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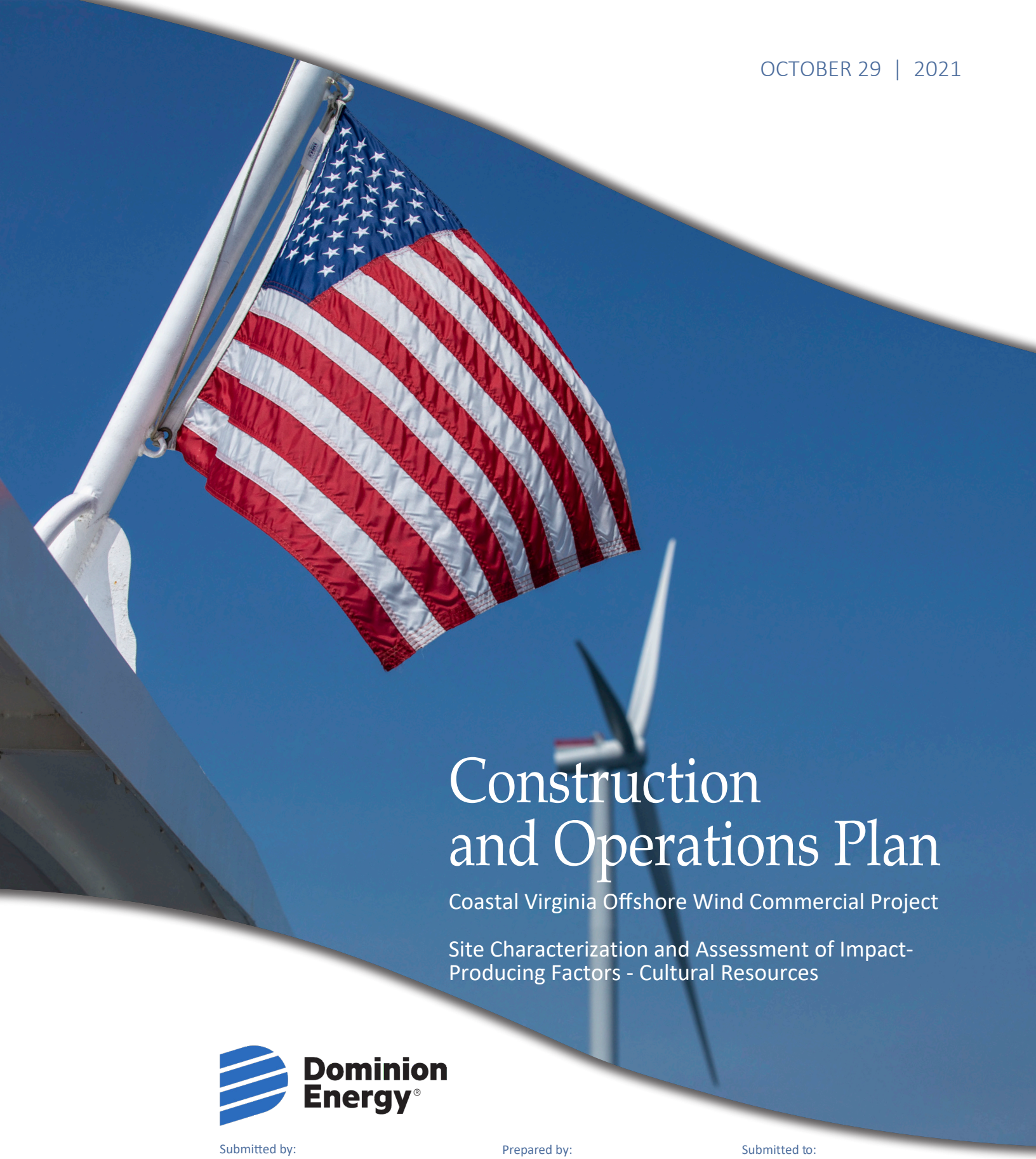

Construction and Operations Plan

Coastal Virginia Offshore Wind Commercial Project

Site Characterization and Assessment of Impact-Producing Factors - Cultural Resources

Dominion Energy®

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TABLE OF CONTENTS

TABLES

FIGURES

4.3 Cultural Resources

This section discusses cultural resources in the offshore and onshore portions of the Project Area, the potential impacts to those resources, and the protection measures and best management practices (BMPs) that will be employed during Project construction.

Cultural resources include archaeological sites, historic standing structures, objects, districts, and traditional cultural properties that illustrate or represent important aspects of prehistory or history or that have important and long-standing cultural associations with established communities or social groups. Significant archaeological and architectural properties are generally defined by the eligibility criteria for listing in the National Register of Historic Places (NRHP).

Consultation under Section 106 of the NHPA of 1966 (54 U.S.C. § 306108) is triggered by a federal undertaking, i.e., when projects require federal permits, the use of federal funds, or occur on federal lands. Such federal undertakings require consultation by federal agencies with the State Historic Preservation Office (SHPO), interested Native American tribes, and other consulting parties. These consultations identify the Area of Potential Effects (APE), architectural or other cultural resources that are listed in or are potentially eligible for listing in the NRHP, and potential adverse effects to those resources from the federal undertaking. Additionally, compliance with NHPA Section 110(f) is also required when National Historic Landmarks (NHLs) are present.

To ensure compliance with Section 106 requirements, BOEM has developed Guidelines for Providing Archaeological and Historic Property Information (BOEM 2020). The information in this section has been developed in compliance with those guidelines.

Consistent with 30 Code of Federal Regulations (CFR) § 585.102, BOEM will establish the APE and provide for coordination and consultation in Section 106 reviews with the SHPOs, including for the Onshore Project Components.

Effective December 1, 2020, BOEM formally implemented NEPA substitution for NHPA Section 106 reviews of COPs in accordance with 36 CFR § 800.8, Coordination with the National Environmental Policy Act. Under this consolidated substitution process, the purposes and requirements of both statues will be met. Initiation of the Section 106 process, ongoing consultation, identification of historic properties, assessment of potential adverse effects to historic properties, and proposals to avoid, minimize, and mitigate adverse effects to historic properties will be fully integrated with NEPA scoping, analysis, and reporting (Draft Environmental Impact Statement) and reflected in supplemental COP filings. It is anticipated that final measures to avoid, minimize, and mitigate adverse effects to historic properties will be presented in the Final Environmental Impact Statement and that such measures will made part of the Record of Decision (ROD). As part of this substitution process, BOEM recommends engaging Tribes and consulting parties that would like to provide input to support the planning and execution of the cultural resources surveys. Dominion Energy has engaged Tribes and consulting parties as the survey plans are developed and will continue to do so throughout the process of completing the cultural resources surveys.

A Section 106 Phased Identification Plan has been developed for the Project (Appendix DD). Due to a lack of private property access permissions, the Terrestrial Archaeological Resources Assessment is partially completed. Additionally, as a public utility, Dominion Energy must obtain several approvals from the State

Corporation Commission (SCC) for the Project, which include an SCC determination of the final onshore route alignment. The SCC may select a route from the alternatives presented by Dominion Energy, a combination of the Dominion Energy route alternatives, or potentially a route alignment that includes new areas not previously subject to cultural resources surveys. If an alternative to any of the routes presented by Dominion Energy is selected by the SCC, supplemental cultural resources assessments may need to be undertaken. In consultation with BOEM it was determined that due to the lack of property access permissions and the SCC route selection process a phased identification plan was appropriate for the Project. The Section 106 Phased Identification Plan was developed in compliance with Section 106 regulations and guidance provided by BOEM. The Section 106 Phased Identification Plan outlines the processes and schedule that will guide the Project through the completion of any remaining cultural resources assessments.

4.3.1 Marine Archaeological Resources

This section describes the marine archaeological resources currently known to be present in the waters within the Offshore Project Area.

Dominion Energy conducted a HRG survey and geotechnical investigation to identify NRHP-listed and NRHP-eligible submerged archaeological resources, geological features with pre-contact period archaeological sensitivity, and remote sensing anomalies or targets with the potential to be post-contact submerged cultural resources. The data presented in Section 4.3.1.1, Affected Environment, includes marine archaeological resources identified through background research and the surveys.. A Marine Archaeological Resource Assessment (Appendix F) report was prepared to present all marine cultural resources identified through the survey, recommendations for NRHP-eligibility of identified resources, potential impacts to resources resulting from construction, O&M, and decommissioning of the Project, and proposed measures and BMPs to avoid, minimize, and/or mitigate potential impacts to marine archaeological resources as necessary.

Other assessments and reports detailed within this COP related to marine archaeological resources include:

- Physical and Oceanographic Conditions (Section 4.1.1); and
- Marine Archaeological Resource Assessment (Appendix F).

This section draws information from several sources of data, reports, and studies in the assessment of marine archaeological resources. These sources include publicly available data, previous cultural resources studies, and data gathered by Dominion Energy within the Offshore Project Area (site-specific HRG and geotechnical investigations).

4.3.1.1 Affected Environment

This section was prepared in accordance with BOEM's site characterization requirements in 30 CFR § 585.626(3) and BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (BOEM 2020).

The Marine Archaeological APE includes the Offshore Project Area and any associated construction ROWs or work areas (as described in Section 3.4.1, Offshore Construction and Installation). The APE was designed to include offshore portions of the Project where marine archaeological resources may be subject

to direct effects from construction, O&M, and decommissioning of the Project. The APE includes the footprint of all Offshore Project Components as well as any temporary seafloor disturbance areas. Typically, surveyed areas include additional width to accommodate potential rerouting for Offshore Project Components or micrositing to avoid identified cultural resources, unexploded ordnance, or other sensitive features. The components of the APE are detailed in Table 4.3-1 below.

Table 4.3-1. MARA APE

Offshore Project Component	Metric	MARA Maximum APE
WTG Foundations	Maximum diameter	36 ft (11 m)
	Maximum seabed penetration	197 ft (60 m)
	Maximum scour protection (diameter)	230 ft (70 m)
	Maximum turbine work area (diameter)	984 ft (300 m)
Inter-Array Cable	Maximum burial depth	9.5 ft (3 m)
	Maximum trench depth a/	11.5 ft (3.5 m)
	Maximum trench width	49 ft (15 m)
	Maximum trench length	up to 300 mi (484 km)
	Average length per cable	5,868 ft (1,789 m)
	Pre-lay grapnel run (inclusive of construction area)	65.6 ft (20 m) per cable
Offshore Substation	Maximum number of piles per offshore substation	12
	Maximum diameter of each pile	11.5 ft (3.5 m)
	Maximum depth of each pile	295.3 ft (90 m)
	Maximum scour protection per pile (diameter)	230 ft (70 m)
	Maximum construction footprint per offshore substation	306.8 x 283.8 ft (93.5 x 86.5 m)
	Temporary construction impacts per offshore substation	656 x 164 ft (200 x 50 m) adjacent to the western side of each offshore substation
Offshore Export Cable	Maximum burial depth	16.4 ft (5 m)
	Maximum trench depth b/	18 ft (5.5 m)
	Maximum total cable length	416.9 mi (671 km)
	Average cable length per cable	(9 cables) 46.3 mi (74.5 km)
	Maximum trench width	49 ft (15 m) per cable
	Maximum width of construction corridor per cable	65.6 ft (20 m)

Notes:
a/ trench depth is based on maximum burial depth of 9.5 ft (3 m) to top of cable plus 1.6 ft (0.5 m) to bottom of trench
b/ trench depth is based on maximum burial depth of 16.4 ft (5 m) to top of cable plus 1.6 ft (0.5 m) to bottom of trench

Previous Cultural Resources Studies

Background research determined that since the late 1990s, 11 studies have been conducted within the Offshore Project Area. These studies and a brief summary of their results are presented in Table 4.3-2. Inquiries directed to the Norfolk District Office of the USACE revealed that one additional study related to surveys executed within a shipping channel leading to the Port of Norfolk had been conducted; however, that report was not readily available at the time. Further pursuit of the document using resources at the archives at the VDHR resulted in no response. The report will be reviewed when available through either the Norfolk District Office of the USACE or the VDHR.

Table 4.3-2. Previous Hydrographic and Cultural Resources Remote Sensing Investigations Within and in the Vicinity of the Offshore Project Area

Date	Author(s)	Title	Client/Agency	Contractor	Summary Results
1996	David Robinson and Martha Williams	*Phase I Remote Sensing Marine Archeological Survey of the Proposed Dredge Site at Sandbridge Shoal, Virginia Beach, Virginia*	Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA	R. Christopher Goodwin & Associates, Inc., Frederick, MD	The survey identified six "relatively weak" magnetic anomalies within the surveyed project area; no further investigations were recommended.
1998	Gordon Watts	*Phase I Remote Sensing Archaeological Survey of the Sandbridge Shoal Borrow Areas Near Virginia Beach, Virginia*	U. S. Army Corps of Engineers, Wilmington District	Tidewater Atlantic Research, Inc., Washington, NC	The survey identified no magnetic or acoustic anomalies within the proposed borrow area, which lay 3 nautical miles (nm) 6 kilometers (km) offshore of Sandbridge, VA. This survey area was expanded by Watts' 2007 work.
2005	Lawrence T. Krepp	*Virginia: Approaches to Chesapeake Bay: 8 NM southeast of Cape Henry* (Hydrographic Descriptive Report #11401).	National Oceanic and Atmospheric Administration/National Ocean Service (NOAA/NOS)	NOAA/NOS	Basic hydrographic data obtained by side-scan sonar and multi-beam sonar. Coverage was limited to areas between 30 and 60 feet ((ft; 9 and 18 meters [m]) charted depths. This survey encountered three items that are listed on the vessel wreck table including an unidentified vessel characterized as an obstruction. Surveyors recommended removal of this item.
2006	Emily Christman	*Virginia: Approaches to Chesapeake Bay: 10 NM southeast of Cape Henry.* (Hydrographic Descriptive Report #11301)	NOAA/NOS	NOAA/NOS	This report was part of a series responding to concerns of the Virginia and Maryland Pilots a/ Associations for updated hydrographic data. Twenty-five (25) square nautical miles (nm^2; 86 square kilometers [km^2]) were surveyed using side-scan sonar and shallow-water multi-beam sonar equipment.
2006a	Raymond Slagle	*Approaches to Chesapeake Bay: 15 NM southeast of Cape Henry* (Hydrographic Descriptive Report #H11303)	NOAA/NOS	NOAA/NOS	This report was part of a series of multi-beam and side-scan sonar surveys that responded to concerns of Virginia and Maryland Pilots' Associations for updated hydrographic data and to accommodate deep draft bulk carriers. The survey covered 13 nm^2 (45 km^2).
2006b	Raymond Slagle	*VA: Approaches to Chesapeake Bay: 17 NM southeast of Cape Henry* (Hydrographic Descriptive Report #H11568)	NOAA/NOS	NOAA/NOS	This side-scan sonar and multi-beam echosounder survey investigated a total of 27 nm^2 (93 km^2) southeast of the Chesapeake Bay buoy. This survey found one previously unidentified wreck, which was described as "mostly buried in sediment, with a prominent mast at the bow," at a depth of 57 ft (19 m).
2007	Gordon Watts	*Archeological Remote Sensing Survey of Offshore Borrow Areas near Sandbridge, Virginia*	U. S. Army Corps of Engineers, Wilmington District	Tidewater Atlantic Research, Inc., Washington, NC	Phase I remote sensing of two proposed borrow areas 3 mi (5 km) offshore of Sandbridge, VA. The survey detected 90 magnetic and/or acoustic anomalies, of which two were confirmed as vessels (one barge and one potential historic wreck). Forty-six (46) additional targets were assessed as potentially significant. Avoidance of all targets was recommended.
2009	Shepard M. Smith	*Virginia: Chesapeake Bay and Approaches: Cape Henry to Portsmouth Marine Terminal.* (Hydrographic Descriptive Report #D00151).	NOAA/NOS	NOAA/NOS	The extreme southeastern segment of this hydrographic survey appears to intersect with the Offshore Export Cable Route Corridor. The entire area surveyed under this order encompassed a total of 32.5 nm^2 (111.5 km^2). The survey entailed recording both multi-beam and side-scan sonar data. All previously charted soundings were found to be accurate within 2 ft (1 m), with depth variations tending towards shoaling. No NOAA (2018) targets were examined during this survey.
2011a	Lawrence T. Krepp	*Virginia: Approaches to Chesapeake Bay: 29 NM East of Cape Henry*. (Hydrographic Descriptive Report #H12309).	NOAA/NOS	NOAA/NOS	This multi-beam and side-scan sonar survey identified two previously charted NOAA (2018) items that are listed in the table of wrecks and obstructions provided in this report. The first item is described a debris field, and NOAA's background research for this vessel indicates that it was torpedoed in 1943 rather than having been sunk as the result of a collision. The second item was found to be associated with several other wrecks that were deliberately scuttled to form an artificial fishing reef.
2011b	Lawrence T. Krepp	*Virginia: Approaches to Chesapeake Bay: Cape Henry to Rudee Inlet* (Hydrographic Descriptive Report #H12315).	NOAA/NOS	NOAA/NOS	Purpose of survey was to update current navigation charts, with special emphasis on concerns expressed by Virginia pilots about depth of clearance for deep-draft coal ships, and to examine two potential new shipping lanes proposed by Virginia's Maritime Association. The side-scan sonar and vertical beam echo sounder survey covered a total area of 364 nm^2 (1249 km^2), including portions that intersect with the Offshore Export Cable Route Corridor. The single item that is listed on the wreck table was not examined, as depths in that area were too shallow. Three previously uncharted wrecks also were identified; none of these appeared to be within the current Offshore Project Area.
2017	Sherilyn Lau	*Virginia: Virginia Beach, VA: 5 NM east of Rudee Inlet* (Hydrographic Descriptive Report #W00412)	NOAA/NOS	NOAA/NOS	Summary only presented online; full descriptive report not available for this multi-beam survey. Summary indicates that "Survey data is not adequate to supersede prior surveys and nautical charts in the common area ."

Charted Wrecks and Obstructions

Table 4.3-2 and Table 4.3-3 present the combined results of a search of four data sets (BOEM 2013; NOAA 2018 [wrecks and obstructions database]; Charles 2004; and Gentile 1992) that provide specific coordinates for 107 charted submerged wrecks and obstructions within the Offshore Project Area and a 1 mi (2 km) buffer zone around the Offshore Export Cable Route Corridor. Table 4.3-3 has been subdivided into four sections: formally named vessels (28 total); diver-named wrecks (e.g., nicknames assigned by the sport diving community to individual resources) (13 total); unidentified/unnamed wrecks (55 total); and objects/obstructions (11 total). Current mapping efforts have eliminated duplicate entries. Specific details, such as vessel sizes, date and cause of vessel losses, cargos, and destinations, were obtained by reviewing additional online websites that contain vessel-specific information; these sources are cited at the bottom of the table and the complete references are included in Section 4.3.1.5, References.

Four considerations should be kept in mind when assessing the results presented in Table 4.3-3. First, submerged cultural resources include not only vessels themselves, but also associated structures, such as pilings, piers, and breakwaters, that may present hazards to navigation. Second, wrecked vessels frequently do not remain intact. Their component parts may separate to become individually charted, and disassociated pieces of wreckage may have been moved away from their original locations by currents and tides. Third, hydrographic surveys that chart such hazards are conducted repeatedly over a number of years and may register such disassociated wreckage as separate items, or remove items, which are no longer considered a hazard. Finally, with reference to specific entries in Table 4.3-3, although latitude/longitude coordinates seem to place these within or in the vicinity of the Offshore Project Area, verbal descriptions provided with those entries clearly indicate widely varying locations that are well removed from the Offshore Project Area. Where such discrepancies exist, the entire entry line has been shaded gray in Table 4.3-3.

Unanticipated Discoveries

In accordance with Lease Stipulation 4.2.7, Dominion Energy notified BOEM of two shipwreck discoveries within the Lease Area. One wreck was discovered on May 11, 2020 (Initial Shipwreck Notification–001), while conducting offshore HRG reconnaissance survey operations. The shipwreck measured approximately 131.2 ft (40.0 m) long, 32.8 ft (10.0 m) wide, and expressed approximately 9.8 ft (3.0 m) of relief above the seabed (Figure 4.3-1). The wreck correlated to an area noted on a NOAA Raster Navigation Chart but was not identified in the NOAA Wrecks and Obstructions Database (NOAA 2018).

A second potential wreck was identified on August 13, 2020 (Initial Shipwreck Notification–005[1]), while conducting offshore HRG reconnaissance survey operations. The second shipwreck measured approximately 164 ft (50 m) long, 32.8 ft (10 m) wide, and expressed approximately 3.2 ft (1.0 m) of relief above the seabed (Figure 4.3-2). The wreck is described as protruding from sloping bathymetry and exposing a potentially prow-like structure. The wreck was not identified in the NOAA Wrecks and Obstructions Database (NOAA 2018).

[1] The second shipwreck notification was inadvertently named Initial Shipwreck Notification–005.

