CUMULATIVE HISTORIC RESOURCES VISUAL EFFECTS ANALYSIS – COASTAL VIRGINIA OFFSHORE WIND COMMERCIAL 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: LK Schnitzer, Section 106 Project Lead

Prepared by

ICF
1902 Reston Metro Plaza
Reston, VA 20190

ICF Project No. 104154.0.001.01.009

November 2022

This page intentionally left blank.

ABSTRACT

The Bureau of Ocean Energy Management (BOEM) requested that ICF prepare a cumulative historic resources visual effects analysis (CHRVEA) for the Coastal Virginia Offshore Wind Commercial (CVOW-C) Project (Project). The Project has the potential to contribute to cumulative visual effects on historic properties in combination with the potential effects of other proposed actions, most specifically other offshore wind energy development activities proposed in offshore wind lease areas adjacent to the Project. Where BOEM has determined that the Project has the potential to result in adverse visual effects on historic properties, this CHRVEA analyzes further where the effects of other reasonably foreseeable development activities may be additive to those of the Project, resulting in cumulative effects. 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 (NHPA), as amended (at 54 United States Code 306108), and its implementing regulations (36 Code of Federal Regulations [CFR] 800). This includes meeting the requirements of NHPA Section 110(f) for protecting National Historic Landmarks, pursuant to 36 CFR 800.10.

The historic resources visual effects assessment (HRVEA) report prepared specific to the Project and updated in September and October 2022 identified historic properties 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. The HRVEA recommended a potential adverse effect on 25 historic properties within the visual APE for offshore Project components associated with the proposed Project (Construction and Operations Plan [COP], Appendix H-1; Dominion Energy 2022). BOEM, in review of the HRVEA and information and comments received from consulting parties, determined the Project would result in adverse effects on 25 historic properties, including the First Cape Henry Lighthouse National Historic Landmark.

Cumulative visibility of the WTGs and activities of other offshore wind energy development in the vicinity is anticipated to intensify the level of adverse effect on the 25 historic properties. WTGs associated with the Project would represent 72.7 to 99.0 percent of the total WTGs visible from each property, and WTGs associated with other offshore wind energy development activities would represent 1.0 to 27.3 percent of the total WTGs visible from each property. As such, the proposed Project represents the largest visible development from these 25 historic properties when compared to other developments nearby, including Kitty Hawk North (Lease Area OCS-A 0508) and Coastal Virginia Offshore Wind Pilot Project (Lease Area OCS-A 0497).

The conclusions herein are ICF's recommendations regarding the Project's WTGs' contribution to cumulative visual effects (daytime and nighttime) on historic properties when combined with past, present, and reasonably foreseeable offshore wind energy development activities in the APE for this Project. These recommendations are provided to inform BOEM's determination of Project effects on historic properties and consultation on any effects found. Where BOEM has made its determination in the *Finding of Adverse Effect for the Coastal Virginia Offshore Wind Commercial Project Construction and Operations Plan*, this determination is expressed consistently in the CHRVEA. While Section 106 consultation is ongoing among BOEM, the Virginia State Historic Preservation Officer, the Advisory Council on Historic Preservation, and other identified consulting parties on the Project, 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

APPENDICES

FIGURES

TABLES

1 INTRODUCTION

This cumulative historic resources visual effects analysis (CHRVEA) assesses the contribution of the Coastal Virginia Offshore Wind Commercial (CVOW-C) 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 (40 Code of Federal Regulations [CFR] 1508.7). Where the Bureau of Ocean Energy Management (BOEM) has determined that the offshore Project components have the potential to result in adverse visual effects on historic properties, this CHRVEA analyzes where the effects of other reasonably foreseeable development activities may be additive to those of the Project, resulting in cumulative effects. The CHRVEA focuses on cumulative visual effects on historic properties.

1.1 Project Background

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 ICF 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, Dominion Energy Virginia (Dominion Energy) proposes to develop a commercial-scale offshore wind energy facility in BOEM Lease Area OCS-A 0438 (Lease Area) with up to 205 wind turbine generators (WTG), up to three offshore substations (OSSs), OSS-link cables linking the individual turbines to the OSSs, offshore export cables, an export cable landfall location, onshore export cable system, and an onshore substation and interconnection facility, switching station and transition station, and a transmission cable route for the onshore export cable system to connect to the existing electrical grid in Virginia. Dominion Energy plans to construct the Project by 2028.

In addition to the proposed Project, BOEM has identified 10 types of actions that could result in cumulative effects on the human environment, including historic properties: (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 offshore wind lease areas adjacent to the Project pose the greatest potential for cumulative effects on 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

The visual portion of the area of potential effects (APE) (hereafter referred to as *visual APE*) includes the viewshed from which renewable energy structures—whether offshore or onshore—would be visible. Cumulative visual effects associated with the Project in combination with other planned offshore wind

energy development activities in adjacent BOEM offshore wind lease areas were assessed within the APE. Effects on historic properties outside the APE were not assessed.

For the visual APE for offshore Project components, geographic information system analysis was used to delineate the APE methodically through a series of steps, beginning with the maximum theoretical distance WTGs could be visible. Generally, the visual APE for offshore Project components includes a boundary of 40 miles radial distance from the offshore Project components, which is the approximate maximum theoretical distance—a distance that does not factor in certain environmental factors such as weather or environmental conditions—at which the WTGs could be visible in whole or in part (COP, Appendix H-1; Dominion Energy 2022).

This was determined by first considering the visibility of a WTG from the water level to the tip of an upright rotor blade at a height of 869 feet. The analysis then accounted for how distance and Earth curvature impede visibility as the distance increases between the viewer and WTGs (i.e., by a 40-mile distance, even blade tips would be below the sea level horizon line). This area was refined through computer modeling through the addition of a land cover vegetation layer to account for large areas of tall vegetation that limit projected visibility to the Project. Data layers for building footprints and building heights were added to account for existing development projected to screen views to the Project (COP, Appendices H-1 and I-1; Dominion Energy 2022). Areas with unobstructed views of offshore Project elements constitute the offshore component of the visual APE (Figure 1).

The visual APE for onshore Project components includes the following components: the Cable Landing Location at the Virginia State Military Reservation; the underground transmission line connecting it to a point north of Harpers Road in Virginia Beach, known as the Cable Landing to Harpers (CLH) Route; the Fentress Substation; the proposed Chicory Switching Station proposed for the Hybrid Route; and the five potential overhead transmission line routes and one underground/overhead hybrid transmission route, known as Routes 1 through 5 and the Hybrid Route. The visual APE around the proposed onshore interconnection cable route corridors was defined in accordance with the nature of the proposed construction for specific segments as follows:

- For portions of the proposed routes to be constructed within existing rights-of-way (ROWs), where no new vegetation will be cleared outside of the maintained ROW and there will be no substantial increase in tower height, the APE consists of resources adjacent to the ROW.
- For portions of the proposed routes to be constructed within existing ROW, and where there will be areas of new vegetation clearance, the APE consists of 0.5 miles on either side of the existing ROW.
- For portions of the routes to be constructed in the proposed new ROW, where there is no existing ROW, the APE consists of 0.5 miles on either side of the proposed new ROW (COP, Appendix H-3; Dominion Energy 2022).

The APE for visual effects for the Project was previously analyzed for Project-specific visual effects in the historic resources visual effects assessment (HRVEA) for onshore and offshore Project elements (COP, Appendices H-1, H-2, and H-3; Dominion Energy 2022). The HRVEA identified visual and physical adverse effects on up to six historic properties from onshore Project facilities, including the cable landfall and transmission cable routes (COP, Appendix H-3; Dominion Energy 2022). The HRVEA also recommended visual adverse effects on 25 historic properties resulting from the proposed offshore Project components (COP, Appendix H-1; Dominion Energy 2022).

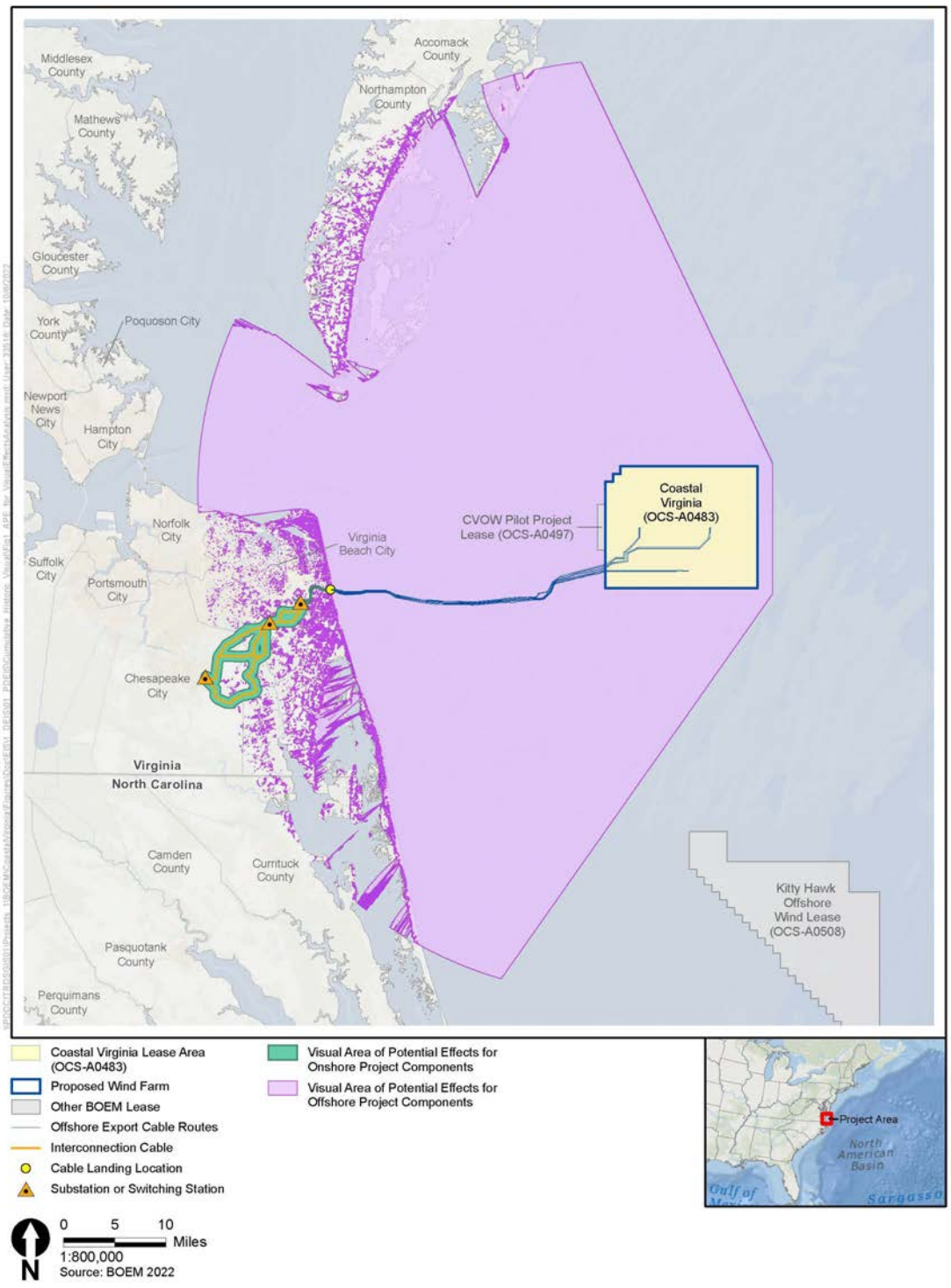


Figure 1 Area of Potential Effects for Visual Effects Analysis Within the Maximum Distance for Potential Visibility of Project Facilities

Visual effects on historic properties tend to especially risk the alteration of characteristics that qualify a property for inclusion in the National Register of Historic Places (NRHP) when these effects diminish integrity of setting, feeling, or association of that property. The National Park Service (NPS) defines *setting*, *feeling*, and *association* as follows (NPS 1997):

1. 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, human-made 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.
2. 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.
3. Association is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character.

The HRVEA identified 712 historic properties in the visual APE for offshore Project components. These properties were assessed to determine if they had character-defining or potentially character-defining ocean views that could potentially contribute to the property's significance. The properties were also investigated to determine if they have a maritime setting that directly contributes to the property's NRHP eligibility, including significant open seaward views that support the integrity of the maritime setting, which are oriented toward the CVOW-C WTGs. The HRVEA recommended a finding of adverse effect on 25 historic properties (COP, Appendix H-1; Dominion Energy 2022). BOEM, in its review of the HRVEA, agreed with the finding of adverse effects for 25 historic properties. BOEM will further review information and comments received from consulting parties and in Section 106 consultation meetings, in determining effects on all historic properties identified in the APE. This cumulative effects analysis addresses those historic properties BOEM found to be adversely affected by visual effects from the Project.

Table 1 provides a list of historic properties that will experience an adverse effect from the Project. Figures 2 through 4 show the location of these historic properties in relation to the Project. Appendix A provides a description, historic character, and basis for NRHP eligibility of these 25 historic properties.

Table 1 Historic Properties Adversely Affected by the CVOW-C Project

Resource ID	Historic Property	Location	NRHP Eligibility	Distance to the Nearest Project WTG
065-0167	Chesapeake Bay Bridge-Tunnel	Northampton, VA	NRHP Eligible	29.2 miles[1]
134-0007/ 134-0660	First Cape Henry Lighthouse	Fort Story, VA	NRHP and NHL Listed	29.2 miles
134-0047	Seatack Lifesaving Station/United States Coast Guard Station	Virginia Beach, VA	NRHP and VLR Listed	27.8 miles
134-0066	Atlantic Wildfowl Heritage Cottage/De Witt Cottage	Virginia Beach, VA	NRHP and VLR Listed	27.8 miles

Resource ID	Historic Property	Location	NRHP Eligibility	Distance to the Nearest Project WTG
134-0079/ 114-5250/ 134-0660	Second Cape Henry Lighthouse	Virginia Beach, VA	NRHP Listed	29.08 miles
134-0413	Camp Pendleton/State Military Reservation Historic District	Virginia Beach, VA	NRHP and VLR Listed	27.7 miles
134-0503/ 134-0536	Cavalier Hotel and Beach Club	Virginia Beach, VA	NRHP and VLR Listed	28.8 miles
134-0587	House (7900 Ocean Front Avenue)	Virginia Beach, VA	Potentially Eligible	28.3 miles
134-0660	Fort Story Historic District	Virginia Beach, VA	NRHP and VLR Listed	29.2 miles
134-5046	Dam Neck Annex	Virginia Beach, VA	Potentially Eligible	27.4 miles
134-5089	House (8304–8306 Ocean Front Avenue)	Virginia Beach, VA	NRHP Eligible	28.37 miles
134-5301	Chesapeake Light Tower	Virginia Beach, VA	Potentially Eligible	13.03 miles
134-5379	Cavalier Shores Historic District	Virginia Beach, VA	NRHP and VLR Listed	28.05 miles
134-5399	House (4910 Ocean Front Avenue)	Virginia Beach, VA	Potentially Eligible	28.10 miles
134-5493	House (8600 Ocean Front Avenue)	Virginia Beach, VA	Potentially Eligible	28.52 miles
134-5660	House (100 54th Street)	Virginia Beach, VA	Potentially Eligible	28.15 miles
134-5665	House (5302 Ocean Front Avenue)	Virginia Beach, VA	Potentially Eligible	28.17 miles
134-5857	Seahawk Motel	Virginia Beach, VA	Potentially Eligible	27.97 miles
134-5863	Hilton Washington Inn/Quality Inn and Suites	Virginia Beach, VA	Potentially Eligible	27.7 miles
134-5865	Virginia House	Virginia Beach, VA	Potentially Eligible	27.92 miles
134-5866	Cutty Sark Motel Efficiencies	Virginia Beach, VA	Potentially Eligible	28.0 miles
134-5869	Econo Lodge/Empress Motel	Virginia Beach, VA	Potentially Eligible	27.92 miles
134-5872	Oceans II Condominiums/Aeolus Motel	Virginia Beach, VA	Potentially Eligible	28.0 miles
Unassigned	Sandbridge Historic District	Virginia Beach, VA	Potentially Eligible	26.9 miles
CK0106	Currituck Beach Lighthouse	Corolla, NC	NRHP Listed	36.86 miles

[1] This distance was measured from the 75-foot-tall portion of the bridge, or the North Landing Bridge.

Note: NC = North Carolina; NHL = National Historic Landmark; VA = Virginia; VLR = Virginia Landmarks Register.

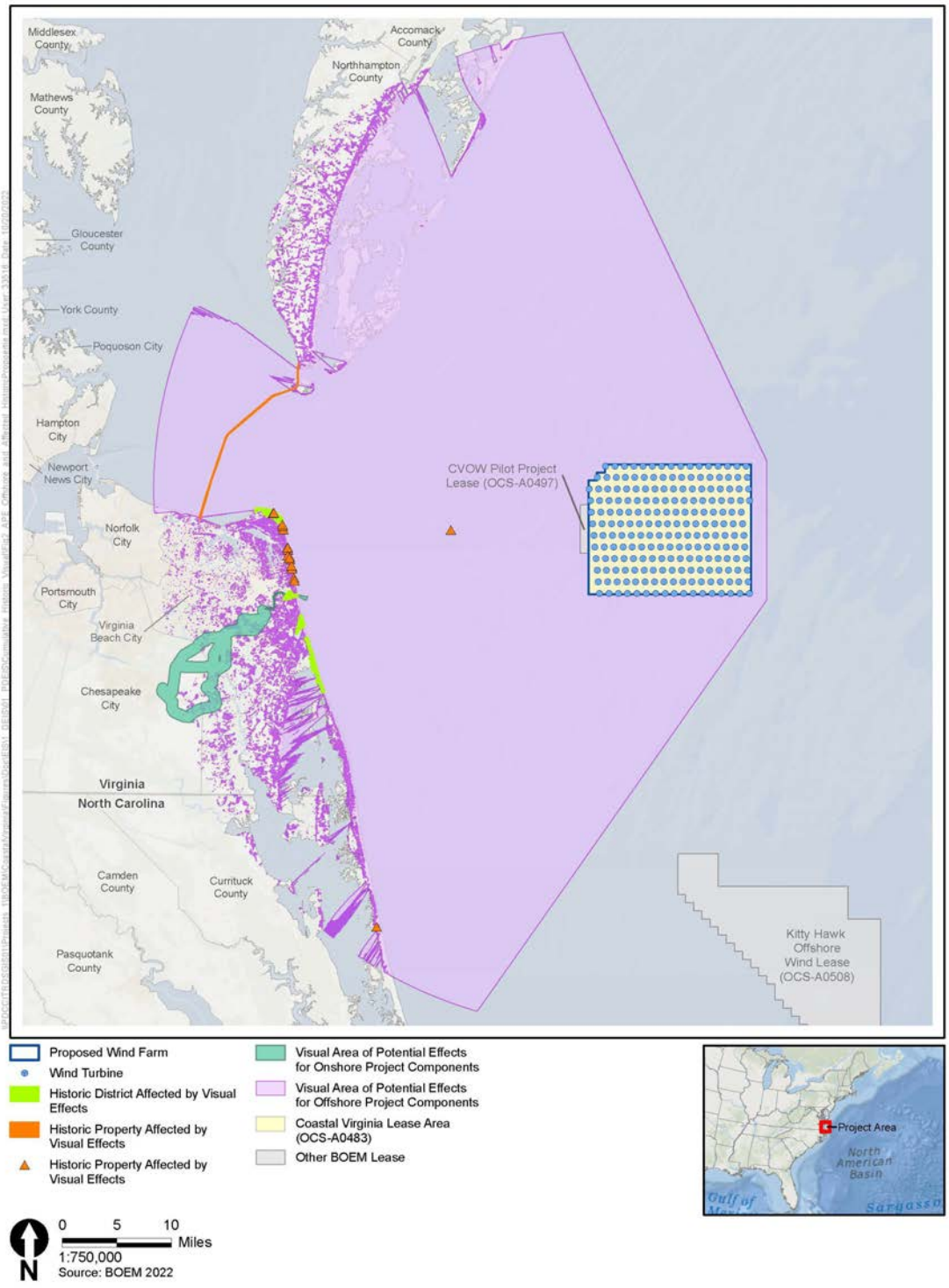


Figure 2 Overview of the Visual APE for Offshore Project Components with Adversely Affected Historic Properties

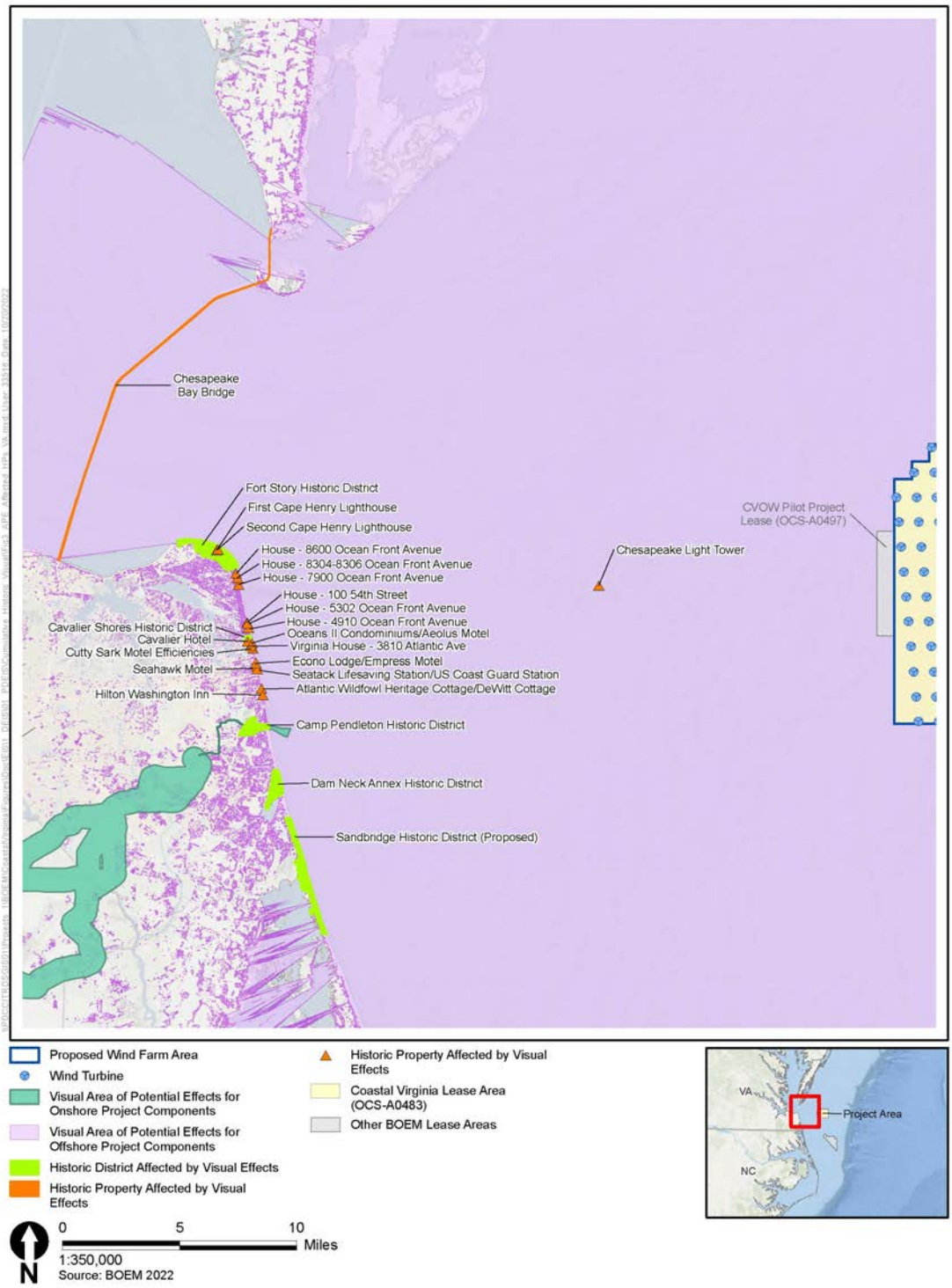


Figure 3 Detail of Virginia Portion of the Visual APE for Offshore Project Components with Adversely Affected Historic Properties

Figure 4 Detail of North Carolina Portion of the Visual APE for Offshore Project Components with Adversely Affected Historic Properties

2 CUMULATIVE VISUAL EFFECTS ANALYSIS

Using the visual APE delineated by BOEM (BOEM 2022a), modeling was conducted for the CHRVEA to establish the maximum potential number and positioning of the Project WTGs and other actions' WTGs cumulatively visible from the historic properties.

