Cumulative Historic Resources Visual Effects Analysis – South Fork Wind Farm and South Fork Export Cable Project

NOVEMBER 2020

PREPARED FOR

U.S. Department of the Interior,
Bureau of Ocean Energy Management,
Office of Renewable Energy Programs

PREPARED BY

SWCA Environmental Consultants

CUMULATIVE HISTORIC RESOURCES VISUAL EFFECTS ANALYSIS – SOUTH FORK WIND FARM AND SOUTH FORK EXPORT CABLE PROJECT

Prepared for

U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs
45600 Woodland Road, VAM-OREP
Sterling, Virginia 20166
Attention: Connie Barnett

Prepared by

SWCA Environmental Consultants
15 Research Drive
Amherst, Massachusetts 01002

SWCA Project No. 049564.03

SWCA Cultural Resources Report No. 20-565

November 2020

ABSTRACT

The Bureau of Ocean Energy Management (BOEM) requested that SWCA Environmental Consultants (SWCA) prepare a Cumulative Historic Resources Visual Effects Analysis (CHRVEA) for the South Fork Wind Farm (SFWF) and South Fork Export Cable Project (Project). The Project has the potential to contribute to the cumulative visual effects on historic properties in combination with the potential effects of other proposed actions, most specifically other offshore wind energy development activities in the analysis area. In considering the potential for cumulative visual effects of the Project on historic properties, the CHRVEA assists BOEM in complying with Section 106 of the National Historic Preservation Act, as amended (at 54 United States Code 306108), and its implementing regulations (36 Code of Federal Regulations 800).

The Historic Resources Visual Effects Analysis (HRVEA) report prepared specific to the Project identified historic properties (including National Historic Landmarks [NHLs]) within the area of potential effects (APE) for visual effects analysis, the area within which adverse visual effects could result from wind turbine generator (WTG) installation (Environmental Design and Research [EDR] 2020a). In review of the previous HRVEA for the Project, BOEM has identified potential adverse effects from visual impacts to the following four historic properties on Block Island, Rhode Island, and Martha's Vineyard, Massachusetts.

- Block Island Southeast Lighthouse (NHL), Rhode Island
- Capt. Mark L. Potter House (National Register of Historic Places [NRHP]-eligible), Rhode Island
- Gay Head Light (NRHP-listed), Massachusetts
- Gay Head – Aquinnah Shops (NRHP-eligible), Massachusetts

For the four historic properties noted above, each retains its maritime setting and that maritime setting contributes to the property's NRHP-eligibility; continues to offer significant seaward views that support the integrity of the maritime setting; and that those seaward views include vantage points with the potential for an open view from each property toward SFWF WTGs (EDR 2020a).

Cumulative visibility of the SFWF WTGs and other offshore wind energy development activities is anticipated to intensify the level of adverse effect to the four historic properties, albeit by approximately 3 percent, owing to the location and intensity of the buildout associated with other offshore wind energy development activities. However, the distance from the historic properties to the SFWF WTGs (between 19.1 and 20.7 miles), the location of other existing and proposed offshore wind energy development activities between the SFWF WTGs and the historic properties, and the proportionately small number of SFWF WTGs within the foreseeable buildout would diminish direct visibility from the four historic properties to the SFWF WTGs.

The conclusions here are preliminary findings by SWCA and recommended to BOEM regarding the SFWF WTGs' incremental contribution to cumulative visual effects on historic properties when combined with past, present, and reasonably foreseeable offshore wind energy development activities in the APE for this Project. This CHRVEA provides information to assist BOEM in determining the effects of the Project on historic properties and to consult on any effects found. While Section 106 consultation is ongoing between BOEM, SHPOs, and other identified consulting parties on the undertaking, final determinations remain with BOEM in accordance with 36 CFR 800. This includes ongoing consultation with Native American tribes that may identify properties of traditional cultural and religious significance in the APE.

CONTENTS

1 Introduction 1
1.1 Project Background 1
1.2 Area of Potential Effects and Historic Properties Identified 1
1.3 Cumulative Visual Effects Analysis 5
1.3.1 Modeling Viewshed and Cumulative Wind Turbine Generator Visibility 5
1.3.2 Potential Visual Effects 8
2 Conclusion 12
3 References Cited 13

Appendices

Appendix A. Description, Historic Character, and Basis for National Register of Historic Places Eligibility of the Four Historic Properties with the Potential for Adverse Effects from the Project
Appendix B. Memorandum: South Fork Wind Farm Cumulative Visual Simulations by Environmental Design and Research
Appendix C. South Fork Wind Farm Cumulative Visual Simulations by Environmental Design and Research

Figures

Figure 1. Area of Potential Effect for visual effects analysis within the maximum distance for potential visibility of Project facilities. 2
Figure 2. Area of Potential Effect with key observation points (KOPs) for affected historic properties. 3
Figure 3. Reduced turbine visibility with distance, given the curvature of the Earth (EDR 2020c)..... 6
Figure 4. Wind turbine generator locations gridded for cumulative visual simulations across the adjacent BOEM lease areas, including the proposed Revolution and Sunrise Wind projects that will surround the SFWF (EDR 2020b)..... 7
Figure 5. Wind turbine generator dimensions used for cumulative visual simulations (EDR 2020b)..... 8

Tables

Table 1. Key Observation Points in Relation to Historic Properties and WTGs (SFWF and Other Offshore Wind Energy Development Activities 10

1 INTRODUCTION

This Cumulative Historic Resources Visual Effects Analysis (CHRVEA) assesses the contribution of the South Fork Wind Farm (SFWF) and South Fork Export Cable Project (the Project) to cumulative visual effects on historic properties. Cumulative effects on historic properties are the incremental effects that the Project could have when added to other past, present, or reasonably foreseeable future actions, regardless of which agency or person undertakes the actions (cf. 40 Code of Federal Regulations [CFR] 1508.7).

1.1 Project Background

The Bureau of Ocean Energy Management (BOEM) is the lead federal agency responsible for the decision on whether to approve, approve with modifications, or disapprove the Project's construction and operations plan (COP) pursuant to 43 United States Code 1332(3). To further inform that decision, BOEM requested that SWCA Environmental Consultants (SWCA) prepare a CHRVEA to assist in BOEM's compliance with Section 106 of the National Historic Preservation Act (NHPA), as amended (54 United States Code 306108), and its implementing regulations (36 CFR 800).