Table 4.3-3. Charted Wrecks and Obstructions Within and in the Vicinity of the Offshore Project Area

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
Bureau of Ocean Energy Management (BOEM) (2013) #3673	Vessel	*Sea Salt II*	Oil Screw	Unknown	0/0/1972	Foundered	No further information.
BOEM (2013) #3671	Vessel	*Powell* a/	Steamer	Unknown	4/6/1920	Unknown	No further information.
BOEM (2013) #5699	Vessel	*Jacob Kienzle*	Schooner	179 GT	7/29/1884	Abandoned	No further information.
BOEM (2013) #10152; Gentile (1992) #321, #324	Vessel	*Edgar E. Clark* b/	Steamship/Tanker	9647 T (Displacement); 499 feet (ft) (152 meters [m]) (L); 68 ft (21 m) (W); 30 ft (9 m) (D)	3/1/1942; 0/0/1977	Torpedoed, Scuttled	WW II Liberty Ship; laid down 1943 and torpedoed by *U-124*. Subsequently scuttled as part of artificial reef.
BOEM (2013) #9586	Vessel	*Teresa*	Steamship	Unknown	3/21/1942	Unknown	No further information.
BOEM (2013) #9295	Vessel	*Philmar*	Fishing Vessel	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #9649; Gentile (1992) # 313,314	Vessel	*James E. Haviland* c/	Steam Screw	7177 GT; 128.9 ft (39.2 m) (L); 17.4 ft (5.3 m) (W); 10.6 ft (3.2) (D)	0/0/1976	Scuttled	WW II Liberty Ship; laid down 1943. Scuttled as part of artificial reef.
BOEM (2013) #9650; Gentile (1992) #311	Vessel	*Webster*	Steam Screw	Unknown	Unknown	Scuttled	WW II Liberty Ship. Scuttled as part of artificial reef.
BOEM (2013) #10184; Gentile (1992) #338	Vessel	USCGC *Cuyahoga* e/	Cutter (Diesel Screw)	320 GT; 129 ft (39 m) (L); 24 ft (7 m) (W)	10/20/1978	Collision/Scuttled	Collided with 521 ft (159 m) M/V *Santa Cruz* II in Chesapeake Bay. Towed to Portsmouth; then sunk as part of artificial reef.
BOEM (2013) #10315; National Oceanic and Atmospheric Administration (NOAA) (2018) #1608; Gentile (1992) #398	Vessel	*Stormy*	Fishing Vessel/Oyster Boat	40 ft (12 m) (L)	Unknown	Unknown	No further information.
BOEM (2013) #10316; NOAA (2018) #3419; Gentile (1992) #404	Vessel	*Salty Sea II*	Fishing Vessel/Clam Boat	105 ft (32 m) (L)	0/0/1972	Unknown	Reported depth is 62 ft (19 m) but, NOAA (2018) entry specifies 45 ft (14 m). No further information.
NOAA (2018) #11448; Gentile (1992) #384	Vessel	*Gulf Hustler*	Fishing Vessel	77 ft (24 m) (L)	Unknown	Unknown	Depth reported as 66 ft (20 m). Vessel merely reported as "sunk." No further information.
NOAA (2018) #903; Charles (2004) #34; Gentile (1992) #306, #307, #310	Vessel	*John Morgan* i/	Steamship	7176 GT; 441.6 ft (134.6 m) (L); 56.8 ft (17.3 m) (W); 34.8 ft (10.6 m) (D).	6/1/1943	Collision	Liberty ship bound from Philadelphia to India with cargo of assorted munitions. Collided with Steamship (SS) *Montana*. Vessel split in two and exploded; stern sank immediately. Casualties: 42 crew and 25 armed guards. Previously charted as 96 ft (29 m) depth; revised to 55 ft (17 m).
NOAA (2018) #11430; Gentile (1992) #408	Vessel	*Kingston Ceylonite* g/	Steam Screw	448 GT; 160.4 ft (48.9 m) (L); 26.6 ft (8.1 m) (W); 14.1 ft (4.3 m) (D)	6/15/1942	Explosion (Mine)	British sub chaser (ex-trawler) loaned to Navy. Struck mine and eighteen (18) British crew perished; 14 were rescued. NOAA (2018) reports depths of between 49-53 ft (15-16 m).
Charles (2004) #36	Vessel	*Rogist*	Yacht	Unknown	Unknown	Unknown	Launched in 1929. No further information.
Gentile (1992) #308, #309, #312	Vessel	*George P. Garrison* j/	Steamer/Cargo	7244 GT; 441.6 ft (134.6 m) (L); 56.8 ft (17.3 m) (W); 34.8 ft (10.6 m) (D)	2/20/1975	Scuttled	Liberty ship.
Gentile (1992) #318, #319	Vessel	SS *Trepca* h/	Steamer/Cargo	5042 GT; 407.2 ft (124.1 m) (L); 53.5 ft (16.3 m) (W); 27.9 ft (8.5 m) (D)	3/13/1942	Torpedoed	Yugoslav registry, enroute from Denarera to Portland, ME; cargo: bauxite. Torpedoed by U-332. Four(4) fatalities. NB: Gentile gives two sets of coordinates for this wreck. Possibly vessel broke in half.
Gentile (1992) #332	Vessel	*Tercel* (formerly *Kern*) k/	Tug	Unknown	Unknown	Unknown	Wreck is in two pieces, bow and stern about 80 ft (24 m) apart.
BOEM (2013) #10391; NOAA (2018) #880; Gentile (1992) #334	Vessel	*Lillian Luckenbach* f/ (formerly SS *Marica*)	Steamship (Oil Screw)	6369 GT; 448.8 ft (137 m) (L); 60 ft (18 m) (W); 25 ft (8 m) (D)	3/27/1943	Collision	Cargo vessel collided with SS *Cape Henlopen*. Reportedly demolished.
BOEM (2013) #10150; NOAA (2018) #14916; Gentile (1992) #387	Vessel	*Francis E. Powell (61, Macy Willis)*	Tanker	7096 GT; 431 ft (131 m) (L); 59 ft. (18 m) (W)	1/27/1942	Torpedoed	Sunk by U-130, enroute from Port Arthur, TX to Providence, RI. Cargo was furnace oil and gasoline. Four (4) dead. Depth: 80 ft (24 m).
BOEM (2013) #2638	Vessel	*Clam Boat*	Trawler	Unknown	Unknown	Unknown	Depth: 50 ft (15 m).
BOEM (2013) #3179	Vessel	*Manhattan*	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #5400	Vessel	USS *Schurtz* m/ *(formerly* SMS *Geier)*	Steamer (Cruiser)	1630 GT; 254 ft (77 m) (L); 32 ft (10 m) (W); 14 ft (4 m) (D)	6/21/1918	Collision	Composite hull, copper sheathed. Collided with SS *Florida*; one (1) dead.
BOEM (2013) #10200	Vessel	*Buck Ridge*	Unknown	Unknown	Unknown	Unknown	Reported depth of 43 ft (13 m).

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
BOEM (2013) #10215	Vessel	*Hans*	Unknown	Unknown	Unknown	Unknown	Reported depth of 67 ft (20 m).
BOEM (2013) #10216	Vessel	Norwegian freighter	Freighter	Unknown	Unknown	Unknown	Reported depth of 70 ft (21 m).
BOEM (2013) #10421	Vessel	*Monroe* d/	Steam Freighter	4704 GT; 366 ft (111 m) (L); 46 ft (14 m) (W)	1/30/1914	Collision	This Old Dominion Line steamship carried passengers between New York and Norfolk. Proceeding northbound to NYC when it collided with the southbound SS *Nantucket* in fog. Forty-one (41) lives lost. Reported depth of 86 ft (26 m).
BOEM (2013) #10424; NOAA (2018) #1262	Vessel	*Wayne*	Schooner	820 GT	0/0/1913	Sunk	Three-masted vessel.
BOEM (2013) #10203	Vessel	"Robinson's Blinker"	Unknown	Unknown	Unknown	Unknown	Reported depth of 41 ft (13 m).
BOEM (2013) #9747	Vessel	"Junk"	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #10207	Vessel	"Seventy-Five Foot Stones"	Unknown	Unknown	Unknown	Unknown	Reported depth of 63 ft (19 m).
BOEM (2013) #10213	Vessel	"Blackfish wreck"	Unknown	Unknown	Unknown	Unknown	Reported depth of 73 ft (22 m).
BOEM (2013) #9731)	Vessel	"Middle Ground Wreck"	Steam Screw	Unknown	Unknown	Unknown	Reported depth of 72 ft (21.9 m).
BOEM (2013) #9647; Gentile (1992) #328	Vessel	"Paddlewheel"	Paddlewheel (possible Steamer)	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #330	Vessel	"Old Ship"	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #350, #353	Vessel	"Chicken Scratch"	Unknown	Unknown	Unknown	Unknown	No further information. NB: Gentile gives two sets of coordinates for this wreck.
Gentile (1992) #380, #381	Vessel	"Dolly Parton Wreck"	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #316, #317	Vessel	"300 ft Wreck"	Unknown	Unknown	Unknown	Unknown	Wooden vessel. No further information.
Gentile (1992) #388	Vessel	"Stanchion Wreck"	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #396	Vessel	"River Front Junction"	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #932;	Vessel	"Four A Wreck"	Unknown	Unknown	Unknown	Unknown	No further information.
Charles (2004) #35	Vessel	Unknown	Brig	Unknown	2/8/1805	Unknown	Cargo was rum and sugar.
BOEM (2013) #9677	Vessel	Unknown	Barge (Steel)	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #933	Vessel	Unknown	Freighter	Unknown	Unknown	Unknown	Stern section only.
BOEM (2013) #917	Vessel	Unknown	Barge (Steel)	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #959	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #8996; Northern Maritime Research (NMR) (2002) #554057	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8499; National Oceanic and Atmospheric Administration (NOAA) (2018) #2940	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth is 44 ft (13 m). Hydrographic survey in 2005 classified this item as disproved.
BOEM (2013) #8500; NOAA (2018) #3329	Vessel	Unknown	Unknown	Unknown	0/0/1942	Unknown	Nearest state is VA. 2005 hydrographic survey (Christman 2006) did not find this item.
BOEM (2013) #8600; NOAA (2018) #779	Vessel	Unknown	Schooner	Unknown	0/0/1910	Unknown	Three-masted vessel. Nearest state is VA. No further information.
BOEM (2013) #8601; NOAA (2018) #788	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Reported depth of 56 ft (17 m). No further information.
BOEM (2013) #8620; NOAA (2018) #7526	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Christman (2006) recommended deleting 52 ft (16 m) deep obstruction.
BOEM (2013) #8621; NOAA (2018) #7527	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8622; NOAA (2018) #7528	Vessel/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	NOAA (2018) obstruction cleared to depth of 59 ft (18 m). Nearest state is VA. No further information.
BOEM (2013) #8622; NOAA (2018) #7529	Vessel/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	NOAA (2018) reports "old anchor buoy weight" as obstruction at 58 ft (18 m), cleared to 57 ft (17 m). Nearest state is VA. No further information.
BOEM (2013) #8632; NOAA (2018) #8152	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Reported depth: 35 ft (11 m). Nearest state is VA. No further information.

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
BOEM (2013) #8633; NOAA (2018) #8277	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Depth is 48 ft (15 m). depth. Wreck located near VA. No further information.
BOEM (2013) #8634; NOAA (2018) #8278	Vessel/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Wreck/obstruction located near VA at 47 ft (14 m). depth. No further information.
BOEM (2013) #8669; NOAA (2018) #9930	Vessel	Unknown	Passenger/Cargo	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8695; NOAA (2018) #12992	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Wreckage depth: 43 ft (13 m). Near VA. No further information.
BOEM (2013) #8696; NOAA (2018) #12993	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Reported depth of wreckage: 51 ft (16 m). Located near VA. Removal of this item was recommended.
BOEM (2013) #8708; NOAA (2018) #11433	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth: 60 ft (18.3 m).
BOEM (2013) #8709; NOAA (2018) #11434	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported BOEM depth: 58 ft (17.7 m). Reported NOAA (2018) depth: 64 ft (20 m).
BOEM (2013) #8711; NOAA (2018) #11431	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth: 60 ft (18 m).
BOEM (2013) #8855; NMR (2002) #536111	Vessel	Unknown	Fishing Vessel	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8948; NMR (2002) #600821	Vessel	Unknown	Unknown	Unknown	0/0/1959	Unknown	Wreck depth: 46 ft (14 m) near VA.
BOEM (2013) #8989; NMR (2002) #553919	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8990; NMR (2002) #553925	Vessel	Unknown	Unknown	Unknown	0/0/1942	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8991; NMR (2002) #553931	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8993; NMR (2002) #553985	Vessel	Unknown	Sailing Vessel (Unidentified Type)	Unknown	0/0/1924	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9022; NMR (2002) #552983	Vessel	Unknown	Unknown	Unknown	7/7/1943	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9025; NMR (2002) #552155	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9296; NMR (2002) #528209	Vessel	Unknown	Fishing Vessel	Unknown	Unknown	Unknown	Reported depth: 99 ft (30 m); nearest state is VA.
BOEM (2013) #9119; NMR (2002) #548681	Vessel	Unknown	Unknown	Unknown	0/0/1925	Unknown	Nearest state is VA. Reported depth: 56 ft (17 m). No further information.
BOEM (2013) #9186; NMR (2002) #539171	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth: 56 ft (17 m). No further information.
BOEM (2013) #9625	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	Reported depth of 41.0 ft (12.5 m).
BOEM (2013) #9221; NMR (2002) #534059	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9234; NMR (2002) #531701	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9646; Gentile (1992) #303	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #9652	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
NOAA (2018) #15065	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	NOAA (2018) reports depth as 14.41 fathoms (86.46 ft).
NOAA (2018) #14904	Vessel	Unknown/ Unidentified	Unknown	180 ft (L)	(Reported) 4/0/1988	Unknown	Described as "steel hulled vessel." No further information.
NOAA (2018) #15063	Vessel	Unknown/ Unidentified	Unknown	Unknown	(Reported) 2011	Unknown	Reported depth is 10.7 fathoms (64.2 ft). No further information.
NOAA (2018) #15064	Vessel	Unknown/ Unidentified	Unknown	Unknown	(Reported) 2011	Unknown	Reported depth is 14.73 fathoms (88.38 ft). No further information.
NOAA (2018) #15147	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	Reported depth is 27.4 ft (8.4 m). No further information.

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
Gentile (1992) #300	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #305	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #327	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #343	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #352	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #401	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #406	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #407	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #409	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #4362	Vessel	Unknown	Freighter	Unknown	Unknown	Unknown	Verbal description gives general location as NC.
BOEM (2013) #9729	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	Reported depth of 103 ft (31 m).
BOEM (2013) #8710; NOAA (2018) #11435	Object/Obstruction	Artificial Reef	N/A	N/A	Unknown	N/A	No further information.
BOEM (2013) #1095	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Cluster of 3 magnetic anomalies consistent with shipwreck debris. Depth: 41 ft (12.5 m). No further information.
BOEM (2013) #1089	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Two (2) magnetic anomalies consistent with shipwreck debris. Depth: 41 ft (13 m). No further information.
BOEM (2013) #1088	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Cluster of three magnetic anomalies consistent with shipwreck debris. Depth: 43 ft (13 m). No further information.
BOEM (2013) #1087	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Two magnetic anomalies consistent with shipwreck debris. Depth: 41 ft (13 m). No further information.
BOEM (2013) #4401	Object/Obstruction	Train Cars	Wreckage	Unknown	Unknown	Unknown	Verbal description gives general location as North Carolina. Depth: 42–60 ft (13–18 m).
NOAA (2018) #11431	Obstruction	Unknown	N/A	N/A	N/A	N/A	Reported depth is 60 ft (18 m).
NOAA (2018) #3330	Obstruction	Pier Remains	N/A	N/A	(Reported) 1976	N/A	Unmapped remains of apparent shoreline pier; feature had disappeared from charts by 1980.
NOAA (2018) #3331	Obstruction	Piling	N/A	N/A	(Reported) 1975	N/A	Feature had disappeared from charts by 1980.
NOAA (2018) #3332	Obstruction	"Sand Trap"/Breakwater?	N/A	N/A	(Reported) 1975	N/A	Feature had disappeared from charts by 1980.
NOAA (2018) #2940	Obstruction	Unknown	N/A	N/A	N/A	N/A	No further information.

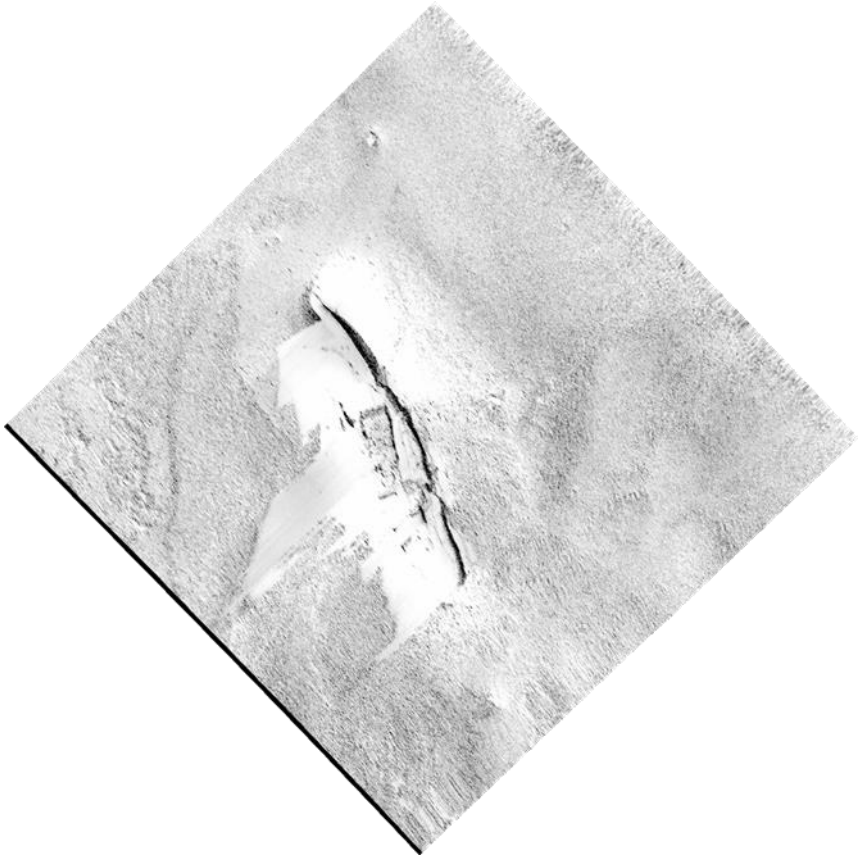

Figure 4.3-1. Side Scan Sonar Image of the Shipwreck Reported in the Initial Shipwreck Notification–001

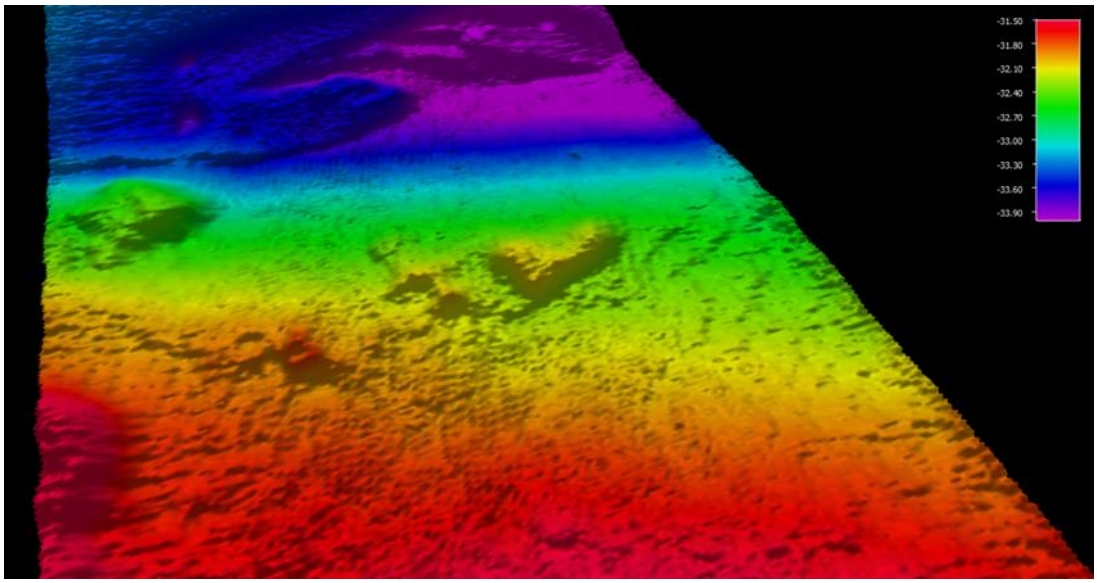

Figure 4.3-2. Oblique 3-Deminsional View of Gridded Raw Multibeam Data along Line TLB50 Showing the Potential Shipwreck Reported in the Initial Shipwreck Notification–005[2]

[2] The second shipwreck notification was inadvertently named Initial Shipwreck Notification–005.

Four additional wrecks were discovered while conducting offshore HRG reconnaissance survey operations within the Lease Area and were reported on May 13, 2020 (Initial Shipwreck Notification–002 and Initial Shipwreck Notification–003). Sonar reports created by the Virginia Marine Resources Commission in 2008 list locational data for the wrecks along with side-scan sonar images. This information was compared with the locations and images generated for the shipwreck notifications. The first and second contacts of Initial Shipwreck Notification–003 were identified as most likely belonging to two named vessels.

On March 16, 2021 while conducting low-frequency, high-resolution geophysical survey operations, survey equipment became entangled within an unknown object (unknown to the survey vessel crew at the time) on the seafloor that was later determined to be a shipwreck. This shipwreck was previously identified on May 13, 2020 and reported to BOEM as noted above. The shipwreck encountered was not noted on the electronic navigational chart used during survey operations by the survey vessel. An incident report was submitted to BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) in accordance with 30 CFR § 585.831 on March 17, 2021. BSEE provided a response on April 7, 2021 noting that the incident was being reviewed and that Dominion Energy was cleared to recover the equipment that was entangled in the shipwreck. They also recommended that Dominion Energy should contact the Virginia Marine Resources Commission (VMRC) to provide notification that remote sensing gear was lost on one of the reefed vessels, as well as to provide the opportunity to participate in both the planning as well as recovery efforts. Dominion Energy provided the incident report to VMRC for review and coordination with USACE.

BOEM Issued a Notice of Noncompliance to Dominion Energy on October 5, 2021 for the entangled survey equipment. Dominion Energy submitted a plan for corrective action to BOEM on October 19, 2021 and will continue to coordinate with BOEM, BSEE, and VMRC to retrieve the equipment.

