing minimization efforts at the highest risk locations. The Applicant has gathered enough pre-construction data on eagle use in the Project Area to establish initial operational controls and help inform decision criteria for adaptive management (Tr.2080, L2-3). Again, the Applicant will implement adaptive management and monitoring protocols once the Facility is operational to minimize the risk to eagles. These procedures will effectively manage risk at other turbine locations and are better predictors of actual risk than pre-construction surveys. (Tr.2076-2089).

d) *Removal of Turbines is a Drastic Remedy and is Not Supported by the On-Site Data or Documented Take of Eagles at Operating Wind Farms*

DOAS and other Parties have advocated for the removal of specific turbines from the Facility, including turbines T25, T26 and T29, to address risk to eagles. Removal of turbines is a drastic remedy and is not supported by the on-site data or documented take of eagles at operating wind farms (Tr.1984, L3-4). If the Applicant were to remove all the turbines identified in the testimony and reports prepared by DOAS, the Applicant would be required to remove more than 30% of the turbines from the Project (Tr.2177, L21). This suggested reduction would be in addition to Applicant's project changes in an effort to minimize potential impacts and optimize energy production from the wind resource in the Project Area, which already has included turbine removal. Removing the turbines identified by DOAS would drastically reduce energy production, which would seriously jeopardize the Project by undermining its contributions to the State's energy mandates, and, of course, preventing the Project from being able to meet the Applicant's goals (Tr.2178, L2-5). In addition, removing turbines would reduce the Project's overall ability to produce clean renewable energy to combat climate change. The National Audubon Society states

that global warming is the greatest threat to birds and other wildlife in human history,[7] and predicts that the golden eagle will lose 41% of existing summer range and 16% of wintering range by 2080 due to climate change[8] (Tr.1982-1983). The Project's current turbine count will produce much needed clean energy, which in turn will provide lasting benefits to all avian species, including eagles.

Removal of turbines is also unwarranted because on-site survey data indicates that the Facility Area is primarily used by migrating eagles in the fall and spring. As previously discussed, very few eagles have been observed at the Facility Site during summer and winter months. In fact, no golden eagles have been observed at the Facility Site 7 months out of the year. Furthermore, take of bald and golden eagles at wind facilities in the Northeast is rare. Only 1 bald eagle fatality has been reported in New York, and no golden eagle fatalities have been reported by wind facilities in the Northeast including Pennsylvania, where golden eagles are known to migrate and winter in areas with operational wind farms (Tr.1951). Completely removing turbines to address a low seasonal risk is disproportional to the risk involved.

The minimization proposed by the Applicant, and agreed to by DEC and DPS, balances the high-risk periods with turbine curtailment to adequately address the risk to eagles. In addition, an adaptive management approach is an effective way to manage for risk reduction to threatened and endangered species while promoting and ensuring renewable energy development – which is needed to reduce the threat and impacts of climate change and regional warming that itself imperils desired animal and plant species (Tr.2080, L8-13).

---

[7] NATIONAL AUDUBON SOCIETY, FACT SHEETS: GLOBAL WARMING AND BIRDS, https://www.audubon.org/sites/default/files/documents/gwandbirds.pdf.

[8] The Climate Report: Climate Endangered Golden Eagle, National Audubon Society, https://climate.audubon.org/birds/goleag/golden-eagle (last visited, July 31, 2019).

Turbine removal is a drastic response to an impact that can be addressed effectively through other means. As a policy, requiring developers to remove turbines as a first option to address impacts when other means are available causes significant Project uncertainty and risk, particularly this late in the development process, and deters investment in the state (Tr.2178). The Applicant has spent years assessing the Project Area wind resource and potential environmental impacts of siting the Project and has proposed a design to avoid and minimize environmental impacts while balancing the need to choose the locations with the strongest wind resource and energy generation potential (*Id*.).

The better approach is to implement the minimization as proposed by the Applicant and agreed upon by DEC and DPS at the highest risk turbine locations during the high-risk periods and use adaptive management to monitor the Facility Site after operation begins. This approach incorporates site specific scientific data and any actual demonstrated effects of the Project to adaptively management risk (Hearing Exh. 10, Final Bluestone Certificate Conditions, 68 & 70). Here, the Applicant, DPS and DEC have agreed to develop a post-construction monitoring and adaptive management plan that will include monitoring all turbine locations and incorporate options and next steps to be implemented if the permitted level of take is exceed or reasonably expected to be exceeded. In other words, a plan will be designed to address impacts at specific turbine locations should they occur and could include expanding the bio-monitors or deploying automated systems at additional turbine locations to address risk (Hearing Exh. 10, Bluestone Final Certificate Conditions, 68(c)).

e) Micro-Siting Turbines Has Not been Proven Effective

In addition to advocating for turbine removal, DOAS also submitted a report by Dr. Miller which alleged that minimizing take to golden eagles can be achieved by micro-siting wind turbine

locations (Hearing Exh. 24). The Miller assessment identified eight turbines for micro-siting.[9] Dr. Miller's recommendation is based upon a model she developed that cross references factors she considers predictive of golden eagle use of a location (based on her telemetry research) and locations of existing wind turbines. Her model has not been validated against empirical data and has never been applied to an operating wind farm (Tr.612, L8). In other words, Dr. Miller's predictive impact model has not been proven under real world conditions.

Moreover, the Applicant's expert testified that the suggested moves are just as likely to move turbines into areas of higher actual risk as they are to move them into areas of lower risk (Tr. 1982 L1-11). For example, in Dr. Miller's interpretation of eagle flight patterns, she indicates that areas of strong updraft potential create high risk of conflict, whereas the Applicant's expert's interpretation is that areas of low orographic updraft potential creates high risk of conflict (Tr.1982, L1-11). Although there is some published information from wind farms supporting the Applicant's expert (Barrios and Rodriguez 2004 [Hearing Exh. 102] Brandes et al. 2011 [Hearing Exh. 103]), the Applicant was unable to find any empirical data indicating that Dr. Miller's model accurately predicts eagle fatality locations. For the present, the best approach is to adaptively manage risk to eagles in a post-construction context until predictive models have been appropriately validated by eagle fatality data.

Furthermore, the moves suggested by Dr. Miller did not consider any of the other many constraints which must be accounted for when siting a turbine. The selection of wind turbine locations considers a multitude of factors including, but not limited to, adequate wind resource, land control, impacts to the environment (including wetlands, streams, sound and shadow flicker

[9] Two of the turbines recommended for micro-siting by Dr. Miller have been removed from the project (T22 and T32) due to land control and other siting constraints.

impacts), site suitability, setbacks, and construction constraints such as slopes and soils (Hearing Exh. 2, Application Exh. 9). The Applicant conducted a feasibility evaluation of the moves proposed by Dr. Miller to determine if they would increase environmental impacts, increase construction impacts (i.e., grading/steep slopes), cause site suitability issues, or present siting constraints due to land control. Five of the turbines identified by Dr. Miller have other siting constraints that limit further micro-siting (Tr.2006-2007).

Given the lack of validated studies demonstrating the effectiveness of Dr. Miller's turbine shifts, the possibility that the shifts could increase risk, and the fact that the turbines sited by Dr. Miller have other siting constraints, the micro-siting proposed by Dr. Miller is not an effective means to reduce risk to eagles. The better approach is to use adaptive management as proposed by the Applicant and agreed upon by DEC and DPS to monitor the Facility Site after operation and implement additional minimization if a particular turbine location proves to be a risk.

f. *Risk to Eagles is Low and the Agreed Upon Take Estimate is Sufficiently Conservative to Address Risk*

Bald and golden eagle interactions with wind turbines are not unique to this Project or the Northeast. The risk to eagles at wind farms is relatively low and is, in fact, lower than the risk to eagles of being struck by a vehicle or train, shot, trapped, or poisoned (Tr.1987, L1-2). Telemetered eagles tracked by Dr. Miller have moved through existing wind farms and none have been killed by wind farms (Tr.598, L14-22). It has been well documented that eagles can adjust their flight paths to avoid collisions with turbines. In fact, one of the telemetered golden eagles tracked by Dr. Miller was documented exhibiting avoidance of turbines (Tr.598-599). Bald eagles tend to soar at high altitudes, above the rotor swept height ("RSH") of wind turbines, and the telemetered golden eagle data show that over the nine years of data collection, few golden eagle flights were recorded over the Facility Site during the spring and fall migration, and when flights

occurred over the Facility Site, they were above the RSH indicating that those golden eagles may be at lower risk for collision. In addition, as cited by the Applicant's expert, at one wind farm, 2,199 golden eagle flights came within 100 meters of operating turbines without any collisions and there were 40,000 eagle flights reported within 800 meters of a turbine without any collisions (Tr.1950, L1-4). Additionally, at the hearings Dr. Miller testified that the Facility is on the edge of the migratory corridor and that there have been no recorded mortalities of golden eagles in the Atlantic Flyway (Tr.668, L6).

Despite bald eagle observations at wind farms in New York, only 1 bald eagle fatality has been reported in New York. Golden eagles are observed throughout wind farms in Pennsylvania and to date no wind farms in that state have reported golden eagle take. Dr. Miller admitted that there are at least 5 operating wind farms in the Northern Allegheny Plateau in Pennsylvania, an area she considers to be an important wintering and migrating area for golden eagles, yet none of those wind farms have reported golden eagle fatalities (Tr.599), including the Sandy Ridge Wind Farm which became operational in 2012 and which Dr. Miller predicted would be a risk to golden eagles (Tr.608, L16-22). In fact, no golden eagle fatalities have been reported at wind projects throughout the eastern US, even though golden eagles migrate throughout the east according to telemetry data, and winter in areas where wind farms are in operation (Tr.1951-1952). In addition, there are no known active bald eagle or golden eagle nests within one mile of the Facility (Tr.1954-1955). Although the Applicant recognizes that the risk to eagles is not zero, the risk to eagles from the Project is likely low, given what we know about eagle and wind turbine interactions.

i. Article 11 Take Estimate

Based upon the data collected during the multiple years of surveys, which indicate a pattern of bald and golden eagle use that is highest in the valley near Oquaga Creek during migration, the

absence of documented golden eagle fatalities at wind projects in the eastern US, the lack of documented bald eagle fatalities (only one) in New York, the lack of eagle nests within one mile of the Facility, the agreed upon Certificate Conditions, and the steps to avoid, minimize, and mitigate eagle take as outlined in the Applicant's Net Conservation Benefit Plan and below, (Hearing Exh. 3, Application Appendix TT), the Applicant estimated, and DEC agreed, that the Project may take up to 6 bald eagles and 3 golden eagles throughout the estimated 30-year life of the Project (Hearing Exh. 10, Final Bluestone Certificate Conditions, 69). In addition, as explained above, the Applicant, DPS and DEC have agreed that additional minimization action may be triggered before take limits are reached to avoid exceeding the estimated take.

ii. A Higher Take Number is Not Warranted; DEC Does not Utilize the Bayesian Risk Model to Predict Take

Despite the data supporting the conclusion that the risk to eagles from turbine collision is low, the protectiveness of a lower take number, and DEC's concurrence with the take estimate, DOAS and other Parties have advocated for a higher take estimate, primarily arguing that the Applicant should use the USFWS Bayesian Collision Risk Model to calculate take on the state level.

The Bayesian Risk model used by USFWS is designed to provide conservative estimates of fatalities; that is, the USFWS model overestimates take of eagles because when approving take permits, it causes them to set aside capacity for more eagle take than is expected (Tr.1965, L20-21). DEC does not believe the Bayesian Risk Model accurately predicts take, and DEC did not request that the Applicant employ the Bayesian Risk Model when calculating take for purposes of Article 11 (Tr.42, L8-12).

The Bayesian Risk model also relies on collision probability information derived from old wind projects from California making it less suitable for comparison to projects in the Northeast that use modern wind turbines (Tr.373, L13-21).

It is also important to note, the Applicant is seeking a federal take permit for this Facility from USFWS. The federal and State take permitting process are two separate processes with separate requirements, and the Applicant is following both processes as required. Applying the federal take estimate to the State take process could have profound impacts on all wind projects in New York. The federal take estimate can be conservatively large because the federal process allows for a wider range of mitigation options across the United States including a Bald Eagle and Golden Eagle In-lieu Fee Program. The federal process also allows for staggered mitigation based on actual realized take, meaning mitigation is reviewed on a five-year basis and although mitigation is paid in advance for anticipated take, any overpayment (due to lower than anticipated take) is applied to subsequent five-year periods, lowering the up-front mitigation costs for those periods. By comparison, the State process requires agreed upon mitigation up front to offset the estimated take and meet the requirements of Article 11 and Part 182.

The regulatory agency charged with implementing and overseeing compliance with Part 182 is the best agency to determine what level of take is needed to satisfy the permit requirements. Here, that agency is DEC, and DEC has agreed that the Project may take up to 6 bald eagles and 3 golden eagles throughout the estimated 30-year life of the Project (Hearing Exh. 10, Final Bluestone Certificate Conditions, 69). No other Article 10 project has been required to apply the federal Bayesian Risk model to estimate take and there is no basis to apply the federal model to the State requirements under Article 11 and Part 182.

Furthermore, lower take numbers can be viewed as more protective of threatened and endangered species given that minimization is triggered sooner than it would be in circumstances with higher take (Tr.2087, L3-5). In the adaptive management plan, adjustments to operations may be made before take occurs based on data on the presence, abundance, flight paths, and other ecological and behavioral data for targeted species gathered through monitoring (Tr.2087, L3-8). The combination of low take levels and adaptive management should contribute to lesser, realized impacts than using the higher federal take model predictions.

g) The Applicant Has Minimized and Mitigated Impacts to Eagles to the Maximum Extent Practicable

i. Minimization, Monitoring and Adaptive Management

As discussed at length above, Certificate Condition 68 requires monitoring of eagles by a biomonitor or automated avian detection system at turbines T25, T26, and T29 during peaks of eagle migration activity (October 15 – November 30 and February 15 – April 30) for a minimum of two years. The biomonitor or detection system will monitor for eagle presence and will initiate targeted turbine curtailments based on those observations, and a protocol for curtailment will be developed in coordination with DEC and DPS. The monitoring and curtailment program will be adaptively managed in coordination with DEC and DPS, and may be modified in response to on-site data, updated options for automated detection and curtailment systems, or new research. Additionally, Certificate Condition 68 specifies that Bluestone will coordinate with DPS and DEC to evaluate data relating to any eagle fatalities at the Facility to determine practicable measures to address the impact and minimize further fatalities to avoid exceeding the estimated take of 6 bald eagles and 3 golden eagles, if warranted. Certificate Condition 68 therefore ensures that monitoring and response to eagles will occur and that there will be flexibility to adaptively respond to impacts that are unanticipated.

After the initial two-year period the Applicant, DPS and DEC will meet to determine if on-going monitoring is needed or determine appropriate changes based upon on-site data, updated automated avian detection technology, and current wind-eagle interactions. DPS has advocated that the avian detection technology should be implemented for the life of the Project. However, DPS staff also recognizes that the purpose of reporting on the first and second year is to gain an understanding of what is actually happening to help formulate a position on future actions (Tr.681, L10-15). Requiring the avian detection systems for the life of the Project at this time may not be necessary, and the implementation of such a system long term should be based upon actual on-site data after the first two years.

The Applicant will also work with DEC and DPS to design and implement a post-construction monitoring program that will ensure that all turbines are monitored and data from the post-construction monitoring will be used to further address any unforeseen risks (Hearing Exh. 10, Final Bluestone Certificate Conditions, 70).

ii. Additional Minimization

In addition to the monitoring described above and the adaptive management plan, the Applicant has proposed the following set of best management practices for minimization of risk to eagles (listed by project phase):

- Design and Pre-construction
    - Selecting a Facility location that avoids known bald eagle nests within 2 miles.
    - Siting of Facility structures to avoid potential high use areas such as larger ponds, rivers, lakes, and wetlands, as practicable.
    - Utilizing existing transmission lines and existing roads, where feasible.
    - Minimizing length and number of road and collection lines as practicable.

- Utilizing permanent met towers that do not have guy wires.
- Designing the Facility to only use underground low-voltage collector lines to reduce eagle collision and electrocution risk associated with above ground lines.
- Siting the Facility near an existing transmission line to avoid the need for a long above-ground powerline.
- Designing the short segment of transmission line between the Facility substation and interconnect following the Avian Power Line Interaction Committee (2006, 2012) guidance on power line design and marking to minimize risks of electrocution and collision

- Construction
  - Minimizing the area and intensity of construction disturbance.
  - Using existing roads for access where reasonable and possible.
  - Restricting vehicles to pre-designated access routes.
  - Limiting speed limits within the Facility Site to 35 miles per hour (mph) along access roads to prevent wildlife collisions.
  - Completing pedestrian surveys to document any new eagle nests that may occur in forested areas prior to tree clearing during the bald eagle nesting season (February 21 – April 30). If an active eagle nest is documented, Bluestone will maintain an area of at least ¼ mile if there is no visual buffer or if there is a visual buffer, an area of at least 660.0-ft buffer around the nest, while the nest is active, to prevent disturbance

- Operation
  - Providing local hunter education materials (i.e., signs or newsletters) to promote use of non-lead ammunition and gut pile removal from leased lands near the Facility to increase awareness of potential impacts, help alleviate lead poisoning, and inadvertent creation of hazardous conditions by creating attractants to eagles.
  - On an ongoing basis, providing information to participating landowners on the possible wildlife interactions resulting from livestock carcass disposal procedures (e.g., attracting scavenging eagles into the area). Through

annual direct communications, newsletters, and/or web-based materials, Bluestone will encourage landowners to dispose of livestock carcasses in a manner that will minimize scavenging opportunities for eagles in the Facility that could create a risk of colliding with turbines.

- Instructing O&M personnel and contractors to recognize and report eagle observations in the Facility Area. Activities may aid in discovery of nests built, unknown carrion/bait piles, or identification of areas of increased activity during the life of the Facility.

- Establishing a 35-mph speed limit for Facility roads to minimize the risk of eagle collisions or creation of carrion (via road-killed wildlife) that may attract eagles.

- Avoiding storage of materials and equipment (e.g., rock piles, pipes, etc.) near turbines that could provide cover for rabbits or other potential eagle prey.

- Clearing garbage and food debris from work sites at regular intervals, and storing trash in covered containers to avoid it becoming an attractant to eagles or their prey.

- Implementing a bird and bat fatality monitoring program with adaptive management to ensure allocated eagle take is not exceeded.

The Applicant has also agreed to reporting requirements and restrictions if a nest or communal roost of bald and golden eagles is discovered at any time during the life of the Project (Hearing Exh. 10, Final Bluestone Certificate Conditions, 103). These additional minimization measures further reduce the potential impacts to bald and golden eagles from the Facility.

iii. Mitigation

The Applicant is proposing to work with DEC to identify mitigation projects that will result in a net conservation benefit to eagles. The Applicant is committed to working with DEC and implementing one or more of the mitigation measures identified by DEC to meet the regulatory requirements under Article 11 and Part 182, including working with DEC to identify a program

that rehabilitates bald and golden eagles and providing a monetary donation to that program to increase the success rate of rehabilitated eagles.

Rehabilitation programs are often non-profit centers that rely heavily on donations from the public. They are frequently staffed with volunteers and rely on volunteer veterinary care to rehabilitate animals. As DEC testified, of the 52 eagles brought into wildlife rehabilitation centers between 2012–2014 only 25 were released back into the wild (Tr.2190, L2-3). Any mitigation that helps successfully rehabilitate an eagle can offset adverse impacts from the Facility.

The Applicant agrees with DEC that any action that improves the status of a species can be effective mitigation and does not have to be directly related to a specific threat to the species (Tr. 2190 L2-9). Mitigation should be measurable in some way so that the amount or extent of a mitigation action can be evaluated and deemed commensurate with meeting the standards under Article 11 (Tr.2185, L12-18).

The Applicant also agrees with DEC that assessing the effectiveness of a lead abatement program, as suggested by DOAS and Dr. Miller, would be difficult to implement and that no Party has offered a viable way of assessing the effectiveness of an action that reduces lead use on the survival rates of the affected population such that it could meet the requirements of Article 11 and Part 182 (Tr.2187,L9-20). Although lead poisoning is a threat to eagles, designing and implementing a lead abatement program that can be effectively measured is difficult and could take years to successfully implement. It would also rely heavily on hunters participating in the program, a factor over which the Applicant has little control. As minimization, the Applicant has already committed to providing local hunter education materials (i.e., signs or newsletters) to promote use of non-lead ammunition and gut pile removal from leased lands near the Facility to increase awareness of potential impacts, help alleviate lead poisoning, and inadvertent creation of

hazardous conditions by creating attractants to eagles. However, the Applicant recognizes the limitation on qualifying this type of program as mitigation under Article 11.

In conclusion, based on the above, the Siting Board can reasonably determine that the agreed-upon Certificate Conditions outline effective minimization and avoidance measures to substantially reduce collision mortality of eagles, and that the Applicant has minimized and mitigated impacts to eagles to the maximum extent practicable as required by PSL Article 10 and ECL Article 11.

E. Bats

a) <u>The Applicant Has Adequately Assessed Impacts to Bats and Has Minimized and Mitigated Impacts to the Maximum Extent Practicable</u>

The Applicant has set forth in detail the nature of the probable impact of the construction and operation of the Facility on bats (Hearing Exh. 2 & 3, Application Exh. 22, Application Appendices: Appendix QQ [Threatened and Endangered Species Database Information], Appendix RR [Habitat Fragmentation Analysis], Appendix TT, [Net Conservation Benefit Plan], and Appendix UU [Cumulative Impact Assessment].

Aside from collision risk, the Application assessed potential impacts associated with the construction and operation of the Facility to bats from loss of habitat, displacement and habitat fragmentation. *Id.* Potential effects of habitat fragmentation on bats are not well understood and effects may be different between species (*Id.*, Hearing Exh. 2 and 3, Application Exhibit 22 (3)(ii)). Indirect impacts to bats may occur as a result of habitat loss. However, given the small percentage of forested habitat loss at the local scale, it is unlikely that habitat loss will have a significant impact on any bat species population (*Id.).* Suitable roosting areas for some species may be lost as a result of Facility construction; however, the creation of open areas and forest edge may actually benefit some species (such as little brown bat [*Myotis lucifugus*] and big brown bat [*Eptesicus*

fuscus]) by increasing foraging opportunities (*Id.)*. Overall, it is unlikely that loss of habitat, displacement, and habitat fragmentation as a result of Facility construction, will have a population-level impact on any bat species (*Id*.).

In addition, it is anticipated that tree clearing will primarily take place between November 1 and March 31 when bats are hibernating. If tree clearing is required outside this season, the Applicant will implement measures to avoid potential impacts from tree clearing as outlined in Certificate Condition 103 (Hearing Exh. 10, Final Bluestone Certificate Conditions, 103).

With respect to collision risk, the Applicant, DPS and DEC agree that the Facility will present a similar collision risk to bats as has been documented at other operating wind facilities in New York, and the Facility has the potential to result in take of the State-threatened northern long-eared bat ("NLEB"; *Myotis septentrionalis*), thereby triggering the requirements of ECL Article 11 ("Article 11"), and its implementing regulations set forth in 6 NYCRR Part 182 ("Part 182").

To avoid, minimize, mitigate, and estimate potential impacts to bats, the Applicant, DPS and DEC have agreed to Certificate Conditions 67, 69, 70 and 103 (Hearing Exh. 10). These Conditions were designed to avoid, minimize, and mitigate impacts to all bats, including NLEB and migratory tree bats (i.e., eastern red bat [*Lasiurus borealis*], hoary bat [*Lasiurus cinereus*], and silver-haired bat [*Lasionycteris noctivagans*]), and contain a curtailment regime at all turbines for the life of the Project during the period from July 1 through October 1 requiring a minimum curtailment of 5.5 m/s, 30 minutes prior to sunset through 30 minutes after sunrise, when temperatures are greater than 10 degrees Celsius.

b) *The Stipulated Certificate Conditions Outline Effective Minimization Measures to Substantially Reduce Collision Mortality of All Bats, including NLEB, and the Applicant Has Minimized and Mitigated Impacts to the Maximum Extent Practicable as Required by PSL Article 10 and ECL Article 11*

The Parties agree that a curtailment regime can be implemented to minimize the collision risk to NLEB and all bat species, including migratory bat species. A curtailment regime is the management of wind turbines such that the conditions under which the turbine blades are permitted to spin in constrained. Such operational controls are based on the time of day, the time of year, the ambient air temperature, and the minimum wind speed at which turbine operation can begin, or cut-in. The majority of bats are killed on nights during the fall migration when the ambient temperature is 50 degrees Fahrenheit or greater, and at low wind speeds (Tr.1435, L4-6). According to DEC, in New York, 83% of wind turbine bat kills are found between July 1 and October 1 (Tr.1444, L5-6). However, curtailment, affects the energy produced, and there are increased costs to the Facility with higher cut-in speeds (Tr.2179, L8-15).

In the Application, the Applicant proposed a curtailment regime with a cut-in speed of 5.0 m/s from July 1 to September 30, one half-hour before sunset to one half-hour after sunrise when temperatures are greater than 50 degrees Fahrenheit. This curtailment regime is expected to result in at least a 60% reduction in fatalities for all bat species (Tr.2165, Table 1). In addition, this curtailment regime results in an estimated 80% reduction in NLEB fatalities. (Tr.1452, L5-7).

DPS recommends a curtailment regime between a cut-in speed of 6.0 m/s and 6.9 m/s during July 1 to October 1, one half-hour before sunset to one half-hour after sunrise when temperatures are greater than 50 degrees Fahrenheit (Tr.1864, L12-17). DEC recommends that full "avoidance" of impacts to NLEB be implemented with a curtailment regime with a cut-in speed of 6.9 m/s during July 1 to October 1, one half-hour before sunset to one half-hour after sunrise when temperatures are greater than 50 degrees Fahrenheit (Tr.1449, L9-13). The Applicant disagrees that a curtailment regime of 6.9 m/s during this period is necessary to "avoid" take of NLEB. To date, the majority of the documented NLEB fatalities caused by wind energy facilities

have occurred during wind speeds below 5.0 m/s (Hearing Exh. 2, Exhibit 22). Nevertheless, the Applicant has agreed for purposes of avoiding the issue for litigation, that 6.9 m/s equates to avoidance for NLEB according to DEC.

However, implementation of a curtailment regime of 6.9 m/s would be a significant economic detriment to the Facility and the generation of renewable energy from this Facility (Tr.2181, L7-12). Consequently, a 6.9 m/s cut in speed results in the need for more wind energy turbines to be installed elsewhere to meet New York State's renewable energy goals, thus raising the overall cost of energy provided to New Yorkers (and increasing the per/turbine risk of take to NLEB). Moreover, studies show that there is only a marginal benefit to reductions in bat fatalities at curtailment above 4.5 m/s (Tr.2164, L17-21).

In recognition of the costs associated with higher curtailment and the marginal benefit to reduction in bat fatalities, the Applicant, DPS and DEC have agreed that the Applicant will implement a curtailment regime with a cut in speed of 5.5 m/s, from July 1 to October 1, one half-hour before sunset to one half-hour after sunrise when temperatures are greater than 50 degrees Fahrenheit (Hearing Exh. 10, Final Bluestone Certificate Conditions, 67). This curtailment regime is expected to result in a greater protection for migratory tree bats than the Applicant's original curtailment proposal (Tr.1865, L16-18). In addition, this curtailment regime results in an estimated 80% reduction in NLEB fatalities (Tr.1452, L5-8).

The Parties agree that implementing a curtailment regime at 5.5 m/s minimizes impacts to bats to the maximum extent practicable given the State's energy goals and the economic impacts to the Facility at higher curtailment regimes. The agreed upon curtailment reduces the renewable energy and RECs generated by the Facility, which impacts project economics, but in a manner that balances the impacts to the Facility economics with the potential reduction in impacts to bats.

Stipulated Certificate Condition 67 also affords an opportunity to employ adaptive management, including possible future modifications to the existing curtailment or adoption of other bat mortality minimization measures as technology and knowledge improve over the lifetime of the Project (Hearing Exh. 10, Final Bluestone Certificate Conditions, 67). Stipulated Certificate Condition 67 protects the Project developer from unknown costs while providing a possible means for future improvements in the overall protection of bats (Tr.1871, L6-10).

The Parties also agree, that the estimated take of NLEB under this agreed upon curtailment regime requires Incidental Take Authorization under Article 11 and Part 182. While the procedural requirements of these provisions are supplanted by Article 10, the Facility must still conform to the substantive requirements of Article 11 and Part 182, which require a mitigation plan that will result in a net conservation benefit to the listed species. While the Applicant disagrees with DEC's NLEB take calculation and believes DEC's take estimate overestimates the take of NLEB[10], the Applicant has agreed to mitigate for the take of NLEB as calculated by DEC. Therefore, the Applicant has agreed to prepare a final Net Conservation Benefit Plan ("NCBP") for the estimated take of 17 northern long-eared bats (Hearing Exh. 10, Final Bluestone Certificate Conditions, 69) that will commit to mitigation that will result in a net conservation benefit to the listed species. The Applicant has proposed to conduct mist-netting for NLEB at priority landscapes identified by DEC and will work with DEC to develop a final NCBP to ensure a net conservation benefit to the species (*Id*.).

[10] DEC uses select data from New York and Ontario Canada wind projects combined with the per megawatt (MW) multiplier to calculate the take of NLEB. The Applicant believes this limited data set and multiplier may lead to an overestimate of take (Tr.2166, L7-12).

Given the above, the Record demonstrates that the Applicant has avoided, minimized and mitigated impacts to bats to the maximum extent practicable, and has met the substantive requirement of Article 11 and Part 182.

VII. THE NATURE OF ENVIRONMENTAL IMPACTS TO PUBLIC HEALTH AND SAFETY AND MITIGATION OR AVOIDANCE THEREOF – PSL § 168(2)(b), 168(3)(c)

PSL § 168(2)(a) requires the Siting Board to make the required findings regarding the nature of the probable environmental impacts of the construction and operation of the Facility on public health and safety. Section 168(3)(c), in turn, requires the Siting Board to determine that any adverse environmental effects of the construction and operation of the Facility will be minimized or avoided to the maximum extent practicable before it issues a Certificate under Article 10.

Wind generated electricity is in many ways safer and healthier than other forms of electricity generation. Among other things, wind energy produces electricity without burning fossil fuels and therefore has no air pollution emissions and no emissions that contribute to climate change. The potential risks associated with the operation of the Facility are generally limited in nature to effects associated with the movement of the blades and the operation of the electrical components within the nacelle. These include ice shedding, tower collapse, and blade failure (Hearing Exh. 2, Application Exh. 15). No issues were raised during the testimony with respect to ice shedding, tower collapse or blade failure. Accordingly, these issues are addressed in Section XIII. L below. The remainder of this section addresses shadow flicker and noise impacts.