In the COP, Deepwater Wind South Fork, LLC (DWSF) proposes to develop a commercial-scale offshore wind energy facility in BOEM Lease Area OCS-A 0517 with wind turbine generators (WTGs), an offshore substation, and one transmission cable making landfall in Suffolk County, New York. For the Project, DWSF would construct and operate up to 15 WTGs (6 to 12 megawatts each) and a substation in federal waters offshore of Massachusetts, Rhode Island, and New York to connect through one transmission cable to onshore facilities within New York. One operations and maintenance (O&M) facility would be built for the Project in either New York or Rhode Island. DWSF plans to install the Project in 2021–2022 and for the Project to be operating before the end of 2022.

In addition to the proposed Project, BOEM has identified 10 types of actions that could potentially result in cumulative effects to the human environment, including historic resources: 1) other offshore wind energy development activities; 2) undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); 3) tidal energy projects; 4) marine minerals use and ocean-dredged material disposal; 5) military use; 6) marine transportation; 7) fisheries use and management; 8) global climate change; 9) oil and gas activities; and 10) onshore development activities, such as onshore wind turbines, telecommunications towers, planned projects in town master plans, and railroad/railroad station improvements.

Of the above actions, the visual effects from other offshore wind energy development activities in BOEM Lease Areas adjacent to the Project (Figure 1) pose the greatest potential for cumulative effects to historic properties when combined with those identified for the Project. The following discussion presents the reasonably foreseeable cumulative visual effects associated with other offshore wind energy development activities and the Project.

1.2 Area of Potential Effects and Historic Properties Identified

Visual effects from the Project have the potential to adversely affect historic properties within the area of potential effects (APE) that BOEM has defined for the undertaking. The APE encompasses the viewshed from which renewable energy structures would be visible, whether located offshore or onshore (Figures 1 and 2). Visual effects associated with the Project and other offshore wind energy development activities in adjacent BOEM lease areas were assessed within this APE for cumulative visual effects analysis.

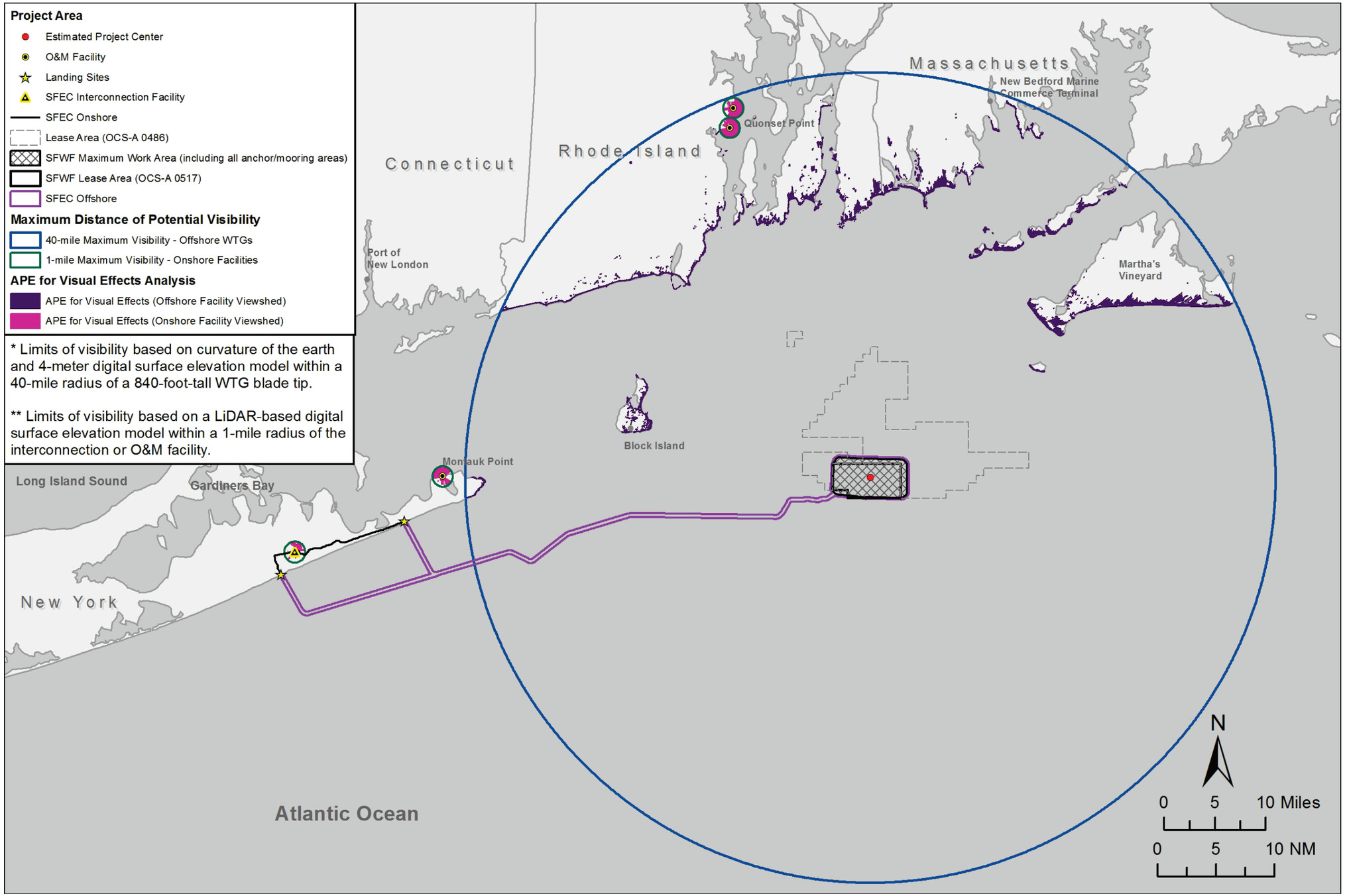

Figure 1. Area of Potential Effect for visual effects analysis within the maximum distance for potential visibility of Project facilities.