On April 5, 2021, six additional shipwrecks were reported that were discovered during the offshore HRG survey campaign. Of these, three shipwrecks have been previously charted in the NOAA Automated Wreck and Obstruction Information System (AWOIS) database (Initial Shipwreck Notification – 010, 011, and 014). The other three (Initial Shipwreck Notification – 012, 013, and 015), appeared to be new discoveries. The shipwreck discovered on June 21, 2020 (Initial Shipwreck Notification – 012) measured approximately 98 ft (30 m) long, 36 ft (11 m) wide, and expressed approximately 3 ft (1 m) of relief above the seabed (See Figure 4.3-3). The shipwreck discovered on October 7, 2020 (Initial Shipwreck Notification – 013) measured approximately 371 ft (113 m) long, 102 ft (31 m) wide, and expressed approximately 7 ft (2 m) of relief above the seabed (See Figure 4.3-4). The shipwreck discovered on August 9, 2020 (Initial Shipwreck Notification – 015) measured approximately 105 ft (32 m) long, 20 ft (6 m) wide, and expressed approximately 13 ft (4 m) of relief above the seabed (See Figure 4.3-5). None of these three wrecks were identified in the NOAA Wrecks and Obstructions Database (NOAA 2018).

Figure 4.3-3. Side Scan Sonar Image of the Shipwreck Reported in the Initial Shipwreck Notification–012

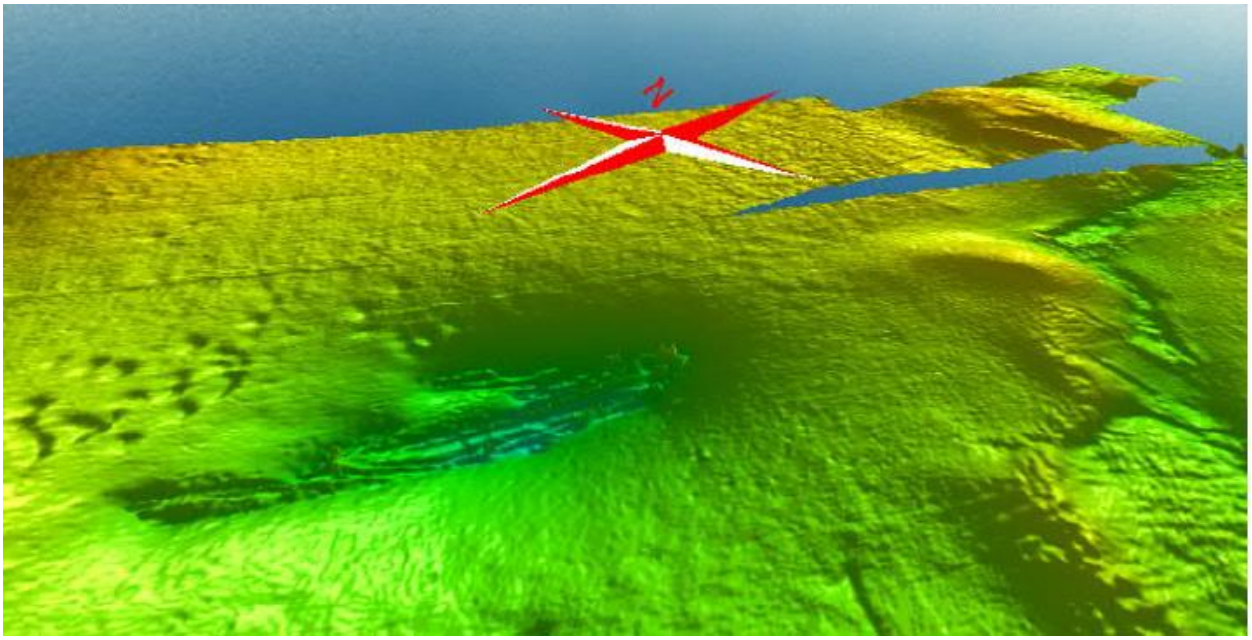

Figure 4.3-4. Oblique 3-Deminsional View of Gridded Raw Multibeam Data along WTG04 Showing the Potential Shipwreck Reported in the Initial Shipwreck Notification–013

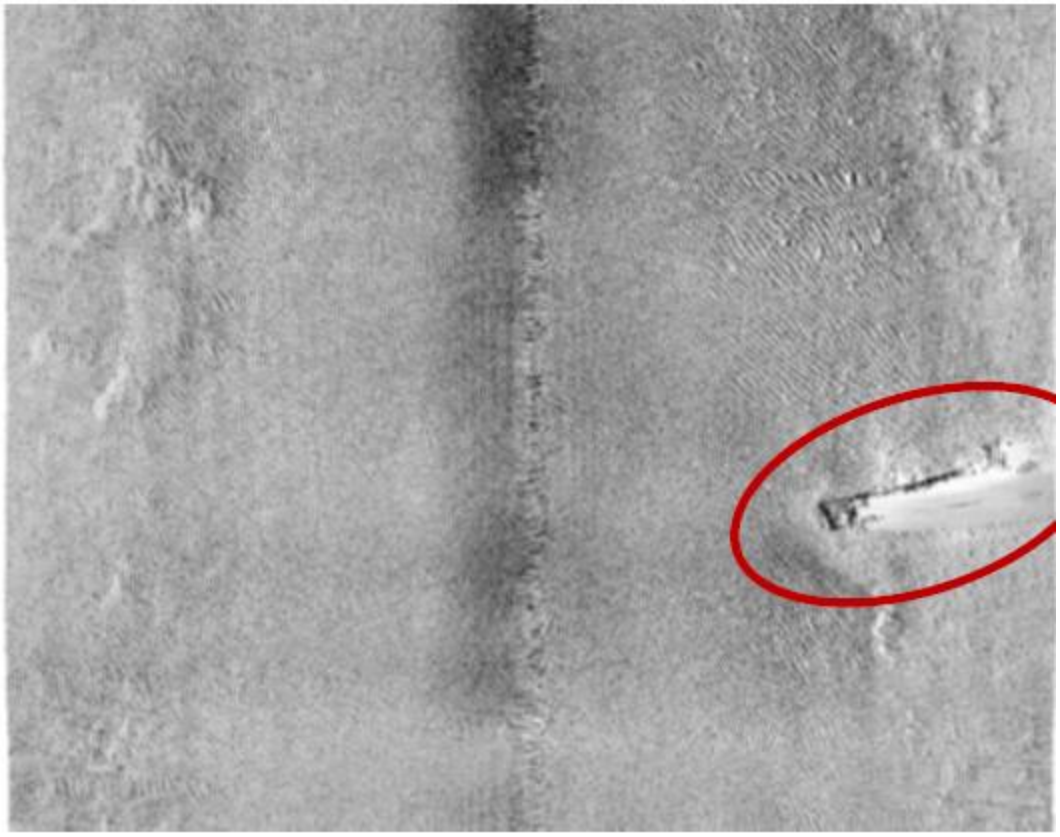

Figure 4.3-5. Side Scan Sonar Waterfall Image of the Shipwreck Reported in the Initial Shipwreck Notification–015

4.3.1.2 Research Design

Research Objectives

The HRG survey data gathered to date has been reviewed by a qualified marine archaeologist (QMA) to identify magnetic anomalies, sonar contacts, and sub-bottom acoustic reflectors that may represent significant submerged cultural resources, in order to provide management recommendations. Submerged cultural resources include the complete range of historic properties as defined by Section 106 of the NHPA and paleolandforms that have a high probability of containing pre-contact archaeological sites (BOEM 2020).

The natural and anthropogenic forces that impact shipwrecks typically deposit or scatter ferrous and nonferrous objects, such as fasteners, anchors, engine parts, ballast, weaponry, cargo, tools, wooden or iron hull remains, and miscellaneous related debris across the seabed. Comprising what are known as debris fields, these objects normally can be detected with a remote sensing array that includes a marine magnetometer (or gradiometer), side scan sonar, sub-bottom profiler, and a multibeam echo sounder. Such an array detects and records anomalous magnetic, acoustic, and seismic signatures. Critical elements in the interpretation of such anomalies are their spatial distribution or patterning, and in the case of magnetic anomalies, their amplitude (deflection of the earth's magnetic field), duration, and orientation (Camidge et al. 2010). Given the importance of anomaly patterning, and the correlation of data from the entire remote sensing array, accurate sensor tracking/positioning is essential.

Geophysical Investigations

Data Matrix

Dominion Energy established data transfer protocols and archaeological information needs for data collection (i.e., detailed surface, subsurface mapping), interpreted data, charting and reporting. Established processes for the transfer of large datasets resulted in a streamlined and efficient workflow process throughout the 2020 and 2021 HRG survey and geotechnical campaigns to ensure that all resulting data products meet the format, content, and other specific data requirements for analysis and BOEM and SHPO review.

HRG Survey Methodology

An HRG survey within the Offshore Project Area was conducted in 2020 and 2021 to support the COP. The HRG survey provides a summary of the geological, archaeological, and cultural resource conditions that exist within the Offshore Project Area. The resulting baseline understanding of the seabed and subsurface sediment conditions support the planning and engineering of the Offshore Project Components. Dominion Energy held pre-survey meetings with BOEM and Native American tribes to discuss the objective of each survey stage, prior to the execution of the survey campaign.

HRG Survey Results

The HRG surveys (2020-2021) provided a summary of the environmental contexts and cultural resources within the Lease Area and along the proposed Offshore Export Cable Route Corridor. The resulting characterization of the seabed and subsurface supports planning of future geophysical, geotechnical, and engineering activities to assist in identifying the preferred planning/layout, installation, and operational right-of-way for the Project.

The HRG survey identified 34,439 magnetic anomalies and 2,268 side scan sonar contacts within the Project APE. Thirty-one potential cultural resources were identified; 18 in the Lease Area and 13 in the Export Cable Route Corridor. Recommended minimum avoidance zones for these resources were designed based on the extent of these potential resources gleaned from side scan sonar, MBES, SBP, seismic, and magnetometer data (Table 4.3-4).

Table 4.3-4. Potential Cultural Resources Identified within the Export Cable Route Corridor and Lease Area

Target ID1	Location	Cultural Resources Recommended Minimum Avoidance Area
Target 1	WEA	164 ft (50 m) radius from center point
Target 2	WEA	164 ft (50 m) radius from center point
Target 3	WEA	164 ft (50 m) radius from center point
Target 4	WEA	164 ft (50 m) radius from center point
Target 5	WEA	164 ft (50 m) radius from center point
Target 6	WEA	164 ft (50 m) radius from center point
Target 7	WEA	164 ft (50 m) radius from center point
Target 8	WEA	164 ft (50 m) radius from visible extent (3.96 ac [1.60 ha])
Target 9	WEA	164 ft (50 m) radius from center point
Target 10	WEA	164 ft (50 m) radius from visible extent (3.38 ac [1.37 ha])

Target ID1	Location	Cultural Resources Recommended Minimum Avoidance Area
Target 11	WEA	164 ft (50 m) radius from visible extent (2.99 ac [1.21 ha])
Target 12	WEA	164 ft (50 m) radius from center point
Target 13	WEA	164 ft (50 m) radius from center point
Target 14	WEA	164 ft (50 m) radius from visible extent (4.18 ac [1.69 ha])
Target 15	WEA	164 ft (50 m) radius from visible extent (4.18 ac [1.69 ha])
Target 16	WEA	459 ft (140 m) radius from center point
Target 17	WEA	164 ft (50 m) radius from center point
Target 18	WEA	164 ft (50 m) radius from center point
Target 19	ECRC	164 ft (50 m) radius from center point
Target 20	ECRC	164 ft (50 m) radius from center point
Target 21	ECRC	164 ft (50 m) radius from center point
Target 22	ECRC	164 ft (50 m) radius from visible extent (3.80 ac [1.54 ha])
Target 23	ECRC	164 ft (50 m) radius from center point
Target 24	ECRC	164 ft (50 m) radius from center point
Target 25	ECRC	164 ft (50 m) radius from center point
Target 26	ECRC	164 ft (50 m) radius from center point
Target 27	ECRC	164 ft (50 m) radius from center point
Target 28	ECRC	164 ft (50 m) radius from center point
Target 29	ECRC	164 ft (50 m) radius from center point
Target 30	ECRC	164 ft (50 m) radius from center point
Target 31	ECRC	164 ft (50 m) radius from center point

Geotechnical Clearances

The QMA has issued geotechnical clearance reports for the WTG locations and for locations along the Offshore Export Cable Route Corridor. A QMA reviewed the HRG survey data in the Lease Area within a 328 by 656 ft (100 by 200 m) rectangular analytical area centered on each of the geotechnical locations co-located at each WTG. Within the Offshore Export Cable Route Corridor, HRG survey data was reviewed within a 591 by 787 ft (180 by 240 m) rectangular analytical area centered on each of the geotechnical sampling locations. The reviewed data included, at a minimum, three parallel lines or two intersecting lines of HRG survey data that captured each of the locations. The HRG review focused on identification of any potential submerged cultural resources and buried, preserved landforms. If any analytical area intersected with a potential cultural resource, then the geotechnical sample location or analytical area was moved, or the analytical area was reduced in size. The geotechnical clearance letters are included in Appendix L, Summary of Agency and Stakeholder Engagement.

Ground Model and Paleoenvironment

A geologic ground model has been developed to determine the ground conditions within the Lease Area (Geo SubSea 2020). This ground model is supported by the collected HRG data that is interpreted within the IHS Markit Kingdom geoscience software to map subsurface seismic layers and features. These interpretations also are supported by sediments and other samples collected during borehole sampling.

Preliminary assessment of sediments and seismic stratigraphy indicate that the subsurface conditions and remnant landforms suggested by these data are consistent with prior studies of the region (Mallinson et al. 2005; and Mallinson et al. 2010). These remnant landforms include fluvial systems, barrier islands, back barrier environments including estuarine and wetland zones, tidal sounds, and shallow marine environments such as shoreface and foreshore zones.

Seismic Stratigraphy

Six distinguishable primary units (Unit A through Unit F) and associated bounding horizons (1 through 6) have been identified within the preliminary ground model (Figure 4.3-6). Units A, B and C are the shallowest units and represent time periods in which there was human occupation. Therefore, they present the greatest potential to contain cultural resources.

Unit C

The top of Unit C is bounded by Horizon 2 and the base by Horizon 2.2. Horizon 2.2 lies 20 to 213 ft (6 to 65 m) below seabed (BSB). Horizon 2.2 is a negative reflector that is predominantly continuous, with variable amplitudes and occasional triplet character. Horizon 2.2 is present through most of the Lease Area but is truncated by Horizon 2 in the northwest; it is shallowest in the northwest and deepest in the southeast (Geo SubSea 2020).

Unit C is the lowest unit in which there is potential for cultural resources. This unit overlies Unit D in all but the northwest portion of the Lease Area and consists of finely stratified reflectors. This suggests that Unit C represents a lower energy environment such as back barrier landforms similar to those found today between modern barrier islands and the mainland. Such environments typically include tidal sounds, brackish tidal marshes, and estuarine environments. Unit C also contains multiple areas of incised and filled channels as well as distinct anticlines. These anticlines could be relict shoreface deposits, relict swale and ridge features, or deltaic lobes, all of which would be consistent with back barrier landforms experiencing tidal influences and sediment transport along both the foreshore and within the estuaries. Further investigation is needed into these anticlines. Unit C is indicative of an extended (stepwise) regression towards glacial conditions as would be expected between marine isotope stage (MIS) 5E and the Last Glacial Maximum (LGM) during MIS 2 (Geo SubSea 2020).

Unit B

The top of Unit B is bounded by the seafloor in the west and northwestern portions of the Lease Area and by Horizon 1 in the central and eastern survey area. Horizon 2 is the base of Unit B and occurs 3 to 74 ft (1 to 23 m) BSB, with the shallowest parts in the north and central portion of the Lease Area and deeper parts scattered throughout the Study Area. The Horizon 2 reflector is negative amplitude reflector, sometimes occurring as a doublet, and is predominantly continuous within the Offshore Project Area (Geo SubSea 2020).

Unit B overlies Unit C for the majority of the Lease Area except for the northwest (landward) portion, where Unit C is absent and instead overlies Unit D. Unit B consists of reworked/disturbed materials in the north and finely stratified/reworked sediments in the south (Geo SubSea 2020).

SEISMIC UNIT DESCRIPTIONS

Units	Horizons	Description
	Seafloor	
A		Reworked/acoustically transparent sediments and channel fill
	H1	
B		Reworked/acoustically transparent sediments and channel fill in northwest; stratified reflectors and channel fill in southeast
	H2	
C		Finely stratified reflectors generally dipping to the southeast; truncated in the northwest by H2; encompasses majority of conspicuous, positive amplitude anomalies
	H2.2	
D		Coarsely stratified reflectors generally dipping to the southeast, somewhat obscured by the seafloor multiple
	H4	
E		Coarsely stratified reflectors, generally dipping to the southeast, interrupted by broad channel features and associated fill
	H5	
F		Coarsely stratified reflectors generally dipping to the southeast with areas of discontinuity/erosional complexity
	H6	

HORIZON SEISMIC SIGNATURES

Horizon	Range TWTT (Seconds)	Description--seismic signatures
Seafloor	0.024-0.054	Peak (positive), continuous, strong amplitude
H1	0.034-0.054	Trough (negative) and peak (positive), discontinuous, variable amplitude
H2	0.039-0.070	Trough (negative), predominantly continuous, some doublet character
H2.2	0.047-0.109	Trough (negative), predominantly continuous, variable amplitude, some triplet character
H4	0.075-0.122	Peak (positive), predominantly continuous, strong amplitude, some doublet character
H5	0.105-0.179	Peak (positive), predominantly continuous, strong amplitude, some doublet character
H6	0.154-0.236	Peak (positive), continuous, strong amplitude

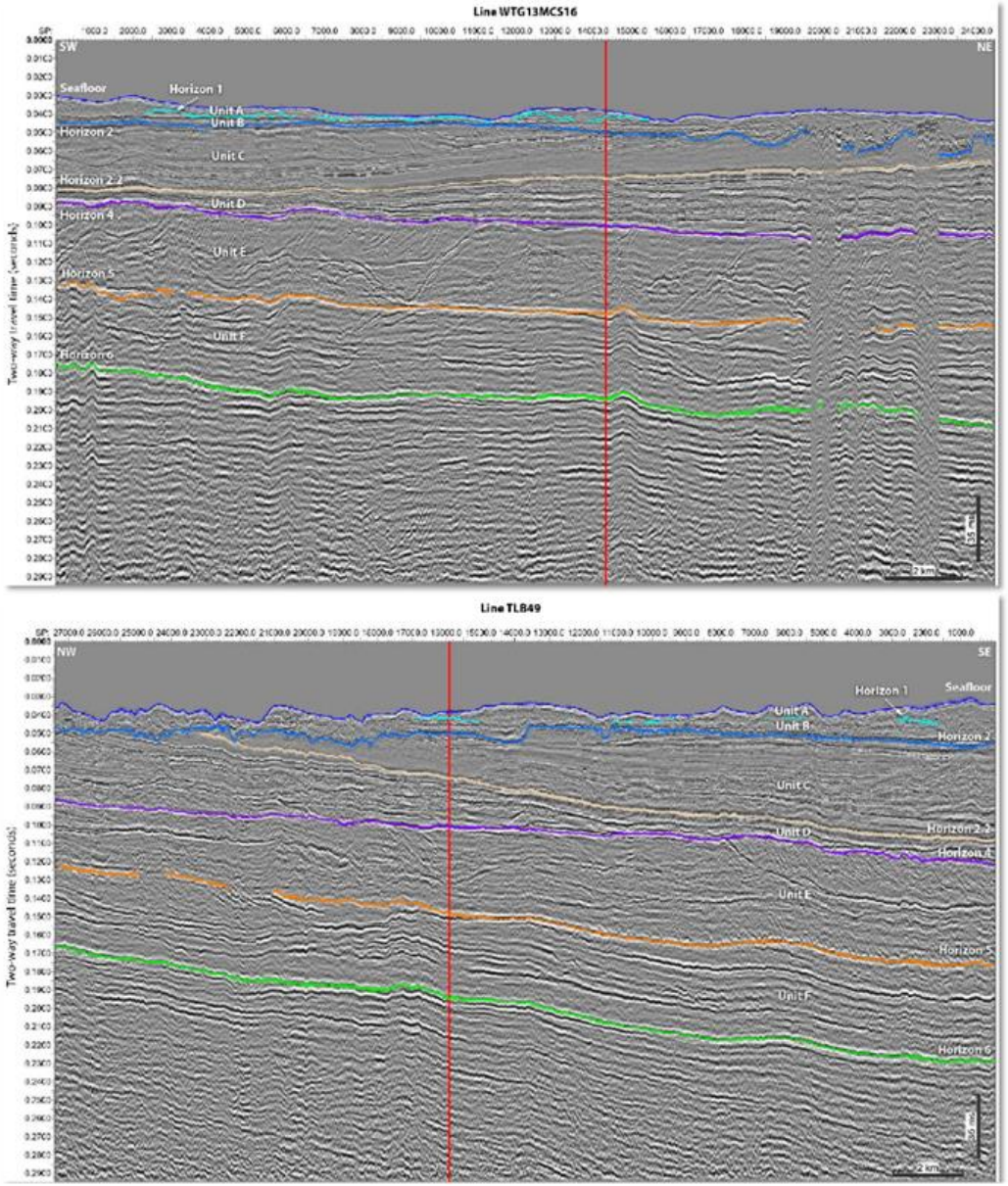

Figure 4.3-6. Summary of Seismic Horizons, Units, and Profiles

This is indicative of partially reworked back barrier sediments associated with marine transgression following subaerial exposure of the middle shelf area. Horizon 2, the lower boundary of Unit B, is interpreted as a subaerial unconformity (Catuneanu et al. 2009) associated with the LGM. As Horizon 2 truncates Units B and C, data indicates this should not be classified as a time-transgressive ravinement surface. Horizon 2 likely corresponds to reflector Q99 identified in Mallinson et al. (2005 and 2010). The complete truncation of Unit C, and likely complete truncation of Unit D further shoreward, suggests that the high-resolution seismic records of Mallinson et al. (2005 and 2010) are compressed with respect to the records because of the lack of the thick C and D units. This is further supported by the work of Thieler et al. (2014), who interpreted the truncation of Q50 (our Horizon 4) by Q99 (our Horizon 2) in the most seaward portion of their A–A profile along the outer shore of Cape Hatteras (Geo SubSea 2020).