2.1 Modeling Viewshed and Cumulative Wind Turbine Generator Visibility

Modeling viewshed and WTG visibility is a multi-step process. The method applied for initial Project-level viewshed modeling is as described in the following summary from the HRVEA (COP, Appendix H-1, page 7; Dominion Energy 2022):

> The Offshore Project Components [Visual Impact Analysis] established an initial 40-mile study area for Project visibility applying a bare earth method that evaluated the location of WTGs, curvature of the Earth, and topography to identify the distance and quality of views to the WTGs. The study area was refined through computer modeling through the addition of a land cover vegetation layer to account for large areas of tall vegetation that limit projected visibility to the Project. Data layers for building footprints and building heights then were added to account for existing development projected to screen views to the Project.
>
> The layers added to refine the study area of the VIA - land cover vegetation layer, building footprints, and building heights - were also added to the PAPE to eliminate areas where historic properties, if present, would not have views to the Project. The addition of this refined modeling is a PAPE containing approximately 74,129 acres.

The HRVEA also reviewed visual simulations from select key observation points (KOP), which are representative locations of sensitive viewing areas where viewers could notice a change in the existing landscape setting due to the presence of Project facilities (COP, Appendix H-1; Dominion Energy 2022). Photographic simulations were also created to depict the proposed Project components and their potential changes to the existing landscape. These visual simulations supplement the analysis undertaken to identify the maritime setting and ocean views of historic properties by providing a more accurate and realistic impression of Project visibility than the geographic extent of theoretical visibility presented in the computer-based viewshed analysis. Appendix B includes the memorandum related to the development of the Cumulative Visual Effects Simulations, and Appendix C includes the simulations.

Cumulative effects modeling was based on technical specifications and Project layouts or layout criteria provided by BOEM for potential locations where WTGs and known OSSs for the Project and all other offshore wind lease areas could be visible from historic properties (Table 2). 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 cumulative WTG visibility assessment considered the combined, simultaneous visibility from the APE of potentially visible WTG locations on offshore wind lease area grids associated with Kitty Hawk North and the Coastal Virginia Offshore Wind Project (CVOW Pilot) at full build-out by 2028. The Kitty Hawk South project is not currently analyzed as the locations of the WTGs have not been confirmed at the time of this analysis. Turbines are counted as "visible" if the computer model determines a single point on the component would be seen from the eye level of a window, observation deck, balcony, or ground location. In addition to height above mean sea level and the height of the viewer at each historic property, the analysis also considered height of the WTGs and OSSs, Earth curvature, and distance between the historic property and WTGs.

Table 2 Maximum-case Scenario Data Modelled for the Project and Other Offshore Wind Projects for the Cumulative Visual Analysis

Offshore Wind Projects	Maximum or Current Height of WTGs	Number of WTGs	Height of Nacelles	Height of OSSs	Scenario of OSSs
Coastal Virginia Offshore Wind (CVOW) Pilot	620 feet (MLLW)	2	489 feet	N/A	0
Coastal Virginia Offshore Wind Commercial (CVOW-C)	869 feet (MHW)	205	364 feet	177 feet	3
Kitty Hawk North	1,042 feet (MSL)	69[1]	574 feet	162 feet	1

[1] There are 70 potential WTG locations for the construction of up to 69 WTGs for Kitty Hawk North. All 70 potential locations were considered in the cumulative analysis.
Note: MHW = Mean High Water; MLLW = Mean Low Low Water; MSL = Mean Sea Level; N/A = Not Applicable.

The Project proposes WTGs with a blade tip height of up to 869 feet, while other offshore wind energy development activities consist of or propose WTGs with blade tip heights ranging from 620 feet (CVOW Pilot) to 1,042 feet (Kitty Hawk North) maximum blade tip elevation above flat sea surface (Figure 8; Coastal Virginia Wind n.d.).[1] A total of 276 WTGs are included within the geographic analysis area (Figures 5–7). Offshore substation heights varied: the Project proposes up to three OSSs with a height of 177 feet, and Kitty Hawk North proposes one OSS with a height of 162 feet (Table 2). The precise location of the Kitty Hawk North OSS has yet to be determined, but based on the height, Earth curvature, and distance between the Kitty Hawk North lease area and shoreline, the substation would not be visible from the shore or from the nearest adversely affected property to the Lease Area, the Currituck Beach Lighthouse. This maintains consistency with the "reasonably foreseeable future offshore WTGs" analyzed in the Draft Environmental Impact Statement (BOEM 2022b).

[1] Coastal Virginia Wind provides a height of approximately 600 feet for the CVOW Pilot WTGs. For the purposes of this analysis, 620 feet was used as the height of these WTGs.

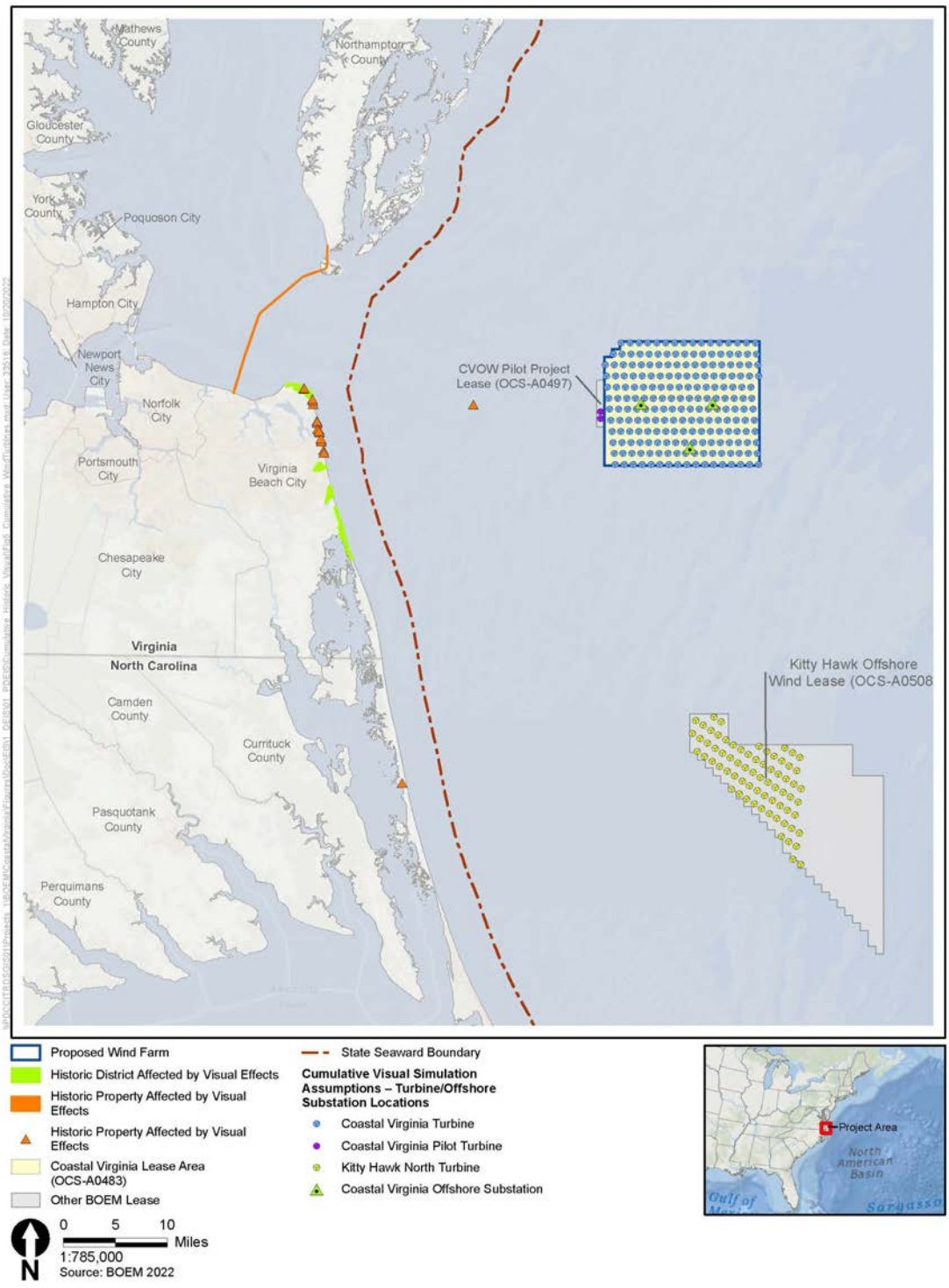


Figure 5 WTG, OSS, and Historic Property Locations for Cumulative Visual Effects Analysis Within the Geographic Analysis Area

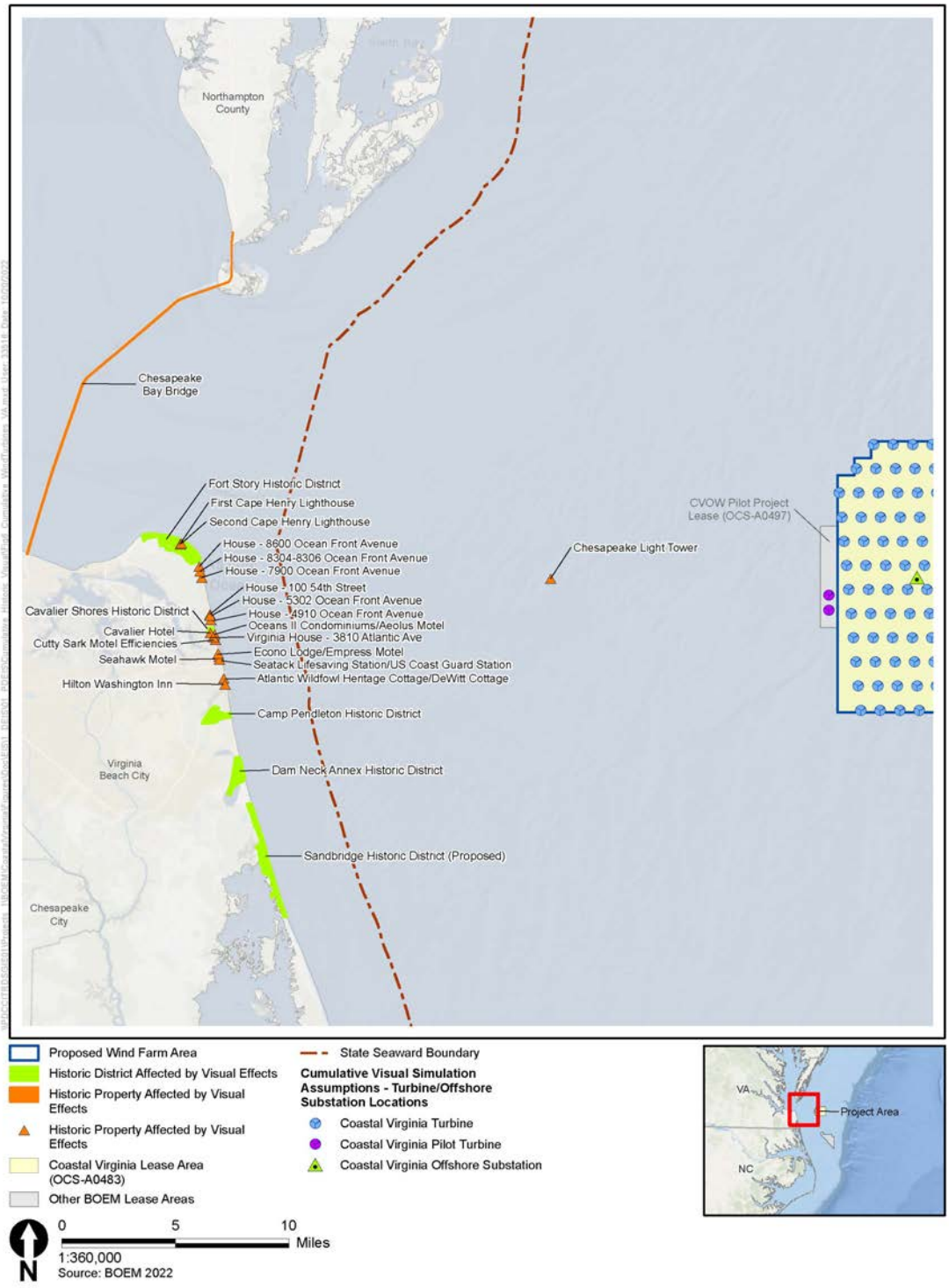
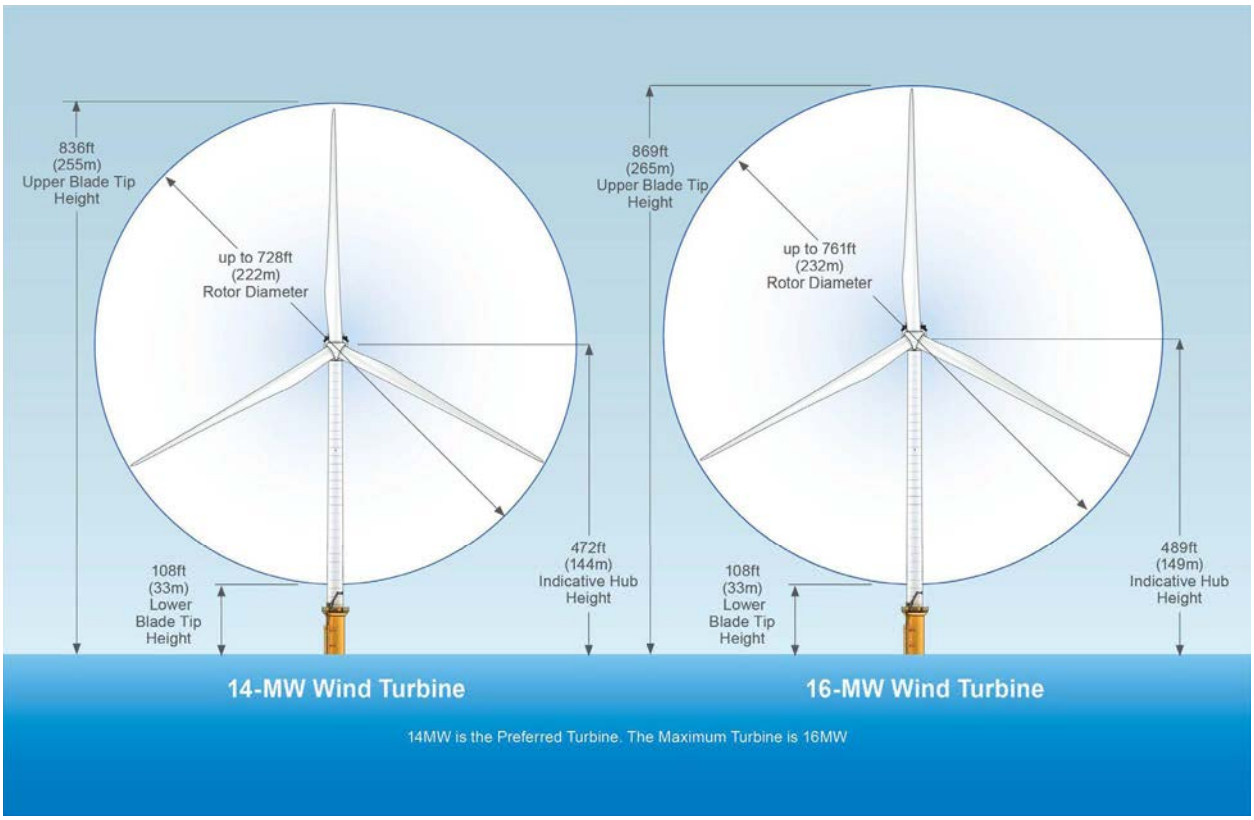


Figure 6 **Detail of Adversely Affected Historic Properties in Virginia Within the Visual APE for Offshore Project Components with WTG and OSS Locations**

Figure 7 Detail of Adversely Affected Historic Properties in North Carolina Within the Visual APE for Offshore Project Components with WTG and OSS Locations



Source: COP, Appendix I-1, Figure I-1-3; Dominion Energy 2022.
Note: WTG dimensions used for the cumulative visual simulations varied by project, with wind turbine blade tip height ranging from 620 to 1,042 feet.

Figure 8 Dimensions for Preferred and Alternative WTGs Proposed for the Project (maximum height of 869 feet)

2.2 Cumulative Visual Simulations

The modeling of cumulative visual effects also involved the creation of cumulative visual simulations from five KOPs (see Appendices B and C). Appendix C presents cumulative visual simulations that illustrate theoretical visibility of WTGs associated with the Project in combination with those of other foreseeable projects. These visual simulations are modeled based on KOPs positioned at locations with representative views. KOPs were placed where seaward views toward all the Projects in the geographic analysis area could be maximized and are considered important. These representative views are not intended to be located at all elements of historic properties, or even directly at historic properties, but are rather situated at approximate locations to provide open views toward WTGs, considering the distance of historic properties from the maximum possible build-out of all WTG locations modeled in the offshore wind lease areas for the Project and other offshore wind energy development activities.

The simulations depict the proposed offshore Project components (i.e., WTGs and OSSs) and best-available layout details for other BOEM-identified proximate planned projects, which includes Kitty Hawk North. Appendix C presents cumulative visual simulations that illustrate theoretical visibility of WTGs associated with the Project in combination with those of other foreseeable projects.

2.3 Weather and Atmospheric Conditions

BOEM completed a Visualization Study for Offshore North Carolina in December 2012 (BOEM 2012 as cited in COP, Appendix I-1, Section I-1.5.1.3.4; Dominion Energy 2022), which helped to characterize the visual impacts related to Points of Interest with respect to recorded weather conditions in the area. The Visual Impact Assessment (VIA) details the number of days where WTGs would be theoretically visible at various distances throughout the year (COP, Appendix I-1, Section I-1.5.1.3.4; Dominion Energy 2022). As summarized in the VIA, summer days have the lowest opportunity for visibility and winter nights have the highest. During the day, visibility drops to 27.3 percent of the days in the summer. Across the year, the sky is clear 67.8 percent of the time and cloudy the remaining 32.2 percent during daytime hours. It is rarely foggy, and it is also documented that visibility and appearance of lighting at night is influenced by meteorological conditions. Clear nighttime skies may provide better views of lit WTGs, while dense clouds and haze may obscure WTG lighting. Under certain conditions, lights viewed at night may result in a halo effect or residual light dome creating a dome-like glow that covers the night sky (BOEM 2012 as cited in COP, Appendix I-1, Section I-1.5.1.3.4; Dominion Energy 2022).