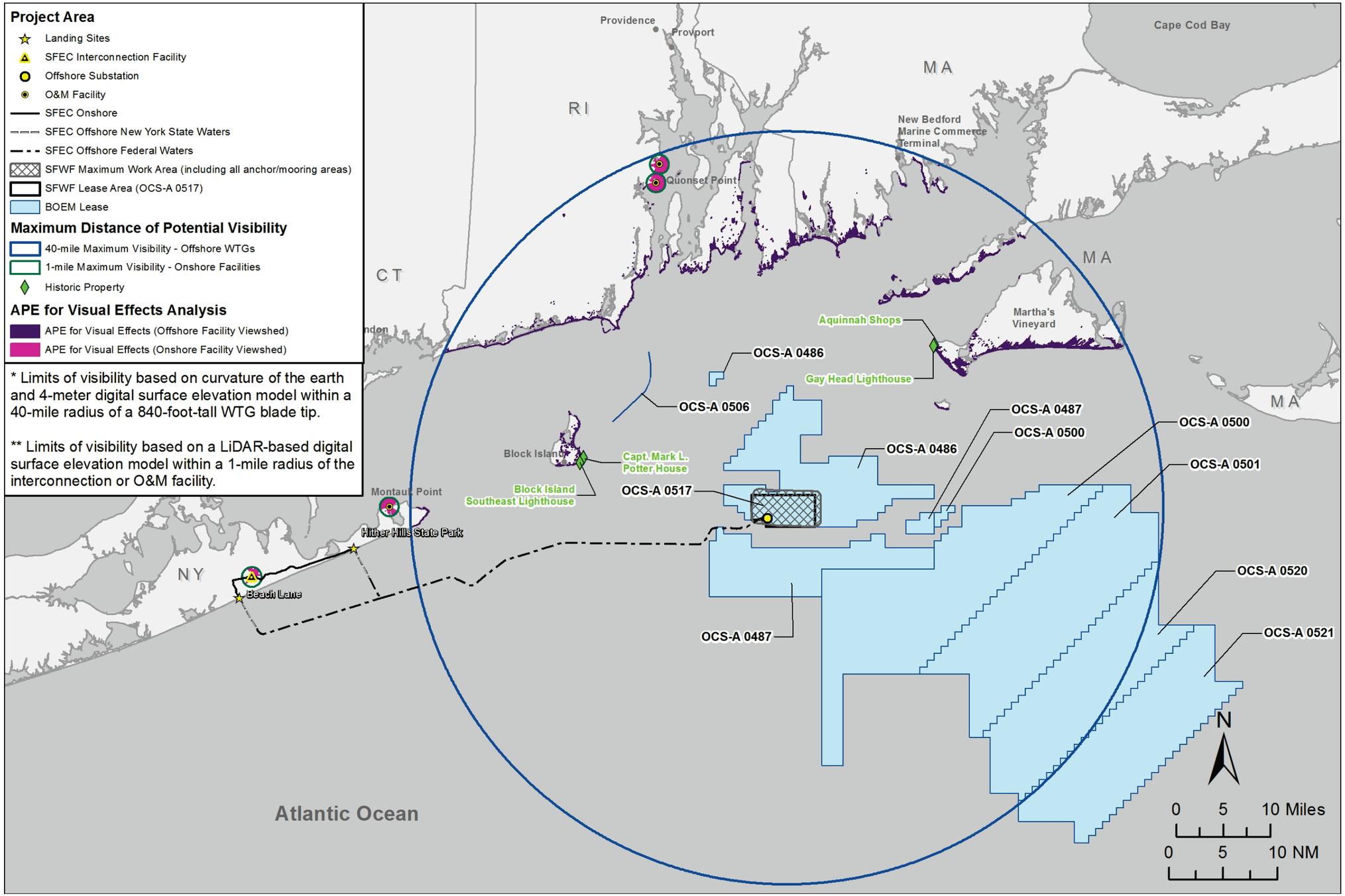

Figure 2. Area of Potential Effect with key observation points (KOPs) for affected historic properties.

The APE for visual effects for the Project was previously analyzed for Project-specific historic visual effects assessments by Environmental Design and Research [EDR] in their Historic Resources Visual Effects Assessments (HRVEA; 2018, 2019, 2020a) for onshore and offshore Project elements. Beyond visual effects from WTGs, previous HRVEA studies did not identify adverse effects to historic properties from other Project facilities, such as the interconnection or O&M facility locations. As a result, this cumulative effects analysis addresses those historic properties found to be adversely affected by the Project.

Visual effects on historic properties tend to especially risk the alteration of characteristics that qualify a property for the National Register of Historic Places (NRHP) when these effects diminish the integrity of setting and/or feeling of that property.

- Setting is the physical environment of a historic property and refers to the character of the place in which the property played its historical role. The physical features that constitute the setting of a historic property can be either natural or human made, including such elements as topographic features, vegetation, manmade features/landscape structures, and relationships between buildings and other features or open space. These features and their relationships are considered between the property and its outside surroundings as well as inside the boundaries of the property (National Park Service [NPS] 1997).
- Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. A historic property retaining original design, materials, workmanship, and setting might relate the feeling of its historic period of significance—its historic feel (NPS 1997).

The previous HRVEA for the SFWF assessed the "overall sensitivity of the property's setting to visual effects" in considering whether the potential visibility of WTGs could affect the historic integrity of a historic property and, thereby, its ability to convey its historic significance (EDR 2020a:56).

> The contribution of a property's maritime setting to its historic significance, the level of Project visibility, relationship of specific views towards [*sic*] the Project to the location, design, and historic use of a resource, and the overall sensitivity of each resource to visual effects were considered in the determination of individual ratings. EDR's assessment of potential adverse visual effects to historic properties is intentionally conservative and intended to identify possible impacts that may warrant further consideration through Section 106 consultations. (EDR 2020a:58)

In review of the previous HRVEA for the Project, BOEM has identified potential adverse effects from visual impacts to the following four historic properties on Block Island, Rhode Island, and Martha's Vineyard, Massachusetts (see Figure 2).