Unit A

Unit A is bounded by the seafloor and Horizon 1, and it overlies Unit B. The seafloor horizon is a peak positive reflector with strong, continuous amplitude. The base of Unit A, Horizon 1, is discontinuous and is mainly present in the central, south, and southeastern portions of the Lease Area. The depth of Horizon 1 is variable throughout the Lease Area, ranging from 0 ft (0 m) BSB in the central and eastern portion of the Lease Area to 43 ft (13 m) BSB in the central and southern portions of the Lease Area. Horizon 1 occurs as both a negative and positive reflector with variable amplitudes (Geo SubSea 2020).

Unit A is acoustically transparent and discontinuous in nature, intersecting the seafloor in multiple areas, and disappearing completely in the north/northwestern portions of the Lease Area. Unit A is interpreted as composed of modern, and to some extent, mobile sediments. The lower boundary of Unit A (Horizon 1) is interpreted to be the early Holocene time-transgressive ravinement surface associated with the transition to modern sea level conditions (Fairbanks 1989). Such transitions regularly include the formation and landward migration of barrier island formations, back barrier zones, and transitions of fluvial systems from incising to aggradational. Landforms that might be detected within Unit A include foreshore, shoreface, barrier islands, back barriers, tidal sounds, and estuarine environments including tidal marshes and brackish fluvial systems. The discontinuity of this surface is not surprising given the storm-dominated, hydrodynamic regime of the mid North Atlantic Shelf (Swift et al. 1986; Geo SubSea 2020). Geoarchaeological analysis of sediment samples recovered from boreholes during geotechnical investigations suggests that remnants of these landscapes do survive within the Lease Area, albeit discontinuously.

Sample Collection and Analysis

The overarching goal for the sample collection and analysis process is to inform the development of the probability model for preserved precontact archaeological deposits. To meet this goal, samples acquired during the geotechnical investigations were selected for geoarchaeological analysis based on their potential suitability to retain materials suitable for radiocarbon dating. Samples also were selected based on their potential to aid in paleolandscape reconstruction following sedimentological principles. This was done in parallel to refinement of the ground model developed using HRG surveys.

Sampling Methods

The selected frozen samples were shipped overnight to the QMA for processing. All samples received by the QMA were thawed and portions removed for analysis. Unused portions were re-frozen. Samples selected for grain size analysis were then dried in an oven at 350ºF (177ºC) until fully dried. All samples were visually examined for large lithic materials, shell, and/or macrobotanical materials. If observed, such materials were removed and bagged separately with identification labels.

Selected samples were then subjected to rudimentary grain size analysis, simplified from Folk and Ward (Folk and Ward 1957). Eight-inch (20 cm) screens were used to separate fractions into very coarse sands (0 φ [phi]) and larger, medium to coarse sand (1 φ) and larger, very fine sands (4 φ) and larger, and the silt/clay fraction, represented by grains small enough to pass through the finest mesh to the catch pan. Each separated size fraction was then visually examined again for lithic materials (including micro-debitage), shell, and/or macrobotanical materials that were not apparent during the first visual inspection. A 10x magnifying hand lens was used for this task along with direct lighting. Any additional examples of such materials were extracted and bagged. Each size fraction was then bagged and weighed. Weights were entered into a spreadsheet logging all identifying information, depth in borehole, and interpretation of the landforms represented by the sediments. Samples were assessed against preliminary geotechnical core logs and photographs provided by the geotechnical survey contractor to ensure consistency with prior analysis.

Dating Results and Analysis

Geotechnical surveys (2020/2021) were completed within the Lease Area and Export Cable Route Corridor and to obtain characteristic ranges for relevant geotechnical properties needed for planning and design of offshore foundations and cables. Dominion Energy collected 31 borehole samples in the Lease Area for geoarchaeological analysis during the two years of survey. Eight samples were radiocarbon dead and provided no dates, another five of the samples predate the end of the LGM and the arrival of humans in the Western Hemisphere and another four were dated post end of the LGM but still predated the arrival of humans. Thirteen samples dated to between 16,000 – 11,500 cal BP which corresponds to the Paleoindian Period, and one dated to approximately 10,259-10,051 cal BP which corresponds with the Archaic period.

Table 4.3-5 presents the information gathered from these 31 samples including date when available, analysis of sediments within and located near the sample, analysis of the sample itself including the Multi-Channel Seismic (MCS) seismic data from the borehole location in order to reconstruct the paleolandscape. Calibrated dates before present (cal BP) were determined using Carbon-14/Accelerator Mass Spectrometry (14C AMS) dating.

Table 4.3-5. Archaeological Analysis of Geotechnical Samples

Geotechnical Campaign	Borehole	Sample ID	Depth	Description	Calibrated 14C Accelerator Mass Spectrometry date	Ratio Mass Spectrometry delta 13Carbon (RMS d13C)	Isotope Ratio Mass Spectrometry d18O	Comments
2020 Sampling Results								
GMOP20-G-010	BH-20CB-07-16	PU13	15.5 meters (m)	Bark, unidentified species	Greater than cal BC 44650 (calibrated dates before present [cal BP] 46600)	-26.2 o/oo, depleted, C3 plant	N/A	Evidence for terrestrial surface. No entry in 14C spreadsheet.
GMOP20-G-012	BH-20SB-06-09	PU05-B3	2.8 m	*Mercenaria* spp. and shell hash	Greater than cal BC 44270 (cal BP 46220)	+0.2 o/oo, enriched, marine waters	1.6, enriched	*Mercenaria* spp. fragments, concreted together in mud. *Mercenaria* spp. show signs of marine growth on both sides of the visible valves, indicating exposure to marine waters before burial in estuarine mud/fine sand. Some fragments of other unidentified shell seen. Bag is labeled BH-20SB-06-09 and sample ID is given as PU05-B3, and depth is given as 9.2 feet (ft; 2.8 meters [m]). 14C spreadsheet appears to have this sample located at BH-20SB-06-07 with sample ID as PU05-B2-C-14.
GMOP20-G-012	BH-20SB-06-09	PU06-B3	2.8 m	Shell concretions	Greater than cal BC 44270 (cal BP 46220)	+0.2 o/oo, enriched, marine waters	3.74, enriched	Shell concretions including hash and some larger fragments in mud that likely has a significant component of re-crystallization of calcite (freshwater decalcification of shell materials followed by redeposition).
GMOP20-G-012	BH-20SB-06-09	PU07-B4	5.25	Shell fragments	(95.4%) 45263 - 42752 cal BC (47212 - 44701 cal BP)	+0.8 o/oo, enriched, marine waters	-0.63, depleted in d18O	*Mercenaria* spp. fragments, concreted together in mud. *Mercenaria* spp. show signs of marine on both sides of the visible valves, indicating exposure to marine waters before burial in estuarine mud/fine sand. Some fragments of other unidentified shell seen.
GMOP20-G-012	BH-20SB-07-14	PU26-B2	16.5/4.5	Wood	(95.4%) 16253 - 15907 cal BC (18202 - 17856 cal BP)	-29.4 o/oo, depleted, C4 plant	N/A	Wood fragment, either very tumbled or even possibly human modified. Very rectangular in shape with rounded edges. Evidence for a land surface. Mismatch between borehole # and depth. BH-20SB-10-07 given in 14C spreadsheet at a depth of 14.8 ft (4.5 m). This sample may come from BH-20SB-10-07 based on sample type and surrounding sediments but this is unclear at present; sample to be discussed in detail once this item is resolved.
GMOP20-G-012	BH-20SB-07-16	PU13-B2	15.4 m	Shell, likely oyster (possibly *Crassostrea virginica*)	Greater than cal BC 44270 (cal BP 46220)	+2.0 o/oo, enriched, marine waters	-1.11, depleted	Shell, fragmentary and blackened. Could be pyritized or burned. Interior of shell shows growth of marine organism inside of valve after death. Small rectangular bit of charcoal observed on shell. Shell is delaminated. Interpretation: likely burned.
GMOP20-G-011	BH-20SB-10-07	PU03-BC-C-14	2.8	Wood and other organics	(95.4%) 16021 - 15692 cal BC (17970 - 17641 cal BP)	-25.3 o/oo, depleted, C3 plant	N/A	Sediments are very enriched in organic materials, with some small pebbles in the coarse fraction. All fractions appear to contain organics, and so weights should be considered preliminary and these samples subjected to loss on ignition testing to get percentages of these organics. This sample appears to be a paleosol, probably an upper B horizon in an inceptisol, given the overall context from which it was taken (near or on top of a fluvial point bar). This sample clearly represents a stable land surface that has undergone pedogenesis. It is unclear if the top of the profile has been truncated. However, the abundant organics should provide ample material for radiocarbon dating.
GMOP20-G-012	BH-20SB-10-07	PU03-BC-C-14	3.25	Wood and other organics	(95.4%) 16324 - 15965 cal BC (18273 - 17914 cal BP)	-23.9 o/oo, depleted, C3 plant	N/A	Sediments are very coarse sands with quartz pebbles that are well to very well rounded. Two bark fragments were recovered. Sediments are very dark gray suggesting a high organic content. Coarse particle sizes and dark color of sediments are more consistent with a fluvial point bar landform, possibly an estuarine context. Sediments to be examined for foraminifera.
GMOP20-G-011	BH-20SB-10-07	PU04-BC-C-14	4.7 m	Wood and other organics	Greater than cal BC 44650 (cal BP 46600)	-26.1 o/oo, depleted, C3 plant	N/A	Sediments are coarse to medium sands with quartz pebbles that are well to very well rounded. Small twig fragments were recovered. Sediments are very dark gray suggesting a high organic content. Particle size suggests fluvial channel and not point bar; lower fines and lower gravel/very coarse sands suggests this.
GMOP-20-G-011	BH-20SB-12-01	PU12-B2-C-14	15.6 m	Wood and other organics	(95.4%) 11185 - 11039 cal BC (13134 - 12988 cal BP)	-26.5 o/oo, depleted, C3 plant	N/A	Sediments are dominated by medium to fine sands with some clay. Laminae are observed, including several leaf impressions. Ample wood preserved. Interpretation: lacustrine setting, not fluvial.

Geotechnical Campaign	Borehole	Sample ID	Depth	Description	Calibrated 14C Accelerator Mass Spectrometry date	Ratio Mass Spectrometry delta 13Carbon (RMS d13C)	Isotope Ratio Mass Spectrometry d18O	Comments
2021 Sampling Results								
GMOP20-G-017	BH-21SB_CS17	P07-B2-C14	6	Wood	Greater than 43,500 cal BP	-25.5 o/oo	N/A	Sediments are transitioning from very dark gray clay with traces of fine sand and mica to gray poorly graded sand with gravel.
GMOP20-G-017	BH-21SB-A-G1	P03-B3-C14	5	Wood	(78.0%) 12,192-11,932 cal BP	-26.4 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P02-B3-C14	3	Plant Material	(93.0%) 12,005-11,818 cal BP	-26.2 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P03-B1-C14	4	Plant Material	(94.3%) 12,471-12,041 cal BP	-24.8 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P03-B3-C14 Plant	4	Plant Material	(44.6 %) 10,259-10,051 cal BP	-15.8 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P05-B2-C14 Plant	6	Plant Material	(95.4%) 12,725-12,618 cal BP	-21.2 o/oo	N/A	
GMOP20-G-017	BH-21SB-B-G1	PU07-B2-C14 Plant	9	Plant Material	(95.4 %) 13,112-12,918 cal BP	-24.8 o/oo	N/A	
GMOP20-G-011	BH-20SB-12-01	PU12-B2-C14 Plant	15	Plant Material	(84.9 %) 13,011-12,831 cal BP	-28.3 o/oo	N/A	Sediments consist of soft to firm dark greenish gray clay with some thin laminations of fine sand
GMOP20-G-011	BH-20SB-12-09	PU05-B2-C14 Plant	4	Plant Material	(95.4%) 12,834-12,743 cal BP	-13.6 o/oo	N/A	
GMOP21-G-002	BH-21CB_04-10	PU22-B2-C1-14	20	Wood	Greater than 43,500 cal BP	-25.6 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P03-B3-C14 Organic Sediment	4	Organic Sediment	(95.4 %) 13,599-13,450 cal BP	-24.6 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P05-B2-C14 Organic Sediment	6	Organic Sediment	(95.4%) 13,801-13,601 cal BP	-23.2 o/oo	N/A	
GMOP20-G-017	BH-21SB-B-G1	PU07-B2-C14 Organic Sediment	9	Organic Sediment	(90.9%) 14,229-14,054 cal BP	-22.6 o/oo	N/A	
GMOP20-G-011	BH-20SB-12-01	PU12-B2-C14 Organic Sediment	15	Organic Sediment	(95.4 %) 13,089-12,909 cal BP	-28.6 o/oo	N/A	Sediments consist of soft to firm dark greenish gray clay with some thin laminations of fine sand
GMOP20-G-017	BH-21SB_05-10	P04-B1-C14	3.5	Wood	(95.4%) 31,292 – 31,036 cal BP	-25.8 o/oo	N/A	

Seismic stratigraphy, sedimentology, and radioisotope and stable isotope results all indicated that paleolandscapes capable of supporting human populations were present and may have been preserved within the Project Area. Much earlier in the geological sequence, and prior to ~45,000 cal BP, Units C-F were deposited during early-late Pleistocene sea-level fluctuations associated with glacial episodes. Units D and C likely were deposited during an interstadial climate period when the coastline was not located at the modern high stand shoreline, nor was it as far seaward as the LGM low stand. Ecological conditions inferred from stable isotope data indicate that both nearshore and terrestrial environments formerly were present in the Project Area. Terrestrial floral assemblages likely were composed of a mesic or temperate forest. Fluctuations in marine water temperatures were detected in oxygen isotope records of shallow marine/brackish water shells. Units D or C likely were deposited during MIS 3. Therefore, it is unlikely that humans occupied this region at such an early period.

Following the LGM, Oldest Dryas materials (18,300 – 17,800 cal BP), as well as Bølling-Allerød materials (13,200 – 12,600 cal BP), were recovered from Unit B. Those remains attest to a landscape dominated by C3 plants, likely boreal or mesic forest cover, which then transitioned into a mix of C3/C4 plants, likely in an intertidal flat or marsh area. Sedimentological data are consistent with deposition in low energy environments such as a sluggish stream, pond and/or floodplain. Although the terrestrial surfaces of Oldest Dryas age are far less likely to have included humans, it is not impossible. However, the terrestrial surfaces dating to the Bølling-Allerød climate episode were more likely to have been visited by human groups of the middle Paleoindian Clovis culture.

4.3.1.3 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

The potential impact-producing factors resulting from the construction, O&M and decommissioning of the Project are based on the maximum design scenario from the Project Design Envelope in Chapter 3, Description of Proposed Activity. The maximum vertical depth of effect for marine archaeological and cultural resources is represented by maximum 12-legged piled jacket foundations, whereas the maximum horizontal area of effect is represented by 205 monopile foundations and three jacket foundations with maximum scour protection. Additionally, the maximum design scenario includes the maximum burial depth and width of the installation corridor for the Inter-Array and Offshore Export Cables.

Construction

During construction, the potential impacts to marine archaeological and cultural resources may include

- disturbance to submerged marine archaeological and cultural resources.

Such disturbances may occur as a result of disturbance to the seabed during installation of the Offshore Project Components. Offshore Project Components, which have the potential to disturb submerged resources during installation activities, include the WTG and Offshore Substation Foundations and associated scour protection, as well as installation of the Inter-Array and Offshore Export Cables. Additionally, there is potential for disturbance to submerged marine archaeological and cultural resources from Project equipment, such as the anchoring of installation vessels or the legs of jack-up vessels. Sediment suspension and deposition as a result of cable installation may temporarily settle on the seafloor and further impact submerged marine archaeological and cultural resources. However, suspended

sediments would settle close to the Inter-Array and Offshore Export Cable trenches following cable installation; modeled deposition thicknesses were less than 4 centimeters within 25 m of the trench centerline and less than 0.004 in (0.01 cm) at all stations within 8,202 ft (2,500 m) of the trench centerline (Appendix J, Sediment Transport Analysis). Disturbance to submerged marine archaeological and cultural resources will be avoided to the extent practicable through the analysis of the APE conducted by the QMA and adherence to the resulting recommended avoidance buffers. Disturbance to known resources that cannot practicably be avoided would only occur with appropriate consultations and approvals. Additional archaeological investigation of resources that cannot be avoided may be needed to determine whether they are historic properties and to fully assess Project effects on them. Furthermore, the Dominion Energy would develop and implement an Unanticipated Discoveries Plan to avoid and mitigate impacts to unknown resources.

Operations and Maintenance

During operations, the potential impacts to marine archaeological and cultural resources may include disturbance to submerged marine archaeological and cultural resources.

Such disturbances may occur as a result of seabed disruption during O&M activities within the APE (i.e., activities involving repair vessels anchoring and submarine cable repairs). However, repairs and other future activities will only occur within previously disturbed portions of the APE which have been previously assessed by the QMA, such as the Offshore Export Cable Route Corridor and existing WTG and Offshore Substation locations. Therefore, adherence to the QMA recommended avoidance buffers will still be in effect, and no submerged resources are anticipated to be disturbed by Project O&M.

Decommissioning

Impacts from decommissioning the Project are expected to be similar to or less than those experienced during construction. Therefore, avoidance, minimization, mitigation, and monitoring measures proposed to be implemented during decommissioning are expected to be similar to those experienced during construction, as described above. Decommissioning techniques are expected to advance during the lifetime of the Project. A full decommissioning plan will be provided to the appropriate regulatory agencies for approval prior to decommissioning activities.

4.3.1.4 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy proposes to implement the following measures to avoid, minimize, and mitigate the potential impact-producing factors described above (Table 4.3-6). Dominion Energy would continue discussion and engagement with the appropriate regulatory agencies and stakeholders throughout the life of the Project to develop an adaptive mitigation approach that provides the most flexible and protective mitigation measures.

Table 4.3-6. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Offshore Project Area	Disturbance to submerged marine archaeological and cultural resources	• Dominion Energy will develop a plan to ensure that construction activities adhere to the recommended avoidance buffers. • Disturbance to known resources that cannot practicably be avoided would only occur with appropriate consultations and approvals. • Additional archaeological investigation of resources that cannot be avoided may be needed to determine whether they are historic properties and to fully assess Project effects on them. • Dominion Energy would develop and implement an Unanticipated Discoveries Plan to avoid and mitigate impacts to unknown resources..
Operations and Maintenance	Offshore Project Area	Disturbance to submerged marine archaeological and cultural resources	• Repairs and other future activities will only occur within previously disturbed portions of the APE which have been previously assessed by the QMA. • Adherence to the QMA recommended avoidance buffers would remain in effect during Operations.

4.3.2 Terrestrial Archaeological Resources

This section describes the terrestrial archaeological resources currently known to be present in the Onshore Project Area. Dominion Energy conducted a desktop review of available cultural resources data to identify terrestrial archaeological resources within the Onshore Project Area. The terrestrial archaeological resources survey is ongoing. To date, the Phase IA portion of the Terrestrial Archaeological Resources Assessment (TARA) has been completed and the Phase IB portion of the TARA for properties which Dominion Energy has access permission is ongoing. The TARA report presented in Appendix G of this COP details terrestrial archaeological resources identified by the survey through September 17, 2021, recommendations for NRHP and Virginia Landmarks Register (VLR) eligibility of identified resources, potential impacts to those resources resulting from construction, O&M, and decommissioning stages of the Project, as well as proposed measures and BMPs to avoid, minimize, and/or mitigate potential impacts to terrestrial archaeological resources as necessary. In consultation with BOEM, a Section 106 Phased Identification Plan for cultural resources has been developed that details the process for completing any remaining cultural resources surveys and requirements for the Project. A final TARA will be provided following the completion of the Phase IB survey.

Other assessments and reports detailed within this COP that are related to terrestrial archaeological resources include:

- Terrestrial Archaeological Resource Assessment (Appendix G), and
- Section 106 Phased Identification Plan (Appendix DD).

For the purposes of this section, the Terrestrial Archaeological APE includes the Onshore Project Area and any associated construction ROWs or work areas (as shown in Figure 4.3-7 and described in Section 3.4.2, Onshore Construction and Installation). The APE was designed to include onshore portions of the Project where terrestrial archaeological resources may be subject to direct effects from construction, O&M, and decommissioning of the Project. The APE includes multiple route options and associated facilities currently under consideration. All Onshore Project Components will be subject to terrestrial archaeological investigations unless components are removed from consideration prior to initiating or during the investigations. If components are removed while survey is taking place, any subsurface excavations that have been completed prior to the design change will be included in the analysis and reporting for the Project.

This section draws information from publicly available data, VDHR archives data, and the results of the ongoing Phase IB survey. This section was prepared in accordance with BOEM's site characterization requirements in 30 CFR § 585.626(3), BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (BOEM 2020), Section 106 (36 CFR Part 800) of the National Historic Preservation Act, the Virginia Antiquities Act, and VDHR's *Guidelines for Conducting Historic Resources Survey in Virginia* (VDHR 2011).

4.3.2.1 Research Design

Dominion Energy initiated consultation with the VDHR through the submittal of the Project into the VDHR ePIX system on November 16, 2020 (VDHR File No. 2020-4849). Meetings held to date relative to the TARA are detailed in Table 4.3-7.