A. Shadow Flicker

The Applicant has set forth in detail the nature of the probable impacts of operation of the Facility with respect to shadow flicker (Hearing Exh. 2, Application Exh. 15(e)(4) & 24(a)(9), Appendix T [Shadow Flicker Report]). Shadow flicker refers to the moving shadows that an

operating wind turbine casts over an identified receptor (i.e., non-participating residence) at times of the day when the turbine rotor is between the sun and a receptor's position. Over the years, concerns have been expressed that shadow flicker may cause or contribute to health effects, such as epilepsy. However, the turbines under consideration for the Project operate at frequencies well below those thought to trigger photosensitive epilepsy. Therefore, there is no concern that the Facility will trigger epileptic seizures (Hearing Exh. 2, Application Exh. 15(a)(4), p. 11).

The shadow flicker analysis presented by the Applicant is a conservative projection of shadow flicker effects at ground level. As described in the original Shadow Flicker Report, shadows cast close to a turbine will be more intense, distinct, and focused. This is because a greater proportion of the sun's disc is intermittently blocked by the turbine. Obstacles such as terrain, vegetation, and/or buildings occurring between receptors and wind turbines, may significantly reduce or eliminate shadow-flicker effects (Hearing Exh. 2, Application Appendix T). As agreed in the pre-application Stipulations, the shadow flicker analysis identified all receptors located within a 10-rotor diameter distance of all proposed turbine locations (i.e., 10 times 150 meters or 4,921 feet) (Hearing Exh. 1, Executed Application Stipulations 24(a)(9)(iii)). It was established in the Application and agreed to by the parties to the Stipulations that at distances beyond roughly 10 rotor diameters shadow-flicker effects are generally considered negligible (Hearing Exh. 2, Application Appendix T). No party has challenged the approach used to model shadow flicker, although several individual intervenors raised concern about the potential impact of shadow flicker on their properties.

Broome County, the Town of Windsor and the Town of Sanford do not have any shadow flicker regulations. In New York State, DPS determined in conjunction with the *Cassadaga Wind Project*, that "operations shall be limited to a maximum of 30 hours annually at any

nonparticipating residential receptor" (Case No. 14-F-0490, Order Granting Certificate of Environmental Compatibility and Public Need, Certificate Condition 30). The Hearing Examiners proposed a similar standard in the recently issued Recommended Decision for the *Baron Winds Project* (Case No. 15-F-0122, Recommended Decision, p. 92). As set forth in the Application, this standard is also consistent with that followed in other jurisdictions (Hearing Exh. 2, Application Exh. 15(e)(4), p. 10). Accordingly, a threshold of 30 shadow flicker hours per year was applied to the analysis of the proposed Facility to identify any potentially significant impacts on identified non-participating receptors.

As part of its Application, the Applicant assessed the shadow flicker impacts of all five turbine models under consideration. The Vestas V150-4.2 turbine represented the largest turbine model under consideration and displayed the greatest amount of annual duration of shadow flicker. The modeling results showed that 27 receptors would be expected to have over 30 hours of shadow flicker per year, 13 of which are on non-participating parcels. However, these results are inherently conservative because the modeling receptors are treated as "greenhouses" (i.e., it is assumed that sunlight can enter the structure from any angle, and there is a window directly facing every turbine), and all receptors were modeled without obstacles such as vegetation or structures that could block the shadow flicker effect (Hearing Exh. 2, Application Exh. 15(3)(4), p. 10). After conducting more refined modeling that takes obstacles such as trees and buildings into account, as well as the actual position of windows at the receptor, two of the non-participating receptors no longer exceeded the 30-hour per year design goal (*Id.* p. 11). Since the filing of the Application the number of turbines has been reduced from 33 to 27. It is anticipated that the reduction in the number of turbines will reduce shadow flicker impacts (Hearing Exh. 7, Application Update Exh. 24). The Applicant has agreed to provide an updated analysis for realistic and receptor-specific

flicker impacts based on final design as a compliance filing (Hearing Exh. 10, Final Bluestone Certificate Conditions, 64).

To address shadow flicker going forward, the Applicant identified steps it will take to respond to shadow flicker complaints for non-participating residences that exceed the 30-hour shadow flicker design goal following modeling of the final Facility layout (Hearing Exh. 2, Application Exh. 15(e)(4)). In addition, the Applicant has agreed to a Certificate Condition requiring a Shadow Flicker Impacts Analysis, Control, Minimization and Mitigation Plan, which includes an updated shadow flicker analysis based on the final Facility design (if necessary), a protocol for monitoring operational conditions and shadow flicker exposure, details of the shadow detection and prevention technology or operational measures, potential temporary turbine shutdowns during periods that produce flicker (subject to certain conditions), and shielding or blocking measures (subject to certain conditions) (Hearing Exh. 10, Final Bluestone Certificate Conditions, 64; Hearing Exh. 11, Final Appendix A Bluestone SEEP Section B.14).

In his Direct Testimony, Andrew C. Davis, Utility Supervisor, DPS Office of Electric, Gas and Water, Environmental Certification & Compliance Section, recommended that the Applicant "agree to adopt similar screening and flicker minimization measures at those receptors that submit complaints due to annoyance resulting from shadow flicker" regardless of whether the impacts exceed the 30-hour threshold (Tr.1366, L13-14). The Applicant agreed to assess shielding and blocking measures "for receptor locations that submit complaints for exposures that are not subject to the 30-hour annual limit" (Hearing Exh. 11, Final Appendix A Bluestone SEEP Section B.14).

Mr. Davis also suggested that the Applicant should adopt a 30-minute daily shadow flicker design goal based on a 2012 National Association of Regulatory Utility Commissioners ("NARUC") study entitled *Put it There! – Wind Energy & Wind Park Siting and Zoning Best*

Practices for States that characterized shadow flicker from wind turbines above this level as an annoyance. However, Mr. Davis went on to find that Stipulated Certificate Condition 64 – which requires the Applicant's Shadow Flicker Plan "to include Site Engineering and Environmental Plan (SEEP) specifications applicable to shadow flicker minimization and mitigation" – "provides an acceptable resolution of this issue" (Tr.1367, L14-15). Accordingly, no further issues remain.

In addition, several members of the BCCR raised concerns about the impact of shadow flicker on their properties. As the testimony of Alec Jarvis makes clear, however, 4 out of 6 of the individuals who raised concerns about shadow flicker are outside the shadow flicker study area or are anticipated to experience less than 10 hours of shadow flicker per year at their residences, well below the accepted 30-hour per year design goal (Tr.2140, L7-8; Tr.2141, L12-13; Tr.2142, L9-13; Tr.2143, L1-5). With respect to the remaining BCCR members that complained about shadow flicker, as set forth above, the Applicant has committed to a shadow flicker limit of 30 hours per year to minimize impacts to their properties and will not exceed that limit once the Facility is in operation. The Applicant has also agreed to implement a Complaint Resolution Plan to address any complaints during construction and operation of the Facility and to address shadow flicker impacts in accordance with the above-referenced Certificate Condition and SEEP provision (Tr.2144, L13-18). These measures should mitigate any shadow flicker impacts.

As the above summary shows, the Applicant has avoided and minimized shadow flicker impacts to the maximum extent practicable. Those impacts that cannot be avoided/minimized will be mitigated in accordance with Stipulated Certificate Condition 64 (Hearing Exh. 10).

B. Noise and Vibration

The Applicant has fully evaluated the potential noise and vibration impacts associated with the construction and operation of the Facility and has proposed noise limits that minimize

annoyance and complaints and are attainable and protective of human health and the environment (Hearing Exh. 2 & 3, Application Exh. 19, Application Appendix X Pre-Construction Noise Impact Assessment ["PNIA"]). The Applicant has also proposed certificate conditions and a post-construction compliance monitoring plan that will be able to verify that the Facility complies with the proposed noise limits and responds to any noise and vibration complaints (Hearing Exh. 10, Final Bluestone Certificate Conditions; Hearing Exh., Application Appendix Y, Post-Construction Noise Evaluation Protocol). The Applicant's acoustical consultant, Epsilon Associates, Inc. ("Epsilon"), conducted sufficiently conservative sound propagation modeling that demonstrates that the Facility will meet the Applicant's design goals and proposed noise limits to the maximum extent practicable.

Despite the Applicant's robust evaluation, Miguel Moreno-Caballero, the acoustics expert for the DPS, disagree with the Applicant on two main points: (1) whether the modeling performed by the Applicant is sufficiently conservative to avoid under predicting actual sound impacts, and (2) the regulatory sound limits that should be implemented for the Facility.

DPS Staff argues that the Applicant should remodel the Facility using more conservative modeling assumptions than already applied by the Applicant and using a stricter sound limit than proposed by the Applicant. DPS Staff's unreasonable argument would require redesigning the Facility, eliminating turbines and placing more turbines in Noise Reduction Operations ("NRO") (Tr.1835, L2-12). There is no basis to apply the recommendations made by Staff as further explained below: (A) the Applicant's modeling is sufficiently conservative; (B) the Applicant's proposed noise limits minimize annoyance and complaints and are attainable and protective of human health and the environment; and (C) DPS Staff lacks the qualifications to make the recommendations they have made in this proceeding. DPS Staff's remaining contentions regarding

the Post Construction Monitoring Plan, noise reduction operations ("NRO") and infrasound are also without merit.

1. The Applicant's Modeling is Sufficiently Conservative and Sound Levels from the Project are Not Underestimated

DPS contends that Applicant's sound modeling is not conservative enough to avoid under predicting the sound impacts from the constructed Facility, and that the Facility should therefore be remodeled and redesigned according to Staff's specifications. DPS Staff's contentions are untrue. Epsilon conducted modeling for the Project consistent with Stipulation 19 to model the estimated short-term sound impacts (single night) and long-term sound impacts (annual nighttime) (Hearing Exh. 1, Stipulation 19). The purpose of sound modeling is to estimate the sound impacts that can be expected from the Project once in operation and ensure that the Facility can be designed to meet the applicable sound limits once operational. As explained below, Epsilon conservatively modeled the expected sound levels to ensure that sound levels from the Project were not underestimated.

a) Short-Term Sound Impact Modeling

Many conservative assumptions were input to the sound modeling, and therefore, it is expected that the actual measured short-term results will be lower than predicted by the Applicant's computer modeling. While the occurrence of some factors that could adversely affect sound levels is possible, the ***simultaneous*** confluence of every possible worst-case assumption listed below is extremely unlikely. These conservative assumptions include:

- Modeled sound levels assume that the following are all happening simultaneously: maximum sound power (high hub height winds), low ground-level winds, and the location of the receptor either downwind or cross-wind from each wind turbine (ISO 9613-2 propagation standard);

- An uncertainty factor of +2 dBA is added to every wind turbine to account for manufacturer variability in sound levels. This factor is actually +/- 2 dBA but to be conservative, +2 dBA was added to every wind turbine. The probability that every single one of the project's wind turbines will be +2 dBA is extremely unlikely;
- Highest sound power level of each octave band was modeled even though these occur at different wind speeds (which cannot happen in the real world);
- Well-developed ground-based temperature inversion for maximum sound propagation;
- A temperature of 10 degrees C and relative humidity of 70% were used in the modeling, which results in the lowest atmospheric attenuation in the 500 Hz and 1000 Hz octave bands where the human ear is most sensitive. Under other meteorological conditions, the atmospheric attenuation will be larger, thus lowering actual sound levels as compared to predicted sound levels; and
- Modeling with mixed ground (G=0.5) with no dense foliage.[11]

These conservative modeling assumptions and accounted for uncertainties provide a conservative margin to the modeling results and assure that the results are conservative enough and that the Facility will not exceed regulatory limits once in operation.

b) *Long-term Sound Impact Modeling*

In addition to all the conservative assumptions used for the short term modeling, the modeling inputs used to predict annual nighttime sound levels ($L_{eq,\ night\text{-}outside}$) are overly

[11] G=0 represents a completely hard surface, which would be appropriate for dense cities with very little ground cover. The Bluestone Project area is primarily rural with very little hard surfaces and a ground factor between 0.5 and 1.0 would have been appropriate. Instead, Epsilon modeled with mixed ground to assure conservatism.

conservative because the "annual" sound power levels from each turbine were estimated based solely on 8,760 hours of on-site wind speed data which provide an annual "weighted" average of sound power (Hearing Exh. 2 and 3 [Application Appendix X, see Table 9-8 of the PNIA]). However, the calculation of the $L_{eq,\ night\text{-}outside}$ sound level utilizes the ISO 9613-2 propagation algorithm, the same one used to calculate potential short-term impacts. Thus, it assumes that for every hour of the year the receptor is downwind of every turbine (never true), or there is always a well-developed moderate ground-based temperature inversion (never true). For example, during hours when a receptor is upwind of a turbine, sound levels can easily be 3-5 dBA lower than predicted by the model. The same is true of a windy hour at the ground. The atmosphere is well-mixed (thus lowering sound levels), and the wind itself is going to dominate sound levels over sound levels from a wind turbine. In other words, the prediction of the annual nighttime sound levels is overstated. Actual annual nighttime sound levels will be lower than predicted. Even with these conservative assumptions, the annual nighttime modeled sound levels are either at or just slightly above the Applicant's annual design goal of 40 dBA making actual levels likely 40 dBA or less.[12]

c) DPS Staff's Arguments are Flawed

DPS Staff gives little weight to the conservative operating assumptions and conservative modeling parameters, and still claims Epsilon's modeling may under predict impacts. Since, DPS Staff believes that the Applicant's modeling underpredicts impacts, Staff argues the Project should be remodeled using more conservative assumptions which could result in turbine elimination and decreased energy output due to increased use of NRO (Tr pg 93 of DT, L 2-12). This is

[12] 40 dBA Lnight, outside at night at non-participating homes is the Applicant's long- term design goal, as explained further below. This is different than the short-term design goals recommended by the Applicant and DPS Staff.

unreasonable, and Staff's arguments for why the modeling may underpredict results is without merit. DPS Staff cites two reasons why the modeling may underpredict results: (1) Epsilon did not use a 4-meter receptor height in the modeling; and (2) DPS Staff's interpretation that one data point in the Massachusetts Study on Wind Turbine Acoustics demonstrates underpredictions ("MA Study") (Hearing Exh. 46). Both arguments are flawed. Moreover, DPS Staff agreed to these modeling parameters in the scoping stipulations and is now precluded from opposing their use (Hearing Exh. 1, Stipulation 19).

i. Modeling at a 1.5-meter receptor height is consistent with the Stipulations in this proceeding and is sufficiently conservative to model sound impacts

As mentioned above, Epsilon conducted modeling for the Facility in accordance with the Stipulations agreed to in this proceeding and executed by the Applicant and DPS. Stipulation 19(d)(6) states "[f]or the purposes of evaluation of community complaint potential, noise modeling with the ISO 9613-2 standard will be conducted by following the recommendations included in the following reference: 'Best Practices Guidelines for Assessing Sound Emissions from Proposed Wind Farms and Measuring the Performance of Completed Projects,' October 13, 2011. Prepared for: The Minnesota Public Utilities Commission Under the auspices of the National Association of Regulatory Utility Commissioners (NARUC), Washington, DC. (Designated as NARUC-2011 in this stipulation)" (Hearing Exh. 1, Stipulation 19 (d)(6)). DPS Staff admitted and was aware at the time of the signing of the Stipulations that NARUC-2011 used a 1.5-meter receptor height for sound modeling (Tr.1012, L22).

Moreover, the Applicant applied reasonable modeling parameters. The modeling parameters used for the Bluestone Wind Application are similar to those used in many other wind energy projects and have been verified through extensive post-construction measurements (Hearing Exh. 124). When conducting sound modeling, wind projects can use different

conservative assumptions to achieve the same goal of ensuring that predicted future sound levels will be equal to or less than actual measured sound levels post construction. Wind farm modeling does not have to include ***all*** conservative assumptions to achieve that goal. Some projects use a G (ground factor) of 0 and no uncertainty ("K" factor) while others use a G=0.5 and K=2 dBA. As described in the PNIA at Section 9.3.2, ground factor predicts how much the ground will absorb sound and the K factor is a wind turbine uncertainty factor addressing noise from the wind turbine itself. Some projects use a 4-meter receptor height but correct for meteorological conditions (i.e., wind speed), as was done in the Cassadaga Wind and Baron Winds proceedings, and other projects like Bluestone and the Number Three Wind Farm use a 1.5 meter receptor height but do not correct for meteorological conditions.[13] Modeling does not require that every conservative assumption, or even specific conservative assumptions, are needed to ensure modeled sound levels will not exceed recommended limits. Mr. Moreno's assertion that "not all of them can be correct" is either a disingenuous attempt to discredit these experts or demonstrates a true lack of understanding regarding wind turbine modeling, which can be conducted using different conservative assumptions to arrive at a similar result (Tr. 1806 L14-22). Moreover, post-construction testing results for various projects using different conservative modeling assumptions, as cited in Hearing Exhibit 124, demonstrate that even under worst-case conditions, sound levels are consistently monitored below modeled predictions. Thus, given the other conservative assumptions applied to the modeling in this proceeding, using a 1.5-meter receptor height is sufficiently conservative. By comparison, adopting Mr. Moreno's approach and using a 4-meter receptor height without

[13] Correcting for meteorological conditions such as a well-mixed atmosphere, upwind conditions, or different temperature/humidity levels would result in lower predicted sound levels as compared to the worst-case conditions assumed in the Application.

correcting for meteorological conditions would be overly conservative and produce modeling results that are so over conservative so as to be unrealistic.

ii. The Massachusetts Study on Wind Turbine Acoustics does not demonstrate that the Applicant's modeling underpredicts sound impacts

The second way that DPS tries to discredit Applicant's modeling is by using an incorrect interpretation of the MA Study. First, it should be acknowledged that Epsilon, the Applicant's expert, was involved in preparing the MA Study relied upon by Mr. Moreno and so is intimately familiar with its purpose, analysis and conclusions. Mr. Moreno contends, based on one figure of the MA Study that 1-hour, worst-case sound levels in the Application may be under predicted by 3 dBA. Contrary to Mr. Moreno's assertions, the figure from that study that Mr. Moreno relies on to make his arguments, Figure 26 in Hearing Exhibit 46, shows excellent alignment between actual measured wind turbine sound levels and pre-construction modeled sound levels using the exact same techniques used in the Bluestone Wind Application. Moreover, Figure 26 also reveals that the modeled and measured sound levels even include over predictions.

There is one outlying data point which appears to show an under prediction of ~3 dBA upon which Mr. Moreno focuses. While a careful read of the MA Study (Hearing Exh. 46, p 75) does reveal several instances where the monitored sound levels were consistently higher than the modeled levels, the study found that this situation occurred just after the turbines restarted following a forced shutdown and not during normal operation. When graphing the sound levels as a function of the shutdown, the sound levels increase rapidly at startup, then decrease over a period of about one minute or more to a stabilized level. Under normal operational circumstances, turbines are not stopped and started again while wind speeds are higher than the turbine's cut-in threshold. As a result, the brief increase in operating sound level observed during this study (about one minute) is most likely an artificial construct of the test design and would not occur under

normal conditions. Moreover, the temporary increase in noise when restarting does not result in a sustained period of noise above the modeled sound levels. In other words, this 3 dBA underprediction is not real. Therefore, Mr. Moreno's assertion that 1-hour, worst-case sound levels in the Application may be under predicted by 3 dBA is incorrect. Mr. Moreno's reliance on an outlier data point, which is unlikely to occur under normal operating conditions, to argue that the Applicant's modeling under predicts potential impacts is incorrect and should be rejected.

Additionally, Mr. Moreno admitted that the variation observed between modeled and monitored sound pressure levels becomes more stable as the averaging time becomes greater (Tr.947, L7-18). In other words, as demonstrated in Figure 26 of Hearing Exhibit 46, a 5 min L_{eq} will have more variation than a 1-hr L_{eq} and a 1-hr L_{eq} will have more variation than an 8 hr L_{eq}, which is the metric recommended by both the Applicant and DPS in this proceeding. Therefore, even assuming that the outlier under prediction Mr. Moreno relies upon was the result of normal operating conditions, a 3 dBA under prediction for the 8-hr L_{eq} is highly unlikely and is not supported by the MA Study.

In conclusion, the Applicant's sound modeling is not likely to under predict sound impacts and is sufficiently conservative to ensure that the modeled sound levels are not exceeded during operation.

2. The Applicant's Proposed Sound Limits are Sufficiently Protective

With respect to the regulatory limits, the Applicant and DPS have proposed different regulatory limits for the Facility. The Applicant is proposing 45 dBA L8h[14], averaged over the entire night (11 p.m. to 7 a.m.) outside at non-participating residences, and sound levels to 50 dBA

[14] 55 dBA L8h outside at participating residences.

day at non-participating residence. DPS has proposed 42 dBA L8h[15] outside day and night at non-participating residences. The Applicant's proposed limit is consistent with prior Article 10 decisions, is sufficiently protective of health, and minimizes annoyance to the maximum extent practicable. There is no health basis to apply a stricter sound limit than that proposed by the Applicant, especially considering that DPS's limits will require eliminating/relocating turbines and operating turbines in reduced generating capacity, substantially impacting the Project's ability to produce clean renewable energy.

In support of its position, DPS claims that the lower regulatory limit complies with the World Health Organization ("WHO")-1999, WHO-2009 and WHO-2018 guidelines. However, none of the WHO guidelines recommend 42 dBA. Instead, as explained in detail below, DPS Staff has performed inaccurate calculations using overly conservative assumptions to conclude that 42 dBA is consistent with these guidelines. Also, the WHO guidelines relied upon by DPS are themselves flawed. The WHO-1999, WHO-2009 and WHO-2018 guidelines, which are intended for the European Union, do not account for the largest, most definitive, and large-scale science-based epidemiological study conducted to-date on wind turbine noise and health effects (Health Canada's 2016 Wind Turbine Noise and Health Study) (Tr. 936, L18-19) and lack sufficient guidance about how to model and measure noise associated with their recommended standards. Moreover, as stated above, none of the guidelines actually recommend the limits being proposed by Mr. Moreno (Tr.939, L2). Also, the WHO-2018 only ***conditionally*** recommends a sound limit, which is the weakest classifications of recommendations in the document. Finally, the WHO-1999 and WHO-2009 guidelines are not for wind turbine noise, but instead address traffic noise.

[15] 52 dBA L8h outside day and night participating residences.

As explained in detail below, the Hearing Examiners and Siting Board should reject DPS Staff's arguments for more conservative modeling and stricter sound limits because (a) the Applicant's proposed limits are protective of health and will result in minimal potential for annoyance, (b) DPS Staff's proposed limit is impractical and would substantially impact the Project's ability to produce clean renewable energy, (c) DPS Staff's short-term limit recommendation is based on incorrect and overly conservative assumptions and is technically flawed, (d) DPS Staff's reliance on the WHO 2018 Guidelines is misplaced, and (e) DPS Staff lacks the qualifications to perform equivalency calculations and recommend short-term noise limits based on long-term noise recommendations from the World Health Organization.

a) The Applicant's Design Goals and Regulatory Limits are Protective of Health and Will Result in Minimal Potential for Annoyance

The Application and the pre-construction noise impact assessment propose noise design goals and regulatory limits developed based on a literature review of health-based standards, guidelines on sound and annoyance, and previous Siting Board proceedings. The purpose of the goals/limits is to balance reasonable development against potential impacts from the Facility.

A design goal is a sound level limit to which the project is designed. A regulatory limit is an enforceable limit that would be imposed on the project after the project is constructed. Not every design goal is translatable into a regulatory limit because they may be difficult or impractical to measure or enforce. Therefore, the design limit is set during design, and the Applicant conducted modeling and design mitigation to meet those goals to the extent practicable. Those designs are then carried forward into the construction and operation of the Facility but are not necessarily measured or enforced during operation.

The Applicant proposed the following design goals and regulatory limits:

Design Goal	**Regulatory Limit**
45 dBA L8h at night at non-participating homes	45 dBA L8h at night at nonparticipating homes 50 dBA day at nonparticipating homes
55 dBA L8h at night at participating homes	55 dBA L8h at night at participating Homes
40 dBA Lnight, outside at night at non-participating homes	N/A
50 dBA Lnight, outside at night at participating homes	N/A
55 dBA L1h day or night at non-participating property lines (except wetlands)	N/A
50 dBA Leq 1-hour at non-residential receptors (e.g., historic venues, cemeteries, playgrounds)	50 dBA Leq 1-hour at non-residential receptors (e.g. historic venues, cemeteries, playgrounds)
6 dBA increase over ambient at State Lands (Receptor #438)	N/A
65 dB Leq 1-hour at non-participating homes at 16 Hz, 31.5 Hz, and 63 Hz	65 dB Leq 1-hour at non-participating homes at 16 Hz, 31.5 Hz, and 63 Hz
No perceptible indoor vibrations at non-participating residences	ANSI S2.71 in response to vibration Complaints
For the substation transformer: 40 dBA L1h at nonparticipating sensitive sound receptors, assuming tonal sound emissions	For the substation transformer: 45 dBA L1h at nonparticipating sensitive sound receptors. A 5 dBA tonal penalty would apply to tonal sound.
5 dBA tonal penalty	5 dBA tonal penalty

The Project has been designed, and the Applicant has agreed to a regulatory limit to ensure that the Facility does not exceed 45 dBA L8h[16], averaged over the entire night (11 p.m. to 7 a.m.) outside at non-participating permanent and seasonal residences. The Town of Sanford limits sound levels to 50 dBA day or night at non-participating residences. The lower standard proposed by the Applicant at night is consistent with the goal of limiting potential sleep disturbance. The higher

[16] 55 dBA L8h at participating receptors.

standard during the day is consistent with local law, and is still protective; typically, sound level limits can be higher during the day as those activities are not as noise sensitive.[17][18][19][20] The local law will limit daytime sound levels to 50 dBA. These levels are well below the level that can cause hearing impairment according to WHO, the EPA, and OSHA, is below thresholds for speech interference, is protective of human health, prevents any quality-of-life concerns, and effectively minimizes annoyance and complaints (Hearing Exh. 2, Application Exh. 19).

The 45 dBA L8h level is also consistent with the short-term regulatory limit imposed during the Cassadaga proceeding, and recommended by the Hearing Examiners in the Baron Wind proceeding, and is consistent with the recent Health Canada Study which concluded that, "long-term exposure to wind turbine sound below 46 dBA was not associated with the increased prevalence of any health-related endpoint" (Hearing Exh. 120). The Health Canada Study is the largest, most definitive, and scientifically rigorous study that has been conducted to date on the potential relationship between wind turbine noise and health impacts.[21] (Hearing Exh. 120). The Health Canada Study found no association between wind turbine noise and any adverse health impact for wind turbine noise levels up to 46 dBA outside a residence (Hearing Exh. 123). The Health Canada Study concluded that for long-term exposure to wind turbine noise levels up to 46 dBA, the results do not support an association between wind turbine noise and any health-related endpoint studied, including quality of life, sleep disturbance, a wide range of illnesses, chronic health conditions, or stress (Hearing Exh. 123).

---

[17] WHO 1999, Table 4.1.
[18] State of Minnesota Pollution Control Agency, Section 7030.0040.
[19] State of Maine, Department of Environmental Protection, Chapter 375.10(I)(2)(b)
[20] State of Connecticut, Department of Energy and Environmental Protection, Section 22a-69-3.5
[21] The Health Canada "study design was subjected to was subjected to a rigorous peer review process, which included a 60-day public consultation, a Research Ethics Board review, a review by Health Canada's Science Advisory Board, a review by external experts selected by the World Health Organization (WHO), and the publication of the final planned study design." (Hearing Exh. 120)

The Applicant has also designed the Facility to meet a long-term design goal of 40 dBA annual L_{night} to the maximum extent practicable. However, the Applicant is not proposing a regulatory limit associated with any long-term design goals (i.e., L_{night}) because demonstrating compliance with long-term regulatory limits is difficult and impractical. Accurately monitoring sound emissions from a wind farm over the course of a year can be extremely difficult, time consuming and costly. Sound emissions from wind farms are constantly changing due to changes in wind speed and direction, and propagation characteristics such as temperature, humidity, and atmospheric pressure. In addition, the non-wind turbine sound ("background") is constantly changing due to a variety of factors, both natural (weather; insects), and manmade (traffic; agricultural activity). One needs to look no further than the existing condition measurements conducted for two weeks in the summer and winter presented in the PNIA. Figures 7-7 and 7-8 in the PNIA show that sound levels at the same location already vary by 30-40 decibels today without the presence of wind turbines (Hearing Exh. 2 & 3, Application Appendix X). Trying to pick out the "turbine-only" sound levels for an entire year is not feasible due to that large variability.

An accurate annual sound level measurement from a wind turbine would require a long noise monitoring campaign to determine the annual average, since weather conditions vary over the year. This would be an excessive and unreasonable request; the Applicant is unaware of any jurisdiction in the world implementing a long-term regulatory limit that requires any sort of long-term monitoring (Tr.2101). Indeed, even the WHO 2018 does not recommend using these descriptors: "Based on all these factors, it may be concluded that the acoustical description of wind turbine noise by means of L_{den} or L_{night} may be a poor characterization of wind turbine noise and may limit the ability to observe associations between wind turbine noise and health outcomes." (Hearing Exh. 45, p. 86).

DPS Staff has conceded this point and testified that they are not recommending that a long-term regulatory standard be adopted in this proceeding (Tr.1000, L2-9).[22] Therefore, the Hearing Examiners should not recommend that the Siting Board adopt any long term regulatory limits as such regulatory limits would be unreasonably burdensome.

b) *DPS Staff's proposed short-term limit is impractical and would not result in any greater protectiveness to health but would substantially impact the Project's ability to produce clean renewable energy*

DPS Staff is recommending a short-term design goal and regulatory limit of 42 dBA (40.5 dBA if DPS modeling methodology using a 4-meter receptor height is applied to the Applicant's current modeling results).[23] DPS' justification for this short-term design goal and regulatory limit is to limit health impacts and reduce complaints. DPS claims that noise levels can be reduced to 42 dBA by eliminating or relocating turbines or by using NRO (Tr.1767, L19-22). In fact, Mr. Moreno claims eliminating turbines is the "best option" to comply with his recommendations (Tr.1809, L11-13). Neither Mr. Moreno nor the DPS Policy Panel, which supports Mr. Moreno's testimony, made any effort to quantify or weigh the negative consequences of this design goal, which requires eliminating/relocating turbines and operating turbines in reduced generating capacity, significantly reducing the productive capacity of the Facility. However, as set forth below, a lower short-term limit is not more protective to health or likely to substantially reduce complaints. At the same time, a lower limit would significantly reduce the Project's ability to produce clean renewable energy

[22] Confusingly, portions of Staff's direct testimony contradict this position, and indicate that the long-term limits can only be eliminated if Staff's short-term limits are adopted (*See* Tr.1817-1818). However, there is no basis provided for why long-term monitoring would become "feasible" if Staff's recommended short-term limits are not accepted.
[23] This level of 42 dBA is not recommended in any of the World Health Organization guideline documents cited by Mr. Moreno. He has incorrectly made inferences that all the WHO guideline values (long-term and short-term) equate to 42 dBA short-term.

As established by the Applicant's health expert, Dr. Robert McCunney, there is no health basis for a lower regulatory standard than the one proposed by the Applicant (Tr.2045-2075). Mr. Moreno appears to believe that the lower the regulatory limit, the lower the likelihood of potential complaints. However, the potential for complaints based on the operating sound levels of the Facility is already very low.