- Block Island Southeast Lighthouse (NHL), Rhode Island
- Capt. Mark L. Potter House (NRHP-eligible), Rhode Island
- Gay Head Light (NRHP-listed), Massachusetts
- Gay Head – Aquinnah Shops (NRHP-eligible), Massachusetts

For the four historic properties listed above, the HRVEA concluded that each property retained its maritime setting and that maritime setting contributes to the property's NRHP-eligibility; that the property continued to offer significant seaward views that support the integrity of its maritime setting; and that those seaward views would include vantage points with the potential for an open view from the property toward SFWF WTGs (EDR 2020a). See Appendix A for a more detailed description of the four properties.

In addition to the WTGs proposed for the SFWF, this CHRVEA assesses where the WTGs proposed for other offshore wind energy development activities may combine with the SFWF to produce cumulative visual effects on historic properties in the APE.

1.3 Cumulative Visual Effects Analysis

Modeling for this CHRVEA was completed in two steps. The first step mapped the maximum area of potential onshore visibility to SFWF WTGs, within which historic properties may occur. This area established the APE for visual effects analysis (EDR 2020a). The second step in the CHRVEA modeling established the maximum potential number and positioning of SFWF WTGs and other actions' WTGs cumulatively visible from representative key observation points (KOPs) for individual historic properties (EDR 2020b).

1.3.1 *Modeling Viewshed and Cumulative Wind Turbine Generator Visibility*

The first step in modeling analyzed the viewshed and set the APE for visual effects analysis within a 40-mile maximum limit from the approximate center of the SFWF Lease Area based on the maximum distance that WTG portions (the vertical extent of blade tips) could potentially be visible during flat sea conditions over the horizon based on curvature of the earth (EDR 2020a) (Figure 3).

> A viewshed analysis was conducted to determine the possible extent of the APE (Project visibility) within the visual Study Area, using United States Geological Survey (USGS) Light Detection and Ranging (lidar) data for Long Island, Rhode Island, Massachusetts, and Connecticut collected between 2010 and 2014. Using the lidar data, a highly detailed digital surface model (DSM) of the Study Area was created at a horizontal resolution of four meters. The DSM includes the elevations of buildings, trees, and other objects large enough to be resolved by lidar technology. Additionally, a digital terrain model (DTM) was created, representing bare earth conditions. The DTM was created at the same resolution as the DSM to allow direct comparison of ground elevation with the elevation of surface features (including the ground, buildings, and vegetation) in the DSM. . . . To account for some small lidar data gaps, USGS 10-meter resolution digital elevation model (DEM) and NLCD [National Land Cover Dataset] data were used to complete the DSM lidar model. The DSM was then used as a base layer for the viewshed analysis. The analysis of potential Project visibility was based on 15 points representing the proposed wind turbine locations (using latitude and longitude coordinates provided by DWSF), an assumed maximum blade tip height of 840 feet . . . and an assumed viewer height of 5.5 feet. Additionally, a separate viewshed analysis was completed to assess the visibility of the aviation obstruction lights [nighttime lighting] at a height of 478 feet, and of the OSS [offshore substation] at a height of 200 feet. . . . The viewshed analysis . . . considers curvature of the earth in the analysis. (EDR 2020a:9)

> Potential visibility of the proposed Project was evaluated in the field between June 2017 and January 2018. The purpose of this exercise was to verify the existence of direct lines of sight to proposed turbine locations from candidate KOPs and other sites with potential Project visibility, as indicated by viewshed analysis. . . . Field review confirmed the results of the lidar-based viewshed analysis. (EDR 2020a:12)

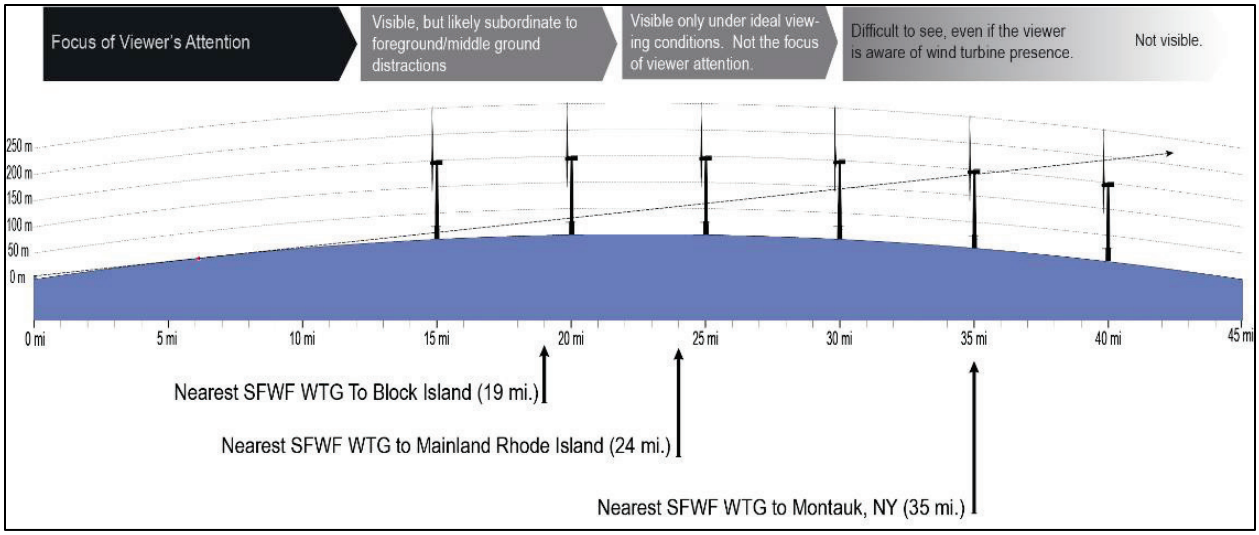

Figure 3. Reduced turbine visibility with distance, given the curvature of the Earth (EDR 2020c).