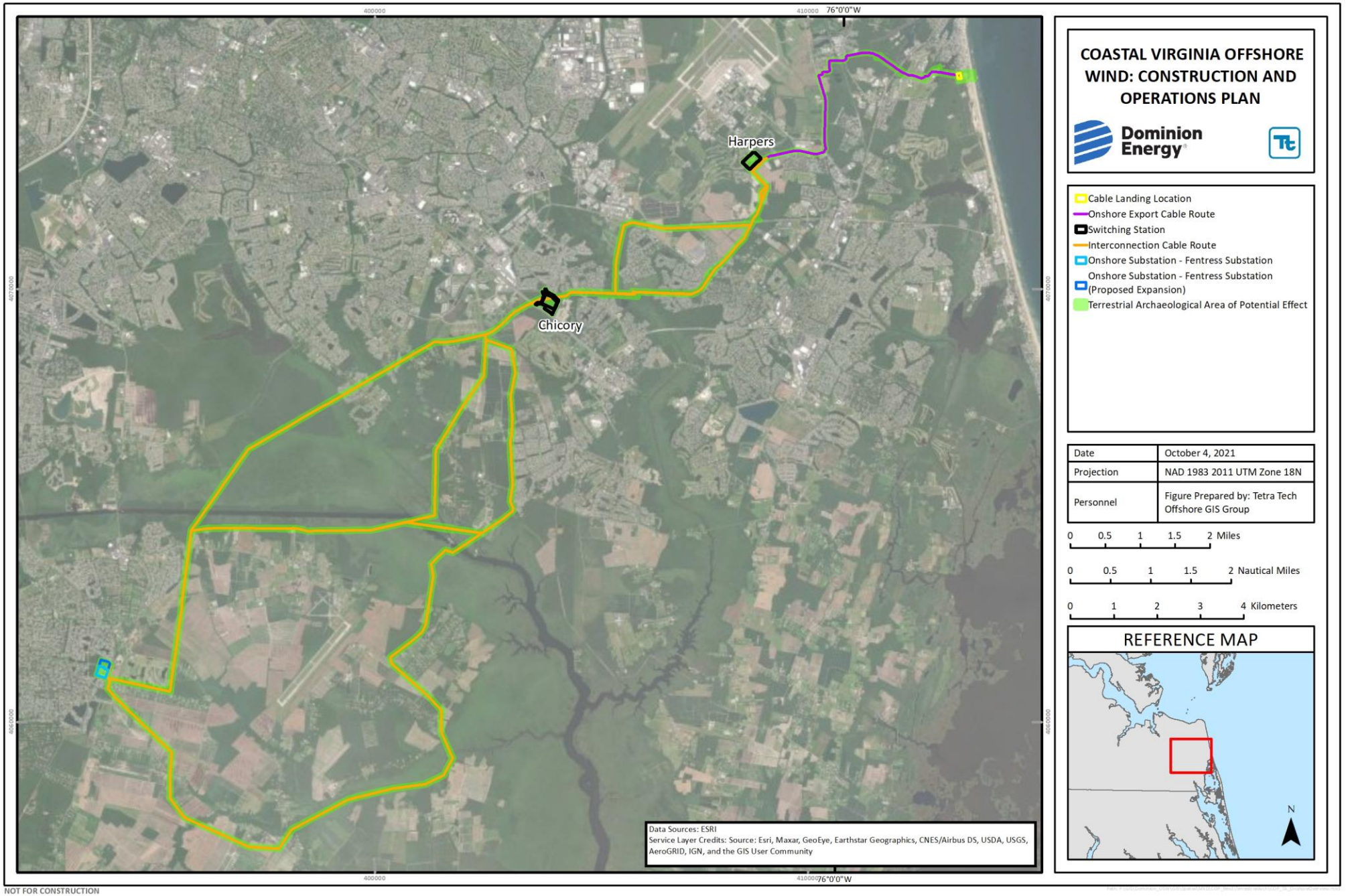

Figure 4.3-7. Terrestrial Archaeological Resources Area of Potential Effects

Table 4.3-7. TARA Consultation Meetings and Communications to Date

Date	Topic	Attendees
Meetings		
December 3, 2020	Cultural Resources Planning Call	BOEM, VDHR, other stakeholders and consultants
January 29, 2021	Terrestrial Archaeology Planning Call	VDHR and consultants
April 15, 2021	Tribal Engagement Groups Meeting	Tribes and consultants
July 16, 2021	Terrestrial Archaeology Planning Call	VDHR and consultants
August 6, 2021	NEPA/SCC Alignment Discussion	BOEM, VDHR and consultants
September 2, 2021	Terrestrial Archaeology Planning Call	BOEM and consultants
September 23, 2021	Terrestrial Archaeology Planning Call	SMR, VDHR and consultants
September 28, 2021	Cultural Resources Planning Call	SMR and consultants
October 6, 2021	Phased Identification Process Document Planning Call	BOEM and consultants
Communications		
April 21, 2021	Applicability of Previous Archaeological Investigations	Tetra Tech, Inc.; VDHR
August 24, 2021	Subsurface Shovel Testing Intervals in Moderate and Low Archaeological Sensitivity Areas	Tetra Tech, Inc.; VDHR

These discussions aided in the development of the TARA Survey Plan (Survey Plan) and methodology for the assessment as well as the Section 106 Phased Identification Plan.

A Survey Plan, which serves as the required VDHR Research Design, was developed for the Project. The Survey Plan was developed in accordance with VDHR guidelines and feedback received during engagement meetings with BOEM, VDHR, and tribes. The Survey Plan was submitted to BOEM and VDHR for review on April 1, 2021. BOEM and VDHR both provided comments on the Survey Plan which were incorporated as appropriate along with additional information based on Project developments and design changes since the original submittal. The revised Survey Plan was submitted to BOEM and VDHR on September 27, 2021. The Survey Plan details the methodology for the TARA including the current Phase I survey and potential future surveys such as Phase II investigation if required.

4.3.2.1 Affected Environment

Terrestrial archaeological resources within the APE may include archaeological sites that date to as early as 15,000 B.C., or pre-contact time periods (also known as prehistoric time periods), and as recently as from around 1600 to 1970 A.D, or contact and post-contact periods (also known as historic time periods, VDHR 2013). Sites may potentially represent a wide range of types, such as small lithic scatters, village sites, Euro-American farmsteads and agricultural sites, nineteenth century tourism-related sites, twentieth century industrial sites, and military coastal defense sites.

Based on regional patterns of pre-contact settlement and land use within southern Virginia, onshore portions of the Project have the potential to contain sites related to the three major pre-contact cultural periods: Paleo-Indian, 15,000 B.C to 8000 B.C.; Archaic, 8000 B.C. to 1200 B.C.; and Woodland, 1200 B.C to 1600 A.D. (VDHR 2013). The environmental setting of the Onshore Project Area, on fairly level terrain near coastal resources and navigable waterways, is ideal for pre-contact resource procurement and settlement. Given their abundance and size, Woodland period sites are considered most likely to be identified within the APE. The APE is also considered sensitive for the potential presence of Archaic and Paleo-Indian period

sites; however, Pleistocene glacial melting, which resulted in sea levels rising throughout the Paleo-Indian and Archaic periods, submerged many coastal sites. As such, the potential for Paleo-Indian and Archaic period sites to be located within coastal portions of the APE is considered lower than that of Woodland period sites.

Through much of the post-contact period (which in this region began in the early 1600s), human use of the Onshore Project Area was largely limited to small-scale agricultural pursuits. Northern portions of historical Princess Anne County supported large-scale plantation agriculture that began to develop in the seventeenth century. The southern part of the county, which includes the APE, remained relatively unsettled because of its poorly drained soils that exhibited low fertility. In addition, the area was inaccessible because it lay beyond navigable portions of the Lynnhaven and Elizabeth rivers (Mansfield 1988).

Coastal resort and urban development in Virginia Beach, to the north of the APE, began in the 1880s. In 1912, major landscape modifications were undertaken in and near the APE during the construction of the State Rifle Range (now SMR). The SMR is listed on the VLR and the NRHP (National Park Service [NPS] Reference Number: 04000852, VLR File No. 134-0413). The VLR and NRHP listed Albemarle and Chesapeake Canal Historic District and the Centreville–Fentress Historic District are also located within or in close proximity to the APE (NPS Reference Number: 04000035, VLR File No. 131-5333; NPS Reference Number: 03000562, VLR File No. 131-5071).

A VDHR archives search determined that 16 previously identified archaeological sites are located within the APE, and 153 previously identified archaeological sites are located within 1 mile of the APE (Table 4.3-8) (VDHR 2021). Four of the 16 sites within the APE are identified as potentially eligible for listing in the NRHP, nine have been determined not eligible for the NRHP, and three have an undetermined NRHP eligibility status.

To date, the Phase I survey has not identified any new archaeological sites or pre-contact artifacts All recovered artifacts date to post-contact time periods and have been typically limited to small deposits of architectural and domestic artifacts such as brick and ceramic fragments. The majority of artifacts do not have diagnostic features. Findings include:

- Three areas of recovered artifacts associated with previously identified archaeological sites. These finds were within the limits of the previously determined boundaries of the sites and excavations did not result in any finds that would extend the sites' boundaries.
- Five isolated finds, consisting of singular artifacts or low-density artifact deposits.
- One post-contact and modern dump area, lacking stratigraphy or context.

4.3.2.2 Schedule

To date, the Phase IA portion of the TARA has been completed and the Phase IB survey has been initiated. The Phase IB portion of the TARA for properties which Dominion Energy has or will gain access permission will continue through 2021-2022. As detailed in the Section 106 Phased Identification Plan, following the SCC onshore route approval in August 2022 Dominion will secure access to any remaining unsurveyed properties. Survey of any remaining parcels is anticipated to be completed by December 2022 and a final TARA report will be submitted by January 2023.

Table 4.3-8. Previously Identified Terrestrial Archaeological Resources within 1 Mile of the APE

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44CS0006	No	—	—	—
44CS0009	No	Camp	Prehistoric/Unknown (15000 B.C.–1606 A.D.)	—
44CS0010	No	—	Prehistoric/Unknown (15000 B.C.–1606 A.D.)	—
44CS0011	No	—	Prehistoric/Unknown (15000 B.C.–1606 A.D.)	—
44CS0012	No	—	Prehistoric/Unknown (15000 B.C.–1606 A.D.)	—
44CS0013	No	—	—	—
44CS0014	Yes	—	Archaic (8500–1201 B.C.)	—
44CS0015	Yes	—	—	—
44CS0016	Yes	—	Archaic (8500–1201 B.C.)	—
44CS0029	No	Camp, base, Cemetery, Dwelling, single	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945)	Potentially Eligible
44CS0034	No	—	—	—
44CS0036	No	Artifact scatter, Other, Well	Early Archaic Period (8500–6501 B.C.), Middle Archaic Period (6500–3001 B.C.), Late Archaic Period (3000–1201 B.C.), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	—
44CS0037	No	—	—	—
44CS0066	No	—	—	—
44CS0116	No	Camp	Prehistoric/Unknown (15000 B.C.–1606 A.D.)	Potentially Eligible
44CS0117	No	Other	19th Century (1800–1899)	Potentially Eligible
44CS0156	Yes	Artifact scatter	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44CS0157	No	Camp, Cemetery, Trash scatter	Prehistoric/Unknown (15000 B.C.–1606 A.D.), 18th Century (1700–1799), 19th Century (1800–1899), 20th Century (1900–1999)	—
44CS0158	No	Farmstead	Historic/Unknown	—
44CS0159	No	Farmstead, Trash scatter	19th Century: 4th quarter (1875–1899), 20th Century (1900–1999)	—
44CS0160	No	Trash scatter	Historic/Unknown, Woodland (1200 B.C.–1606 A.D.)	—
44CS0162	No	Trash scatter	20th Century (1900–1999)	—
44CS0165	No	Artifact scatter, Trash scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44CS0168	No	Cemetery	Historic/Unknown	—
44CS0183	No	Trash scatter	Historic/Unknown	—
44CS0184	No	Trash scatter	20th Century (1900–1999)	—
44CS0185	No	Trash scatter	19th Century: 4th quarter (1875–1899), 20th Century (1900–1999)	—
44CS0186	No	Trash scatter	19th Century: 4th quarter (1875–1899), 20th Century (1900–1999)	—
44CS0190	No	Canal, Other, Store	19th Century (1800–1899), 20th Century (1900–1999)	—
44CS0250	Yes	Camp	Middle Archaic (6500–3001 B.C.), Late Archaic (3000–1201 B.C.)	—
44CS0270	No	Farmstead	20th Century (1900–1999)	Not Eligible
44CS0274	No	Trash scatter	19th Century: 4th quarter (1875–1899), 20th Century: 1st quarter (1900–1924)	—
44CS0349	No	Artifact scatter	Antebellum Period (1830–1860), Civil War (1861–1865)	Not Eligible
44CS0350	No	Artifact scatter	Reconstruction and Growth (1866–1916)	Not Eligible
44CS0351	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945)	Not Eligible
44CS0352	No	Artifact scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945)	Not Eligible
44CS0357	No	Artifact scatter	Pre-Contact, Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44CS0358	No	Artifact scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44CS0364	No	Artifact scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44CS0365	No	Artifact scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0088	No	Trash pit	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945)	—
44VB0124	No	Dwelling, single	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Potentially Eligible
44VB0125	Yes	—	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	—
44VB0126	No	—	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	—
44VB0162	Yes	Camp, temporary, Cemetery	Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606), Early National Period (1790–1829)	Potentially Eligible

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0163	No	Artifact scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0164	No	Artifact scatter, Camp, temporary	Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606), Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829)	Potentially Eligible
44VB0165	No	Artifact scatter, Camp	Paleo-Indian (15000–8501 B.C.E), Middle Archaic Period (6500–3001 B.C.E)	Potentially Eligible
44VB0166	No	Camp, Camp, base, Dwelling, single	Middle Archaic Period (6500–3001 B.C.E), Early National Period (1790–1829)	Potentially Eligible
44VB0167	No	Camp, temporary	Pre-Contact	Not Eligible
44VB0168	No	Artifact scatter, Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0169	No	Camp, temporary	Pre-Contact	Not Eligible
44VB0170	No	Camp, temporary, Other	Pre-Contact, Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0171	No	Dwelling, single	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0172	No	Camp, temporary, Dwelling, single	Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0173	No	Artifact scatter, Camp, temporary	Middle Archaic Period (6500–3001 B.C.E), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0174	No	Artifact scatter, Camp, temporary, Cemetery	Middle Archaic Period (6500–3001 B.C.E), Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0175	Yes	Artifact scatter	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0176	No	Camp, temporary, Farmstead	Late Archaic Period (3000–1201 B.C.E), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Potentially Eligible
44VB0177	No	Artifact scatter, Camp, temporary	Pre-Contact, Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0178	No	Artifact scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0179	No	Camp, temporary, Other	Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0180	No	Artifact scatter, Camp, Cemetery, Trash scatter	Paleo-Indian (15000–8501 B.C.E), Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606)	Potentially Eligible
44VB0181	No	Artifact scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0182	No	Cemetery	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0183	No	Cemetery	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0184	No	Cemetery	Historic/Unknown	Not Eligible
44VB0185	No	Cemetery	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0186	No	Dwelling, single	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0187	No	Other	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0188	No	Artifact scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0189	No	Artifact scatter, Cemetery	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Potentially Eligible
44VB0190	No	Artifact scatter	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860)	Potentially Eligible
44VB0191	Yes	Artifact scatter, Camp	Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0193	No	Farmstead	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Potentially Eligible
44VB0194	No	Farmstead	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0196	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0200	Yes	—	Early National Period (1790–1829), Antebellum Period (1830 –1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	—
44VB0201	No	Artifact scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0203	No	Outbuilding	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0204	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0205	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0206	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0207	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0208	No	Dwelling, single, Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0209	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0210	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	—
44VB0211	No	Trash scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0212	No	Artifact scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0219	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0220	No	Camp	Pre-Contact	—

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0221	No	Camp, Trash scatter	Pre-Contact, Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0222	No	Trash scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0223	No	Camp	Pre-Contact	—
44VB0224	No	Lithic cache	Pre-Contact	—
44VB0225	No	Lithic workshop	Pre-Contact	—
44VB0226	No	Cemetery	Historic/Unknown	—
44VB0227	Yes	Camp, Farmstead, Trash scatter	Middle Woodland (300–999 C.E), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0228	No	Artifact scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0229	No	Artifact scatter	Colony to Nation (1751–1789), Early National Period (1790–1829)	—
44VB0230	No	Trash scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0231	No	Trash scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0249	No	Farmstead	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0250	No	Farmstead, Outbuilding	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0257	No	Farmstead	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860)	Not Eligible
44VB0258	No	Camp, base	Middle Woodland (300–999 A.D.)	Not Eligible
44VB0259	No	Camp, temporary	Early Archaic (8500–6501 B.C.)	Not Eligible
44VB0262	Yes	Farmstead	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860)	Not Eligible
44VB0263	Yes	Artifact scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0264	No	Artifact scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Potentially Eligible
44VB0265	No	Trash scatter	—	Potentially Eligible

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0266	No	Artifact scatter	Pre-Contact, Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0267	Yes	Trash scatter	19th Century: 2nd half (1850–1899), 20th Century: 1st half (1900–1949)	Potentially Eligible
44VB0268	No	—	Historic/Unknown, Early Archaic (8500–6501 B.C.)	Not Eligible
44VB0269	No	Trash scatter	Early National Period (1790–1829), Antebellum Period (1830–1860)	Potentially Eligible
44VB0270	No	Artifact scatter	Paleo-Indian (15000–8501 B.C.E), Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606)	Potentially Eligible
44VB0271	No	Trash scatter	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0272	No	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0273	No	Trash scatter	Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0274	Yes	Artifact scatter, Farmstead	Paleo-Indian (15000–8501 B.C.E), Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606)	Not Eligible
44VB0275	Yes	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Potentially Eligible
44VB0278	No	Farmstead	Prehistoric/Unknown (15000 B.C.–1606 A.D.), 18th Century: 2nd half (1750–1799), 19th Century: 1st half (1800–1849)	Potentially Eligible
44VB0279	No	Camp	Woodland (1200 B.C.–1606 A.D.)	Not Eligible
44VB0280	Yes	Cemetery	Reconstruction and Growth (1866–1916)	Not Eligible
44VB0290	No	Camp	Late Archaic Period (3000–1201 B.C.E)	—
44VB0291	No	Camp	Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E)	—
44VB0292	No	Artifact scatter	Pre-Contact	Not Eligible
44VB0293	No	Artifact scatter	Pre-Contact	Not Eligible
44VB0300	No	Lithic scatter	Pre-Contact	Not Eligible
44VB0301	No	Farmstead	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0306	Yes	Canal	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0307	Yes	Canal	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0310	No	Cemetery	Reconstruction and Growth (1866–1916)	—
44VB0311	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0312	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0313	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0314	Yes	Dwelling, single	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0315	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0316	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0317	No	Dwelling, single	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	—
44VB0318	No	Dwelling, single	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0319	Yes	Dwelling, single	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0320	No	Dwelling, single	Early National Period (1790–1829), Antebellum Period (1830–1860)	Not Eligible
44VB0321	No	Dwelling, single	Early National Period (1790–1829), Antebellum Period (1830–1860)	Not Eligible
44VB0342	No	Cemetery	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	—
44VB0343	No	Other	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0361	Yes	Farmstead	Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0363	No	Dwelling, single	18th Century: 4th quarter (1775–1799), 19th Century: 1st quarter (1800–1825)	Potentially Eligible
44VB0364	No	Dwelling, single	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0365	No	Farmstead	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0370	No	Dwelling, single	18th Century (1700–1799), 19th Century (1800–1899), 20th Century: 1st half (1900–1949)	Not Eligible
44VB0374	No	Artifact scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	—

VDHR ID	Within APE	Site Type	Time Period	NRHP Eligibility Status
44VB0379	No	Farmstead	World War I to World War II (1917–1945)	—
44VB0385	No	Military base/facility	World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0386	No	Military base/facility	World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0387	No	Military base/facility	World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0388	No	Military base/facility	World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0389	No	Lithic scatter, Military base/facility	Pre-Contact, World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0390	Yes	Military base/facility	World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0391	No	Dwelling, single	Reconstruction and Growth (1866–1916)	Not Eligible
44VB0392	Yes	Dwelling, single	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0393	Yes	Dwelling, single	Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0394	No	Lithic scatter, Military base/facility	Pre-Contact, Middle Woodland (300–999 C.E), Late Woodland (1000–1606), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0395	Yes	Lithic scatter, Military base/facility	Pre-Contact, Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0396	Yes	Military base/facility	World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0409	No	Cemetery	Reconstruction and Growth (1866–1916)	—
44VB0430	No	Artifact scatter	Colony to Nation (1751–1789), Early National Period (1790–1829)	—
44VB0431	No	Artifact scatter	Pre-Contact, Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	—
44VB0432	No	Agricultural field	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	—

Source: VDHR 2021

Notes: A.D. – Anno Domini, B.C. – before Christ; C.E. – Common Era
Sites within the APE are shaded gray.

4.3.2.3 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

The impacts of construction, O&M, and decommissioning of the Project on terrestrial archaeological resources will be assessed following completion of the survey and analysis, and submitted in the final TARA report.

4.3.2.4 Summary of Avoidance, Minimization, and Mitigation Measures

Avoidance, minimization, and mitigation measures appropriate for terrestrial archaeological resources will be assessed following completion of the survey and analysis. Dominion Energy is committed to minimizing impacts to cultural resources through the siting, routing, and design process of the Onshore Project Components to the extent practicable. Additionally, Dominion Energy plans to have an Unanticipated Discoveries Plan (Appendix G, Attachment G-3) in place throughout construction, O&M, and decommissioning of the Project.

As detailed in the Section 106 Phased Identification Plan, a summary of avoidance, minimization, and mitigation measures will be assessed following completion of the survey and analysis and submitted in the final TARA report.

4.3.3 Aboveground Historic Resources

This section describes the aboveground historic resources that are currently known to be present in the Onshore Project Area and within the area of potential onshore visibility to the Offshore Project Area. Dominion Energy conducted preliminary desktop aboveground historic resources reviews and aboveground historic resources surveys to identify National Register of Historic Places (NRHP)-listed and NRHP-eligible aboveground historic resources that have the potential to be impacted by the Project. Onshore and Offshore Historic Properties Assessments (Appendix H) were prepared at the conclusion of surveys and data analysis. These reports present all aboveground historic resources, recommendations for NRHP-eligibility of identified resources, potential impacts to resources resulting from construction, O&M, and decommissioning of the Project, and proposed measures and BMPs to avoid, minimize, or mitigate potential impacts to aboveground historic resources, as necessary. Other assessments and reports in this COP related to cultural resources include:

- Visual Resources (Section 4.3.4);
- Section 106 Phased Identification Plan (Appendix DD);
- Historic Properties Assessments (Appendix H); and
- Visual Impact Assessment (Appendix I).