According to the VIA, the degree to which the WTGs will be noticeable will vary depending upon atmospheric conditions and the direction and intensity of the sunlight. Under certain atmospheric conditions the WTGs located out on the horizon will be "skylined" or seen in front of a contrasting color such as blue sky or sunrise. This means that the WTGs may be backlit (during sunrise) or front-lit (during mid-afternoon) depending on the viewer's location in relation to the Project. During afternoon hours with especially (unusually) clear conditions, visual contrast will be highest, and the WTGs will be more likely to draw the viewer's attention (COP, Appendix I-1, Section I-1.5.2.2; Dominion Energy 2022). The structures potentially will produce visual contrast by virtue of their design attributes (form, color, and line) and the reflectivity of their surfaces (USDI 2013 as cited in COP, Appendix I-1; Dominion Energy 2022). In addition, the movement of the rotors will likely be discernible, based on findings by Sullivan et al. (2013) that blade movement was visible for smaller sized WTGs at 24 miles (39 kilometers). Given the larger scale of the Project WTGs, blade rotation would be discernable under fair skies when viewed from seascapes 26 to 27 miles away; specifically, locations along the beachfront in Virginia Beach with hub-up visibility. When the weather is overcast or hazy, which is typical in the summer months, the WTGs will produce less contrast, or even no contrast when viewed from beachfront areas, because the white/light grey color of the WTG structures will be similar to the white/grey color of the backdrop and will be less noticeable (COP, Appendix I-1, Section I-1.5.2.2; Dominion Energy 2022).

2.4 Visual Effects

This CHRVEA analyzes how the adverse visual effects from offshore Project components, which BOEM has determined for 25 historic properties, have the potential to result in additive cumulative visual effects in combination with the other reasonably foreseeable offshore wind energy development activities. This CHRVEA uses the modeling of the Project viewshed and cumulative WTG visibility within that viewshed to inform this analysis. The analysis considers the importance of maritime setting to the integrity of these properties from the vantage of significant seaward views that could include the Project 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, this CHRVEA analyzes the level of effect on the integrity of the historic property.

To inform determinations of adverse and cumulative visual effects, BOEM reviewed the HRVEA's list of historic properties assessed as likely to be adversely affected by the Project. Not all properties identified within the APE that retain a maritime setting that contributes to the property's NRHP eligibility were determined to be adversely affected. These historic properties are in areas that offer significant seaward

views that support the integrity of the maritime setting and vantage points with the potential for open views from each property toward the WTGs. As noted, 25 historic properties were determined to be adversely affected (COP, Appendix H-1; Dominion Energy 2022). In considering and making determinations of effect, BOEM will review all information and comments provided by consulting parties in correspondence and at meetings.

The Project would add to the cumulative visual effects on the 25 historic properties for visual effects analysis, when combined with the effects of other past, present, or reasonably foreseeable future actions where intervisibility occurs. The potential Project WTG locations within the Lease Area (OCS-A 0508) have the potential for intervisibility with other WTG locations within the nearby lease areas, including in the CVOW Pilot project (Lease Area OCS-A 0497) and Kitty Hawk North (Lease Area OCS-A 0508), which could be constructed from 2024 through 2030.

Table 3 provides the maximum number of theoretically visible WTGs from each of the 25 adversely affected historic properties based on current and reasonably foreseeable offshore wind energy development activities. Not all potential WTGs from the Project and other reasonably foreseeable offshore wind energy development activities would be visible from each property. WTGs would begin to disappear from view at locations with increased distance, and where potential development locations within the offshore wind lease areas extend south and southeastward. Only two properties, the Chesapeake Light Tower and Virginia House, have views of the OSSs associated with the Project. The distances to the nearest potential WTG location for other wind energy development activities in this table was calculated for Kitty Hawk North for all of the properties as the distance to the CVOW Pilot project will be very similar to the distance to the closest Project WTG. One property, the Chesapeake Light Tower includes the distance to the Pilot project to demonstrate the proximity of this property to both the Project and CVOW Pilot WTGs.

Table 3 Theoretical Visibility of Offshore Wind Components from Adversely Affected Historic Properties

Historic Property	Total Theoretically Visible WTGs (blade tips) and OSSs (WTGs, OSSs)	Distance from the Historic Property to the Nearest Potentially Visible WTG for Other Proposed and Built Wind Farms and CVOW-C
Chesapeake Bay Bridge-Tunnel	207, 0	29.2 miles to nearest CVOW-C WTG and 56.5 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
First Cape Henry Lighthouse	223, 0	29.12 miles to nearest CVOW-C WTG and 49.43 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Seatack Lifesaving Station/United States Coast Guard Station	220, 0	27.8 miles to nearest CVOW-C WTG and 44.9 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Atlantic Wildfowl Heritage Cottage/De Witt Cottage	221, 0	27.8 miles to nearest CVOW-C WTG and 44.28 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Second Cape Henry Lighthouse	228, 0	29.08 miles to nearest CVOW-C WTG and 49.43 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)

Historic Property	Total Theoretically Visible WTGs (blade tips) and OSSs (WTGs, OSSs)	Distance from the Historic Property to the Nearest Potentially Visible WTG for Other Proposed and Built Wind Farms and CVOW-C
Camp Pendleton/State Military Reservation Historic District	216, 0	27.7 miles to nearest CVOW-C WTG and 43.2 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Cavalier Hotel and Beach Club	224, 0	28.18 miles to nearest CVOW-C WTG and 45.94 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
House (7900 Ocean Front Avenue)	207, 0	28.3 miles to nearest CVOW-C WTG and 47.6 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Fort Story Historic District	216, 0	29.12 miles to nearest CVOW-C WTG and 49.43 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Dam Neck Annex	220, 0	27.4 miles to nearest CVOW-C WTG and 43.4 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
House (8304-8306 Ocean Front Avenue)	207, 0	28.37 miles to nearest CVOW-C WTG and 48 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Chesapeake Light Tower	274, 3	13.02 miles to nearest CVOW-C WTG, 12.28 miles from the nearest CVOW Pilot WTG, and 37.2 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Cavalier Shores Historic District	149, 0	28.05 miles to nearest CVOW-C WTG and 27.16 miles to the nearest potential WTG location for other wind energy development activities (CVOW-Pilot)
House (4910 Ocean Front Avenue)	207, 0	28.1 miles to nearest CVOW-C WTG and 46.28 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
House (8600 Ocean Front Avenue)	206, 0	28.52 miles to nearest CVOW-C WTG and 48.15 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
House (100 54th Street)	207, 0	28.15 miles to nearest CVOW-C WTG and 46.46 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
House (5302 Ocean Front Avenue)	207, 0	28.17 miles to nearest CVOW-C WTG and 46.42 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Seahawk Motel	225, 0	27.97 miles to nearest CVOW-C WTG and 45.0 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Hilton Washington Inn/Quality Inn and Suites	229, 0	27.7 miles to nearest CVOW-C WTG and 44.0 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Virginia House	249, 1	27.9 miles to nearest CVOW-C WTG and 45.12 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)

Historic Property	Total Theoretically Visible WTGs (blade tips) and OSSs (WTGs, OSSs)	Distance from the Historic Property to the Nearest Potentially Visible WTG for Other Proposed and Built Wind Farms and CVOW-C
Cutty Sark Motel Efficiencies	215, 0	28.0 miles to nearest CVOW-C WTG and 45.12 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Econo Lodge/Empress Motel	243, 0	27.9 miles to nearest CVOW-C WTG and 45.12 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Oceans II Condominiums/Aeolus Motel	215, 0	28.0 miles to nearest CVOW-C WTG and 45.67 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Sandbridge Historic District	249, 0	26.9 miles to nearest CVOW-C WTG and 36.5 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)
Currituck Beach Lighthouse	264, 0	36.86 miles to nearest CVOW-C WTG and 28.34 miles to the nearest potential WTG location for other wind energy development activities (Kitty Hawk North)

Table 4 summarizes the number of theoretically visible WTGs up to the blade tip, WTG nacelles, and OSSs for each historic property. Aviation navigation lights will be placed at their highest point on the nacelles (located approximately 10 feet higher than the hubs); therefore, the maximum theoretically visible nacelles indicate the maximum theoretically visible aviation lights at nighttime from each historic property. As presented in Table 4, the Project WTG locations represent 72.7 to 99.0 percent of the total WTGs that are potentially visible from the historic properties in the cumulative build-out scenario of wind energy developments in the area. Therefore, the Project WTGs would constitute the majority of the total WTGs theoretically visible from all of the historic properties based on the maximum WTG build-out from all development activities by 2030.

Table 4 Summary of Maximum Theoretically Visible Offshore Wind Structures from Adversely Affected Historic Properties

Historic Property	Number of Theoretically Visible Offshore Wind Structures: WTGs (blade tip); Nacelles; OSSs				Percent of Visible WTGs from Project	Percent of Visible WTGs from All Other Projects
	CVOW-C (Project)	CVOW (Pilot)[1]	Kitty Hawk North	Total		
Chesapeake Bay Bridge-Tunnel	205; 106; 0	2; 2; N/A	0; 0; 0	207; 108; 0	99.0	1.0
First Cape Henry Lighthouse	205; 175; 0	2; 2; N/A	16; 0; 0	223; 177; 0	91.9	8.1
Seatack Lifesaving Station/United States Coast Guard Station	205; 117; 0	2; 2; N/A	13; 0; 0	220; 119; 0	93.2	6.8
Atlantic Wildfowl Heritage Cottage/De Witt Cottage	205; 115; 0	2; 2; N/A	14; 0; 0	221; 117; 0	92.8	7.2
Second Cape Henry Lighthouse	205; 205; 0	2; 2; N/A	21; 0; 0	228; 207; 0	89.9	10.1
Camp Pendleton/State Military Reservation Historic District	205; 113; 0	2; 2; N/A	9; 0; 0	216; 115; 0	94.9	5.1
Cavalier Hotel and Beach Club	205; 141; 0	2; 2; N/A	17; 0; 0	224; 143; 0	91.5	8.5
House (7900 Ocean Front Avenue)	205; 89; 0	2; 2; N/A	0; 0; 0	207; 91; 0	99.0	1.0
Fort Story Historic District	205; 205; 0	2; 2; N/A	21; 0; 0	216; 207; 0	94.9	5.1

Historic Property	Number of Theoretically Visible Offshore Wind Structures: WTGs (blade tip); Nacelles; OSSs				Percent of Visible WTGs from Project	Percent of Visible WTGs from All Other Projects
	CVOW-C (Project)	CVOW (Pilot)[1]	Kitty Hawk North	Total		
Dam Neck Annex	201; 85; 0	2; 2; N/A	17; 0; 0	220; 87; 0	91.4	8.6
House (8304-8306 Ocean Front Avenue)	205; 102; 0	2; 2; N/A	0; 0; 0	207; 104; 0	99.0	1.0
Chesapeake Light Tower	205; 205; 3	2; 2; N/A	67; 19; 0	274; 226; 3	74.8	25.2
Cavalier Shores Historic District	147; 53; 0	2; 2; N/A	0; 0; 0	149; 55; 0	98.7	1.3
House (4910 Ocean Front Avenue)	205; 105; 0	2; 2; N/A	0; 0; 0	207; 107; 0	99.0	1.0
House (8600 Ocean Front Avenue)	204; 80; 0	2; 2; N/A	0; 0; 0	206; 82; 0	99.0	1.0
House (100 54th Street)	205; 103; 0	2; 2; N/A	0; 0; 0	207; 105; 0	99.0	1.0
House (5302 Ocean Front Avenue)	205; 103; 0	2; 2; N/A	0; 0; 0	207; 105; 0	99.0	1.0
Seahawk Motel (2525 Atlantic Ave)	205; 139; 0	2; 2; N/A	18; 0; 0	225; 141; 0	91.1	8.9
Hilton Washington Inn/Quality Inn and Suites	205; 141; 0	2; 2; N/A	22; 0; 0	229; 143; 0	89.5	10.5
Virginia House	205; 202; 1	2; 2; N/A	42; 0; 0	249; 204; 1	82.3	17.7

Historic Property	Number of Theoretically Visible Offshore Wind Structures: WTGs (blade tip); Nacelles; OSSs				Percent of Visible WTGs from Project	Percent of Visible WTGs from All Other Projects
	CVOW-C (Project)	CVOW (Pilot)[1]	Kitty Hawk North	Total		
Cutty Sark Motel Efficiencies	205; 105; 0	2; 2; N/A	8; 0; 0	215; 107; 0	95.3	4.7
Econo Lodge/Empress Motel	205; 189; 0	2; 2; N/A	36; 0; 0	243; 191; 0	84.4	15.6
Oceans II Condominiums/Aeolus Motel	205; 105; 0	2; 2; N/A	8; 0; 0	215; 107; 0	95.3	4.7
Sandbridge Historic District[2]	203; 72; 0	2; 2; N/A	44; 1; 0	249; 75; 0	81.5	18.5
Currituck Beach Lighthouse	192; 166; 0	2; 0; N/A	69; 69; 0	264; 238; 0	72.7	27.3

[1] The precise height of the rotors and hub for the CVOW Pilot project are unknown. Overall height was estimated at 620 feet; therefore, at minimum the rotor blades are visible from elevated locations with direct views.
[2] Elevation was not provided for Sandbridge Historic District. The district has many three-story homes that provide views over the dunes on the eastern, beachside edge of the district. Therefore, a viewing height was selected based on the viewing height at Dam Neck just to the north, plus 12 feet for an estimated viewing height of 34 feet.
NOTE: N/A = Not applicable.

WTGs of offshore wind energy development activities could be readily noticeable to and draw the attention of the casual observer at the historic properties (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. For some historic properties, the increased distance between the property and offshore wind energy projects results in greatly reduced visibility of offshore structures, including WTGs and OSSs. For the Chesapeake Bay Bridge-Tunnel, only the Project and CVOW Pilot WTGs would be visible. No WTGs associated with Kitty Hawk North are visible from this historic property due to the large distance from the property to the lease area, the southeasterly location of the lease area, and the curvature of the Earth. For the twenty other properties that are over 40 miles from the Kitty Hawk North WTGs, views of these WTGs are possible but are unlikely to dominate the ocean viewscape due to the great distance and curvature of the Earth.

Conversely, the Currituck Beach Lighthouse in Corolla, North Carolina, is 36.86 miles from the nearest CVOW-C WTG but is 28.34 miles from the nearest WTG associated with Kitty Hawk North. Because the Kitty Hawk North WTGs are proposed to be 173 feet taller than the CVOW-C WTGs and because of the relative proximity to the nearest Kitty Hawk North, the Project WTGs would likely serve as background development amid the more numerous and visible WTGs of other offshore wind energy development activities for this historic property.

The CVOW Pilot WTGs are located in front of the taller and more numerous CVOW-C WTGs. While the Pilot WTGs are visible from all the historic properties, it is likely that they will be difficult to discern from the larger field of WTGs associated with the Project.

2.4.1 Nighttime Visibility

According to the HRVEA, nighttime lighting could affect properties on the shore when the WTGs are visible. However, areas with the greatest potential for effect, such as Virginia Beach, already have a presence of nighttime lighting due to the urbanized nature of the beachfront (COP, Appendix H-1; Dominion Energy 2022). Additionally, NPS has indicated during consultation for other offshore wind projects that a dark nighttime sky should be assumed to be a character-defining feature of certain resource types, including lighthouses, light stations, and observatories, and resources associated with historic events that may have occurred at night, such as battlefields. Of the 25 historic properties assessed in the CHRVEA, four are resource types that meet these conditions: First Cape Henry Lighthouse NHL; Second Cape Henry Lighthouse; Chesapeake Light Tower; and Currituck Beach Lighthouse.

An Aircraft Detection Lighting System (ADLS) may be used to significantly reduce the impact of nighttime aviation lighting from WTGs. An ADLS will activate when aircraft enter the light activation volume and will deactivate when all aircraft depart. Based on historical air traffic data for flights passing through the light activation areas for the Project, ADLS-controlled lights would have been activated for a total of less than 26 hours per year. Considering the local sunrise and sunset times, this could result in over a 99 percent reduction in system-activated duration as compared to a traditional obstruction lighting system (COP, Appendix T; Dominion Energy 2022). If Kitty Hawk North also implements an ADLS or related system, the amount of time that lighting on the nacelles of the WTGs associated with this Project would also be reduced. If the Project and other offshore wind development activities do not implement an ADLS or related system, nighttime lighting on the WTGs would be more readily and consistently visible, depending on weather conditions, from the historic properties.

As such, there may be cumulative visual effects on up to 25 historic properties due to nighttime visibility of aviation lights on the WTG nacelles associated with the Project and other proposed offshore wind development projects.

3 CUMULATIVE EFFECTS CONSIDERATIONS SPECIFIC TO NATIONAL HISTORIC LANDMARKS

The NPS, which administers the National Historic Landmark (NHL) program for the Secretary of the Interior (Secretary), describes NHLs and requirements for NHLs as follows:

> National Historic Landmarks (NHL) are designated by the Secretary under the authority of the Historic Sites Act of 1935, which authorizes the Secretary to identify historic and archaeological sites, buildings, and objects which "possess exceptional value as commemorating or illustrating the history of the United States." Section 110(f) of the NHPA requires that Federal agencies exercise a higher standard of care when considering undertakings that may directly and adversely affect NHLs. The law requires that agencies, "to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark." In those cases when an agency's undertaking directly and adversely affects an NHL, or when Federal permits, licenses, grants, and other programs and projects under its jurisdiction or carried out by a state or local government pursuant to a Federal delegation or approval so affect an NHL, the agency should consider all prudent and feasible alternatives to avoid an adverse effect on the NHL. (NPS 2021)

NHPA Section 110(f) applies specifically to NHLs. BOEM is implementing the special set of requirements for protecting NHLs and for compliance with NHPA Section 110(f) at 36 CFR 800.10, which, in summary:

1. Requires the agency official, to the maximum extent possible, to undertake such planning and actions as may be necessary to minimize harm to any NHL that may be directly and adversely affected by an undertaking;
2. Requires the agency official to request the participation of the Advisory Council on Historic Preservation in any consultation conducted under 36 CFR 800.6 to resolve adverse effects to NHLs; and
3. Further directs the agency to notify the Secretary of any consultation involving an NHL and to invite the Secretary to participate in consultation where there may be an adverse effect.

The HRVEA identified two NHLs in the visual APE for the Project: First Cape Henry Lighthouse and Eyre Hall. BOEM has determined that one of these properties, the First Cape Henry Lighthouse, would be adversely affected by the Project (COP, Appendix H-1; Dominion Energy 2022).

3.1 First Cape Henry Lighthouse

The First Cape Henry Lighthouse (134-0007/134-0660) is located on a steep sand dune within Fort Story Historic District in Virginia Beach, Virginia. The octagonal, sandstone lighthouse was constructed in 1792 and is the first commissioned public works building in the United States and the first lighthouse authorized, completed, and lit by the federal government. It is the third-oldest lighthouse in the United States. The tower is 72 feet in height, and the diameter ranges from 26 feet at the base to 16.5 feet at the top. The base walls are 6 feet thick, and a glass observation tower is located at the top of the tower. The tower later was lined with brick, and a metal staircase was added to the interior (COP, Appendix H-1; Dominion Energy 2022). The lighthouse was listed as an NHL in 1964, in the NRHP in 1966, and in the Virginia Landmarks Register (VLR) in 1969 under Criteria A and C.

The property is identified as possessing a significant maritime setting and significant views to the ocean (COP, Appendix H-3; Dominion Energy 2022). It is located within the Fort Story Historic District. The historic district is an early- to mid-twentieth century defense facility with an association with military history. Portions of the Fort Story Historic District are sited directly along the ocean coastline with

historic associations with ocean views. Because the facility is located along the Atlantic Ocean, it has clear ocean views from multiple vantage points (COP, Appendix H-3; Dominion Energy 2022).

The First Cape Henry Lighthouse, within this district, has a seaside location, and from the top of the 90-foot tower in the lantern room, there is a 360-degree view of the Atlantic Ocean, Chesapeake Bay, and the city. According to the VIA (COP, Appendix I-1; Dominion Energy 2022), from this elevated viewpoint under clear conditions, WTGs will appear as grayish white lines in rows in the distance. The white color of the proposed WTGs creates contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. However, WTGs located farther from the viewer begin to fall below the horizon, and only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 29.12 miles or greater from the viewer. From this location, under clear conditions, the WTGs appear as grayish white lines in rows in the distance. The thin form of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will be visible after a brief glance in the direction of the Project. Under some atmospheric conditions, such as haze or cloud cover, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The OSSs will not be perceived from this location. No views are anticipated from the lighthouse grounds due to the dense vegetation in the foreground (COP, Appendix I-1, Attachment I-1-7; Dominion Energy 2022).

The introduction of the WTGs into the seascape horizon of the First Cape Henry Lighthouse would result in an adverse visual effect on the viewshed and setting. Simulated conditions at historic locations and KOPs along the coast of Virginia Beach revealed potential visual changes due to the introduction of the WTGs, including a moderate contrast change (see Appendix C). The intensity of the visual effect depends on blade movement, differing atmospheric conditions, and lighting. Based on this assessment, the introduction of offshore Project components would result in a change to the unobstructed ocean viewshed of the NHL and would potentially compromise the setting of the NHL, which is one of its key character-defining features. Therefore, the Project would result in an adverse effect on the First Cape Henry Lighthouse NHL (COP, Appendix H-1; Dominion Energy 2022).

Cumulatively, the maximum theoretical number of Project WTGs visible from the First Cape Henry Lighthouse is 223 WTGs; 205 of these are represented by the Project. Sixteen WTGs from the Kitty Hawk North project would be over 49.4 miles from the lighthouse. Overall, the Project would result in a cumulative adverse effect on the First Cape Henry Lighthouse.