The second step in modeling created an evenly spaced grid for the assessment of all potential locations (within 40 miles of the approximate center of the SFWF Lease Area) where WTGs for the SFWF and all other offshore wind energy development Lease Areas could potentially be visible from historic properties (EDR 2020b) (Figure 4). As a result, the simulation of cumulative WTG visibility from KOPs representative of the four affected historic properties identified by BOEM considered the combined, simultaneous visibility from the APE of 1,056 potentially visible WTG locations (including 18 possible locations for the 15 SFWF WTGs), on a uniform 1 by 1 nautical-mile gridding of Lease Areas (EDR 2020b) (see Figure 4). Many of these possible WTG siting locations would be beyond the visible limit/not part of the viewshed of the Project APE (see inset maps with the EDR [2020b] simulations in Appendix C). For cumulative analysis (EDR 2020b), WTG height was increased uniformly from 840 feet to 873 feet (maximum blade tip elevation above flat sea surface) to uniformly account for potentially taller WTGs planned for other offshore wind energy development activities (Figure 5).

> The next step involves positioning the WTG layout in each of the aligned views at the appropriate distance in front of, at, or below the horizon (depending on the distance from the viewer). This was done by first determining the distance [visible] to the horizon (ocean to sky interface). . . . This is accomplished by entering the viewer position and elevation into the Haversine Formula, which uses the radius of the earth (corrected for refraction) to calculate the mathematical distance to the horizon (D), or the point at which the sky meets the water. . . . This distance is then used to draw a horizontal line (virtual horizon). . . . WTGs were all placed relative to this horizon line. The Haversine Formula was then used to determine each turbine's position, relative to the horizon (X). . . . This value was then applied to the turbine's vertical position in the model so that it appears on or below the visible horizon. . . . The proposed exterior color/finish of the WTGs was then added to the model, and the appropriate sun angle was simulated based on the specific date, time, and location (latitude and longitude) at which each photo was taken. . . . All simulations show the WTGs with rotors oriented toward the KOP. (EDR 2020b:6)
>
> The resulting simulations show a field of view of 38.7 degrees . . . because it most closely approximates normal human perception of spatial relationships and scale in the landscape . . . [and the resulting] panorama illustrates a horizontal field of view equal to 124 degrees and a vertical field of view equal to 55 degrees [from each KOP]. (EDR 2020b:7)

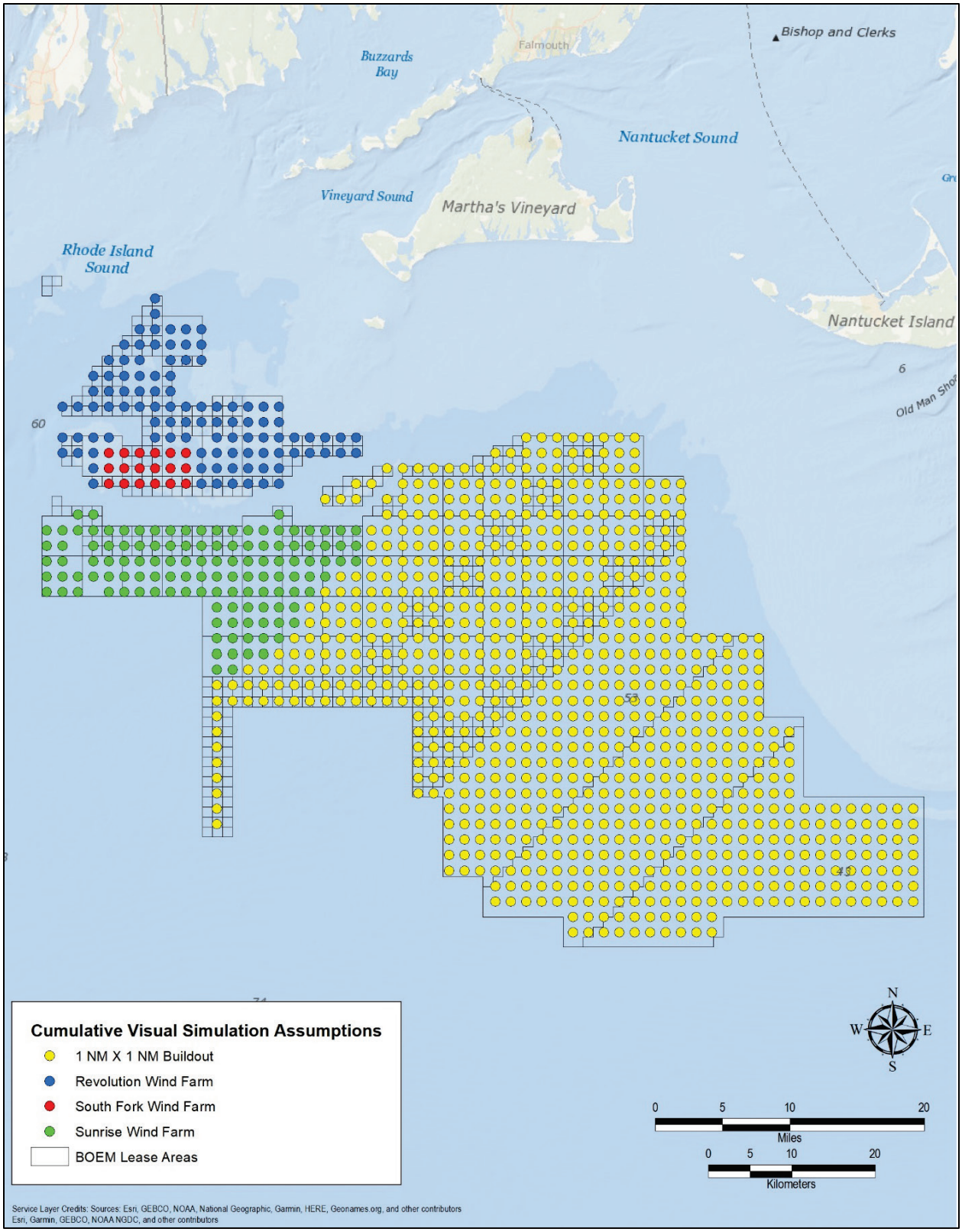

Figure 4. Wind turbine generator locations gridded for cumulative visual simulations across the adjacent BOEM lease areas, including the proposed Revolution and Sunrise Wind projects that will surround the SFWF (EDR 2020b).