For the purposes of this section, the Aboveground Historic Resources Area of Potential Effect (APE) is divided into two components: the Onshore APE (Figure 4.3-8) and the Offshore Viewshed Study Area and APE (Figure 4.3-9 and Figure 4.3-10). The maximum Onshore APE includes resources within a 1.5 mi (2.4 km) buffer of the Onshore Project Area. The Offshore Viewshed APE includes resources within the current maximum GIS based viewshed envelope that has potential visibility of the Offshore Project Components. The two APEs were designed to capture the maximum number of resources that may experience impacts from the Project. This section draws information from several sources of data, reports, and studies in the assessment of aboveground historic resources. These sources include publicly available data and previous cultural resources studies.

The purpose of the aboveground historic resources' investigations proposed for the Project are to support BOEM in its review of the effects of the Project on historic properties. Historic properties are defined as historic resources listed in, or eligible for listing in, the NRHP (36 CFR § 60.4). This assessment will be completed by BOEM in consultation with the Advisory Council on Historic Preservation, VDHR and the North Carolina State Historic Preservation Office (NCHPO) in their roles as State Historic Preservation Offices (SHPOs), as well as federally recognized Indian Tribes and other interested and consulting parties pursuant to NEPA and the NHPA of 1966, as amended.

Consideration of the effects of both Onshore and Offshore Project Components to historic properties is required under NEPA and NHPA. BOEM under its obligations defined in 30 CFR Part 585, Subpart F, requires an aboveground historic resources investigation to identify and locate historic properties whose integrity may be affected by the Project.

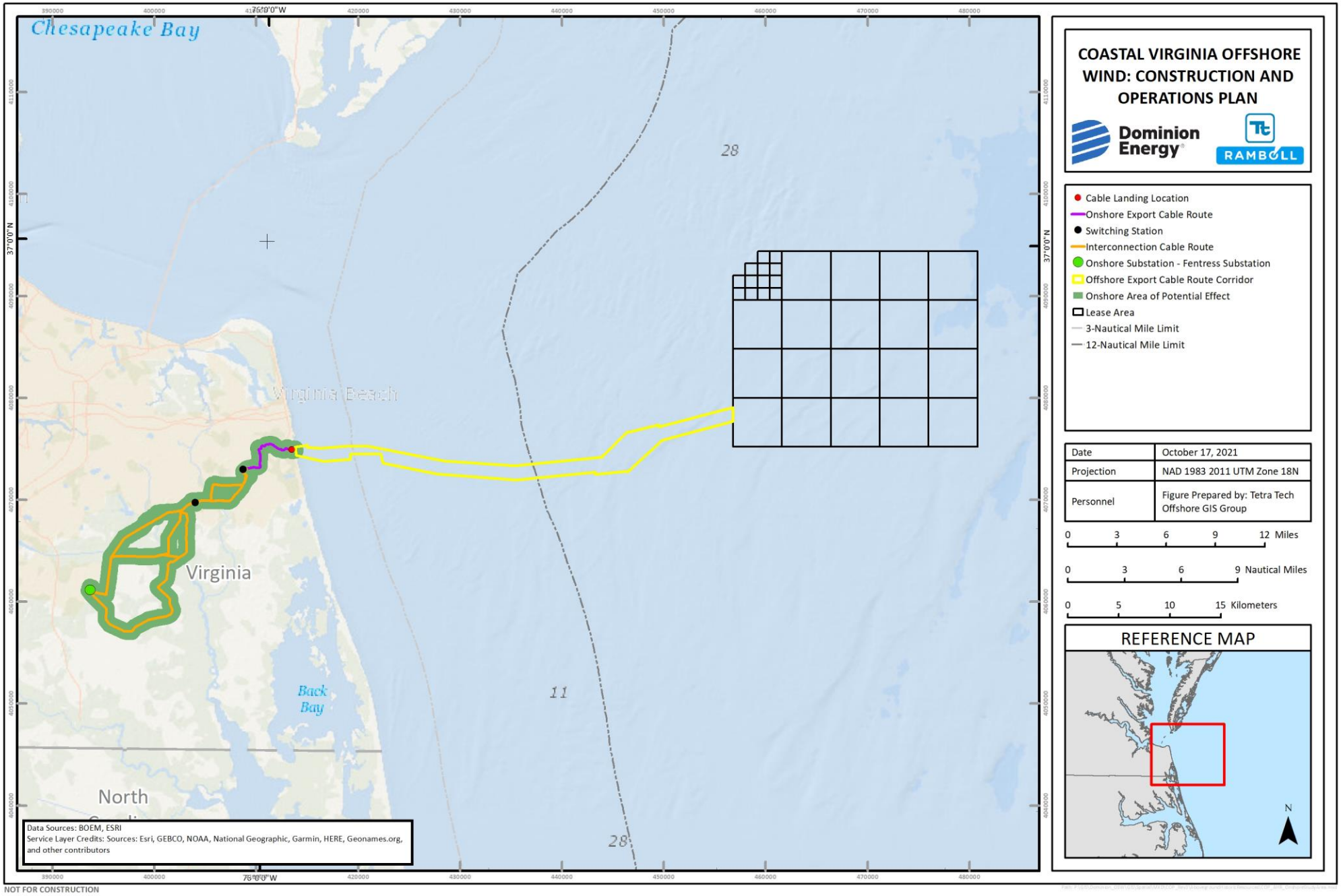

Figure 4.3-8. Aboveground Historic Resources Onshore Area of Potential Effects

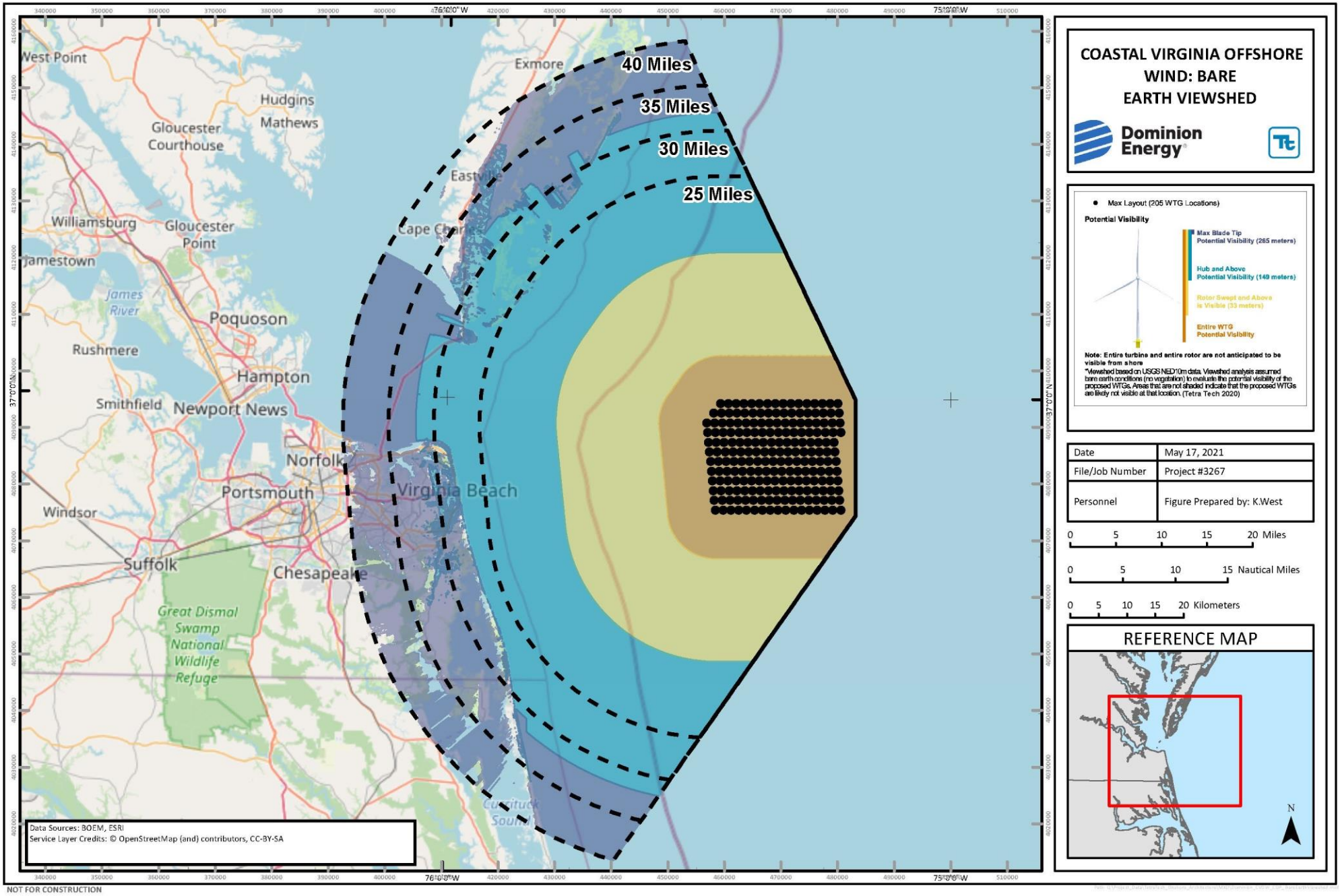

Figure 4.3-9. Aboveground Historic Resources Offshore Study Area

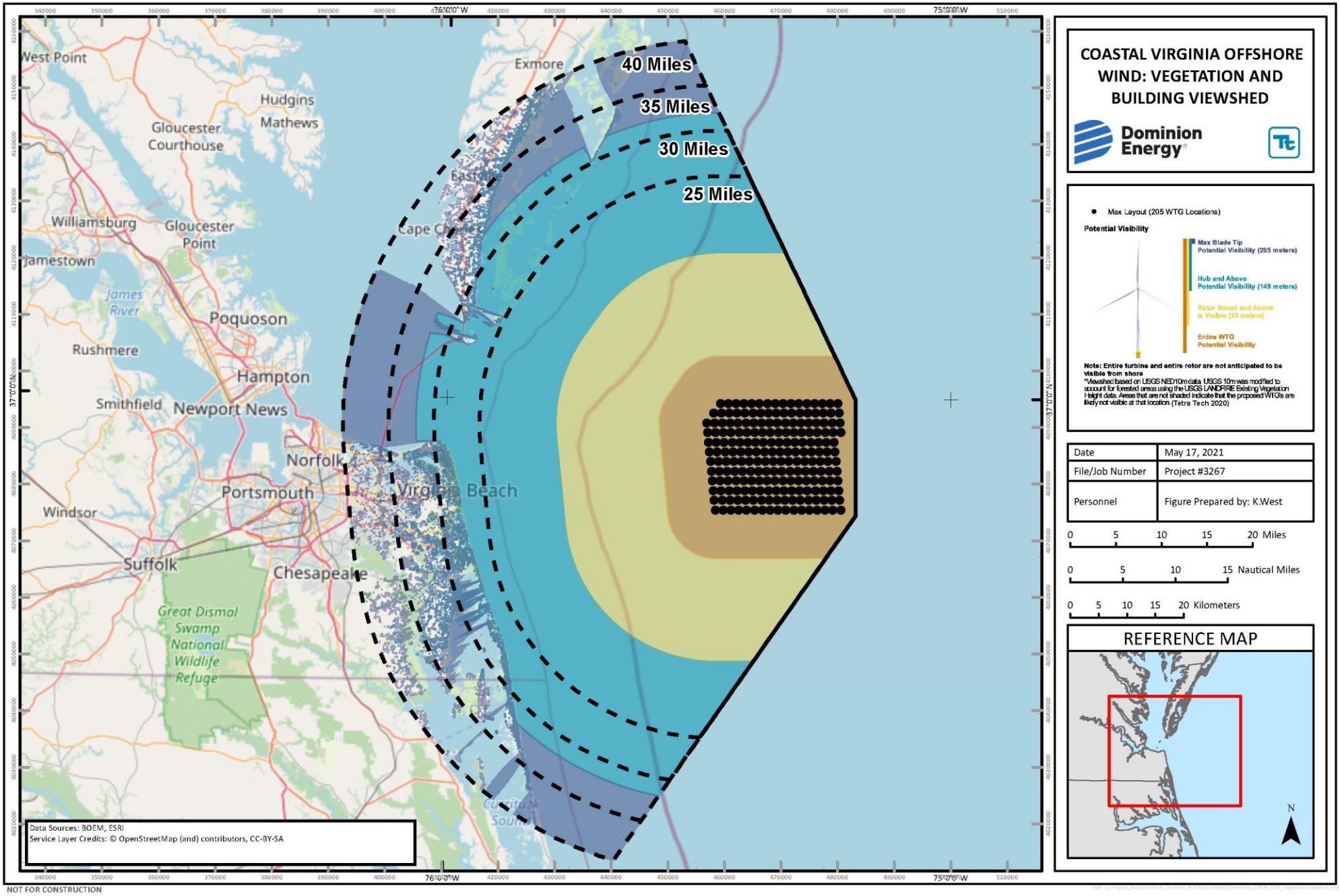

Figure 4.3-10. Aboveground Historic Resources Offshore Viewshed Area of Potential Effects

The aboveground historic resources investigations were completed following the appropriate SHPO standards and guidelines. The VDHR guidance includes *Guidelines for Conducting Historic Resources Surveys in Virginia* (VDHR 2017), *Assessing Visual Effects on Historic Properties* (VDHR 2010), and *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008). The investigation was also informed by BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (BOEM 2020), the North Carolina HPO's *Architectural Survey Manual: Practical Advice for Recording Historic Resources* (NCHPO 2008), the NPS's *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* (NPS 1997), and the NPS's *National Register Bulletin 24: Guidelines for Local Surveys: A Basis for Preservation Planning* (NPS 1985). All work was completed by architectural historians and historians whose professional qualifications meet or exceed those standards established by the Secretary of the Interior for their respective fields (36 CFR Part 61).

4.3.3.1 Affected Environment

Communities within Virginia and North Carolina that are within the areas of potential effects (APEs) for the offshore and onshore assessments include the cities of Virginia Beach, Norfolk, and Chesapeake, Virginia; Virginia's Eastern Shore; and Currituck County, North Carolina. Historic properties within the APEs have the potential to be impacted by construction of Offshore or Onshore Project Components.

Project Components are not anticipated to physically alter historic properties. However, certain components have the potential to introduce new visual and auditory elements that may affect the integrity of setting of historic properties. Integrity is defined as a property's qualities of location, design, setting, materials, workmanship, feeling, and association. Historic properties possess both the qualities of significance and integrity defined in the NRHP Criteria for Evaluation (36 CFR § 60 [a-d]). The integrity of historic and potentially historic properties, those listed in or eligible for listing in the NRHP, can be affected by the introduction of new elements within the landscape that may diminish their significant historic features through loss of integrity. Adverse effects to these properties may include the physical destruction or alteration of a property and the alteration of the important aspects of integrity that qualify it for NRHP consideration.

4.3.3.2 Research Design

The aboveground historic resources investigations were be undertaken through a series of steps, beginning with the establishment of the APE, followed by archival research, field investigation, and reporting.

Establishment of the Area of Potential Effects for the Onshore and Offshore Project Components

This section presents the APEs for the Onshore and Offshore Project Components. The Onshore APE was developed in accordance with the VDHR's *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008) and utilizes buffers established by the VDHR. The Offshore Viewshed APE was developed using a GIS based viewshed analysis. Both APEs have been presented to BOEM and the VDHR in meetings and/or survey plans.

Offshore Viewshed APE

Dominion prepared an Offshore Historic Properties Survey Plan (Offshore Survey Plan) that details the proposed methodology for the identification and assessment of historic properties that may be subject to impacts from Offshore Project Components. The proposed APE presented in the plan was developed using a GIS based viewshed analysis to determine a Study Area that was further reduced to the APE.

The Study Area extends 40 mi (64 km) from the Offshore Project Components. The Study Area was defined using a bare earth method based on a visibility analysis that evaluated the location and maximum height of the WTGs, curvature of the earth, and topography to identify where, and at what distance, the WTGs would be visible, in whole or in part. The Study Area was used to assess the potential visibility of the Offshore Project Components. Mapping illustrates that visibility of the turbines includes limited areas with visibility of the WTG hub and above within 30 miles of the WTGs. The majority of the Study Area contains visibility of the max blade tip of the WTGs located between 30 and 40 miles of the WTGs. There is no visibility of the rotor or entire WTG from land within the Study Area (Figure 4.3-9).

The Study Area was further refined through additional computer modeling and the addition of vegetation layers applying land cover data 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. These data sets imbued the viewshed analysis with greater granular detail. The result of this refined modeling is the APE (Figure 4.3-9).

The APE was presented in the Offshore Viewshed Historic Properties Survey Plan submitted to BOEM on March 4, 2021. BOEM provided comments on the plan to Dominion Energy by email on April 27, 2021. Dominion Energy and BOEM participated in a planning call on May 13, 2021 to review BOEM comments to the Offshore Viewshed Historic Properties Survey Plan, during this meeting a revision to the proposed methodology was discussed and it was determined the methodology would be revised to include previously documented above-ground resources (buildings, structures, landscapes) that have not been formally evaluated for National Register listing to assure a good faith effort to identify historic properties within the APE.

Onshore APE

Dominion prepared an Onshore Aboveground Historic Properties Survey Plan (Onshore Survey Plan) that details the proposed methodology for the identification and assessment of historic properties that may be subject to impacts from the Onshore Project Components. The methodology presented in the Onshore Survey Plan is consistent with the requirements of the VDHR *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008). These guidelines define a two-step process for evaluating impacts on aboveground historic resources for electric transmission line projects subject to the jurisdiction of the SCC. The first step, referred to as a Stage 1 pre-application analysis, consists of desktop review, limited field reconnaissance, and preparation of photosimulations of transmission infrastructure in the viewsheds of select historic properties. The second step, referred to as a Stage 2 survey, consists of a full field survey and evaluation of historic resource impacts after a route is approved by the SCC.

As discussed in the Onshore Survey Plan, Dominion proposed to modify its approach for the Stage 2 study for the Project to include a full field survey of all Interconnection Cable Routes still under consideration at

the time Dominion files its application with the SCC in November 2021. This modified approach will ensure that the BOEM has sufficient information on all routes under consideration by the SCC to support its review of the Project under the NEPA Substitution for NHPA Section 106 process.

For the Stage 1 pre-application analysis, the VDHR guidelines require an analysis of the following:

- National Historic Landmark (NHL) properties within a 1.5-mile radius of route centerlines;
- National Register of Historic Places (NRHP)-listed properties, NHLs, battlefields, and historic landscapes within a 1.0-mile radius of the route centerlines;
- NRHP-eligible and -listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of the route centerlines; and
- All of the above qualifying architectural resources located within the proposed right-of-way for each alternative route.

This is a tool used by the VDHR and SCC to assess impacts on aboveground historic resources in the evaluation of route alternatives.

Under VDHR's guidelines, the Stage 2 survey is designed to provide the information needed to assess effects on historic properties as required under Section 106 of the NHPA. For this analysis, the VDHR's guidelines define the APE for the undertaking as follows:

> The APE for the route options still under consideration will consist of a 0.5-mile buffer on either side of new overhead segments as well as areas immediately adjacent to route segments in which underground line is proposed or where overhead lines will occupy existing right-of-way and will not require removal of vegetation or construction of transmission line structures more than 20 feet or 10 percent taller than those of the existing line (VDHR 2008).

The guidelines require a full survey of the APE for aboveground historic resources, including architectural sites, cemeteries, engineering structures, districts, and landscapes. Dominion's Onshore Survey Plan incorporated all relevant aspects of the VDHR guidelines, including the definition of the APE, and expanded it beyond the single SCC-approved route to apply to all route alternatives under consideration as part of BOEM's NEPA Substitution process.

Dominion submitted the Onshore Survey Plan to BOEM on April 5, 2021. BOEM provided comments on the plan to Dominion Energy by email on April 13, 2021. Dominion Energy submitted comment responses and an updated plan to BOEM by email on April 23, 2021. BOEM responded to Dominion by email on May 4, 2021, approving the revised document and Dominion Energy's comment responses. BOEM's May 4, 2021 email noted that "this concludes our review" of the plan. Dominion submitted the plan to the VDHR on April 5, 2021. The VDHR concurred with the plan in a letter to Dominion dated May 12, 2021.

Archival Research

Archival research was undertaken to identify and to develop a comprehensive inventory of previously identified historic properties and previously identified unevaluated properties within the Study Area. Research was conducted using the State Historic Preservation Office (SHPO) databases, the VDHR Virginia Cultural Resource Information System (VCRIS), NCHPO HPOWEB, and BOEM's *Evaluation of*

Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straights Volumes I and II (Klein et al. 2012a, 2012b). Additionally, the NRHP and NHL registers were consulted. These resources were utilized to identify historic properties eligible or listed through state and federal historic property registers, or designated or considered for designation as NHL, or inventoried on V-CRIS or HPOWEB. The Virginia state register also is known as the VLR. The NCHPO maintains the North Carolina State Register.

The data used in this investigation reflects information available as of February 10, 2021. Forms corresponding to resources were downloaded for reference and logged in Excel databases. The locations of previously identified built resources were incorporated into the Project GIS model, created to manage data for the investigation by geographic location and classification.

Previously Identified Aboveground Historic Resources

Data regarding previously recorded aboveground historic resources within the Offshore Viewshed APE was compiled utilizing multiple sources including:

- VDHR's Virginia Cultural Resource Information System (V-CRIS);
- NCHPO's HPOWeb system;
- BOEM's *Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straights Volumes I and II* (Klein et al. 2012a, 2012b);
- NRHP and NHL databases; and
- Properties considered historic by the City of Virginia Beach.

Seventy-four eligible or listed previously identified historic properties were considered from SHPO databases. Virginia Beach's Oceana Neighborhood Historic District, Virginia Beach Courthouse Village and Municipal Center Historic District, Cavalier Shores Historic District, L & J Gardens Historic District, and the Seatack Historic District are included in this number. Sixteen properties were identified by the BOEM database and overlap with the 74 properties. Forty-three properties listed on the VDHR also are located within the APE. Twenty-four of these properties are not included among the 74 previously identified historic properties recorded in SHPO databases. These 24 properties are considered eligible for the purposes of this Project. Finally, the Old Beach Overlay District also is considered eligible for the purposes of this report. Thus, a total of 99 previously identified resources were considered historic properties for this report.