3.2 Eyre Hall

Eyre Hall (065-0008) is located on a 467.3-acre rural lot north of Cheriton in Northampton County, Virginia. The property is defined by a mile-long drive that divides the property and provides access to the different buildings of the complex. The original one-and-one-half-story portion of Eyre Hall was constructed in 1759 by Littleton Eyre. Littleton Eyre's son, Severn, inherited the property in 1773; Severn Eyre was a member of the Virginia House of Burgesses between 1766 and 1773. The house was enlarged to two stories and converted into a wing of the present gambrel roof primary block between 1796 and 1800 by Severn's son John Eyre. Eyre Hall is notable for utilizing a vocabulary typical of less affluent properties including wood weatherboard, gambrel roof, and three-room side-hall plan. However, its scale and interior finishes signify the wealth and status of its historic owners. The primary dwelling is a Vernacular-style example of a Colonial-period house in the Chesapeake. Eyre Hall is listed as an NHL under Criterion 4 for its exceptional visual character and preservation of its historic architecture landscape (COP, Appendix H-1; Dominion Energy 2022). BOEM determined that the Eyre Hall NHL would not experience an adverse effect from the Project. As such, this property was not included in the CHRVEA.

4 CONCLUSION

BOEM has determined the Project would have visual adverse effects on 25 historic properties with direct views to WTGs. The HRVEA found that the Project would not adversely affect the remaining 704 historic properties identified in the visual APE for offshore Project components (COP, Appendix H-1; Dominion Energy 2022). BOEM agrees with this assessment, finding no adverse effects on any historic properties identified in the visual APE for offshore Project components beyond the 25 historic properties listed in Table 1.

This CHRVEA concludes that the Project, in combination with the Kitty Hawk North and CVOW Pilot projects, would have a cumulative adverse effect on 25 historic properties identified:

1. Chesapeake Bay Bridge-Tunnel, Northampton, Virginia
2. First Cape Henry Lighthouse, Fort Story, Virginia
3. Seatack Lifesaving Station/United States Coast Guard Station, Virginia Beach, Virginia
4. Atlantic Wildfowl Heritage Cottage/De Witt Cottage, Virginia Beach, Virginia
5. Second Cape Henry Lighthouse, Virginia Beach, Virginia
6. Camp Pendleton/State Military Reservation Historic District, Virginia Beach, Virginia
7. Cavalier Hotel and Beach Club, Virginia Beach, Virginia
8. House (7900 Ocean Front Avenue), Virginia Beach, Virginia
9. Fort Story Historic District, Virginia Beach, Virginia
10. Dam Neck Annex, Virginia Beach, Virginia
11. House (8304-8306 Ocean Front Avenue), Virginia Beach, Virginia
12. Chesapeake Light Tower, Virginia Beach, Virginia
13. Cavalier Shores Historic District, Virginia Beach, Virginia
14. House (4910 Ocean Front Avenue), Virginia Beach, Virginia
15. House (8600 Ocean Front Avenue), Virginia Beach, Virginia
16. House (100 54th Street), Virginia Beach, Virginia
17. House (5302 Ocean Front Avenue), Virginia Beach, Virginia
18. Seahawk Motel, Virginia Beach, Virginia
19. Hilton Washington Inn/Quality Inn and Suites, Virginia Beach, Virginia
20. Virginia House, Virginia Beach, Virginia
21. Cutty Sark Motel Efficiencies, Virginia Beach, Virginia
22. Econo Lodge/Empress Motel, Virginia Beach, Virginia
23. Oceans II Condominiums/Aeolus Motel, Virginia Beach, Virginia
24. Sandbridge Historic District, Virginia Beach, Virginia
25. Currituck Beach Lighthouse, Currituck, North Carolina

For the historic properties noted above, each would retain its maritime setting, and that maritime setting contributes to the property's NRHP eligibility and continues to offer significant seaward views that support the integrity of the maritime setting; those seaward views include vantage points with the potential for an open view from each property toward the WTGs.

Cumulative visibility of the WTGs and other offshore wind energy development activities, including construction and operation, is anticipated to intensify the level of adverse effects on the historic properties. The Project would contribute 72.7 to 99 percent of the cumulative adverse effect, owing to the

location and intensity of the Project and foreseeable build-out attributable to other offshore wind energy development activities.

The conclusions here are recommendations by ICF regarding the WTGs' incremental contribution to cumulative visual effects (daytime and nighttime) on historic properties when combined with past, present, and reasonably foreseeable offshore wind energy development activities in the APE for this Project. These recommendations are provided to inform BOEM's determination of Project effects on historic properties and consultation on any effects found. Where BOEM has made its determination in the *Finding of Adverse Effect for the CVOW-C Construction and Operations Plan*, this determination is expressed consistently in the CHRVEA. While Section 106 consultation is ongoing among BOEM, State Historic Preservation Officers, and other identified consulting parties on the Project, final determinations and findings 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.

5 PERSONNEL

This study was co-authored by key personnel: Secretary of the Interior–qualified professional architectural historians Maureen McCoy, MA and MSHP and Susan Lassell, MA. Resumes of the report co-authors can be found in Appendix D, *Key Personnel Resumes*.

6 REFERENCES CITED

Bureau of Ocean and Energy Management (BOEM). 2022a. *Area of Potential Effects Delineation Memorandum for Coastal Virginia Offshore Wind Commercial Project*. Prepared by ICF.

Bureau of Ocean and Energy Management (BOEM). 2022b. *Coastal Virginia Offshore Wind Commercial Project Draft Environmental Impact Statement*. Available: https://www.boem.gov/renewable-energy/state-activities/CVOW-C. Coastal Virginia Wind. n.d. *Coastal Virginia Offshore Wind.* Available: https://coastalvawind.com/img/general5.pdf. Accessed: October 4, 2022.

Dominion Energy. 2022. *Construction and Operations Plan, Coastal Virginia Offshore Wind Commercial Project.* Volumes I–II and Appendices. July. Available: https://www.boem.gov/renewable-energy/state-activities/cvow-construction-and-operations-plan. Accessed: August 23, 2022.

National Historic Preservation Act, Section 106, 36 Code of Federal Regulations Part 800. April 5, 2004. Available: https://www.achp.gov/sites/default/files/regulations/2017-02/regs-rev04.pdf. Accessed: February 4, 2022.

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

National Park Service (NPS). 2021. Section 110 of the National Historic Preservation Act. Available: https://www.nps.gov/fpi/Section110.html. Accessed: October 4, 2022.

Sullivan, Robert G., Leslie B. Kirchler, Jackson Cothren, and Snow L. Winters. 2013. *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances*. Available: https://blmwyomingvisual.anl.gov/docs/WindVITD.pdf. Accessed: November 19, 2020.

APPENDIX A

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

This page intentionally left blank.

The HRVEA (COP, Appendix H-1; Dominion Energy 2022) provided a description, photograph, historic character, and basis for the NRHP eligibility the historic properties that could be adversely affected by the Project, as summarized below.

Chesapeake Bay Bridge-Tunnel

The Chesapeake Bay Bridge-Tunnel (DHR ID: 065-0167) spans 17.6 miles from Cape Charles to Virginia Beach across the Chesapeake Bay. Prior to 1954, a ferry service operated over the crossing. Later, the Chesapeake Bay Ferry Commission oversaw the crossing. However, a permanent, fixed crossing was desired. Once determined feasible, the bridge was engineered by Sverdrup & Parcel, and bonds were sold to fund the construction. The bridge opened in 1964 after 3.5 years of construction. A parallel crossing was constructed between 1995 and 1999 to expand service. The bridge includes 12 miles of low-level trestle, two tunnels, two bridges, causeways, and four human-made islands. Virginia Department of Historic Resources (DHR) staff recommended the structure as eligible for listing in the NRHP under Criteria A and C for significance in the areas of transportation and engineering in 1992 (Virginia Department of Historic Resources 2014a). The Chesapeake Bay Bridge-Tunnel possesses a significant maritime setting and views to the ocean.

Figure 1: View of 065-0167 from beach.

First Cape Henry Lighthouse

The first Cape Henry Lighthouse (DHR ID: 134-0007/134-0660) is located on a steep sand dune within Fort Story in Virginia Beach, Virginia. The octagonal, sandstone lighthouse was constructed in 1792 and is the first commissioned public works building in the United States and the first lighthouse authorized, completed, and lit by the federal government. It is the third-oldest lighthouse in the United States. The tower is 72 feet in height, and the diameter ranges from 26 feet at the base to 16.5 feet at the top. The base walls are 6 feet thick. A glass observation tower is located at the top of the tower. The tower later was lined with brick, and a metal staircase was added to the interior (Virginia Department of Historic Resources 2013a). The lighthouse was replaced by a more modern lighthouse in 1881. The lighthouse was listed as an NHL in 1964, in the NRHP in 1966 and in the VLR in 1969 under Criteria A and C; and it was listed in the Virginia Beach Historic Register in 2016 (Virginia Department of Historic Resources 2013a; City

of Virginia Beach n.d.d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and significant views to the ocean (Klein et al. 2012b).

Figure 2: View from 134-0007 toward ocean.

United States Coast Guard Station/Seatack Life Saving Station

The United States Coast Guard Station/Seatack Life Saving Station (DHR ID: 134-0047) is located in an urban setting on a half-acre lot in Virginia Beach, Virginia. The two and one-half-story wood frame building was moved to its current location during the late twentieth century and turned so that the original east elevation now faces north. Constructed in 1903, the wood weatherboard building is one of the few remaining examples of United States Lifesaving Service buildings. The property was listed in the VLR and NRHP in 1979 under Criteria A and C and was listed in the Virginia Beach Historic Register in 2017 (Virginia Department of Historic Resources 2013c; City of Virginia Beach n.d.d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and views to the ocean (Klein et al. 2012b). The Seatack Life Saving Station is part of the Historic Seatack Life Saving Station and Virginia Beach Coast Guard Station District and is subject to the Virginia Beach Historical Review Commission for exterior changes and development related to the building (City of Virginia Beach n.d.b.).

Figure 3: Photo of 134-0047, facing east.

DeWitt Cottage/Atlantic Wildfowl Heritage Museum

The deWitt Cottage/Atlantic Wildfowl Heritage Museum (DHR ID: 134-0066) is located in an urban setting on the waterfront on a 0.36-acre lot in Virginia Beach, Virginia. The property fronts the boardwalk and contains a seaside garden. Constructed in 1895, the dwelling is the sole remaining beachfront cottage constructed between Virginia Beach's founding in 1883 and its incorporation in 1906. The two-and-one-half-story dwelling features a Vernacular style and is constructed in brick. The property was listed in the VLR and NRHP in 1988 under Criteria A and C and was listed in the Virginia Beach Historic Register in 2017 (Virginia Department of Historic Resources 2013g; City of Virginia Beach n.d.d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and views to the ocean (Klein et al. 2012b). The deWitt Cottage is part of the Historic deWitt Cottage District and is subject to the Virginia Beach Historical Review Commission for exterior changes and development related to the building (City of Virginia Beach n.d.b.).

Figure 4: View from 134-0066 looking east.

Second Cape Henry Lighthouse

The second Cape Henry Lighthouse (DHR ID: 134-0079/114-5250/134-0660) is located on a 5-acre parcel within Fort Story on Cape Henry in Virginia Beach, Virginia. Constructed in 1881, the lighthouse replaced the earlier Cape Henry Lighthouse, which was considered beyond repair. The old lighthouse is located approximately 100 yards away. The new lighthouse was constructed with cast iron panels backed with masonry. The lighthouse features a granite base supporting a 163-foot-tall tower featuring a Fresnel lens. The property also contains three dwellings (ca. 1881), a coal house (ca. 1905), an oil house (ca. 1892), a fog signaling building (ca. 1881), and a fog signal testing laboratory (ca. 1935). The lighthouse is located within the Fort Story Historic District and is associated with the Light Stations of the United States Multiple Property Documentation Form (MPDF). The property was listed in the NRHP in 2002 and VLR in 2003 under Criteria A and C and was listed in the Virginia Beach Historic Register in 2016 (Virginia Department of Historic Resources 2013e; City of Virginia Beach n.d.d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and views to the ocean (Klein et al. 2012b).

Figure 5: View of 134-0079.

Camp Pendleton/State Military Reservation Historic District

The Camp Pendleton/State Military Reservation (SMR) Historic District (DHR ID: 134-0413) is a suburban historic district bound by the Atlantic Ocean to the east located on 343.01 acres in Virginia Beach, Virginia. Construction on the Virginia Army National Guard facility began in 1912. The landscape generally is grassy and features wooded areas and a lake, Lake Christine. The property includes the SMR, an area leased for use by the Virginia Air National Guard civil engineer unit, the Virginia Army National Guard Virginia Beach Readiness Center, and an area owned by the U.S. Navy. Buildings in the historic district generally are utilitarian and reflect military design; however, there are examples of American building styles. The historic district contains 114 contributing resources and initially was listed in the VLR in 2004 and NRHP in 2005 under Criteria A and C (Virginia Department of Historic Resources 2014b). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and unknown views to the ocean (Klein et al. 2012b).

Figure 6: View from 134-0413, facing east.

Cavalier Hotel and Beach Club

The Cavalier Hotel and Beach Club (DHR ID: 134-0503) is located in an urban setting on a 5.41-acre hilly lot overlooking the Atlantic Ocean in Virginia Beach, Virginia. The lot is defined by historic serpentine walls and a rectangular driveway. Constructed in 1927, the property was associated with the Cavalier Beach Club and Cavalier Golf and Yacht Club. The historic hotel hosted multiple presidents and celebrities. During World War II, the United States Navy utilized the hotel as a Radar Training School. The seven-story brick hotel exhibits the Classical Revival style and is constructed in a Y form. The property also contains a tennis court and garage. The hotel was listed in the VLR and NRHP in 2014 under Criterion C and was listed in the Virginia Beach Historic Register in 2017 (Virginia Department of Historic Resources 2014c; City of Virginia Beach n.d.d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and views to the ocean (Klein et al. 2012b).

The Cavalier Beach Club (DHR ID: 134-0536) is located in an urban setting on a flat lot surrounded by parking lots in Virginia Beach, Virginia. The property originally was part of the Cavalier Hotel. The one-story building was constructed in 1928 and exhibits the Classical Revival style. VDHR staff recommended the property potentially eligible for listing in the NRHP in 1994 (Virginia Department of Historic Resources 1994i). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and no significant views to the ocean (Klein et al. 2012b).

Figure 7: Photo of 134-0503, facing east.

House (7900 Ocean Front Avenue)

This resource is considered eligible for the purposes of the Project. It is potentially eligible under Criterion A as an example of an urban residence in Virginia Beach on the local level and Criterion C. The ca. 1910 one-story cottage is situated on an urban lot directly on the beach coastline (Virginia Department of Historic Resources 1992bo). The building is oriented west onto Ocean Front Avenue. The resource is situated on a beachfront lot in a coastal setting with beach access and ocean views from the rear elevation. The resource has a historic association with maritime activities.

Figure 8: View from 134-0587, facing east.

Fort Story Historic District

The Fort Story Historic District (DHR ID: 134-0660) is a naval military installation located in a hamlet setting on 1,458 acres in Virginia Beach, Virginia. The historic district is located on Cape Henry at the mouth of the Chesapeake Bay and Atlantic Ocean and contains approximately 4 miles of shoreline. The historic district is eligible under Criterion A for its association with military history and government, especially for its purpose defending the tidewater of Virginia during the Cold War. Nike Missile-associated buildings constructed until 1974 are eligible under Criteria Consideration G for their exceptional significance. Fifty-seven resources potentially contribute to the historic district. There are different resource types in the historic district: the administrative core, housing area, coastal defense, amphibious vehicle/transportation training, Nike Missile site, and former private cottages. DHR staff recommended the historic district eligible for listing in the NRHP under Criterion A and C in 2000. A Federal Determination of Eligibility was completed in 2003 (Virginia Department of Historic Resources 2011d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and significant views to the ocean (Klein et al. 2012b).

Figure 9: View from 134-0660, facing southeast.

Dam Neck Annex

This resource is considered eligible for the purposes of the Project under Criterion A as an example of a naval defense facility. Dam Neck Annex is located on the Naval Air Station Oceana, along the Atlantic Ocean in Virginia Beach, and is in close proximity to other joint forces and NATO Commands (Virginia Department Historic Resources 2009b). The property is located on over 1,100 acres of highlands, marshes, and coastal beaches. Several defense buildings are located at the Annex, which has over 3 miles of beachfront views. The property, as whole, is sited on an early-to-mid twentieth-century defense property with associations with military history. Portions of the Dam Neck Annex are sited directly along the ocean coastline with historic associations with ocean views.

Figure 10: View from 134-5046.

House (8304-8306 Ocean Front Avenue)

Sandswept (DHR ID: 134-5089) is located on three lots at the north end of Shore Drive and includes ocean dunes to the east, mature deciduous trees, and sand walkways in Virginia Beach, Virginia. The dwelling was designed by local architect Herbert Smith who was influenced by Frank Lloyd Wright. The two-story, International-style dwelling was constructed in 1955 in concrete and features two blocks connected by a stair connector. The property includes a garage (1955). DHR staff recommended the property eligible for listing in the NRHP under Criterion C in 2005, and it was listed in the Virginia Beach Historic Register in 2007 (Virginia Department of Historic Resources 2005a; City of Virginia Beach n.d.d). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and significant views to the ocean (Klein et al. 2012b).

Figure 11: Photo of 134-5089, facing east.

Chesapeake Light Tower

The Chesapeake Bay Tower (DHR ID: 134-5301) is located in open water 12.83 miles (20.66 kilometers) from the proposed turbines. The Chesapeake Bay Tower is a 120-foot-tall light station constructed in 1965 and is an example of Texas Tower design. The property is referenced in the National Register Multiple Property Listing for Light Stations in the United States (NRHP accepted: 2002) and the property is considered eligible for listing in the NRHP by the Virginia DHR under Criterion C. Modeled after the design of offshore drilling platforms, Texas Towers were prefabricated light stations utilized in open ocean conditions in water greater than 30 feet. The Chesapeake Bay Tower was prefabricated by the Tidewater Raymond Kiewit Company of Norfolk and originally manned by a staff of four people. The structure was later converted to an automated station for data collection for scientific research and for the National Oceanic and Atmospheric Administration (NOAA) marine reporting system. The lighthouse, which was deactivated in 2016 due to its structural condition, was the last Texas Tower light station in service. The light station was sold by the General Services Administration to a private party in 2016.

Figure 12: View from 134-5301, from 2010.

Cavalier Shores Historic District

The Cavalier Shores Historic District (DHR ID: 134-5379) is a suburban historic district occupying 31.5 acres at the north end of Virginia Beach along the oceanfront immediately north of the Cavalier Hotel to which the neighborhood is connected via walkway. The historic district comprises seven blocks of a rectilinear street grid platted in 1927. Lots generally are uniform in size, and houses have consistent setbacks. The period of significance dates from 1927 to 1968. There are 93 contributing resources in the historic district and 27 non-contributing resources. The historic district was listed in the VLR in 2018 and in the NRHP in 2019 under Criteria A and C (Virginia Department of Historic Resources 2019g).

Figure 13: Photo of 134-5379, facing east.

House (4910 Ocean Front Avenue)

This resource is considered eligible for the purposes of the Project under Criterion A as an example of urban development in Virginia Beach and under Criterion C as an example of the Shingle style. The ca. 1930 Shingle-style cottage is an early example of the houses that were built along the Virginia Beach beachfront during this period, and the building retains several characteristics of the-style including shingle cladding, clipped gable roofs with swooping eaves, and cottage-style windows (Virginia Department of Historic Resources 2018ab). The dwelling is situated on a beachfront lot and is oriented west onto Ocean Front Avenue. From the rear of the dwelling, the ocean is visible. The resource is situated on a beachfront lot in a coastal setting with beach access and ocean views. The resource has a historic association with maritime activities.

Figure 14: Photo of 134-5399, facing east.

House (8600 Ocean Front Avenue)

The Faulkner House (DHR ID: 134-5493) is located in a suburban setting on a flat lot defined by its lawn, concrete drive, and oceanfront location in Virginia Beach, Virginia. Constructed ca. 1934, the two-story duplex dwelling rests on a brick foundation, is sheathed in wood shingles, and terminated in an asphalt shingle roof (Virginia Department of Historic Resources 2018o). The property was listed in the Virginia Beach Historic Register in 2003 (City of Virginia Beach n.d.)….

This resource is considered eligible for the purposes of the Project under Criterion A as an example of urban development in Virginia Beach. The ca. 1934 two-story dwelling with no discernable-style is situated on a coastal lot with vegetation and partial-ocean views from the east elevation (Virginia Department of Historic Resources 2018o). The dwelling is oriented south onto Ocean Front Avenue. The resource is situated on a beachfront lot in a coastal setting with beach access and ocean views. The resource has a historic association with maritime activities.

Figure 15: Photo of 134-5493, facing east.

House (100 54th Street)

This resource is considered eligible for the purposes of the Project under Criterion A as an example of urban development in Virginia Beach. The resource is ca. 1956, two-story Colonial Revival-style dwelling situated on a modest oceanfront lot populated with minimal landscaping (Virginia Department of Historic Resources 2018bp). The dwelling is oriented west onto 54th Street and has unobstructed ocean views from the rear (east) elevation. The resource is situated on a beachfront lot in a coastal setting with beach access and ocean views. The resource has a historic association with maritime activities.

Figure 16: Photo of 134-5660, facing east.

House (5302 Ocean Front Avenue)

This resource is considered eligible for the purposes of the Project under Criterion A as an example of urban development in Virginia Beach. The resource is ca. 1936 two-and-one-half story vernacular dwelling located on a modest coastal lot with minimal landscaping (Virginia Department of Historic Resources 2018bu). The dwelling is oriented west onto Ocean Front Avenue and has ocean views from the rear (east) elevation. The resource is situated on a beachfront lot in a coastal setting with beach access and ocean views. The resource has a historic association with maritime activities.