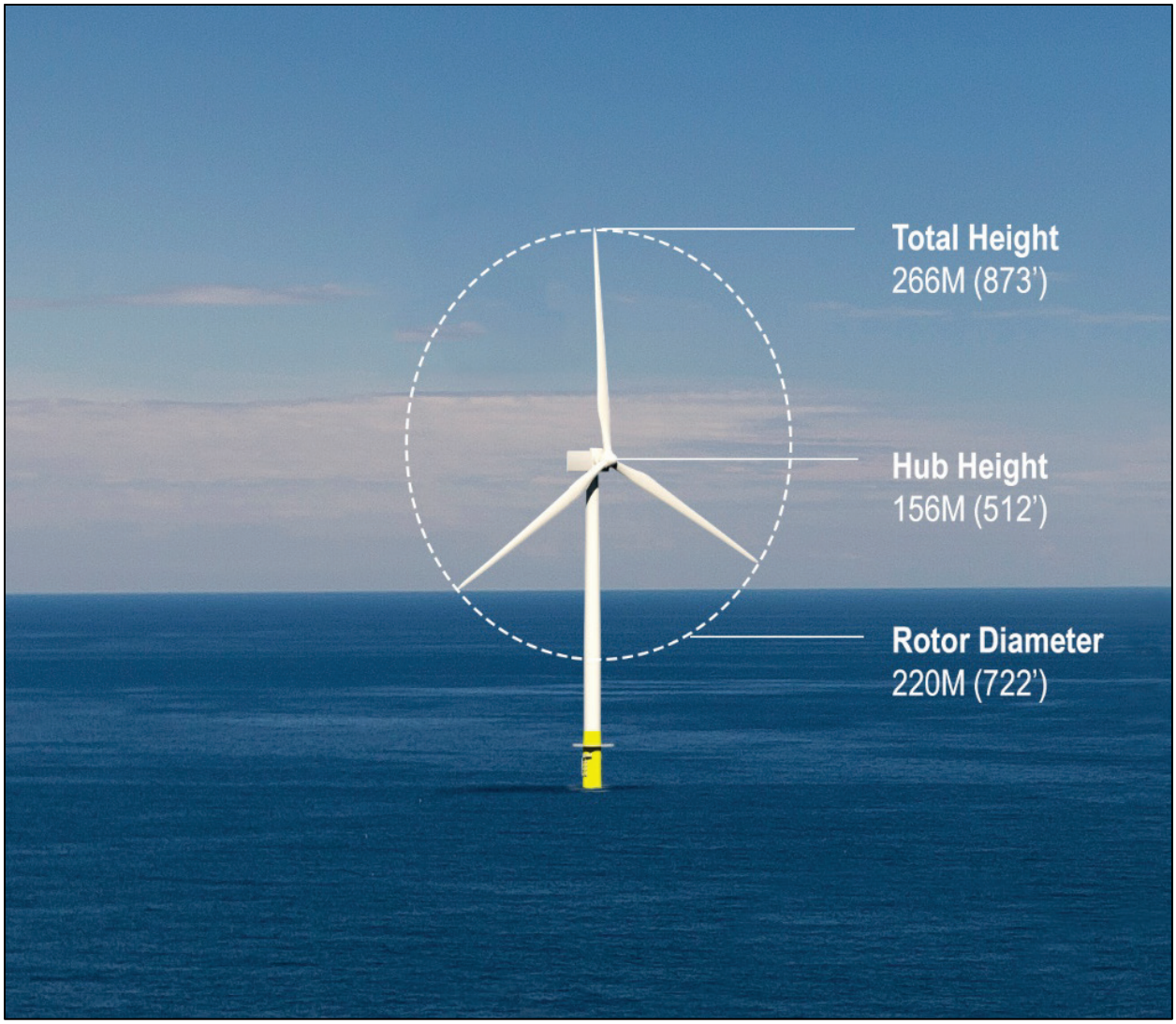

Figure 5. Wind turbine generator dimensions used for cumulative visual simulations (EDR 2020b).

These viewshed and cumulative WTG visibility models themselves "do not determine the level of impact, or whether the presence of structures would result in an adverse effect on historic properties; however, viewshed models can be used to help interpret the potential visual impact on historic properties," as others have noted for cumulative visual effects analysis intersecting these BOEM Lease Areas (ERM 2020:9).

1.3.2 *Potential Visual Effects*

The CHRVEA uses the modeling of the viewshed and cumulative WTG visibility to inform analysis on how the Project and other offshore wind energy development activities would cumulatively affect the qualities of significance and aspects of integrity of the four historic properties with maritime settings important to their NRHP eligibility. In addition, the analysis considered significant seaward views that support the integrity of the maritime setting of the historic properties, and the potential of seaward views to include vantage points with the potential for open views from the historic properties toward SFWF WTGs and the WTGs of other planned offshore wind energy development activities.

The modeling quantifies the total number of WTGs that are theoretically visible from the historic properties and the distance at which they may be visible. Based on these factors, the CHRVEA analyzed the level of effect on the historic properties in relation to the described aspects of NRHP integrity.

The previous HRVEA report for the SFWF (EDR 2020a) identified the KOPs for analyzing the potential effects on historic properties from possible SFWF WTG locations. This analysis (EDR 2020a) positioned KOPs at locations with representative views for the four historic properties. Based on the overall distance of the nearest SFWF WTGs from affected historic properties, beginning at greater than 19 miles to the nearest SFWF WTG from the nearest historic property KOP, and the diminished scale of WTG visibility at such a distance, representative KOPs were selected at areas near historic properties where seaward views and potentially visible historic properties could be maximized. As a result, worst case visual effects were analyzed, even though KOPs were not located directly at each historic property. For example, Aquinnah Overlook was selected within the Project viewshed on Martha's Vineyard as an elevated point nearest to and with greatest views of proposed SFWF WTGs; although, areas of some of the Aquinnah Shops and Gay Head Light would not have as great of SFWF WTG views as those available immediately at Aquinnah Overlook. Similarly, the Block Island Southeast Lighthouse and the Capt. Mark L. Potter House are approximately equidistant from the nearest SFWF WTG, and the KOP representative of the views from these two affected historic properties on Block Island is situated at the lighthouse; the Capt. Mark L. Potter House is within approximately 1 mile, north-northeast, of this lighthouse. The KOPs considered in the CHRVEA and depicted at Figure 2 are those applicable to the four affected historic properties, distilled from all KOPs analyzed in the HRVEA (EDR 2020a) and in the cumulative visual simulations (EDR 2020b) to arrive at the representative KOPs in this CHRVEA.