4.3.3.3 Field Investigations

Systematic reconnaissance surveys for both the Onshore and Offshore APEs were undertaken. Due to the differing guidelines and methodologies for the two surveys, the field methods vary between the two assessments.

Offshore Viewshed APE

Computer modeling of the maximum area of projected on-shore visibility of off-shore Project components was refined through the addition of LiDAR datasets on building height and existing vegetation. Locational data for historic properties and previously identified but unevaluated properties then were integrated into

the visibility model and existing property data were analyzed. Computer modeling and analysis were field verified through progressive reconnaissance-level architectural surveys and additional analysis.

Field survey was undertaken in May 2021 to verify and to document maritime setting and views to the ocean of previously identified historic properties within the APE. Maritime setting is related to resource integrity and is defined as deriving all or some importance from proximity to the ocean or intentionally sited near the water. Data was preloaded into Fulcrum, a digital survey platform, to record the locations of all historic properties within the APE and to document and assess the maritime setting and views to ocean. Surveyors noted the presence or absence of a maritime setting through views to the ocean from the property. Surveyors then photographed the property for reference and the properties' view towards the ocean utilizing National Park Service Photographic Standards. All survey was conducted from the public right-of-way. Photographs were not taken where properties were inaccessible due to road conditions from the public right-of-way. Instead, the maritime setting and views to the ocean were noted in Fulcrum without a photograph. Properties that were inaccessible due to their location within military installations or on isolated beaches were noted and views to the ocean often were ascertained through the analysis of aerial photographs and Google Maps. Historic districts were photographed from the eastern edge of the property to log the closest views to the ocean within the district.

Next, a systematic windshield survey of the APE was undertaken to characterize the types of properties present and to further identify potential viewsheds to the Project. This windshield survey was performed from public rights-of-way. Access to private lands such as military installations was not available. The windshield survey compiled data on the overall physical character of the area including topography, general sequence and type of development, type and orientation of land plans and road networks, building density, and vista points. The windshield survey acted as a reconnaissance survey for previously identified unevaluated properties. The reconnaissance survey served two purposes. First, the survey aided is characterizing the APE including major roadways, development patterns, and types of resources present. Second, the reconnaissance was utilized to define potential views to the ocean for previously identified unevaluated properties in order to further refine and limit the APE.

A systematic field methodology was employed to document the APE. The APE encompasses an area extending approximately 75 miles along the shore and extending approximately 12 miles inland in portions of Virginia and North Carolina due to adopting a conservative modeling approach. A half-mile grid was superimposed on the APE. Each vertex point was labeled by longitude and latitude and assigned a number. Points then were entered into a mobile surveying platform, Fulcrum, which allowed global positioning of all points. Photographs documenting views towards the Project were executed from the public rights-of-way and geo-referenced for future reference. The reconnaissance survey was completed between January 4 and 7, 2021. Surveyors documented visibility from 144 vertex points. Of these, 107 points were in Virginia, and 37 points were in North Carolina.

The reconnaissance survey was used to characterize the APE and identified rural areas on Virginia's Eastern Shore, low-density urban areas in Virginia Beach, and planned communities and rural peninsulas in North Carolina. Systematic field observations of visibility to the ocean were used to refine the APE. A systematic half-mile grid was superimposed over the APE and observations, including 35 mm digital photography, were recorded at each vertex point. Vertex points were photographed along the horizontal axis on the grid

until visibility to the Project no longer was present. The results of this systematic survey then were synthesized to define a refined study area where ocean visibility was present.

Reconnaissance survey found no visibility to the ocean from Virginia's Eastern Shore due to the presence of barrier islands. This conclusion is supported by the findings of the investigation of previously identified historic properties. Visibility to the Project in Virginia Beach is limited to an area much closer to the shoreline than the 12-mile inland APE initially depicted. Visibility also is not present across Virginia Beach's inland bays.

Reconnaissance survey in North Carolina found that visibility to the ocean is limited to portions of the eastern side of the Currituck Sound. Visibility includes the Currituck Beach Lighthouse due to its height, although it is outside the ground-studied area of visibility. Land of the western side of the Currituck Sound has no ocean view due to the obstruction by the eastern side of the sound. A new, refined, field-verified visibility model was created.

The results of the reconnaissance survey provide a refined and field-verified viewshed model for previously identified unevaluated properties. Properties within the refined viewshed model of the APE were included in the analysis of previously identified unevaluated properties. This refined viewshed combining the APE and reconnaissance survey data is referred to as the field-verified viewshed model.

Field survey was undertaken in July 2021 to verify and to document maritime setting and views to the ocean of previously identified unevaluated properties within the area of potential visibility informed by the windshield/reconnaissance survey. This phase of the investigation following the survey methodology utilized for previously identified historic properties.

The reconnaissance survey undertaken served to document a maritime settings and views to the ocean to historic and previously-identified unevaluated properties. This data then was analyzed to identify each property's sensitivity to visual effects: low, moderate, or high. Properties with high sensitivity to visual effects were determined to be potentially adversely affected by the Project's Offshore Project Components due to their character-defining views and relationship to the ocean. Properties possessing a maritime setting and no views to the ocean were evaluated as moderate sensitivity to effects. It was anticipated that moderate sensitivity likely will not result in an adverse effect to the properties' setting due to the lack of integral views to the ocean. Field survey revealed that these properties possessed a maritime setting but lack views to the ocean. Therefore, views to the ocean are not integral to the integrity of setting of the resource. Therefore, there are no potential adverse effects from the construction of the Offshore Project Components. Properties possessing neither a maritime setting nor views to the ocean were determined to possess low sensitivity to visual effects and will not be adversely affected by the Project.

For the purposes of this Project, all unevaluated properties are considered historic. All evaluation and mitigation considered these properties historic. Ninety of the 97 properties with maritime settings and ocean views are located within Virginia Beach, Virginia. One property is located in Accomack County, Virginia; one property is located in Northampton County Virginia; four are in Currituck County, North Carolina; and one is located in both Northampton County and Virginia Beach. These 97 properties have a potentially to be subject to visual effects from the Offshore Project Components.

The 2013 study *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances* (Sullivan et al. 2013) projected the distance from which offshore turbines are visible. The study developed a visibility

rating system corresponding to distance ranging from one to six with one indicating low levels of visibility, and six corresponding with high visibility. The study assigned a rating of three to a distance of 18 miles (29 km) from offshore wind turbines. A three rating denotes that the turbines cannot be viewed by the casual observer. The study also found that moderately sized wind farms can be seen at a maximum distance of 27 miles (44 km) (Sullivan et al. 2013).

A 27-mile buffer was projected from the proposed Offshore Project Components in order to anticipate the maximum visibility radius as projected by the Sullivan study (Figure H.7-1). The addition of the 27-mile maximum visibility radius revealed that 12 historic properties or properties considered NRHP eligible for the purposes of the Project will have both views of the ocean, possess a maritime setting, and have high sensitivity to visual effects. Three lighthouses were added to the list of visible properties due to their size, scale, and locations in relation to the ocean. All of these properties are within the 18-to-27-mile visibility radius defined by Sullivan as not being visible to the casual observer. Due to the limits of visibility to the casual observer within the 18-to-27-mile radius, it is unlikely that the historic setting of the historic properties would be substantially diminished with the exception of the three lighthouses.

A historic property's integrity conveys its significance and is defined by seven aspects: location, design, setting, materials, workmanship, feeling, and association. To retain integrity, a property must exhibit most of the seven aspects (NPS 1995). The aspect of integrity of setting has the potential to be adversely affected by the Project by introducing new, modern visual elements into the viewshed of the ocean. However, the character of views to ocean of these properties have changed over time with advancements in transportation and maritime technology, including designated shipping channels and the introduction of large container ships. The construction of the Project will represent further evolution in this maritime landscape. It is anticipated that the Project will not be visible to the casual observer within the 18-to-27-mile radius and not visible beyond the 27-mile marker from the lower-scale resources. While the Project may impact the aspect of historical integrity associated with setting, it will not diminish the integrity or affect the NRHP-eligibility of the affected resources. Due to the unique design and construction of the lighthouses and their character-defining orientation towards the maritime landscape, changes in their historic setting are anticipated to be adversely impacted.

Onshore APE

The Onshore APE field survey was divided in two stages, correlating with the stages detailed in the VDHR *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008). The Stage 1 pre-application analysis consists of limited field reconnaissance. The Stage 2 survey consists of a full field survey and evaluation of historic resource impacts of the Onshore Project Components still under consideration at the time Dominion Energy files its application with the SCC.

Stage 1

For the Stage 1 survey ERM identified previously recorded NHL properties located within a 1.50-mile radius of the centerline of each alternative under consideration; NRHP-listed properties, locally significant resources, NHLs, battlefields, and historic landscapes within a 1.0-mile radius of each centerline; NRHP-eligible and -listed properties, NHLs, battlefields, and historic landscapes within a 0.50-mile radius of the centerline; and all of the above qualifying architectural resources located within the ROW for each

alternative route. Information on the considered resources in each study tier was collected from the V-CRIS. ERM also collected information from the City of Virginia Beach City Council's Historic and Cultural Overlay Districts (City of Virginia Beach 2017), the Virginia Beach Historical Register (City of Virginia Beach 2018), and the City of Chesapeake's Historic Preservation Commission (City of Chesapeake 2018) to find locally significant resources within a 1.0-mile radius of each centerline. In addition, ERM collected information on battlefields surveyed and assessed by the National Park Service's American Battlefield Protection Program.

Many of the previously recorded cultural resources in the vicinity of the Project have not been assessed for NRHP eligibility, and therefore are not included in the pre-application analysis, per VDHR's guidelines. Such resources are addressed as part of the full historic resource survey (Stage 2), discussed in more detail below.

Along with the records review carried out for the four study tiers as defined by VDHR, ERM also conducted field assessments of the considered aboveground resources for each Project alternative route in accordance with the VDHR guidelines. Digital photographs of each architectural resource and views to the alternative transmission line were taken. Photosimulations were prepared to assess visual impacts on the considered resources within the VDHR-defined tiered study areas for considered resources.

Ten aboveground resources fall within the VDHR tiers for the Onshore Export Cable Route and six Interconnection Cable Route Alternatives under consideration. Since many of the routes substantially overlap, several resources would have the same impact regardless of the selected option.

Stage 2

VDHR's 2008 Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (VDHR 2008) prescribe that a full architectural survey be conducted once an alternative is approved by the SCC. While the Stage 2 survey normally covers only the SCC-approved alternative, because seven routes are still under consideration, the terrestrial architectural study for the Project considered all resources in the defined APE for each route. The purpose of the Stage 2 study was to record all architectural resources 50 years or older, evaluate them for listing on the NRHP, determine project impacts to resources that are eligible for listing on the NRHP, and develop a plan(s) to avoid, minimize, or mitigate adverse effects. If comments are received from the public or other stakeholders regarding impacts to specific resources, these comments will be taken into consideration when developing any necessary treatment plans.

Per VDHR guidance, for the Stage 2 analysis, ERM identified historic resources that could be affected by the Project and described the nature of expected impacts, focusing on historic setting and viewshed of significant resources. Per the VDHR guidance document, the APE was defined in accordance with the nature of the proposed construction for specific segments of the routes, as summarized below:

- For portions of the proposed routes to be constructed within existing ROW, 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 mile on either side of the existing ROW.
- For portions of the routes to be constructed in new ROW, the APE consists of 0.5 mile on either side of the existing ROW.

Survey was also conducted in accordance with a number of guidelines per below:

- Guidelines for Assessing Impacts of Proposed Electrical Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia;
- The approved Coastal Virginia Offshore Wind Commercial Project Onshore Aboveground Historic Properties Survey Plan prepared for the Project;
- OCS Study BOEM 2021-032, Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States (BOEM 2021);
- National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (NPS 1995);
- NHPA Section 106 from 16 U.S.C. § 470f to 54 U.S.C. § 306108; and
- NHPA Section 110(f).

4.3.3.4 Impacts for Construction, Operations and Maintenance, and Decommissioning

The impacts of construction, O&M, and decommissioning of the Project, as described above, are based on the worst-case scenario, as detailed in Section 3, Description of Proposed Activity. The maximum design scenario represents the greatest amount of impacts the Project may have on Historic Properties. Project impacts to onshore historic properties and to recorded but unevaluated properties are anticipated to include visual impacts to maritime settings that are significant to the historical integrity of the resources. The affected resources include three lighthouses.

Mitigation to address adverse effects to historic properties generally is memorialized in binding agreement documents negotiated with the consulting parties in the Section 106 process. Under 36 CFR § 800.6(b)(1)(i), "The agency official shall consult with the SHPO/THPO and other consulting parties to seek ways to avoid, minimize, or mitigate adverse effects." Total avoidance or minimization of the adverse effects to historic properties identified in the current investigation is anticipated to be impracticable owing to the nature, scale, and complexity of the proposed Project WTGs.

Mitigation measures to address residual adverse effects to historic properties are designed to be commensurate with the scope and nature of the adverse effect. Examples of such mitigation may include support for cultural resource survey efforts, NRHP nominations, specialized historic preservation planning initiatives, or historic building rehabilitation.

4.3.3.5 Summary of Avoidance, Minimization, and Mitigation Measures

Mitigation options for consideration in the development of agreement documents to avoid, limit, or mitigate adverse effects to historic properties are summarized in Table 4.3-9.

Table 4.3-9. Historic Properties Mitigation Options.

Mitigation Measure	Description
Support for preparation of NRHP nominations for Chesapeake Beach, Doyletown, and/or Queen City, Virginia Beach	This mitigation option would financially support the development of a NHRP nomination. Virginia Beach has developed a study list of potential NRHP historic districts that warrant further investigation and NRHP nomination.
Support for planning and design studies for the rehabilitation of the St. Teresa's Chapel and/or the 1902 Railroad Station.	Both buildings are candidates for rehabilitation to enable active use. Studies to advance rehabilitation would ensure appropriate treatment of the resources.
Support for the recognition and preservation of historic properties associated with African-American history, including Seatack Elementary School and the Mount Olive Baptist Church.	Preservation and interpretation of historic resources associated with African American communities is a goal of the City of Virginia Beach. Support of the preservation of the buildings associated with the City's African American history would advance this goal.
Support for updating the publication, 50 Most Significant Houses and Structure in Virginia Beach.	The City of Virginia Beach previously issued a publication on historic properties within the City. Supporting an update to the publication would advance historic preservation in the city through increased public awareness.
Support the development of interpretive signs in the Historic Kempsville mini park in the City of Virginia Beach	Interpretative signage would advance public awareness and appreciation of the historic site.
Preservation planning support for 302 22nd Street—the C & P Telephone Building.	Support of a reuse and rehabilitation study for the building would aid in planning for future preservation and use.
Support for the survey and designation of resources associated with underrepresented communities.	The history of previously under- represented groups along with the identification of associated properties will further local historic preservation initiatives
Support for a public lecture series on preservation topics to support regional historic preservation planning objectives.	A lecture series would support public engagement in local preservation and history. Potential lecture topics include technical lectures on historic preservation topics, the early history of Virginia Beach, and historic resources from the recent past to publicize work undertaken to recognize Virginia Beach Oceanfront Resort Motel and Hotels (1955-1970).

4.3.4 Visual Resources

This section describes the visual resources located within and surrounding the Onshore and Offshore Project Areas and potential effects to those visual resources that may result from construction, O&M, and decommissioning of the Project. Measures to avoid, minimize, or mitigate effects to visual resources are also described. Other resources and assessments detailed within this COP related to visual resources include:

- Aboveground Historic Resources (Section 4.3.3);
- Recreation and Tourism (Section 4.4.5);
- Marine Transportation and Navigation (Section 4.4.7);
- Aviation and Radar (Section 4.4.10);
- Historic Properties Assessment (Appendix H); and
- Visual Impact Assessment (Appendix I).

For the purposes of this section, the Project Area described in Section 3, Description of Proposed Activity, and the surrounding areas that have the potential to be impacted by construction, O&M, and decommissioning of the Project, were evaluated as described further below. Visual Study Areas were identified based on locations from which Project Components are likely to be visible and noticeable to the casual observer. The "casual observer" is a viewer who is not actively looking or searching for Project facilities but is otherwise engaged in activities in locations that may have views of the Project. Examples of such activities include fishing from a pier or spending time on the beach.

4.3.4.1 Data Relied Upon and Studies Completed

This section was prepared in accordance with BOEM's *Information Guidelines for a Renewable Energy Construction and Operations Plan* (BOEM 2020), which was in place at the initiation of the analysis. BOEM's new guidance, *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments On the Outer Continental Shelf of the United States*, was released in April 2021 and is being reviewed and discussed with BOEM to determine applicability to the visual analysis (BOEM 2021). A standard inventory and assessment approach that applies elements of the new BOEM guidance, along with elements of the U.S. Bureau of Land Management (BLM) Visual Resource Management (VRM) system, will be implemented in the Visual Impact Assessment that will be completed for the Project. The Project does not occur on or impact land under the jurisdiction of the BLM, but the BLM VRM system is widely used to systematically assess potential visual impacts. The methodology that was implemented for assessment in the Visual Impact Assessment has been modified from the BLM VRM system to address the specifics of offshore wind project development and is described in the Visual Impact Assessment (Appendix I). Elements of the new BOEM guidance (BOEM 2021) were incorporated and include identification of seascape and landscape zones. These zones are described and quantified in acres; scale of change has been incorporated; as well as conclusions on degree of impact that considers contrast, scale of change, variations in impact, impacts on user experiences, and other considerations.

The Visual Impact Assessment was coordinated with Aboveground Historic Properties data and the Historic Properties Assessment (see Section 4.3.3, Aboveground Historic Properties; and Appendix H, Historic

Properties Assessment). The viewshed analysis informed the selection of the aboveground historic resources recommended for evaluation, and some of those resources were evaluated in the Visual Impact Assessment if publicly accessible as representative of that viewer group (see Appendix I, Visual Impact Assessment).

4.3.4.2 Affected Environment

The affected environment is defined as the coastal, inland, and offshore areas where viewers might experience visual effects of the Onshore and Offshore Project Components. The types of viewers present within the Project Area include local residents and workers, travelers, and tourists and recreational users. The types of viewers and associated user groups may experience landscape changes differently based on activity types and viewing characteristics and are further described in the Visual Impact Assessment (Appendix I), including more detail regarding the seascape, landscape, and ocean character.

Offshore Visual Study Area

The Offshore Visual Study Area for the Offshore Project Components consists of a 40 mi (64 km) buffer around the WTGs. The Offshore Visual Study Area was determined based on a visibility analysis that evaluated the location of WTGs, curvature of the earth, and topography to identify where, and at what distance, the WTGs would be visible (see Appendix I, Visual Impact Assessment, for additional information). The Offshore Visual Study Area was used to assess the potential visibility of the Offshore Project Components and evaluate potential effects to visual resources.

Located within the 40 mi (64 km) buffer of the WTGs are the Atlantic Ocean, coastal Virginia and North Carolina, the mouth of Chesapeake Bay, and a portion of the Delmarva Peninsula. Figure I-1-9 of the Visual Impact Assessment shows the Visual Study Area used for the offshore visual analysis.

The ocean area is characterized by large expanses of open water for approximately 25 mi (40 km) or more surrounding the WTGs. The surface of the water varies from smooth and relatively level during calmer weather to undulating and choppy during more turbulent weather conditions. Also varying with weather conditions is the apparent color of the surface of the water, which ranges from blue to silver to dark grey. Existing visual intrusions offshore include buoys, channel markers, marine vessel traffic, the Chesapeake Light Tower, and the two existing WTGs of the CVOW Pilot Project. These features are visible during daytime hours, and safety and warning lights are visible during nighttime hours from certain viewing locations. Air traffic (including nighttime safety lighting on aircraft) arriving and departing from military and civilian airports is also commonly seen in the Offshore Study Area (see Section 4.4.10, Aviation and Radar).

The landward portion of the Offshore Visual Study Area is located along the eastern coastline of Virginia Beach, Virginia, and the Currituck Sound area in North Carolina in the Middle Atlantic Coastal Plain Level III Ecoregion. This ecoregion consists of low-elevation flat plains, with many swamps, marshes, and estuaries. Forest cover in the region is mostly loblolly and some shortleaf pine, with patches of oak, gum, and cypress near major streams (EPA 2013). Agricultural fields are present in the more rural areas south of Virginia Beach and inland.

Cultural modifications that have locally altered the landscape setting include urban development associated with Virginia Beach, Chesapeake, and Portsmouth; coastal tourist and residential areas that include a

boardwalk, hotels, restaurants, and shops along the Virginia Beach shoreline; and military development within the SMR. Local infrastructure modifications include roadways and above-ground electric infrastructure.

Onshore Visual Study Area

The Onshore Visual Study Area includes areas within 5 mi (8 km) of aboveground Onshore Project Components, except for areas where vegetation and structures prevent views of those facilities. The 5-mi (8 km) distance is consistent with the start of the "background" distance zone, as defined in the federal methodologies cited in Section 4.3.4.1. At this distance, individual landscape features become simplified with only large geometric landforms discernible from one another. Large patterns of vegetation and surface conditions are discernible, but textures have smoothed and disappeared and color has flattened. At background distances, individual Onshore Project Components (e.g., Switching Station, Interconnection Cable Route towers, or Onshore Substation) would be indiscernible in most lighting, weather, and atmospheric conditions.

To identify locations where viewers could potentially see the aboveground Onshore Project Components, a GIS viewshed model was prepared for all areas within 5 mi (8 km) of those components. The viewshed model was constructed using a digital elevation model from the National Elevation Dataset (USGS 2019), enhanced to add 30 ft (9 m) of elevation for all building footprints and 50 ft (15 m) of elevation for all forested areas, as identified through the National Land Cover Database (MRLC 2021).

Key Observation Points for Offshore and Onshore Project Components

Key Observation Points (KOPs) are representative locations of viewing areas where viewers could notice a change in the existing landscape setting due to the presence of project facilities and are used to assess visual impacts of a proposed project. In this regard, sensitive viewing locations are typically associated with protected areas, key travel routes, recreation and tourist areas, and residential areas.