Figure 17: Photo of 134-5665, facing east.

Seahawk Motel

"The Seahawk Motel is an oceanfront hotel that was constructed in 1964 on the site formerly occupied by the 67-room Spotswood Arms resort inn. The Spotswood was built in the 1910s and was torn down in 1962. The Seahawk stands on Lots 5 and 6 of Block 62 of the Virginia Beach Development Company plat. The hotel was owned by Hugh Kitchin Jr., and initially was managed by his son Hugh Kitchin III, and later by William H. Phillips. The elder Kitchin served as a Virginia Beach Councilman (representing the Virginia Beach borough), was a member of the Virginia Beach School Board, and served as the Chairman of the city's Erosion Commission. The Kitchin family had been involved in hotel-motel industry since the 1930s and at the time the Seahawk was built, Mr. Kitchin's mother, Mrs. W.H. Kitchin, operated the Halifax House vacation cottage, formerly located north of the Seahawk at 2600 Atlantic Avenue. The Seahawk Motel is recommended eligible for listing in the NRHP as part of the MPD Virginia Beach Oceanfront Resort Motels and Hotels (1955-1970) as a resource that is located in the Virginia Beach Oceanfront, was built as a motel during the period of significance, and that retains a sufficient amount of its original architectural character to convey its historical appearance. Early brochures for the resort motel highlighted its "100% oceanfront" rooms, the "sun struck protected pool and sun lounge terrace," and the "expansive parking area." Individual guest rooms were equipped with "oceanfront verandas, oceanscope glass window wall, conversation corner (seating), tiled shower tub baths" and luxurious appointments. Corner efficiency rooms had kitchenettes, adjustable circular tables, and connected to adjacent rooms for use by families. The motel was open year-round with golf and beach club privileges included" (Virginia Department of Historic Resources 2020c).

Figure 18: Photo of 134-5857, facing east.

Hilton Washington Inn/Quality Inn and Suites

"The Washington Club Inn Hotel, now the Quality Inn and Suites, was constructed on Lots 1, 2, 3, and 4, Block 1 of the Ocean Lot Investment Company subdivision plat (1922, W. Frank Robertson, president). In 1966, plans were announced for the 124-unit hotel and construction was underway in February of that year. By June, the hotel had opened 40 rooms. The owner and president of the Washington Hotel Corp., was Charles Gardner, a Nashville native. Gardner and his wife Juanita moved to Virginia Beach in the early 1960s, and continued working in the accommodations industry until his retirement in 1975. Mr. Gardner died in 2009. Mr. Gardner's community service to Virginia Beach included terms on City Council, the city's Personnel Board and its Race Relations Committee, the Chesapeake Bay Preservation Board, Virginia Marine Science Museum Board, the Crime Task Force Rotary (lifetime), and Mid-Atlantic Teen Challenge Board (chairman). He also served as president of the Innkeepers of Virginia Beach Association. Construction of the hotel was completed in phases, with the 40-unit south end wing constructed first. In 1968, an additional 20 units (on two floors) were added, and in 1969, a permit was granted for construction of the final 64 units at the motel. Those units opened in 1970. The Quality Inn/Washington Club Inn is recommended eligible for listing in the NRHP as part of the MPD Virginia Beach Oceanfront Resort Motels and Hotels (1955-1970) as a resource that is located in the Virginia Beach Oceanfront, was built as a motel during the period of significance, and that retains a sufficient amount of its original architectural character to convey its historical appearance. The hotel retains its unique semi-circular plan with all oceanfront rooms. Private balconies, a centralized pool area, and office wing remain intact. Exterior materials appear to be original and any renovations to railings or windows have been made in-kind. Additions to the hotel include two small food service areas (one on each wing) near the pool. The wooden fence between the pool area and the boardwalk has recently been reconstructed" (Virginia Department of Historic Resources 2020i).

Figure 19: Photo of 134-5863, facing east.

Virginia House

"When originally built, the Virginia House Residences incorporated at least some motel units, though they have since been converted to condominiums. The Virginia House Motel is listed for the first time in the 1966 Virginia Beach City Directory but does not appear in the 1971 Accommodation Directory. It continues to be listed in the City Directory under the Motels heading in the early 1970s, however. It seems likely that it was built to incorporate a variety of functions; City Directories appear to list some private offices within the Virginia House as well, and, to the recollection of local residents, it was always year-round apartments. It appears to have good integrity to the 1960s on the exterior. It was evaluated under the Multiple Property Document Virginia Beach Oceanfront Resort Motels and Hotels (1955-1970), but, because it was built to serve multiple uses and not as a resort hotel, it is not eligible under the MPD. Further survey would be necessary to evaluate it for individual eligibility" (Virginia Department of Historic Resources 2020k). The resource has a historic association to maritime setting as a recreational lodging resource.

Figure 20: Photo of 134-5865, facing east.

Cutty Sark Motel Efficiencies

> "The Cutty Sark was built as the Crest Kitchenette Motel in 1963 by Mr. William T. Winner, owner and general contractor. The architect was William Burton Alderman and the plans are dated February 17, 1963. Alderman was also the architect for several other motels in Virginia Beach, including Jefferson Manor Motel Apartments, the Blue Marlin Lodge, the Plantation Motel, and the Golden Sands Motel. Winner built the motel as something to keep him busy during retirement and, at the time, it had the largest units on the oceanfront and high-end kitchen efficiencies. He soon realized that he missed the construction business and sold the Crest Kitchenette Motel to Mr. Lit Hudgins, a local developer. Hudgins was responsible for changing the name to the Cutty Sark, which, depending on which story you believe, is either a nod to a famous sailing ship or a bottle of scotch. The Cutty Sark is an excellent example of the type of small, independently-owned, family-operated motels that were built along the oceanfront in the 1950s and 1960s and it retains good integrity to the period. It is recommended individually eligible for listing on the Registers, and is also eligible under the Multiple Property Document, Virginia Beach Oceanfront Resort Motels and Hotels (1955-1970). It retains such significant character-defining features as concrete block construction; original flat roof; visually differentiated units; original private concrete balconies with exposed concrete beams; plate glass windows; original footprint and three-story height; stacked/vertically aligned façade; and Modern-inspired-style" (Virginia Department of Historic Resources 2020l)."

Figure 21: Photo of 134-5866, facing east.

Econo Lodge/Empress Motel

"The Econo Lodge was built in 1965 as the Empress Motel. It was part of a boom in resort motel construction along the Virginia Beach oceanfront following the opening of the Chesapeake Bay Bridge Tunnel in 1964. One of the co-founders was Norman T. Cox who is also listed as the manager in the 1966 City Directory; in the 1971 Accommodation Directory Mrs. Norman Cox is listed as the manager. The Directory indicates that the Empress had 38 air conditioned units, each with a private ocean front balcony. The property also boasted a heated pool and sun deck, and advertised motel rooms, efficiencies, motor apartments, and bridal suites. The former Empress Motel was surveyed and evaluated under the Multiple Property Document, Virginia Beach Oceanfront Resort Motels and Hotels (1955-1970). In spite of some alterations to stylistic details, the motel retains its original footprint and several character-defining features of a resort motel as defined in the MPD including concrete construction; original, multi-story height; concrete balconies, both private, oceanfront balconies and continuous balconies forming exterior corridors along the west elevation; visually distinctive individual units that are stacked/vertically aligned; plate glass windows; sun deck and pool; on-site parking; and separate office building with porte cochère. Therefore, it is considered eligible for listing on the Registers under the MPD" (Virginia Department of Historic Resources 2020m).

Figure 22: Photo of 134-5869, facing east.

Oceans II Condominiums/Aeolus Motel

"The Aeolus Motel was built in 1955-56 and is the oldest remaining mid-century motel along the oceanfront. It was built by former Virginia Beach mayor Paul F. (Pat) Murray and operated by he and his sons, Arthur E. Murray and P.F. Murray, Jr. It was designed by Ft. Lauderdale architectural firm Gambel, Pownall, & Gilroy and opened for business in the spring of 1956 as one of the first motels in Virginia Beach to incorporate a tropical Florida vibe. In 1963, Murray sold the motel to Mr. and Mrs. George Davis, who had previously operated the Ebbtide Motor Lodge at 20th Street and the oceanfront. In 1973, the Aeolus was sold to developer E. Howland Smith II, president of Oceans Condominium Corp., which developed the Oceans condominium tower just across Atlantic from the Aeolus. A major remodel in 1974 by architects Williams & Tazewell (who were also the architects for the Oceans tower and the Oceans Club, adjacent to the Aeolus) converted the motel into studio efficiency condominiums called Oceans II. It is eligible for listing on the Registers under the Multiple Property Document, Virginia Beach Oceanfront Resort Motels and Hotels (1955-1970) as an example of the Resort Motel property type that retains such character defining features as multi-story height, masonry construction, concrete balconies, plate glass windows, identifiable units that are vertically aligned, on-site parking, and Modern-inspired stylistic elements. From the exterior, it remains recognizable when compared to 1950s and 60s photographs" (Virginia Department of Historic Resources 2020p).

Figure 23: Photo of 134-5872, facing east.

Sandbridge Historic District

The City of Virginia Beach has documented selected buildings contained in the community of Sandbridge as part of their on-going municipal architectural survey efforts. Architectural survey data for the Sandbridge community were recorded using VCRIS forms and entered into the Virginia inventory system maintained by VDHR. Formal evaluation by VDHR of the individual significance or potential collective significance of this area as a historic district is not reflected in the database. However, recommendations contained in the VCRIS forms concluded that while individual resources lacked significance, the community, as a whole, possesses historic importance as among the City's last-planned communities with beachfront access and limited commercial development, particularly when initial development (ca. 1958) is combined with the more recent development (1970-85) in the community. Formal consideration of the area as a whole as a historic district was recommended in the near future (2030). Based on this recommendation, the importance of the community to the history of the City of Virginia Beach, the long-standing history of local municipal preservation interest, and the importance of maritime setting to the character of the area, the Sandbridge area was considered as a potential historic district for the purposes of the current assessment. This approach is consistent with methodology adopted for properties surveyed but not yet evaluated, and recognizes the potential local historical significance of the Sandbridge area to the development of the City of Virginia Beach under Criteria A of the National Register Criteria for Evaluation (36 CFR 60 [a-d]).

A formal boundary delineation of the potential historic district has not been made to date. Maps accompanying this assessment include the neighborhood boundaries for reference and anticipate that the definition of formal boundaries will accompany a formal determination of National Register eligibility. The potential district is anticipated to include residential development; Sandbridge Beach, an oceanfront amenity of approximately 4.5 miles; and Fire Station 17, a two-bay firehouse constructed by the residents of Sandbridge in 1975 and currently manned by the Virginia Beach Fire Department. The Sandbridge Lifesaving Station (DHR ID 134-0596), a surveyed but unevaluated property, was among the properties documented by the City of Virginia Beach during the first architectural survey of the south section of the City in 1992. Sandbridge is a physically isolated seaside residential community distinguished by its beach front and ocean

orientation. The station, constructed in 1920, is recorded as among the oldest surviving lifesaving facilities in Virginia Beach and is closely associated with the recreational history and orientation of the Sandbridge community during the twentieth century. Fire Station 17 replaced an earlier fire station and currently houses the Sandbridge Lifeguard Service (summer) and the Sandbridge Volunteer Rescue Squad.

Sandbridge is a residential coastal community in south Virginia Beach accessible from Sandbridge Road. The community is located on the Currituck Banks Peninsula separating North Bay from the Atlantic Ocean. Predominantly single-family dwellings on single building lots are organized along a densely developed attenuated grid plan that extends along the peninsula from the Atlantic Ocean beach to the North Bay, with most recent development extending into the bay along irregular cul-de-sacs. Beach and waterfront orientation dominates the architectural character of the community, which comprises low scale, one- to three-story, frame dwellings of irregular size and massing. Dwellings occupying lots between Sandbridge Road and the beach are sited with direct beach access and sweeping ocean views. The compressed land area and development plan affords ocean views from the majority, if not all, dwellings in the community.

<Placeholder for photo>

Currituck Beach Lighthouse and Lighthouse Complex

The Currituck Beach Lighthouse and Lighthouse Complex (SITE ID: CK0001, CK0106) is a historic district located on a 30.58-acre property defined by maintained grounds and natural vegetation in Corolla, North Carolina. Completed in 1875, it is the northernmost lighthouse in North Carolina. The 158-foot-tall lighthouse is constructed with red bricks, rests on a hexagonal foundation, and features a glass lantern with metal roof and finial. Windows are present on the lighthouse as well as metal brackets with pendants. A one-story brick office building is connected to the base of the lighthouse and provides access to the structure. A two-story Keeper's House was constructed in 1876 and is located west of the lighthouse occupying a Greek cross plan and clad in wood weatherboard. The Keeper's House includes two rainwater cisterns and a storehouse as outbuildings. A second dwelling, the Small Keeper's House, was constructed in 1870 for the Long Point Lighthouse Station and was relocated to the site in the 1920s. The Small Keeper's House includes a privy and cistern as outbuildings. Additionally, a modern storehouse dating to ca. 1990 is located on site. The lighthouse, office building, Keeper's House, and a cistern were listed in the NRHP in 1973 as the Currituck Beach Lighthouse. The historic district was expanded in 1999 to include additional buildings and structures (Smith 1999). The property is identified in Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-

Atlantic, South Atlantic, and Florida Straits: Volume II: Appendices as possessing a significant maritime setting and significant views to the ocean (Klein et al. 2012b).

Figure 24: View from CK0106.

APPENDIX B

Memorandum: CVOW-C Cumulative Assessment Visual Material (February 17, 2022)

This page intentionally left blank.

Dominion Energy Inc.
707 E Main Street
Richmond, VA 23219

Memorandum

To: John McCarty, BOEM
From: Jenn Chester, Janelle Lavallee, Tetra Tech, Inc.
William Kinnan, Dominion Energy
Date: November 12, 2021
Project: Coastal Virginia Offshore Wind Commercial Project
Subject: Cumulative Visual Effects Approach

Attachments:
A. Request letter from BOEM dated September 2, 2021
B. Cumulative Effects Simulation Layout Template Sheets

Background and Purpose

In 2020, The Virginia Electric and Power Company, doing business as Dominion Energy Virginia (hereinafter referred to as Dominion Energy) contracted with Tetra Tech, Inc. (Tetra Tech) to conduct a visual impact assessment (VIA) for the Coastal Virginia Offshore Wind (CVOW) Commercial Project (Project). The Project (Lease Area OCS-A 0483) is located within one of the Bureau of Ocean Energy Management (BOEM) designated Renewable Energy Lease Areas off the eastern coast of Virginia and North Carolina. BOEM released its Notice of Intent to prepare an Environmental Impact Statement for the Project in July 2021.

In September 2021, BOEM requested that Dominion Energy develop photographic simulations to support an analysis of potential cumulative visual effects (BOEM's request is included in Attachment A). Per BOEM's request:

> *Cumulative Effects (CE) simulations should portray the foreseeable future condition (BOEM authorized development as well as other development approved by other jurisdictions) as accurate as possible illustrating how individual projects contribute to the incremental changes to the viewshed that may occur over a defined timeframe*

The Cumulative Effects simulations would depict the offshore components proposed for the Project (i.e., wind turbine generators and offshore substations) and best-available layout details for other BOEM-identified proximate planned projects. Where offshore substation details are unavailable for potentially contributing planned projects, for example, offshore substation(s) would be substituted with a wind turbine generator, per BOEM's recommendations. The simulations will be developed based upon information and requirements in Attachment A, including:

- Simulation sequencing and relevant information for foreseeable planned projects
- Monopile substructure for all projects
- Simulation field of view and required views (stationary, left, right)

The purpose of this memorandum is to describe Tetra Tech's proposed approach for selecting and preparing the Cumulative Effects simulations for BOEM's review and comment before work begins to produce the simulations. Following BOEM's review, a work session with BOEM is expected to confirm the approach and refine next steps.

Potentially Contributing Offshore Wind Projects Analyzed

One potentially contributing offshore wind planned project was included in this analysis: Kitty Hawk Offshore Wind, which is the only other proximate project, and which has submitted a Construction and Operations Plan (COP) to BOEM that is publicly available. Kitty Hawk LLC (Kitty Hawk) is proposing an approximately 2,500-megawatt (MW) wind energy facility within the lease area (OCS-A 0508) located 20.7 nautical miles (nm) south of the Project. The Project and Kitty Hawk are shown on Figure 1, below.

Table 1. Contributing Project Specifications

	Kitty Hawk Offshore Wind
Lease Area Number	OCS-A 0508
Max. tip height	1,042 feet (ft)
Hub height	574 ft
Rotor diameter	935 ft
Wind turbine spacing	WTGs spaced 1.21 nm apart with rows spaced 1.08 nm apart

Intervisibility Assessment

To support the assessment of potential cumulative visual effects (CE), Tetra Tech first conducted an intervisibility assessment in ArcGIS to understand the identified contributing wind project's lease area locations relative to one another and the technical parameters of each project. Tetra Tech then analyzed several key observation point (KOP) locations from the Project Visual Impact Assessment (VIA) in relation to Kitty Hawk's proposed wind turbine configuration, while factoring in the limitations of visibility due to earth curvature. The results of this analysis are shown in Table 2, below.

Tetra Tech then determined which KOP locations studied for the CVOW Project VIA potentially included views of a combination of the contributing projects.

Table 2. Distance from KOPs Considered to Nearest Wind Turbine, by Project

	Camera Elevation	CVOW Offshore Wind (mi)	Distance CVOW WTG Obscured (mi)	Kitty Hawk (mi)	Distance Kitty Hawk Obscured (mi)
Virginia					
Marriott Beach Oceanfront Hotel	236	28	55	45	58.4
Beach Views at State Military Reservation	20	27.7	41.6	42.2	44.9
False Cape State Park	15	27.1	40.9	32.5	44.3
North Carolina					
Currituck Beach Light House	155	36.8	51.4	27.8	54.8
Whale Head bay Residential Area	20	39.1	41.6	28.4	44.9

Notes:

1. Turbine visibility determined based on turbine specifications provided by BOEM and accounts for Earth curvature calculation to determine amount obscured.
2. Grey shaded rows indicate the KOPs selected for further cumulative viewshed analysis.

After distance and earth curvature visibility factors were considered, specific viewshed 'cones' were applied to the selected KOPs, to determine how a person's field of view would perceive the different projects across the horizon. The field of view cones as applied to the selected KOPs are shown in Figure 1.

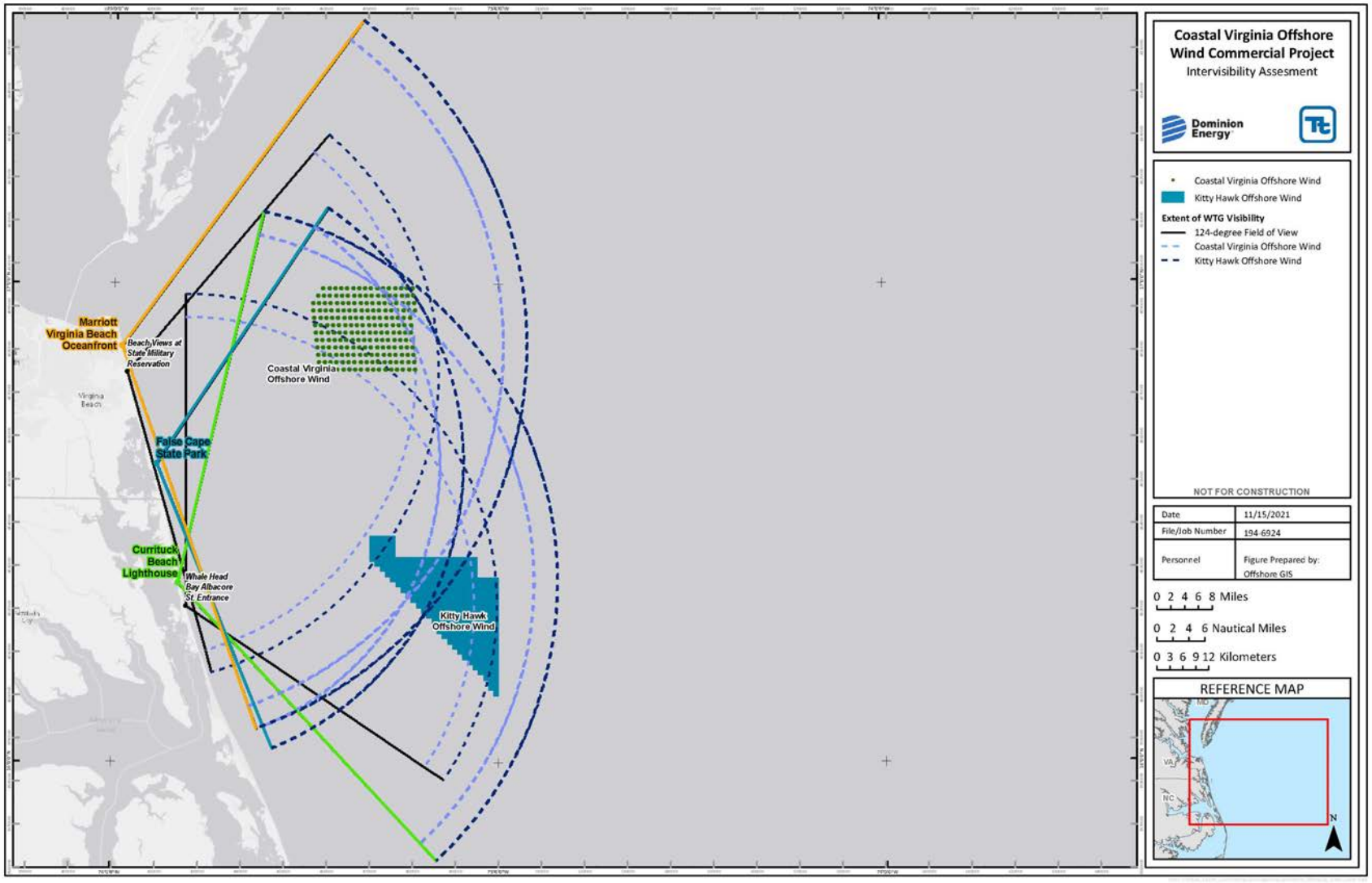


Figure 1. Coastal Virginia Offshore Wind Commercial Project candidate KOPs with prescribed 124-degree fields of view (FOV) applied. FOV coloration conveys KOPs selected for Cumulative Effects simulation production.