As outlined in the Applicant's PNIA, various studies have indicated that between 2% and 10% of receptors between 40 dBA and 45 dBA may be highly annoyed (Hearing Exhibit 2 & 3, Application Appendix X, Section 4.6.1). Here, for the worst-case wind turbine under consideration (GE 3.8-137), using the NARUC methodology,[24] out of 328 non-participating receptors only 23 or 7% of receptors are predicted to be between 40 dBA and 45 dBA while 36 participating receptors are predicted to be between 40 dBA and 45 dBA (Hearing Exh. 61). The most conservative approach entails evaluating both participating and non-participating receptors, although complaints or annoyance is typically limited to non-participants. Of those 59 receptors only 6% (3.5) are predicted to be highly annoyed at those levels. To put it another way, DPS Staff is requesting that the Applicant redesign the Project to meet lower design goals, at a substantial cost to energy production, on the chance that 3 or 4 potential receptors may be annoyed. Less than 4 receptors demonstrate that impacts have been minimized to the maximum extent practicable.

Reducing the expected complaint rate any further is unrealistic, especially considering that some people are annoyed by wind turbines regardless of sound level due to visual or other impacts.

[24] In order to follow the NARUC methodology, no uncertainty factor (K) is included in the modeling results. Therefore, 2 dBA was subtracted from the Bluestone Wind Leq 8hr modeling results for the GE 3.8-137. This results in 59 receptors with modeled sound levels between 40-45 dBA (36 participating and 23 non-participating). NARUC says that 4-6% of receptors modeled at these sound levels are likely to complain or be annoyed.

This is evidenced by the fact that even at the lowest sound levels (i.e., 30 dBA), 2% of people still claim to be "annoyed" by wind turbines (Hearing Exh. 125).

A sound level of 45 dBA Leq 8-hour allows people to sleep with their windows open at night. The Health Canada study showed that levels of 46 dBA or lower did not show a correlation between wind turbine noise and health effects (*Id.*). A sound level of 45 dBA is a balance between landowner rights to develop their property, such as by hosting a wind turbine, and neighbor's rights to enjoy their land without unreasonable noise.

Moreover, as explained below, DPS's Staff recommendation is based on incorrect and overly conservative assumptions and there is no basis to require a lower short-term sound limit than the one proposed by the Applicant.

c) DPS Staff's short-term limit recommendation is based on incorrect and overly conservative assumptions and is technically flawed

DPS Staff recommends 42 dBA as a short-term limit based on the following four inaccurate calculations and overly conservative assumptions.

(i) Taking the interior sleep disturbance guideline from WHO 1999 of 30 dBA L8h (World Health Organization, 1999), and then adding an outdoor to indoor attenuation of 12 dBA to get to 42 dBA L8hr outside;

(ii) Assuming a 40 dBA $L_{eq,\ night\text{-}outside}$ sound level, then adding between 1 and 2 dB to account for DPS Staff's calculation of the difference between the annualized sound power level and the short-term sound power level of the wind turbines modeled in the Application;

(iii) Performing L_{den} equivalency calculations using $L_{eq,\ night\text{-}outside}$ data presented by the Applicant to determine a short-term equivalency for the L_{den}; and

(iv) Starting with a 45-dBA short-term standard, but then applying a 3 dBA amplitude modulation penalty, which assumes that the wind turbines will generate almost constant amplitude modulation greater than 3 dBA.

All four of these assumptions are overly conservative and take an unrealistic approach to sound modeling and wind turbine sound.

i. DPS Staff's outdoor to indoor attenuation of 12 dBA is overly conservative

DPS Staff incorrectly argues that in order to comply with WHO-1999's indoor noise guideline of 30 dBA, outside sound limits should not exceed 42 dBA. Staff argues that the attenuation between outdoor levels and indoor levels is likely not to exceed 12 dBA and therefore in order to meet 30 dBA indoors, 42 dBA outdoors is required.

However, DPS Staff's argument ignores the fact that the WHO-1999 Guidelines explicitly state that at a 45-dBA outdoor limit "it should be possible to sleep with a bedroom window slightly open (a reduction from outside to inside of 15 dB)" (Hearing Exh. 42, p. 28). The WHO-2018 Guidelines also specifically note that "[t]he differences between indoor and outdoor levels are usually estimated at around 10 dB for open, 15 dB for tilted or half-open, and about 25 dB for closed windows" (Hearing Exh. 45, p. 9). Under this assumption, the sound limit for outside should be 45 dBA L8h, which is the Applicant's proposed regulatory limit, in order to meet the 1999 recommendation of 30 dBA indoors to minimize sleep disturbance and allow windows to be partly open.

A 15-dB sound attenuation, from outdoor to indoors, is reasonable and supported by actual wind turbine sound studies. Measurements from the Health Canada Study found that the average façade attenuation with windows completely opened was 14 dBA ± 2 dB(A) (Hearing Exh. 123).

The attenuation reduction of 12 dBA that Mr. Moreno argues for is overly conservative because it also assumes that windows will be fully open year-round and will occur at the exact same time as the highest sound levels. However, the open window and highest sound level scenario are not likely to occur simultaneously since the climate around the Project is only conducive to opening windows for less than half the year (late spring, summer, early fall) (Tr.2106, L12-16). During the summer season the Project sound levels will be lower (reduced wind speeds) and other sources such as agricultural equipment, foliage, and insect/amphibian noise will be the most common.

Thus, applying a 12-dBA attenuation instead of the more reasonable yet still conservative 15 dBA attenuation proposed by the Applicant, is just one example of Mr. Moreno layering on overly conservative sound level modeling assumptions no matter the likelihood that they will not occur in the real world.

Moreover, the research papers relied upon by Mr. Moreno in direct testimony to argue for a lower attenuation do not support his conclusion and did not involve indoor to outdoor sound level reduction testing of wind turbine sound (Tr.958). In fact, the Morsing study cited by Mr. Moreno was a sleep study that showed undisturbed sleep at indoor sound levels of 33 or 34 dBA, and that windows open or closed did not necessarily make a difference in levels of sleep disturbance (Tr.954). This finding is consistent with the Applicant's proposed 45 dBA L8h[25], averaged over the entire night (11 p.m. to 7 a.m.) outside at non-participating permanent and seasonal residences, which is set to reduce sleep disturbance even assuming a 12-dBA attenuation. In other words, even if one accepts DPS' 12 dBA attenuation factor, Applicant's proposed limit of

[25] 55 dBA L8h at participating receptors.

45 dBA with a conservative 12 dBA attenuation factor, equals 33 dBA and is consistent with the findings in the Morsing study.

The Locher et al. study relied upon by Mr. Moreno is a detailed Swiss study that looked at sound level reductions from over three hundred residences. Results showed average sound level reductions for traffic noise of 10 dBA for the windows fully open, 16 dBA for partially open, and 28 dBA for closed (Tr.2106). This study, although it involved traffic noise not wind turbines, indicates that the Applicant's 15 dBA attenuation is consistent with the literature and that DPS' proposed 12 dBA attenuation is overly conservative.

In conclusion, Staff's recommendation of a 12-dBA attenuation to comply with WHO's 1999 indoor recommendations of 30 dBA indoors is overly conservative and not supported by the studies cited by Staff. A 15-dBA attenuation is reasonable and supported by the WHO Guidelines and the Health Canada Study. In order to meet the WHO-1999 recommendation of 30 dBA indoors to minimize sleep disturbance, the sound limit for outside should be 45 dBA L8h, which is the Applicant's proposed regulatory limit.

ii. DPS Staff inaccurately calculates the difference between the annualized sound power level and the short-term sound power level of the wind turbines modeled in the Application

In another attempt to rationalize a shorter-term sound limit, DPS Staff argues that a lower short-term limit is needed to comply with WHO-2009's recommendation of a 40 dBA $L_{eq,\ night\text{-}outside}$ long-term limit. Staff's lower short-term limit is based on its calculation that the maximum 1-hour sound levels are only above the annual sound level by approximately 1 to 3 dBA depending on the turbine model considered. In other words, Mr. Moreno argues that a 41-43 dBA short term is equivalent to a 40-dBA long term, because he calculated the short term variation in sound levels over a year to only be between 1 to 3 dBA. Not surprisingly, Mr. Moreno recommends a short-

term regulatory limit of only a 1 dBA difference, despite the fact that 3 of the 4 turbine models showed a 3-dBA difference according to his calculations (Tr.1786, L12-20).

Mr. Moreno's calculations look at only the short-term worst-case sound power level and assume the same conditions will exist for an entire year but at a lower annualized sound power level. As explained above, the modeled long-term sound level of 40 dBA is already conservatively high and overstates the actual expected sound level over an entire year. Other meteorological conditions – atmospheric stability and wind direction, for example – will vary throughout the year (Tr.2113, L4-5). The modeled annual sound level assumes a house is always downwind of every wind turbine for the entire year. This will never happen. When a house is upwind of some wind turbines, actual sound levels will be lower than those assumed in the model, and thus the actual annual sound level will be lower than the long-term modeled sound level (Tr.2113, L5-9).

In reality, annual variation will be greater than 1, 2 or 3 dBA in a year.[26] The modeling provided by the Applicant showed differences of at least 1 dBA and an average of 3.4 dBA for the worst-case wind turbine under evaluation (Nordex N149) by comparing the Leq 8h results in Table E-3 and the annual nighttime sound level in Table F-2 of the PNIA. This is based only on the long-term sound power level differences and does not take into consideration the annual meteorological differences discussed above. Taking into consideration the meteorological differences will increase the difference between the short-term worst-case and long-term worst-case impacts to 4-5 dBA, or more. This is consistent with the 45-dBA short-term standard proposed by the Applicant, as the annual variation between the long term and short term are closer to 5 dBA, not the 2 dBA proposed by DPS Staff. Mr. Moreno calculated a 1 to 3 dBA difference because his

[26] To clarify, a lower variation between short-term and long-term sound levels means less wind turbine output which means less renewable energy for no appreciable increase to health or decrease in complaints.

analysis assumed that wind turbine noise propagates without directivity and that other meteorological conditions will have a minimal effect on sound propagation. Mr. Moreno attributes variation in wind turbine sound to wind speed magnitude only.

In summary, the actual difference between short term sound levels and long-term sound levels, when accounting for such things as directivity and atmospheric stability is closer to 4 or 5 decibels, which is much more consistent with the 45 dBA short term standard proposed by the Applicant. Therefore, the Applicant's proposed 45 dBA short term is consistent with the WHO-2009 guidelines (40 dBA annual nighttime average).

iii. DPS inaccurately calculated the equivalency of 45 Lden

Next, DPS Staff recommends that a lower short-term limit is needed to comply with WHO 2018's conditional recommendation of a 45 L_{den}. L_{den} is a long-term yearly average of day, evening and nighttime sound levels. (Tr.967). For reasons discussed further below, the L_{den} descriptor is flawed and should not be applied as a sound level criterion for this wind energy project. Thus Mr. Moreno's argument is without merit.

Furthermore, Mr. Moreno incorrectly calculated equivalencies to reach his conclusions. He used the Applicant's annual nighttime calculations to determine the difference between the sound power level that generates the annual nighttime levels and the L_{den} in a year. However, the annual nighttime levels and the L_{den} are not equivalent and are not proper surrogates. Mr. Moreno's assumption that the day, evening and night levels are "equal" is not reasonable and should not be used to estimate the sound power levels that will generate the L_{den} or to calculate the difference between the L_{den} and annual nightime in a year. The annualized sound power levels for the day, evening and night are different and vary by about 1 dBA, not a few decimal points as DPS Staff claims. (Tr.1798, L9-20)

iv. Amplitude Modulation is a rare occurrence and a penalty is unnecessary

DPS Staff's final rationalization for a stricter short-term limit is premised on the assumption that amplitude modulation will occur all of the time, thus prompting a 3-dBA penalty all of the time (Tr.1815-1816). Based on the results of the MA Study, amplitude modulation depths greater than 3 dBA occurred 2.26% of the time for flat sites (Hearing Exh. 46, Figure 69). Thus, amplitude modulation at 3 dBA is very infrequent. An additional penalty should not be applied to a reasonable wind turbine standard to account for an infrequent feature of operations. Based on the existing scientific literature, while amplitude modulation is likely to occur in varying degrees, this site is not conducive to excessive amplitude modulation, and the noise design goals proposed by the Applicant are sufficient to accommodate a normal range of amplitude modulation as the Applicant has already included several decibels of buffer by assuming many concurrent, conservative assumptions. It is not clear why Staff is requesting an additional 3 dBA penalty to account for something that occurs so infrequently.

To conclude, the four reasons argued by Staff to implement a stricter short-term limit are inaccurate, overly conservative and take an unrealistic approach to sound modeling and wind turbine sound. Staff's calculations and assumptions do not support the conclusion that a 42-dBA short term sound limit is needed to comply with the recommendations of WHO-1999, WHO-2009 or WHO-2018, and applying a 3-dBA penalty for amplitude modulation is unreasonable. Moreover, the WHO Guidelines, especially the WHO-2018 Guidelines, should not be used to set a regulatory limit in this proceeding.

d) WHO Guidelines should not be relied upon to set regulatory limits in this proceeding

The WHO-1999 and WHO-2009 Guidelines were recommended for traffic noise, and the WHO 2018 Guidelines admit that their recommended descriptor, L_{den} may be a poor characterization of wind turbine noise and may limit the ability to observe associations between wind turbine noise and health outcomes (Hearing Exh. 45, p. 86). Much more work and research need to be done before any of the recommendations in the WHO 2018 Guidelines can be used by the Siting Board.

The WHO 2018 Guidelines admit that there is a lack of evidence linking wind turbine noise and public health impacts and only ***conditionally*** recommends the limit of 45 L_{den}. This is the weakest classifications of recommendations in the document (Hearing Exh. 45, p. xv). A conditional recommendation means that high quality evidence indicating a strong adverse effect is lacking (*Id.*). This conditional recommendation was not intended by WHO to be applied to proposed wind farms without further debate, review and consideration by appropriate stakeholders. A conditional recommendation requires a policy-making process with substantial debate and involvement of stakeholders (*Id.*). The WHO report acknowledges that in forming its recommendations for wind turbines, it appears there was no stakeholder input at all (Hearing Exh. 45, p. 146, Table A1.5). The Report also states that "…additional considerations of costs, feasibility, values and preferences should also feature in decision-making when choosing reference values such as noise limits for a possible standard or legislation" (Hearing Exh. 45, p. 29).

Furthermore, the guidelines do not reflect the last three to five years' worth of research on wind turbine noise, including the 2016 Health Canada study and a 2017 Lawrence Berkeley National Laboratory survey of neighbors of American wind farms (Tr.2099, L4-6). The Lawrence Berkeley survey is the largest, most comprehensive survey of its kind, and made several relevant findings:

- Fewer Americans than Europeans say they can hear the wind farm outside their home and fewer report being strongly annoyed by turbine sound.
- If a person was opposed to the project during the development phase, that person was more likely to report being able to hear the turbines and be annoyed by the noise. (Tr.2100, L2-8).

Only four studies were used to determine the WHO 2018 conditional recommendation. The guidelines only reviewed studies concerned with health effects and did not look at the wider benefits of such technologies, such as reducing carbon dioxide and other emissions and combatting the effect of climate change.

WHO 2018 states the following shortcomings of their work in Section 3.4.2.3 "Consideration of additional contextual factors" (Hearing Exh. 45):

- There is very little evidence about the adverse health effect of continuous exposure to wind turbine noise;
- The evidence of health effects, excluding annoyance, from wind turbine noise is either absent or rated low or very low quality;
- The effects related to attitudes towards turbines are hard to discern from those related to noise and may be partly responsible for the associations;
- The number of people exposed to wind turbine noise is far lower than for many other sources of noise; therefore, the burden on health at the population level from wind turbines is low and any benefit from specifically reducing population exposure to wind turbine noise in all situations is unclear;

- In relation to possible harms associated with the implementation of the recommendation, the guidelines development group (GDG) underline the importance of wind energy for the development of renewable energy policy;
- In light of the assessment of the contextual factors in addition to the quality of evidence, the recommendation for wind turbines remains conditional. There is not enough evidence to provide a strong, certain and definitive recommendation;
- There are serious issues with the noise exposure assessments relating to wind turbines;
- The sound levels of wind turbine noise are generally much lower than those of transportation;
- The audibility of wind turbines in bedrooms is unknown;
- The conversion of L_{eq} to L_{den} requires:
    - A specific statistical distribution of annual wind speeds, wind direction, and atmospheric stability (wind shear and temperature profile, etc.) at a particular height, for each turbine location for the particular wind farm site
    - The turbine sound power levels at each wind speed
    - The residences being upwind, downwind or crosswind from the wind farm site;
- The WHO 2018 report concludes that the acoustical description of wind turbines noise by the means of L_{den} or $L_{eq,\ night\text{-}outside}$ may be a poor characterization of wind turbine noise and may limit the ability to observe associations between wind turbine noise and health outcomes; and
- There is not enough quality evidence to recommend an $L_{eq,\ night\text{-}outside}$ level.

The WHO 2018 report states that no stakeholders and end users participated in the stakeholder consultation for implementation of recommendations on wind turbine noise.

Therefore, there has been no consultation with regulatory bodies and the wind farm acoustics community in the determination of the guidelines.

Finally, the WHO 2018 Guidelines were published ***after*** the Bluestone Application was filed. Stipulations for this case were signed by DPS Staff on August 30, 2018 and the Article 10 Application was submitted September 18, 2018. The WHO 2018 report was released October 10, 2018 after the Stipulations were signed and the Application was submitted (Tr.2096, L5-10). Attempting to apply these guidelines "after the fact" creates significant uncertainty for this Applicant during development and would necessitate a significant re-design of the Facility at a very late stage in the process.

In summary, the WHO Guidelines are not the best guidelines to apply when determining appropriate sound limits for a wind farm. The 2016 Health Canada study and 2017 Lawrence Berkeley National Laboratory survey provide a better framework for determining what sound limits to apply.

The Health Canada authors concluded that wind turbine noise up to 46 dBA did not increase the prevalence of disturbed sleep and did not support an association with increased stress (Tr.2060, L2-10, L19-21). The Health Canada's finding is consistent with the Applicant's proposed limits, and the Hearing Examiners in this proceeding should recommend that the Siting Board adopt the Applicant's proposed limits. The Applicant's proposed short-term regulatory limit of 45 dBA L8h at night at non-participating homes and 55 dBA L8h at night at participating homes is consistent with a variety of studies, recommendations and guidelines, which specifically address wind turbine noise, including: the Town of Sanford local wind law, the National Association of Regulatory Utility Commissioners 2011 report ("NARUC-2011"), the 2016 Health Canada Study (Hearing Exh. 119), 2017 Lawrence Berkeley National Laboratory report, and other Article 10

wind proceedings including the Siting Board's Order in Cassadaga Wind and the Hearing Examiner's recommendations in Baron Winds.

e) *DPS Staff lacks the qualifications to perform equivalency calculations and recommend short-term noise limits based on long-term noise recommendations from the WHO*

DPS Staff lacks the qualifications to perform the equivalency calculations to arrive at its recommendations for the short-term noise limits. By contrast, Applicant's proposed short-term noise limits were derived using standard modeling by qualified professionals. Epsilon is a distinguished acoustical engineering firm with extensive expertise in sound propagation modeling from wind turbines and has published work in accredited scientific journals on the subject. Epsilon performs acoustical studies not only for wind energy developers but for governmental entities reviewing wind farm applications. In fact, Epsilon, under contract with the Massachusetts Clean Energy Center and the Massachusetts Department of Environmental Protection, collaborated with another well-known acoustical engineering firm on the MA Study, one of the most recent and comprehensive studies evaluating the validity and accuracy of sound propagation models for wind farms (Hearing Ex. 46).

Mr. Robert O'Neal, one of the managing principals at Epsilon, who was the primary preparer of the sound modeling and post construction compliance protocol, is Board Certified by the Institute of Noise Control Engineering ("INCE"), previously served on the Board of Directors for the INCE of the USA, and is the author and co-author of numerous peer-reviewed articles on noise modeling and the sound characteristics of wind turbines. Mr. O'Neal is a nationally recognized acoustics expert in the wind energy field having performed noise impact assessments for wind farms in over 25 states across the U.S. and Canada. Mr. O'Neal has presented the results of wind turbine low frequency noise and infrasound research at major conferences and in peer-

reviewed scientific journals, and was invited by the Commissioner of the Massachusetts Department of Environmental Protection to serve as a technical expert on the Wind Noise Technical Advisory Group ("WNTAG").

In comparison, Mr. Moreno, is not Board Certified, and has never modeled or monitored a wind farm project (Tr.935, L9 & L15). The first wind farm project Mr. Moreno reviewed was the Cassadaga Wind farm (Tr.935, L12). Mr. Moreno admitted that he did not reference the Health Canada Study, (Tr.936, L18-19) and did not consult with any municipalities with operational wind farms for their recommendations or guidance (Tr.935, L21). He also admitted that he has never attended any of the International Conferences on Wind Turbine Noise organized by the INCE-Europe, even though he relies on European guidance in making his recommendations (Tr.936, L23).

Despite his lack of experience, as explained above, Mr. Moreno performed equivalency calculations, using data provided by the Applicant (and other wind farm projects), to recommend a short-term noise limit, which he claims is equivalent to the long-term noise recommendations from the World Health Organization. The accuracy and reliability of Mr. Moreno's calculations have been challenged by the Applicant and other Article 10 Applicants. In fact, three of the Country's leading wind turbine acoustical engineers all disagree with Mr. Moreno's calculations and assumptions, Mr. Robert O'Neal, Mr. Kenneth Kaliski[27], and Mr. James D. Barnes[28].

For all the reasons cited above, the Hearing Examiners should reject Mr. Moreno's recommendation to adopt a 42-dBA sound limit.

[27] Testifying expert in the Cassadaga Wind proceeding (Case No 14-F-0490) and Baron Winds proceeding (Case No. 15-F-0122.
[28] Testifying expert in the Number Three Wind proceeding (Case No. 16-F-0328)

For the reasons set forth below, DPS Staff's remaining contentions regarding the Post Construction Monitoring Plan and NRO should also be rejected.

3. The Applicant's Post-Construction Monitoring Protocol Should be Adopted

Epsilon has proposed a post-construction monitoring and compliance protocol that will determine compliance with sound limits for the Facility. Epsilon has extensive experience in designing and implementing post-construction monitoring protocols for wind farms and has been monitoring wind farms for about 15 years. Epsilon's post-construction monitoring protocol is practical and takes into consideration years of experience in the field monitoring projects.

Mr. Moreno has admittedly never monitored a wind farm, yet he has proposed his own post-construction monitoring and compliance protocol for the Facility, which he admits was based upon his experience with compressor stations, not wind farms (Tr.1029, L8). At the hearings, Mr. Moreno admitted that certain provisions in his protocol were unclear and could be understood to be time consuming and difficult. If the Hearing Examiners and Siting Board are going to adopt a protocol, the protocol should be clearly written and drafted by someone with expertise in the area, such as Epsilon, who has performed numerous post-construction compliance programs, including those performed over long durations in a variety of conditions.

4. DPS Staff's Criticisms of NRO during Design are without Merit

In addition to recommending a lower short-term limit, DPS staff raises concerns with the Applicant's use of NRO during modeling (Tr.1807). Only two of the four wind turbine models evaluated would need NRO (Tr.2105, L1-3). For the two turbine models needing NRO, only two of the 33 proposed turbines would need a modest amount of NRO under worst-case conditions to meet a limit of 45 dBA Leq 8-hour (*Id*.).

NRO is a common form of noise control for wind turbines and has proven effective at minimizing turbine sound at receptors during design (Tr.2103, L14-17). It is routine to include NRO as part of pre-construction design modeling for wind projects (Tr.2103, L18-19). NRO was used in the modeling at Cassadaga and the Siting Board did not find that such use was unreasonable, nor did DPS Staff object to its use in that proceeding. NRO has also been used in the design of other wind projects currently undergoing Article 10 review before the Siting Board. (Tr.2104, L10-15). It is also important to note that because NRO reduces energy production, it is the Applicant's interest to use NRO sensibly and design a project that is protective of health and the environment while maximizing energy production.

NRO is a reasonable noise abatement measure and just like other design mitigation options, should be allowed during facility design. In fact, 16 NYCRR § 1001.19(j) requires an "identification and evaluation of reasonable noise abatement measure for the final design and operation of the facility." There is simply no basis to disallow NRO in the design of the Facility. In addition, other noise mitigation options are still available in the highly unlikely scenario that the maximum NRO proves to be ineffective, such as good neighbor agreements and curtailment during periods if the turbines are found to be in violation.

5. Conclusion

For all of the reasons above, DPS Staff's arguments and recommendations should be rejected by the Hearing Examiners, and the Hearing Examiners should recommend that the Applicant's Certificate Conditions be adopted by the Siting Board.

VIII. THE NATURE OF ENVIRONMENTAL IMPACTS ON CULTURAL, HISTORIC AND RECREATIONAL RESOURCES, INCLUDING AESTHETICS AND SCENIC VALUES AND MITIGATION OR AVOIDANCE THEREOF – PSL § 168(2)(c), 168(3)(c)

PSL § 168(2)(c) requires the Siting Board to make the required findings regarding the nature of the probable environmental impacts of the construction and operation of the Facility on cultural, historic, and recreational resources, including aesthetics and scenic values. Section 168(3), in turn, requires the Siting Board to determine that any adverse environmental effects of the construction and operation of the facility will be avoided or minimized to the maximum extent practicable before it issues a Certificate under Article 10.

This section addresses visual impacts only. Non-visual impacts on cultural resources are addressed in Section XIII. O below. Shadow flicker is discussed in Section VII. A above.

A. Visual Impacts

The Applicant has set forth the nature of the probable visual impacts associated with the construction and operation of the Facility, which consists of up to 27 wind turbines reaching up to 673 feet in height (Hearing Exh. 2, Application Exh. 24, Appendix ZZ [Visual Impact Assessment ("VIA")]; Hearing Exh. 7, Application Update Exh. 24, Addendum to Appendix ZZ). The VIA assessed the Facility's potential visibility and includes an evaluation of the character and visual quality of the existing landscape, including dividing the area by Landscape Similarity Zones ("LSZ"), identification of visually sensitive resources, viewshed mapping, confirmatory visual assessment fieldwork, visual simulations (photographic overlays), and potential visual mitigation. As set forth in greater detail below, the viewshed analysis, which considers the screening effects of topography, vegetation, and structures, suggests that 89.2% of the 10-mile visual study area will not include views of the Project and that 54% of the identified visually sensitive resources will be fully screened from views of the Project. The methodology and results of all the analyses included in the VIA are described in greater detail below.

1. Visual Impacts Generally

A 10-mile visual study area was established to identify visually sensitive resources of national, regional and statewide significance (Hearing Exh. 1). A more inclusive inventory that added locally significant visually sensitive resources was conducted for the area within 5 miles of the proposed Facility. Following public outreach, several additional resources of local significance located within the 10-mile radius visual study area were identified. The VIA includes an analysis of potential visibility (construction, turbines, and lighting), and identifies locations within the visual study area where it may be possible to view the installation and operation of the proposed wind turbines (Hearing Exh. 2, Application Exh. 24(a)(1)).

The Applicant's consultant, EDR performed a viewshed analysis to identify locations within the visual study area where views of the proposed turbines would be blocked by topography alone (i.e., the screening provided by structures and trees is ignored). The viewshed analyses were conducted using 2-meter resolution digital elevation model ("DEM") data downloaded from New York State's Geographical Information System ("GIS") Program Office FTP server, the location and height of all proposed turbines, an assumed viewer height of 1.83 meters, and ESRI ArcGIS® software with the Spatial Analyst extension. Two topographic viewsheds were mapped, one set to illustrate "worst case" daytime visibility based on the tallest of the proposed turbines, with a maximum blade tip height of 205 meters (673 feet) above existing grade and the other to illustrate the worst case potential visibility of turbine lights at night based on the Federal Aviation Administration ("FAA") warning light height of 131 meters (430 feet) above existing grade (Hearing Exh. 2, Application Exh. 24(b)(2)). Such topographic viewshed analyses are very accurate in identifying areas where there is no possibility of Facility visibility due to topography but are less accurate in assessing where views will be further limited by vegetation and structures as they do not consider screening provided by trees and buildings.

Therefore, to supplement the topographic viewshed analysis, a second level viewshed analysis was conducted to illustrate the potential screening effect of vegetation and structures. For most of the visual study area (approximately 90%), light detection and ranging (lidar) data was used to create a digital surface model ("DSM") of the study area that included the elevation of buildings, trees and other objects large enough to be resolved by lidar technology. For the remainder of the study area, EDR used the 2011 USGS National Land Cover Dataset ("NLCD") to identify the mapped location of forest land. Based on standard visual assessment practice, the mapped locations of the forest land were assigned a conservative height of 40 feet and added to the DEM (*Id.*).

Based on the screening provided by topography alone, the blade tip viewshed analysis indicates that some portion of the original 33-turbine array could potentially be visible during daytime hours in approximately 72.4% of the 5-mile visual study area but only 54.0% of the 10-mile visual study area. Factoring structures and vegetation into the DMS viewshed analysis significantly reduces potential Facility visibility. Only 17.4% and 10.8% of the 5-mile and 10-mile visual study areas, respectively, would have the potential for daytime views of the Facility. The Application also broke down potential visibility by LSZ for the 10-mile visual study area. Taking screening provided by topography, vegetation, and structures into account, it was determined no turbines would be visible from the following portions of each LSZ: Forest 94.7%, Open Water 89.2%, Transportation Corridor 75.9%, Rural Residential/Agricultural 67.0% and Village 80.3%. (Hearing Exh. 2, Application Exh. 24(b)(1), Tables 24-2 and 24-3).

Using these same techniques, the Applicant assessed the visual impact of the updated Facility layout described in the April 2019 Application Update, which reduced the number of turbines from 33 to 27 and made largely minor shifts to the locations of several other turbines. The

updated analysis showed that the updated layout would result in a minor decrease in potential turbine visibility when compared to the original 33-turbine layout (Hearing Exh. 7, Application Update Exh. 24, Addendum to Appendix ZZ).

EDR also conducted a visual field review on multiple dates in March through May 2018, driving public roads and visiting public vantage points within the 10-mile radius of the visual study area to document locations from which the turbines and other Facility components would likely be visible, partially screened or fully screened. The field review confirmed that Facility visibility from each of the LSZs generally agreed with the predictions revealed by the DSM viewshed analysis discussed above. The comparatively low percentage of views of the Facility predicted by the viewshed analysis was confirmed by the following landscape generalizations observations during the field review: curving valleys, roadside vegetation and forested hillsides and ridgelines, and limited long-distance views throughout the study area.

During the visual field review, EDR took photographs to document representative views, and for use in the preparation of visual simulations. As required by the Article 10 regulations, the Applicant conferred with municipal planning representatives, DPS and other agencies to identify important or representative viewpoints (Hearing Exh. 2, Application Exh. 24(b)(2), (4)). From an initial pool of 117 representative viewpoints for which photographs were taken, a total of 19 viewpoints were selected for the development of simulations based on various criteria, including the goal of representing different types of typical views, views from specific visually sensitive resources and views illustrating different numbers of turbines from a variety of viewer distances to illustrate the range of visual change associated with the proposed Project. To show the anticipated visual change associated with the proposed Facility, high-resolution computer enhanced image processing was used to create realistic photographic simulations of the proposed

turbines and other Facility components from the various LSZs where views could be available within the study area (e.g., Forest, Rural Residential/Agricultural, Open Water, Village, Transportation Corridor) (Hearing Exh. 2, Application Exh. 24(a)(2)-(4), (b)(4)).