Table 4.3-10 lists the KOPs within the Offshore Visual Study Area (located in Virginia and North Carolina).

Table 4.3-10. Key Observation Points (KOPs), Offshore Visual Study Area

Field ID a/	Name	Location	Landscape Similarity Zone	Distance to Nearest Project Component (mi [km])
				14 MW and 16 MW WTG
5	Oyster Village/ Horse Island Trail	Northampton	Rural Coastal Plain	32.6 (52.5)
8	Eastern Shore of Virginia National Wildlife Refuge (Simulation from Wise Point boat ramp)	Northampton	Lower Coastal Plain/Tidewater	28.2 (45.4)
13	(Old) Cape Henry Lighthouse/Fort Story Military Base	Virginia Beach	Industrial	29.1 (46.8)
22	King Neptune Statue/Boardwalk	Virginia Beach	Tourism	27.9 (45)
23	Naval Aviation Monument Park	Virginia Beach	Rural Coastal Plain/ Tourism	27.9 (45)

Field ID a/	Name	Location	Landscape Similarity Zone	Distance to Nearest Project Component (mi [km]) 14 MW and 16 MW WTG
26	Marriott Virginia Beach Oceanfront Hotel	Virginia Beach	Tourism	28 (45)
29	Grommet Island Park/Boardwalk	Virginia Beach	Rural Coastal Plain/Developed Shoreline	27.7 (44.6)
31	Picnic Views on Beach	Virginia Beach	Industrial	27.7 (44.6)
44	Back Bay National Wildlife Refuge (Little Island Park)	Virginia Beach	Historic	26.8 (43.1)
15	North End Beach – Residential View 1	Virginia Beach	Developed	28.1 (45.2)
15	North End Beach – Residential View 1 (Nighttime)	Virginia Beach	Developed	28.1 (45.2)
24a	Virginia Beach Boardwalk – 17th Street Park	Virginia Beach	Rural Coastal Plain/ Tourism	27.8 (44.7)
24b	Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime)	Virginia Beach	Rural Coastal Plain/ Tourism	27.8 (44.7)
24d	Virginia Beach Boardwalk – Fishing Pier	Virginia Beach	Ocean/Open Waters	27.6 (44.4)
30a	Croatan Beach A	Virginia Beach	Low Density Residential	27.7 (44.6)
30c	Croatan Beach C	Virginia Beach	Historic	27.7 (44.6)
48	Currituck Beach Lighthouse	Currituck	Rural Coastal Plain	36.8 (59.2)
47	Currituck National Wildlife Refuge	Currituck	Lower Coastal Plain/Tide Water	34.7 (55.8)
49a	Whale Head Bay Residential View 4	Currituck	Rural Coastal Plain/Developed Shoreline	36.6 (58.9)
49g	Whale Head Bay Albacore Street Entrance – Elevated	Currituck	Rural Coastal Plain/Developed Shoreline	39.1 (62.9)

Note:
a/ Non-sequential Field ID numbers reflect that not all inventoried sensitive locations were carried forward for development of visu al simulations.

Table 4.3-11 lists the KOPs within the Onshore Visual Study Area (all in Virginia).

Table 4.3-11. Key Observation Points, Onshore Visual Study Area

KOP Number	Onshore Project Components	Location	Landscape Similarity Zones
KOP 03	Switching Station	Intersection of Dewey Road and Harpers Road	Transportation Corridor, Agriculture/Open Land, Developed—industrial
KOP 04	Interconnection Cable (Alternative 3)	South side of Dam Neck Road just east of London Bridge Road intersection	Transportation Corridor, Agriculture/Open Land, Developed—commercial
KOP 05	Interconnection Cable (Alternatives 1, 2, 4, and 5)	Median of Kingsland Lane between the existing towers and the new tower locations	Developed—suburban residential

KOP Number	Onshore Project Components	Location	Landscape Similarity Zones
KOP 06	Interconnection Cable (Alternatives 4 and 5)	Kempsville Mennonite Church	Agriculture/Open Land, Developed—suburban residential, Developed—rural residential
KOP 07	Interconnection Cable (Alternatives 4 and 5)	Indian River Road east of North Landing Road, at proposed and existing transmission line crossing	Agriculture/Open Land, Developed—suburban residential, Developed—rural residential
KOP 08a	Interconnection Cable (Alternatives 2, 3, and 4)	North Landing Bridge facing northwest	Forested, Open Water
KOP 08c	Interconnection Cable (Alternative 5)	North Landing Bridge facing southeast	Forested, Open Water
KOP 09	Interconnection Cable (Alternative 5)	South of the intersection of Long Ridge Road and Land of Promise Road	Agriculture/Open Land, Developed—rural residential
KOP 10	Fentress Substation	Median of Fentress Loop Road at substation entrance north of intersection of Meredith Drive	Agriculture/Open Land, Developed—suburban residential
KOP 11	Interconnection Cable (Alternative 1, and Overhead Portion of Hybrid Alternative)	East of parking lot on north side of baseball and soccer fields in Princess Anne Sports Complex	Developed Recreation Area
KOP 12	Interconnection Cable (Alternative 1 and Overhead Portion of Hybrid Alternative)	Salem Road Development, corner of Salem Road and Highland Drive	Agriculture/Open Land, Developed—rural residential
KOP 13	Interconnection Cable (Alternatives 1 and Overhead Portion of Hybrid Alternative)	Highland Parish Development. End of Boarder Way Road (cul-de-sac)	Developed—suburban residential
KOP 14	Interconnection Cable (Alternatives 1 and Overhead Portion of Hybrid Alternative)	Indian River Road, crossing of Route 8 near Dewberry Farm residential subdivision	Suburban Residential
KOP 15	Interconnection Cable (Alternatives 2, 3, and 4)	Intersection of Mt. Pleasant Road and Santoro Way	Agriculture/Open Land
KOP 17	Interconnection Cable (Alternatives 2, 3, and 4)	Mt. Pleasant Road at existing Line 271 crossing	Agriculture/Open Land, Developed—rural residential

4.3.4.3 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

The potential impacts resulting from the construction, O&M, and decommissioning of the Project, as described below, are based on the worst-case scenario as detailed in Section 3, Description of Proposed Activity. The maximum design scenario represents the greatest amount of visual impacts the Project may have on the Preliminary Onshore and Offshore Visual Study Areas.

Construction

During construction, the potential impact-producing factors to visual resources may include construction of the Offshore Project Components, staging activities and assembly of Onshore and Offshore Project Components at applicable facilities or areas, and construction of Onshore Project Components. Dominion

Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction. The following impacts may occur as a consequence of the factors identified above:

- Short-term visual impacts during offshore construction activities; and
- Short-term visual impacts during onshore construction activities.

Short-term visual impacts during offshore construction activities. Short-term visual effects would occur during construction of the Offshore Project Components resulting from construction activities and the presence of vessels used to transport components from fabrication and manufacturing facilities to the Project Area. Vessel traffic is common along the Atlantic Coast, and vessels being used for construction of the Project would be similar to the existing vessel traffic in the area (see Section 4.4.7, Marine Transportation and Navigation, for more information). The duration of this increased vessel traffic is also minimal and is therefore not anticipated to affect the visual quality of the area long term.

Nighttime construction activities are also proposed to occur within the Offshore Project Area. Navigation lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform construction activities within the Lease Area and along the Offshore Export Cable Route Corridor may be visible from coastal vantage points. The vessel and construction lighting would appear similar to that associated with existing marine vessel traffic. The longest duration of nighttime construction activity would occur at a distance of 24 nm (43 km) or more from shore, and any visual effects would be temporary because large vessels and lights necessary to perform construction activities would not be present overnight once construction is complete.

Viewers within the Offshore Visual Study Area would be able to observe marine traffic associated with the Project on a short-term basis during the construction period for Offshore Project Components. It is anticipated the level of change perceived by viewers during the construction period will vary both among locations and over time at a specific location. The degree of change would be greater along the coastline and within elevated areas along the coast, particularly around Virginia Beach and Delmarva Peninsula where vessels will at times be seen in the foreground to middleground (zero to 18 mi [29 km]); the degree of change will lessen as the vessels move farther away from shore. Commercial and recreational vessel traffic is commonly seen within the Study Area. Overall, visual impacts during construction would be temporary, and are expected to be negligible to minor.

Short-term visual impacts during onshore construction activities. Short-term visual effects would occur during construction of the Onshore Project Components resulting from construction activities and the presence of construction equipment and work crews. Construction activities associated with the Onshore Project Components would include surveying; clearing construction areas (of pavement, existing buildings, and/or vegetation, depending on the location); stockpiling topsoil; grading; forming and construction of foundations for outdoor electrical equipment and buildings; placement and erection of buildings, electrical equipment enclosures, cranes, and electrical equipment; placement of security fencing; restoration; and landscaping installation (if required). It is anticipated that impacts would exist primarily for viewers within the Onshore Visual Study Area that have unobscured views toward the Onshore Project Area (see Section 4.3.4.2) where the presence of construction equipment, materials, and crews would be noticeable.

Construction-related visual impacts would be temporary (lasting for the duration of construction activities for a specific Onshore Project Component), and would be similar to the impacts associated with O&M of

each Onshore Project Component, as discussed below. To mitigate onshore visual impacts from the construction stage of the Project, Dominion Energy would implement a Fugitive Dust Plan to minimize dust and visual pollution. The Onshore Project Area would be maintained free of debris, trash, and waste to the extent possible during construction, and areas temporarily disturbed during construction would be restored to the conditions required by state and/or local permits.

Operations and Maintenance

During O&M, the potential impact-producing factors to visual resources may include the presence of aboveground Project Components. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction. The following impacts may occur as a consequence of the factors identified above:

- Long-term visual effects from the presence of Offshore Project Components; and
- Long-term visual effects from the presence of Onshore Project Components.

Long-term visual effects from the presence of Offshore Project Components. Long-term visual effects are expected during the O&M stages of the Project as a result of introducing vertical objects (i.e., WTGs) and Offshore Substations into a landscape setting dominated by open expanses of water and defined by the horizon line. The new WTGs and Offshore Substations would be viewed in context with two existing offshore WTGs, the Chesapeake Light Tower, and marine vessel traffic in the area.

The visual simulations prepared for the Offshore Project Component Visual Impact Assessment analysis depict visibility of the Project from a variety of distances, elevations, atmospheric conditions, times of day, times of year, and site contexts. On a long-term basis during operation of the Project, views of the WTGs would be limited primarily to shoreline areas of the Delmarva Peninsula, Virginia Beach, and the Carova and Carolla Beach areas of North Carolina. The most apparent views of WTGs were found to be within 27 to 28 mi (43.5 to 45.1 km) from the Lease Area, where views are oriented toward the ocean and horizon. Within these areas, beach/shoreline and elevated viewpoints, such as multi-story buildings and/or lighthouses with ocean views, will have the most conspicuous views of the WTGs. As represented by the visual simulations, the foundations and deck of the WTGs would be below the visual horizon and would not be visible for most WTGs from most KOPs. The visible elements (tower, nacelle, and rotors) would be minimally discernable to distinct during the best visibility conditions (a clear, low-humidity day). Atmospheric haze or cloud cover greatly reduces visibility, as weather conditions reduce visual contrast at the horizon. Refer to the Visual Impact Assessment Attachment I-1-5 for visual simulations depicting the offshore components of the Project.

In addition to the variable effects atmospheric/meteorological conditions have on visibility, the quality and direction of the sun as it changes throughout the day would also affect how the WTGs are seen by viewers. Time lapse videos simulating views of the Project from selected KOP locations created for this analysis demonstrate these effects during clear conditions (Visual Impact Assessment Appendix I-1, Attachment I-1-6). During early morning, the turbines would be backlit by the rising sun to the east, and thus relatively more noticeable as darker grey silhouettes against the orange early-morning sky. During dusk and sunset, the western sunlight would briefly catch the light grey surfaces of the WTG's rotors, nacelle, and tower, resulting in the WTGs appearing as light-colored objects in contrast with the darkening sky.

The Offshore Substations are shorter than the WTGs, and there are fewer of them, and so they would likely be less noticeable. The Offshore Substations would appear as small grey blocks near the horizon and would appear similar to large marine vessels. It is anticipated that the Offshore Substations would be imperceptible from coastal viewing locations and likely not visible from most inland locations.

Viewers along the immediate coastline from Delmarva Peninsula to Corolla Beach, North Carolina, will perceive some change to ocean views during perfect viewing conditions, where the visual simulations showing contrast created by the change will vary from negligible to moderate (Appendix I-1, Table I-1-9). Concluding results are given below for Delmarva Peninsula, Virginia Beach, and North Carolina.

Delmarva Peninsula

Eastside shoreline areas on the Delmarva Peninsula will have indistinguishable to faint views of the nacelle (hub), most of the rotor blades, and tops of the towers. Simulations from the Delmarva Peninsula (for example, at Oyster Village/Horse Island Trail) indicate contrast would be weak to none. The very few publicly accessible east-facing shoreline locations on the Peninsula primarily function as boat ramps, so viewers at these locations would likely be focused on that activity and less focused on elements on the distant horizon. Overall, visual impacts to the Delmarva Peninsula would be negligible.

Virginia Beach

In Virginia Beach, viewers on the beach with focused views toward the ocean would experience weak to moderate contrast as they view the WTGs for an extended duration. Beachgoers (e.g., sunbathers), drawn to the beach during clear, sunny weather, may experience relatively greater impacts to their experience because their activity would predominantly place them within view of the Project under optimal viewing conditions. However, weather data shows 90 percent visibility reaching 20 nm (37 km) is limited to just 7.3 percent of summer days (i.e., 6 to 7 days of the season). Viewers enjoying the Virginia Beach Boardwalk would primarily be focused on views to the north or south as they move along the promenade, but could notice the WTGs when they turn to face the ocean directly. Inland elevated views, such as from rooftop restaurants and bars and/or upper story residential units, would experience relatively more conspicuous views of the Project, because the superior position offsets some of the earth curvature screening; therefore, more of the WTGs could be seen. Refer to KOP from a rooftop restaurant on the 23rd floor of the Marriott Virginia Beach Oceanfront Hotel (Attachment I-1-5, pages 16-18). Overall, visual impacts to KOPs in Virginia Beach would be minor to moderate.

North Carolina

In North Carolina, the nearest publicly accessible viewing location would be over 30 mi (48 km) from the nearest WTG, so even under perfect viewing conditions, visibility would be faint. Viewers in the lens room of Currituck Lighthouse may notice the WTGs as faintly contrasting white objects at the horizon, but the degree of change from this distance (38.6 mi [62.1 km]), even from an elevated position, would be slight. Other simulations at Whale Head Bay show the WTGs are imperceptible. Overall, impacts to visual resources in North Carolina would be negligible to minor.

Visual Effects from Nighttime Lighting

Dominion Energy included the effects of nighttime lighting in its visual analyses, in accordance with BOEM guidance. FAA lights will be mounted on the top of each WTG structure and will include two red lights, one on either side of the nacelle, so they are visible to pilots approaching from any direction. The FAA lights will be applicable to both the representative WTGs. The representative WTGs may also require mid-tower lighting, which will consist of three to four red lights, mounted midway between the top of the nacelle, that will flash in unison with the nacelle lights. The need and number of mid-tower lights will be dependent upon FAA requirements as well as the diameter of the tower. The proposed lighting for the Offshore Substations will include lights around the perimeter of each deck level for safety and will be mounted to lightning protection rods. Where visible, the proposed Offshore Substation lighting will be seen in the context of the FAA lights and therefore is not discussed separately.

FAA lights would be visible from locations where the nacelle is visible above the horizon line. A 2013 study prepared for the BLM (Sullivan et al. 2013) found that FAA lights were noted as being visible at a distance of 36.2 miles. It is anticipated that FAA lights would be more visible along the coastline and that most inland views would be screened by vegetation, topography, and/or development. Exceptions include elevated viewing locations, in which case FAA lights would most likely be seen in the context of other light sources such as marine vessels, residential or urban development, streetlights, and vehicle headlights.

The introduction of nighttime lights into the relatively dark setting of the Atlantic Ocean would be most noticeable from the Virginia and North Carolina coasts. Areas around Virginia Beach, Chesapeake Bay, and Delmarva Peninsula have more continuous vessel traffic, and therefore, lighting of WTGs with hub up views may not be as noticeable as areas with darker skies. Areas south of Virginia Beach and North Carolina may have darker skies and the lights may seem more pronounced from these locations. It is anticipated that more contrast would be introduced in areas that are relatively void of human-made light sources, such as beaches and natural areas along barrier islands. However, given that these areas are primarily used during daytime hours and most of the local, state, and federal parks and beaches close at sunset, the number of affected viewers would be limited. In areas where boardwalks and other development parallel beaches, nighttime lighting associated with the Project would be seen in the context of human-made lights such as pedestrian lights along the boardwalk and lights associated with restaurants, hotels, arcades, and other commercial businesses. For rural viewers along the coasts of Virginia and North Carolina, the additional lights would introduce more contrast and may make the WTGs stand out more against the dark sky. Contrast is anticipated to be reduced elsewhere along the coastline as the distance between the mainland and Project Area increases. At greater distances, WTGs in portions of the Project Area would not be visible because the nacelle of some WTGs would fall below the horizon. Visibility at these distances may be reduced or completely obscured by wave action and/or atmospheric conditions, such as haze or fog.

Dominion Energy is considering implementing an Aircraft Detection Lighting System (ADLS) (or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Dominion Energy has conducted an analysis of historical air traffic operations to determine how often the ADLS would activate the obstruction lights for the Project. The ADLS analysis report is included as Appendix T, Obstruction Evaluation and Additional Analysis.

Additionally, the USCG requires navigation lights on all WTGs including three white lights mounted no less than 20 ft (6 m) above mean high water. In addition, flashing yellow SPS lighting will be located on corner towers or significant points on the periphery of the wind farm. Both array and SPS lighting are designed to be visible up to approximately 5 nm (9.2 km). The nearest onshore vantage point is approximately 25 mi (40.2 km) from the Project Area. It is anticipated that USCG navigation lights would not be visible from most viewpoints on land because the lights would fall below the horizon line. Elevated viewpoints in areas such as the lighthouses may have views of the USCG navigation lights, because more of the WTG structures would be visible above the horizon. However, because the lighthouses are closed at night the numbers of affected viewers would be limited. In addition, since USCG navigation lights are designed to be visible up to 5 nm (9 km), it is anticipated that these lights would be relatively inconspicuous to onshore viewers (BOEM 2007). On a clear night, it is anticipated that the WTG lights would create moderate contrast with the dark skies.

Long-term visual effects from the presence of Onshore Project Components. During O&M, the potential impact-producing factors to visual resources may include the presence of aboveground Onshore Project Components. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction.

Long-term visual effects during O&M of the aboveground Onshore Project Components would result from the visibility of the aboveground components associated with the Onshore Substation, Switching Station, and Interconnection Cable Route, including outside electrical equipment, static masts, perimeter security fence, and aboveground interconnection cables and transmission towers.

Appendix I, Visual Impact Assessment, provides a detailed discussion of the visual impacts of the aboveground Onshore Project Components. Overall, the Onshore Project Components would introduce new, visible transmission infrastructure in predominantly undeveloped rural forested or agricultural areas, as well as through some suburban residential areas from (and including) the Harpers Switching Station to the Fentress Substation. The human-made transmission structures would be visually contrasting modern elements with strong vertical and horizontal linear elements, smooth surfaces, and brown (weathering steel) or black (conductors) colors.

These structures would contrast with the predominantly rough, green, irregular pattern of agricultural and forest areas, as well as the flat, rectangular light-colored character of residential areas. Due to this contrast and the height and mass of the transmission towers, the Project's structures would be noticeable if not dominant features in most views, especially close views (i.e., KOPs 12 and 17).

Most viewers would be local residents or commuters traveling on public roads. These viewers—especially local residents—would likely be sensitive to visual changes such as those observed at the KOPs associated with Alternative 1. Viewers would likely be more sensitive to change along segments of Alternative 1 that are not collocated with existing transmission lines (i.e., KOPs 3 and 12 through 14). Viewers in more developed commercial or non-residential locations (i.e., KOP 11) would likely be less sensitive to visual changes.

To mitigate onshore impacts from the O&M of the Project, Dominion Energy would evaluate vegetative buffers to help screen views of the Onshore Substation and Switching Stations and design the lighting of

the Onshore Substation and Switching Station to reduce light pollution where feasible (e.g., downward lighting, motion-detecting sensors).

Decommissioning

Decommissioning activities would be similar to construction activities, but in reverse, and would occur over a shorter period of time than initial construction. Once the Onshore and Offshore Project Components are removed, the visual character of the Project area would return to baseline conditions. The Onshore Project Components, the regrowth of trees in previously forested areas used for the Project's aboveground facilities and Interconnection Cable Corridors would occur over a period of decades. A full decommissioning plan will be provided to the appropriate regulatory agencies for approval prior to any decommissioning activities, and potential impacts would be re-evaluated at that time.

4.3.4.4 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy proposes to implement the following measures to avoid, minimize, and/or mitigate the potential impact-producing factors described (Table 4.3-12). Dominion Energy would continue discussion and engagement with the appropriate regulatory agencies and environmental non-governmental organizations throughout the life of the Project to develop an adaptive mitigation approach that provides the most flexible and protective mitigation measures.

Table 4.3-12. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and/or Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term visual impacts during offshore construction activities Short-term visual impacts during onshore construction activities	• Dominion Energy would implement a Fugitive Dust Plan to minimize dust and visual pollution. The Onshore Project Area would be maintained free of debris, trash, and waste to the extent possible during construction, and areas temporarily disturbed during construction would be restored to the conditions required by state and/or local permits.
Operations and Maintenance	Onshore Project Area	Long-term visual effects from the presence of Onshore Project Components	• Dominion Energy would evaluate vegetative screening to help screen views of the Onshore Substation and Switching Station and design the lighting of the Onshore Substation and Switching Station to reduce light pollution where feasible (e.g., downward lighting, motion-detecting sensors).