Recommended Key Observation Points

Based on the analysis described above, Tetra Tech recommends the following KOPs be carried forward for development of Cumulative Effects photo simulations, because they potentially have views of both the Project and Kitty Hawk:

- Marriott Virginia Beach Oceanfront Hotel, Virginia
- False Cape State Park, Virginia
- Currituck Beach Lighthouse, North Carolina

Cumulative Effects Photo Simulation Layout Template

CE simulation layout templates are provided in Attachment B, for review and discussion. Simulations would be developed following discussion with BOEM. The Cumulative Effects simulation layout templates for each KOP include the following:

- Inset map depicting the KOP location, offshore wind energy project lease areas, project wind turbine layout configuration (if known), and the prescribed 124-degree cone of vision.
- Existing and Simulated images formatted as directed by BOEM to capture a 124-degree (h) by 55-degree (v) field of view (FOV).
- Location geographic details
- Photograph details
- Identification of the wind turbine (or other element) that would be in the center of the cone of vision's view
- Graphic comparison of wind turbine dimensions for each offshore project analyzed

Commercial Virginia Offshore Wind
Recommendations for Cumulative Effects Simulations
Prepared by John McCarty, Connie Barnett, Justin Bedard, and Ian Slayton
Revised September 2, 2021

Commercial Virginia Offshore Wind (CVOW) Cumulative Effects Simulation Recommendations

Cumulative effects (CE) simulations should portray the foreseeable future condition (BOEM authorized development as well as other development approved by other jurisdictions) as accurate as possible illustrating how individual projects contribute to the incremental changes to the viewshed that may occur over a defined timeframe. The simulations are used for project's EIS analysis of cumulative visual effects to seascapes, landscapes, visually sensitive settings, and historic properties. The information is also instrumental during Tribal consultations when explaining incremental changes to the viewshed and how a particular project fits into the overall context of the leasing area.

1. Conduct an intervisibility viewshed assessment to confirm those projects listed below contribute to the changes of the offshore ocean character associated with the CVOW project. Also, to confirm that other projects do not encroach on the CVOW affected viewshed.
   - Potential projects include:
     - North of CVOW
       - No projects share the viewshed north of CVOW
         (US Wind's 15 miles extended southern edge of a 40-mile viewshed touches the edge of CVOW's northern 40-mile viewshed)
     - South of CVOW
       - Avangrid Renewables (Kitty Hawk) (OCS – A 0508)

2. Simulation sequencing and relevant information: the goal for CE simulations is to illustrate incremental change using the most accurate information available for wind turbine generators (WTG) and offshore substations (OSS) sizing and layout configurations. The following summarizes the information to use depending on the project's status or phase of project development, and a list of those projects thought to fit the description.

   - BOEM authorized projects: simulate decision in the ROD
     - Model of WTG
     - Maximum height and width of WTGs and OSSs
     - Final WTG and OSS layout configuration

     NO PROJECTS OF THIS TYPE IN THIS GEOGRAPHIC AREA

   - Projects under BOEM review where project information has been disclosed to the public, or is scheduled for disclosure before the planned date for releasing the CVOW Draft EIS:
     - Model of WTG proposed in the COP VIA
     - Proposed maximum height and width of WTGs and OSSs (use the taller WTG scenario for those projects that simulate multiple WTG alternatives)
     - Proposed WTG and OSS layout configuration

     Avangrid Renewables (Kitty Hawk) (NOI: 09/30/2021)

   - Lease areas where project information is not yet submitted or released to the public:
     - Use the following dimensions for the wind turbine (based on information released for wind turbine model GE Haliade-X 14 MW)

        - 853 feet height,
        - 492 ft. hub height
        - 722 ft. rotor-diameter
    - Maximum build out configuration scenario on a 1 nm x 1 nm spacing
    - Substitute OSS with a WTG

NO PROJECTS OF THIS TYPE IN THIS GEOGRAPHIC AREA

3. Assume monopile substructure for all projects.
4. Simulations should be a 124° horizontal by 55° vertical field of view. If the project occupies an area that exceeds the 124° x 55° field-of-view, then more than one simulation may be needed to capture the sequence of successive viewing from left to right.
5. Simulations would include three views that characterize the stationary view (person viewing with turning his/her head) and successive viewing (viewer standing in the same location turning his/her head from left to right).
6. In addition to the customary information (e.g., location name and coordinates, weather conditions, direction of view, camera elevation, distance to the nearest and farthest WTG with a graphic illustrating feet and percent visible of each, etc.), please include the following for each lease covered within the simulations:
    - WTG blades position should be oriented in full frontal view toward the key observation point (KOP)
    - Locator map insert illustrating:
        - the viewer orientation at each KOP,
        - cone of view from the KOP,
        - number and configuration of WTGs and OSSs (color-coded) within the different leases
        - color code the individual projects represented in the simulation with a unique color signature,
        - delineate the WTGs seen from the KOP apart from those unseen using an arc that separates the two, and screen back those that are unseen.
7. Prepare a total of 3 CE simulation series per KOP in the sequence described below to illustrate incremental effects:
    1) CVOW without other foreseeable future changes
    2) Full lease build-out showing foreseeable projects with CVOW
        a. Avangrid Renewables (Kitty Hawk)
            i. 42 - 20 MW WTGs
                1. Total height 1,042 feet above sea-level;
                2. hub height 574 ft;
                3. rotor diameter 935 ft;
            ii. WTGs spaced 1.21 nm apart with rows spaced 1.08 nm apart
            iii. 4 large OSSs
                1. 164 feet high by

2. 164 feet wide by
3. 263 feet long

b. Avangrid Renewables (Kitty Hawk) Phase II, for the remaining 60% of the lease area assume the same size of WTG and spacing proposed for Phase I:
   i. 96 – 20 MW WTGs
      1. Total height 1,042 feet above sea-level;
      2. hub height 574 ft;
      3. rotor diameter 935 ft;
   ii. WTGs spaced 1.21 nm apart with rows spaced 1.08 nm apart

3) Full lease build-out showing foreseeable projects implementation not including CVOW.

8. Include a brief narrative describing the assumptions on the simulations.
9. The developer should submit a written description for developing the simulations that incorporates the above information, identifies proposed KOPs, and provides sample simulation templates for BOEM to review for completeness and readability.

Coastal V ind Commercial Project

Existing Condition

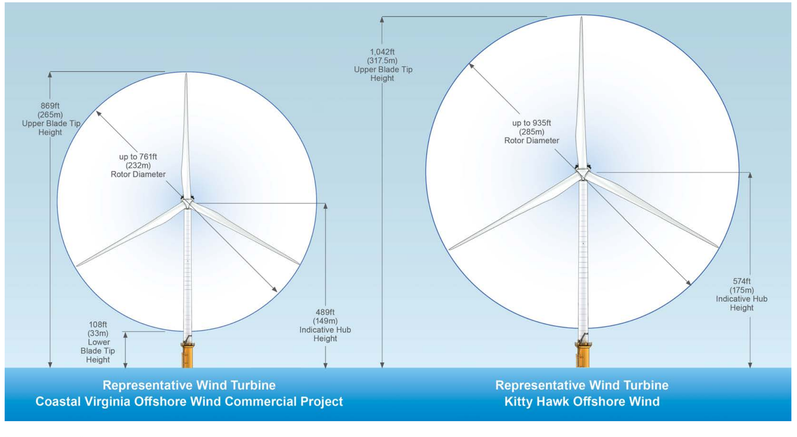
View of the existing condition at Marriott Virginia Beach Oceanfront

Locator Map

Legend

Visible	Not Visible	
		WTG Location
●	●	Coastal Virginia Offshore Wind Commercial Project
●	●	Kitty Hawk Offshore Wind
●	●	Pilot Project Turbine
□	■	OSS
■	□	Chesapeake Light Tower
●		Photo Point

Turbine Data



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	55 miles
Kitty Hawk Wind WTG	58.4 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Photograph Information

. iewpoint Location:	Marriott Oceanfront
Date of Photograph:	September 29, 2021
Time of Photograph:	10:56AM (EDT)
Weather Condition:	Fair
Latitude:	36.8617° N
Longitude:	-75.9856° W
Viewing Direction:	East
Ground Elevation + Tripod Height:	236 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

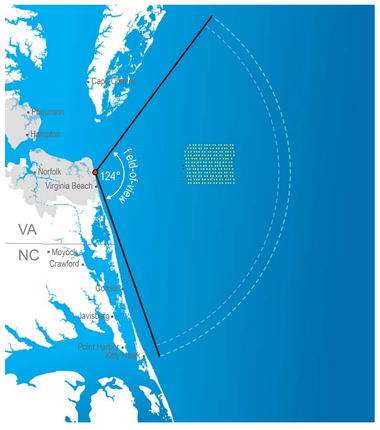
Simulation

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

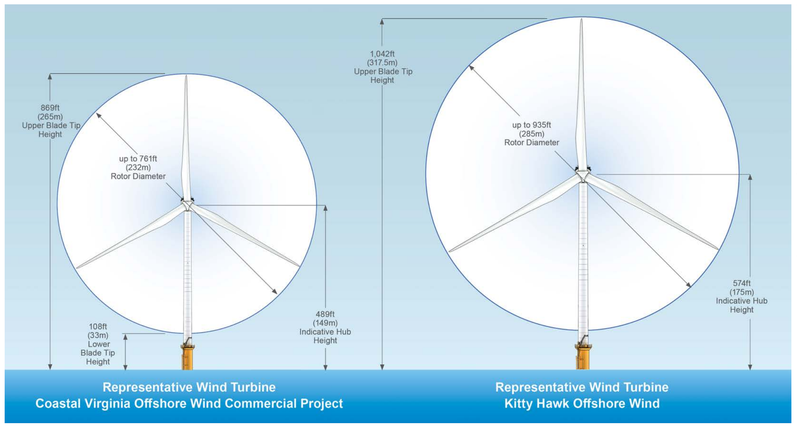
Locator Map

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Turbine Data



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	55 miles
Kitty Hawk Offshore Wind WTG	58.4 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Photograph Information

Viewpoint Location:	Marriott Oceanfront
Date of Photograph:	September 29, 2021
Time of Photograph:	10:56AM (EDT)
Weather Condition:	Fair
Latitude:	36.8617° N
Longitude:	-75.9856° W
Viewing Direction:	East
Ground Elevation + Tripod Height:	236 feet

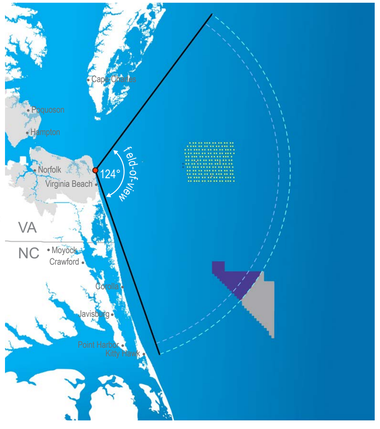
*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

Simulation

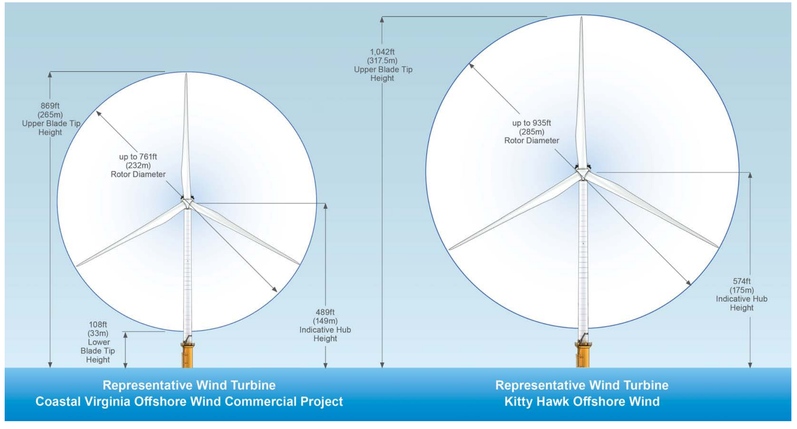
Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Turbine Data

Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	55 miles
Kitty Hawk Offshore Wind WTG	58.4 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Viewpoint Location:	Marriott Oceanfront
Date of Photograph:	September 29, 2021
Time of Photograph:	10:56AM (EDT)
Weather Condition:	Fair
Latitude:	36.8617° N
Longitude:	-75.9856° W
Viewing Direction:	East
Ground Elevation + Tripod Height:	236 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

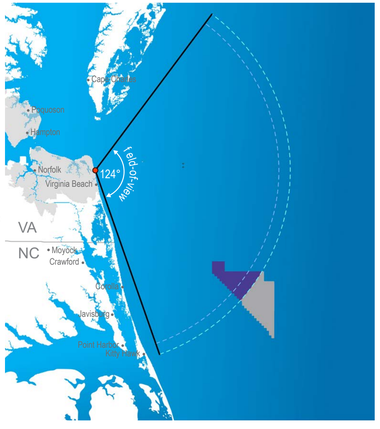
Photograph Information

Simulation

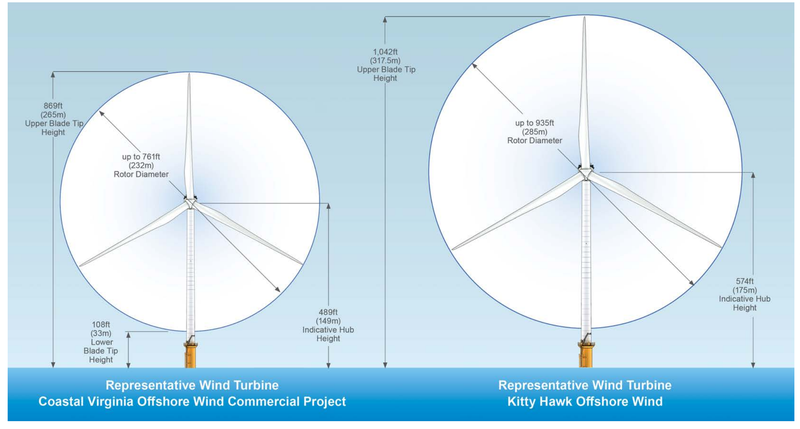
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	55 miles
Kitty Hawk Offshore Wind WTG	58.4 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	Marriott Oceanfront
Date of Photograph:	September 29, 2021
Time of Photograph:	10:56AM (EDT)
Weather Condition:	Fair
Latitude:	36.8617° N
Longitude:	-75.9856° W
Viewing Direction:	East
Ground Elevation + Tripod Height:	236 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

Photograph Information

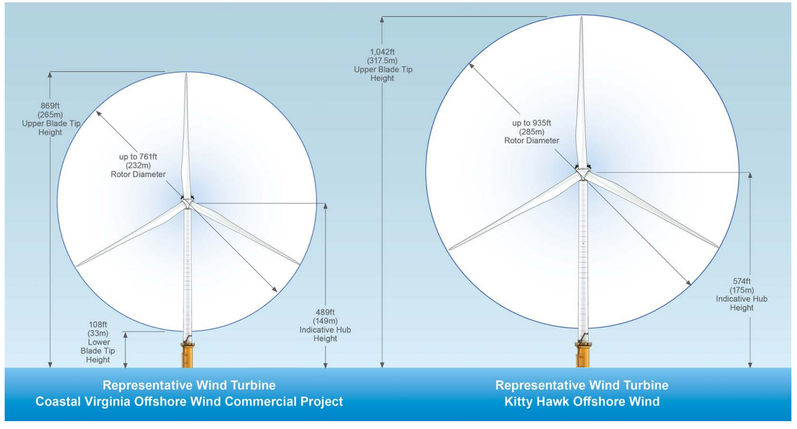
Existing Condition

View of the existing condition at False Cape State Park

Legend

Visible	Not Visible	
●	●	WTG Location
●	●	Coastal Virginia Offshore Wind Commercial Project
●	●	Kitty Hawk Offshore Wind
●	●	Pilot Project Turbine
□	■	OSS
■	□	Chesapeake Light Tower
●		Photo Point

Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	40.9 miles
Kitty Hawk Offshore Wind WTG	44.3 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	False Cape State Park
Date of Photograph:	September 26, 2021
Time of Photograph:	12:55pm (EDT)
Weather Condition:	Clear
Latitude:	36.6232° N
Longitude:	-75.8911° W
Viewing Direction:	Southeast
Ground Elevation + Tripod Height:	15 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

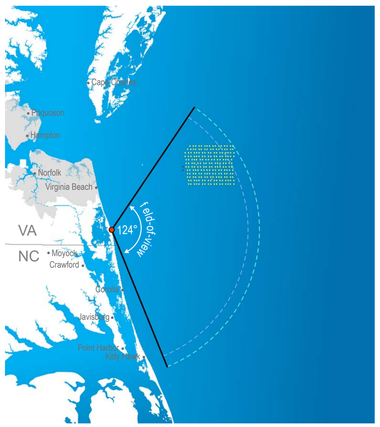
Photograph Information

Simulation

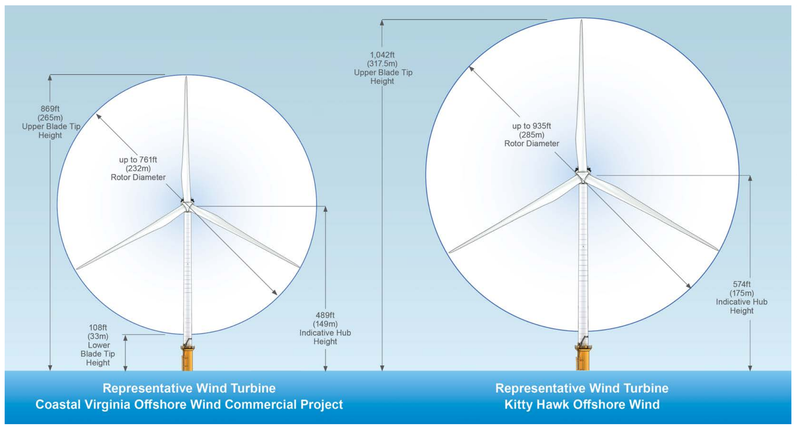
Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

Legend

Visible	Not Visible	
		WTG Location
●	●	Coastal Virginia Offshore Wind Commercial Project
●	●	Kitty Hawk Offshore Wind
●	●	Pilot Project Turbine
□	■	OSS
■	□	Chesapeake Light Tower
●		Photo Point



Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	40.9 miles
Kitty Hawk Offshore Wind WTG	44.3 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	False Cape State Park
Date of Photograph:	September 26, 2021
Time of Photograph:	12:55pm (EDT)
Weather Condition:	Clear
Latitude:	36.6232° N
Longitude:	-75.8911° W
Viewing Direction:	Southeast
Ground Elevation + Tripod Height:	15 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

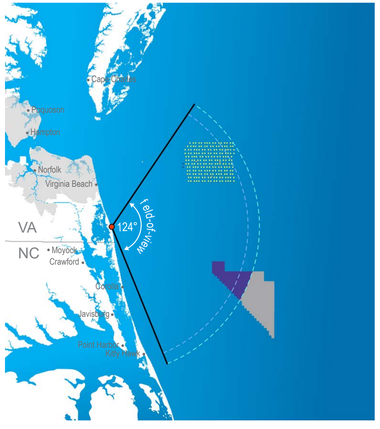
Photograph Information

Simulation

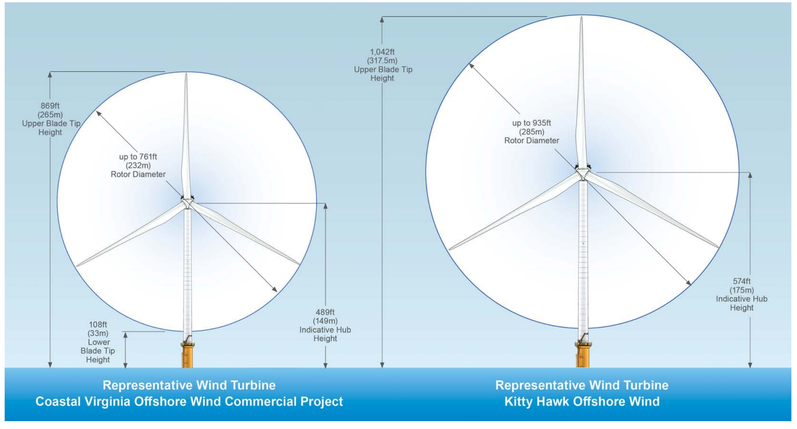
Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	40.9 miles
Kitty Hawk Offshore Wind WTG	44.3 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	False Cape State Park
Date of Photograph:	September 26, 2021
Time of Photograph:	12:55pm (EDT)
Weather Condition:	Clear
Latitude:	36.6232° N
Longitude:	-75.8911° W
Viewing Direction:	Southeast
Ground Elevation + Tripod Height:	15 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