Visual simulations of the 33-turbine layout were provided to a panel of three professionals with educational and career experience in the assessment of visual impacts who were asked to evaluate the visual impact of the proposed Facility on a scale ranging from 0 (insignificant) to 4 (strong). The panel concluded that the Facility's overall contrast with the visual/aesthetic character of the area will generally be moderate (Hearing Exh. 2, Application Exh. 24(b)(7)). Based on the results of this evaluation, as well as experience with currently operating wind power projects elsewhere, public reaction to the Facility is likely to be highly variable based on proximity to the turbines, the affected landscape, and the personal attitude of the viewer regarding wind power. Not all viewers find wind turbines to be unattractive (Hearing Exh. 2, Application Exh. 24(b)(7), p. 41).

Measures to minimize and mitigate visual impacts are limited given the height of wind turbines generally. However, in accordance with NYSDEC Program Policy: Assessing and Mitigating Visual Impacts, DEP-00-2 (NYSDEC, 2000) ("NYSDEC Visual Policy"), various mitigation measures were considered to minimize potential visual impacts, the Applicant and DPS have agreed to Certificate Condition 43, which requires the Certificate Holder to file an attestation affirming that the Facility design incorporates the following measures to minimize visual impact:

- Prohibiting advertisements, conspicuous lettering, or logos identifying the Facility owner, turbine manufacturer or other entity;
- Requiring turbines, towers and blades to be in FAA-approved colors and non-reflective finishes; and

- Requiring turbine lighting to be kept to the minimum allowable by the FAA. Several conditions addressing lighting concerns are discussed in greater detail below. (Hearing Exh. 10, Final Bluestone Certificate Conditions, 43).

Although the focus of the VIA is on the turbines, the Applicant also assessed the potential visibility of the collection and point of interconnection substations. Viewshed analysis of these Project components indicated that the substations could be visible from approximately 69% of the surrounding 1-mile radius study area based on screening provided by topography alone. However, visibility is limited by the valley location of the substation and the relatively high topographic relief within the 1-mile study area. Once forest vegetation was factored into the analysis, it was determined that the proposed substations would potentially be visible from only 10.8% of the 1-mile study area. The only above-ground electrical line associated with the Facility is a short length of aboveground transmission line connecting the collection and POI substations to the NYSEG transmission line. This portion of overhead transmission line is illustrated in the substation simulation (Hearing Exh. 2, Application Exh. 24(a)(3)). With respect to the operation and maintenance building, the Applicant has agreed to assess the need for landscape improvements, including vegetation planting, earthwork or installed features to provide screening or soften views toward the Facility (Hearing Exh. 10, Final Bluestone Certificate Conditions, 65).

Visual impacts during construction are anticipated to be relatively minor and temporary in duration. Representative photographs of construction activities were included in the VIA (Hearing Exh. 2, Appendix I of Appendix ZZ [VIA]). Visual impacts associated with construction may include, but are not limited to: temporary increase in truck traffic on area roadways, temporary widening of some public roads/intersections, construction/operation of construction laydown yards, disturbance associated with construction and operation of the access roads, construction of

turbine foundations, and installation of the tower, nacelles and rotors using a large erection crane. All temporarily disturbed areas will be restored to original grades and reseeded to minimize visual impacts following the completion of construction (Hearing Exh. 2, Application Exh. 24(a)(7)).

Andrew Davis, Utility Supervisor, DPS Office of Electric, Gas and Water, Environmental Certification and Compliance Section, reviewed the Application and concluded that "[t]he VIA generally presents a reasonable depiction and characterization of the likely appearance of the proposed generating Facility from a range of viewpoints" (Tr.1384, L6-9). While acknowledging that some reviewers may disagree with the impact ratings assigned by the expert panel and that certain viewpoints of interest to the public may not be included, he noted that the VIA is intended to provide a "representative assessment identifying and addressing potential impacts on the range of landscape types, user-groups, and distance zones in the Study Areas; as well as site-specific review of the extent of the Facility visibility for locations including public lands and recreational resources in New York State" (Tr.1384, L15-21). The VIA for the Bluestone Wind Project achieves that goal.

Several members of BCCR raised concerns with the height of the towers and visibility of taller turbines. However, as DPS Staff testified, shorter turbines may mean less output (per turbine) and correspondingly, more turbines would be needed to reach the Facility design goals (Tr. 902, L17-25). More turbines also would mean more receptors exposed to shadow flicker, noise, and visual impacts. Therefore, taller turbines reduce impacts as compared to more turbines over a wider impact area. It is also important to note that three of the four individuals who raised concerns with visual impacts own properties that are located beyond 1.5 miles from the nearest turbine: Mary Willis: 9,128 feet (1.73 miles), John Alfano 29,066 feet (5.5 miles), and Joanne McGibney, 14,514 feet (2.74 miles) (Tr. 2142, 2144).

In addition, Joanne McGibney criticized the visual impact assessment process, arguing that the Applicant failed to do sufficient outreach to the public concerning the selection of viewpoints for purposes of completing the VIA (Tr. 1247, L25-26 to Tr.1248, L1-2). This assertion is incorrect. 16 NYCRR § 1001.24(b)(4) provides that the applicant "shall confer with municipal planning representatives, DPS, DEC, OPRHP and where appropriate, APA in its selection of the important or representative viewpoints" and make its viewpoint selection based on specific criteria spelled out in the regulations. Consistent with that provision, the Applicant conducted a systematic program of public outreach to assist in the identification of important or representative viewpoints. The Applicant distributed a request on January 19, 2018 to 49 municipal planning representatives, regional organizations and State of New York interested parties seeking feedback on important aesthetic resources and representative viewpoints in the vicinity of the Facility. The Applicant heard from five visual stakeholders, including representatives of the Towns of Colesville, Tompkins and Windsor. Based on this feedback, 30 additional resources were identified and added to the sensitive resource table and cross-referenced with the result of viewshed mapping and field review to determine whether simulations from these sites would be appropriate. The Applicant then followed up with visual stakeholders, providing them with information about the visual study effort, together with a preliminary list of 11 viewpoints recommend for preparation of visual simulations and a rationale for the viewpoint selection. The Applicant received feedback from four stakeholders, including representatives of the Towns of Deposit and Windsor. Based on that feedback, the number of simulations increased from 11 to 19 (Hearing Exh. 1, Application Exh. 24(b)(3)-(4), Appendix G [Stakeholder Outreach and Correspondence] of Appendix ZZ [VIA]).

As the Record shows, the Applicant conducted extensive public outreach before selecting resources/viewpoints for study, consistent with the requirements of the Article 10 regulations. This

process resulted in the selection of 19 viewpoints for development of visual simulations of the turbines, and two viewpoints addressing the substations and O&M building. As set forth in the Application, the viewpoints were selected after considering a wide range of criteria and are intended to provide representative views of the turbines from different LSZs and at different distances. This process more than satisfies the requirements of the Article 10 process.

2. Lighting-Related Visual Impacts

Because the turbines will exceed 499 feet in height, FAA regulations require that they each be marked with aviation hazard lighting, including two flashing warning lights mounted on each of the turbine nacelles. Based on the screening provided by topography alone, areas with potential nighttime views of one or more of the 33 turbines associated with the original layout include approximately 66.7% of the 5-mile radius visual study area and approximately 48.6% of the 10-mile radius visual study area. Factoring vegetation and structures into the analysis significantly reduces potential nighttime Facility visibility to 14.3% and 8.7% of the study areas, respectively (Hearing Exh. 2, Application Exh. 24(b)(1), Table 24-2).

Lighting at the substations will be kept to a minimum and turned on only as needed (Hearing Exh. 2, Application Exh. 24(a)(10)). Consistent with the requirements of Certificate Condition 54, the Applicant will prepare a Facility Exterior Lighting Plan addressing lighting requirements for the entire Facility (Hearing Exh. 10, Final Bluestone Certificate Conditions, 54). In developing the plan, the Applicant will seek to balance the need for providing safe working conditions and ensuring aviation safety with the goal of minimizing off-site lighting impacts.

In his testimony, Mr. Davis recommended that the Applicant request the use of red lights on the turbines to reduce visual impacts (Tr.1382, L14-16). Agreed-upon Certificate Condition 43 specifically compels the Applicant to install medium intensity red flashing lights at the Facility

consistent with Mr. Davis' recommendation (Hearing Exh. 10, Final Bluestone Certificate Conditions, 43). Mr. Davis also discussed the possibility of using radar-activated detection lighting systems ("ADLS") at the Facility, which allow turbine hazard lights to be turned on only when activated by radar sensors detecting aircraft approaching and passing nearby or over the Facility. However, he noted that "[b]ased on discussion with the Applicant and my understanding of this technology based on manufacturer's information, the characteristics of the Bluestone Wind site are not suited to this technology" (Tr.1383, L9-14). Consistent with Certificate Condition 43, the Applicant has agreed that "the extent of lighting will be minimized to the extent allowable by the FAA" (Hearing Exh. 10, Final Bluestone Certificate Conditions, 43). The Applicant is currently reviewing the feasibility of employing ADLS technology at the Facility with several equipment suppliers. ADLS will be implemented if determined to be technologically feasible given the specific parameters and site conditions. (Hearing Exh. 10, Final Bluestone Certificate Conditions, 54).

IX. THE NATURE OF ENVIRONMENTAL IMPACTS ON TRANSPORATION, COMMUNICATIONS, UTILITIES AND OTHER INFRASTRUCTURE AND MITIGATION AND AVOIDANCE THEREOF – PSL § 168(2)(d), 168(3)(c)

PSL § 168(2)(d) requires the Siting Board to make the required findings regarding the nature of the probable environmental impacts of the construction and operation of the Facility on transportation, communication, utilities and other infrastructure. Section 168(3), in turn, requires the Siting Board to determine that any adverse environmental effects of the construction and operation of the facility will be avoided or minimized to the maximum extent practicable before it issues a Certificate under Article 10.

This section addresses transportation impacts as well as issues relating to site decommissioning and restoration. Other infrastructure-related issues (i.e., utilities and communications) are discussed in Sections XIII. I and XIII. R below, respectively.

A. Transportation

The Applicant has set forth in detail in its original Application and Application Update the nature of the probable impacts of construction and operation of the Facility on transportation (Hearing Exh. 2, Application Exh. 25, Appendix AAA [Route Evaluation Study] and Appendix BBB [Road Use Agreement]; Hearing Exh. 7, Application Update Exh. 25, Appendix AAA Update). The transportation analysis supplied by the Applicant provides sufficient information for the Siting Board to determine that the Facility will not have a major impact on transportation and that any effects will be minimized or avoided to the maximum extent practicable.

Virtually all of the traffic-related impacts associated with the Facility will occur during construction. The Application includes a detailed assessment of anticipated volume of construction vehicles associated with the Project and the impact of that additional volume on local traffic. The Application concludes that there will be a temporary increase in truck traffic on area roadways serving the Facility Site during construction that may result in minor delays. However, as the local area traffic volume is relatively low, the impacts will not be significant. Moreover, the Applicant has identified preventative measures that can be implemented to facilitate transportation and maintain the safety of road users (Hearing Exh. 2, Application Exh. 25(b)-(d); Hearing Exh. 7, Application Update Exh. 25).

As part of its assessment of the traffic impacts of the Facility, the Applicant's consultant reviewed available traffic information, corresponded with local traffic supervisors, drove around the Facility Area to identify possible access routes, assessed the physical condition of existing

roadways, and identified and eliminated routes that pose safety concerns (sharp curves, steep grades, restricted sight distance). As a result of this assessment, the Applicant has preliminarily identified certain temporary improvements that must be made to address deficiencies in local roads and ensure safe use by oversized/overweight ("OS/OW") vehicles (Hearing Exh. 2, Application Exh. 25(b)(4), (c)(4), (d), Appendix AAA). The Applicant will obtain any necessary State, county and local transportation permits prior to construction (Hearing Exh. 2, Application Exh. 25(d)(5), Exh. 31(b), Exh. 32(a), (b); Hearing Exh. 10, Final Bluestone Certificate Conditions, 56). The Applicant also has entered or will enter into Road Use Agreements ("RUA") with the Towns of Windsor and Sanford and Broome County[29] to address possible damage to local roads associated with construction and operation of the Project (Hearing Exh. 2, Application Exh. 25(d)(5), Appendix BBB).

Prior to commencing construction, the Applicant has agreed to develop final haul routes in consultation with the Towns of Windsor and Sanford, and draft versions have already been shared and modified per input from the Towns. In addition, the Applicant has agreed to file with DPS a final or updated Route Evaluation Study and Final Traffic Control Plan (required only if delays in local traffic during construction activities are anticipated) and to obtain all necessary State, county or local transportation permits (Hearing Exh. 10, Final Bluestone Certificate Conditions, 56).

With respect to aviation impacts, there are no airports that meet the criteria for consultation spelled out in 16 NYCRR § 1001.25(f)(2). However, the Applicant committed in its PIP to reach out to specific airports and heliports. Consistent with that commitment, the Applicant worked to meet or otherwise consult with managers of seven airports and one heliport identified in the PIP. These facilities are located between 9.6 and 23.5 nautical miles from the nearest turbine. Five of

[29] The Towns of Windsor and Sanford have executed the RUAs with the Applicant.

the airport managers contacted had no concern about the impact of the Project on airport operations. After the filing of the Application, the manager of the Greene Airport requested additional information regarding turbine lighting and aircraft safety. The Applicant provided Greene Airport with information on the FAA review process and turbine lighting and no further concerns were raised by Greene Airport. The remaining airport/heliport managers either did not respond to the Applicant's outreach and/or were unreachable (Hearing Exh. 2, Application Exh. 25(f)(2)). As discussed in Section XII. R below, the Applicant has received determinations of no hazard for the 33-turbine layout from the FAA and will file final determinations based on final facility design in accordance with agreed upon Certificate Condition 41 (Hearing Exh. 10, Final Bluestone Certificate Conditions, 41).

The agency stakeholders in this proceeding did not raise any concerns regarding the transportation-related impacts of the Project. However, several members of BCCR expressed concerns about the potential impact of Project construction on local traffic (*see* Testimony of Jay Vandermark (Tr.1923, L4-5), Patricia Kurz (Tr.1255, L22-23), and John Alfano (Tr.1927, L7-8)). As discussed above and in the Exhibits and Appendices referenced, the Applicant has conducted a thorough analysis of the potential impacts of construction of the Project on local traffic and determined that they will be minor and temporary given the current low traffic volumes in the area and the fact that construction activities will not be concentrated in any particular area for an extended period of time. BCCR has introduced no evidence to contradict this conclusion. Karl Katen recounted his experience relating to construction of the Bluestone natural gas pipeline as evidence of the potential impacts associated with construction of the Project (Tr.1235, L18-23 to Tr.1236, L1-16). However, the transportation impacts relating to the Bluestone natural gas pipeline are not directly relevant to assessing the Project. The Siting Board must be guided by the

detailed information currently contained in the Record in this proceeding in assessing the transportation-related impacts of the Project.

Julie Beyer – whose son suffers from health problems – expressed concern that she would not be able to access a medevac helicopter because of her proximity to the proposed wind turbines (Tr.1231, L21 to Tr.1232, L1-2). In response, the Applicant declared that prior to construction it "will coordinate with local emergency responders, including any air ambulance and medevac services, to ensure nearby landing zones are available in case of emergency" (Tr.2140, L11-13).

Subject to the above, the Record shows that the majority of transportation impacts are construction-related and will therefore be temporary, and that any adverse transportation-related impacts of the Facility have been minimized or avoided to the maximum extent practicable.

B. Site Restoration and Decommissioning

The Applicant set forth in detail its proposal for addressing site restoration and decommissioning in its original Application and revised it in February 2019 in advance of submission of the April 2019 Application Update (Hearing Exh. 2, Application Exh. 29, Appendix MMM [Decommissioning Plan and Decommissioning Obligation Cost Estimate (hereinafter "Decommissioning Plan")]). In response to the Direct Testimony of the DPS Decommissioning Panel, the Applicant updated the Decommissioning Plan in June 2019 to address several concerns raised by the Panel (Hearing Exh. 130). Application Exhibit 29 and the Decommissioning Plan, as updated, discuss key aspects of the decommissioning process including circumstances that trigger decommissioning, procedures for removing aboveground structures (e.g., turbines, permanent meteorological towers, battery storage, and the collection substation), approach to decommissioning underground structures, erosion control and permitting, notification requirements, and preparation of periodic decommissioning estimates for the Towns (including

responsibility for payment, basis of estimate, role of resale and salvage value, and financial assurance mechanism, among other subjects). To ensure the decommissioning costs remain current, the Applicant has agreed to submit updated decommissioning and site restoration costs prior to construction, after one year of Facility operation, and every five years thereafter (Hearing Exh. 10, Final Bluestone Certificate Conditions, 48).

The Applicant's Decommissioning Plan submitted with the Application was prepared by the Applicant's decommissioning expert, Jeffrey T. Kopp, Burns & McDonnell Engineering Company, Inc., and included a detailed analysis of the costs associated with Facility decommissioning and site restoration for the original 33-turbine Facility layout. In its Direct Testimony, the DPS Decommissioning Panel raised several concerns regarding the Plan, some but not all of which were addressed in the updated June 2019 Decommissioning Plan submitted as Exhibit RTK-R1 to Mr. Kopp's Rebuttal Testimony (Hearing Exh. 130). A summary of the issues no longer in dispute is set forth below:

- The DPS Decommissioning Panel noted that there were some inconsistencies in the original Application and subsequent submissions concerning the depths at which underground collection lines would remain in place (Tr.1508-1509). The Applicant confirmed that all collection lines will be buried at depths that that will allow them to remain (at least 4 feet in agricultural land and 3 feet elsewhere). Accordingly, no costs for collection line removal were included in the updated cost estimate. The Applicant's final design drawings will reflect the correct collection line depth (Tr.2011);
- At the DPS Panel's request, the Applicant deleted the cost of removing the O&M building from the updated cost estimate. The Applicant included the information in the Decommissioning Plan for informational purposes only. Since the O&M facility will

be located on land owned by the Applicant, demolition of the O&M building will not be required; the cost was therefore dropped from the cost estimate (Tr.1509-1510; Tr.2012); and

- The Decommissioning Plan was updated to reflect the increase in the width of access roads from 16 to 20 feet and reduction in the number of turbines from 33 to 27 (Tr.1510-1511; Tr.2012).

The Applicant disagreed with other issues raised by the DPS Decommissioning Panel. A major area of dispute is the Applicant's approach to addressing the removal of proposed access roads.

- The DPS Decommissioning Panel objected to the Applicant's purported assumption that all future landowners hosting access roads will want the roads left in place. In fact, the Applicant made no such assumption. The Applicant merely noted that if the landowner wants the access roads left in place rather than removed, it would accommodate that wish. The cost estimate included with the Decommissioning Plan assumed that all access roads would be removed (Tr.1511-1512; Tr.2012-2013);
- The DPS Decommissioning Panel disagreed with the Applicant's expert concerning the proper approach for calculating the cost of access road removal. The Panel recommended that the Final Decommissioning Plan "should utilize the … price of $24 per cubic yard of access road aggregate removal and site restoration for establishing the Project's overall "Civil Works Removal Cost," based on final layout details including length and width of proposed access roads. (Tr.1514, L9-14). This approach is less accurate than the one proposed by the Applicant's expert and should be rejected. The June 2019 Decommissioning Plan quantified the cost of access road removal using

a method that is "more specific to the types of activities that need to be performed and the individual project site and attributes" and thus provides more accurate results (Tr.2013, L5-6). Under this approach, costs are assigned to each stage in the road removal process – crushed rock surfacing removal, hauling and disposal, and grading and seeding costs – based on the actual task to be performed. For example, the costs of hauling are based on the tons of rock removed and the distance hauled, while the cost of regrading and seeding the road areas is based on square yards of area to be graded and seeded. As Mr. Kopp notes, "[s]ince many of these quantities are not correlated directly to the cubic yards of crushed rock, simply using a dollar amount per cubic yard of crushed rock surfacing is a less accurate approach for estimating … costs" than that called for in the Decommissioning Plan (Tr.2013, L10-12); and

- The DPS Decommissioning Panel questioned the Applicant's failure to consider the increased costs associated with the removal of cement stabilized soil for access roads (Tr.1514-1516). Per Mr. Kopp, cement stabilized soil is not currently proposed for the Project; as a result, the increased costs were not included in the cost estimate. The final decommissioning amount will reflect the removal of cement stabilized soil if the technique is, in fact, used (Tr.2013, L14-19).

With respect to the preparation of a final cost estimate, the Applicant agrees generally with the DPS Decommissioning Panel's recommendation that the Siting Board be required to file updated costs under Stipulated Certificate Condition 48 rather than establishing a dollar figure for decommissioning at this time, and that the estimate should be based on a per turbine cost. The Applicant has also agreed in Certificate Condition 48 not to consider salvage value in calculating decommissioning and site restoration costs. However, as an expert who has prepared

decommissioning cost estimates for numerous facilities, including wind farms, solar farms, hydroelectric power plants, natural gas-fired boilers, natural gas-fired simple and combined cycle units and coal-fired power plants, Mr. Kopp clarified his belief and common industry practice that "it is appropriate to offset decommissioning costs with salvage value" (Tr.2014, L9). In particular, he notes that:

- Bids provided by demolition contractors always include a credit for salvage value (Tr.2014, L13-18);
- Most other states allow the project sponsor to consider salvage value based on scrap metal values when calculating decommissioning and site restoration costs and establishing financial security (Tr.2014, L19-21 to Tr.2015, L1-5);
- While scrap metal values may fluctuate, history shows that scrap metal always maintains some value (i.e., the price of scrap steel, copper and aluminum as a commodity has never been zero in the past 112 years) (Tr.2015-2016). As a result, the fact that scrap metal values may fluctuate is not a reason to disallow any offset for scrap value, as DPS has demanded; and
- The Applicant used a conservative approach to calculating salvage value, including using an average price over the five-year period preceding the cost estimate and adding a contingency factor of 10% to the net cost (Tr.2016-2017).

Also, DPS's approach to salvage value largely ignores the Article 10 statute and implementing regulations. The implementing regulations require that the Application include a statement of the "performance criteria" proposed for site restoration that specifically includes "salvage and recycling" (16 NYCRR § 1000.29(a)(4)). Presumably, the decision to require the Applicant to

provide information about salvage and recycling reflects a desire by the agency to consider that information in deciding how to quantify decommissioning costs.

The key provision relating to Facility decommissioning is set forth in Certificate Condition 48 (Hearing Exh. 10, Final Bluestone Certificate Conditions, 48). With respect to the provision of financial security, the Applicant and DPS Decommissioning Panel agree that financial assurance will be provided in the form of letters of credit held by the Towns of Windsor and Sanford consistent with the provision of Stipulated Certification Condition 48. However, the Applicant disagrees with the addition to Certificate Condition 48 proposed by the DPS Decommissioning Panel, which calls for using a strict per turbine method to calculate decommissioning costs (Tr.1527). As noted by the Applicant's expert, Jeffrey Kopp, "[i]ncorporating overall decommissioning costs on a per turbine basis can be problematic, because a change in the quantity of turbines may not cause the total decommissioning cost to increase or decrease linearly by the turbine cost, due to non-scalable differences in balance-of-plant costs, such as equipment mobilization, and other similar factors" (Tr.2017, L12-15). Considering these factors, the Panel's proposed change to Stipulated Certificate Condition 48 should be rejected.

X. THE FACILITY IS A BENEFICIAL ADDITION TO OR SUBSTUTION FOR THE ELECTRIC GENERATING CAPACITY OF THE STATE – PSL § 168(3)(a)

In order to issue a Certificate, the Siting Board must find that the Facility would be a beneficial addition to or substitution for the electric generation capacity of the State (PSL § 168(3)(a)). These findings are made, in part, by considering the Facility's consistency with the most recent New York State Energy Plan ("SEP") and with the energy policies and long-range planning objectives of the State (PSL § 168(4)(e)).

As demonstrated below, the Facility would be a beneficial addition to the electric generation capacity of the State because it: increases the State's renewable energy generation

capacity and so helps the State meet the goal of New York's Renewable Energy Vision ("REV") initiative of generating 50% of the energy consumed in the State from renewable sources by 2030; helps the State meet the SEP goal of reducing greenhouse gas ("GHG") emissions by 40% from 1990 levels by 2030 to address climate change concerns; and advances numerous other goals as spelled out in greater detail below.

New York State has adopted a broad view of the benefits of renewable energy and carbon emissions reductions and has expressly declined to limit its consideration of public benefits to those "benefits experienced solely within New York" as advancing state policy goals (Order Adopting a Clean Energy Standard in Case 15-E-0302, Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard, p. 71 (August 1, 2016) (hereinafter "CES Order")). As articulated in the CES Order, a narrow approach to assessing benefits "in the case of climate change… could lead to inaction not only in New York but in all other jurisdictions" (CES Order, p. 71). Thus, the SEP policies are not solely aimed at reducing New York's emissions or generating renewable energy consumed by New Yorkers, but are "part of the State's sweeping initiative to transform the way energy is produced, delivered and consumed," which "places New York in a leadership position among states" to meet these challenges (CES Order, pp. 6 and 10).

The Bluestone Wind Project will serve as a beneficial addition to New York's electric generation capacity by providing clean, renewable energy to the regional market, diversifying New York's generation fleet, and lowering GHG emissions from New York's economy, all in furtherance of the SEP, REV initiative, Regional Greenhouse Gas Initiative ("RGGI"), and other State and regional policy objectives. The Applicant has provided evidence of these contributions

in the Record (Hearing Exh. 2, Application Exh. 10). The Parties have not raised this issue for litigation in the proceeding.

New York has long acknowledged the multitude of benefits offered by renewable energy generation, and the SEP declared the development of renewables to be a top priority for New York's energy future (Hearing Exh. 2, Application Exh. 10, pp. 2, 5)). Additions to the State's – and the Northeast region's – renewable capacity aids in diversifying fuel sources, increases grid reliability and resiliency, and supports the modernization of grid infrastructure (SEP Vol. 1, pp. 76-77; Hearing Exh. 2, Application Exh. 10(b), (c)). This advances the State energy planning objectives of "improving the reliability of the state's energy systems… insulating customers from volatility in market prices" and "reducing the overall cost of energy in the state" (NY Energy Law § 6-102(5)).

The Facility will add renewable energy generation capacity to aid in diversification of the regional grid by using wind resources within New York State instead of relying on imports of non-renewable gas, coal or oil from other regions (Hearing Exh. 2, Application Exh. 10(c)). As a generation facility that does not rely on fuels which must be sourced and delivered from other parts of the country or the world, and which do not require mining, drilling, refining, or any other processing to be used, the Facility would also offer the ability to generate energy unencumbered by transportation problems, extraction-related complications or delays, or political unrest in foreign countries – all potential issues for traditional fossil fuel facilities which rely on price-volatile commodities, often sourced from outside the region[30] (Hearing Exh. 2, Application Exh. 10(c); CES Order, p. 76). This improves system resiliency and allows the region to recover more

[30] *SEP Vol. 2, Sources*, pp. 83-87 and 169, noting that 97% of the natural gas supply required to supply New York is harvested outside of New York, primarily the Gulf Coast and Canada, and predicting that at least 30% of the electric generation displaced due to the addition of new renewables in New York will be from out-of-state sources.

quickly from significant disruptions to the grid, such as large storms, extreme weather, or other incidents. Siting facilities throughout the State that are capable of recovering quickly, allows those facilities to operate independently of the central grid until the rest of the system is able to recover (SEP Vol. 1, pp. 34-37; Hearing Exh. 2, Application Exh. 10(b); CES Order, pp. 76-77). The battery storage component of the Facility will further enhance the resiliency and reliability of the State's energy by helping manage the variability of the intermittent wind resource. The batteries will store production when demand is lower and release electricity when demand is higher. The battery storage system also will potentially help the system manage peak demand by storing excess supply and deploying it during periods of greater demand (Hearing Exh. 2, Application Exh. 10(b)).

The Bluestone Wind Facility is consistent with State policies that encourage the development of renewable energy projects. The Facility, as proposed, will add up to 124.2 MW of clean, green New York-based renewable power into the grid. As set forth below, the Facility will aid in advancing the specific SEP/REV goals of cutting State GHG emissions 40% by 2030 and increasing renewable energy generation to 50% by that date. It will also advance the State's goals of transforming the energy market, encouraging private sector investment, increasing fuel diversity, and improving system reliability and resiliency. The New York State Energy Research and Development Authority ("NYSERDA") recognized the merits of the Project when it awarded a contract to the Applicant as part of its 2017 Renewable Energy Standards ("RES") solicitation for the purchase of renewable energy credits generated by the Facility. NYSERDA's award is indicative of the Project's consistency with the SEP, including the State's goal of achieving 50% renewable energy by 2030 (Hearing Exh. 2, Application Exh. 10(a)(2), p. 4).

Consistent with the discussion above, the DPS Staff Policy Panel "recommend[ed] that the Siting Board find that the Project will result in a modest beneficial addition of electric generation capacity in the State that will not displace other existing efficient generation" (Tr.1566, L13-17). The Staff Policy Panel also concluded that "the Facility would provide benefits consistent with the State's policies regarding energy generation. It would also help the State meet is regional greenhouse gas emissions goals" (Tr.1573, L2-7). The Panel also found that the Project, as proposed, would contribute to the goals effectuated through the RES and would help the State contribute to the regional marketplace for GHG emission reductions established under the RGGI (Tr.1575, L7-13). For all of the above reasons, the Siting Board should determine that the Facility is a beneficial additional to the generation capacity of the State.

XI. THE CONSTRUCTION AND OPERATION OF THE FACILITY WILL SERVE THE PUBLIC INTEREST – PSL § 168(3)(b)

Overall, the Record establishes that the Facility is in the public interest. The Applicant's design criteria and siting considerations have avoided potential negative effects from the Facility, and the agreed-upon Certificate Conditions (Hearing Exh. 10) provide adequate mitigation for impacts that cannot be avoided. Although DPS and DEC have identified exceptions to certain Certificate Conditions, these disagreements are sufficiently minor to allow the Siting Board to conclude that the Facility is in the public interest.

The Facility's environmental impacts (wetlands/streams, eagles, bats) and sound, shadow flicker, and visual impacts have been avoided and minimized through stringent standards and conditions. Given the significant air pollution/climate change, economic and public health benefits associated with the Facility, the Siting Board should determine that the Facility is in the public interest. The DPS Staff Policy Panel concurred that the Facility would serve the public interest subject to implementation of specific Certificate Conditions (Tr.1566, L18-22 to Tr.1567, L1-5).