For the cumulative effects analysis in this CHRVEA, EDR (2020b) created updated simulations for the KOPs' representative of views from the clustered historic property locations, including in the areas of Block Island, Rhode Island, Gay Head and Aquinnah (Martha's Vineyard), Massachusetts where the affected historic properties are located (Table 1; see Figure 2). These updated simulations include SFWF WTGs in combined views with the maximum possible number of WTGs of other proposed offshore wind energy development activities visible from these KOPs. For comparison, Table 1 provides the maximum number of WTG locations with nearest KOP distances of other reasonably foreseeable offshore wind energy development activities that could be visible from the four historic properties analyzed in this CHRVEA, and the number of WTG locations with nearest KOP distance for the SFWF that could be visible from the same four historic properties. Methods for creation of the SFWF cumulative visual simulations (EDR 2020b) are included in Appendix B. The SFWF cumulative visual simulations created by EDR (2020b) are included in Appendix C.

Table 1. Key Observation Points in Relation to Historic Properties and WTGs (SFWF and Other Offshore Wind Development Activities)

Historic Property	Key Observation Point (KOP) Name	Total Number of Potentially Visible WTGs from the KOP (with 18 SFWF locations)	Distance of the KOP to the Nearest Potentially Visible WTG for Other Proposed and Built Wind Farms and for the SFWF
Block Island Southeast Lighthouse	Southeast Lighthouse	564 WTGs visible in simulation locations (3 percent are SFWF)	3.0 miles to the nearest built Block Island Wind Farm WTG, 15.1 miles to the nearest proposed WTG location for other wind energy development activities, and 19.1 miles to the nearest possible SFWF WTG location
Capt. Mark L. Potter House	Southeast Lighthouse	564 WTGs visible in simulation locations (3 percent are SFWF)	3.0 miles to the nearest built Block Island Wind Farm WTG, 15.1 miles to the nearest proposed WTG location for other wind energy development activities, and 19.1 miles to the nearest possible SFWF WTG location
Gay Head Light	Aquinnah Overlook	538 WTGs visible in simulation locations (3 percent are SFWF)	13.7 miles to the nearest proposed WTG location for other wind energy development activities and 20.7 miles to the nearest possible SFWF WTG location
Gay Head – Aquinnah Shops	Aquinnah Overlook	538 WTGs visible in simulation locations (3 percent are SFWF)	13.7 miles to the nearest proposed WTG location for other wind energy development activities and 20.7 miles to the nearest possible SFWF WTG location

The Project has the potential to incrementally add to the cumulative visual effects on the four historic properties identified within its APE for visual effects analysis, when combined with the potential effects of other past, present, or reasonably foreseeable future actions. This may occur where there is intervisibility between the Project viewshed and the viewshed of other actions, the area of intervisibility being the geographic extent of the intersection of Project visibility with the visibility of another action. The proposed SFWF WTG locations within the BOEM Lease Area (OCS-A 0517) have the potential for intervisibility with other WTG locations to be installed within the adjoining BOEM Lease Area (OCS-A 0486) and within the BOEM Lease Areas extending east and southeast from there (OCS-A 0487, OCS-A 0500, OCS-A 0501, OCS-A 520, and OCS-A 0521) (EDR 2020b).

As presented in Table 1, the 18 SFWF WTG locations represent 3 percent of the total simulated WTG locations modeled by EDR (2020b) to be potentially visible from the KOPs for the four historic properties in the cumulative buildout scenario of wind energy developments in the area. As such, the SFWF WTGs would foreseeably be surrounded by other offshore wind energy development activities that would constitute 97 percent of the total WTGs potentially visible from the four historic properties on WTG buildout from all development activities. The historic properties would have no direct views to the SFWF WTGs in light of these reasonably foreseeable future offshore wind energy development activities; although, they may retain distant direct SFWF WTG views for a period of time until these other activities reach buildout. The distance from the historic properties to the SFWF WTGs (between 19.1 and 20.7 miles); and the proportionately small number of SFWF WTGs, will further diminish the visibility from the four historic properties to the SFWF WTGs. The SFWF WTGs would serve as background development amid the more numerous WTGs of other offshore wind energy development activities visible from the historic properties, as the other activities reach buildout. WTGs of other offshore wind energy development activities located less than 18 miles from historic properties would be readily noticeable to and draw the attention of the casual observer (EDR 2020a; Sullivan et al. 2013). Sullivan et al. (2013) found in general that offshore wind facilities tend to be a major focus of visual attention at distances up to 10 miles and were only noticeable to casual observers at distances of up to almost 18 miles. This is similar to the results of the CHRVEA for the Vineyard 1 Project (ERM 2020), for similarly sized WTGs in a similar setting to the SFWF.

SFWF has been determined by BOEM to be an adverse effect to four historic properties with direct views to the SFWF WTGs. Cumulative visibility of the SFWF and other offshore wind energy development activities is anticipated to intensify the level of adverse effect to the four historic properties, albeit by 3 percent, owing to the location and buildout associated with other offshore wind energy development activities. However; the distance from the historic properties to the SFWF WTGs (between 19.1 and 20.7 miles), the location of other existing and proposed) offshore wind energy development activities between the SFWF WTGs and views from historic properties, and the proportionately small number of SFWF WTGs within the foreseeable offshore wind energy development areas would diminish direct visibility from the four historic properties to the SFWF WTGs.

BOEM remains in consultation with all consulting parties under Section 106 of the NHPA, including Native American tribes that may have concerns for properties of traditional cultural and religious significance in the area, SHPOs/DHP, local governments, and historical interest groups.