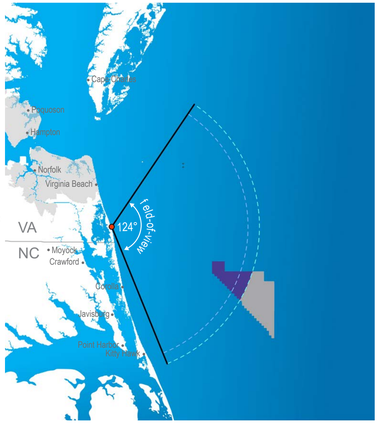
Photograph Information

Simulation

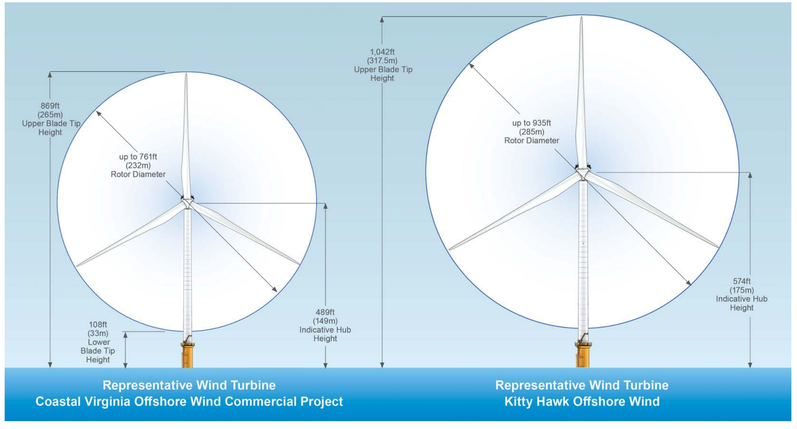
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	40.9 miles
Kitty Hawk Offshore Wind WTG	44.3 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	False Cape State Park
Date of Photograph:	September 26, 2021
Time of Photograph:	12:55pm (EDT)
Weather Condition:	Clear
Latitude:	36.6232° N
Longitude:	-75.8911° W
Viewing Direction:	Southeast
Ground Elevation + Tripod Height:	15 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

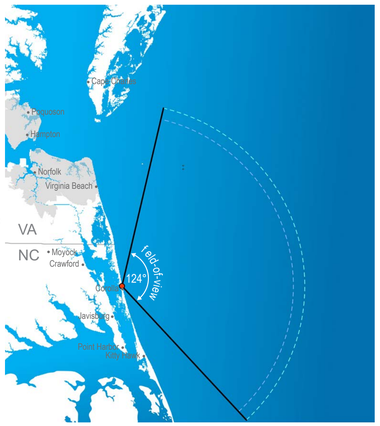
Photograph Information

Existing Condition

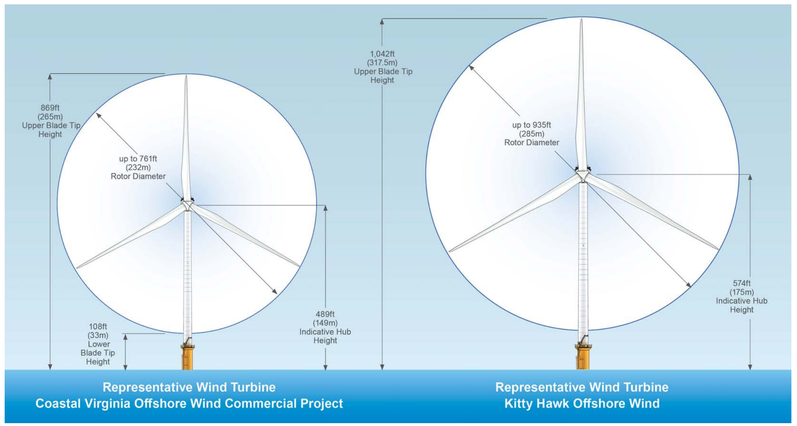
View of the existing condition at Currituck Beach Lighthouse

Legend

Visible	Not Visible	
		WTG Location
●	●	Coastal Virginia Offshore Wind Commercial Project
●	●	Kitty Hawk Offshore Wind
●	●	Pilot Project Turbine
□	■	OSS
■	□	Chesapeake Light Tower
●		Photo Point



Locator Map



Turbine Data

Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	51.4 miles
Kitty Hawk Offshore Wind WTG	54.8 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Viewpoint Location:	Currituck Beach Lighthouse
Date of Photograph:	July 7, 2021
Time of Photograph:	2:40 PM (EDT)
Weather Condition:	Clear
Latitude:	36.3767° N
Longitude:	-75.8307° W
Viewing Direction:	Northeast
Ground Elevation + Tripod Height:	155 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

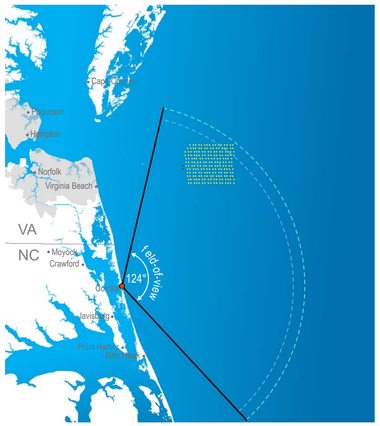
Photograph Information

Simulation

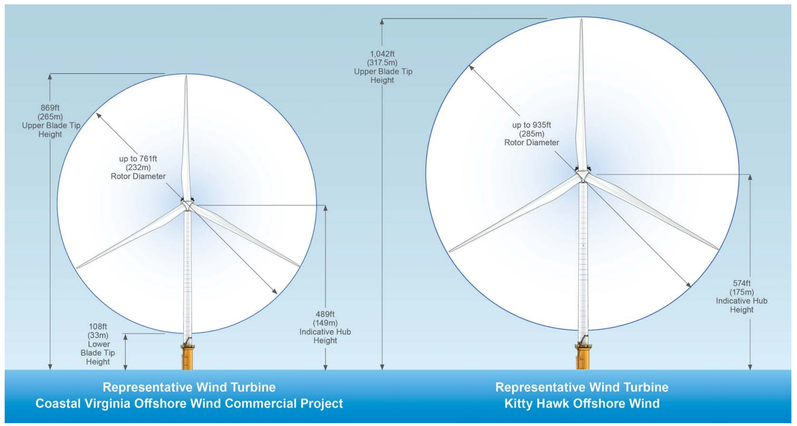
Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	51.4 miles
Kitty Hawk Offshore Wind WTG	54.8 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	Currituck Beach Lighthouse
Date of Photograph:	July 7, 2021
Time of Photograph:	2:40 PM (EDT)
Weather Condition:	Clear
Latitude:	36.3767° N
Longitude:	-75.8307° W
Viewing Direction:	Northeast
Ground Elevation + Tripod Height:	155 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

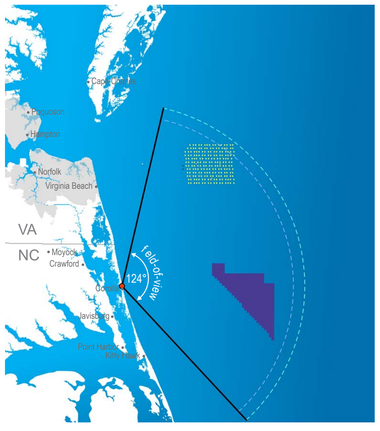
Photograph Information

Simulation

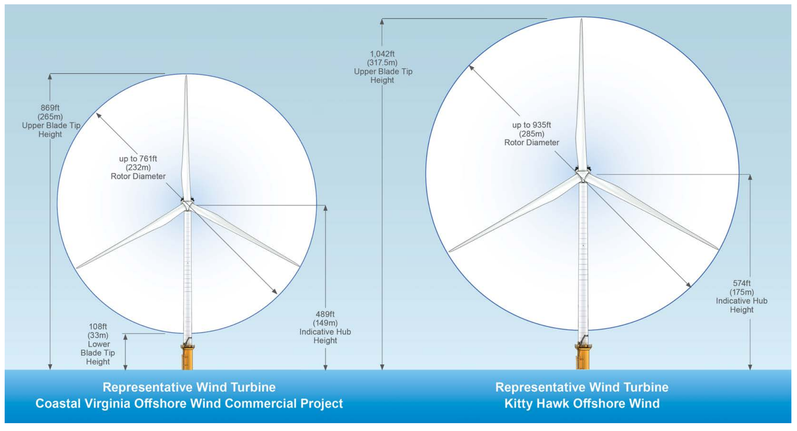
Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Turbine Data

Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	51.4 miles
Kitty Hawk Offshore Wind WTG	54.8 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Viewpoint Location:	Currituck Beach Lighthouse
Date of Photograph:	July 7, 2021
Time of Photograph:	2:40 PM (EDT)
Weather Condition:	Clear
Latitude:	36.3767° N
Longitude:	-75.8307° W
Viewing Direction:	Northeast
Ground Elevation + Tripod Height:	155 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

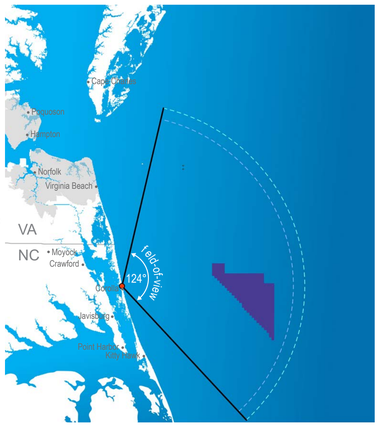
Photograph Information

Simulation

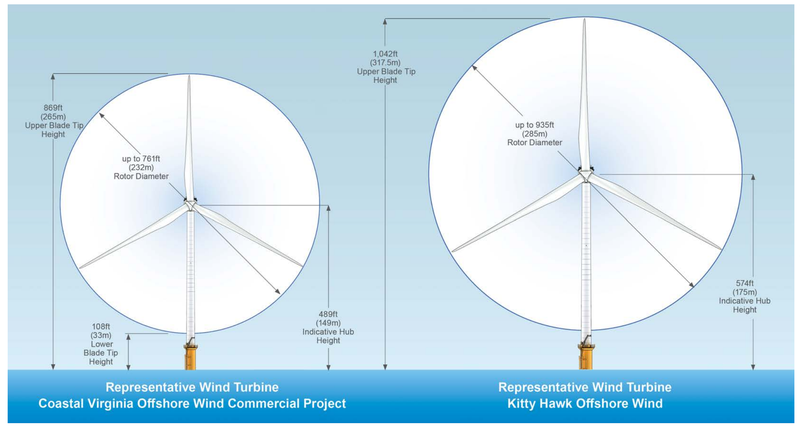
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

Legend

Visible	Not Visible	
		WTG Location
		Coastal Virginia Offshore Wind Commercial Project
		Kitty Hawk Offshore Wind
		Pilot Project Turbine
		OSS
		Chesapeake Light Tower
		Photo Point



Locator Map



Distance Obscured (mi)	
Coastal Virginia Offshore Wind Commercial Project WTG	51.4 miles
Kitty Hawk Offshore Wind WTG	54.8 miles

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

Turbine Data

Viewpoint Location:	Currituck Beach Lighthouse
Date of Photograph:	July 7, 2021
Time of Photograph:	2:40 PM (EDT)
Weather Condition:	Clear
Latitude:	36.3767° N
Longitude:	-75.8307° W
Viewing Direction:	Northeast
Ground Elevation + Tripod Height:	155 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

Photograph Information

Dominion Energy Inc.
707 E Main Street
Richmond, VA 23219

Memorandum

To: John McCarty, BOEM
From: Jenn Chester, Janelle Lavallee, Tetra Tech, Inc.
William Kinnan, Dominion Energy
Date: February 17, 2021
Project: Coastal Virginia Offshore Wind Commercial Project
Subject: Cumulative Visual Effects Simulations

Attachments:

A. Request letter from BOEM dated September 2, 2021
B. Cumulative Visual Effects Simulations
C. Cumulative Effects Simulations Approach Memorandum dated November 12, 2021

Background and Purpose

In 2020, The Virginia Electric and Power Company, doing business as Dominion Energy Virginia (hereinafter referred to as Dominion Energy) contracted with Tetra Tech, Inc. (Tetra Tech) to conduct a visual impact assessment (VIA) for the Coastal Virginia Offshore Wind (CVOW) Commercial Project (Project). The Project (Lease Area OCS-A 0483) is located within one of the Bureau of Ocean Energy Management (BOEM) designated Renewable Energy Lease Areas off the eastern coast of Virginia. BOEM released its Notice of Intent to prepare an Environmental Impact Statement for the Project in July 2021.

In September 2021, BOEM requested that Dominion Energy develop photographic simulations to support an analysis of potential cumulative visual effects (BOEM's request is included in Attachment A). Per BOEM's request:

> *Cumulative Effects (CE) simulations should portray the foreseeable future condition (BOEM authorized development as well as other development approved by other jurisdictions) as accurate[ly] as possible illustrating how individual projects contribute to the incremental changes to the viewshed that may occur over a defined timeframe.*

Cumulative Visual Effects Simulations Approach and Assumptions

Cumulative visual effects simulations developed to fulfill BOEM's request are included in Attachment B.

A detailed description of the planned approach to prepare the cumulative visual effects simulations for the Project was provided in a memorandum submitted to BOEM in November 2021, which is included in Attachment C. Through the course of developing the simulations, however, Tetra Tech made the following additions and/or modifications to the original approach, in consultation with Dominion and BOEM:

Dominion Energy Inc.
707 E Main Street
Richmond, VA 23219

1. Cumulative effects simulations were prepared for all five KOP locations identified during the initial intervisibility assessment: three locations in Virginia and two in North Carolina.

2. In addition to the original Kitty Hawk Offshore Wind Project WTG layout corresponding to its published COP, BOEM provided additional WTG layout assumptions for the proposed full buildout of Lease Area OCS-A 0508: Kitty Hawk Phase II, adding approximately 109 WTGs in the southeast portion of the Lease Area. The same WTG dimensions were applied for all the Kitty Hawk Wind Project and WTGs were located according to the same orientation and spacing as for Kitty Hawk Phase I, or 0.75 nm between turbines in each direction. Therefore, the cumulative effects simulations included in Attachment B represent the Kitty Hawk Wind Project according to its full Lease Area development as directed by BOEM.

3. To the extent possible, the simulations represent the horizontal field of view typical human eyes perceive, or 124°. As directed by BOEM, new field photography was beyond the scope of this task, so Dominion utilized field photography captured for the Project VIA. Consequently, the vertical field of view portrayed in the simulations is less than the normal human perception of 55°. However, this limitation did not affect the portrayal of WTGs in the simulations: all the Project WTGs and identified contributing project (i.e., Kitty Hawk Wind) WTGs were analyzed.

APPENDIX C
CVOW-C Cumulative Visual Simulations

This page intentionally left blank.

Coastal V ind Commercial Project

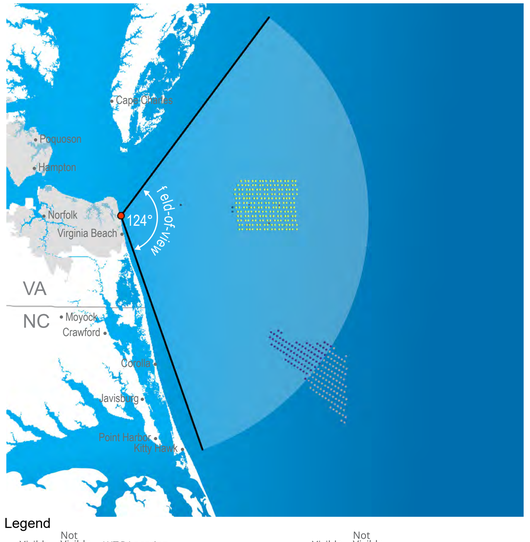
Dominion Energy®

TABLE OF CONTENTS

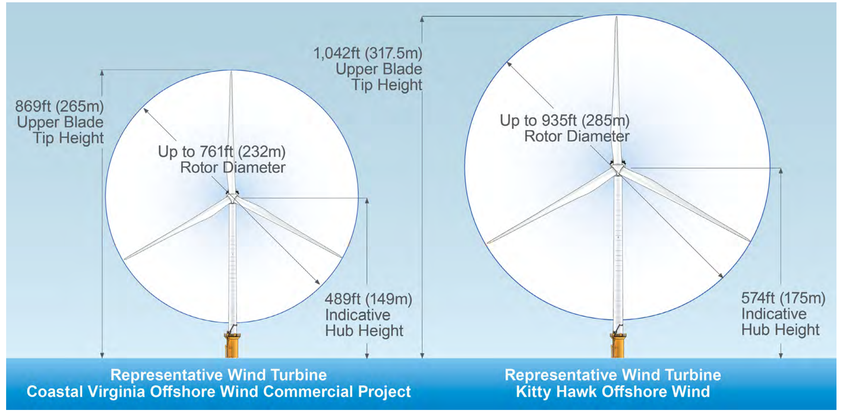
SIM 1

Existing Condition

View of the existing condition at Marriott Virginia Beach Oceanfront



Locator Map



Project	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Coastal Virginia Offshore Wind Commercial Project WTG	28.0	42.8
Kitty Hawk Offshore Wind WTG	45.9	58.1

Turbine Data

Viewpoint Location:	Oceanfront Hotel Rooftop
Date of Photograph:	September 29, 2021
Time of Photograph:	10:56AM (EDT)
Latitude:	36.8617° N
Longitude:	-75.9856° W
Viewing Direction:	East
Ground Elevation + Tripod Height:	236 feet

ENVIRONMENTAL	
Temperature:	71° F
Humidity:	61%
Wind Direction:	NNE
Wind Speed:	10 mph
Weather Condition:	Fair

CAMERA			
	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens			NIKKOR Z 50mm
Focal Length			50 mm

*The image on this page approximates the full horizontal field-of-view of typical human eyesight (124° horizontal)

Photograph Information

Simulation 1A.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 1A.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 1A.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 1A.3: Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

SIM 1B

Simulation 1B.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

SIM 1B

Simulation 1B.2: CVOWC + Kitty Hawk

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

SIM 1B

Simulation 1B.2: CVOWC + Kitty Hawk - *Annotated*

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

SIM 1B

Simulation 1B.3: Kitty Hawk

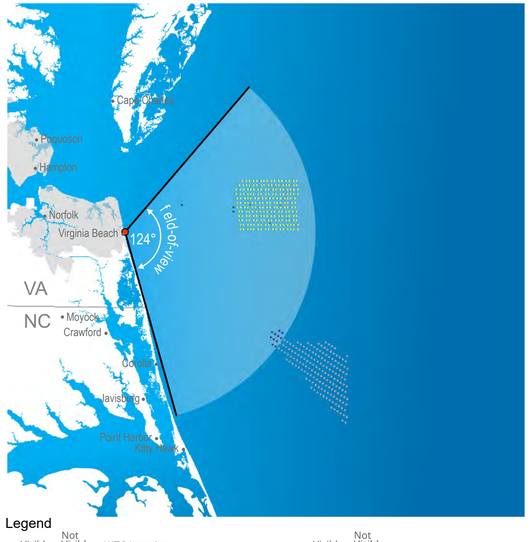
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

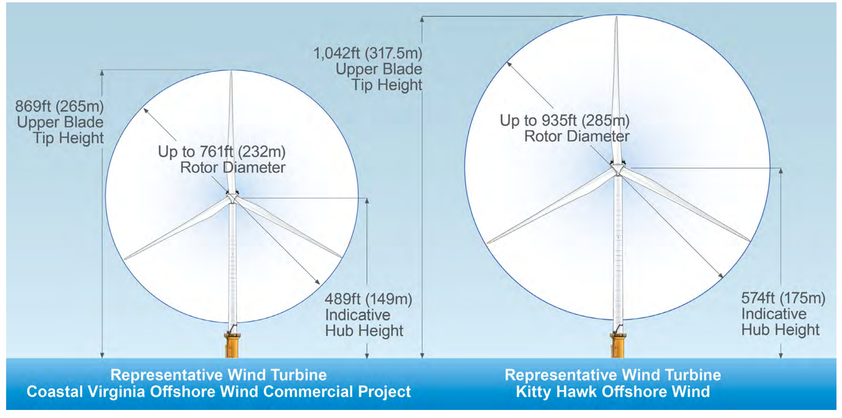
Complete Panoramic View

Existing Condition

Beach view of the existing condition at State Military Reservation



Locator Map



Project	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Coastal Virginia Offshore Wind Commercial Project WTG	27.6	41.5
Kitty Hawk Offshore Wind WTG	43.0	44.8

Turbine Data

Viewpoint Location:	State Military Reservation
Date of Photograph:	September 28, 2021
Time of Photograph:	1:11pm (EDT)
Latitude:	36.815716° N
Longitude:	-75.966839° W
Viewing Direction:	East
Ground Elevation + Tripod Height:	14 feet

ENVIRONMENTAL	
Temperature:	82° F
Humidity:	51%
Wind Direction:	SW
Wind Speed:	9 mph
Weather Condition:	Fair

CAMERA			
	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens			NIKKOR Z 50mm
Focal Length			50 mm

*The image on this page approximates the full horizontal field-of-view of typical human eyesight (124° horizontal)

Photograph Information

Simulation 2A.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 2A.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 2A.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 2A.3: Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 2B.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 2B.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 2B.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 2B.3: Kitty Hawk

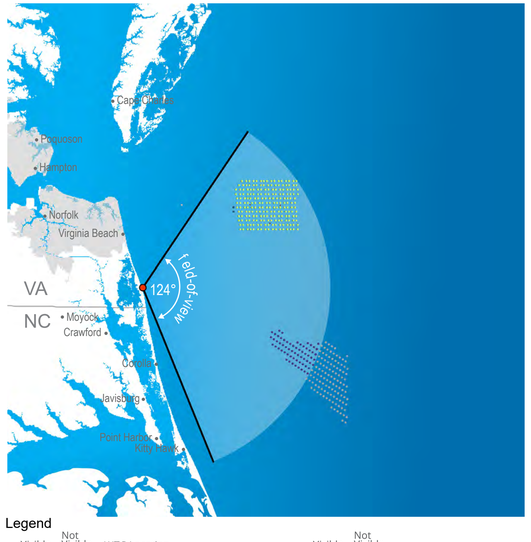
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