PSL § 66-c(1) states "it has hereby declared to be the policy of this state that it is in the public interest to encourage… the development of alternate energy production facilities…" Numerous aspects of large-scale renewable energy projects, such as the Facility, are in the public interest, from the benefits to society, public health, and the environment, to the socioeconomic impacts which stem from renewable investments in New York State (CES Order, pp. 3-13; SEP Vol. 1, pp. 70-72, 111-113; Hearing Exh. 2, Application Exh. 10(a)-(f)). As a privately sponsored renewable energy project designed to be competitive in today's electric markets, the Facility serves the public interest and furthers these goals (Hearing Exh. 2, Application Exh. 10 and 27).

A. Regional Benefits and Greenhouse Gas Emissions Reductions

As discussed more fully in the Record, climate change and air quality are regional issues. The Facility is in the public interest because it addresses both state and regional air pollution and greenhouse gas emission reduction goals, including the SEP's goal of reducing GHG emission in the State 40% by 2030 and the RGGI's GHG goal of reducing GHG emissions from the energy generation sector by an additional 30% below 2020 levels by 2030 in RGGI participating states (Hearing Exh. 2, Application Exh. 2, 10 and 17). Large-scale wind farms like the Facility produce significant quantities of electricity without generating any direct GHG emissions. The Facility thus will contribute to the RGGI goal of reducing regional GHG emissions, as acknowledged by the DPS Staff Policy Panel (Tr.1575, L7-13).

The Facility will produce no direct emissions of other air pollutants such as nitrogen oxides and sulfur dioxide that contribute to regional air pollution problems such as smog and acid rain. The Facility thus will advance the State and regional goals of reducing total emissions of air pollutants resulting from fossil fuel combustion (Hearing Exh. 2, Application Exh. 17).

B. Advancement of Environmental Justice Goals

PSL § 168(2)(d) specifically requires the Siting Board to make findings on "the cumulative impact of emissions on the local community including whether the construction and operation of the facility results in a significant and adverse disproportionate impact" in accordance with DEC's environmental justice ("EJ") regulations (6 NYCRR § 487.5). Likewise, the SEP includes a goal of avoiding disproportionate impacts of energy projects on EJ communities. As noted in the SEP, fossil fuel-fired energy power generation facilities have often been located in EJ communities, which have borne a disproportionate share of the environmental impacts of these facilities (SEP Vol. 2, Impacts and Considerations, pp. 97-126). As a result, there are EJ benefits associated with transitioning away from fossil fuel generation to cleaner, renewable sources (SEP Vol. 1, p. 39). Reducing environmental impacts to EJ communities will also aid in reducing the adverse disproportionate public health impacts suffered by those populations, such as the higher incidence of asthma and breathing disorders among children and people of color in many urban neighborhoods where air pollution is a significant problem. In that sense, renewable energy development advances environmental justice by displacing major sources of air pollution which are frequently concentrated in EJ communities.

The Application includes information about the potential impacts of the Facility on environmental justice communities (Hearing Exh. 2, Application Exh. 28). Based on data obtained from DEC's GIS Tools for Environmental Justice and the USEPA's Environmental Justice Screening and Mapping Tool, the closest potential environmental justice community at the time of the filing of the Application was approximately 12.8 miles from the nearest proposed turbine location, well outside the ½ mile Impact Study Area (ISA) specified by the DEC EJ regulations.

Over the course of the proceedings, individual party, Heather DeHaan, argued that the Village of Deposit *may* meet the criteria to be an Environmental Justice Area ("EJA") under 6

NYCRR § 487.5(b) or 6 NYCRR § 487.5(c). Her arguments were originally dismissed by the Hearing Examiners as she admitted that the Village did not actually meet the criteria enumerated in the regulations. However, after the evidentiary hearings, on July 17, 2019, Ms. DeHaan filed a letter outlining her position that the Village of Deposit (Census Block Group 3) meets the criteria for an EJA under 6 NYCRR § 487.5(b).

As a preliminary matter, the Applicant correctly decided not to identify the Village of Deposit and Census Block Group 3 as an EJA under 6 NYCRR § 487.5(b). The data used by Ms. DeHaan was not available until February 7, 2019,[31] nearly six months after the filing of the Bluestone Wind Application in September 2018.[32] The data available at the time of the filing of the Application did not show that the Village of Deposit met the criteria for an EJA under 6 NYCRR § 487.5(b). Given the data available at the time of the PSS, Stipulations, and the filing of the Application, the Applicant's required EJ analysis was complete (6 NYCRR § 487.6).

Moreover, for the purposes of environmental justice, the minimum ISA is defined by DEC as the area within a one-half mile radius of a project (*see* 6 NYCRR § 487.4). By comparison, the Applicant provided an ISA with a five-mile radius consistent with the default study area under 16 NYCRR § 1000.2. The Applicant thus established an ISA with an area approximately 100 times larger than the minimum ISA required by DEC. However, this decision does not mean that the Project has impacts as far as five miles away. The Application demonstrates that the impacts of the Project are limited outside of a one-mile radius. As a result, it was arguably unnecessary for the ISA to be expanded to include the Village of Deposit and Census Block Group 3, which are approximately two miles from the closest proposed turbine. Moreover, as demonstrated in the

[31] Estimates were released in December 2018, which is four months after the Application filing.
[32] https://www.census.gov/programs-surveys/acs/news/data-releases/2017/release.html#par_textimage_700933727.

Article 10 Application, no long-term sound, shadow flicker, human health, transportation, or other environmental impacts are anticipated within the Village of Deposit and Census Block Group 3. In fact, the Applicant did not identify any substantive impacts to the Village of Deposit in its Application other than visual effects. The Facility will be visible from some areas within and adjacent to the Village of Deposit as shown in simulations 12, 15, 17, and 22 of Appendix D of the Visual Impact Assessment (Hearing Exh. 2, Application Exh. 24, Appendix ZZ). However, this visibility will be limited to middle ground and background views. No other substantive impacts were identified.

Finally, as previously noted, PSL § 168(2)(d) specifically requires the Siting Board to make findings on the "cumulative impact of ***emissions*** on the local community," including whether the facility results in significant and adverse disproportionate impact on EJ communities under DEC's EJ regulations (emphasis added). In this case, the Facility will not release any emissions or otherwise have a negative impact on air quality during operations. Indeed, the Facility is expected to have net benefit to air quality and will displace thousands of tons of air pollutants (Hearing Exh. 2, Application Exh. 17). Therefore, even if the Village of Deposit and Census Block Group 3 are considered an EJA, impacts to this potential EJA have been avoided and the Facility will have no disproportionate impacts on this potential EJ community.

C. Economic Benefits (Including Review of Exhibit 27)

A guiding principle of the past decade's State energy policies and the 2015 SEP is increasing private investment in New York's clean energy economy. Efforts to fight climate change and develop renewables in New York will create direct and indirect socioeconomic benefits, including new jobs and business opportunities, and will help broaden the market for clean

energy products and innovations, including domestically-produced products and locally-based services (Hearing Exh. 2, Application Exh. 10(g)(4), pp. 15-16).

As part of its Article 10 Application, the Applicant submitted significant information and documentation concerning the socioeconomic benefits of the Project both locally and statewide, including increased construction and permanent employment, increased revenues to local municipalities, and purchases of products and services in the local community (Hearing Exh. 2, Application Exh. 27, Appendix LLL [Socioeconomic Report]). As set forth in greater detail below, while DPS Staff has expressed concerns about the Applicant's approach to quantifying the jobs impact of the Project, there does not appear to be any major disagreement that the Project is in the public interest.

The socioeconomic analysis of the Project was conducted using the Jobs and Economic Development Impact ("JEDI") model, which was developed by the National Renewable Energy Laboratory specifically to estimate jobs and economic development impacts associated with wind power generation projects using project-specific data provided by applicants and geographically-defined multipliers. In this case, the multipliers were produced by IMPLAN Group, LLC using a software/database system called IMPLAN and specifically address both New York State and Broome County. The Applicant reviewed the default values generated by the JEDI model to determine whether they were on par with real costs as experienced by the Applicant's team of development and financial experts and adjusted them, as appropriate, based on experience. According to the Applicant's Socioeconomic Report (Hearing Exh. 2, Application Exh. 27, Appendix LLL [Socioeconomic Report]) as summarized in Exhibit 27 of the Application, the Facility will have the following socioeconomic benefits:

- *Statewide and Countywide Jobs and Economic Impact Analysis:* According to the JEDI model, construction of the Facility will generate 150 direct jobs in construction and construction-related services, 297 turbine and supply chain jobs, and 109 jobs associated with induced impacts, with total earnings of $41.4 million and total output of $96.2 million. Annual operation of the Facility will generate 7 on-site jobs, 11 local revenue and supply chain jobs, and 6 jobs relating to induced impacts, with total earnings of $2.0 million and total output of $5.2 million (Hearing Exh. 2, Application Exh. 27, Table 27-5).
- *PILOTs:* Local governments will receive significant payments in lieu of taxes (PILOTs) over 25 years that will be distributed over 5 jurisdictions – the Towns of Windsor and Sanford, 2 school districts, and Broome County (Hearing Exh. 2, Application Exh. 27(i)). At the same time, the Facility will impose little, if any, additional operating or infrastructure costs on the local municipalities because wind turbines require limited police, fire and emergency medical services (*Id.*, Application Exh. 27(f)-(g), (k)). Damage to local roads relating to construction and operation of the Facility will be addressed under RUAs with the affected towns and county (*Id.*, Application Exh. 27(g), Appendix BBB [Road Use Agreement]).
- *Payments to Landowners:* Landowners leasing land for the Facility received and will receive payments from the Applicant. These payments may supplement farm and forestry income, enabling the landowner to keep their property as agricultural land or forest (Hearing Exh. 2, Application Exh. 27, Tables 27-2 & 27-3).

As it has in previous Article 10 proceedings, DPS Staff has expressed concerns regarding the "non-robust nature of the direct, indirect and induced job impacts estimated with the

Applicant's use of the JEDI model" (Tr.1892, L1-4). Although McKenzie Yezzi, Econometrician 1, DPS Office of Market and Regulatory Economics, references all three types of job impacts – direct, indirect, and induced – her primary concern appears to be indirect and induced job impacts. Ms. Yezzi conducted an analysis comparing (i.e., benchmarking) the Bluestone Wind jobs estimates against other New York State wind projects (Hearing Exh. 76, Exh. MY-2 [Benchmarking Analysis]). With respect to direct operation and maintenance jobs, Ms. Yezzi concluded the "Applicant's … job impact estimate appears to be reasonable for the scale of the Project as compared to other New York State renewable generation projects" (Tr.1913, L20-23). With respect to direct construction jobs, Ms. Yezzi declared that the "Applicant's 150 direct construction jobs estimate equates to 1.23 jobs per MW" and that "[t]his 1.23 jobs per MW figure appears reasonable when compared to job estimates for other New York State Wind Projects" (Tr.1914, L7-12). DPS thus appears reasonably comfortable with the Applicant's direct job estimates.[33]

With respect to the Applicant's indirect/induced job estimates, Ms. Yezzi criticized both the method used to obtain the estimate and the actual results. Based on these criticisms, she recommended that "the Applicant's indirect and induced jobs estimates should not be quantitatively weighed as a benefit." (Tr.1916, L15-17). Although the JEDI model is widely used

[33] Despite the conclusion that the Applicant's job estimate appears reasonable, Ms. Yezzi goes on to recommend that the Siting Board use the construction job estimate included in Applicant's NYSERDA bid to evaluate the economic benefits of the Project. She noted that the estimate in the Application was higher than that contained in the Applicant's winning bid submitted in response to the NYSERDA 2017 Renewable Energy Standard Request for Proposals and recommended that the Board "consider the Applicant's construction jobs in a range consistent with the estimates provided in the NYSERDA bid" based largely on the fact that the Applicant is subject to a financial penalty in estimates in the NYSERDA bid are determined to be inflated and so "a higher degree of accuracy is expected" (Tr.1915, L3-6, 8-9). However, as noted by the Applicant's consultant Jane Rice, a principal with EDR, the NYSERDA estimate was calculated when the Project was in the early stages of development, when precise information was unavailable. The job estimates contained in the Application, unlike those in the NYSERDA bid, were based, in large part, on actual project quotes and budget estimates and so are more accurate (Tr.2155-1256). Under these circumstances, the Siting Board should reject the recommendation by Ms. Yezzi that it consider direct construction job estimates provided in the NYSERDA bid in assessing the economic benefits of the Project.

throughout the industry as a means of estimating the economic impact of wind projects, Ms. Yezzi concludes that the model has various limitations, including that the "1) results are an estimate, not a precise forecast; 2) results reflect gross impacts and not net impacts; [and] 3) … results … are "dependent on the accuracy of the multipliers used" (Tr.1894, L21-23 to Tr.1895, L1-3). These concerns are similar to those raised by DPS in conjunction with other Article 10 wind projects and should be rejected for the reasons spelled out in the Testimony of Jane Rice (Tr.2151-2153).

As a preliminary matter, DPS staff was aware that the Applicant intended to use the JEDI model to quantify the economic impacts and did not specifically object nor did they suggest that the Applicant use another model (Tr.2149, L10-12). In her testimony, Ms. Yezzi identifies another model (the Regional Economic Models, Inc.) as a possible alternative to the JEDI model, but goes on to declare that "the results developed by such regional models may not provide estimates that are readily allocable to the vicinity of the Bluestone Project" (Tr.1910, L9-12). Thus, even the possible alternative identified by DPS has acknowledged limitations.

As it has in conjunction with other wind projects, DPS has condemned the JEDI model because it estimates only positive job impacts and not net job impacts, i.e., it does not consider the potential for a wind facility to cause secondary job losses associated with the possible displacement of other energy sources or increased electricity rates due to wind development (Tr.1901-1902). This contention is problematic for several reasons.

First, neither the Article 10 regulations nor the Stipulations agreed to by the parties require the Applicant to consider job losses (Tr.2151, L4-6). Although the Stipulations require the Applicant to estimate "induced impacts associated with construction and operation of the Facility" they do not specifically require an assessment of net job impacts (Hearing Exh. 1, Executed Application Stipulations, 27(3)). Also, the focus of the regulations is on the economic impact of

the Project locally. In particular, the relevant provisions focus on job and economic impacts "in the vicinity of the facility." 16 NYCRR § 1001.27(b)-(e). The type of net economic benefit analysis demanded by DPS can only be performed industry/state-wide.

Finally, the regulations and Stipulations do not require the Applicant to assess a Facility's impact on retail electric rates, let alone how the change in rates could affect jobs in the electric industry. Estimated impacts on wholesale pricing for electricity post operation of the Project are discussed in Application Exhibit 8. The DPS Engineering Panel "found that both our internal analysis, as well as the Applicant's modeling, forecasted a decrease in statewide wholesale energy market prices for the year 2021. This would generally be expected, as the wind resource would displace higher cost dispatchable resources. This results in lowering energy market costs and, in turn, wholesale energy market prices." (Tr.1546, L12-20; Tr.2152, L16-20 to Tr.2153, L1-2).

Ms. Yezzi herself acknowledged the difficulties associated with linking the construction of a single wind energy facility to job losses and other adverse economic impacts associated with the possible shutdown of conventional power plants. In her testimony, Ms. Yezzi cites a 2012 study of the potential costs and benefits of increasing the use of solar photovoltaics ("PV") as an example of a model that considers the net benefits of renewable generating facilities. However, she acknowledges that translating the results of a statewide solar PV study to a single renewable energy project "would be difficult to accomplish in practice" (Tr.1907, L12-13). She then notes that while renewable projects can have significant economic impacts in the aggregate, "an attempt to allocate a portion of the total secondary impacts from a statewide study to an individual project would be very imprecise" (Tr.1907, L21-24; Tr.2153-2154).

Despite these acknowledged difficulties, Ms. Yezzi declares that a separate job impact analysis is necessary to show that each individual project is beneficial and cost effective on its own

(Tr.1909, L16-20) even though the New York State Clean Energy Standard has already considered net job impacts and concluded that renewable energy projects have important economic benefits. Ms. Yezzi provides no realistic alternative to the JEDI model for conducting that analysis.

DPS is condemning the Applicant for failing to quantify something – the net economic benefits of a particular renewable energy project – that they acknowledge cannot realistically be quantified. While the JEDI model may not be perfect, (1) it is widely used in New York State and nationwide to quantify economic impacts in the absence of a workable alternative, (2) it provides a reasonable estimate of direct construction and operation job impacts, and (3) it provides a reasonable basis for benchmarking one wind energy project against another, as Ms. Yezzi has done.

Even if the Applicant were to concede DPS's argument that the Siting Board should not consider indirect and induced job impacts in assessing the socioeconomic benefits of the Project, the Siting Board nevertheless must conclude that the Project offers significant economic benefits and so is in the public interest. There appears to be no dispute among the parties that:

- The Project will directly generate both construction and operation-related jobs (Hearing Exh. 2, Application Exh. 27, Table 27-5; Tr.1913-14);
- Per DPS Staff, both its modeling and the Applicant's forecasts a decrease in statewide wholesale energy market prices as a result of the Project (Tr.1546);
- The affected communities will receive significant PILOT payments (Hearing Exh. 2, Application Exh. 27(i));
- The Project will not impose significant additional costs on the participating communities (*Id.,* Application Exh. 27(f)-(g), (k)); and

- The landowners will receive lease payments based on their participation in the Project. (*Id.*, Application Exh. 27, Tables 27-2 & 27-3).

Taking the larger view, the State has repeatedly emphasized the economic development opportunities associated with encouraging renewable energy development. Over the past decade, a key goal of the State's energy policies, including the SEP, is increasing private investment in New York's clean energy economy. In support of this goal, these policies have repeatedly pointed to the various State and local direct and indirect economic benefits associated with clean energy investment (Hearing Exh. 2, Application Exh. 10(g)(4)). In light of these declarations, the dispute between the Applicant and DPS regarding the specific jobs and economic impact of the Bluestone Wind Project is largely academic. Regardless of whether the Applicant or DPS is right about the indirect/induced economic impacts of Project, as a matter of State policy, renewable energy projects are generally considered an economic "plus." The precise number of indirect/induced jobs associated with the Project does not change this determination.

This conclusion is consistent with the recent Recommended Decision issued to the *Baron Winds Project* (Case No. 15-F-0122), in which the Examiners declared that:

> "based upon the arguments for and against reliance upon the indirect/induced job estimates, and given our recommendation below that the record otherwise contains evidence sufficient for the Siting Board to determine that the Project is in the public interest, we do not believe the Siting Board needs to resolve the issue whether the JEDI model's estimates of indirect/ induced jobs should be considered in determining the economic benefits resulting from the Project" (Baron Recommended Decision, p. 178).

In light of the above, the Siting Board can readily determine that, on balance, construction and operation of the Project will result in economic benefits and that the Project is in the public interest. To confirm the economic impact of the Project, the Applicant has agreed to a Certificate Condition – requested by Ms. Yezzi – which requires it to file a tracking report concerning the

actual number of jobs created and actual tax payments to local jurisdictions within one year of the Project becoming operational (Hearing Exh. 10, Final Bluestone Certificate Conditions, 39).

D. Property Values

An assessment of impacts to property values is not explicitly required under Article 10 or its implementing regulations. Economic impacts, standing alone, are not an environmental impact for which the Siting Board is required to make explicit findings (PSL § 168 (2)). Under State Environmental Quality Review Act ("SEQRA") case law, which is helpful in providing guidance under Article 10, it is clear that "[r]eduction of property values and other economic-related matters *standing alone* are not considered to be environmental impacts." In The Matter Of St. Lawrence Cement Company, LLC, Applicant, 2004 WL 2026420, at 51 [September 8, 2004] (emphasis added) *citing,* Matter of Red Wing Props., Inc., 1989 WL 97001, Interim Decision of the Commissioner, January 20, 1989, at 2; Matter of William E. Dailey, Inc., Interim Decision of the Commissioner, June 20, 1995, at 8 (upholding administrative law judge [ALJ] ruling that diminution of property values not an environmental issue); Matter of Hyland Facility Assocs., Interim Decision of the Commissioner, August 20, 1992, at 5 (potential loss of revenue derived from tourism an economic issue, not an issue of community character); Matter of Waste Mgt. of New York, ALJ Rulings on Party Status and Issues, December 31, 1999, at 46 (holding that under agency precedent, property value impacts not considered "environmental" impacts, but accepting submission relating to property impacts as a substantive comment on the project's Draft Environmental Impact Statement) *see also* In the Matter of the Application of Seneca Meadows, Inc., 2012 WL 1384772, Ruling on Issues and Party Status, March 26, 2012.

In addition, property values are not listed as an issue of concern in PSL § 168 (2) and Article 10's implementing regulations, which are designed to include all the information the Siting

Board needs to make its findings under Article 10 (*see* 16 NYCRR § 1001.27). Therefore, Article 10 applicants are not required to specifically avoid, minimize or mitigate economic impacts related to property values (PSL § 168 (3)).

Although the Article 10 statute and implementing regulations do not expressly require an assessment of property values as part of the Article 10 review process, the Applicant nevertheless agreed during the scoping and stipulation phase of the proceeding, to provide a review of publicly available property value studies (Hearing Exh. 1, Executed Application Stipulations, 4). Numerous property value studies, based on statistical analysis of real estate transactions near wind farms, have found that wind facilities have no consistent significant impact on property values (Sterzinger et al. 2003; Hoen 2006; Hoen et al. 2009; Hinman 2010; Carter 2011) (Hearing Exh. 2, Application Exh. 4(p)(1). Given the results of these studies, it is reasonable to conclude that the proposed Facility will not have a significant long-term adverse impact on local property values. It is also not unreasonable to assume that the economic benefits associated with the Project including landowner payments, PILOT payments, and job opportunities, will, at a minimum, preserve property values, if not increase values due to a stronger local economy.

The Applicant submitted rebuttal testimony from Dr. Eric Brunner to address concerns raised by members of BCCR in direct testimony, and to further supplement the record regarding potential property value impacts associated with the Project to the extent that this is considered an issue to be addressed by the Siting Board in this proceeding (Tr.1929-1938).

Dr. Brunner testified that since 2009, 11 large empirical studies have been completed that examined the impact of wind farms on nearby property values in the United States 9 of which found no significant effect of wind turbines on property values (Tr.1933, L17-19). The other two studies had mixed results, finding a negative effect in one location but either no effect or a positive

effect in another (Tr.1935, L9-15). Both studies suffered from small sample sizes as compared with the 9 studies that found no significant impact (Tr.1935-1936).

There have also been 2 recent peer-reviewed studies that conducted a meta-analysis of the existing evidence on the impact of wind turbines on residential property values (Tr.1936, L7-14). These studies did not conduct original research but rather analyzed the existing body of peer-reviewed studies to investigate the overall impact of wind turbines on property values (*Id.*). These studies concluded that most of the literature on effects of wind farms on nearby housing values have overwhelming indicate no significant impacts on nearby property values (*Id*.)

While there may be negative property value effects in the post-announcement, pre-construction phase (which is commonly referred to as anticipation effects), these anticipation effects are transitory and disappear once the operation of the wind farm commences (Tr.1934, L12-13). In conclusion, the overwhelming evidence in the Record indicates that the Facility is unlikely to have a long-term negative impact on property values.

E. Consistency with the State Energy Plan and State Energy Policies

The Applicant has provided extensive discussion and analysis of the Facility's consistency with the SEP and state energy policy, including in the preceding sections of this brief as well as in Hearing Exhibit 2, Application Exhibits 2, 10, and 17. Consistent with this discussion and analysis, the DPS Staff Policy Panel concluded that "The Facility would provide benefits consistent with the State's policies regarding energy generation and more specifically, renewable energy generation. It would also help the State meet its regional greenhouse gas emission goals" (Tr.1573, L2-7). In particular, the Staff Policy Panel concluded that the Facility will help the State meet its goal of generating 50% of the electricity consumed in the State from renewable sources by 2030

as effectuated by the Renewable Energy Standard (Tr.1573-74) as well as its regional GHG emissions goals under the RGGI (Tr.1575).

To summarize: the Facility advances State energy policies because it represents a proposed private investment in New York's newly-animated competitive energy markets; it will harness wind resources in the southern tier of New York to generate renewable electricity to be fed into the energy grid; it will produce power without emitting carbon, aiding in the State's efforts to combat climate change and facilitating achievement of GHG emissions reduction goals; and it will encourage modernization of infrastructure (including an innovative battery storage component) and the development of a reliable, resilient, affordable energy grid.

For all of the above reasons, the Siting Board should find that the Facility is consistent with the State Energy Plan and state energy policies.

XII. State and Local Laws and Regulations – PSL § 168(3)(e)

A. State Law Compliance

Consistent with 16 NYCRR § 1001.32, the Applicant has set forth all procedural and substantive State laws that may apply to the construction and operation of the Facility. The Parties agree that the discussion of issues elsewhere in this brief demonstrates that the construction and operation of the Facility will comply with all applicable State laws. The Applicant has requested that the Siting Board authorize the New York State Department of Transportation ("DOT") to issue special hauling permits if required, and no Party has raised concerns with this request.

B. Local Law Compliance

Consistent with 16 NYCRR § 1001.31, the Applicant has set forth all procedural and substantive local laws of the Towns of Windsor and Sanford (sometimes collectively referred to as the "Towns") and Broome County that may apply to the construction and operation of the

Facility (Hearing Exh. 2, Application Exh. 31, Appendix NNN [Copies of Local Laws] and Appendix OOO [Windsor Code Enforcement Officer Letter]). Pursuant to 16 NYCRR § 1001.31(a), any procedural provisions of local laws are preempted by Article 10 except as expressly authorized by the Siting Board. Pursuant to 16 NYCRR § 1001.31(d), the Applicant will comply with all substantive provisions of local law except to the extent it seeks a waiver from the Siting Board. Under PSL § 168(3)(e), waivers from local laws can be granted if the Siting Board finds that, as applied to the proposed facility, the local law is "unreasonably burdensome in view of the existing technology or the needs of or costs to rate payers…".

The Applicant has not requested any waivers from local laws in conjunction with the Project. After reviewing the information in the Application, the DPS Staff Policy Panel concluded that the Application "addresses the required showings of Exhibit 31. As proposed, the Project is designed to comply with all substantive local laws and regulations" (Tr.1573, L9-11). Consistent with that conclusion, the Siting Board should find that the Facility will comply with all local requirements.

XIII. OTHER ISSUES

This section briefly discusses those aspects of the Bluestone Wind Application that were not addressed in written testimony, at the evidentiary hearings, or were not identified as issues in dispute. It also discusses those aspects of the Application that were the subject of concerns that have been easily addressed by the Parties and raise no significant issues. Overall, the Record contains adequate evidence for the Siting Board to make the findings required under PSL § 168 for the substantive matters discussed below.

A. Exhibit 1 – General Requirements

Per the requirements of the Article 10 regulations, the Applicant provided general information regarding the Applicant and its business structure. No party has raised any issues with respect to the information contained in Application Exhibit 1, and Application Exhibit 1 provides the Siting Board with sufficient information regarding the Applicant as required by the Article 10 regulations (16 NYCRR § 1001.1).

B. Exhibit 4 – Land Use

The land use analysis conducted by the Applicant permits the Siting Board to determine, consistent with PSL § 168(3)(c), that the Facility is compatible with existing and proposed land uses and that any effects on land use will be minimized or avoided to the maximum extent practicable (Hearing Exh. 2, Application Exh. 4).

In preparing Application Exhibit 4, the Applicant identified existing and proposed land uses using publicly available data from the Broome County GIS Department and the Delaware County Planning Department as well as land use information obtained from the Towns of Windsor and Sanford where the Facility site is located, and municipalities within a 5-mile radius of the Facility, including the Town of Colesville and the Villages of Deposit and Windsor (Hearing Exh. 2, Application Exh. 4(a), (b) and (d)). The Applicant also reviewed other land use-related data, including gas well and mining data obtained from DEC, comprehensive plans for the Towns of Windsor and Sanford and Broome County, data relating to specially designated areas (e.g., inland waterways, groundwater management zones, agricultural districts, flood hazard areas, etc.) and recreational areas and other sensitive land uses (e.g., wild, scenic and recreational river corridors, open space, archaeological, geologic, historical or scenic areas, etc.), and regional planning documents (Hearing Exh. 2, Application Exh. 4(c), (e), (g)-(i)).

As set forth in the September 2018 Application, the presence of the turbine pads, access roads, substations, and the O&M building would result in the cumulative conversion of approximately 53.6 acres of the 5,657-acre site from its current use to built facilities, which represents less than 1% of the Facility Site. In addition, the Application identified an additional 379.6 acres of temporary land use impacts resulting from construction activities (i.e., clearing, soil disturbance, etc.) as a result of the Project (Hearing Exh. 2, Application Exh. 22(b)(1), Table 22-3). This amount will be reduced to 335.8 acres of temporary impacts given the reduction in the number of turbines from 33 to 27 as described in Table 22-3 of the April 2019 Update (Hearing Exh. 7, Application Update Exh. 22, Table 22-3). During Facility operation, additional impacts on land use (if any) over the years should be infrequent and minimal. Aside from occasional maintenance and repair activities, Facility operation will not interfere with ongoing land use (i.e., farming and forestry activities) (Hearing Exh. 2, Application Exh. 4(i)). No substantial permanent changes in land use are anticipated because of Facility construction and operation, and no changes are predicted outside the Facility Site (*Id.*).

1. Agricultural Land

The impact of the Facility on agricultural land is addressed in Exhibits 4 and 22 of the Application. Active agricultural land occupies approximately 250 acres (4.4%) of the Facility Site identified in the original Application and consists primarily of cropland and hay fields (Hearing Exh. 2, Application Exh. 22(a)(1)). Of this amount, approximately 34.4 acres will be temporarily disturbed while 8.0 acres will be converted to built facilities (i.e., permanently disturbed) (Hearing Exh. 2, Application Exh. 22(b)(1)). In designing the Facility, the Applicant attempted to minimize impacts to farmland through measures such as siting facility access roads on existing farm roads.

Approximately 2,419 acres (43%) of the Facility Site as described in the Application is enrolled in a New York State Certified Agricultural District, established pursuant to Article 25-AA of the New York State Agriculture and Markets Law. Of that amount, approximately 122.4 acres will be temporarily impacted by the Facility while an additional 28.0 acres will be permanently impacted. Numerous wind farms have been built in Certified Agricultural Districts, and where appropriately designed and built, such projects are consistent with and supportive of agricultural land uses and districts (Hearing Exh. 2, Application Exh. 4(a)). Moreover, to minimize and/or mitigate impacts to active agricultural land and farming operations, to the extent practicable Facility siting and construction will generally comply with the most recent version of *New York State Department of Agriculture and Markets Guidelines for Agricultural Mitigation for Wind Power Projects* ("DAM Wind Guidelines") (Hearing Exh. 2, Application Exh. 4(i), pp. 20-21). The New York State Department of Agriculture and Markets did not identify any areas of concern for this Facility.