2 CONCLUSION

The preliminary assessment of this CHRVEA is that the SFWF will have an adverse effect on the four historic properties identified. These historic properties are:

Block Island Southeast Lighthouse (NHL), Rhode Island

- Capt. Mark L. Potter House (NRHP-eligible), Rhode Island
- Gay Head Light (NRHP), Massachusetts
- Gay Head – Aquinnah Shops (NRHP-eligible), Massachusetts

For the four historic properties noted above, each retains its maritime setting and that maritime setting contributes to the property's NRHP-eligibility; continues to offer significant seaward views that support the integrity of maritime setting; and that those seaward views include vantage points with the potential for an open view from each property toward SFWF WTGs (EDR 2020a).

Cumulative visibility of the SFWF WTGs and other offshore wind energy development activities is anticipated to intensify the level of adverse effect to the four historic properties, albeit by 3 percent, owing to the location and buildout associated with other offshore wind energy development activities. However; the distance from the historic properties to the SFWF WTGs, between 19.1 and 20.7 miles, the location of other existing and proposed offshore wind energy development activities between the SFWF WTGs and views from historic properties, and the proportionately small number of SFWF WTGs within the foreseeable buildout would diminish direct visibility from the four historic properties to the SFWF WTGs.

The conclusions here are preliminary findings by SWCA, recommended to BOEM regarding the SFWF WTGs' incremental contribution to cumulative visual effects on historic properties when combined with past, present, and reasonably foreseeable offshore wind energy development activities in view of the APE. This CHRVEA provides information to assist BOEM in determining the potential effects of the Project on historic properties and to consult on any effects found. While Section 106 consultation is ongoing between BOEM, SHPOs, and other identified consulting parties on the undertaking, final determinations remain with BOEM in accordance with 36 CFR 800. This includes ongoing consultation with Native American tribes that may identify properties of traditional cultural and religious significance in the APE.

3 REFERENCES CITED

Environmental Design and Research (EDR)

2020a *Historic Resources Visual Effects Analysis (Revised) - South Fork Wind Farm*. On file, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Sterling, Virginia.

2020b *Memorandum: South Fork Wind Farm Cumulative Visual Simulations*. On file, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Sterling, Virginia.

2020c Effects of Earth Curvature on WTG Visibility. Slide 27 in *National Historic Preservation Act Section 106 Consultation Meeting: South Fork Wind Farm and South Fork Export Cable Project* presentation materials (September 29). On file, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Sterling, Virginia.

2019 *Historic Resources Visual Effects Analysis: Operations and Maintenance Facilities - South Fork Wind Farm*. On file, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Sterling, Virginia.

2018 *Historic Architectural Resources Survey - South Fork Export Cable Onshore Substation*. On file, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Sterling, Virginia.

ERM

2020 Draft Historic Properties Cumulative Visual Effects Assessment for the Vineyard Wind 1 Project under Section 106 of the National Historic Preservation Act. Available at: https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Cumulative-Visual-Effects-Assessment.pdf. Accessed September 24, 2020.

National Park Service (NPS)

1997 *How to Apply the National Register Criteria for Evaluation*. Rev. ed. *National Register Bulletin* 15. Available at: https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf. Accessed August 26, 2020.

Sullivan, Robert G., Leslie B. Kirchler, Jackson Cothren, and Snow L. Winters

2013 *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances*. Available at: https://blmwyomingvisual.anl.gov/docs/EnvPractice_Offshore%20Wind%20Turbine%20Visibility%20and%20Visual%20Impact%20Threshold%20Distances.pdf. Accessed November 19, 2020.

APPENDIX A

Description, Historic Character, and Basis for National Register of Historic Places Eligibility of the Four Historic Properties with the Potential for Adverse Effects from the Project

EDR (2020a) provided a description, historic character, and basis for the NRHP eligibility of each of the four historic properties that could be impacted by visual effects from the Project, as summarized below from the HRVEA.

> Block Island Southeast Lighthouse . . . is located approximately 12 miles south of the coast of mainland Rhode Island, on Mohegan Bluff, on the southeast shore of Block Island. Built in 1874 and fully operational by 1875, Block Island South East Lighthouse [*sic*] consists of a five-story brick tower and a two-and-a-half-story, brick duplex keeper's residence. . . . It is [eligible for the NRHP as] a rare surviving example of a lighthouse built during a brief period of Victorian Gothic design influence at the U.S. Lighthouse Board and the sole surviving lighthouse of its high-style design. In 1993, the lighthouse structure and dwelling were moved approximately 250 feet back from the edge of the bluffs to prevent the loss of the historic property to erosion. The light tower and dwelling were moved as a single mass, including the above-ground elements of the foundations, to retain the historic fabric. The new location preserves the historic relationship of the lighthouse with [the] seacoast. . . . Block Island Southeast Lighthouse was designated an NHL in 1995.
>
> Capt. Mark L. Potter House . . . is a two-and-one-half-story four-square home on an approximately 2.45-acre lot overlooking the ocean. . . . The house was built in 1901 as a summer home for Brooklyn shipmaster Captain Mark Potter. It was moved away from the nearby bluffs in the 1970s. This property represents the residential development of Block Island and was determined eligible for listing on the . . . NRHP in 2012.
>
> Gay Head Light . . . is located on the National Natural Landmark-designated red cliffs of the southwestern tip of Martha's Vineyard, Massachusetts. The cylindrical brick lighthouse tower was built in 1856 and automated in 1961. There are no existing associated buildings remaining, although the tower was once part of a greater Coast Guard complex. The lighthouse was listed [in the NRHP] . . . as part of the "Lighthouses of Massachusetts" Thematic Group Nomination in 1987. . . . In 2015, the lighthouse was moved away from the eroding cliff face to a new position . . . . 135 feet to the southeast.
>
> The Gay Head – Aquinnah Shops Area . . . is a collection of nine commercial buildings overlooking the ocean at the intersection of Lighthouse and South Road in Aquinnah, Massachusetts. This area has been used for commercial tourism related to the ocean and the . . . Gay Head Light . . . since the mid-nineteenth century. The oldest extant structure within the boundaries of this inventory area was built in the mid-twentieth century.

APPENDIX B

Memorandum: South Fork Wind Farm Cumulative Visual Simulations by Environmental Design and Research

APPENDIX C

South Fork Wind Farm Cumulative Visual Simulations by Environmental Design and Research