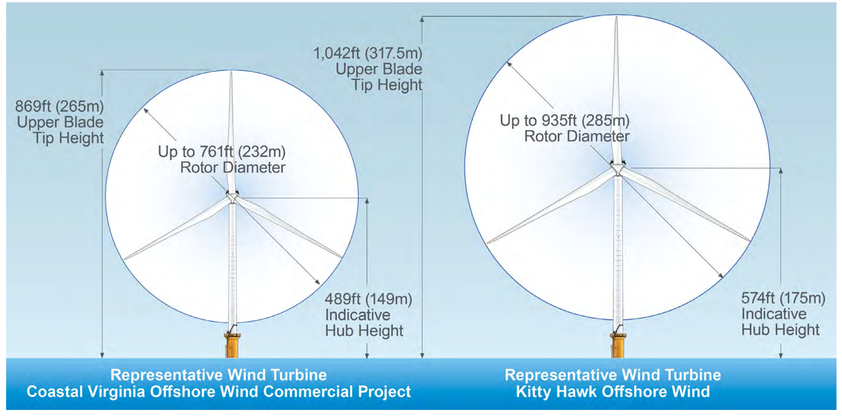
Complete Panoramic View

Existing Condition

View of the existing condition at False Cape State Park



Locator Map



Project	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Coastal Virginia Offshore Wind Commercial Project WTG	27.1	40.9
Kitty Hawk Offshore Wind WTG	33.2	44.2

Turbine Data

Viewpoint Location:	False Cape State Park
Date of Photograph:	September 26, 2021
Time of Photograph:	12:55pm (EDT)
Latitude:	36.6252° N
Longitude:	-75.8885° W
Viewing Direction:	Southeast
Ground Elevation + Tripod Height:	15 feet

ENVIRONMENTAL	
Temperature:	73° F
Humidity:	41%
Wind Direction:	N
Wind Speed:	7 mph
Weather Condition:	Fair

CAMERA			
	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens			NIKKOR Z 50mm
Focal Length			50 mm

*The image on this page approximates the full horizontal field-of-view of typical human eyesight (124° horizontal)

Photograph Information

Simulation 3A.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 3A.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 3A.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 3A.3: Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 3B.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 3B.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 3B.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 3B.3: Kitty Hawk

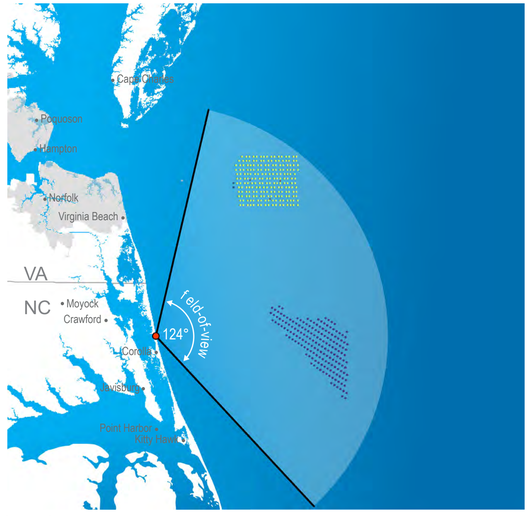
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

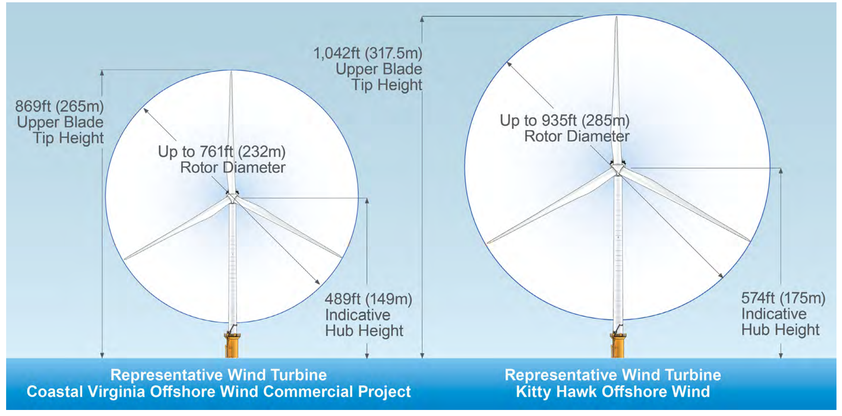
Complete Panoramic View

Existing Condition

View of the existing condition at Currituck Beach Lighthouse



Locator Map



Project	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Coastal Virginia Offshore Wind Commercial Project WTG	36.8	51.4
Kitty Hawk Offshore Wind WTG	28.3	39.1

Turbine Data

Viewpoint Location:	Currituck Beach Lighthouse
Date of Photograph:	July 7, 2021
Time of Photograph:	2:40 PM (EDT)
Latitude:	36.3767° N
Longitude:	-75.8307° W
Viewing Direction:	Northeast
Ground Elevation + Tripod Height:	155 feet

ENVIRONMENTAL	
Temperature:	93° F
Humidity:	38%
Wind Direction:	S
Wind Speed:	14 mph
Weather Condition:	Clear

CAMERA			
	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens			NIKKOR Z 50mm
Focal Length			50 mm

*The image on this page approximates the full horizontal field-of-view of typical human eyesight (124° horizontal)

Photograph Information

Simulation 4A.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 4A.2: CVOWC + Kitty Hawk

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 4A.2: CVOWC + Kitty Hawk - *Annotated*

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 4A.3: Kitty Hawk

Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 4B.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 4B.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 4B.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 4B.3: Kitty Hawk

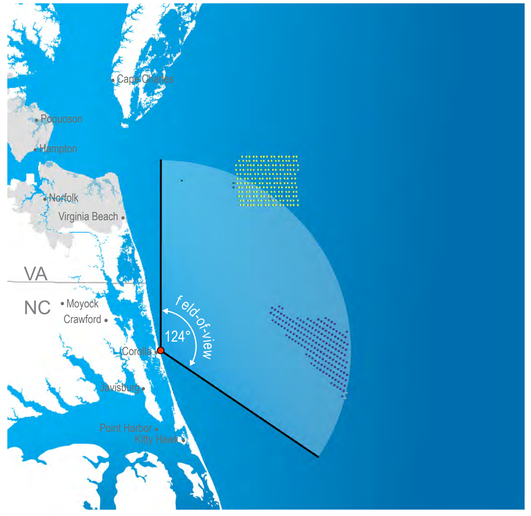
Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

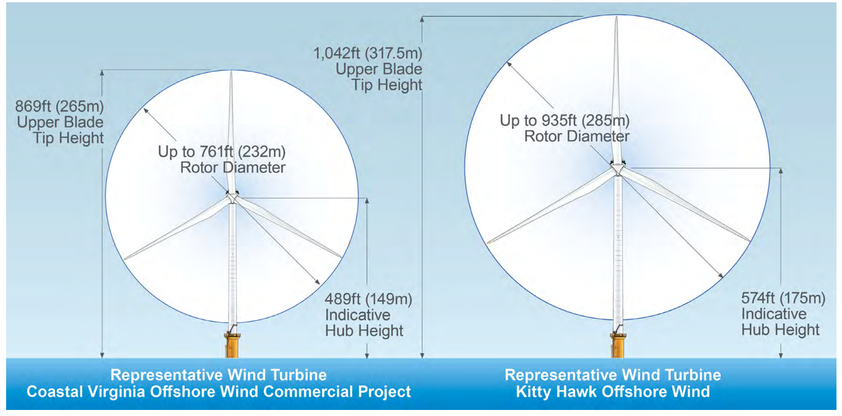
Complete Panoramic View

Existing Condition

View of the existing condition at Whale Head Bay Residential Area



Locator Map



Project	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Coastal Virginia Offshore Wind Commercial Project WTG	39.1	41.4
Kitty Hawk Offshore Wind WTG	27.9	37.6

Turbine Data

Viewpoint Location:	Whale Head Bay Residential Area
Date of Photograph:	July 7, 2021
Time of Photograph:	12:20 PM (EDT)
Latitude:	36.3776° N
Longitude:	-75.8242° W
Viewing Direction:	Northeast
Ground Elevation + Tripod Height:	25 feet

ENVIRONMENTAL	
Temperature:	91° F
Humidity:	48%
Wind Direction:	SW
Wind Speed:	13 mph
Weather Condition:	Fair

CAMERA			
	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens			NIKKOR Z 50mm
Focal Length			50 mm

*The image on this page approximates the full horizontal field-of-view of typical human eyesight (124° horizontal)

Photograph Information

SIM 5A

Simulation 5A.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 5A.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 5A.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Kitty Hawk is not present in this view angle.

Complete Panoramic View

Simulation 5A.3: Kitty Hawk

Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 5B.1: CVOWC

Simulation illustrating Coastal Virginia O shore Wind Commercial Project without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

Simulation 5B.2: CVOWC + Kitty Hawk

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 5B.2: CVOWC + Kitty Hawk - *Annotated*

*The simulation image includes approximately 62° horizontal field of view.

Simulation illustrating full lease buildout showing foreseeable projects located in leased area with Coastal Virginia O shore Wind Commercial Project. Coastal Virginia O shore Wind Commercial Project is not present in this view angle.

Complete Panoramic View

Simulation 5B.3: Kitty Hawk

Simulation illustrating full lease buildout not including Coastal Virginia O shore Wind Commercial Project

*The simulation image includes approximately 62° horizontal field of view.

Complete Panoramic View

APPENDIX D
Key Personnel Resumes

This page intentionally left blank.

Years of Experience

Professional start date: 01/1994
ICF start date: 11/2014 – Present and 03/1997 – 11/2002

Education

MA, Historic Preservation Planning, Cornell University, 1994

BS, Environmental Design, University of California, Davis, 1991

Professional Affiliations

Member, California Preservation Foundation (2010-present)

Former Vice President of Planning and Board President, Preservation Texas, Inc 2004-2010

Susan Lassell, MA, BS

Senior Historic Preservation Planner/Principal

Susan Lassell serves as ICF's cultural resources practice lead for the Northern California and Pacific Northwest region, directing a 20-person staff that includes archaeologists, ethnographers, historians, architectural historians, and historic preservation planners. Susan's technical leadership includes her ability to smoothly navigate highly complex projects and direct multi-disciplinary teams through NEPA, CEQA, and Section 106 compliance. Susan works closely with clients to develop cultural resources regulatory compliance strategies, including developing programmatic agreements under Section 106 and strategies for engaging tribal and historic preservation stakeholders. Susan has authored and directed projects throughout the United States with a focus on the West Coast, Mid-Atlantic, and Texas, including built environment survey and evaluation reports, cultural resources management plans, interpretive media and displays, and the full range of environmental documents. She also develops and teaches environmental education courses for UC Davis Extension and local and state agencies. Through a combination of 25 years of experience and her master's degree in historic preservation planning from Cornell University, Susan meets the Secretary of the Interior's professional qualification standards for architectural history, history, and preservation planning.

Project Experience

NEPA and Section 106 Services – Coastal Virginia Offshore Wind (Commercial), Virginia Beach, VA (vicinity), 07/2021-Present

Task Manager and Technical Lead – In support of the Bureau of Ocean Energy Management's efforts to oversee responsible renewable energy development ICF is providing third-party support across multiple projects for off-shore wind development on the Outer Continental Shelf along the U.S. Atlantic coast. Susan serves as the Cultural Resources task manager for environmental reviews of the construction and operations plan (COP) submitted by Dominion Energy for construction and operation of up to 205 wind turbines off the coast of Virginia Beach, Virginia. Tasks include coordination of all aspects of Section 106 outreach and consultation, review of technical studies appended to the COP, preparation of the cultural resources chapter of the Environmental Impact Statement, and working closely with BOEM Section 106 staff to implement the agency's innovative approach for integrating NEPA and Section 106 compliance into a single aggressively streamlined process.

NEPA and Section 106 Services – New York Bight Programmatic EIS, New York and New Jersey, 9/2022 – Present

Task Manager and Technical Lead – In support of the Bureau of Ocean Energy Management's efforts to oversee responsible renewable energy development ICF is providing support to the Office of Environmental Programs for the development of a programmatic environmental impact statement (PEIS) addressing six offshore wind lease areas off the coast of Long Island, NY and Cape May, NJ.

Susan is leading ICF's support to BOEM for the development of a National Historic Preservation Act programmatic agreement that will outline the process for complying with Section 106 of the NHPA during project-level reviews of each wind developer's construction and operations plan (COP).

Section 106 Support Services BPA – Bureau of Ocean Energy Management (BOEM), Eastern United States, 01/2020 - Present

Section 106 Technical Lead – ICF is supporting BOEM on a range of Section 106 tasks that will guide all proposed ocean wind energy projects along the Atlantic coast. Susan and a team of archaeologists and historic preservation planners have assisted BOEM by preparing updates for existing regional Section 106 programmatic agreements, preparing technical briefs on a mitigation fund concept for resolving unavoidable adverse effects, preparing draft templates for addressing project-level reviews through NEPA substitution, developing consultation plans, performing outreach to consulting parties and preparing and delivering briefings for BOEM management.

Historic-era Electrical Infrastructure Management Plan – Pacific Gas & Electric (PG&E), Sacramento, California, 08/2017 – 12/2019

Task Manager and Technical Lead – ICF prepared a comprehensive guide to the inventory, evaluation, project review, and treatment of the historic-era electrical infrastructure owned and maintained throughout PG&E's service area. Susan worked closely with PG&E to develop the scope and methods for the project and a peer review of the results, assembled a team of researchers and authors, and provided quality assurance oversight through the entire project. The resulting HEIMP provides PG&E with a consistent, defensible framework for addressing the historic and environmental regulatory requirements for project reviews on this category of infrastructure.

Sacramento Municipal Utility District (SMUD) Headquarters Campus Master Plan EIR—SMUD, Sacramento, California, 09/2016 – 08/2017

Cultural Resources Lead Reviewer. As a subconsultant to the EIR prime consulting firm, ICF conducted an archaeological and historic built environment technical study to identify any CEQA historical resources present within the headquarters campus. Susan provided quality assurance support and quality control reviews of the study. She also led ICF's support to SMUD on AB 52 coordination with California Native American tribes.

Spindletop Oil Discovery Site National Historic Landmark Treatment Plan—Atlanta Power & Light, Beaumont, Texas, 03/2009 – 05/2010

Historic Preservation Planner. While employed by CP&Y Inc., Susan prepared a treatment plan for seven historic wooden tanks located on the former Spindletop site. Baseline information provided includes a preliminary analysis of historical significance based upon historical research and preliminary field investigations. The plan presents recommendations for further treatment, including preparation of a Historic Structures Report, a forensic structural condition assessment, HAER documentation and interpretive materials for public distribution.

Employment History

ICF. Senior Historic Preservation Planner. Sacramento, California. 11/2014 – Present.
AECOM. Associate Principal/Senior Planner. San Francisco, California. 12/2010 – 10/2014.
CP&Y Engineers. Historic Preservation Program Manager. Austin, Texas. 08/2007 – 11/2010.
Hicks & Company. Historic Preservation Program Manager. Austin, Texas. 02/2003 – 08/2007.
Jones & Stokes Associates. Historic Preservation Planner. Sacramento, California. 03/1997 – 11/2002.
John Cullinane Associates. Historic Preservation Planner. Washington, District of Columbia. 01/1994 – 11/1996.

Years of Experience

Professional start date: 05/2018
ICF start date: 11/2021

Education

MS, Historic Preservation, University of Vermont, 2018

MA, Humanities, University of Louisville, 2013

BA, Art History & Humanities, University of Louisville, 2011

Certifications/Registrations

Secretary of the Interior-qualified Architectural Historian

Professional Affiliations

Transportation Research Board, Committee on Historic and Archaeological Preservation in Transportation, 2019-present

Member, Vernacular Architecture Forum, 2020-present

Member, Preservation Delaware, 2020-present

Member, U.S. National Committee of the International Council on Monuments and Sites, 2017-2019.

Maureen R. McCoy, MSHP & MA

Historic Preservation Specialist, Architectural Historian

Maureen R. McCoy is an Architectural Historian with experience working with federal and state agencies on projects that comply with the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act (NHPA), and Section 4(f) of the Department of Transportation Act of 1966. She has served as a subject matter expert and authored architectural history reports for projects in the New England and Mid-Atlantic regions, including cultural resource survey reports and evaluations of properties from the National Register of Historic Places (NRHP). She has experience in assessing and mitigating environmental and cultural impacts from infrastructure projects from the initial design stage through construction monitoring. Through a combination of experience and education, she meets the professional qualifications of the Secretary of the Interior for architectural history and history.

Project Experience Examples

Offshore Wind Energy

Atlantic Shores Offshore Wind Energy Project—Bureau of Ocean Energy Management (BOEM), New Jersey, 11/2021 – Present

Historic Preservation Specialist. Maureen assists with multiple aspects of the NEPA and Section 106 processes for this project, which involves two projects to construct wind turbine generators (WTGs) off the coast of New Jersey. She developed the Section 106 Consultation Plan, is assisting consulting party invitations and coordination, provides support for sufficiency reviews of the Construction and Operations Plan (COP), co-authored the cultural resources chapter of the Environmental Impact Statement (EIS), assessed cumulative visual effects, and is developing the Section 106 Finding of Effect (FOE), Cumulative Historic Resources Visual Effects Analysis (CHVREA), and Memorandum of Agreement (MOA).

Coastal Virginia Offshore Wind Commercial (CVOW-C) Project—BOEM, Virginia, 11/2021 – Present

Historic Preservation Specialist. Maureen assists with multiple aspects of the NEPA and Section 106 processes for this project, which involves the construction of up to 205 WTGs off the coast of Virginia. She is producing the cultural resources chapter of the EIS, assessing project effects, assisting with consulting party meetings, and developing the FOE, CHRVEA, and MOA.

Kitty Hawk Offshore Wind Project—BOEM, Virginia, North Carolina, 12/2021 – Present

Historic Preservation Specialist. Maureen assists with multiple aspects of the NEPA and Section 106 processes for this project, which involves the construction of up to 69 WTGs off the coasts of North Carolina and Virginia. She is producing the cultural resources chapter of the EIS, assessing project effects, assisting with consulting party meetings, and developing the FOE and CHRVEA.

Mayflower Offshore Wind Project—BOEM, Massachusetts and Rhode Island, 03/2022 – Present

Historic Preservation Specialist. Maureen assists with multiple aspects of the NEPA and Section 106 processes for this project, which involves the construction of WTGs off the coasts of Rhode Island and Massachusetts. She is producing the cultural resources chapter of the EIS, assessing project effects, assisting with consulting party meetings, and developing the FOE, CHRVEA, and MOA.

Federal Programs

Cultural Heritage Guidance—United States Agency for International Development (USAID), 01/2022 – Present

Historic Preservation Specialist. Maureen is developing a document to provide USAID mission and project managers with guidance and best practices for considering cultural heritage impacts within the USAID environmental review process. This includes an overview of cultural heritage considerations in a global setting, advice on sources of information on sites and their significance, and recommendations for how to work with local communities and understand and address project impacts on cultural heritage.

Educational Mitigation

Stairway of Power Documentary—Pacific Gas and Electric (PG&E), California, 05/2022 – Present

Historic Preservation Specialist. Maureen developed the narrative script for this documentary and conducted research to inform the script and contribute historic visual resources to the video. This documentary is being produced in accordance with a MOA between the United States Forest Service (USFS), California State Historic Preservation Officer, and PG&E as a mitigation measure to resolve the adverse effect on the Caribou-Big Bend 115kV transmission line from the decommissioning and removal of the line.

Transportation—Roads, Bridges, Highways

Georgetown Transportation Hub—Federal Transit Administration (FTA) and DelDOT, Georgetown, DE, 07/2021 – 10/2021

Environmental Specialist. While employed by DelDOT, Maureen provided an expedited Section 106 review process for a new transit facility in coordination with FTA and DE SHPO that resulted in a conditional FOE. She conducted an architectural survey and compiled a report with property evaluations and recommendations for eligibility of each property for the NRHP to fulfill the conditions of the finding within the expedited funding timeframe.

West Camden Bypass, East Camden Bypass, and US 13 Widening from Lochmeath Way to Walnut Shade to Loch—FHWA and DelDOT, Newark, DE, 05/2020 –10/2021

Environmental Specialist. While employed by DelDOT, Maureen facilitated all aspects of the Section 106 documentation and coordination for this project. She provided technical direction, task management, and quality control of deliverables during the production of a consultant-led architectural survey of the three adjacent project areas. She coordinated with consulting parties about the findings of this survey and prepared the FOEs for all three projects. The East Camden Bypass resulted in an Adverse Effect and Memorandum of Agreement, and Maureen prepared the ACHP notification documents for this project.

Employment History

ICF International. Historic Preservation Specialist. Elkton, Maryland. 11/2021 – Present.
Delaware Department of Transportation. Environmental Specialist III. Dover, Delaware. 01/2019 – 10/2021.
International Council on Monuments and Sites. US/ICOMOS International Exchange Program Intern. Charenton-le-pont, France. 05/2018-08/2018.
University of Vermont. Graduate Writing Consultant. Burlington, Vermont. 08/2017 – 12/2018.
University of Louisville. Program Coordinator. Louisville, Kentucky. 08/2015 – 08/2017.
Bellarmine University. Tutor Coordinator. Louisville, Kentucky. 06/2013 – 07/2015.