In addition, the Applicant will continue to consult with landowners and DAM during construction and operation of the Facility to ensure impacts to active agricultural land and farming operations are minimized and/or mitigated wherever practicable (Hearing Exh. 2, Application Exh. 4(i), p. 22). To ensure agricultural lands are properly protected, the Applicant has stipulated to various Certificate Conditions including Certificate Condition 47 (requiring the Certificate Holder to submit an Environmental Compliance and Monitoring Plan), 63 (requiring an Agricultural Area Plan, which describes the programs, policies and procedures to mitigate agricultural impacts), and 85-87 (addressing the appointment of a third-party Environmental Monitor and a third-party Agricultural Monitor, unless DAM determines that the Environmental Monitor is qualified to address agricultural issues) (Hearing Exh. 10, Final Bluestone Certificate Conditions). DAM staff

submitted no Information Requests during the discovery phase of this proceeding and specifically declared that they had no issues for litigation in response the Hearing Examiners' Written Request for Issues.[34]

As noted at the outset, only 4.4% of the Facility Site identified in the Application is active agricultural land. The Applicant has agreed to generally implement mitigation measures from the DAM Wind Guidelines where practicable, and appoint an Agricultural Monitor, among other measures, to oversee construction of the Facility and ensure that all agreed-upon measures to protect agricultural land in the Certificate Conditions are implemented. Under these circumstances, the Siting Board can reasonably conclude that impacts of the Facility on agricultural land have been avoided or minimized to the maximum extent practicable.

2. Conservation Lands

To determine the location of conservation program lands near the Facility Site, the Applicant consulted the National Conservation Easement Database ("NCED") and identified 4 conservation easements within the 5-mile Study Area, all owned by the Delaware Highlands Conservancy. Although none of the conservation easements are within the Facility Site, 3 are located within 0.15 miles of the nearest proposed turbine site and the fourth is located approximately 4 miles from the nearest proposed turbine site. Although Facility turbines may be visible from portions of the easement lands, there will be no direct impacts to the lands or to the ecological functions and values protected by the easements (Hearing Exh. 2, Application Exh. 4(a)).

3. 480-a Forest Tax Law Program Parcels

[34] BCCR member John Alfano expressed concern that the blasting associated with the Project would adversely affect the health of his goats (Tr.1927). However, Mr. Alfano's residence is 29,066 feet (approximately 5.5 miles) from the nearest turbine.

According to the Towns of Windsor and Sanford 2018 Final Assessment Rolls, and the Broome County tax map, there are three 480-a Forest Tax Law program parcels located within the Facility Site that are proposed to host facility components. These properties are identified on Figure 4-2 of the Application. The 480-a Forest Tax Law program provides property tax savings for landowners who enroll in the program. To be eligible, a forest tract must consist of at least 50 contiguous acres. The landowner must commit to follow a 10-year management plan prepared by a forester and approved by DEC. The management plan must identify scheduled commercial harvests, non-commercial thinning, road construction, and other management practices, and include a schedule that shows the work to be done each year. Failure to adhere to the annual commitment in the work schedule will result in revocation of the certificate of approval by DEC and the imposition of penalty or roll-back taxes by the county.

In his testimony, Andrew Davis, Utility Supervisor, DPS Office of Electric, Gas and Water Environmental Certification and Compliance Section, raised concerns regarding the placement of Facility components on 480-a parcels and the potential for landowners to lose their 480-a status if such placement violates the 480-a management plans for the parcels and requested information about the parcels, which the Applicant supplied (Tr.1363, L15-19; Hearing Exh. 137, GSL-R3, Bluestone Information Request DPS-3, Land Use).

In response to DPS concerns, the Applicant reviewed the location of Facility components to determine if they could be moved to portions of the parcels not covered by 480-a management plans. With respect to each of the three parcels, a comparatively small percentage of the parcel enrolled in the 480-a program is impacted by the Project. The reductions associated with the Project do not make the entire parcels ineligible for ongoing participation in the program, since the remaining unaffected acreage exceeds the 50-acre minimum enrollment criterion (Tr.1364, L1-

6). With respect to two of the three parcels, the Applicant eliminated a turbine, significantly reducing impacts to the 480-a enrolled acres within the parcels. With respect to the remaining parcel, almost the entire parcel is enrolled in the 480-a program, limiting the Applicant's ability to site components in non-forested areas. However, to the extent practicable, Facility components were co-located or otherwise sited to minimize impacts to enrolled acreage (Tr.2038-2039). In addition, the Applicant has entered into lease agreements with the parcel owners and has agreed to cover any losses incurred by the landowners (the imposition of penalty or roll-back taxes by the county) if DEC determines that the construction of Facility components renders all or a portion of the previously 480-a parcel ineligible for the program (Hearing Exh. 137, GSL-R3, Bluestone Information Request DPS-3, Land Use). Furthermore, Mr. Davis also noted that he believes there is "actually potential to expand enrollment in the 480-a program to include additional landowners following development of these and similar facilities, due to the development of permanent access roads associated with remotely sited wind turbine in generally rugged terrain" (Tr.1365, L5-11). The Applicant thus has avoided or minimized potential impacts to forested land enrolled in the 480-a parcel to the maximum extent practicable.

4. Zoning Districts

As outlined in Application Exhibits 4 and 31, the Facility is compatible with existing and proposed local zoning regulations and districts, and the Facility components will be located in districts that allow wind farm development (Hearing Exh. 2, Application Exh. 4 and 31, Appendix NNN and OOO). In addition, both of the towns comprising the Facility Site have adopted comprehensive/development plans addressing their future development goals. The Town of Windsor plan specifically allows for and encourages responsible development of energy-deriving technologies, including wind, while at the same time maintaining the rural residential community

with an emphasis on agriculture. Although the Town of Sanford plan does not specifically address wind energy development, the planned Facility is consistent with the goal stated of preserving the rural residential community, including agriculture (Hearing Exh. 2, Application Exh. 4(e)). Construction and operation of the proposed Facility is consistent with these goals. In addition, the Project is consistent with the goal articulated in both plans of encouraging development to broaden the tax base and provide employment.

The Facility will have no direct impact on any recreational or other sensitive resources in the Facility Area (i.e., they will not be removed or physically modified in any way) (Hearing Exh. 2, Application Exh. 4(h), p. 19). The prevalence of forestland throughout the visual study area, provides little opportunity for open views of the Project. When accounting for screening by vegetation and structures in the viewshed analysis these features, in combination with topography, will serve to block daytime views of the turbines from approximately 89.2% of the 10-mile study area (Hearing Exh. 2, Application Exh. 24(b)(1), Table 24-2).

As outlined in Application Exhibit 4, the Facility is compatible with the existing community character and land uses in and around the Facility Site and is not expected to interfere with future land uses. No existing structures will be physically impacted, and aside from temporary disturbance during construction activities – which will be restored following construction – the Facility is largely consistent with the rural forested and agricultural character of the surrounding community and compatible with farming practices. The Facility will not result in a significant change in land use and will promote the long-term economic viability of the region by supplementing the income of participating farmers and landowners and protecting the agricultural and rural community character of the region (Hearing Exh. 2, Application Exh. 4(i) and (p)).

Given the above, the Siting Board should find that the Facility is compatible with existing and proposed land uses and that any impacts to land uses have been minimized and avoided to the maximum extent practicable.

C. Electric System Effects

Per the requirements of the Article 10 regulations, CF Power, Ltd. prepared a System Reliability Impact Study ("SRIS") for the Facility on behalf of the New York Independent System Operator ("NYISO"). The Facility is participating in the NYISO 2018 Class Year (Hearing Exh. 2, Application Exh. 5(a), Appendix D [SRIS]). DPS's Engineering Panel specifically declared that the "SRIS analysis showed that the Project does not cause any significant adverse impact to the New York Transmission System" (Tr.1544, L13-15). The NYISO Operating Committee approved the SRIS on July 12, 2018, prompting the Panel to conclude that it did not have any concerns with the proposed Project's impact on the reliability of the New York State Transmission System (Tr.1545, L1-4). No Party has raised any issues with the conclusions of the SRIS.

Based on the result of the SRIS and the information provided by the Applicant in Application Exhibit 5, the Siting Board can reasonably determine that the Facility will not have any adverse effects on New York's electric system and will improve fuel diversity in the State and is therefore a beneficial addition to or substitution for the electric generation capacity of the State and that construction and operation of the Facility will serve the public interest (PSL § 168(3)(a) and (3)(b)).

D. Wind Power Facilities (i.e., Setbacks)

The setback analysis conducted by the Applicant permits the Siting Board to determine, consistent with PSL § 168(3)(c), that the proposed Facility has been sited and set back from dwellings, pipelines, and other existing facilities to avoid or minimize the potential risks from

blade failure, tower collapse, icing, or other mechanical problems (Hearing Exh. 2, Application Exh. 6; Hearing Exh. 7 Application Update Exh. 6).

As part of the Application, the Applicant analyzed the location of the turbines relative to manufacturer setback specifications, turbine setbacks required by local law or ordinance, and its own internal setback standards. Exhibit 6 of the Application provides an evaluation of the Facility's turbine setbacks. Wind turbine setbacks are designed to prevent turbines from being erected in areas where sensitive resources would be located within a "fall zone" or "fall-down distance," which is the area directly under a wind turbine that could be subject to falling debris in the unlikely event of a blade failure, tower collapse, icing, or other mechanical problem (Hearing Exhibit 2, Application Exh. 6(a), Application Exh. 15(e)).

In order to create an appropriate "fall-down distance," setbacks are based on total turbine height (i.e., the height of the entire turbine, as measured from the tower base at the ground surface to the tip of the blade oriented in its highest position). The total height for the turbine models presented in the Application ranged from 655 to 673 feet. Setback distances were calculated for the proposed Facility assuming a total turbine height of 673 feet representing the tallest turbine model under consideration (Hearing Exh. 2, Application Exh. 6(a); Hearing Exh. 7, Application Update Exh. 6(a)).

As outlined in Application Exhibit 6 as updated, the Facility will meet or exceed all turbine setback requirements including local zoning regulations, or written consent will be obtained from affected property owners (Hearing Exh. 2, Application Exh. 6(b)). The Applicant has proposed setbacks that meet or exceed local zoning regulations and has agreed to demonstrate compliance with the turbine setback requirements in each Town's applicable local law (Hearing Exh. 10, Final Bluestone Certificate Conditions, 58).

The setback distances agreed to for the Facility minimize the potential impacts to public health and safety in the unlikely event of ice throw/shedding, blade throw or tower collapse incidents as outlined in Exhibit 15 of the Application (Hearing Exh. 2, Application Exh. 15(e)). See Section K for further discussion of ice throw/shedding, blade throw or tower collapse.

The Facility will cross two existing natural gas pipelines (Millennium Pipeline and Bluestone Pipeline) and one proposed natural gas pipeline (Constitution Pipeline). The Applicant has made efforts to site turbines away from gas pipelines within the Facility Site and has established a minimum setback from these lines of 841 feet (1.25x fall zone) (Hearing Exh. 7). The Applicant is working with Millennium Pipeline, Bluestone Pipeline, and Constitution Pipeline to enter into crossing agreements to ensure Facility construction and operation does not interfere with the pipeline (Hearing Exh. 10, Final Bluestone Certificate Conditions, 27).

Consistent with the discussion above, the setback analysis presented in Application Exhibit 6 and the Application Update meets the requirements of Article 10 and enables the Siting Board to determine that the proposed Facility has been sited and set back from dwellings, pipelines, and other existing facilities to avoid or minimize the potential risks from blade failure, tower collapse, icing, or other mechanical problems.

E. Electric System Production Modeling

Exhibit 8 of the Application assesses the impact of the proposed Facility on air emissions, energy prices, capacity, output capability, and energy dispatch, analyzing economic and environmental impacts from commercial operation of the Facility relative to a business as usual base case (with the Facility not in service) for the year 2021. The analyses were conducted using ABB PROMOD/Powerbase Versions 11.1 software after consulting with DPS and DEC staff concerning acceptable input data (Hearing Exh. 2, Application Exh. 8, Appendix J [Generation

Dispatch Forecasting Analysis]). Consistent with expectations, both DPS and the Applicant forecast a decrease in statewide wholesale energy market prices for the year 2021 (Tr.1546, L11-20). With respect to air emissions, while the Applicant and DPS Engineering Panel reached different results regarding estimated emission reductions associated with the Project for nitrogen oxides, sulfur dioxide and carbon dioxide, DPS concluded that "[t]he differences between the Applicant and Staff's emission forecasts are reasonable" in light of the "inherent differences in the Production Modeling software and the respective electric system topology databases used" (Tr. 1548, L2-7). The DPS Engineering Panel went on to find that "the Electric System Production Modeling provided by the Applicant is reasonable" (Tr.1548, L17-19). No Party has raised any issue with the conclusions in Application Exhibit 8.

Based on the result of the Electric System Production Modeling summarized in Exhibit 8, the Siting Board can reasonably determine that the Facility will have environmental and economic benefits and is therefore a beneficial addition to or substitution for the electric generation capacity of the State and will serve the public interest (PSL § 168(3)(a) and (3)(b)).

F. Alternatives

The Applicant, DPS, DEC, DAM and the Joint Towns stipulated to the alternatives analysis to be presented and addressed in Application Exhibit 9 of the Application (Hearing Exh. 1, Executed Application Stipulations, 9; Hearing Exh. 2, Application Exh. 9). No Party has raised any issues with the alternative layouts and related analysis included in the original Application nor have any Parties suggested that the Application Update submitted in April 2019 reducing the number of turbines from 33 to 27 will increase the overall environmental impact of the Facility; in fact, the updated layout will decrease impacts to key resources including surface waters and forest lands.

The Applicant presented a 53-turbine alternative layout considered early in the project development process in conjunction with its analysis of alternatives. The alternative layout contemplated using a greater number of smaller turbines to generate 124 MW of electricity. The layout of this alternative was similar to the 33-turbine layout included in the September 2018 Application but included an additional 20 turbines that extended west toward the Town of Windsor and south of Interstate 86. The GE 2.3-116 turbine or an equivalent model would likely have been used if the alternative layout had been selected. The model is rated for 2.3 MW and has a total height of 152 meters (499 feet) (Hearing Exh. 2, Application Exh. 9(c)(4)(ii), Figure 9-1).

The 53-turbine alternative is not preferred because the impacts from this layout are much greater than for either the 33 or the 27-turbine layout. Among other things, the layout would significantly increase key environmental impacts as set forth below:

- The alternative layout would likely have resulted in a 42% increase in vegetation clearing, a 33% increase in soil disturbance (temporary and permanent), and a 61% increase in permanent impacts (i.e., built facilities) as compared to the layout proposed in the original Application (Hearing Exh. 2, Application Exh. 9(c)(4)(ii), p. 19). These impacts were further reduced with the reduction in the number of turbines from 33 to 27 (Hearing Exh. 7, Application Exh. 22(b)).
- Although a precise comparison of wetland impacts of the 53-turbine and 33-turbine layout is not possible because a full wetland delineation was not performed in conjunction with the 53-turbine layout, permanent wetland impacts were estimated to be 61% greater for the 53-turbine layout (Hearing Exh. 2, Application Exh. 9(c)(4)(ii), p. 20).

- The alternative 53-turbine layout was estimated to result in approximately 42% more forest impacts than the 33-turbine layout (Hearing Exh. 2, Application Exh. 9(c)(4)(ii), p. 20). The 27-turbine Application Update layout resulted in an additional 15% reduction in forest clearing as compared to the original 33-turbine layout (Hearing Exh. 7, Application Update Exh. 22(b)).
- Visual impacts would likely differ greatly between the proposed and alternative layout. Although the turbines identified in the Application are significantly taller than those proposed for the alternative layout, the latter would potentially have a larger viewshed and so would be visible from a greater number of visually sensitive resources (Hearing Exh. 2, Application Exh. 9(c)(4)(ii), pp. 21-22).
- The alternative layout would likely have increased noise and shadow flicker impacts compared to the proposed layout based on preliminary receptor data (Hearing Exh. 2, Application Exh. 9(c)(4)(ii), pp. 22-23).

Having decided on the 33-turbine layout, the Applicant engaged in "micro-siting" efforts with the goal of further avoiding and minimizing impacts to environmental resources. These efforts are addressed in Table 9-1 of Application Exhibit 9, and include rerouting access roads, collection lines and other Facility components to avoid direct impacts to wetlands and stone landscape features (Hearing Exh. 2, Application Exh. 9(b)(5), Table 9-1). These efforts continued after submission of the Application and resulted in further reductions in the environmental impacts associated with the Project (Hearing Exh. 7, Application Update, pp. 2, 10-14).

The alternatives analysis presented in Application Exhibit 9 meets the requirements of Article 10 and enables the Siting Board to determine that the proposed turbine layout is best suited to promote public health and welfare as it properly balances siting constraints and minimization of

environmental resource impacts with the generation of the maximum amount of renewable energy to meet the Applicant's objectives and goals and achieve the significant public health and economic benefits of wind energy generation in comparison to other alternatives.

G. Consistency with Energy Planning Objectives

The Facility's consistency with the State's energy planning objectives, in particular the State Energy Law, is set forth in detail in Sections X and XI above.

H. Preliminary Design Drawings

Details relating to the design of the Facility can be found primarily in Application Exhibit 11 of the Application and various accompanying Appendices (Hearing Exh. 2, Application Exh. 11, Appendix E [Buried Collection and Transmission Line Details], Appendix F, [Example Type Certification], Appendix G [Preliminary Operations and Maintenance Plan], Appendix H [Substation Plans and Details], Appendix I [Turbine Brochure Material], Appendix K [Preliminary Design Drawings], Appendix L [Preliminary Turbine Foundation Drawings], Appendix M [Site Plan Schematics], Appendix N [Operation and Maintenance Building Elevation Drawings], Appendix O [Typical Wind Turbine Technical and Safety Manuals]). Key aspects of several of these plans and drawings were amended in response to the Siting Board's November 15, 2018 notice of noncompliance and as part of the Applicant's April 2019 Application Update (Hearing Exh. 4, Attachment G [Revised O&M Facility Site Plan], Attachment H [Elevation Plans]; Hearing Exh. 7, Application Update, Appendix K Update [Preliminary Design Drawings]; Appendix QQQ [Site Layout for Updated Laydown Yard]).

As the above list shows, the Applicant submitted preliminary design drawings for all key aspects of the Facility. The Applicant also submitted detailed Site Plan drawings for the Facility as well as preliminary plans relating to construction and operation of the Facility and a preliminary

list of applicable engineering codes, standards, guidelines and practices. Finally, the Applicant submitted various construction-related plans and documents. Several of these documents were revised in response to non-compliance notices issued by DPS and updated as part of the April 2019 Application Update (Hearing Exh. 4 and 7). The Applicant has agreed to provide final facility design plans in accordance with the agreed upon Certificate Conditions and SEEP Guidance Document (Hearing Exh. 10 and 11, Finale Bluestone Certificate Conditions & Final Appendix A Bluestone SEEP). The Facility has been designed to meet the design and construction standards set forth in the Application, as updated, subject to the Certificate Conditions and SEEP Guidance Document.

I. Construction

Pursuant to 16 NYCRR § 1001.12, the Applicant developed a preliminary Quality Assurance and Control Plan ("QA/QC Plan") demonstrating how the Applicant will monitor and assure conformance of Facility installation with all applicable design, engineering and installation standards and criteria (Hearing Exh. 2, Application Exh. 12(a), Appendix P [Preliminary QA/QC Plan]). The final QA/QC Plan is site specific and will not be developed until the balance of plant (BOP) contractor has been selected and the Facility is proceeding with construction (*Id.*).

As part of the Application, Bluestone Wind assessed the potential impact of the Facility on utility systems, pipelines, electrical and communications transmission infrastructure, and gas wells within the Facility Site. As a preliminary matter, the Applicant has committed to siting Facility wind turbines at a minimum setback distance of 841 feet (1.25x fall zone) for substations, transmission lines (115kV and greater), and natural gas pipelines (Hearing Exh. 7, Application Update Exh. 6, Table 6-2). In addition, all construction and maintenance work that requires

excavation will follow the appropriate one-call/Dig Safely New York procedures (Hearing Exh. 2, Application Exh. 12(b)).

The Applicant reviewed publicly available databases and consulted with local municipalities and other stakeholders, and no underground facilities, such as public water or sewer lines, were identified near proposed ground disturbances (Hearing Exh. 2, Application Exh. 12(c)).

With respect to pipelines, the Facility will cross two existing natural gas pipelines (Millennium Pipeline and Bluestone Pipeline) and one proposed natural gas pipeline (Constitution Pipeline). The Applicant has made efforts to site turbines away from gas pipelines within the Facility Site and has established a minimum setback from these lines of 841 feet (1.25x fall zone) (Hearing Exh. 7, Application Update Exh. 6, Table 6-2). The Applicant is working with Millennium Pipeline, Bluestone Pipeline, and Constitution Pipeline to enter into crossing agreements to ensure Facility construction and operation does not interfere with the pipeline (Hearing Exh. 10, Final Bluestone Certificate Conditions, 27).

Based on the layout in the original Application, Facility collection lines will cross NYSEG distribution lines at 25 locations and Facility access roads will cross NYSEG distribution lines at 8 locations. As all Facility collection lines will be below ground and all NYSEG distribution lines are above ground, no interference between the two are anticipated and no interference avoidance measures have been identified by NYSEG. With respect to access roads, the Application identifies various measures to prevent interference with transmission lines during transportation of Project components (e.g., field investigation/mitigation to address transmission/distribution lines along haul routes; design software to ensure OS/OW vehicles do not interfere with transmission or distribution poles) (Hearing Exh. 2, Application Exh. 12(c)(2)).

As with the NYSEG distribution lines, all telecommunication distribution lines appear to be carried overhead. Potential interference between these overhead telecommunications lines and OS/OW vehicles traveling through the Facility Site will be mitigated using the same measures outlined for electric transmission and distribution lines (Hearing Exh. 2, Application Exh. 12(c)(3)).

The Applicant identified one gas well within the Facility Site. However, based on DEC spatial data, it was determined that this well and other wells near the Facility Site, are inactive and have had their fees refunded. Accordingly, consultation and coordination to avoid impacts is not necessary (Hearing Exh. 2, Application Exh. 12(c)(4)).

Going forward, the Applicant has agreed to various Certificate Conditions relating to utility concerns, including: Certificate Condition 27 (requiring outreach to pipeline owners), Certificate Condition 44 (requiring as built plans relating to pipeline crossings), and Certificate Condition 50 (requiring final Emergency Action Plan to address pipeline concerns) (Hearing Exh. 10, Final Bluestone Certificate Conditions).

In addition, the Applicant developed a preliminary Complaint Resolution Plan to establish a procedure for responding to complaints during and after construction (Hearing Exh. 2, Application Exh. 12(d), Appendix R [Complaint Resolution Plan]). The Applicant has agreed with DPS to file a Final Complaint Resolution Plan that addresses complaints during the construction and operation phases of the Project. The plan will address complaint reporting and resolution procedures for all construction and operation issues (Hearing Exh. 10, Final Bluestone Certificate Conditions, 49).

The preliminary QA/QC Plan, the preliminary Complaint Resolution Plan, and the agreed upon Certificate Conditions allow the Siting Board to find that construction of the Facility will

follow all applicable design, engineering and installation standards and criteria and that impacts to utilities have been avoided and minimized to the maximum extent practicable.

J. Exhibit 13 – Real Property

Pursuant to 16 NYCRR § 1001.13, the Applicant provided real property data for the Facility Site, including data for all proposed interconnection facilities and associated access roads/laydown areas. The Applicant also provided information regarding the Applicant's lease agreements (Hearing Exh. 2, Application Exh. 13). Certificate Condition 28 requires the Applicant to provide documentation demonstrating that all necessary agreements for use of the Facility Site are in place (Hearing Exh. 10, Final Bluestone Certificate Conditions, 28).

No party has raised any issues with respect to the Applicant's ability to obtain land control for the Facility. The information contained in Application Exhibit 13, as supplemented by Certificate Condition 28, allows the Siting Board to reasonably determine that the Applicant has obtained or will obtain control over all land required for the Facility Site and all interconnections.

K. Exhibit 14 – Cost of Facilities

Pursuant to 16 NYCRR § 1001.14, the Applicant provided an estimate of the total capital costs of the Facility, including documents that describe the assumptions in estimating the total capital costs (Hearing Exh. 2 and 3, Application Exh. 14, Appendix S [Cost Estimates]). No issues relating to Facility costs have been raised by the Parties, and the documents supplied provide the Siting Board with sufficient information regarding the cost of the Facility to satisfy the Article 10 regulations.

L. Exhibit 15 – Public Health and Safety

1. Blade Throw and Tower Collapse

A potential public safety concern identified in the Application is the possibility of a wind turbine tower collapsing or a rotor blade dropping or being thrown from the nacelle. While extremely rare, such incidents have occurred; however, to the best of the Applicant's knowledge, no member of the public has ever been injured as a result of these incidents and local setbacks have proved to be sufficient to protect area homes and public roads (Hearing Exh. 2, Application Exh. 15(e)(1)). The reasons for tower collapse or blade throw vary depending on conditions and tower type. The main causes of blade and tower failure are a control system failure leading to an over speed situation, a lightning strike, or a manufacturing defect in the blade. Technological improvements and mandatory safety standards during turbine design, manufacturing, and installation, and wind turbine design certification and type approval, have significantly reduced the instances of blade throw (*Id.*).

Modern utility-scale turbines are certified according to international engineering standards. These include ratings for withstanding different levels of hurricane-strength winds and other criteria. The wind turbines under consideration for the Project will meet all applicable engineering standards. In particular, they will be equipped with state-of-the art braking systems, pitch controls, sensors, and speed controls, all of which greatly reduce the risk of blade throw. In addition, it is anticipated that the turbines will be equipped with two fully independent braking systems that allow the rotor to be brought to a halt under all foreseeable conditions and that the turbines will automatically shut down at wind speeds over the manufacturer's threshold. The turbines will also cease operation if significant vibrations or rotor blade stress is sensed by the monitoring systems. For all of these reasons, the risk of catastrophic blade throw is low (Hearing Exh. 2, Application Exh. 15(e)(1)). The Applicant has agreed to Certificate Conditions to document for the Siting Board that the turbines selected for the Facility will meet these design standards and commit to

providing certain manufacturer safety and operational manuals (Hearing Exh. 10, Final Bluestone Certificate Conditions, 32-34 and 142). These measures are sufficient to assure that the risks associated with tower collapse and blade throw have been avoided or minimized to the maximum extent practicable.

2. Ice Shedding and Ice Throw

Another potential public health impact associated with the operation of wind turbines is ice shedding or ice throw (Hearing Exh. 2, Application Exh. 15(e)(3)). Ice shedding and ice throw refer to the phenomena that can occur when ice accumulates on rotor blades and subsequently breaks free and falls to the ground. Although a potential safety concern, no serious accidents caused by ice being "thrown" from an operating wind turbine have been reported. The risk of ice landing at a specific location is found to drop dramatically as the distance from the turbine increases. Studies identified in the Application have shown that ice fragments typically land within 410 feet (125 meters) of the wind turbine. The "Wind Turbine Health Impact Study" prepared by an independent expert panel for the Massachusetts Department of Public Health concluded that "ice is unlikely to land farther from the turbine than its maximum vertical extent" (Ellenbogen et al., 2012) (*Id.*). Since all of the applicable setbacks are greater than the proposed turbine height, any risk associated with ice throw has been minimized to the extent practicable. Moreover, the Applicant is not aware of any reported injury caused by ice being thrown from a turbine (Hearing Exh. 2, Application Exh. 15(e)(3)).

M. Exhibit 17 – Air Emissions

One of the significant benefits of wind powered electric generation is that wind turbines generate electricity without combusting fuel or releasing pollutants into the atmosphere. The

Facility, once constructed, thus will not adversely affect air quality or contribute to the problem of global climate change (Hearing Exh. 2, Application Exh. 17).

During the construction phase, the Facility may result in minor, temporary adverse air impacts resulting from vehicle emissions, dust from earthmoving activities and travel on unpaved roads, and emissions from the concrete batch plant and fossil fuel-fired generators (Hearing Exh. 2, Application Exh. 17). However, the Facility will have an overall positive impact on air quality and will contribute to meeting New York's climate change and renewable energy goals.

N. Exhibit 18 – Safety and Security

To ensure the safety of construction and operations personnel, as well as the security of the Facility, the Applicant has developed and will implement plans for site security, worker safety, and emergencies (Hearing Exh. 2, Appendix U [Preliminary Site Security Plan (SSP), addressing site security measures during construction and operation of the Facility]), Appendix V [Preliminary Emergency Action Plan (EAP), addressing measures to be taken in response to emergencies at the Facility], and Appendix W [Preliminary Health and Safety Plan (HASP), addressing measures to be implemented to protect worker safety during construction and operation of the Facility]). The Applicant revised Appendix U and V in response to concerns raised by DPS in their November 15, 2018 notice of Application deficiencies (Hearing Exh. 4, Application Supplement Attachments I and J).

To ensure the necessary safety and security measures are in place, the Applicant and DPS have agreed to the following Final Bluestone Certificate Conditions in Hearing Exhibit 10 addressing safety and security issues:

- Requiring preparation of final SSP, EAP and HASP (Certificate Conditions 50,[35] 51 & 52);
- Requiring Project Communications Plan as part of the Facility Environmental Compliance and Monitoring Plan identifying the Certificate Holder's construction organization structure, contact list, and protocol for communications between parties (Certificate Condition 47); and
- Requiring preparation of a Facility Exterior Lighting Plan prior to commencement of construction of the O&M building, collection substation and POI switchyard (Certificate Condition 54).

The information and safety plans presented in Exhibit 18 of the Application, along with the above-referenced Certificate Conditions, enable the Siting Board to reasonably determine that the proposed Facility has appropriate safety and security measures in place to protect public health and safety.

O. Exhibit 20 – Cultural Resources

The impact of construction and operation of the Facility on cultural, historic and recreational resources is addressed in Application Exhibit 20 (Hearing Exh. 1, Application Exh. 20, Appendix Z [Phase 1B Archaeological Survey Report], Appendix AA [Unanticipated Discovery Plan], Appendix BB [Stone Landscape Features Memo], Appendix CC [Phase 1A Archaeological Survey and Phase 1B Work Plan], Appendix DD [Phase IA Historic Architectural Survey and Work Plan], Appendix EE [Historic Resources Survey Report], Appendix FF [Historic Resources Effects Analysis], and Appendix GG [Preliminary Cultural Resources Mitigation

[35] DPS took exception to Certificate Condition 50. However, it is unclear from the testimony what concerns Staff has with the condition.

Plan]). Consistent with 16 NYCRR § 1001.20 and the OPRHP *Guidelines for Wind Farm Development Cultural Resources Survey Work* (OPRHP, 2006) (the "SHPO Wind Guidelines"), the Applicant consulted with OPRHP to develop the scope and methodology for the resource studies conducted for the Facility and included with the Application.

1. Archaeological Resources

With respect to archaeological resources, the Applicant initiated formal consultation with OPRHP in March 2017 and prepared a Phase 1A Archaeological Resources Survey and Phase 1B Fieldwork Plan to define the Facility's Area of Potential Effect ("APE") with respect to archaeological resources, to determine whether previously identified resources are located in the APE, and to propose a methodology to identify additional resources (Hearing Exh. 2, Application Exh. 20(a)(2), Appendix CC). The Applicant followed up with a Phase 1B Archaeological Resources Study consisting of a site walkover and shovel testing in areas where proposed Facility components are located in proximity to structures depicted on historic maps and areas deemed to have high sensitivity for Pre-Contact Native American archaeological material (Hearing Exh. 2, Application Exh. 20(a)(3), Appendix Z).

As part of its archaeological review, the Applicant consulted with the Oneida and Delaware Indian Nations on issues of concern to the nations, including the presence of so-called "stone landscape features". SLFs are a type of cultural feature made from stacked, aligned, modified or otherwise culturally significant stones. These features, once attributed entirely to historic-period agricultural land clearance, have recently been recognized throughout the eastern United States as being potentially of Native American origin and may be considered sacred or otherwise significant (Hearing Exh. 2, Application Exh. 20(a)(1)).

Based on this review, the Applicant identified 22 archaeological resources on the Facility Site – 20 potentially Pre-Contact SLF sites consisting of 66 individual SLFs, one Pre-Contact Native American lithic scatter, and one historic period farmstead. The 20 SLF sites and the historic period farmstead are unevaluated with regard to the State/National Register of Historic Places ("S/NRHP") while the Pre-Contact lithic scatter is recommended not eligible for the S/NRHP (i.e., non-significant) (Hearing Exh. 2, Application Exh. 20(a), Appendix CC).

The locations of the SLF sites were shared with the Applicant and their design engineers who redesigned the Facility to avoid impacts to these features where possible. In addition, the Applicant consulted with representatives of various Indian nations concerning the SLF issue. The Applicant also visited four SLF sites with representatives of the Oneida Indian Nation, DPS, the Public Archaeology Facility at Binghamton University, and others, and discussed possible measures to avoid or mitigate impacts to SLFs. Due to these efforts, the Applicant was able to avoid 19 of the 20 SLF sites entirely and minimize impacts to the single remaining site, Site JL-3. As a result, 62 of the 66 individual SLFs have been avoided as has the historic period farmstead site. Going forward, the Applicant is continuing to consult with the New York State Historic Preservation Office ("SHPO"), the stakeholders identified in the Phase 1B Archaeologic Survey Report, and others, to further avoid, minimize or mitigate impacts to SLFs (Hearing Exh. 2, Application Exh. 20(a)(1), (4), Appendix BB & CC).

As previously noted, the Applicant submitted an updated Application in April 2019 that included various changes in the Facility layout, including a reduction in the maximum number of turbines from 33 to 27. This change resulted in a reduction in the overall property disturbance as compared to the original Application layout. However, the revised layout moved some Facility components to areas not reviewed during the Phase 1B archaeological survey. The Applicant

therefore conducted an additional pedestrian reconnaissance to identify possible SLFs and/or extant historical-period foundations; no such features were identified (Hearing Exh. 7, Application Update).

Going forward, to prevent impacts, mapped locations of archaeological sites within 100 feet of proposed Facility-related impacts will be identified on construction drawings and marked in the field by construction fencing with signs restricting access (Hearing Exh. 11, SEEP Section A, Subsection 10(b)). If a potentially significant archaeological resource is discovered within the APE, the Applicant will attempt to relocate the component to avoid the impact; if the impact cannot be avoided, then a Phase 2 archaeological investigation will be conducted in accordance with OPRHP guidance (Hearing Exh. 2, Application Exh. 20(a)(1)). If unanticipated archaeological resources are discovered, the Applicant will implement its Unanticipated Discovery Plan, which will include provisions to stop all work in the vicinity of the archaeological finds until those resources can be evaluated and documented by a Registered Professional Archaeologist ("RPA") (Hearing Exh. 2, Application Exh. 20(a)(6), Appendix AA).

No parties have identified issues relating to the potential archaeologic impacts associated with the Facility. The information included in the Application and the Phase 1B archaeological survey permits the Siting Board to find that the Facility has avoided, minimized and mitigated potential impacts on archaeological resources to the maximum extent practicable.

2. Cultural/Historic Resources

The Applicant also conducted a comprehensive assessment of the impact of the Facility on cultural/historic resources. Cultural resource surveys for the Facility included a Historic Resources Survey, which was submitted to the OPRHP/SHPO and summarized in Exhibit 20 of the Application. The survey inventoried structures and buildings within the APE identified as being

50 years or older, and provided basic information about their architectural style, features, current integrity, and identification for purposes of determining whether the structures/buildings warrant consideration for eligibility for listing on the S/NRHP (Hearing Exh. 2, Application Exh. 20(b)(1), Appendix DD & EE).

As described in the Historic Resources Survey Report and Exhibit 20 of the Application, the Facility will have no physical impacts to the identified historic architectural resources (i.e., no historic structures will be damaged or removed) (Hearing Exh. 2, Application Exh. 20(b)(1), Appendix EE). The Facility's only potential effect on historic properties would be a change in the property's visual setting resulting from the introduction of wind turbines (*Id.*).

Of the 46 resources identified as historic architectural resources in the September 2018 Application, 2 properties located in the APE are listed on the S/NRHP. An additional 8 properties within the APE were previously recommended as S/NRHP eligible by the OPRHP. After considering recommendations from the Applicant's consultant, OPRHP determined that a total of 25 properties should be classified as S/NRHP eligible (Hearing Exh. 2, Application Exh. (b)(1), Appendix EE).

Of the 25 properties within the APE determined by OPRHP to be S/NRHP eligible, the viewshed analysis indicates that a total of 9 will have no views of the Facility. At the other end of the spectrum, 2 properties will potentially have views of between 16 and 23 proposed turbines while an additional 5 properties will potentially have views of between 4 and 10 proposed turbines. However, actual Facility visibility is likely to be more limited due to limitations in the viewshed mapping process. The nearest S/NRHP-eligible property to the proposed collection and POI substations is located 2.1 miles to the south. Based on the viewshed analysis, no historic properties will have views of the substations (Hearing Exh. 2, Application Exh. 20(b)(2), Appendix FF).

The Applicant updated its visual impacts analysis to address the changes to the Facility layout as part of the April 2019 Application Update. The APE for indirect (i.e., visual) effects for the revised Facility layout did not contain any new areas of visibility when compared to the September 2018 layout (Hearing Exh. 7, Application Update, Exh. 20(b)).

The next step in the review process under Section 106 of the National Historic Preservation Act, is to wait until the involved federal agency initiates a formal consultation process under this statute. Once this process begins, OPRHP will finalize its review and provide the involved agency with its recommendations on effects and possible mitigation measures.

In anticipation of this process, the Applicant proposed a Cultural Resource Mitigation Plan as part of its Application (Hearing Exh. 2, Application Exh. 20(b), Appendix GG). The Applicant also has stipulated to Certificate Condition 66, which calls for (a) plans to avoid or minimize impacts to archaeological and historic resources to the extent practicable, (b) preparation of a final Unanticipated Discovery Plan, (c) consultation with OPRHP and DPS staff if complete avoidance of archaeological sites is impossible, and (d) preparation of a final Cultural Resources Mitigation and Offset Plan (Hearing Exh. 10, Final Bluestone Certificate Conditions 66). Based on the above, the Siting Board can reasonably determine that the Applicant has avoided, minimized and mitigated impacts to cultural resources to the maximum extent practicable.

P. Geology, Seismology and Soils

As required by 16 NYCRR § 1001.21, the Applicant evaluated the geological and related implications of the Project, including, but not limited to: evaluating existing slopes and contours; assessing cut-and fill activities, including whether materials would need to be imported onto or removed from the Facility Site and describing temporary cut and fill scenarios that will occur during construction; identifying the excavation techniques proposed, including the need for

blasting; evaluating the overall suitability of the site for the Facility; assessing the regional geology, tectonic setting and seismology of the area; and evaluating soil types within the Facility Site and conducting a bedrock analysis. As part of that review, the Applicant conducted a Preliminary Geotechnical Assessment to evaluate the surface and subsurface soils, bedrock and groundwater conditions in the vicinity of the Facility that included collecting test borings at sites in and near the Facility Area. Information relating to soil, cut and fill, and steep slopes is contained primarily in Hearing Exhibit 2, Application Exhibit 21, Appendix JJ, Report of Expected Geotechnical Conditions, and Appendix HH, Preliminary Blasting Plan. In addition, preliminary cut and fill locations, existing and proposed grading, and proposed limits of work are identified in the Preliminary Design Drawings in Application Appendix K.

1. Soils

Terracon-NY, Inc. ("Terracon") conducted a Preliminary Geotechnical Investigation to evaluate the surface and subsurface soils, bedrock, and groundwater conditions within the Facility Site. This investigation included soil borings conducted at a subset of turbine locations and a desktop analysis of on-site conditions. The results of the investigation are summarized in Terracon's Report of Expected Geotechnical Conditions (Hearing Ex. 2, Application Appendix JJ). The Report of Expected Geotechnical Conditions addresses the suitability and limitations of soils for the proposed site development, including excavation stability, erosion hazard, corrosion potential, and foundation integrity. Based on Terracon's findings, the Facility Site is generally suitable for the proposed development because the site soils and bedrock encountered at the Project Site can support structures on shallow spread footing foundations or rock anchor foundations using conventional construction equipment. Although some soil units within the Facility Site are considered acidic and are likely to be corrosive to steel and concrete, this condition can be

addressed using protective coatings or additives. Detailed design requirements will be determined during the final engineering phase (Hearing Exh. 2, Application Exh. 21(h), Appendix JJ). Because soils within the Facility Site have low permeability, the risk of frost action is likely to be moderate to high. However, the turbine foundations will be constructed at a suitable depth below the frost line, eliminating the need for further assessment of frost impacts (Hearing Exh. 2, Application Exh. 21(p) and (r)).

Prior to construction, further geotechnical investigations will be performed to verify subsurface conditions at each turbine location and at other Facility component locations, as necessary, to allow development of final wind turbine foundation and electrical design, and the design of other Facility components, as necessary (Hearing Exh 10. Final Bluestone Certificate Conditions, 61).

b) *Cut and Fill*

It was estimated in the Application that 587,000 cubic yards of material will be excavated for the construction of the proposed Facility based on 2-foot contours interpolated from publicly available Broome County LIDAR data. Of this amount, approximately 182,000 cubic yards will be topsoil, 376,000 cubic yards will be subsoil, and 29,000 cubic yards will be bedrock (Hearing Exh. 2, Application Exh. 21(c)).

Based on the 33-turbine layout, it was estimated that 455,000 cubic yards of fill (of which 97,000 cubic yards will be gravel) will be used in the construction of the Facility. Fill will be used to create appropriate grades for access roads, crane pads, substations, the O&M facility, and laydown areas. Except for gravel, fill will be derived from excavated material. No non-gravel fill will be imported. Gravel will be brought into the Facility Site and used as surface material for access roads, crane pads, met tower pads, and other Facility components. A total of 97,000 cubic

yards of gravel will be needed to surface Facility access roads, crane pads, substations, met tower pads, and the laydown/O&M/batch plant area. The approximate length of all Facility access roads is 16 miles. The original Application assumed that the roads would be a minimum of 16 feet wide, with gravel 12 inches deep; however, the Application Update submitted in April 2019 increased the proposed road width from 16 to 20 feet to comply with turbine manufacturer requirements. Crane pads will be 100 feet by 65 feet and gravel will be 12 inches deep (Hearing Exh. 2, Application Exh. 21(d); Hearing Exh. 7, Application Update, p. 2).

This Project will involve excavation of soil and bedrock for the installation of foundations for supporting wind turbines. The excavation consists of mass removal of materials for constructing mat foundations, or drilling holes of various diameter and depth for the installation of foundations to support steel structures. Mechanical excavation (e.g., pneumatic hammer, large ripper) may be possible for some of the rock encountered but, in many cases, blasting will generate less noise and take less time. A Preliminary Blasting Plan has therefore been prepared (Hearing Exh. 2, Application Exh. 21(i) & Appendix HH). Prior to construction, the blasting contractor will be responsible for generating a final site-specific Blasting Plan. All blasting operations will follow the Blasting Plan (Hearing Exh. 10, Final Bluestone Certificate Conditions, 62).

All blasting operations adjacent to residences, buildings, structures, utilities or other facilities will be carefully planned with full consideration for all forces and conditions involved. The minimum amount of blasting material will be used to effectively fracture the competent rock for the excavation depth. Independent monitoring of vibration and air concussion levels will be carried out by the contractor during all blasting operations. Any necessary blasting will be overseen by the third-party Environmental Monitor (Hearing Exh. 2, Application Exh. 21(k)).

Pre and post-blasting well surveys will be conducted. Structural, water quality, and water quantity investigations of any wells located within 1,000 feet of blasting activities before (to establish baseline quality and quantity) and after blasting will be conducted. Impacts identified through these investigations will be addressed on a case-by-case basis and appropriately mitigated (Hearing Exh. 10, Final Bluestone Certificate Conditions, 45). As part of the Applicant's Final Design Drawings, a blasting setback map will be developed and submitted (Hearing Exh. 11, Final Appendix A Bluestone SEEP, Section B.13).

Given the above, the Siting Board can determine that adverse environmental effects of the construction of the Facility related to cut and fill activities and blasting have been minimized or avoided to the maximum extent practicable.

c) Slopes

Although construction on steep slopes (i.e., more than 15 percent) will be avoided to the extent practicable by siting access roads and wind turbines in a linear fashion along the ridgelines, some construction in areas of steep slopes is unavoidable. The steepest slopes are associated with the electrical collection system, whereas slopes associated with the access roads, turbines, and the associated substations and O&M facility range generally from 0% to 31% (Hearing Exh. 2, Application Exh. 21(a)).

Jeremy Flaum, Utility Analyst 3, DPS Office of Electric, Gas and Water, raised concerns with several locations where buried collection lines will be installed along and across steep slopes (Tr.1401-1402). In response the Applicant has agreed to provide details of its proposed erosion controls where electric collection lines will be installed by trenching along and across steep slopes (rather than via HDD, direct embedment, or "plowing-in") (Hearing Exh. 11, Final Appendix A Bluestone SEEP, Section B.5(a)). The details will specify measures to address temporary erosion,

including stormwater events with an open trench, and permanent erosion risks, including "piping" erosion after backfilling of the trench for the life of the Facility (*Id*.).

Construction of the Facility could result in some siltation and sedimentation in streams adjacent to steep uplands. However, these impacts are anticipated to be minor because the Applicant will take measures to avoid and minimize siltation, including developing and implementing a SWPPP (Hearing Exh. 2, Application Appendix KK). In addition, the use of HDD will minimize impacts to DEC protected stream reaches, and typical BMPs will be implemented (e.g., appropriate drilling setbacks from surface waters, use of erosion and sediment control measures, etc.). Additionally, the Applicant prepared an Inadvertent Return Plan (Hearing Exh. 2, Application Appendix II) intended to minimize the potential for a frac-out associated with HDD activities. A final Plan will be prepared by the Applicant's contractor prior to the installation of HDD crossings (Hearing Exh. 10, Final Bluestone Certificate Conditions, 71). For further analysis of impacts to streams see Section VI. C of this brief.

Environmental impacts associated with cut and fill activities and the construction of Facility components on steep slopes will be minimized as follows consistent with the Certificate Conditions and SEEP Guidance Document (Hearing Exh. 10, Final Bluestone Certificate Conditions; Hearing Exh. 11, Final Appendix A Bluestone SEEP):

- A Final Detailed Geotechnical Engineering Report will be prepared prior to construction (Certificate Condition 61);
- In locations where electric collection lines will be installed by open trenching, particularly along or across areas of steep slopes, the Applicant will follow the measures outlined in SEEP Guidance Document Section B.5(a);

- In locations where electric collection lines will be installed by trenchless technologies, the Applicant will follow measures outlined in SEEP Guidance Document Section B.5(a) and in the final Inadvertent Return Plan (Certificate Condition 71);
- Implementation of SWPPP (Hearing Exh. 2, Application Exh. 23(c));
- Implementation of the final Blasting Plan (Certificate Condition 62); and
- Appointment of an Environmental Monitor to oversee construction of the Facility and ensure all agreed-upon measures to protect the environment are implemented (Certificate Condition 85).

The concerns identified by Jeremy Flaum, Utility Analyst 3, DPS Office of Electric, Gas and Water have been resolved and the Applicant believes that no further geology-related issues remain. The areas of agreement are set forth below:

- Mr. Flaum recommended that additional geotechnical investigations should be performed prior to final design and construction of the Facility at final turbine locations (Tr.1398) and in areas where blasting and HDD is proposed (Tr.1398-1399). The Applicant agreed with these recommendations (Tr.1995). The Applicant also agreed that that this information will be documented in the final Geotechnical Engineering Report, which will be included with the SEEP and that these commitments and recommendations are consistent with Certificate Condition 61 (*Id.*);
- The Applicant agreed with Mr. Flaum's recommendation that it implement mitigation measures to protect steel and concrete from corrosion due to acidic soils (Tr.1398); and
- Mr. Flaum recommended various measures to address construction on steep slopes (Tr.1401-1402). In response, the Applicant noted that it will issue a final SWPPP per the New York State Standards for Erosion and Sediment Control that will be included

in the SEEP document. In addition to the SWPPP, the Applicant agreed to provide site-specific details for areas where construction occurs on steep slopes, including trench plus, breakers, and/or other measures to address temporary erosion, including stormwater events with an open trench and permanent erosion risks. The specific control measures proposed will be consistent with those developed by DPS staff and will be provided in the SEEP. These commitments should satisfy Mr. Flaum's concerns (Tr.1996).

As requested by Mr. Flaum, the Applicant has also agreed to coordinate with water well owners as described in Stipulated Certificate Condition 45 to ensure that the exact locations of water supply wells are identified prior to construction (Tr.1996). The Applicant also agrees with Mr. Flaum that appropriate setbacks and other measures for protecting water well quality are included in Stipulated Certificate Condition 45 and that these requirements are consistent with those specified by DOH. In particular, the Applicant has agreed to prohibit blasting within 500 feet of any known, existing active water supply well or water supply intake on a non-participating parcel. The Applicant also agreed to conduct reasonable investigations of active water supply wells or water supply intakes on non-participating parcels within 1,000 feet of any blasting as identified during final design and based on the final geotechnical analysis (Tr.1997).

The Application, in conjunction with the agreed-upon Certificate Conditions discussed above, provide a basis for the Siting Board to conclude that the Applicant has satisfied its obligations under 16 NYCRR § 1001.21 with respect to geology, seismology and soil concerns.

Q. Exhibit 22 – Terrestrial Ecology and Wetlands

1. Ecology

a) <u>Ecology generally</u>

Information about the general ecological impact of the Facility can be found in Exhibits 4 and 22 of the Application and the April 2019 Application Update (Hearing Exh. 2, Application Exh. 4, and 22, Appendix LL [Plant and Wildlife Species Lists]; Hearing Exh. 7, Application Update Exh. 22, including Figure 22-1 Update).

Per the original Application, the primary ecological communities on the 5,657-acre Facility Site are forestland (4,900 acres), successional old field (404 acres), and cropland/hayfield (250 acres) (Hearing Exh. 2, Application Exh. 22(a)(1)). Impacts to plant communities from construction and operation of the Facility include vegetation clearing and disturbance from construction and permanent loss of vegetated habitats by conversion to built facilities. Landowners can continue to use areas of the Facility Site other than built areas for compatible uses once construction is complete (Hearing Exh. 2, Application Exh. 22(b)).

Per Table 22-3 Updated, included in the April 2019 Application Update documenting the reduction from 33 to 27 turbines, a total of up to 390.5 acres of vegetation is proposed to be disturbed by Facility construction (approximately 6.9% of the Facility Site). Of this area, 335 acres of vegetation (or 86% of the disturbed area) will be temporarily disturbed, including areas where collection line is buried underground, construction staging areas, and the margins of access roads and turbine construction workspaces. Approximately 54.6 acres of vegetation will be permanently converted to built facilities, which represents less than 1% of the Facility Site. The reduction in the number of turbines from 33 to 27 resulted in a 58.5-acre (15%) reduction in forest clearing as compared to the layout in the original Application. Permanent vegetation impacts are relatively unchanged (Hearing Exh. 7, Application Update Exh. 22(b)).

Temporary and permanent impacts to vegetation communities will not result in extirpation or significant reduction in any ecological community type (Hearing Exh. 2, Application Exh.

22(b)(1), p. 9). In addition, no state-listed plant species or significant ecological communities were identified on the Facility Site (Hearing Exh. 2, Application Exh. 22(d)(1)).

The Applicant avoided, minimized and mitigated impacts to vegetation through careful site planning, including siting access roads on existing roads, farm lanes, logging roads and utility rights-of-way wherever possible and confining areas of disturbance to the smallest feasible area. In addition, the Applicant will implement an SWPPP and other measures to avoid, minimize and mitigate impacts to vegetation associated with erosion and sediment (Hearing Exh. 2, Application Exh. 22(c)). Long term, vegetation will be managed in accordance with a Facility and Corridors Management Plan and a Facility Vegetation and Herbicide Use Plan (see Hearing Exh. 10, Final Bluestone Certificate Conditions, 72 & 74). In addition, an Environmental Monitor will conduct inspections of all areas requiring environmental compliance during construction activities, with an emphasis on activities occurring in sensitive areas (Hearing Exh. 10, Final Bluestone Certificate Conditions, 85-87). These measures will ensure that Facility construction and operation does not adversely impact protected plants, significant ecological communities or vegetation generally.

Under these circumstances, the Siting Board can reasonably conclude that adverse environmental effects of the construction and operation of the Facility related to ecology generally as described above will be avoided or minimized to the maximum extent practicable in accordance with PSL § 168(2)(a) and (3)(c).

b) *Invasive species*

ECL Article 9 provides DEC with the authority to review projects for any risks posed by invasive species to the State's environment, including the detrimental effect upon the State's "fresh and tidal wetlands, water bodies and waterways, forests, agricultural lands, meadows and grasslands, and other natural communities and systems." ECL § 9-1701. Invasive species are

addressed in Exhibits 22(b)(2)-(3) and (p) and 23(e) of the Application as well as in the December 2018 Application Supplement (Hearing Exh. 2, Application Exh. 22 and 23, Appendix MM [Invasive Species Survey Baseline Report ("Baseline Report")], Appendix NN [Invasive Species Control Plan ("ISCP")]); Hearing Exh. 4, Application Supplement Exh. 22, Attachment Q [Revised Baseline Invasive Species Survey Figures]).

As discussed in Exhibit 22(b)(2) of the Application, the Applicant conducted a survey of invasive species in June and July 2018, the results of which are in the Baseline Report included as Appendix MM of the Application. A map depicting the distribution and density of invasive species documented within the Facility Site is included in the Baseline Report and Attachment Q to the Application Supplement. The Baseline Report identified seven different invasive plant species prohibited or regulated by the DEC. As indicated in the ISCP, a second survey will be conducted prior to construction. Data collected during these surveys will serve as a baseline against which post-construction conditions will be compared (Hearing Exh. 2, Application Exh. 22(b)(3)).

As indicated in the Baseline Report included in the Application, approximately 12% of the anticipated areas of disturbance for the Facility contains existing populations of plant species listed as "regulated' by DEC. Invasive species were primarily found in previously disturbed areas such as roadsides, quarries, logging roads, and utility rights-of way, and were absent from interior forests. The most common species are Morrow's honeysuckle, multiflora rose, and Japanese knotweed. The location and density of these species is depicted in the Applicant's Baseline Report; invasive species occur throughout the survey area at varying densities. No invasive species of insects were recorded during on-site surveys. However, the emerald ash borer and hemlock wooly adelgid are known to occur in Broome County (Hearing Exh. 2, Application Exh. 22(b)(2), Appendix MM).

Invasive species typically establish most readily in places where soil has been disturbed and vegetation removed through the movement of topsoil, fill, gravel, and construction equipment. To address this concern, the Application includes an ISCP, which summarizes the Applicant's proposed invasive species control measures, including: educating workers on invasive species issues, inspection of construction materials, targeted species treatment and removal, sanitation of construction equipment, and site restoration (Hearing Exh. 2, Application Exh. 22(b)(3)).

Because some invasive species, such as Japanese knotweed, can spread rapidly, the ISCP indicates that a second pre-construction survey will be performed. This will occur within the growing season prior to the commencement of construction to verify the distribution of invasive species documented in the Baseline Report. If the changes in invasive plant communities are significant, an updated ISCP will be prepared. Post-construction monitoring will also take place once the Facility is operational. If the monitoring shows that invasive coverage within the Facility Site has increased, the ISCP must be revised to ensure the control measures are sufficient to prevent further spread (Hearing Exh. 2, Application Exh. 22(b)(2), (3)).

The Applicant has stipulated to various Certificate Conditions to address invasive species concerns. As noted above, the Applicant will finalize and implement the ISCP for the Project (Hearing Exh. 10; Final Bluestone Certificate Conditions, 73) and fund an independent third-party Environmental Monitor to oversee compliance with environmental commitments, including those related to invasive species control during construction (*Id.*, Bluestone Certificate Conditions, 85-87). As set forth in Certificate Condition 73, a post-construction monitoring program ("MP") will be conducted in year 1, year 3, and year 5 following completion of construction and restoration to collect information to facilitate evaluation of the ISCP effectiveness. At the conclusion of the MP, a report will be submitted to DPS Staff, DEC, the Towns and DAM, and filed with the Secretary,

that assesses how well the goal of no net increase of invasive species has been achieved. If a report concludes that ISCP goals are not being met, the Certificate Holder, DPS, DEC and DAM will meet to review treatment measures to achieve the goal of no net increase of invasive species and develop a plan for implementing remedial actions to treat and control for invasive species if appropriate (*Id.*, Final Bluestone Certificate Conditions, 73).

Under these circumstances, the Siting Board can reasonably find that the adverse environmental effects of the construction and operation of the Facility related to invasive species have been avoided or minimized to the maximum extent practicable consistent with PSL § 168(2)(a), (3)(c).

c) Forests, including Forest Fragmentation

The impact of construction and operation of the Facility on forests is addressed in Exhibits 4 and 22 of the Application and April 2019 Update (Hearing Exh. 2, Application Exh. 4 & 22; Hearing Exh. 7, Application Update Exh. 22). For the purposes of the Article 10 Application, plant communities and vegetation occurring within the Facility Site were determined using National Land Cover Data ("NLCD") information, which is compiled by USGS (Homer et al., 2015), and verified during field surveys conducted in 2018. Regarding the Facility Site, approximately 4,900 acres (87%) are forested. Of this amount, approximately 44.6 acres of forest will be converted to built facilities (i.e., access roads, turbines, etc.) and 76.7 acres of forest will be permanently converted to a successional state (i.e., cleared and maintained as successional communities for the life of the Project). A total of 207.6 acres of forest will be temporarily disturbed but allowed to reforest following post-construction soil stabilization; ecological succession will restore the forested condition of these areas with time (Hearing Exh. 2, Application Exh. 22(a)(1), (b)(1)). As

noted in Section VI. A above, the April 2019 Application Update layout and design would result in a 58.5-acre reduction in forest clearing as compared to the original Application layout.

In designing the Facility, the Applicant avoided areas of forest to the maximum extent practicable through measures such as burying underground collection lines in areas of existing disturbance (e.g., existing forest logging roads), co-locating access roads with existing roads and farm lanes, and confining disturbance to the smallest area possible (Hearing Exh. 2, Application Exh. 22(c)).

Application Exhibit 22 includes a detailed analysis of the impact of the Facility on forest fragmentation (Hearing Exh. 2, Application Exh. 22(f)(3), Appendix RR [Habitat Fragmentation Analysis]). Forest fragmentation occurs when large blocks of contiguous forest are divided or broken into smaller patches as a result of clearing or canopy removal. Fragmentation may affect the movement, breeding, roosting or nesting behavior of birds and bats, and degrade overall habitat suitability. The Application (including Appendix RR) assessed the impact of the changes to forested habitat and concluded that "it is unlikely that the Facility will cause significant forest fragmentation impacts to bird communities" (Hearing Exh. 2, Application Exh. 22(f)(3)(ii), p. 30). The Applicant will appoint an Environmental Monitor to oversee construction of the Facility and ensure that all agreed-upon measures to protect forests are implemented (Hearing Exh. 10, Final Bluestone Certificate Conditions, 85-87).

As the discussion above shows, the Facility layout minimizes impacts to natural resources, including forests, while maintaining the renewable energy production capability of the Project. Accordingly, the Siting Board should determine that the Applicant has avoided and minimized impacts to forests to the maximum extent practicable consistent with PSL § 168(2)(a) and (c)(3).

2. Wildlife

a. Generally (excluding birds and bats)

The Applicant has set forth in detail the nature of the probable impact of construction and operation of the Facility on wildlife other than birds and bats (Hearing Exh. 2, Application Exh. 22(d)(2), (4), and (5), (e), (f)(1)-(4), (g) and (o), Appendix LL [Plant and Wildlife Species List] and Appendix QQ [Threatened and Endangered Species Database Information]).

As a preliminary matter, the Application includes an inventory of wildlife species in the Project Area. Only one State-endangered or threatened species of wildlife (excluding birds and bats) was identified as occurring or likely to occur within the Facility Site – the timber rattlesnake (*Crotalus horridus*). Although the species was recorded in the vicinity of the Facility Site during the New York State Amphibian and Reptile Atlas Project, it was not observed during on-site surveys. In addition, two threatened species of mussels are found in area; however, only limited suitable habitat is present within the Facility Site. Non-bird/non-bat species of special concern identified as occurring or likely to occur within the Facility Site, include the wood turtle (*Glyptemys insculpta*), eastern box turtle (*Terrapene carolina),* longtail salamander (*Eurycea longicauda*), Jefferson salamander (*Ambystorma jeffersonianum),* and hellbender (*Crytobranchus alleganiensis)* (Hearing Exh. 2, Application Exh. 22(d), Table 22-4).

Construction-related impacts to wildlife will be limited to incidental injury/mortality due to construction activity, habitat disturbance/loss and displacement associated with clearing and earth-moving activities, and displacement of wildlife due to noise and human activities. In addition, aquatic species may be impacted as a result of silt and sedimentation. However, these impacts are not expected to significantly affect wildlife populations. Once construction is complete, the Facility may cause minor disturbance/displacement due primarily to habitat loss. Again, however, these impacts are not expected to significantly affect wildlife populations

(Hearing Exh. 2, Application Exh. 22(f)(2), (3)). With respect to aquatic habitat, only a small fraction of the available aquatic habitat that exists within the Facility Site will be impacted by Facility construction and operation. Although two species of mussels classified as threatened by the State have historically been recorded in the vicinity of the Facility, no suitable habitat for these species will be disturbed by construction or operation of the Facility; sediment impacts will be minimized through implementation of the SWPPP (Hearing Exh. 2, Application Exh. 22(f)(6) & 23(e)).

b) Birds (Excluding Eagles)

The Applicant has set forth in detail the nature of the probable impact of construction and operation of the Facility on birds generally (Hearing Exh. 2, Exhibit 22(d)(3), (f)(3), Appendix LL [Plant and Wildlife Species Lists], Appendix OO [Site Specific Surveys], Appendix PP [DOAS Spring and Fall Raptor Survey Results], QQ [Threatened and Endangered Species Database Information], and Appendix SS [Avian Risk Assessment]). The issues specific to eagles are discussed in Section VI. D above.

Extensive research was conducted to identify protected species that could occur on the Facility Site, including review of numerous federal and State databases and direct observations made on-site by both the Applicant and DOAS (Hearing Exh. 2, Application Exh. 22(d)(3)). No federally threatened or endangered bird species were identified as potentially occurring on the Facility Site. State-listed bird species (excluding the bald and golden eagle) identified as occurring or likely occurring within the Facility Site include two endangered bird species, three threatened species, and one protected species. In addition, 13 bird species of State special concern were identified (Hearing Exh. 2, Application Exh. 22(f), Table 22-4).

Construction-related impacts to birds are anticipated to consist largely of habitat disturbance/loss associated with clearing and earth-moving activities and displacement due to increased noise and human activities. However, potential mortality is expected to be low (Hearing Exh. 2, Application Exh. 22(f)(2)).

Operation-related impacts to birds include direct habitat loss, habitat degradation through forest/grassland fragmentation, disturbance/displacement due to wind turbines, and avian mortality as a result of collisions with operating turbines (Hearing Exh. 2, Application Exh. (f)(3); see section XII(Q)(f) below for a discussion of habitat issues). The impact of habitat disturbance/displacement on forest-breeding birds, water birds, raptors and game birds is not anticipated to result in population level impacts (Hearing Exh. 2, Application Exh. 22(f)(3)(iii)). With respect to avian fatalities due to collisions, 42 of the 63 available studies conducted across the United States reported bird mortality rates of 3.0 birds/MW/year or fewer. At the 10 New York facilities studied, avian fatality rates have ranged from 0.83 birds/MW/year to 2.66 birds/MW/year. Collision risk varies among avian species based on abundance, use of habitat, and behavior, with passerines (songbirds) accounting for the highest percentage of wind-related fatalities. However, no one species has been observed to be impacted disproportionately either nationwide or in the Northeast. Information collected during raptor migration surveys conducted by WEST and DOAS showed relatively lower numbers of raptor observations per hour during fall migration compared to data collected from the nearby Hawk Migration Association of North America raptor migration survey locations. Given relatively low raptor use at the Facility Site and the results of mortality monitoring studies at other New York wind facilities, WEST concluded that "raptor fatality rates at the Facility are expected to be similar to those at other northeastern wind facilities and that the Facility is not expected to adversely impact any raptor species at a

population level." (Hearing Exh. 2, Application Exh. 22(f)(3)(iv), p. 35). The Application includes an analysis of the impacts of construction and operation of the Project on all special status birds (Hearing Exh. 2, Application Exh. 22(f)(5), Table 22-6).

The Facility has been designed to minimize bird collision mortality through various means, including locating collection lines underground to the maximum extent practicable, designing turbine and other lighting to reduce collision risk, and minimizing the use of guy wires and marking them to avoid collisions in accordance with Avian Power Line Interaction Committee recommendations (Hearing Exh. 2, Application Exh. 22(g)(2), p. 50).

To ensure that impacts to bird populations are avoided, minimized or mitigated to the maximum extent practicable, the Applicant, DEC, and DPS have agreed to the following Certificate Conditions (Hearing Exh. 10, Final Bluestone Certificate Conditions):

- Development of a Post-Construction Avian and Bat Monitoring and Adaptive Management Plan (Certificate Condition 70);
- Implementing grassland bird protection measures (Certificate Condition 104);
- Requiring recording/reporting of all observations of threatened and endangered species (Certificate Condition 105); and
- Requiring reporting of the discovery of an active nest of any federally or State-listed threatened or endangered bird species and implementation of posted area requirements (Certificate Condition 106).

Subject to compliance with the aforementioned Certificate Conditions, the adverse environmental effects of the construction and operation of the Facility related to birds have been avoided or minimized to the maximum extent practicable.

c) Habitat

The Applicant has set forth in detail the nature of the probable impact of construction and operation of the Facility on wildlife habitat (Hearing Exh. 2, Application Exh. 22(d)(6), (f), (g), Appendix RR [Habitat Fragmentation Analysis]). Based on that information, the Siting Board should determine that the potential adverse impact on wildlife habitat associated with construction and operation of the Facility will be avoided or minimized to the maximum extent practicable.

As set forth in the Application, a total of 54.6 acres of vegetation will be permanently impacted (i.e., converted to built facilities) as a result of the Project, which represents less than 1% (approximately) of the Facility Site. Facility construction will result in a temporary loss of approximately 335.9 acres of habitat. Of this, approximately 79.6 acres of forest are expected to be converted to successional community and/or maintained for the life of the Facility. This will result in an increase in habitat for early-successional species, many of which are in decline due to factors unrelated to the Facility. Given the relatively small area of lost or converted natural communities, habitat loss/conversion resulting from development of the Facility is not considered significant (Hearing Exh. 2, Application Exh. 22(b)(1), (f)(3)(i)). No significant natural communities or critical habitats were identified within the Facility Site (Hearing. Exh. 2, Application Exh. 22(d)(6)).

Construction and operation of the Facility could have minor adverse impacts on habitat attributable to temporary disturbance during construction and the permanent conversion of a small percentage of the Facility Site to built facilities. However, none of the impacts described in the Application will significantly affect wildlife populations or the extent of forest fragmentation (Hearing Exh. 2, Application Exh. 22(f)(2)-(3)). Moreover, the available evidence indicates that the Facility is unlikely to pose a significant risk of habitat fragmentation impacts to most bird species in the area (Hearing Exh. 2, Application Exh. 22(f)(3), pp. 29-30). The Applicant

minimized impacts related to permanent habitat loss and forest fragmentation through careful site design (locating Facility access roads and collection lines along existing logging roads, the edges of agricultural fields and pipeline rights-of-way). Also, the Applicant will allow cleared forest land along access roads and at the periphery of turbine sites to regenerate to the maximum extent practicable (Hearing Exh. 2, Application Exh. 22(g)(2)).

Based on the Record in this matter, the Applicant has demonstrated that adverse environmental effects of the construction and operation of the Facility related to wildlife habitat have been avoided or minimized to the maximum extent practicable in accordance with PSL § 168(2)(a) and (3)(c).

3. Wetlands

The Applicant has set forth in detail the nature of the probable impact of construction and operation of the Facility on wetlands (Hearing Exh. 2, Application Exh. 22, Appendix VV [Wetland Delineation Report], Appendix WW [Wetland and Stream Impact Drawings]). It also has submitted various plans and agreed to various Certificate Conditions designed to avoid/mitigate impacts to wetlands (Hearing Exh. 2, Appendix II [Draft Inadvertent Return Plan], Appendix KK [SWPPP], and Appendix YY [SPCC Plan]; Hearing Exh. 10, Final Bluestone Certificate Conditions; and Hearing Exh. 11, Final Appendix A Bluestone SEEP). Based on the information provided and the proposed Certificate Conditions with the SEEP Guidance Document, the Siting Board should determine that the potential adverse environmental effects to wetlands have been avoided, minimized or mitigated to the maximum extent practicable.

Wetland delineations at the Facility Site were conducted through on-site field investigations out to 500 feet from the area to be disturbed by the construction of the Facility. The delineations were conducted per the three-parameter methodology described in the USACE

Wetland Delineation Manual (Environmental Laboratory, 1987), and further described by the *Interim Regional Supplement to the USACE Wetland Delineation Manual: Northcentral and Northeastern Region*. The results of the on-site wetland delineations are summarized in Exhibit 22 of the Application and detailed in the accompanying Wetland Delineation Report (Hearing Exh. 2, Application Exh. 22(i), Figure 22-2 and Appendix VV and WW; Hearing Exh. 7, Application Update, Exh. 22, Figure 22-2). A Jurisdictional Determination site visit was held on October 26, 2018 with representatives of the USACE Auburn Field Office, DEC Region 7, and DPS staff. During this meeting, there was general concurrence with the extents of wetland boundaries and no substantive changes to the location of flagged boundaries were requested (Tr.2022, L10-13).

In brief, 64 wetlands totaling approximately 29 acres were delineated within a 200-foot corridor centered on Facility components (Hearing Exh. 2, Application Exh. 22(i)). The locations of the wetlands were mapped and the wetlands characterized based on their community type and wetland function and value (Hearing Exh. 2, Application Exh. 22(j)-(k) & Appendix RR).

New York State regulates freshwater wetlands pursuant to ECL Article 24 and the implementing regulations set forth at 6 NYCRR Part 663. The Applicant concluded – and DEC's wetland expert agreed – that no wetlands regulated under Article 24 or their associated 100-foot adjacent area are located within the Project's boundary (Hearing Exh. 2, Application Exh. 22(i); Tr.1326, L18-21; Tr.2022, L13-15).[36]

The Applicant's wetland analysis suggests that the majority of the delineated wetlands are likely to be hydrologically connected to waters of the United States and are considered to be jurisdictional under Section 404 of the Clean Water Act (Hearing Exh. 2, Application Exh. 22(l)).

[36] The Project will impact a wetland adjacent and contiguous to navigable waters regulated under ECL Article 15 (Tr.1326, L21 to Tr.1327, L1-2; Tr.2028, L15-21 to Tr.2029, L1-5). These impacts are addressed in the discussion of streams in Section VI. C above.

The Applicant submitted a Joint Application for Permit seeking coverage under USACE Nationwide Permit No. 51 to the USACE. The filing of the application for the Water Quality Certification with the DPS Secretary is forthcoming.

During construction, potential direct impacts to federally regulated wetlands and indirect impacts to State and/or federally-regulated wetlands may occur as a result of the installation of access roads and wind turbine foundations, the installation of electrical collection lines, and the development and use of temporary workspaces around the turbine sites and substation. Direct impacts are anticipated to include clearing of vegetation, earthwork such as excavating and grading activities, and the direct placement of fill in wetlands and surface waters to accommodate road crossings. Indirect impacts may result from sedimentation and erosion caused by nearby construction activities (e.g., removal of vegetation and soil disturbance) (Hearing Exh. 2, Application Exh. 22(m)).

These impacts have been avoided or minimized to the maximum extent practicable through site planning and initial Facility component siting efforts and reconnaissance investigations. Over the life of the Project, Facility components have been continually removed or relocated to avoid or minimize both temporary and permanent impacts to surface waters, including wetlands, to the maximum extent practicable. For example, access roads and collection lines to turbines T5 and T6 were completely re-routed to avoid and minimize impacts to wetlands identified during the reconnaissance survey. Also, two turbines in the preliminary design were completely removed to avoid wetland impacts. In addition, various access roads were rerouted to avoid or minimize impacts to wetlands, including wetlands containing vernal pools (Hearing Ex. 2, Application Exh. 22(n)). As a result of these and other measures, the Facility layout in the September 2018 Application – which called for installation of up to 33 turbines – resulted in temporary impacts to

only 1.90 acres of wetlands and permanent impacts to only 0.41 acres of wetlands, with an additional 0.67 acres of permanent forested wetland conversion (Hearing Exh. 2, Application Exh. 22(m), Table 22-7).

As discussed above, in April 2019, the Applicant submitted an Application Update that reduced the total number of turbines from 33 to 27 and made other changes to the Facility layout, including minor shifts of several turbines and other components. These shifts did not result in substantial changes to wetland impacts with the exception of an Article 15 wetland associated with Oquaga Creek, which is discussed in Section VI. C above (Hearing Exh. 7, Application Update Exh. 22).

Measures proposed to avoid or minimize impacts to wetlands going forward include establishing no equipment access areas and restricted activity areas (Hearing Exh. 2, Application Exh. 22(n)). In addition, indirect impacts to wetlands that may result from sedimentation and erosion caused by construction activities (e.g., removal of vegetation and soil disturbance leading to stormwater-related impacts to surface waters) will be minimized through implementation of measures identified in the SWPPP for the Project (e.g., erosion and sediment control practices and daily site inspections). The Applicant also will implement post-construction erosion and sediment control practices identified in the SWPPP (e.g., dry swales, vegetative filters and level spreaders) to minimize indirect discharges once construction of the Facility is complete (Hearing Exh. 2, Application Exh. 22(n), Appendix KK).

To further ensure that the Applicant meets its commitment to avoid and minimize impacts to wetlands to the maximum extent practicable, the Applicant has stipulated to numerous Certificate Conditions as set forth below (Hearing Exh. 10, Final Bluestone Certificate Conditions):

- Appointment of an Environmental Monitor to oversee construction of the Facility and ensure that all agreed-upon measures to protect wetlands are implemented (Certificate Conditions 85-87);
- Requiring pre-construction flagging of sensitive areas, including wetlands and wetland adjacent areas (Certificate Condition 90);
- Implementation of precautions to preclude contamination of wetlands by deleterious materials or construction activities (Certificate Conditions 93-95, 107, 114-116, 118 & 124) and ensure compliance with spill reporting requirements (Certificate Conditions 108 & 117);
- Seeding of disturbed soils in wetlands and associated adjacent areas with native seed mix or crops consistent with existing agricultural uses (Certificate Condition 119);
- Implementation of appropriate wetland restoration measures (Certificate Conditions 120-121 & 130);
- Installation of underground collection lines and access roads using specific methods (Certificate Conditions 111, 112 & 122-123); and
- Implementation of a Final Wetlands Mitigation Plan, and/or confirmation of appropriate wetland mitigation credit through an approved in-lieu fee program, to address permanent wetland impacts (Certificate Condition 131).

In her testimony, Jean P. Foley, Habitat Protection Biologist, DEC Division of Fish and Wildlife, concluded that "no wetlands regulated under Article 24 or their associated 100 foot adjacent area are located within the Project's boundary" and that "the Project, as proposed, does not involve activities regulated by Article 24" of the ECL (Tr.1326, L18-19 and Tr.1327, L13-14). No other party to the proceeding offered any testimony concerning wetland impacts.

By any standard, construction of the Facility will result in minimal wetland impacts. As conceded by DEC, the Project will not impact any DEC wetlands regulated under ECL Article 24. With respect to wetlands generally, the Project will temporarily disturb only 1.90 acres of wetland and will permanently disturb only 0.41 acre of wetland, with an additional 0.67 acres of permanent forested wetland conversion. These impacts are extremely small given the size of the Project and the fact that the permanent impacts will be mitigated. The Project layout has been designed to avoid wetlands whenever practicable. The Applicant also has stipulated to numerous certificate conditions designed to minimize wetland impacts and has agreed to specific wetland mitigation measures. Under these circumstances, the Siting Board can find that the Facility has avoided and minimized wetland impacts to the maximum extent practicable.

R. Exhibit 26 – Effect on Communications

The Applicant set forth in detail the nature of the probable impacts of construction and operation of the Facility on communications in its Application and Application Update (Hearing Exh. 2, Application Exh. 26, Appendix DDD [National Telecommunications and Information Administration ("NTIA") Correspondence], Appendix EEE [AM and FM Radio Report], Appendix FFF [Off-Air TV Analysis], Appendix GGG [Land Mobile and Emergency Services Report], Appendix HHH [Microwave Study], Appendix III [Mobile Phone Carrier Report], Appendix JJJ [Communication Tower Study], and Appendix KKK [Government RADAR Systems Analysis]; Hearing Exh. 7, Application Update Exh. 26, Appendix HHH Update [Microwave Study]). As set forth below, the Record in this matter shows that the Facility will not have a potential impact on communications other than off-air television stations. Any adverse impacts to communications have been avoided or minimized to the maximum extent practicable

and will be mitigated in accordance with the Applicant's Complaint Resolution Plan (Hearing Exh. 2, Application Exh. 12(d) & Appendix R [Complaint Resolution Plan]).

The Applicant retained Comsearch, a well-known expert in communications interference analyses, to assess the potential impact of the Facility on communications. Comsearch concluded that the Facility is not expected to have an impact on AM and FM radio broadcast coverage, cable or satellite television, cellular phone service (i.e., wireless networks), emergency services, municipal/school district services, public utility services or GPS (Hearing Exh. 2, Application Exh. 26(a)(1)-(4), (6)-(8), (12), Appendix EEE, GGG, III & JJJ).

Microwave bands are the telecommunication's backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, and data interconnects for mainframe computers and the internet, among other services. A study conducted in conjunction with the 2018 Application identified a microwave path that intersects the Facility Site. To assure an uninterrupted line of communication, a microwave link should be clear both along the axis between the center point of each microwave dish and within a formulaically calculated distance around the center axis of the radio beam, known as the Fresnel Zone. Comsearch calculated the Fresnel Zone for the microwave path of concern and mapped it in relation to the rotor-swept area of the turbine layout in the Application. The analysis evaluated up to 33 proposed turbines, each with a rotor blade diameter of 150 meters and a tower height of 130 meters. Comsearch found that none of the turbines would result in obstruction of the microwave path (Hearing Exh. 2, Application Exh. 26(a)(5) & Appendix HHH).

Subsequent to submission of the original Application, the Broome County Office of Emergency Services identified a proposed microwave path associated with Broome County's planned update of its 911 network and expressed the concern that turbine T25 could potentially

interfere with that path. In consultation with the County, the Applicant shifted the location of the turbine approximately 200 feet to avoid any possible impacts to the proposed 911 network update (Hearing Exh. 7, Application Update Exh. 26, Appendix HHH Update [Microwave Study]). As such, the current Facility layout does not intersect with any existing or known proposed microwave paths, and no impacts to microwave paths are expected.

The Facility is also not anticipated to result in any adverse impacts to federal communication systems, NEXRAD (next-generation radar) or Doppler weather radar operated by the National Weather Service ("NWS") – an agency of the National Oceanic and Atmospheric Administration ("NOAA") – the FAA, and the U.S. Air Force. Turbines sited within 18 kilometers (11.2 miles) of a NEXRAD installation begin to impact operation of the system. With respect to the Bluestone Wind Project, the closest NEXRAD Doppler radar system is in Binghamton approximately 32.2 kilometers (20 miles) from the Facility. Comsearch analyzed the potential impacts of the proposed Facility on three types of radar systems: NWS NEXRAD WSR-88D systems, FAA long-range radar systems, and Department of Defense ("DoD") military systems. Comsearch used the DoD RADAR screening tool and determined that there were no potential coverage issues with DoD military systems, FAA long range radar systems or NWS NEXRAD WSR-88D systems (Hearing Exh. 2, Application Exh. 26(a)(9), Appendix KKK).

The Applicant also sent written notification of the proposed Facility to the National Telecommunications and Information Administration ("NTIA") on April 25, 2018. The NTIA, in turn, provided plans for the Facility to numerous federal agencies represented in the Interdepartmental Radio Advisory Committee ("IRAC"). The NTIA's response, dated July 12, 2018, indicated that the Facility will result in low impacts to doppler/weather radar and only the lowest elevation angle will likely be affected, and no further notification is required unless there

are changes in the height of the proposed turbines or project area (Hearing Exh. 2, Application Exh. 26(a)(9) & Appendix DDD). Because the initial filing to NTIA was based on an anticipated turbine height of 410 feet and the Applicant is proposing a turbine height of 673 feet, an updated request was submitted to NTIA on August 30, 2018. Again, the NTIA provided the update for the Facility to the federal agencies represented in the IRAC and again the agencies identified no issues with turbine placement. Moreover, according to Comsearch, no additional adverse effects are anticipated as a result of the turbine height increase, based on the results of the government radar systems analysis (Hearing Exh. 2, Application Exh. 26(a)(9)).

The closest air traffic control tower is located approximately 22 miles west of the Facility at the Greater Binghamton Airport. Under 49 USC § 44718, the FAA is responsible for evaluating the potential impact of objects that penetrate the nation's airspace. Any person proposing to undertake construction that is more than 200 feet above ground level ("AGL") must provide notice to the FAA. Objects, such as wind turbines, which are higher than 499 feet AGL are automatically issued a Notice of Presumed Hazard, compelling the FAA to conduct an aeronautical study of the locations of each object of concern. At the time of the Application, the Applicant had submitted the proposed turbine layout to the FAA but had not yet received the necessary hazard determinations from the agency (Hearing Exh. 2, Application Exh. 26(a)(10)). Since the filing of the Application, the Applicant has received Determinations of No Hazard ("DNH") for the 33-turbine layout. Issuance of the DNH confirms that the Facility will not significantly impact radar operations relative to aviation safety and military readiness. In accordance with Certificate Condition 41, the Applicant will file final determinations from the FAA based on final facility design, which addresses compliance with FAA permit and documentation requirements (Hearing Exh. 10, Bluestone Final Certificate Conditions, 41).

The nearest Armed Forces installation to the Facility Site is the Tobyhanna Army Depot, which is located approximately 60 miles south of the proposed Facility. The DoD is a member of the IRAC and so received notice of the Project as part of the NTIA review discussed above. In addition, as part of the review process under 49 USC § 44718, the FAA reached out to the DoD Siting Clearinghouse, which is responsible for assessing the impact of possible airspace obstructions on military operations and readiness. FAA's issuance of the DNH reflects a determination by the DoD Siting Clearinghouse that the Facility will not impact military readiness (Hearing Exh. 2, Application Exh. 26(a)(11)).

The only communications impact associated with the Facility identified involves off-air television. A study conducted by Comsearch on behalf of the Applicant indicates that there are 57 televisions stations within 100 km of the proposed Facility, of which 51 are currently licensed and operating. Thirty-three of the licensed/operating stations are low-power stations or translators, while the remaining 18 are full power stations. After the wind turbines are installed, 11 of the full-power stations may have their reception disrupted in and around the Facility, primarily in locations on the opposite side of the Facility relative to the station antennas (Hearing Exh. 2, Application Exh. 26(a)(3), (c)(1), Appendix FFF). Any resident that experiences degraded off-air television service after installation of the Facility can file a complaint with the Applicant in accordance with the Complaint Resolution Plan. The Applicant will work with the complainant to resolve the issue consistent with the Plan (Hearing Exh. 2, Application Exh. 26(e), Appendix R; Hearing Exh. 10, Bluestone Final Certificate Conditions, 49 [addressing preparation of Final Complaint Resolution Plan]).

In its Direct Testimony, the DPS Engineering Panel was asked whether it had "any concerns with the proposed Project's effect on communications." The Panel responded that it

believed "the Applicant has adequately addressed the requirements of PSL Article 10, with respect to evaluating the Project's effects on communications" and recommended that the Applicant continue to monitor these impacts during construction and operation and address any adverse impacts that may arise (Tr.1553, L10-17). The only issue raised in this proceeding – the potential impact of the Facility on planned upgrades to the Broome County 911 system – has been addressed by relocating the turbine of concern as outlined above.

Accordingly, the Record in this proceeding allows the Siting Board to find that the Facility will not have an impact on communications except perhaps with respect to off-air television stations, and that the Applicant has avoided or minimized communications impacts to the maximum extent practicable. With respect to off-air television, the Applicant has mitigated potential impacts to the maximum extent practicable in accordance with its Complaint Resolution Plan. The conclusion that the Applicant has avoided, minimized and mitigated communications impacts is consistent with that reached by the DPS Engineering Panel, which did not identify any concerns with the proposed Project's effect on communications (Tr.1553).

S. Exhibit 33 – Other Applications and Filings

The Applicant has provided the information required by 16 NYCRR § 1001.33 regarding other Applications and Filings including information regarding federal permits, consents, approvals or licenses that will be required for the construction or operation of the Facility (Hearing Exh. 2, Application Exh. 33).

The Applicant and DPS have also agreed to the following Certificate Conditions addressing Federal permits and consents (Hearing Exh. 10, Final Bluestone Certificate Conditions):

- Requiring filing for Water Quality Certification prior to construction of the Facility with the Siting Board pursuant to 16 NYCRR § 1000.8(a)(8)) (Final Bluestone Certificate Condition 7); and
- Requiring filing of all federal permits/approvals required to construct and operate the Facility (Certificate Condition 40).

No issues remain with respect to the information contained in Application Exhibit 33. The information supplied by the Applicant provides the Siting Board with sufficient information regarding other applications or filings as required by the Article 10 regulations.

T. Exhibit 34 – Electric Interconnection

As required by 16 NYCRR § 1001.34, the Applicant supplied information relating to design voltage and voltage of initial operation; type, size, number and materials of conductors; insulator design; length of transmission line; typical dimensions and construction materials of the towers; design standards for each type of tower and foundation; type of cable system and design standards for underground construction; profile of underground lines; equipment to be installed in substations or switching stations; and need for cathodic protection measures (Hearing Exh. 2, Application Exh. 34). Interconnection of the Facility to the electric transmission system is achieved using multiple systems. The wind turbines themselves produce power at a low voltage, which is stepped up to a medium voltage at the output of each turbine. A medium voltage collection system comprised of underground wires transmits the power to a collection substation. The substation steps the voltage up to a high voltage and a high voltage transmission line carries the power to a POI station, which will be owned by NYSEG. The POI station connects the Facility to the NYSEG transmission system. (*Id.*)

No party has raised any issues with respect to Exhibit 34, and the information contained in Application Exhibit 34 provides the Siting Board with sufficient information regarding the electric interconnection for the Facility required by the Article 10 regulations.

U. Exhibit 35 – Electric and Magnetic Fields

As required by 16 NYCRR § 1001.35, the Applicant prepared an Electric and Magnetic Field (EMF) study (Hearing Exh. 2, Application Exh. 35, Appendix PPP). The EMF study modeled the strength and locations of magnetic fields to be generated by the Facility. The study concluded that all electric and magnetic field levels are within the standard values of 1.6 kV/m for electric fields and 200 mG for magnetic fields set forth by the New York State Public Service Commission. (*Id.*). With respect to the change in the Facility layout, the April 2019 Application Update concluded that "[c]onsidering that th[e] update has resulted in a 1% reduction in the overall length of collection line, the findings of the EMF report remain valid" (Hearing Exh. 7, Application Update Exh. 35(d)). The DPS Engineering Panel concluded that it was satisfied with the results of the EMF studies, finding that "the field strength estimates for the transmission circuits evaluated in this study are consistent with the estimates for similar transmission and collection circuits provided in previous PSL Article 10 EMF studies" (Tr.1557, L7-12).

Based on the result of the EMF study and the information provided by the Applicant in Application Exhibit 35, as updated, the Siting Board should find that the Facility will not have any adverse EMF impacts.

V. Exhibit 38 – Water Interconnection

PSL § 168(2) requires the Siting Board to determine the nature of the probable cumulative environmental impacts of the proposed Facility and any "related facilities such as electric lines, gas lines, water supply lines, wastewater or other sewage treatment facilities, communications and

relay facilities, access roads, rail facilities or steam lines." Under 16 NYCRR § 1000.2(aj), "related facilities" is defined to include "interconnections" which, in turn, is defined as "off-site" lines servicing the site, but does not include "service lines designed and sized for household type usage, such as for bathrooms or ordinary telephones" (16 NYCRR § 1000.2(q)).

As stated in Application Exhibit 38, the Facility does not include any proposed water interconnections as the term is defined in 16 NYCRR § 1000.2(q) (Hearing Exh. 2, Application Exh. 38). The Applicant, DPS, DEC, DAM and the Towns stipulated that water interconnections were not applicable to the Facility (Hearing Exh. 1, Executed Application Stipulation, 38). The only water service line potentially required would be for the O&M building, which would likely be supplied via an individual water well. Any impacts associated with drilling a new water well will be minimized or avoided to the maximum extent practicable by using a DEC registered well driller and constructing the system in accordance with the standards in 10 NYCRR Part 75. Any water withdrawal system used to supply the concrete batch plant will have a capacity of less than 100,000 gallons per day and will not require a water withdrawal permit under 6 NYCRR Part 601 (Hearing Exh. 2, Application Exh. 38).

W. Exhibit 39 – Wastewater Interconnection

Consistent with the discussion of water interconnections above, the Facility does not include any proposed wastewater interconnections as the term is defined in 16 NYCRR § 1000.2(q) (Hearing Exh. 2, Application Exh. 39). The Applicant, DPS, DEC, DAM and the Towns stipulated that wastewater interconnections were not applicable to the Facility (Hearing Exh. 1, Executed Application Stipulations, 39). The only wastewater service line potentially required would be for the O&M building, which would likely be serviced via an individual on-site wastewater treatment system (i.e., septic system). Any impacts associated with installing a new wastewater system will

be minimized or avoided by constructing the system in accordance with the standards in 10 NYCRR Part 75 (Hearing Exh. 2, Application Exh. 39).

X. Exhibit 40 – Telecommunications Interconnection

The Applicant is not proposing any telecommunication interconnections for the Facility as defined by Article 10 at 16 NYCRR § 1001.40. Instead, the Applicant anticipates transmitting data to NYSEG and others using existing telecommunications facilities. Although additional communications equipment may be installed on-site as part of the substation and O&M building, the activity does not have the potential to cause adverse environmental or other impacts (Hearing Exh. 2, Application Exh. 40).

XIV. CONCLUSION

The Siting Board can make all of the findings and determinations required pursuant to Article 10 (PSL § 168(2) and (3)) and should issue a Certificate of Environmental Compatibility and Public Need to the Applicant for the Bluestone Wind Project.

Dated: August 9, 2019

YOUNG/SOMMER LLC

James A. Muscato II, Esq.
Elizabeth M. Morss, Esq.
Jessica Ansert Klami, Esq.
Attorneys for Bluestone Wind, LLC
Five Palisades Drive
Albany, NY 12205
jmuscato@youngsommer.com
Phone: (518) 438-9907 ext. 243

References:

Carter, J., 2011. The effect of wind farms on residential property values in Lee County, Illinois. Illinois State University.

eBird, 2018. eBird: An online database of bird distribution and abundance. eBird, Ithaca, New York. Available at, https://ebird.org/hotspot/L3008806?yr=all&m=&rank=mrec. (Accessed June 2018).

Ellenbogen, et al., 2012. Wind Turbine Health Impact Study: Report of Independent Expert Panel. January 2012. Prepared for Massachusetts Department of Environmental Protection and Massachusetts Department of Public Health. Available at, http://www.mass.gov/eea/docs/dep/energy/wind/turbine-impact-study.pdf.

Health Canada, 2014. Wind Turbine Noise and Health Study: Summary of Results. Available at, https://www.canada.ca/en/health-canada/services/environmental-workplace-health/noise/wind-turbine-noise/wind-turbine-noise-health-study-summary-results.html.

Hinman, J., 2010. "Wind Farm Proximity and Property Values: A Pooled Hedonic Regression Analysis of Property Values in Central Illinois." Thesis. Illinois State University. May 2010. 143 pages. Available at, http://puc.sd.gov/commission/dockets/electric/2017/el17-055/exhibit4.pdf.

Hoen, B., 2006. Impacts of Windmill Visibility on Property Values in Madison County, New York. Master's thesis. Bard Center for Environmental Policy. April, 2006.

Hoen, B. et al., 2009. The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis. Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division. December, 2009.

Hoen, B. et al., 2018. National Survey of Attitudes of Wind Power Project Neighbors: Summary of Results. U.S. Department of Energy, Lawrence Berkeley National Laboratory. January 2018.

Homer et al., 2015. Completion of the 2011 National Land Cover Database for the Conterminous United States—Representing a Decade of Land Cover Change Information. Published by Photogrammetric Engineering and Remote Sensing.

National Association of Regulatory Utility Commissioners (NARUC), 2011. Assessing Sound Emissions from Proposed Wind Farms & Measuring the Performance of Completed Projects. A report for the Minnesota PUC. Funded by the U.S. Department of Energy. October 2011.

NYSDEC. 2007. New York State Breeding Bird Atlas 2000 [Internet]. 2000 - 2005. Release 1.0. Albany, New York. Updated June 11, 2007. Available at, http://www.dec.ny.gov/animals/7312.html. (Accessed February 2016).